The Illustrated Dictionary of Electronics
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Preface

The Illustrated Dictionary of Electronics—8th Edition has been revised, clarified, and updated, reflecting technological advances of recent years. New definitions have been added in the fields of wireless technology, robotics, and artificial intelligence. Every effort has been made to be concise and accurate, without "talking down" to the reader.

Many definitions contain cross references (indicated in ALL CAPITALS); these provide recommended additional information or allow comparison with related terms. Expressions of special significance are printed in italics. Electronics abbreviations are included in the text; the full terms are stated as definitions.

While an effort has been made to avoid superfluous mathematics, equations are sometimes necessary to completely and effectively define a term. Mathematics beyond the high-school level has not been used.

Appendix A contains the standard symbols used in electrical and electronic diagrams. These symbols are used in illustrations throughout this dictionary. Appendix B contains the following data tables:

1. Conversion between electrical systems
2. Greek alphabet
3. Mathematical functions and operations
4. Prefix multipliers
5. Resistor color code

Suggestions for future editions are welcome.

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Editor-in-Chief

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Abbe condenser 1. In microscopy, a special two-piece lens that has enhanced light-gathering power. 2. A similar focusing device in an electromagnetic antenna.

abbreviated dialing In telephone systems, special circuits requiring fewer-than-normal dialing operations to connect subscribers.

abc 1. Abbreviation of AUTOMATIC BASS COMPENSATION, a system for boosting the volume of bass sounds at low amplifier gain. 2. Abbreviation of AUTOMATIC BIAS CONTROL. 3. Abbreviation of AUTOMATIC BRIGHTNESS CONTROL. 4. Abbreviation of AUTOMATIC BRIGHTNESS COMPENSATION.

abcoulomb The unit of electrical quantity in the cgs electromagnetic system. One abcoulomb equals 10 coulombs and is the quantity of electricity that flows past any point in a circuit in one second when the current is one abampere.

abfarad The unit of capacitance in the cgs electromagnetic system. One abfarad equals 10⁻⁹ farads and is the capacitance across which a charge of 1 abcoulomb produces a potential of 1 abvolt.

abhenry The unit of inductance in the cgs electromagnetic system. One abhenry equals 10⁻⁹ henry.
and is the inductance across which a current that changes at the rate of 1 ampere per second produces a potential difference of 1 volt. ABL. Abbreviation of Automated Biology Laboratory (NASA).

abmh The obsolete unit of conductance and of conductivity in the cgs electromagnetic system. Replaced with ABSIEMENS.

abnormal dissipation Power dissipation higher or lower than the customary level, usually an overload.

abnormal oscillation 1. Oscillation where none is desired or expected, as in an amplifier. 2. Oscillation at two or more frequencies simultaneously when single-frequency operation is expected. 3. Oscillation at an incorrect frequency. 4. Parasitic oscillation.

abnormal propagation 1. The chance shifting of the normal path of a radio wave, as by displacement in the ionosphere, so that reception is degraded. 2. Unintentional radiation of energy from some point other than the transmitting antenna. 3. Propagation over a path or in a direction not expected.

abnormal reflections Sharp, intense reflections at frequencies higher than the critical frequency of the ionosphere's ionized layer.

abnormal termination The shutdown of a running computer program or other process. Caused by the detection of an error by the associated hardware that indicates that some ongoing series of actions cannot be executed correctly.

abnormal triggering The false triggering or switching of a circuit or device, such as a flip-flop, by some undesirable source instead of the true trigger signal. Such noise pulses often cause abnormal triggering.

abohm The unit of resistance and of resistivity in the cgs electromagnetic system. One abohm equals 10^9 ohms and is the resistance across which a steady current of 1 abampere produces a potential difference of 1 abvolt.

absolute A temperature scale in which zero represents the complete absence of heat. Units of measurement are same as units on Celsius and Fahrenheit scales. See ABSOLUTE SCALE.

absolute accuracy The full-scale accuracy of a meter with respect to a primary (absolute) standard.

absolute address In a digital computer program, the location of a word in memory, as opposed to the location of the word in the program.

absolute code A computer code in which the exact address is given for storing or locating the reference operand.

absolute coding In computer practice, coding that uses absolute addresses.

absolute constant A mathematical constant that has the same value wherever it is used.

absolute error The difference between a measured value and the true value. This difference is positive when the approximate value is higher than the exact value, and is negative when the approximate value is lower than the exact value. Compare RELATIVE ERROR.

absolute gain Antenna gain for a given orientation when the reference antenna is isolated in space and has no main axis of propagation.

absolute humidity The mass of water vapor per unit volume of air. Compare RELATIVE HUMIDITY.

absolute instrument A computer instruction that states explicitly and causes the execution of a specific operation.

absolute magnitude For a complex number quantity, the vector sum of the real and imaginary components (i.e., the square root of the sum of the squares of these components). Also see ABSOLUTE VALUE and IMPEDANCE.

absolute maximum rating The highest value a quantity can have before malfunction or damage occurs.

absolute maximum supply voltage The highest supply voltage that can be applied to a circuit without permanently altering its characteristics.

absolute measurement of current Measurement of a current directly in terms of defining quantities. 1. TANGENT GALVANOMETER method: Current is proportional to the tangent of the angle of deflection of the needle of this instrument. Deflection depends on torque, resulting from the magnetic field produced by current in the galvanometer coil acting against the horizontal component of the earth’s magnetic field. 2. ELECTRODYNAMOMETER method: With this 2-terminal instrument, current is determined from the observed deflection, the torque of the suspension fiber of the movable coil, and the coil dimensions.

absolute measurement of voltage Measurement of a voltage directly in terms of defining quantities. 1. CALORIMETRIC method: A current-carrying coil immersed in water raises the temperature of the water. The difference of potential that forces the current through the coil that has been determined in terms of the equivalent heat energy. 2. Disk-electrometer method: In this setup, a metal disk attached to one end of a balance beam is attracted by a stationary disk mounted below it, the voltage being applied to the two disks. The other end of the beam carries a pan into which accurate weights are placed. At balance, the voltage is determined in terms of the weights required to restore balance, the upper disk area, and the disk separation.

absolute minimum resistance The resistance between the output terminal of a potentiometer, when the wiper is as close to that terminal as physically possible. All potentiometers have two such specifications, one for each terminal.
absolute units Fundamental physical units (see ABSOLUTE SYSTEM OF UNITS) from which all others are derived. See, for example, AMPERE, OHM, VOLT, and WATT.

absolute value The magnitude of a quantity without regard to the second direction. The absolute value of a is written |a|. The absolute value of a positive number is the number itself; thus, |10| equals 10. The absolute value of a negative number is the number with its sign changed: |−10| equals 10.

absolute-value circuit A circuit that produces a unipolar signal in response to a bipolar input and in proportion to the absolute value of the magnitude of the input.

absolute-value computer A computer in which data is processed in its absolute form; i.e., every variable maintains its full value. (Compare to INCREMENTAL COMPUTER.)

absolute-value device In computer practice, a device that delivers a constant-polarity output signal equal in amplitude to that of the input signal. Thus, the output signal always has the same sign.

absolute zero The temperature −273.16°C (−459.67°F and 0 K). The coldest possible temperature, representing the complete absence of heat energy.

absorbed wave A radio wave that dissipates in the ionosphere as a result of molecular agitation. This effect is most pronounced at low and medium frequencies.

absorptance The amount of radiant energy absorbed in a material, equal to 1 minus the transmittance.

absorption The taking up of one material or medium by another into itself, as by sucking or soaking up. Also, the retention of one medium (or a part of it) by another medium, through which the first one attempts to pass. See, for example, ABSORBED WAVE, ABSORPTION COEFFICIENT, DIELECTRIC ABSORPTION. Compare ABSORPTION.

absorption band See ABSORPTION SPECTRUM.

absorption circuit A circuit that absorbs energy from another circuit or from a signal source—usually a resonant circuit, such as a wavemeter or wavetrap.

absorption current In a capacitor, the current resulting from absorption of energy by the dielectric material.

absorption dynamometer A power-measuring instrument in which a brake absorbs energy from a revolving shaft or wheel.

absorption fading Fading of a radio wave, resulting from (usually) slow changes in the absorption of the wave in the line of propagation.

absorption frequency meter See WAVEMETER.

absorption loss 1. Transmission loss caused by dissipation of electrical energy, or conversion of it into heat or other forms of energy. 2. Loss of all or part of a skywave because of absorption by the ionosphere. Also called ionospheric absorption or atmospheric absorption.

absorption marker A small blip introduced onto an oscilloscope trace to indicate a frequency point. It is so called because it is produced by the action of a frequency-calibrated tuned trap, similar to an absorption wavemeter.

absorption modulation Amplitude modulation of a transmitter or oscillator by means of an audio-frequency-activated absorber circuit. In its simplest form, the modulator consists of a few turns of wire coupled to the transmitter tank coil and connected to a carbon microphone. The arrangement absorbs energy from the transmitter at a varying rate as the microphone changes its resistance in accordance with the sound waves it receives.

absorption modulation absorption spectrum For electromagnetic waves, a plot of absorption coefficient (of the medium of propagation) versus frequency. Also called EMISSION SPECTRUM.

absorption trap See WAVETRAP.

absorption wavemeter A resonant-frequency indicating instrument that is inductively coupled to the device under test.

acceleration voltage The unit of potential difference in the egs electromagnetic system. One abvolt equals 10⁴ V and is the difference of potential between any two points when 1 erg of work is required to move 1 abscoulomb of electricity between them.

acceleration voltage The unit of power in the egs electromagnetic system. One abvolt equals 10⁻⁷ W and is the power corresponding to 1 erg of work per second.

ac 1. Abbreviation of ALTERNATING CURRENT. 2. Abbreviation of ATTITUDE CONTROL. 3. Abbreviation of AERODYNAMIC CENTER. 4. A suffix meaning AUTOMATIC CALCULATOR or AUTOMATIC COMPUTER.

ac-c 1. Abbreviation of AIRCRAFT. 2. Abbreviation of AIR CONDITIONING.

AC Symbol for ACTINIUM.

ACA Abbreviation of automatic circuit analyzer.

ac base voltage Symbol, Vbase. The ac component of base voltage in a bipolar transistor. It is the ac input signal voltage in a common-emitter amplifier or emitter-follower amplifier.

ac bias In a tape recorder, the high-frequency current that passes through the recording head to limit tape operation.

ac 1. Abbreviation of AUTOMATIC CHROMATICITY CONTROL. 2. Abbreviation of AUTOMATIC COLOR COMPENSATION. 3. Abbreviation of ACCELERATION.

ac cathode current Symbol, Ic. The ac component of cathode current in an electron tube.

ac cathode resistance Symbol, R secular. The dynamic base resistance in a bipolar transistor.

ac base voltage Symbol, Vbase. The ac component of base voltage in a bipolar transistor. It is the ac input signal voltage in a common-emitter amplifier or emitter-follower amplifier.

ac cathode voltage Symbol, Vc. The ac component of cathode voltage in an electron tube. It is the ac output signal voltage in cathode-followers and cathode-coupled amplifiers.

accelerated life test A test program that simulates the effects of time on devices or apparatus, by artificially speeding up the aging process.

accelerated service test A service or bench test in which a signal source or a circuit is subjected to an extreme condition in an attempt to simulate the effects of average use over a long time.

accelerating conductor or relay A conductor or relay that prompts the operation of a succeeding device in a starting mode according to established conditions.

accelerating electrode In a cathode-ray tube or klystron, the electrode to which the accelerating voltage is applied.

accelerating time The elapsed time that starts when voltage is applied to a motor, and ends when the motor shaft reaches maximum speed.

accelerating voltage A positive high voltage applied to the accelerating electrode of a cathode-ray tube to increase the velocity of electrons in the beam.

acceleration at stall The angular acceleration of a servomotor at stall, determined from the stall torque and the moment of inertia of the motor’s rotor.

acceleration derivative Acceleration (d) expressed in terms of the second derivative of distance (s) with respect to time (t): a = ds²/dt².

acceleration potential See ACCELERATING VOLTAGE.

acceleration switch A switch that operates automatically when the acceleration of a body to which it is attached exceeds a predetermined rate in a given direction.

acceleration time The time required by a computer to take in or deliver information after interpreting instructions. Compare ACCESS TIME.

acceleration torque During the accelerating period of a motor, the difference between the torque demanded and the torque actually produced by the motor.

acceleration voltage The potential between accelerating elements in a vacuum tube, the value of which determines average electron velocity.

accelerometer A transducer whose output voltage is proportional to the acceleration of the moving body to which it is attached.

acclentuation The emphasis of a desired band of frequencies, usually in the audio-frequency spectrum.

absolute-value A-B test A test program that simulates the effects of time on devices or apparatus, by artificially speeding up the aging process.
accentuator A circuit or device, such as a filter, tone control, or equalizer, used to emphasize a band of frequencies, usually in the audio-frequency spectrum. Also see ACCENTUATION.

acceptable-environmental-range test A test to disclose all conditions that equipment can endure while maintaining at least the minimum performance.

acceptable quality level Abbreviation, AQL. A percentage that represents an acceptable average of defective components allowable for a process, or the lowest quality that a supplier is permitted to regularly present for acceptance.

acceptance sampling plan A probabilistic method of sampling a quantity of units from a lot, and determining from the sample whether to accept the lot, reject the lot, or perform another sampling.

acceptance test A test performed on incoming equipment or on submitted samples to determine if they meet tester's or supplier's specifications.

acceptor 1. Any device or circuit, such as a series-resonant circuit, that provides relatively easy transmission of a signal, in effect accepting the signal. 2. A hole-rich impurity added to a semiconductor to make the latter p-type. It is so called because its holes can accept electrons. Compare DONOR.

acceptor circuit See ACCEPTOR, 1.

acceptor impurity See ACCEPTOR, 2.

access 1. To gain entrance to something, such as the interior of the cabinet of a high-fidelity amplifier. 2. In a computer, the action of going to a specific memory location for the purpose of data retrieval. 3. A port or opening into a piece of equipment, placed there to make the equipment easy to maintain and repair.

access arm A mechanical device that positions the read/write mechanism in a computer storage unit.

access control register A register that is part of a computer protection system that prevents interference between different software modules.

access method A method of transferring information or data from main storage to an input/output unit.

access right The access status given to computer users that indicates the method of access permitted (e.g., read a file only or write to a file).

access time The time required by a computer to begin delivering information after the memory or storage has been interrogated.

accidental error An unintentional error committed by a person making measurements and recording data.

accidental darkening The undesired chance-operation of a flip-flop or other switching circuit caused by a noise pulse or other extraneous signal.

ac collector voltage Symbol, \( V_{cc} \). The ac component of collector voltage in a bipolar transistor.

ac collector resistance Symbol, \( R_{cc} \). The dynamic collector resistance of a bipolar transistor.

ac coupling Transformer coupling or capacitive coupling, which transmit ac, but not dc. Compare DIRECT COUPLING.

ac current Symbol, \( I_{ac} \). The component of current in a bipolar transistor.

ac emitter voltage \( V_{e} \) equals \( dV_{ce}/dt \), for a constant value of base current \( I_{b} \) (in a common-emitter circuit) or emitter current \( I_{e} \) (in a common-base circuit) or collector voltage \( V_{ce} \) (in a common-emitter circuit).

ac emitter resistance Symbol, \( R_{e} \). The dynamic emitter resistance in a bipolar transistor.

ac emitter current \( I_{e} \) equals \( dI_{e}/dt \), for a constant value of base current \( I_{b} \) (in an emitter-follower circuit) or collector current \( I_{c} \) (in an emitter-follower circuit).

ac equipment An apparatus designed for operation from an ac power source only. Compare DC EQUIPMENT and AC/DC.

ac erasing In tape recording, the technique of using an erasing magnet to erase material already recorded on the tape.

ac erasing head Also called ac erase head. In tape and wire recording, a head that carries alternating current to erase material already recorded on the tape or wire. Also see AC ERASING.

acetate Cellulose acetate, a tough thermoplastic material that is an acetic acid ester of cellulose. It is used as a dielectric and in the manufacture of photographic films.

acetate film The cellulose acetate film that serves as the base for the magnetic oxide coating in early recording tape. Most such tapes today are of polyester base. The cellulose acetate substrate onto which certain photosensitive materials are deposited for lithographic reproduction. Also see ACETATE AND ANCHORAGÉ.

acetate tape Recording tape consisting of a magnetic oxide coating on a cellulose acetate film. Also see ACETATE BASE.

ac coupling Transformer coupling or capacitive coupling, which transmit ac, but not dc. Compare DIRECT COUPLING.

ac coupling \( R_{cc} \) equals \( dV_{cc}/dt \), for a constant value of base current \( I_{b} \) (in a common-emitter circuit) or emitter current \( I_{e} \) (in a common-base circuit) or collector voltage \( V_{cc} \) (in a common-emitter circuit).

ac current Abbreviation of ALTERNATING CURRENT.

AC Bias Abbreviation for Association for Computing Machinery.

ac magnetic bias See AC BIAS.
ac meter  A meter that is intended to work only on alternating current or voltage. Such meters include iron-vane and rectifier types.

ac noise  1. Electromagnetic interference originating in the ac power lines. 2. Electrical noise of a rapidly alternating or pulsating nature.

ac noise immunity  In computer practice, the ability of a logic circuit to maintain its state, despite excitation by ac noise.

acous  Abbreviation for ACOUSTIC.

acoustic  Pertaining to audible sound disturbances, usually in air (versus audio-frequency currents or voltages).

acoustic absorption  The assimilation of energy from sound waves passing through or reflected by a given medium.

acoustic absorption loss  That portion of sound energy lost (as by dissipation in the form of heat) because of ACOUSTIC ABSORPTION.

acoustic absorptivity  The ratio of sound energy absorbed by a material to sound energy striking the surface of the material.

acoustic attenuation constant  The real-number component of the complex acoustic propagation constant, expressed in nepers per unit distance.

acoustic burglar alarm  An alarm that receives the noise made by an intruder. The alarm device responds to the impulses from concealed microphones.

acoustic capacitance  The acoustic equivalent of electrical capacitance.

acoustic clarifier  In a loudspeaker system, a set of cones attached to the baffle that vibrate to absorb and suppress sound energy during loud bursts.

acoustic communication  Communications by means of sound waves. This can be through the atmosphere, or it can be through solids or liquids, such as a taut wire, a body of water, or the earth.

acoustic compliance  COMPLIANCE in acoustic transducers, especially loudspeakers. It is equivalent to electrical capacitive reactance.

acoustic concordance  An effect that occurs when two objects are near each other but not in physical contact, and that is related harmonically or acoustically.

acoustic coupler  A device that produces sound waves of a desired frequency and/or intensity. Examples are electrical devices (headphones or loudspeakers operated from a suitable oscillator, buzzer, bell, or flame) and mechanical devices (tuning forks, bells, string, or whistles).

acoustic damping  The deadening or reduction of the vibration of a body to eliminate (or cause it to die out quickly) sound waves arising from it.

acoustic delay line  Any equivalent of a special transmission line that introduces a useful time delay between input and output signals. In one form, it consists of a crystal block or bar with an input transducer at one end and an output transducer at the other. An electrical input signal in the first transducer sets up sound waves that travel through the interior of the crystal; the piezoelectric reaction of the crystal to sound vibrations sets up an output voltage in the second transducer. The delay is caused by the time required for the acoustic energy to travel the length of the crystal bar.

acoustic depth finder  A direct-reading device for determining the depth of a body of water, or for locating underwater objects via sonic or ultrasonic waves transmitted downward and reflected back to the instrument.

acoustic dispersion  Variation of the velocity of sound waves, depending on their frequency.

acoustic electric transducer  Acoustic radiator

acoustic electric transducer  A transducer, such as a microphone, to which a tiny piece of crystal is affixed, that converts sound energy into electrical energy. Compare ELECTRICAL-ACOUSTIC TRANSUDER.

acoustic feedback  A usually undesirable effect that occurs when sound waves from a loudspeaker (or other reproducer) reach a microphone (or other input transducer) in the same system. This can cause an amplifier to oscillate with a resultant rumbling, howling, or whistling.

acoustic filter  Any sound-absorbing or transmitting arrangement, or combination of the two, that transmits sound waves of desired frequency while attenuating or eliminating others.

acoustic frequency response  The sound-frequency range as a function of sound intensity. A means of describing the performance of an acoustic device.

acoustic generator  A device that produces sound waves of a desired frequency and/or intensity. Examples are electrical devices (headphones or loudspeakers operated from a suitable oscillator, buzzer, bell, or flame) and mechanical devices (tuning forks, bells, string, or whistles).

acoustic grating  A set of bars or slits that are parallel to one another and arranged a fixed distance apart so that an interference pattern forms as sound waves pass through. Used to determine the wavelength of acoustic waves.

acoustic homing system  1. A system that uses a sound signal for guidance purposes. 2. A guidance method in which a missile homes in on noise generated by a target.

acoustic horn  A tapered tube (round or rectangular, but generally funnel-shaped) that directs sound away from the source, amplifies it. So called to distinguish it from a microwave horn.

acoustic bow  See ACOUSTIC FEEDBACK.

acoustic input  1. A person skilled in acoustics (an acoustician) 2. An AUDIOLOGIST.

acoustic impedance  Unit, ACOUSTIC OHM. The acoustic equivalent of electrical impedance. Like the latter, acoustic impedance is the total opposition encountered by acoustic force. Also like electrical impedance, acoustic impedance has resistive and reactive components: ACOUSTIC RESISTANCE and ACOUSTIC REACTANCE.

acoustic inductance  Also called inductance. The acoustic equivalent of electrical inductance.

acoustic inertia  See ACOUSTIC INERTANCE.

acoustic inhibition  See AUDITORY INHIBITION.

acoustic impedance  The acoustic equivalent of electrical impedance. Like the latter, acoustic impedance is the total opposition encountered by acoustic force. Also like electrical impedance, acoustic impedance has resistive and reactive components: ACOUSTIC RESISTANCE and ACOUSTIC REACTANCE.

acoustic inductance  Also called inductance. The acoustic equivalent of electrical inductance.

acoustic line  An instrument that evaluates the frequency and velocity of sound waves in a liquid or gas, in terms of a standing wave set up by a transducer and reflector as the frequency or pressure changes. The reflector is a second transducer that is sensitive to sound waves of desired frequency while attenuating or eliminating others.

acoustic line  Any equivalent of a special transmission line that introduces a useful time delay between input and output signals. In one form, it consists of a crystal block or bar with an input transducer at one end and an output transducer at the other. An electrical input signal in the first transducer sets up sound waves that travel through the interior of the crystal; the piezoelectric reaction of the crystal to sound vibrations sets up an output voltage in the second transducer. The delay is caused by the time required for the acoustic energy to travel the length of the crystal bar.

acoustic loudspeaker  A device that produces sound waves of a desired frequency and/or intensity. Examples are electrical devices (headphones or loudspeakers operated from a suitable oscillator, buzzer, bell, or flame) and mechanical devices (tuning forks, bells, string, or whistles).

acoustic mirror  A type of sound distortion in which the listener experiences the illusion of two sound sources when there is only one. The phenomenon is caused by the effect of a large temperature gradient in the air or water through which the sound passes.

acoustic mode  A device that emits sound waves. Examples are the cone of a loudspeaker, the diaphragm of a headphone, and the vibrating reed of a buzzer.

acoustic noise  Interferential (usually disagreeable) sounds carried by the air or other propagation medium to the ear or to an acoustic transducer. This is in contrast to external noise, which consists of extraneous current or voltage impulses and is insurable until converted into sound.

acoustic ohm  The unit of acoustic, resonance, reactance, or impedance. One acoustic ohm equals the volume velocity of 1 cm/s produced by a sound pressure of 1 microbar (0.1 Pa). Also called acoustical ohm.

acoustic phase constant  The imaginary-number component of the complex acoustic propagation constant expressed in radians per second or radians per unit distance.

acoustic phase inverter  A device that serves simultaneously as the output load of an amplifier and as a transducer of electrical energy into acoustic energy (e.g., headphones or a loudspeaker).

acoustic memba  In a computer, a volatile memory element employing an acoustic delay line, often incorporating quartz or mercury as the transmission and delay element.

acoustic mirror  A device that emits sound waves. Examples are the cone of a loudspeaker, the diaphragm of a headphone, and the vibrating reed of a buzzer.

acoustic line  A device that emits sound waves. Examples are the cone of a loudspeaker, the diaphragm of a headphone, and the vibrating reed of a buzzer.

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acoustic line  A device that emits sound waves. Examples are the cone of a loudspeaker, the diaphragm of a headphone, and the vibrating reed of a buzzer.
acoustic radiator • active chord mechanism 11

10 acoustic radiometer • ac plate resistance

acoustic radiator. An instrument for measuring the intensity of a sound wave (see SOUND INTENSITY) in terms of the unidirectional steady-state pressure exerted at a boundary as a result of absorption or reflection of the wave. It is used as an ACOUSTIC OHM. The imaginary-number component of ACOUSTIC IMPEDANCE. It can take the form of ACOUSTIC CAPACITANCE or ACOUSTIC INDUCTANCE. See ACOUSTIC FEEDBACK, acoustic resistance. Unit, ACOUSTIC OHM. The real-number component of ACOUSTIC IMPEDANCE. The opposing force that causes acoustic energy to be dissipated in the form of heat. It is attributed to molecular friction in the medium through which sound waves pass. See ACOUSTIC OHM.

acoustic resonant. In an enclosed chamber with walls that reflect sound waves, resonance that occurs at certain wavelengths because the echoes combine in and out of phase. Speaker enclosures almost always have resonance at certain frequencies. This effect can be used to an advantage when it is desired to produce high-fidelity low-frequency response from a relatively small speaker.

acoustic resonator. 1. A chamber, such as a box, cylinder, or pipe, in which an air column resonates at a particular frequency. 2. A piezoelectric, magnetic, or electrostatic body that vibrates at a resonant frequency that is governed by the mechanical dimensions of the body when an audio voltage at that frequency is applied.

acoustic scattering. The spreading of a sound wave in many directions as a result of diffraction, refraction, reflection, or refraction.

acoustic suspension. A loudspeaker design that allows exceptional low-frequency reproduction for a fairly small physical size. An air gap is used to increase the tension on the cone.

acoustic system. 1. A coordinated array of acoustic components (e.g., acoustic filters, resonators, etc.) that responds to sound energy in a predetermined manner. 2. An audio-frequency system in which sound energy is converted into electrical energy, processed, and then reconverted into sound energy for a clearly defined purpose.

acoustic telegraph. A telegraph that gives audible signals, as opposed to visual signals or printed messages.

acoustic transducer. 1. Any device, such as head-phones or a loudspeaker, for converting audio-frequency electrical signals into sound waves. 2. Any device, such as a microphone, for converting sound waves into alternating, pulsating, or fluctuating currents.

acoustic transmission. The direct transmission of sound energy without the intermediary of electric currents.

acoustic transmission system. A set of components designed to generate acoustic waves.

acoustic transmissivity. Also called acoustic transparency. The ratio $\frac{I_{ac}}{I_{ac}}$ where $I_{ac}$ is the incident sound energy reaching the surface of the medium. Acoustic transmissivity is proportional to the angle of incidence.

acoustic treatment. Any arrangement of sound-absorbing materials to the interior of an enclosure or room to control reverberation.

acoustic wave. The traveling vibration, consisting of molecular motion, which sounds or is transmitted through a gas, liquid, or solid. Usually refers to sound waves in air.

acoustic wave filter. See ACOUSTIC FILTER.

acoustic-electric effect. The generation of a voltage across the faces of a crystal by sound waves traveling along the surface of a piezoelectric chip and generating electrical energy. Also called piezoelectricity and piezoelectricity.

dipole current. Symbol, $I_{dipole}$. The ac component of plate current in a diode tube.

plate current. Symbol, $I_{plate}$. The total plate current of an electron tube. $I_{plate}$ equals $I_d + I_C$, where $I_d$ is the plate voltage and $I_C$ is the plate current, for a constant value for grid voltage $V_g$.

power. Symbol, $P$. Unit, watt (W). The power output of an ac circuit $P_{ac}$ equals $E_{ac} I_{ac}$ where $E_{ac}$ is in volts, $I_{ac}$ is in amperes, and $P_{ac}$ is the phase angle and the peak value of power. See ACOUSTIC POWER. Also see POWER.

ac power supply. A power unit that supplies ac only (e.g., ac generator, vibrator transformer, oscillator, or inverter). Compare DC POWER SUPPLY.

acquisition. 1. The gathering of data from transducers or a computer. 2. Locating the path of an orbiting body for purposes of collecting telemetered data. 3. Orienting an antenna for optimum pickup of telemetered data.

acquisition and tracking radar. An airborne or ground radar, which locks in on a strong signal and tracks the body that reflects (or transmits) the signal.

acoustic suspension. The property whereby radiant energy and certain materials (such as selenium, cadmium sulfide, germanium, and silicon) change their electrical resistance or generate a voltage on exposure to light. Also see ACOSTINODIELECTRIC.

acoustic telegraph. An instrument for measuring the direct heating power of the sun’s rays or the actinic power of a light source.

action current. A small transient current that flows in a nerve in the human body as a result of stimulation.

activate. To start an operation, usually by applying a power supply to it. Sometimes used as a verb to mean control by applying a power supply to it. Sometimes used as a noun to mean control by applying a power supply to it.

activation time. The time required for a battery cell to come to full charge. The time required for a battery cell to come to full charge. The time required for a battery cell to come to full charge.

acrylic. A device with a certain property or characteristic. Also see ACTIVATION.

active area. The forward-current-carrying portion of the rectifying junction of a metallic rectifier.

active arm. See ACOUSTIC LEAD.

active bias. In the repeated operation, the sum of return currents at a terminal network balanced against the local circuit or drop resistance.

active chord mechanism. Abbreviation, ACM. In robots, an electromechanical gripper capable of conforming to irregular objects. It has a structure similar to the human spine, with numerous small, rigid links connected by hinges.
active communications satellite  A satellite containing receivers (which pick up beamed electromagnetic signals from a ground point and amplify them) and transmitters (which send signals back to the surface of the earth). Also called active system. Compare PASSIVE COMPONENTS SATELLITE.

cable component 1. A device capable of some dynamic function (such as amplification, oscillation, or signal control) that usually requires a power supply for its operation. Examples include bipolar transistors, field-effect transistors, and integrated circuits. Compare PASSIVE COMPONENTS.

actuator 1. A mechanical or electromechanical switching device, and the resulting ACTUATION. 2. In an ac circuit, a quantity that contains no reactance so that the current is in phase with the voltage.

active component of current See ACTIVE CURRENT.

active computer A computer in an installation or network that is processing data.

active component In an ac circuit, the current component that is in phase with the voltage. This is in contrast to reactive current, which is not in phase with the voltage, and is "inactive," with respect to power in the circuit. The active current is equal to the power supplied divided by the effective voltage.

active decoder An automatic ground-station device that gives the number or letter designation of a received radio beacon reply code.

active device 1. An electronic component, such as a transistor, that needs a power supply, and/or that is capable of amplifying. 2. Broadly, any device (including electromechanical relays) that can switch or amplify by application of low-level signals.

active electric network A network containing one or more active components, usually amplifiers or generators, in addition to passive devices or components.

active element The driven or RF-excited element in a multielement antenna or antenna array.

active element A file A computer file in use (i.e., one that is being updated or referred to).

active filter A bandpass, bandstop, highpass or lowpass filter, consisting of resistors, capacitors, and operational amplifiers, arranged to pass a desired frequency range. Commonly used at audio frequencies.

active infrared detection Detection of infrared rays reflected from a target to which they were beamed.

active jamming Transmission or retransmission of signals for the purpose of disrupting communications.

active junction A pn junction in a semiconductor device that has been created by a diffusion process.

active leg An element within a transistor that changes one or more of its electrical characteristics in response to the input signal of the transistor. Also called active arm.

active mixer In a U.S. television picture, the lines (approximately 488) that make up the picture. The remaining 37 of the 525 available lines are blanked and are called INACTIVE LINES.

active material 1. In a storage cell, the chemical material in the plates that provides the electrical action of the cell, as distinguished from the supporting material of the plates themselves. 2. A dielectric substance. 3. The phosphor coating of a cathode-ray tube screen.

active network See ACTIVE ELECTRIC NETWORK.

active network An electromechanical device that operates electrical contacts to affect signal transmission.

active network See ACTIVE ELECTRIC NETWORK.

active pressure The electromotive pressure that produces a current in an ac circuit.

active pull-up An arrangement using a transistor as a pull-up resistor replacement in an integrated circuit, providing low output impedance and low power consumption, for example, in drivers, inverter, etc.

active RC network A resistance-capacitance (RC) circuit that contains active components (transistors or integrated circuits), as well as passive components (capacitors and resistors). 2. An RC network in which some or all of the resistors and capacitors are stimulated by the action of active components.

active repair time The time during which maintenance is done on a system and the system is out of operation.

active satellite See ACTIVE COMMUNICATIONS SATELLITE.

active sensor In an electronic security system, a transmitter that generates an electromagnetic field or acoustic-wave field, and detects changes in the field resulting from the presence or movement of objects in the vicinity.

active substrate In an integrated circuit, a substrate consisting of single-crystal semiconductor material into which the components are formed; it acts as some or all of the components. This is in contrast to a substrate consisting of a dielectric, where the components are deposited on the surface.

active system A radio and/or radar system that requires transmitting equipment to be carried in a vehicle.

active tracking system A system in which a transponder or responder on board a vehicle retransmits information to tracking equipment (e.g., jammers, sensors).

active transducer 1. A transducer that contains an active device, such as a transistor or integrated circuit, for immediate amplification of the sensed quantity. 2. A transducer that is itself an active device.

active wire In the armature of a generator, a wire experiencing induction and, therefore, is delivering voltage.

activity 1. Intensity, of as well as readiness for, osmic activity 2. Intensity of, as well as readiness for, osmic intensity. 3. Intensity of thermal agitation. 4. Thermionic emission of electrons.

activity ratio The ratio of active to inactive records in a computer file.

ac transducer A transducer that either requires an ac supply voltage or delivers an ac output signal—even when operated from a dc supply.

ac transmission The use of an alternating voltage to transmit power from one point to another, usually from generators to a distribution center, and generally over a considerable distance.

actual ground The ground as "seen" by an antenna. The actual ground surface is not necessarily in the same physical location as the true ground surface (i.e., the earth itself). An actual ground can be an artificial ground plane, such as that provided in some antenna structures. Actual ground can also be modified by nearby rooftops, buildings, guy wiring, and utility wiring.

actual height The highest altitude where radio frequency reflection actually occurs.

actual power Also called active or AVERAGE POWER. Symbol, P_avg. In a resistive circuit under sine-wave conditions, average power is the product of the rms voltage and the rms current. It is also equal to half the product of the maximum current and maximum voltage.

actuator Also called active component that operates electrical contacts to affect signal transmission.

actuating system 1. An automatic or manually operated system that starts, modifies, or stops an operation. 2. A system that supplies energy for actuation.

actuating time Also called actuation time. The time interval between generation of a control signal, or the mechanical operation of a control device, and the resulting ACTUATION.

activation 1. The starting, modification, or termination of an operation or process. 2. Activation of a mechanical or electromechanical switching device.

actuator An electromechanical device that uses electromagnetic or piezoelectric or other transducers to produce movement or to convert electrical energy to mechanical energy.

actual curvatrue A satellite con- SATELLITE.

active decoder 1. A communications code word sometimes used for phonetic verbalizing of the letter A. More commonly, ALPHABET is used.

active adapter 1. A fitting used to change either the terminal scheme or the size of a jack, plug, or socket to that of another. 2. A fitting used to provide a transition from one type or style of conductor to another (e.g., waveguide to coaxial line). 3. An
adapter

auxiliary system or unit used to extend the operation of another system (e.g., a Citizens-band adapter for a broadcast receiver).

adaptive communication A method of communication that adjusts itself according to the particular requirements of a given time.

adaptive suspension vehicle Abbreviation, ASV. A specialized robot that moves on mechanical legs, rather than on wheels. It generally has six legs and resembles an insect. It is designed to move over extremely irregular or rocky terrain, and to carry a human passenger.

adaptivity The ability of a system to respond to its environment by changing its performance characteristics.

adc Abbreviation of ANALOG-TO-DIGITAL CONVERTER.

Adcock antenna A directional antenna system consisting of two vertical antennas, spaced in such a way that the whole array behaves like a loop antenna. Its members are connected and positioned so that it discriminates against horizontally polarized waves, and delivers output that is proportional to the vector difference of signal voltages induced in the two vertical arms.

add In a calculation, any number to be added to another. Compare AUGEND.

add register In a digital computer, the register that stores the addend.

adder 1. In a digital computer, the device or circuit that performs binary addition. A HALF ADDER is a two-input circuit that can produce a sum output and a carry output, but it cannot accommodate a carry signal from another adder. A FULL ADDER can accommodate a carry input, as well as two binary signals to be added. Also see ANALOG ADDER. 2. A circuit in a color TV receiver that amplifies the receiver primary matrix signal.

additive 1. The character or characters added to a code to encipher it. 2. In a calculation, an item that is to be added. An ingredient, usually in a small quantity, added to another material to improve the latter in quality or performance.

additive color A color formed by combining the rays from two or three primary-colored lights onto a single neutral surface. For example, by projecting a red and a green beam onto a neutral screen, a yellow additive color results.

additive primaries Primary colors that form other colors in a mixing of light (see ADDITIVE COLOR), but are not themselves formed by mixing other additive primaries. For example, red, green, and blue are the additive primaries used in color television. Through appropriate mixing, these colors can be used to generate an unlimited variety of other colors. Compare SUBTRACTIVE PRIMARIES, which form the color spectrum by mixing the complementary colors.

addition record An extra data store created in a computer during processing.

address 1. In computer operations, a usually numerical expression giving the location of material within the memory or the destination of such material. 2. The act or process of designating the location of information within a computer; a data point within a grid, matrix, or table; a station within a network. In computer operations, to select the location of stored information.

address comparator A device that ensures that the address being read is correct.

address computation In computer operations, a usually numerical expression giving the location of material within the memory or the destination of such material.

address field In a computer, the part of the instruction that gives the address of a location (of data or a word) in the memory.

address generation The programmed generation of numbers or symbols used to retrieve records from a randomly stored direct-access file.

adjacent-channel attenuation from the picture signal in the next higher channel and the sound signal in the next lower channel.

adjacent-channel selectivity The extent to which a receiver or tuned circuit can receive on one channel and reject signals from the nearest outlying channels.

adjacent sound channel In television, the radio-frequency (RF) channel containing the sound modulation of the next lower channel.

adjacent video carrier In television, the radio-frequency (RF) carrier containing the picture modulation of the next higher channel.

adjustable component Any circuit component whose main electrical value can be varied at will (e.g., a variable capacitor, inductor, resistor, or load).

adjustable instrument 1. An instrument whose sensitivity, range, or response can be varied at will (e.g., multirange meter or wideband generator).

adjustable motor tuning The motor tuning of a receiver to be confined to a portion of the frequency spectrum.

adjustable resistor A wirewound resistor in which the resistance can be varied at will.

adjustable voltage divider A wirewound resistor with terminals that slide on exposed resistance wire to produce various voltage values.

adjacent circuit A circuit in which leads that are normally connected to a circuit breaker are shunted so that current can be measured under short-circuit conditions without breaker tripping.

adjusted decibels Noise level (in decibels) above a reference noise level (designated arbitrarily as zero decibels) measured at any point in a system with a noise meter that has previously been adjusted for zero (at reference), according to specifications.
admittance 
Symbol, Y. Unit, siemens (formerly mho). The property denoting the comparative ease with which an alternating current flows through a circuit or device. Admittance is the reciprocal of impedance (Ω) - 1.

adv 1. Abbreviation of AUTOMOTIVE DIEHYDROGEN PHOSPHATE, a piezoelectric compound used for solid-state replacement of automatic data processing.

adsorption
Adhesion of a thin layer of molecules of one substance to the surface of another without absorption. An example is adsorption to water of the surface of a dielectric. This term is often confused with ABSORPTION because the spellings of the two words are almost identical. Compare ABSORPTION.

ads
Abbreviation of automatic dialing unit.

advanced-class license
An amateur radio license conveying all operating privileges, except for a few small bands that are allocated to extra-class licenses. The second-highest class of amateur license.

advance information
Data published prior to the actual production or availability of a manufacturable component, circuit, or system. Advance information is often only an approximate reflection of the expected characteristics of a device.

advance warning
A notice or instruction used in thermo- and cryogenic applications. It is an alloy of copper and nickel, which has high resistivity and a high-temperature coefficient of resistance.

aeroglow
A glow seen against a cold cathode and a mixture of inert gases. Because its illumination can be regulated with an applied signal voltage, it is sometimes used as a modulation indicator for television sound recording.

aerial
See ANTENNA.

aerial cable
A wire or cable run through the air, using support structures, such as towers or poles.

aerodisc antenna
A miniature disc type anten- na mounted on aircraft.

aerodynamics
The science dealing with forces exerted by air and other gases in motion—especially upon bodies (such as aircraft) moving through air or in transporting cargo.

air-cooled component
A primary electrical/thermal cell in which the positive electrode is depolarized by reduced oxygen in the air.

air cleaner
See DUST PRECIPITATOR.

air column
The open space inside an acoustic chamber, pipe, or horn.

air-cooled transistor
A transistor (particularly a power transistor) that is cooled by circulating air, compared with one cooled by a circulating liquid, such as water or oil.

airborne radar
A radar system, either stationary or airborne, that is used to detect distant targets, either stationary or moving, by emitting electromagnetic waves and measuring the time required for the signal to return. The second-highest class of amateur license.

airfoil
A thin wedge-shaped device, such as a wing, for producing lift by conversion of the forward movement of an airfoil into a vertical component in the direction of flight.

aircraft bonding
The practice of solidly connecting, for electrical purposes, the metallic parts of an aircraft, including the engine.
Aircraft Flutter • Airwaves

Aircraft Flutter  Rapid, repetitive fading and intensifying of a received radio or television signal, resulting from reflections of the signal by passing aircraft.

Aircraft Station  A nonautomatic radio communications station installed on an aircraft.

Air-Dielectric Coax  A special type of Coaxial Cable designed to have minimum loss. The space between inner and outer conductors is mostly empty (i.e., air-filled). Some such cables are sealed and filled with an inert gas. The inner conductor is held away from the inner wall of the outer conductor by beads, washers, or a spiral-wound filament of high-grade dielectric material, such as polyethylene.

Airflow  The path or movement of air in, through, or around an electronic device or piece of equipment—especially pertaining to an Air-Cooled Component.

Air Gap 1. A narrow space between two parts of a magnetic circuit (e.g., the gap in the core of a filter choke). Often, this gap is filled with a non-magnetic material, such as plastic, for mechanical support. 2. The space between two or more magnetically coupled or electrostatically coupled components. 3. A device that gets its name from the narrow gap between two small metal balls, needle points, or blunt rod tips therein. When an applied voltage is sufficiently high, a spark discharges across the gap.

Air/ground control radio station  A station for aeronautical telecommunications related to the operation and control of local aircraft.

Air-insulated Line  1. An open-wire feeder or transmission line. Typically, the line consists of two parallel wires held apart by separators (bars or rods of high-grade dielectric material) situated at wide intervals. 2. Air-DIELECTRIC COAX.

Air Moving Device  A mechanical device, such as a specially designed fan or blower, used to facilitate air cooling of electronic components.

Airport Beacon  A radio or light beacon that marks the location of an airport.

Airport Control Station  A station that provides communications between an airport control tower and aircraft in the vicinity.

Airport Surveillance Radar  An air-traffic-control radar that scans the airspace within about 60 miles (approximately 100 kilometers) of an airport, and displays in the control tower the location of all aircraft below a certain altitude and all obstructions in the vicinity.

Airport Position Indicator  An airborne computer system that, using airspeed, aircraft heading, and elapsed time, furnishes a continuous indication of the position of the aircraft. The indication is affected by high-altitude winds. Compare GROUND-POSITION INDICATOR.

Air-to-Air Communication  Radio transmission from one aircraft to another in flight. Compare AIR-TO-GROUND COMMUNICATION and GROUND-TO-AIR COMMUNICATION.

Air-to-Ground Communication  Radio transmission from an aircraft in flight to a station located on the ground. Compare AIR-TO-AIR COMMUNICATION and GROUND-TO-AIR COMMUNICATION.

Alc  Abbreviation of AUTOMATIC LEVEL CONTROL.

Alexanderson Antenna  An audible alarm that includes a self-contained solid-state audio oscillator. Powered from the ac line or a battery, the device produces a raucous noise when activated.

Alexanderson Antenna  A Very-low-frequency (VLF) and low-frequency (LF) vertically polarized antenna, designed to minimize ground losses in structures of manageable height. It usually consists of several wires, each quarter-wave resonant with a loading coil, and all connected together at the apex of a tower. The antenna is fed between the ground and the base of one of the wires.

Aloft Antenna  A loop antenna, in a square configuration, with the corners bent toward the center to lower the impedance at the current nodes.

Airwaves 1. Radio waves. The term is slang, but is widely used. It probably came from the public's mistaken notion that radio signals are propagated by the air. 2. Skywaves.

Aircraft 1. Symbol for ALUMINUM.

Alistaline Switch  A mercury switch in which the tendency of the mercury to stick to the parts has been reduced.

Alarm 1. An electronic security system. 2. A silent and/or audible alert signal transmitted by an electronic security system when an intrusion occurs. 3. A silent and/or audible signal that informs personnel of the occurrence of an equipment malfunction.

Alarm Circuit  A circuit that alerts personnel to a system malfunction, a detected condition, or an alarm condition.

Alarm Condition  1. An intrusion or equipment malfunction that triggers an alarm circuit. 2. The operation of an alarm circuit that occurs in response to an intrusion or equipment malfunction.

Alarm Hold  A device that keeps an alarm sounding once it has been activated.

Alarm Output  The signal sent from an alarm circuit to a siren, buzzer, computer, or other external device to alert personnel to an ALARM CONDITION.

Alarm Relay  A relay that is actuated by an alarm device.

A-law  A form of companding law frequently used in European electronics (the mu-law is more often used in North America). A nonlinear transfer characteristic in companding circuits. It can be continuous, or can be a piecewise linear approximation of a continuous function.

A-law Compressed  Compressing by means of an A-bit binary code following the A-LAW, a specific companding function.

Abeded  For an unpollished surface, the ratio of reflected light to incident light. It can vary from 0.0 to 1.0, or from 0 to 100 percent.

Abedograph  An instrument for measuring the albedos of planets.

Ald  Abbreviation of AUTOMATIC LEVEL CONTROL.

Allelectric Adder  In computer operations, an adder that provides the algebraic sum, rather than the arithmetic sum, of the entered quantities.

Algebraic Operation  A form of electronic calculator operation, in which the keystrokes proceed in an intuitive sequence, following the way in which the calculation is written down. Compare REVERSE POLISH NOTATION.

Algebraic Sum  The sum of two or more quantities with consideration of their signs. Compare ARITHMETIC SUM.

Algorithm  A step-by-step procedure for solving a problem, (e.g., the procedure for finding the square root of a number). It can be expressed in a line-by-line instruction set or as a flowchart.

Algorithmic Language  A computer language used to describe a numeral or algebraic process.

Alias  A label that is an alternate term for items of the same type; a label and several aliases can identify the same data element in a computer program.

Aliasing 1. In analog-to-digital (A/D) conversion, a false output signal that results from a sampling rate that is too slow. Ideally, the sampling rate is at least twice the highest input signal frequency. 2. Bluetooth-like irruptions, also called jaggies, which are sometimes introduced into a bit-mapped computer image when it is changed in size.

Aliasing Noise  A form of signal distortion caused by a signal with an excessive bandwidth.
align 1. To adjust (i.e., to preset) the circuits of an electronic system, such as a receiver, transmitter, or ions, pertaining to predetermined response. 2. To arrange elements in a certain precise orientation and spacing, relative to each other, as in a Yagi antenna. 3. To orient antennas so that they are in line of sight, with respect to a signal source.

alignment The process of ensuring that equipment, components, or systems are adjusted, both physically and electronically, for the most efficient possible performance.

alignment chart A line chart for the simple solution of electronic problems. It is so called because its use involves aligning numerical values on various scales, the lines intersecting at the solution on another scale. Also called nomograph.

alignment pin A pin or protruding key, usually in the base of a removable or plug in component, to ensure that the latter will be inserted correctly into a circuit. Often, the pin mates with a keyway, notch, or slot.

alignment tool A specialized screwdriver or wrench (usually nonmagnetic) used to adjust paddler or trimmer capacitors or inductor cores.

alive See LIVE.

alkaline See BASE. 2. A common term for a group whose hydrides are bases (alkalis). The group includes cesium, francium, lithium, potassium, rubidium, and sodium.

alkaline battery 1. A battery composed of an alkaline cell characterized by a relatively flat discharge curve under load. 2. A type of INTEGRATED CIRCUIT in which both active and passive elements have been fabricated by diffusion and related processes.

Allen screw Allen wrench A tool used to tighten or loosen an Allen screw. It is a hexagonal rod and is available in various sizes.

Allen wrench A screw fitted with a six-sided hexagonal hole.

alligator clip A spring-loaded clip with jagged teeth, designed to be used for temporary electrical connections.

allocate 1. To assign (especially through legislation) operating frequencies or other facilities or conditions needed for scientific or technical activity, see, for example, ALLOCATION OF FREQUENCIES. 2. In computer practice, to assign locations in the memory or registers for routines and subroutines.

allocated channel A frequency channel assigned to an individual or group.

allocated-use circuit 1. A circuit in which one or more channels have been authorized for the exclusive use of one or more services. 2. A communication link assigned to users needing it.

allocation of frequencies See RADIO SPECTRUM.

allocate 2. In telephone service, an automatic central-office switchboard that uses relay circuits to make line interconnections.

All-wave Pertaining to a wide operating-frequency range. Few systems are literally all-wave. For example, a so-called ‘all-wave radio receiver’ might cover 500 kHz to 30 MHz only.

all-wave antenna An antenna that can be operated over a wide frequency range with reasonable efficiency and preferably without needing readjustment. Examples are the DISSONE ANTENNA and the LOG-PERIODIC ANTENNA.

all-wave generator A signal generator that will supply output over a wide range of frequencies.

all-wave receiver A radio receiver that can be tuned over a very wide range of frequencies, such as 10 kHz to 70 MHz.

all yt plastics Plastics, sometimes used as dielectrics or for other purposes in electronics, based on resins made by polymerization of monomers (such as dialyl phthalate) that contain allyl groups.

alignment chart A line chart for the simple solution of electronic problems. It is so called because its use involves aligning numerical values on various scales, the lines intersecting at the solution on another scale. Also called nomograph.

align • alloy diode
amateur radio • AM/FM tuner

neus charge and the instantaneous value of an alternating voltage.

amplitude
Abbreviation, ac. A current that periodically reverses its direction of flow. In one cy-cle, an alternating starts at zero, rises to a maxi-mum positive value, returns to zero, rises to a maximum negative level, and again returns to zero. The number of such cycles completed per second is termed the frequency. Also see CURRENT.

amplification
avalanche or low frequency. Also see CURRENT.

amplification
continuous wave An amplitude-modulated signal resulting from the operation of an oscillator or RF amplifier with raw ac voltage.

amplitude delay
A plan-position-indicating type of radar, the sync delay introduced between trans-mission of the pulse and start of the trace on the indicator screen to eliminate the altitude circle in the display.

amplitude modulation
Abbreviation of ARITHMETIC AND LOGIC UNIT.

amplitude
An alloy used in the construction of one type of THERMOCOUPLE. It is composed of nickel (three parts) and aluminum (one part).

amplitude noise
An electronic aid to the blind, in which photocells in a pair of goggles receive light images. Electric pulses proportional to the light are impressed upon the visual receptors of the brain through electrodes in contact with nerves above each eye.

ambience
A yellow or brown fossil resin that is histor-ically important in electronics. It is the first mate-rial reported to be capable of electrophotography by Thales, 600 BC. Also, the words elec-tricity, electron, and electronics are derived from the Greek name for amber, elektron.

ambience
The seeking of a false null by in-terference or resulting from improper design of logic. Also see AMSI.

ambiguity
Any unclear, illogical, or incorrect in-dication or result. 2. The seeking of a false null by a servo. 3. In digital computer operations, an er-ror resulting from improper design of logic or circuit or device.

ambiguity
Any unclear, illogical, or incorrect in-dication or result. 2. The seeking of a false null by a servo. 3. In digital computer operations, an error resulting from improper design of logic or circuit or device.

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amp-hour One style of abbreviating AMPERE-HOUR. Also, Ah.

amplidyne A dynamo-like rotating dc machine that can act as a power amplifier because the response of the output voltage to changes in field excitation is quite rapid. Used in servo systems.

amplification 1. The process of increasing the magnitude of a signal. This entails an input signal and delivers a larger output signal that, in addition to its increased amplitude, is a replica of the input signal. Also see CURRENT AMPLIFIER, POWER AMPLIFIER, and VOLTAGE AMPLIFIER.

amplifier diode Any semiconductor that can provide amplification in a stable circuit or microwave system. See DIODE AMPLIFIER.

amplifier distortion A change in the waveform of a signal with amplifier output signal does not exhibit a linear relationship to the corresponding input signal. Some amplifiers are designed to operate in a linear manner at all times, but many amplifier types need not function in this manner to be effective. Also see AMPLIFIER DISTORTION and LINEAR AMPLIFIER.

amplifier output 1. The terminals and section of an amplifier that delivers the amplified signal for external use. 2. The signal to be amplified.

amplifier noise The amount of all extraneous signals present in the output of an amplifier when no working signal is applied to the amplifier input terminals. 3. Nonlinearity A condition in which the amplifier gain does not exhibit a linear relationship to the corresponding input signal. Some amplifiers are designed to operate in a linear manner at all times, but many amplifier types need not function in this manner to be effective. Also see AMPLIFIER DISTORTION and LINEAR AMPLIFIER.

amplifier power The power level of the output signal delivered by an amplifier (also called OUTPUT POWER), or to the extent to which the amplifier increases the power of the input signal (also called POWER AMPLIFICATION).

amplifier response The performance of an amplifier, including all of its parameter values that define its operation. A. The negative terminal of an A battery, or pertaining to the part of a circuit connected to that terminal.

ammeter An instrument used to measure the amount of current (in amperes) flowing in a circuit.

ammeter shunt A resistor connected in parallel with an ammeter to increase its current range. Also see AYTTON-MATHER GALVANOMETER SHUNT.

amp-hr, amplify 25

Ampere's Law

[Diagram of Ampere's Law]

Direction of current

Wire

Direction of flux

Flux

Commutating wire

Load

Control field

d control

Armature and commutator

amplidyne

amplification

The process of increasing the magnitude of a signal. This entails an input signal and delivers a larger output signal that, in addition to its increased amplitude, is a replica of the input signal. Also see CURRENT AMPLIFIER, POWER AMPLIFIER, and VOLTAGE AMPLIFIER.

amplifier factor 1. The ratio of the output voltage, current, or power of an AMPLIFIER circuit to its input. For voltage or current, this ratio has meaning only when the input and output impedances are identical. See DECIBEL.

amplifier gain The ratio of the output voltage, current, or power of an AMPLIFIER circuit to its input. For voltage or current, this ratio has meaning only when the input and output impedances are identical. See DECIBEL.

amplifier power The power level of the output signal delivered by an amplifier (also called OUTPUT POWER), or to the extent to which the amplifier increases the power of the input signal (also called POWER AMPLIFICATION).

amplifier response The performance of an amplifier, including all of its parameter values that define its operation. A. The negative terminal of an A battery, or pertaining to the part of a circuit connected to that terminal.

ammeter An instrument used to measure the amount of current (in amperes) flowing in a circuit.

ammeter shunt A resistor connected in parallel with an ammeter to increase its current range. Also see AYTTON-MATHER GALVANOMETER SHUNT.

amperage The number of amperes.

ampere-hour meter An instrument for measuring ampere-hours. It contains a small motor driven by current (in amperes) by the number of turns in the coil.

ampirian whirl A condition in which the output terminal of an amplifier is electrically connected to the input terminals of a preceding stage.

anomalous chloride Formula, NH3Cl. The electrolyte in the carbon-nickel dry cell. Also called SULFUR AMMONIAC.

amplifier GALVANOMETER SHUNT. (AYRTON-MATHER GALVANOMETER SHUNT).
amplifying delay line • amplitude selection

amplifying delay line A delay line that causes amplification of signals in a circuit intended for pulse compression.

amplitstat A self-saturating magnetic amplifier.

amplitron A backward-wave amplifier used in microwave circuits.

amplitude The extent to which an alternating or indicating current or voltage swings, positively and negatively, from zero or from a mean value.

amplitude-controlled rectifier A thyatron- or thyratron-based rectifier circuit.

amplitude density distribution A mathematical function giving the probability that, at a given instant in time, a fluctuating voltage has a certain value.

amplitude distortion In an amplifier or network, the condition in which the output-signal amplitude exhibits a nonlinear relationship to the input-signal amplitude.

amplitude error 1. The error in measuring the amplitude of a signal, normally expressed as a percentage of signal amplitude or as a percentage of full scale. 2. The frequency at which the output amplitude of a signal is in error by 1% with amplitude at 10% of full scale.

amplitude factor For an ac wave, the ratio of the peak value to the rms value. The amplitude factor of a sine wave is equal to the square root of two $\sqrt{2}=1.4142136$.

amplitude fading In the propagation of electromagnetic waves, a condition in which the amplitudes of all components of the signal (i.e., carrier and sidebands) increase and decrease uniformly.

amplitude/frequency response Performance of an amplifier throughout a specified range, as exhibited by a plot of output-signal amplitude versus frequency for a constant-amplitude input signal.

amplitude gate A transducer that transmits only those portions of an input wave that lie within two close-spaced amplitude boundaries; also called slicer.

amplitude limiter A circuit, usually with automatic gain control (AGC), that keeps an amplifier output signal from exceeding a certain level, despite large variations in input-signal amplitude. A dc-biased diode performs passive limiting action via clipping.

amplitude-modulated generator A signal generator whose output is modulated. Usually, this instrument is an RF generator that is modulated at an audio frequency.

amplitude-modulated transmitter A radio-frequency transmitter whose carrier is varied in amplitude, according to the rate of change of some noncontaining signal (such as voice, music, facsimile, television pictures, control signals, or instructions).

amplitude modulation Abbreviation, AM. A method of conveying intelligence in wireless communications and broadcasting. The modulating-signal energy appears at sideband frequencies above and below, and very close to, the carrier frequency. These sideband signals carry all the information. The extent of modulation is expressed as a percentage, from 0, which represents an unmodulated carrier, to 100, which represents full modulation. In a signal modulated 100 percent, one-third of the power is used to convey the data, the other two-thirds is consumed by the carrier. This form of modulation is essentially outmoded, although it is still used in the standard broadcast band from 535 to 1605 kHz. See FREQUENCY MODULATION, PHASE MODULATION, SINGLE SIDEBAND.

amplitude modulation noise Spurious amplitude modulation of a carrier wave by extraneous signals and random impulses, rather than by the intended data-containing signal.

amplitude noise In radar, amplitude fluctuations of an echo returned by a target. This noise limits the gain of the system.

amplitude on The level of random noise in a system. The amplitude of noise is measured in the same way that signal amplitude is measured.

amplitude range The maximum-to-minimum amplitude variation of a signal. It can be expressed as a direct numerical ratio or in decibels.

amplitude response The maximum output obtainable at various frequencies over the range of an instrument operating under rated conditions.

amplitude selection The selection of a signal, according to its correspondence to a predetermined amplitude or amplitude range.

amplitude separation In a television receiver, a circuit that separates the control pulses from the composite video signal.

amplitude suppression ratio The ratio of an undesired output of a frequency-modulated (FM) receiver to the desired output, when the test signal is amplitude modulated and frequency modulated simultaneously.

amplitude-versus-frequency distortion Distortion resulting from varying gain or attenuation of an amplifier or network, with respect to signal frequency.

amplifier A component of an amplifier or network that is based on uniformly changing signals, such as sine waves. Compare DIGITAL ELECTRONICS.

analog/electronic A circuit or device that operates two or more inputs and delivers an output equal to their sum. Compare DIGITAL ELECTRONICS.

analog adder An analog circuit or device whose output waveform is the integral of the input signal waveform, with respect to time.
analogue inverter

**analog inverting adder**
An analog adder that delivers a sum with the opposite sign to that of the input quantities.

**analog inverter**
An indicating instrument that uses a movable-foil arrangement or the equivalent, causing a rotating pointer to indicate a particular value on a graduated printed scale. Compare DIGITAL METER.

**analogue to digital converter**
A process in which an analog signal (such as a voice waveform) is changed into a digital or binary signal that conveys the same information. This process is commonly used in digital computers to encode sounds and images. It is also used in communications systems to improve efficiency, minimize the necessary bandwidth, and optimize the signal-to-noise ratio.

**analog-computer**
A computer and test instruments attached to a system. Compare DIGITAL METER.

**analog computer**
A computer program used for debugging or analyzing equipment. Compare SYNTHESIS.

**analog output**
A multiplexer used with various tasks. The most advanced androids have self-contained computer control systems.

**analog output component**
An extraneous image, usually of short duration, on a cathode-ray-tube (CRT) display. The term applies particularly to anomalies in a radar image caused by low-atmospheric reflection, birds, or other mobile objects.

**analog output circuit**
A switching device that will only pass signals that are faithful analogs of transducer parameters.

**analog oscillator**
An instrument that measures or indicates wind speed, or speed and direction (velocity).

**analogous pole**
A branch of mathematics dealing with point sets, relations, and functions.

**analytical engine**
A primitive mechanical calculating machine, invented in 1833 by Charles Babbage.

**analyzer**
1. Any instrument that permits analysis through close measurements and tests (e.g., distortion analyzer, WAVE ANALYZER, or gas analyzer).
2. A computer program used for debugging purposes; it analyzes other programs and summarizes references to storage locations.
3. An analysis interface to an oscilloscope.

**anastigmatic yoke**
Also called full-focus yoke. In a television (TV) receiver, a deflection yoke with a cosine winding for better focus at the edges of the picture.

**anchorage**
In plastic recording tape, the adhesion of the magnetic oxide coating to the surface of the tape.

**analog representation**
Representation of information within a smooth, continuous range, rather than as separate (discrete) steps or points.

**analog signal**
A signal that contains a large number of different amplitude levels, as opposed to one that can contain only a finite number of levels as a function of time.

**analog subtractor**
An analog circuit or device that receives two inputs and delivers an output equal to their difference.

**analog summer**
See ANALOG ADDER.

**analog switch**
A switching device that will only pass signals that are faithful analogs of transducer parameters.

**analog-to-digital converter**
Any circuit or device that performs ANALOG-TO-DIGITAL CONVERSION.

**analysis**
1. The rigorous determination of the constants and modes of operation for electronic equipment. Compare SYNTHESIS.
2. A branch of mathematics dealing with point sets, relations, and functions.

**analytical engine**
A primitive mechanical calculating machine, invented in 1833 by Charles Babbage.

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A process in which an analog signal (such as a voice waveform) is changed into a digital or binary signal that conveys the same information. This process is commonly used in digital computers to encode sounds and images. It is also used in communications systems to improve efficiency, minimize the necessary bandwidth, and optimize the signal-to-noise ratio.

**angle of arrival**
The angle which the line of propagation makes with the surface of the earth.

**angle of beam**
The angle which the line of propagation makes with the surface of the earth.

**angle of departure**
The angle of arrival of an echo arriving at the receiver. The interference resulting from variations in the angle at which an echo arrives from the target.

**angulation**
A process in which continuous values are represented rather than in discrete steps.

**angle noise**
In radar reception, the interference resulting from variations in the angle at which an echo arrives from the target.

**angle modulation**
Variation of the angle of a sine-wave carrier in response to the modulating source. As in FREQUENCY MODULATION and PHASE MODULATION.

**angle of azimuth**
The horizontal angle between the viewer and object or target, usually measured clockwise from north.

**angle of beam**
The angle most of the transmitted energy in the radiation from a directional antenna. It is usually measured between the half-power points in the main lobe of the directional pattern. This angle can be measured in the horizontal (azimuth) plane or in the vertical (elevation) plane.
angle of conduction 1. Also called angle of flow. The number of degrees of an excitation-signal cycle during which output (drain, collector or plate) current flows in an amplifier circuit. 2. The number of degrees of any sine wave at which conduction of a device (e.g., a diode) begins.

angle of convergence 1. In any graphical representation, the angle formed by any two lines or plots that come together at a point. 2. The angle formed by the light paths of two photocells focused on the same object.

angle of declination The angle between the horizon and a descending line. Compare ANGLE OF ELEVATION.

angle of deflection In a cathode-ray tube, the angle between the electron beam at rest and a new position resulting from deflection.

angle of departure The angle, relative to the horizon, made by the line of propagation of a transmitted radio wave. Compare ANGLE OF ARRIVAL.

angle of depression See ANGLE OF DECLINATION.

angle of divergence In a cathode-ray tube, the angle formed by the spreading of an undeflected electron beam as it extends from the gun to the screen.

angle of elevation The angle that an ascending line subtends, with respect to the horizon. Compare ANGLE OF DECLINATION.

angle of flow See ANGLE OF CONDUCTION.

angle of incidence The angle, measured relative to the perpendicular (orthogonal) to a surface or boundary, subtended by an approaching ray. Compare ANGLE OF REFLECTION and ANGLE OF TRANSMISSION.

angle of lag The phase difference (in degrees or radians) whereby one component precedes another in time, both components being of the same frequency. Compare ANGLE OF LEAD. Also see PHASE ANGLE.

angle of lead The phase difference (in degrees or radians) whereby one component precedes another in time, both components being of the same frequency. Compare ANGLE OF LAG. Also see PHASE ANGLE.

angle of polarization The angle, measured relative to the orbital plane of an electron, to which the chief axis of polarization is directed when it leaves the target material at any given point. Compare ANGLE OF POLARIZATION.

angle of propagation The angle, measured relative to the perpendicular (orthogonal) to a surface, subtended by a ray leaving the surface after having been reflected from it. Compare ANGLE OF Incidence.

angle of refraction The angle, measured relative to the perpendicular (orthogonal) to a boundary between two different media, subtended by a ray leaving the boundary after having been refracted therein. Compare ANGLE OF INCIDENCE.

angle of reflection The angle, measured relative to the perpendicular (orthogonal) to a surface, subtended by a ray leaving the surface after having been reflected from it. Compare ANGLE OF INCIDENCE.

angle tracking noise Noise in a servo system that results in a tracking error.

angstrom (Anders. 1814–1874). A unit of length used to describe certain extremely short waves and microscopic dimensions; 1 angstrom equals 10^-10 meters.

angular deviation loss The ratio of microphone or loudspeaker response on the principal axis of response to the response at a designated angle from that axis. Expressed in decibels.

angular difference See PHASE ANGLE.

angular displacement In an ac circuit, the separation, in degrees, between two waves. See PHASE ANGLE.

angular frequency The frequency of an ac signal, expressed in radians per second (rad/sec) and approximately equal to 6.28f, where f is the frequency in hertz.

angular length Length, as along the horizontal axis of an ac wave or along the standing-wave pattern on an antenna, expressed as the product of radians and wavelength.

angular-mode keys On a calculator or computer, the DEG, RAD, and GRAD keys for expressing or converting angles in DEGREES, RADIANS, and GRADS, respectively.

angular phase difference For two sinusoidal waves, the phase difference, expressed in degrees or radians.

angular rate In navigation, the rate of bearing change, expressed in degrees or radians.

angular resolution The ability of an antenna to resolve two targets by angular measurement.

angus pen recorder An instrument that makes a pen trace the pattern on an antenna, expressed as the product of radians and wavelength.

anharmonic oscillator An oscillating device in which the force toward the balance point is not linear, with respect to displacement.

anhysteresis The magnetization of a material by a unidirectional field containing an alternating field component of gradually decreasing amplitude.

anisotropic Pertaining to the tendency of some materials to display different magnetic and other physical properties along different axes.

ANL Abbreviation of AUTOMATIC NOISE LIMITER.

anhysteretic state • anomalous propagation31

anion A negative ion. Also see IGN.

anomalous dipole moment The dipole moment of an atom that is not a linear combination of its electronic orbitals. Compare NORMAL DIPOLE MOMENT.

anomalous dispersion Dispersion of electromagnetic radiation that is characterized by a decrease in refractive index with increase in frequency.

anomalous propagation 1. The low-attenuation propagation of UHF or microwave signals through the atmosphere.
antenna into a receiver.

antenna toximeter An electronic instrument for measuring or alerting against the onset of anoxemia (deficiency of oxygen in the blood)—especially in airplane pilots.

AN radio range A navigational facility entailing four zones of equal signal strength. When the aircraft deviates from course, an aural Morse-code signal, A/DIT DASH or S (DAH DIT) is heard; but when the aircraft is on course, a continuous tone is heard.

ANSI Acronym for American National Standards Institute.

AN signal The signal provided by an AN radio range to apprise aircraft pilots of course deviation.

answerback The automatic response of a terminal station to a remote-control signal.

answer cord In a telephone system, the cord used for answering subscribers’ calls and incoming trunk calls.

answering machine A device that automatically answers a telephone and records an audio message from the caller.

answer lamp A telephone switchboard lamp that lights when an answer cord is plugged into a line jack; it switches off when the telephone answers and lights when the call is completed.

antenna A device that converts incoming electromagnetic fields into alternating electric currents and lights when an answer cord is plugged into a line jack; it switches off when the telephone answers and lights when the call is completed.

antenna/ground system A system against which the antenna operates.

antenna elements to lower the resonant frequency of the system without necessarily making the system physically larger or the elements longer.

antenna height 1. The height of an antenna above the surface of the earth immediately beneath the driven element(s). 2. The height of an antenna above the effective radio-frequency (RF) ground immediately beneath the driven element(s). The height of an antenna above average terrain, determined against the mean altitude of a number of points on the earth’s surface that lie within a certain radius of the antenna structure. Also called height above average terrain (HAAT).

antenna impedance The complex-number impedance that an antenna presents to a transmission line. It can vary over a tremendous range, and depends on the antenna type, antenna size, antenna height, operating frequency, and various other factors.

antenna induced potential Also called antenno-induced microvolts. The voltage across the open-circuited terminals of an antenna.

antenna lens Also called lens antenna. A radiator designed to focus microwave energy in much the same manner that an optical lens focuses light rays. Lens antennas are made from dielectric materials and/or metals.

antenna loading 1. The insertion of inductance in antenna elements to lower the resonant frequency of the system without necessarily making the system physically larger or the elements longer. 2. The insertion of capacitance in antenna elements to raise the resonant frequency of the system without necessarily making the system physically smaller or the elements shorter.

antenna lobe A well-defined region in the radiation pattern of an antenna in which radiation is most intense, or in which reception is strongest. Also see ANTEenna PATTERN.

antenna matching The technique of establishing a satisfactory relationship between the antenna impedance and the transmission-line or transmitter-out impedance (maximum transfer of power into the antenna). Also, the matching of antenna impedance to receiver input impedance, for delivery of maximum energy to the receiver.

antennameter An antenna/oscillator combination that serves as a low-power transmitter.

antenna pattern A polar plot of antenna performance that shows field strength versus angle of azimuth, with the antenna at the center. It is usually specified in the horizontal plane.
antenna polarization The orientation of electric lines of flux, with respect to the surface of the earth, for which an antenna is most efficient. A vertical antenna radiates and receives vertically polarized waves. A horizontal antenna radiates and receives horizontally polarized waves broadside to itself, and vertically polarized waves at high elevation angles off its ends. In other directions, the polarization is slanted at various angles.

antenna power Symbol, $P_{\text{avg}}$. The RF power developed in an antenna by a transmitter: $P_{\text{avg}}$ equals $P_{\text{RF}}$, where $P_{\text{RF}}$ is the antenna current and $R$ is the reference antenna resistance at point $I$ is measured.

antenna power gain The ratio of the maximum effective radiated power (ERP) from a wireless transmitting antenna to the ERP from a reference antenna, expressed in decibels (dB). If the ERP of an antenna under test is $P_1$ watts and the ERP from the reference antenna is $P_0$ watts, then the gain $G_{\text{ant}}$ is:

$$G_{\text{ant}} = 10 \log_{10} \left( \frac{P_1}{P_0} \right)$$

Power gain is always measured in the direction in which the test antenna performs the best. The reference antenna, usually a dipole, is chosen with a gain assumed to be unity, or 0 dB. Gain relative to a dipole is expressed in dbd (decibels relative to a dipole). Alternatively, the reference antenna can be an isotropic radiator, in which case the gain is expressed in dBi (decibels relative to an isotropic radiator). Gain figures in dbd and dBi differ by a constant amount as follows:

$$G_{\text{ant}} = 2.15 + G_{\text{dBi}}$$

antenna preamplifier A highly sensitive amplifier used to enhance the gain of a receiver. It is usually used at the very high frequencies and above.

antenna radiation The propagation of radio waves from a transmitting antenna.

antenna radiator The element of an antenna that receives RF energy from the transmitter and radiates waves. Also known as the driven element. Compare ANTENNA DIRECTOR and ANTENNA REFLECTOR.

antenna range 1. The frequency band, communication distance characteristic of, or other continuum of values that specify the operating limits of an antenna. 2. The region immediately surrounding an antenna in which tests and measurements with the bandwidth of an input signal to preclude aliasing and its effects. See ALIasing, 1.

antenna reflector In a directional antenna, a PARASITIC ELEMENT situated behind the radiator and separated from the latter by an appropriate fraction of a wavelength. Its function is to intensify radiation in the direction of transmission. Compare ANTENNA DIRECTOR and ANTENNA RADIATOR.

antenna relay In a radio station, a low-loss, heavy-duty relay that enables the antenna to be switched between transmitter and receiver.

antenna resistance The resistive component of ANTENNA IMPEDANCE.

antenna resonant frequency The frequency, or narrow band of frequencies, at which an antenna’s impedance appears resistive.

antenna stage 1. The first RF amplifier stage of a receiver. 2. Occasionally, the final RF amplifier of a transmitter.

antenna switch In a radio station, a low-loss, heavy-duty switch that enables the antenna to be connected to transmitter, receiver, or safety ground.

antenna system Collectively, an antenna and all of the auxiliary electrical and mechanical devices needed for its efficient operation, including couplers, tuners, transmission lines, supports, insulators, and rotators.

antenna terminals 1. The points at which a transmission line is attached to an antenna. 2. The signal input terminals of a receiver. 3. The signal output terminals of a transmitter.

antenna waver At an antenna and converter combined into a single circuit, intended for connection to the antenna terminals of a receiver to allow operation of the receiver for the band for which the receiver has been designed.

antenna wire 1. The radiator element of a wire-type antenna. 2. A strong solid or stranded wire (e.g., hard-drawn copper, copper-clad steel, or phosphor-bronze) used for antennas.

anthropomorphism The perception, by people, of machines as having human qualities. This can lead to emotional attachment to hardware, such as computers and robots. The more sophisticated the technology, the more powerful this perception can become.

antialiasing filter A low-pass or bandpass filter that is made to prevent aliasing and its effects. See ALIAsing, 1.

anticlutter circuit A circuit whose members are thin blades and stiff wires widely separated to maximize capacitance between them.

anticathode The target electrode of an X-ray tube.

anticyclic Sciences A group of futurists, people who attempt to predict the course of technology. Some futurists believe that progress will continue until, for example, homes become fully automated and artificial intelligence reaches a level comparable to human intelligence. Other futurists believe that such things are highly improbable.

anticoincidence circuit A supplementary circuit in a radio receiver that minimizes the effect of extraneous reflections that would obscure the image of the target.

anticlutter gain control In a radio receiver, a circuit that automatically raises the gain of the receiver slowly to maximum after each transmitter pulse to reduce the effect of clutter-producing echoes.

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antiactive 1. Pertaining to the behavior of materials in which, at low temperatures, the magnetic moments of adjacent atoms point in opposite directions.

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anticorrelation 1. Pertaining to the behavior of materials in which, at low temperatures, the magnetic moments of adjacent atoms point in opposite directions.

antimeasure A group of particle detectors that are the counterparts of conventional particles (i.e., positrons instead of electrons, antineutrons instead of neutrons, and antiprotons instead of protons). When a particle meets its antiparticle, the two annullate, releasing energy. Also see ANTI- PARTICLE.

antimatter Pertaining to particles that are the counterparts of conventional particles (i.e., positrons instead of electrons, antineutrons instead of neutrons, and antiprotons instead of protons). When a particle meets its antiparticle, the two annullate, releasing energy. Also see ANTI- PARTICLE.

antimatter Symbol, $\bar{b}$. A metallicoid element. Atomic number, 51. Atomic weight, 121.76. Often used as n-type dopant in semiconductor manufacture.

antinut The antiparticle of the NEUTRINO, emitted as a result of radioactive decay.

antinute An uncharged particle with a mass equal to that of the neutron, but with a magnetic moment in the direction opposite that of the neutron.

antinode A point of maximum amplitude in a standing wave.

antilogarithm Abbreviated, antilog or log⁻¹. The number corresponding to a given logarithm. For example, log 10,000 = log 10⁴ = 4, and thus antilog 4 = 10⁴ = 10,000.

antilogarithm In a PYROELECTRIC MATERIAL, the end that becomes negatively charged as the temperature rises.

antimagnetic Pertaining to materials having extremely low RETENTIVITY.

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antimorphic See NONMICROPHONIC.

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aphase • A plus

antiphase The property of being in phase opposition (180 degrees out of phase).

aperture compensation In some television (TV) receivers, a pair of corrective magnets in the deflection assembly on the picture tube that eliminates pinched-aperture distortion (disregardment of the raster so that it resembles a pincushion—a rectangular form bowed out). Another use is in a cathode-ray tube. A subatomic particle with a mass equal to that of the proton, but with opposite electrical charge.

antiquark An ANTI-PARTICLE of a QUARK.

antiparticle Substance a material that protects against damage caused by atomic radiation.

antiresonance 1. Parallel resonance. 2. The condition of being detuned from a resonant frequency.

antiresonant circuit See PARALLEL-RESONANT CIRCUIT.

antiresonant frequency 1. The resonant frequency of a parallel-resonant circuit. 2. In a piezoelectric crystal, the frequency at which impedance is maximum (as in a parallel-resonant circuit).

antisidetone Pertaining to the elimination in telephone circuits of interference between the microphone and earphone of the same telephone.

antistickoff voltage The low voltage applied to the coarse synchro control transformer rotor winding in a dual-speed servo system to eliminate an aperiodic discharge in the system. Also, A+. The positive terminal of an A battery.

antenna antenna An antenna whose beamwidth depends on the size of a horn, reflector, or lens.

aperture angle For an antenna or telescope or mi-
croscope, the half-angle formed by the radius of the detecting instrument, as viewed from the source.

aperture antenna An antenna whose beamwidth depends on the size of a horn, reflector, or lens.

aperture compensation In a television (TV) camera, the minimizing of APERTURE DISTORTION by widening the video-amplifier passband.

aperture distortion In a television (TV) camera tube, a form of distortion that occurs when the scanning beam covers several mosaic elements simultaneously. This condition, caused by excessive beam thickness, results in poor image resolution.

aperture mask In a three-gun-color picture tube, a thin, perforated sheet mounted behind the viewing screen to ensure that a particular color phosphor will be excited only by the beam for that color. Also called shadow mask.

aperture synthesis In radio communications that use a voice-activated circuit as a transmitter, during reception on the companion receiver.

apc 1. Abbreviation of automatic power control. 2. Abbreviation of AUTOMATIC PHASE CONTROL.

aperiodic Characterized by a lack of predictable repetitive behavior. For example, the sferics or static electromagnetic interference caused by lightning.

aperiodic current The unidirectional current that follows an electromagnetic disturbance in an LCR circuit. It decreases in R/C time (10 to 100 times slower than the circuit resistance.

aperiodic damping Damping of such a high degree that the damped system, after disturbance, comes to rest without oscillation or hunting.

aperiodic discharge A discharge in which current flows in one direction only. The term "unidirectional, rather than oscillatory. For this condition, 1/LC is less than or equal to 1/RC (or 1/2RC).

aperiodic function A nonrepetitive function (e.g., a hyperbolic trigonometric function).
The arc length is the length along a given arc, usually a part of the circumference of a circle. If the circle has circumference $C$ and the arc measures $x$ degrees, then the arc length is $C x / 360$ units.

The arc tangent is the angle, in radians or degrees, corresponding to a given tangent. The arc tangent function is a mathematical function that is the inverse of the tangent function. It is used to determine the effective duration of an irregularly shaped pulse. A rectangle is constructed whose height is equal to the peak height of the pulse, as displayed on an oscilloscope. The rectangle width is adjusted until the area of the rectangle is the same as the area under the curve representing the pulse. The width of the rectangle then represents the effective duration of the pulse.

The area code is the three-digit number that indicates the location, according to specified assigned districts, of a telephone sub-

argon gas. It generates coherent light at specific wavelengths that are characteristic of elemental argon.

**Area search** The scanning of a large group of computer records for those of a major category or class.

**Area sensor** A transducer, used with an alarm system, that protects a defined region or volume, such as an office or bedroom.

**Area redistribution** A scheme to determine the effective duration of an irregularly shaped pulse. A rectangle is constructed whose height is equal to the peak height of the pulse, as displayed on an oscilloscope. The rectangle width is adjusted until the area of the rectangle is the same as the area under the curve representing the pulse. The width of the rectangle then represents the effective duration of the pulse.

**Area protection** Coverage of a defined region, in terms of area or volume, by an alarm system.

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**Area search** The scanning of a large group of computer records for those of a major category or class.

**Area sensor** A transducer, used with an alarm system, that protects a defined region or volume, such as an office or bedroom.

**Area redistribution** A scheme to determine the effective duration of an irregularly shaped pulse. A rectangle is constructed whose height is equal to the peak height of the pulse, as displayed on an oscilloscope. The rectangle width is adjusted until the area of the rectangle is the same as the area under the curve representing the pulse. The width of the rectangle then represents the effective duration of the pulse.
arm 1. Any of the distinct branches of a circuit or network. Also called log. 2. A movable element in a device, usually connected in contact for switching.

armature 1. The rotating member of a motor. 2. The rotating member of some types of electro-mechanical generator. 3. The movable member of a relay, bell, buzzer, or gong. 4. The movable member of an actuator. 5. The soft iron keeper placed across the poles of a permanent magnet to conserve power.

avertex coil 1. A coil of insulated wire wound on a ferromagnetic core to provide the electromagnetic properties of an armature. In a motor or generator, the armature coil is distinguished from the field coil. 2. The ferromagnetic core upon which the armature coil of a motor or generator is wound.

armature gap 1. In a motor or generator, the space between an armature core and the pole of a field magnet. 2. In a relay, the space between the armature and the relay-coil core.

armature hesitation 1. A momentary delay in the movement of a relay.

armature-hesitation contact chatter Undesired (usually rapid, repetitive) making and breaking of relay contacts. Generally caused by armature hesitation.

armature-impact contact chatter Undesired (usually rapid, repetitive) making and breaking of relay contacts, caused by contact bounce where the armature strikes the relay core (closure) or latch between energization and deenergization.

armature relay 1. A relay that uses an electromagnet to pull a lever toward or away from a set of fixed contacts.

armature travel The distance traveled by an armature during relay operation.

armor A protective metal cable covering.


armature voltage control A means of controlling the power delivered to the armature winding voltage.

armchair copy An amateur radio term for reception of exceptionally clear signals.

arming the oscilloscope sweep Enabling an oscilloscope to trigger on the first pulse by closing a switch.

Armstrong oscillator (Edwin H. Armstrong, 1880–1954) An oscillator circuit that uses inductive feedback between the output and input. Either the output coil or the input coil can be tuned to set the oscillator frequency. The amount of positive feedback is controlled by varying the coupling between the coils.

Armstrong superheterodyne circuit See SUPERHETERODYNE CIRCUIT.

Armstrong superregenerative circuit See SUPERREGENERATIVE CIRCUIT.
symbolic program language into a machine (binary) language program by substituting operation codes and addresses.

assembly 1. A finished unit that can be either a practical working model or a dummy, a prototype, or a final model; an integrated aggregation of subunits.

assembly language A source code that uses mnemonic instructions. (See ASSEMBLY, assembly program, assembly 2.)

assembly program The program that operates on a symbolic-language program to produce a machine-language program in the process of assembly. Also called assembler.

assembly robot A form of industrial robot that puts hardware together. Such a robot is generally a component of an automated integrated manufacturing system (AIMS). The robot can do repetitive work at high speed and precision for long periods of time.

assign To reserve part of a computing system for a specific purpose, normally for the duration of a program run.

assigned frequency The radio carrier frequency or band of frequencies designated for a transmitting station by a licensing authority. Also see SPECTRUM.

associative memory Computer memory in which locations are identified by content, rather than by specific address.

asteroid A free-running multivibrator. The common circuit uses two bipolar or field-effect transistors, their inputs and outputs being cross coupled. Conduction switches alternately between the two.

table A circuit that has two unstable states, and whose operation is characterized by alternation between those states at a frequency determined by the circuit constants.

asymmetrical multivibrator An unbalanced multivibrator (i.e., one in which the circuit halves are not identical). If the time constants of the halves are different, the output pulses will be short and widely separated.

asymmetrical sideband See VESTIGIAL SIDE-BAND.

asymmetrical sideband transmission See VESTIGIAL SIDE-BAND TRANSMISSION.

asymmetrical wave A wave whose upper (positive half-cycles) and lower (negative half-cycle) portions have different amplitudes or shapes. Also called asymmetrical communications. Also called asymmetrical conductivity.

asymmetrical distortion In a binary system, lengthening or shortening of one of the states, by comparison to the theoretical or ideal duration.

asymmetrical PET A FIELD-EFFECT TRANSISTOR in which the source and drain cannot be interchanged without degrading performance.

asymmetrical vibrato An adjustment in a device in- tended for measuring the pH (acidity/alkalinity). Each effect is the inaccuracies that results from the differences between the electrodes.

asymptote In analytical geometry, a fixed straight line that recedes to infinity (as in out-of-phase waves). Also called asymmetrical communications.

asymptotic expression An expression having this form as a variable approaches a limit.

asymptotic breakdown voltage A voltage that will reliably cause dielectric breakdown if applied continu- ously for a sufficiently long time.

asymptotic expression An expression having this form as a variable approaches a limit.

asynchronous 1. Not synchronous, i.e., nonrecurrent (as in out-of-phase waves). A mode of communication in which the completion of one operation starts another.

asynchronous device A device not regulated by the system in which it is used, as far as its operating frequency or rate is concerned.

asynchronous motor An ac motor whose speed is not proportional to the supply frequency.

asynchronous transmission Data transmission in which each character or symbol begins with a start signal and ends with a stop signal. This eliminates the need for the data to be sent at a uniform speed.

asynchronous vibrator In a vibrator-type portable power supply, a vibrator that only makes and breaks the primary circuit of the step-up transformer. This is in contrast to the synchronous vibra- tor, which also makes and breaks the secondary circuit in synchronism with the primary.

asynchronous input In digital circuitry, any flip-flop input at which a pulse can affect the output independently of the clock.

astigmatism A focusing fault in a cathode-ray tube (CRT), in which electrons in different axial planes focus at different points.

asymmetrically produced from radioactive decay. A radioactive decay table (CRT), in which electrons in different axial planes focus at different points.

asymmetry control An adjustment in a device intended for measuring the pH (acidity/alkalinity).

asymmetrical communications A mode of communication in which the speed of transmitted data is much greater in one direction than in the other. Two-way communications in which the vacuum tube (CRT), in which electrons in different axial planes focus at different points.

asymmetrical communications A mode of communication in which the speed of transmitted data is much greater in one direction than in the other. Two-way communications in which the vacuum tube (CRT), in which electrons in different axial planes focus at different points.
atmospheric bending  The refraction or reflection of electromagnetic waves by the troposphere or ionosphere. See ATMOSPHERIC REFLECTION.

atmospheric duct  A tropospheric stratum, often associated with temperature inversions, lake effects, or weather fronts, through which electromagnetic energy at ultra-high and microwave frequencies is efficiently propagated for long distances.

atmospheric refraction 1. Downward bending of radio waves in the ionosphere, resulting in long-range propagation at high frequencies. 2. Communication via scattering of VHF and UHF radio waves in the lower atmosphere.

atomic reactor  See REACTOR, 2. atomic theory  The scientific theory that all matter is composed ultimately of atoms, which are the smallest particles retaining the identity of an element. Atoms combine to form molecules, the smallest particles that retain the identity of a compound. Atoms themselves contain minute subatomic particles, some of which carry electric charges. See BOHR ATOM and RUTHERFORD ATOM.

atomic weight 1. The mass of a particular atom in ATOMIC MASS UNITS (amu). 2. A number characterizing the average mass of individual atoms for a specific isotope of an element. Thus, carbon 12 (C12) has an atomic weight of 12, oxygen 16 (O16) has an atomic weight of approximately 16, and uranium 238 (U238) has an atomic weight of about 238.

atomic unit of energy  The science of the atom and atomic energy. Also called atomics.

atomic time 1. The rise of a pulse from zero to maximum amplitude. 2. The time required for a pulse to rise from zero to maximum amplitude. 3. The initialization of a circuit voltage or current for a certain purpose, such as an automatic gain control. 4. The rise of a musical note from zero to full volume.

atomic reactor • attracted-disk electrometer 45

attenuate  To reduce in amplitude.

attenuation  A reduction of signal amplitude.

attenuation characteristic  Also called attenuation constant. 1. In an amplifier, network, or component, the decrease in signal amplitude as a function of frequency, usually expressed in decibels per octave. 2. In a transmission line, the decrease in signal amplitude per unit length. Usually expressed in decibels per 100 feet, decibels per mile, or decibels per kilometer.

atmospheric electricity  Static electricity present in the atmosphere, which evidences itself in disturbance of radio communications and in displays of lightning.

atmospheric noise  Receiver noise resulting from ATMOSPHERIC ELECTRICITY. Also called static or static.

atmospheric pressure  Abbreviation, atm press. 1. The pressure exerted by the earth’s atmosphere, as indicated by a barometer at sea level; normally between 29 and 31 inches of mercury. 2. A pressure of 1.013 × 10^5 dynes per square centimeter. See ATMOSPHERE, 2.

atmospheric radio wave  See SKYWAVE.

atmospheric radio window  The band of frequencies approximately 10 MHz to 10 GHz, including radio waves that can penetrate the earth’s troposphere and ionosphere.

attenuation  The return of a radio wave to earth, resulting from reflection by an ionized portion of the atmosphere.

atomic fission  Energy released by the FUSION or NUCLEAR FUSION of atomic nuclei. See also ATOMIC POWER.

atomic fusion  The physics of electron movement.

atomic number  The number of protons in the nucleus of an atom. Also, the number of electrons if the atom is electrically neutral. For example, the atomic number for copper is 29, indicating 29 protons in the nucleus. An electrically neutral atom of copper has 29 electrons. The atomic number uniquely identifies an element.

atomic collision  The transfer or “wandering” of a valence electron between or among atoms in a single molecule.

atomic charge  The electrification (i.e., the electron charge) exhibited by an ion.

atomic clock  Also called atomic time standard. A highly accurate electronic clock, driven by the natural vibration frequency of an atomic transition. Some of these clocks use a Cs resonance while others use a Rb resonance. They are used for atomic time standards.

atomic mass unit  Abbreviated amu. A unit that expresses the relative mass of an elemental atom. The scattering of very-high frequency (VHF) and ultra-high frequency (UHF) radio waves by the lower atmosphere.

atomic unit of energy  Energy released by the FUSION or NUCLEAR FUSION of atomic nuclei. See also ATOMIC POWER.

atomic frequency  The frequency of electromagnetic waves in the lower atmosphere.

atomic migration  The transfer or “wandering” of a valence electron between or among atoms in a single molecule.

atomic number  The number of protons in the nucleus of an atom. Also, the number of electrons if the atom is electrically neutral. For example, the atomic number for copper is 29, indicating 29 protons in the nucleus. An electrically neutral atom of copper has 29 electrons. The atomic number uniquely identifies an element.

atomic radiation  The emission of radiant energy by radioactive substances.

atomic relaxation time  The rise of a pulse from zero to maximum amplitude. 2. The time required for a pulse to rise from zero to maximum amplitude. 3. The initialization of a circuit voltage or current for a certain purpose, such as an automatic gain control. 4. The rise of a musical note from zero to full volume.

atomic time 1. The rise of a pulse from zero to maximum amplitude. 2. The time required for a pulse to rise from zero to maximum amplitude. 3. The initialization of a circuit voltage or current for a certain purpose, such as an automatic gain control. 4. The rise of a musical note from zero to full volume.

atomic time 1. The rise of a pulse from zero to maximum amplitude. 2. The time required for a pulse to rise from zero to maximum amplitude. 3. The initialization of a circuit voltage or current for a certain purpose, such as an automatic gain control. 4. The rise of a musical note from zero to full volume.
**audio clipping** Brute-force limiting of the amplitude of an audio signal, usually accomplished using semiconductor diodes to prevent the positive and negative peak amplitudes from exceeding a certain level.

**audio-frequency meter** An instrument to measure frequencies in the audio-frequency spectrum (approximately 20 Hz to 20 kHz). Three types are commonly used:

- **Analog** Gives direct indications of frequency on the scale of a D’Arsonval meter; the usual range is 20 Hz to 100 kHz.
- **Digital** Gives direct indications of frequency by means of readout lamps; the usual range is 1 Hz to 15 MHz. This instrument is useful also as a radio-frequency meter.
- **Bridge** Consists of a frequency-sensitive bridge, such as a Wien bridge, with a null-indicating meter. The operator balances the bridge and reads the unknown frequency from the dial of the balance control.

**audio component** The audio-frequency portion of any wave or signal.

**audio converter** A circuit in which a received radio-frequency (RF) signal is heterodyned with a local RF oscillator signal to produce an audio-frequency (AF) beat-note output. The beat note is then amplified by an AF amplifier. It is used especially by amateur radio operators in the reception of continuous-wave (CW) radiotelegraphy, radioteletype, and packet radio at high frequencies.

**audio frequency** A frequency lying within the audible spectrum. Abbreviated AF. See AUDIO-FREQUENCY SPECTRUM.

**audio amplifiers** An amplifier that operates in part or all of the frequency range 20 Hz to 20 kHz. High-fidelity amplifiers function over a somewhat wider range (e.g., 10 Hz to 50 kHz).

**audio-frequency choke** An inductor (usually having a ferromagnetic core) that blocks audio-frequency current, but passes direct current.

**audio-frequency feedback** 1. Electrical feedback (positive and/or negative) that affects audio-frequency circuits. 2. ACOUSTIC FEEDBACK. 3. DYNAMIC FEEDBACK.

**audio converter** A filter of any type that operates on any part of the frequency range 20 Hz to 20 kHz.

**audio converter** A device used for the purpose of matching impedances at frequencies within the range of human hearing (up to approximately 20 kHz). This ensures the most efficient possible transfer of power between stages of audio amplification, between an amplifier and a speaker or headset, or between a microphone and an audio preamplifier. These transformers are available with various power ratings and impedance-matching ratios. Some devices are tailored to have a certain attenuation-versus-frequency response. At audio frequencies, transformers are physically similar to the alternating-current transformers used in power supplies. They are wound on laminated or powdered-iron cores. Compare RADIO-FREQUENCY TRANSFORMER.

**audio-frequency meter** A transistor that is usually used on audio-frequency signals.

**audio-frequency meter** A graph used to rate hearing, used by audiometrists in the fitting of hearing aids.

**audio-frequency meter** An instrument used for monitoring signal amplitude in an audio-frequency system. It can indicate in volts, decibels, volume units (VU), or arbitrary units, and is often permanently connected in the circuit.

**audio limiter** A limiter or clipper operated in the audio-frequency (AF) channel of a receiver or transmitter to hold the output-signal amplitude constant, or to minimize the effect of noise peaks.

**audio meter** A person skilled in testing hearing (i.e., in using audiometers and other electronic instruments) and evaluating their indications for the fitting of hearing aids.

**audio meter** An instrument used for monitoring signal amplitude in an audio-frequency system. It can indicate in volts, decibels, volume units (VU), or arbitrary units, and is often permanently connected in the circuit.

**audio meter** A limiter or clipper operated in the audio-frequency (AF) channel of a receiver or transmitter to hold the output-signal amplitude constant, or to minimize the effect of noise peaks.

**audio meter** A limiter or clipper operated in the audio-frequency (AF) channel of a receiver or transmitter to hold the output-signal amplitude constant, or to minimize the effect of noise peaks.

**audio oscillator** A modulator for audio-frequency-shift keying of a signal.

**audio-frequency spectrum** The band of frequencies extending from 20 Hz to 50 kHz. High-fidelity component specifications extend this range somewhat in both directions (e.g., from 10 Hz to 50 kHz).

**audio-frequency transformer** Abbreviation, AF transformer. A device used for the purpose of matching impedances at frequencies within the range of human hearing (up to approximately 20 kHz). This ensures the most efficient possible transfer of power between stages of audio amplification, between an amplifier and a speaker or headset, or between a microphone and an audio preamplifier. These transformers are available with various power ratings and impedance-matching ratios. Some devices are tailored to have a certain attenuation-versus-frequency response. At audio frequencies, transformers are physically similar to the alternating-current transformers used in power supplies. They are wound on laminated or powdered-iron cores. Compare RADIO-FREQUENCY TRANSFORMER.

**audio-frequency transfomer** A transistor that is usually used on audio-frequency signals.

**audio loudspeaker** A loudspeaker is used in the audio-frequency spectrum (approximately 20 Hz to 20 kHz). Three types are commonly used:

- **Analog** Gives direct indications of frequency on the scale of a D’Arsonval meter; the usual range is 20 Hz to 100 kHz.
- **Digital** Gives direct indications of frequency by means of readout lamps; the usual range is 1 Hz to 15 MHz. This instrument is useful also as a radio-frequency meter.
- **Bridge** Consists of a frequency-sensitive bridge, such as a Wien bridge, with a null-indicating meter. The operator balances the bridge and reads the unknown frequency from the dial of the balance control.

**audio-quality meter** An instrument used for monitoring signal amplitude in an audio-frequency system. It can indicate in volts, decibels, volume units (VU), or arbitrary units, and is often permanently connected in the circuit.
audio oscillator 1. An oscillator that delivers an output signal in the frequency range 20 Hz to 20 kHz. 2. An audio-frequency (AF) signal generator. Some instruments of this type operate above and below the limits of the human audio-frequency spectrum (e.g., 1 Hz to 1 MHz).

audio output The output of an audio-frequency oscillator or amplifier. It can be measured in terms of peak or rms volts, amperes, or watts.

audiophile A sound-reproduction hobbyist.

audio power Alternating-current power at frequencies roughly between 20 Hz and 20 kHz. When used in connection with transmitters and other modulated radio-frequency (RF) equipment, the term refers to modulator power output.

audio response unit A device that links digitized responses, held in computer storage, to a telephone set or line to answer incoming calls and inquiries.

audio signal generator See AUDIO OSCILLATOR 2.

audio spectrum The range of sine-wave frequencies detectable by the human ear when they occur as acoustic vibrations. This range is about 20 Hz to 20 kHz.

audio squelch A squelch circuit that operates only on the audio channel of a receiver.

audio system 1. The portion of any electronic assembly that is used to process sound. 2. Special computer equipment capable of storing and processing audio-frequency (AF) data.

audiotape Magnetic tape for the recording and reproduction of data in the audio-frequency (AF) range.

audio taper In potentiometers, a semilogarithmic variation of resistance versus rotation. Used in volume and tone controls for audio circuits. At midposition (the halfway point), the counter-clockwise portion of the device has about $1/10$ the resistance of the clockwise portion. A listener will hear sound at half-volume because of the logarithmic nature of the human auditory curve.

audio-visual Pertaining to a combination of sound and sight (e.g., television and sound motion picture).

auditory backward inhibition A subjective phenomenon, in which a sound is erased from the memory of a listener by a second sound arriving about 60 milliseconds later.

auditory inhibition The tendency of sound waves to be partitioned, or totally canceled by the ears/mind of a listener, depending on the waves’ intensity, relative phase, and/or direction of impingement.

auditory mirage See ACOUSTIC MIRAGE.

audit trail A history of the processes relating to a record, transaction, or file in a computer system. Created during the routine processing of data, the audit trail is stored as a file. The audit trail allows the assembly that is used to process sound.

aural Pertaining to sound actually heard, as opposed to sound that exists only as audio-frequency currents or waves.

aurora A phenomenon sometimes called the northern lights or southern lights, as seen in the night sky. In the Northern Hemisphere, it is known as Aurora Borealis; in the Southern Hemisphere, it is called Auror Australis. It generally occurs a few hours after a solar flare, when charged particles, emitted from the sun, arrive at the earth, and are accelerated in the vicinity of the earth’s geomagnetic poles.

auroral absorption Radio wave absorption by an aurora.

auroral flutter Rapid fading of a signal at high or very high frequencies, so-called because it often imparts a fluttering quality to the signal that is caused by phase distortion and Doppler shift when the waves are reflected from the aurora.

auroral interference 1. Interference at high-frequency radio propagation and also occasionally to medium-frequency and low-frequency propagation, caused by the activity of the aurora. 2. Auroral flutter on a signal.

auroral opening A condition in which radio communication becomes possible via AURORAL PROPAGATION. It can occur when communication between two points is normally impossible at a certain frequency. Auroral openings allow long-distance communication well into the very-high-frequency (VHF) spectrum.

auroral propagation Reflection of radio signals from aurora that occur during geomagnetic storms. Theoretically, auroral propagation is possible when the aurora are active, between any two points on the earth at which the same part of the aurora lie on a line of sight. This type of propagation seldom occurs when one end of the circuit is at a latitude less than 35 degrees north or south of the equator. Auroral propagation can take place at frequencies well above 30 MHz. It is characterized by deep, rapid fading and random phase modulation of reflected signals.

auroral reflection The return of electromagnetic waves that have been beamed toward an aurora. Most often observed between 15 MHz and 190 MHz.

authorized access switch A device that disables a security system in a defined region or volume so that unauthorized personnel can enter without triggering an alarm condition.

authorized channel The carrier frequency or band assigned to a transmitting station by a licensing authority. Also see RADIO SPECTRUM.

autoalarm A device that is actuated from a received signal to alert a radio or computer network operator to the existence of a message.

autobaud 1. In digital communications, a function that allows the equipment to adjust itself to the speed of the terminal. 2. Any digital communications equipment capable of automatically adjusting to the speed of the terminal.

autocondensation A measure of the similarity between delayed and undelayed versions of a signal. Used as a delay function.

autodyne reception Radio reception of cw signals by means of an oscillating detector. This is in contrast to heterodyne reception, in which a local oscillator (LO) generates an audio beat note with the cw signal in a harmonic detector.

autointerpolation A two-phase process of adaptive ionization. The atom is excited beyond its ionization potential, and then it is allowed to deionize, causing the emission of an electron. The result is a positively charged atom (positive ion).

automated communications The transfer of data without the use of operating personnel; generally done with computers connected to communications equipment.

automated guided vehicle Abbreviation, AGV. A robot cart that runs without a driver. It uses an electric engine and is guided by the magnetic field produced by a current-carrying wire embedded in the floor or pavement. Alternatively, the robot can run on a program of coded signals.

automated home A residence in which many, or most, of the routine chores are done by comput- ers and/or robots. Examples of such tasks are dishwashing, doing the laundry, mowing the lawn, blowing snow, and vacuuming the floors.

automated integrated manufacturing system See AUTOMATIC MANUFACTURING SYSTEM (AMS).

automatic Self-regulating, independent of human intervention. Some periodic adjustment might be necessary, such as realigning an instrument.

automatic bias A method of obtaining base bias in a bipolar transistor, where a resistor develops a voltage drop because of the current flowing through it. The resistor is usually placed in the emitter circuit, raising the emitter above ground potential.

automatic bass compensation Also called bass boost. In audio high-fidelity systems, a resistor-capacitor (RC) network that increases the relative amplitude of the bass at low volume levels. This compensates for the ear’s inefficiency at low frequencies. The function can be automatically actuated by the setting of the volume control, or it can be switched manually on and off.

automatic bias In an amplifier, an offset that is due to grid (gate) or grid bias obtained from the voltage drop produced by collector/drain/plate current flowing through a resistor common to the input and output. This resistor is usually shunted by a capacitor and placed in the emitter/source/cathode circuit.

auroral propagation • automatic chorminance control
automatic gain control 1. Abbreviated AGC. A system that holds the output of a receiver or amplifier substantially constant despite input-signal amplitude fluctuations. A rectifier samples the ac signal output and delivers a dc signal proportional to that output. The dc signal is filtered, and the smoothed-out voltage is applied in correct proportionality to bias to one or more preceding stages to reduce their gain. The stronger the signal entering the system, the greater the reduction in gain. As a result, smaller signals and, usually, much more than strong ones. Various forms of this scheme are used in many types of amplifiers and communications systems.

automatic gain control 2. A method of obtaining gate current on a transistor or gate current on a field effect transistor. This is done by the use of a circuit that holds the output of a receiver or amplifier constant despite input-signal amplitude fluctuations.

automatic height control 1. In a television (TV) receiver, a system that automatically maintains the height of the picture, despite signal-amplitude fluctuations, power-line voltage changes, and gain variations.

automatic height control 2. A method of obtaining gate current on a transistor or gate current on a field effect transistor. This is done by the use of a circuit that holds the output of a receiver or amplifier constant despite input-signal amplitude fluctuations.

automatic noise limiter 1. Abbreviation, ANL. Any device that reduces the noise level of a circuit or device. This is done by the use of a circuit that holds the output of a receiver or amplifier constant despite input-signal amplitude fluctuations.

automatic noise limiter 2. A method of obtaining gate current on a transistor or gate current on a field effect transistor. This is done by the use of a circuit that holds the output of a receiver or amplifier constant despite input-signal amplitude fluctuations.

automatic phase control 1. A program interruption caused by hardware or software acting in response to some event independent of the program.

automatic phase control 2. A technique of correcting transmission errors using error-detecting and error-correcting codes and, usually, automatic retransmission.
to a security network that provides encoded voice communications.

**automatic**

- **automatic set** A teletypewriter or terminal that is capable of receiving and transmitting.
- **automatic sensitivity control** 1. A self-actuating circuit using principles similar to those used in AUTOMOTOR. It varies the sensitivity of the radio-frequency (RF) and intermediate-frequency (IF) sections of a receiver in inverse proportion to the strength of a received signal. 2. In a bridge null detector, a circuit similar to the one described in 1, which operates ahead of the detector, varying the sensitivity of the latter automatically.
- **automatic sequencing** The ability of a digital computer to perform successive operations without additional instructions from the operator.
- **automatic short-circuit protection** A device that automatically opens the circuit breaker in a device or circuit under certain specified conditions.
- **automatic switch center** A telephone-switching network to their destinations without the need for a human operator.
- **automatic target control** For a television camera tube, a circuit that automatically adjusts the target voltage in proportion to brightness of the target.
- **automatic telegraph reception** Telegraph reception providing a direct printout of the received information, without intervention by an operator.
- **automatic telegraph transmission** Telegraph transmission originating from tapes, disks, or other records, rather than from a hand-operated key.
- **autotuner** Also known as AUTOMATIC RANGING.
- **autowave** A device or system that operates on the principle of the synchronous ac motor, in which the position of the rotor in one motor (the transmitter) is assumed by the rotor in a distant motor (the receiver) to which the first is connected.
- **audio tracking** A method of controlling the output voltages of many different power supplies simultaneously.
- **autovoltage regulator** A type of magnetic amplifier whose power windings serve also as control windings.
- **autotransformer** A single-winding transformer in which the primary coil is a fraction of the entire winding for voltage step-up, or the secondary coil is a fraction of the entire winding for voltage step-down.
- **auxiliary circuit** A circuit that is supplementary to the main system.
- **auxiliary contacts** In switches and relays, contacts that are supplementary to the main contacts and are usually actuated with them.
- **auxiliary equipment** 1. Also known as peripheral. An apparatus not directly governed by the central processing unit of a digital computer, such as a printer or personal robot. 2. Peripheral equipment in any system. 3. Backup equipment.
- **auxiliary memory** In a digital computer, a unit that is supplementary to the main memory, which it augments.
- **auxiliary receiver** Also called standby receiver. In a radio communications system, a receiver that is available for use if the main receiver fails.
- **auxiliary relay** 1. A standby relay. 2. A relay whose operation supports that of another relay. 3. A relay that is operated by the actuation of another relay.
- **auxiliary switch** 1. A standby switch. 2. A switch wired in series or parallel with another switch. 3. A switch that is operated by another switch.

**auxiliary equipment**

- **avalanche breakdown** The amount of time at which a computer is available to an individual.

**avalanche** The phenomenon in semiconductors operated at high reverse bias voltage, whereby carriers acquire sufficient energy to produce new electron-hole pairs as they collide with atoms. The action causes the reverse current to increase sharply.

**avalanche breakdown** In a semiconductor P-N junction, a condition that occurs when the reverse bias voltage exceeds a certain value. If the electric field in the vicinity of the junction becomes strong enough, charge carriers are dislodged from the atoms and the carriers (electrons and holes) flow freely across the P-N junction in the opposite direction from normal. The mini-
**avalanche breakdown** A plan-position display that incorporates two different radar traces on a single cathode-ray tube (CRT), one giving bearing, the other elevation.

**azimuth alignment** In a tape recorder, the alignment of record and playback head gaps so that their centerlines are parallel.

**azimuth blanking** In a radar system, blacking-out the image as the antenna sweeps across a specified range of azimuth angles. Effectively eliminates nuisance echoes from stationary, permanent objects (such as tall buildings or communication towers).

**azimuth resolution** In a radar system, the minimum azimuth separation of two targets whose range (distance from the station) are equal that is required for the system to show two echoes, rather than one. It is generally measured in degrees.

**azusa** An electronic tracking system, in which a single station provides slant range and two direction cosines for a distant airborne object. This accurately defines the coordinates of the distant object in three-dimensional space.

**axial leads** The centrally located leads emanating from the ends of cylindrical components, such as resistors and diodes.

**axial ratio** The ratio of the minor to major axes of a waveguide's polarization ellipse.

**axis** 1. A coordinate in a graphical presentation or display (e.g., horizontal and vertical axes in a rectangular coordinate system). 2. The real or imaginary straight line around which a body rotates, or the line that passes through the center of a symmetrical arrangement (line of symmetry).

**axis of abscissas** The horizontal axis (x-axis) of a rectangular-coordinate graph or screen. Compare AXIS OF ORDINATES.

**axis of ordinates** The vertical axis of the complex plane in which rectangular vectors lie. Compare AXIS OF IMAGINARIES.

**Ayrton-Mather galvanometer shunt** A step-adjustable universal shunt resistor for varying the sensitivity of a galvanometer. It has the virtue of keeping the galvanometer critically damped. The shunt is also useful in multirange milliammeters, microammeters, and ammeters. The sensitive meter movement is never without a shunting resistor during range switching.

**azimuth** Also called compass direction. Angular measurement in the horizontal plane, clockwise from north. It is important in radio and television communications, navigation, direction finding, land surveying, and radar.

**average brilliance** The average brilliance of a television (TV) picture, cathode-ray-tube (CRT) computer display, or oscilloscope image.

**average brightness** The average brilliance of a television (TV) picture, cathode-ray-tube (CRT) computer display, or oscilloscope image.

**average calculating operation** The operating time considered typical for a computer calculation (i.e., one that is longer than an addition and shorter than a multiplication); it is frequently taken as the average of nine additions and one multiplication.

**average current** Abbreviation, $I_{avg}$. The average value of alternating current flowing in a circuit. Taking polarity into account, this value is zero for a pure sine wave. For other waveforms, it can vary. When polarity is not considered, the sine-wave value of $I_{avg}$ is equal to $0.637 I_{pk}$. The peak value of voltage.

**average voltage** Abbreviation, $E_{avg}$. The average value of voltage in a circuit. Taking polarity into account, this value is zero for a pure sine wave. For other waveforms, it can vary. When polarity is not considered, the sine-wave value of $E_{avg}$ is equal to $0.637 E_{pk}$, the peak value of voltage.

**avc** Abbreviation of automatic volume control.

**AVC** Abbreviation for automatic volume control.

**avdp** Abbreviation for Avoirdupois, a weight-measurement scheme that is used in English-speaking countries and is based on the pound.

**average noise figure** Measurement scheme that is used in English-speaking countries and is based on the pound.

**average pulse amplitude** Also called effective pulse amplitude. The value obtained by integrating the pulse amplitude, with respect to time, from the start of the pulse to its end, then dividing this integral by the pulse duration.


BAS See AMERICAN WIRE GAUGE.

B5-cut crystal A piezoelectric plate cut from a quartz crystal in such a way that the face of the plate is at an angle, with respect to the z-axis of the crystal. This type of crystal has good frequency stability under conditions of changing temperature.

BA Abbreviation of BATTERY. Also see B and BAT.

Ba Symbol for BARIUM.

babbit A relatively soft, tin-base alloy of various compositions. One composition contains 7.4% antimony, 3.7% copper, and 89.9% tin.

babbie Interference caused by crossstalk from a number of channels.

babbie signal A jamming signal containing babbie components. See BABBLE and JAMMING.

BABS Abbreviation of BLIND-APPROACH BEACON SYSTEM.

baby monitor A short-range radio transmitter and receiver that can be used to listen at a distance to the sounds in an infant’s room. The transmitter contains a sensitive microphone, a whip antenna, and a power supply. The unit can be placed on a table or desk, or even on the floor near the baby’s crib. The receiver is similar to a handheld “walkie-talkie.” It is battery-powered and can be carried around. It has an inductively loaded, short “rubber duckie” antenna similar to the antennas on cordless telephone sets. The receiver can pick up signals from the transmitter at distances of up to about 200 feet. The radio-frequency signals pass easily through walls, ceilings, and floors.

back bias 1. A feedback signal (negative or positive). 2. Reverse bias (also see BIAS). 3. A reverse bias voltage, obtained from a voltage divider connected between a voltage source and ground.

backbone A form of transmission line with capacitive connections between the generator and the load.

back conduction Conduction of current in the reverse direction, as across a semiconductor junction that is reverse-biased.

back contact A contact that closes a circuit when a relay, switch, or jack is in its normal rest position.

back current Symbol, I. The normally small current flowing through a reverse-biased pn semiconductor junction. Also called reverse current and inverse current. Compare FORWARD CURRENT. See DIODE.

back diode A semiconductor diode that is normally back biased (reverse-biased).

back echo An echo resulting from the rear lobe of an antenna radiation pattern.

back emf See BACK VOLTAGE.

Back-Goudsmit effect See ZEEMAN EFFECT.

background 1. The context or supporting area of a picture (e.g., the background of a television picture). 2. Background noise.

background control In a color television receiver, a potentiometer used to set the dc level of the color signal at one input of the three-gun picture tube.

background count Residual response of a radiation counter in an environment as free as practicable of radioactivity. This background is caused largely by cosmic rays and inherent radioactivity of surrounding buildings and other materials in the environment. Also see BACKGROUND 2. background job A low-priority, relatively long-running computer program that can be interrupted so that a higher-priority program can be run.

background noise Electrical noise inherent to a particular circuit, system, or device that remains when no other signal is present.

background processing In a computer, the running of programs having low priority.

background radiation Nuclear radiation from materials in the environment. Also see BACKGROUND COUNT.

background response The response of a radiation detector to background radiation.

backing store In a computer, a device that stores large amounts of information. In most small computers, this is done via MAGNETIC DISK and/or MAGNETIC TAPE. A backing store can also be an optical storage medium, such as CD-ROM (compact disk, read-only memory).

backlash 1. Slack or lag in action of moving parts. Example: delay between initial application of a force (such as that required to turn a knob) and movement of a part or device (e.g., a potentiometer or variable capacitor). 2. On a mechanical analog tuning dial, an arc within which slack or lag is discernible.

backloaded horn A loudspeaker enclosure in which the front of the speaker cone feeds sound directly into the listening area, and the rear of the cone feeds sound into the same area through a folded horn.

backloading In a cascaded series of amplifiers, the tendency of loading effects to be passed to earlier stages. A change in the output impedance of a final amplifier circuit, for example, could also result in a change in the output impedance of the driver circuit, and perhaps even in a change in the output impedance of the predriver.

back lobe In the pattern of a directional antenna, the lobe directly opposite the major lobe, representing the radiation or response in or from a direction 180 degrees from that in which the gain is greatest.

backlight A flat electrode in a television (TV) camera tube that receives the stored-charge image via capacitive coupling.

back porch In a television (TV) horizontal sync pulse, the time interval between the end of the blanking pedestal and the beginning of the rise of the sync pulse. That portion of the flat top of the blanking pedestal behind the sync pulse. Compare FRONT PORCH.

back-porch effect In transistor operation, the continuation of collector current flow for a short time after the input signal has fallen to zero.

back-porch tilt The departure of the top edge of a back porch from true horizontal.

back pressure sensor A device that detects and measures the torque that a motor is applying, and produces a signal whose amplitude is proportional to the torque. This signal can be used for various purposes. In a robotic device, for example, the sensor output can be fed back to the motor control to limit the applied force.

back resistance Symbol, Rb. The resistance of a reverse-biased pn semiconductor junction. Also called REVERSE RESISTANCE.
balanced antenna system  mounted in a waveguide to reduce the cross-sectional area.

A metal plate

A board on which a loudspeaker is mounted

baffle  back-wave radiation

The oscillator signal present in an amplifier circuit in the event that the main power source should fail.

back pressure sensor

back scatter  Scattering of a wave back toward a radio transmitter from points beyond the skip zone. This phenomenon is caused by ionospheric reflection. Compare FORWARD SCATTER.

backstop  A contact or barrier (such as a screw or post) that serves to limit the BACKSWING of a relay.

backswing  1. The tendency of a pulse to overshoot, or reverse direction after completion. Backswing is measured in terms of the overshoot amplitude as a percentage of the maximum amplitude of the pulse. 2. The extent to which a relay armature moves back from a contact when the relay contacts are open.

back-to-back connection  The connection of diodes in reverse parallel (i.e., the anode of one to the cathode of the other) across a signal line to pass both half cycles of ac in certain control circuits.

back-to-back sawtooth  A symmetrical sawtooth wave in which the rise and fall slopes are equal.

back-up  1. Any component, that is used to replace a main component, in case of main-component failure. 2. Any process or scheme that serves to maintain operation of a system in case of main-component failure. 3. A battery that maintains volatile memory data stored in one or more integrated circuits. 4. A computer file, or set of files, stored in a nonvolatile medium, such as diskettes or magnetic tape, to prevent catastrophic data loss in the event of a hard disk failure. 5. A battery or alternative power source that keeps an alarm system power-up in the event of a utility power failure.

backup battery  1. In a computer or microcomputer-controlled electronic device, a source of voltage to preserve volatile memory data if the power source is removed. 2. A battery used for powering a system in the event that the main power source should fail.

backup facility  In an electrical or communications system, a facility that is intended for use when the primary, or main, facility is not operational.

back voltage  1. Voltage induced in an inductor by the flow of current through the inductor, so-called because its polarity is opposite to that of the applied voltage. Also called counter emf. 2. A voltage used to obtain back-action (e.g., the voltage used to zero the meter in an electronic voltmeter circuit). 3. Reverse voltage applied to a semiconductor junction.

backwall  In a pot core, the plate or disk that connects the sleeve and center post to close the magnetic circuit.

backward diode  A semiconductor diode manufactured in such a way that its high-current flow occurs when the junction is reverse biased. Such a diode is also a negative-resistance device.

backward-wave oscillator  Abbreviation, BWO. A microwave oscillator tube similar to the traveling-wave tube. Like the traveling-wave tube, the BWO contains a helical transmission line. In the electron beam, electron bunching results from interaction between the beam and the electromagnetic field, and reflection occurs at the collector. The wave moves backward from collector to cathode, and oscillation is sustained because the backward wave is in phase with the input. Output is taken from the cathode end of the helix.

Back to back wave  The oscillator signal present in an amplifier-klystron, continuous-wave (CW) Morse-code transmitter. Normally, this signal is at the same frequency as the transmitter output, but it is not sufficiently strong to be radiated over the air.

back-wave radiation  The condition wherein a back wave is strong enough to be heard on a continuous-wave (CW) klystron signal at the receiving station. This results from ineffective amplifier keying.

baffle  A board on which a loudspeaker is mounted to separate acoustic radiation from the back of the cone from radiation emanating from the front. The baffle improves bass response by increasing the wavelength (lowering the frequency) at which phase cancellation occurs.

baffle plate  1. See BACKPLATE. 2. A metal plate mounted in a waveguide to reduce the cross-sectional area.

bail  1. A wire loop or chain that holds one member of a two-member assembly to prevent loss (e.g., the short chain holding the dust cap of a jack). 2. A loop or heading for netting, or a net-forming line.

Balanced antenna system  The trade name for a specialized plastic dielectric material. Its chemical composition is phenolic/formaldehyde resin.

baker  An obsolete phonetic alphabet code word for letter B. BRAVO is commonly used instead.

baking-out  In the process of evacuating a system, the procedure of heating the system to a high temperature to drive out gases occluded in the glass and metal parts.

balance  1. See BIRDGE. To null a bridge or similar circuit. 2. To equalize loads, voltages, or signals between two circuits or components. 3. In a high-fidelity stereo sound system, a control or set of controls that adjusts the relative loudness of the left and right channels. 4. Alignment of a balanced modulator for minimum carrier output amplitude. 5. Adjustment of a balanced modulator or mixer to bring the carrier output amplitude to a specified level.

balanced coil  1. A type of autotransformer that enables a three-wire ac circuit to be supplied from a two-wire line. A series of taps around the center of the winding enables the circuit to be compensated for unequal loads. 2. See BALANCING COIL.

balance control  A variable component, such as a potentiometer or variable capacitor, that is used to balance bridges, null circuits, or loudspeakers.

balanced  Having identical impedances, relative to ground.

balanced bridge  1. A circuit that has its electrical midpoint grounded, as opposed to the single-ended circuit, which has one side grounded. 2. A bridge circuit in the condition of null.

balanced converter  See BALUN.

balanced currents  Currents with the same value. In the two conductors of a balanced transmission line, these currents are equal in amplitude and opposite in phase at every point along the line.

balanced delta  A set of coils or generators in a three-phase system, connected so that the currents in any two coils differ in phase by 120 degrees.

balanced detector  A symmetrical demodulator, such as a full-wave diode detector or a discriminator.

balanced electronic voltmeter  An electronic voltmeter circuit in which two matched transistors are connected in a four-arm bridge arrangement. The drift in one half of the circuit opposes that in the other half; the resulting drift of the zero point is virtually eliminated.

balanced filter  A filter consisting of two identical sections, one in each branch of a balanced system, such as a balanced transmission line.

balanced input  An input circuit whose electrical midpoint is grounded. Compare SINGLE-ENDED INPUT.

balanced input transformer  An input transformer in which the center tap of the primary winding is grounded.

balanced line  A pair of parallel wires that possesses a uniform impedance. The two conductors are of the same material and have identical diameters. The distance between them is constant. In a balanced two-wire line, the currents in the two conductors are of equal amplitude and opposite phase.

balanced lines  In high-fidelity audio systems, a cable that consists of two parallel conductors surrounded by a single braid. The parallel wires carry the audio-frequency (AF) signals, and the braid is grounded for shielding.

balanced loop antenna  A loop antenna with a grounded electrical midpoint, determined by the junction of two identical series-connected capacitors shunting the loop.

balanced low-pass filter  A low-pass filter used in a balanced system or balanced transmission line.

Balakulo  The trade name for a specialized plastic dielectric material. Its chemical composition is phenolic/formaldehyde resin.

Balduine  A metal plate mounted in a waveguide to reduce the cross-sectional area.

Bakelite  A symmetrical sawtooth wave in which the rise and fall slopes are equal.

baker  An obsolete phonetic alphabet code word for letter B. BRAVO is commonly used instead.

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balanced loop antenna  A loop antenna with a grounded electrical midpoint, determined by the junction of two identical series-connected capacitors shunting the loop.

balanced low-pass filter  A low-pass filter used in a balanced system or balanced transmission line.
balanced method  A system of instrumentation in which a zero-center scale is used. The reading can be either side of the zero reading but is suitably balanced.

balanced modulator  A symmetrical modulator circuit using bipolar transistors, field-effect transis tors, an integrated circuit, or diodes as principal components, that delivers an output signal containing alternating positive and negative carrier. It is commonly used to generate a double-sideband (DSB) signal that can be filtered to obtain a single-sideband (SSB) signal.

balanced multivibrator  A switching oscillator circuit in which the two halves are identical in configuration, and as nearly identical as practicable in performance.

balanced network  Any network intended to be used with a balanced system or balanced transmission line. It is characterized by a pair of terminals, each of which shows the same impedance with respect to ground.

balanced oscillator  A PUSH-PULL OSCILLATOR.

balanced output  Output balanced against ground (i.e., where the electrical midpoint of the output circuit is grounded).

balanced output transformer  1. A push-pull output transformer with a center-tapped primary winding. 2. An output transformer with a grounded center tap on its secondary winding.

balanced-probe probe  A probe, such as one for an electronic voltmeter or oscilloscope, that has a balanced input and usually a single ended output.

balanced-tee trap  A wavetrap constructed in a T configuration, with a resonant section in each conductor of a balanced transmission line.

balanced telephone line  A telephone transmission line that carries two, similar to a balanced radio-frequency transmission line. Either side has the same impedance, with respect to ground.

balanced termination  A load device (or the practice of using such a device) in which the sections provide the same termination for each of the sections or conductors of a balanced system, such as a balanced line.

balanced-to-unbalanced transformer  See BALUN.

balanced transmission line  See BALANCED LINE.

balanced varactor  It has a two-variable input voltage that is high enough to maintain the diode in a high-tuned condition.

balanced voltages  In any symmetrical system, such as a balanced line or push-pull circuit, two or more input or output voltages that are adjusted to have the same amplitude and (usually) opposite phase.

balanced-wire circuit  A circuit or conductor sys tem with identical halves that are symmetrical, with respect to ground and to other conductors.

balancing circuit  See BUCKING CIRCUIT.

balancing coil  In a receiver, a center-tapped antenna coil that is balanced to ground to eliminate MARCONI EFFECT.

ballast  1. A component that is used to stabilize the current flow through, or operation of, a circuit, stage, or device. 2. An iron-core choke connected in series with one of the electrodes in a fluorescent or other gas-discharge lamp.

ballast resistor  A nonlinear inductive power re sistor whose voltage-current (IE) characteristic is such that current through the resistor is independent of voltage over a useful range. This feature allows the ballast resistor to reduce lamp voltage without affecting lamp efficiency. 3. A small (usually high-resistance) resistor operated in series with a glow lamp, such as a neon lamp, to prevent overshoot.

ballast transformer  A misnomer often used in place of BALLAST. 2. ballistic galvanometer  An undamped galva nometer that is used particularly to observe electric charges by noting the single throw resulting from the momentary flow of current through the galvanometer coil.

ballistics  The electronics-supported science concerned with the motion of projectiles and similar objects over a single interval.

balloon antenna  A vertical antenna consisting of a wire or wires held aloft by a captive balloon. Occasionally, used by radio amateurs and shortwave-listeners at low and medium frequencies. A poten tially dangerous antenna because of large static elec tric build-up, a tendency to attract lightning, the possibility of its breaking loose, and the risk of line-of-sight contact with high voltage power lines.

balop  A range of energy levels.

balopticon  A picture tube. Also spelled ballopticon.

banal  A specialized impedance-matching radio-frequency (RF) transformer. It is a wideband device, usually providing a 1:1 or 1:4 impedance ratio and available in several different forms. It is so called because it has an unbalanced input that is suitable for coaxial transmission lines, and a balanced output suitable for dipole, Yagi, and quad antennas.

banana jack  The female half of a two-part quick connect combination. Failing of a circuit is completed by inserting a BANANA PLUG into this jack.

banana plug  The male half of a two-part quick-connect combination, with sides usually composed of flat springs that ensure contact with the female BANANA JACK into which it is inserted.

band  1. A continuous range of radio or television communications frequencies or wavelengths, usually designated by the lowest and highest frequency, or the approximate wavelength (e.g., the 20-meter amateur radio band). 2. A set of discrete radio or television frequency channels within a specified range (e.g., the standard AM broadcast band). 3. A range of wavelengths for infrared, visible, ultraviolet, X-ray, or gamma-ray energy. 4. A range of energy levels. 5. A colored stripe on a resistor or capacitor that forms part of the code that indicates component value and tolerance.

band center  1. In a given radio or television com munications band, the arithmetic mean of the lowest and highest frequencies. 2. In a given band, the geometric mean of the longest and shortest wavelengths.

band-elimination filter  See BAND-REJECTION FILTER.

band gap  In any atom, the difference in electron en ergy between the conduction and valence bands.

bandpass  1. The frequency limits between which a BANDPASS FILTER or BANDPASS AMPLIFIER transmits ac energy with negligible loss. 2. The ability to allow passage of signals at a given frequency or band of frequencies while blocking other signals. Compare BANDSTOP.

bandpass amplifier  An amplifier that is tuned to pass only those frequencies between preset limits.

bandpass coupling  A coupling circuit with a flat topped frequency response so that a band of frequencies, rather than a single frequency, is coupled into a succeeding circuit. Also see BANDPA SS transformer tube.

bandpass filter  Any resonant circuit, or combina tion of resonant circuits, designed to discriminate against all frequencies except a specific frequency $f_0$ or a band of frequencies between two limiting frequencies $f_1$ and $f_2$. In a parallel inductance-capacitance (LC) circuit, the device exhibits high impedance at the desired frequency or frequen cies and a low impedance at unwanted frequen cies. In a series configuration, the filter has a low impedance at the desired frequencies and a high impedance at unwanted frequencies. Compare BANDSTOP FILTER, HIGH-PASS FILTER, LOW-PASS FILTER.

bandpass-flatness  The degree to which a bandpass device’s attenuation-versus-frequency curve is a straight line with zero slope within the passband.

band pressure level  The net acoustic pressure of a sound source within a specified frequency range (band).

band-rejection filter  Also called a band-stop filter. Any resonant circuit, or combination of resonant circuits designed to discriminate against a specific frequency $f_0$ or a band of frequencies between two limiting frequencies $f_1$ and $f_2$. In a parallel inductance-capacitance (LC) circuit, the device exhibits high impedance at the desired fre quencies, and a low impedance at the unwanted frequency or range of frequencies. In a series con figuration, the filter has a low impedance at the desired frequencies and a high impedance at the unwanted frequency or range of frequencies. Compare BANDPASS FILTER, HIGH-PASS FILTER, LOW-PASS FILTER.

band select  Any switch or relay that facilitates switching the frequency of a radio transmitter, receiver, or transceiver among various bands.

bandset capacitor  In some older communications receivers, a variable capacitor is used to provide the tuning range in each band to correspond to graduations on the tuning dial. This capacitor is also called a trimmer or padder operated in conjunction with the main tuning capacitor.

bandsplintering  In some older communications receivers, the process of widening the tuning range within a given frequency band to cover the entire dial. Otherwise, the band would occupy only a portion of the dial, and tuning would be difficult. It is usually accomplished with a BANDSPREAD TUNING CONTROL whose range is preset via the main tuning control and/or a BANDSET CAPAC ITOR.

bandspread tuning control  An analog adjustment in some older communications receivers that allows continuous tuning over a desired band of frequencies. This control is separate from the main bandswitch control and provides a continuously variable range of tuning within the desired band.

bandstop  1. The frequency limits between which a BAND-REJECTION FILTER blocks, or greatly attenuates, ac energy. 2. The ability to suppress or block signals of a given frequency or band of frequencies, while allowing signals of other frequencies to pass with little or no attenuation. Compare BANDPASS.
bandstop filter  See BAND-REJECTION FILTER.

band suppression 1. The property of blocking, or greatly reducing, signals within a specific frequency band. 2. The frequency limits between which a device or circuit rejects or blocks as energy, while passing energy at other frequencies with negligible loss.

band-suppression filter  See BAND-REJECTION FILTER.

bandswitch  A low-reactance selector switch (usually rotary) that facilitates changing the tuning range of a radio receiver, transmitter or transceiver from one band of frequencies to another.

bandswitching  In a receiver, transmitter, or test instrument, the process of switching self-contained tuned circuits to change from one frequency spectrum to another within the range of the device’s intended operation.

bandwidth  1. A communications or data signal, a measure of the amount of spectrum space over which the signal occupies. Usually, it is given as the difference between the frequencies at which the signal amplitude is nominally 3 dB down with respect to the amplitude at the center frequency. These frequencies represent the half-power points of the amplitude-versus-frequency function. In general, the bandwidth increases as the data rate (in bits per second, baud, or words per minute) increases. 2. Also called NECESSARY BANDWIDTH. The minimum amount of spectrum space for effective transmission and reception of a communications or data signal. 3. See BANDWIDE.

bank  A collection of usually similar components used in conjunction with each other, usually in a parallel circuit (e.g., the parallel examples are resistor bank, lamp bank, and transformer bank).

banked transformers  Parallel-operated transformers.

bankwound coil  A coil wound in such a way that the turns are not side by side, thus reducing the inherent distributed capacitance.

bar  1. Abbreviation. b. The cgs unit of pressure, in which 1 bar = 10 atmospheres. 2. A horizontal or vertical line produced on a television (TV) screen by a bar generator and used to check linearity. 3. A relatively long permanent magnet in the shape of a bar with a rectangular or square cross section. 4. A digital meter that displays a quantity of the shape of a bar with a rectangular or square cross section. 5. The state of near equilibrium in a subatomic particle made up of three quarks.

barrier-layer cell  1. See BARRIER. 2. A barrier layer consists of horizontal and vertical bulging.

barrier layer  The carrier-free space-charge region in a semiconductor material.

barrier potential  The voltage required for the initiation of current flow through a pn junction.

Barlett force  See EXCHANGE FORCE.

baryon  A subatomic particle made up of three quarks.

base  1. In a bipolar transistor, the intermediate region between the emitter and collector, which usually serves as the input or controlling element of transistor operation. 2. A substance that dissociates in water solution and forms hydroxyl (OH) ions. For example, sodium hydroxide.

baseband  The frequency band over which a device or circuit rejects or blocks ac energy, while passing energy at other frequencies with negligible loss.

baseband frequency response  The range of frequency over which a radio transmitter can be modulated to convey information. For single sideband (SSB), it is approximately 300 Hz to 3 kHz for high-fidelity, frequency-modulated (FM) music broadcast.
transmission, it is about 10 Hz to 20 kHz or 30 kHz; for fast-scan television, it consists of frequencies up to several megahertz. This range is determined by bandwidth and/or lowpass filters in the AF or composite video section of the transmitter.

- **base bias** The steady dc voltage applied to the base electrode of a transistor to determine the operating point along the transistor characteristic curve.

- **base-bulk resistance** The resistance of the semiconductor material in the base layer of a bipolar transistor.

- **base-charging capacitance** In the common-emitter connection of a bipolar transistor, the internal capacitance of the base-emitter junction.

- **base current** Symbol, \( I_b \). Current flowing through the base electrode of a bipolar transistor. Also see AC BASE CURRENT and DC BASE CURRENT.

- **base electrode** See BASE 1. Also called base 1.

- **base element** 1. Base electrode. 2. One of the basic metals, such as iron or tin, that are not generally considered precious (as opposed to noble).

- **base-e logarithm** See NAPIERIAN LOGARITHM.

- **base film** The plastic substrate of a magnetic recording tape.

- **base frequency** 1. The frequency of the principal, or strongest, component in a complex signal or waveform, also called basic frequency. 2. The frequency of operation of a base-station transmitter when the receiver is tuned to a second channel.

- **base-input circuit** A common-collector circuit, common-emitter circuit, or emitter follower.

- **base insulator** A static dielectric insulator, used to support a heavy conducting element and keep the conductor isolated from other possible conductors or conductive paths.

- **base line** In visual alignment procedures involving an oscilloscope and radio-frequency (RF) sweep generator, a zero-voltage reference line developed by the generator as a horizontal trace on the oscilloscope screen.

- **baseline stabilizer** A clamping circuit that holds the reference voltage of a waveform to a predetermined value. Also called DC RESTORER.

- **base-loaded antenna** A usually vertical antenna or radiating element, the electrical length of which is adjusted by means of a loading coil or tuned circuit in series with, and positioned at the bottom of, the antenna or radiator.

- **base material** In printed circuits, the dielectric material used as a substrate for the metal pattern. Also called base medium.

- **base notation** The numbering or radix system used in any application (as octal, decimal, binary, or hexadecimal).

- **base number** See BASE 4.

- **base pin** One of the straight prong-like terminals on an electrical or electronic component; it is used to provide support for the device and to allow a physical connection between the socket terminal, into which it fits, and one of the internal electrodes of the device.

- **base plate** The chassis plate upon which components are mounted before wiring.

- **base potential** See BASE VOLTAGE.

- **base region** See BASE 1.

- **base resistance** Symbol, \( R_b \). Resistance associated with the base electrode of a bipolar transistor. Also see AC BASE RESISTANCE and DC BASE RESISTANCE.

- **base resistor** The external resistor connected to the base of a bipolar transistor. In the common-emitter circuit, the base resistor is analogous to the gate resistor of a field-effect transistor (FET) circuit.

- **base spreading resistance** Symbol, \( R_{eb} \). In a bipolar transistor, the bulk-material resistance of the base region between the collector junction and emitter junction.

- **base station** The head station or fixed home station in a communication network.

- **base 10 logarithm** Abbreviation, \( \log_{10} \). A logarithm based on the decimal number 10. If \( \log_{10} M = y \) then \( 10^y = M \). Base-10 logarithms are commonly used in engineering. Compare NAPIERIAN LOGARITHM.

- **base voltage** Symbol, \( V_b \). The voltage at the base electrode of a bipolar transistor. Also see AC BASE VOLTAGE and DC BASE VOLTAGE.

- **BASIC** Acronym for BEGINNER’S ALL-PURPOSE SYMBOLIC INSTRUCTION CODE, a relatively primitive, but versatile and easy-to-learn computer language developed at Dartmouth College.

- **basic frequency 1.** The FUNDAMENTAL FREQUENCY of a signal, as opposed to one of its harmonics. See BASE FREQUENCY 1.

- **basic protection** Devices and procedures essential to minimize the risk of damage to electronic equipment, and/or injury or death to its operators, as a result of lightning. Hardware provisions include a substantial earth ground, heavy-gauge grounding wire, lightning arrestors for antennas, and transient suppressors for power connections.

- **bass** In audio and high-fidelity applications, a sound in which the low-frequency components, below about 500 Hz, are predominant.

- **bass booster** A manually variable potentiometer used to enhance the low-frequency (bass) sound heard in stereo listening.

- **bass boost 1.** The special emphasis given to low audio frequencies (the bass notes) by selective circuits in audio systems. 2. The technique of increasing the loudness of the bass, relative to the mid-frequency and high-frequency sounds. 3. A loudspeaker or its enclosure designed to give low-frequency response. Also see ACOUSTICAL BASE補 through.

- **bass compensation** A basket weave coil A type of single-layer inductor in which adjacent turns do not parallel each other around the circumference, but zigzag oppositely as a strand does in the woven pattern of a basket. This reduces distributed capacitance.

- **bass crossover** See BASS BOOST.

- **bass control** 1. A manually variable potentiometer for adjusting bass boost of an amplifier or sound system. 2. The arrangement of components that are required to achieve amplitude variation of bass in an audio signal.

- **bass port** In a loudspeaker, a hole in the cabinet that enhances the low-frequency (bass) sound output. Used in high-fidelity audio systems.

- **bass reflex enclosure** A loudspeaker cabinet with a critically dimensioned duct or port that allows bass notes to be radiated in phase with front waves, thus averting unwanted acoustic phase cancellations in the bass that would otherwise occur in high-fidelity audio systems.

- **bass reflex loudspeaker** A loudspeaker mounted in a bass reflex enclosure. Also see ACOUSTICAL PHASE INVERTER.

- **bass resonant frequency** The frequency at which a loudspeaker or its enclosure displays resonant vibration.

- **bass roll-off** 1. The attenuation of the low-frequency (bass) component in a high-fidelity audio signal. 2. A control that allows adjustable attenuation of the low-frequency component in a high-fidelity audio signal.

- **bass suppression** In speech transmission, the removal of all frequencies below about 300 Hz, on the assumption that those frequencies contribute little to intelligibility. This suppression permits the speech level to be increased without overmodulating a transmitter. It also allows smaller audio transformers to be used because the transformer core size must increase as the frequency it passes decreases.

- **battery** In audio and high-fidelity applications, a sound in which the low-frequency components, below about 500 Hz, are predominant.

- **BATTER** Abbreviation of BATTERY.

- **batch fabrication process** The manufacture of devices in a single batch from materials of uniform grade. Particularly, the manufacture of a large number of semiconductor devices from one batch of semiconductor material by means of carefully controlled, identical processes.

- **batch processing** In digital computer operations, the processing of quantities of similar information during a single run.

- **bat-handle switch** A toggle switch, the lever of which is relatively long and thick, and is shaped like a baseball bat.

- **bathtub capacitor** A usually oil-filled capacitor housed in a metal can that looks like a miniature bathtub.

- **bathyconductorgraph** An instrument that is used to measure the electrical conductivity of seawa ter.

- **bathymeterograph** An instrument that plots a graph of temperature versus depth in a body of water, such as a lake or an ocean.

- **batten** Supporting bars or braces that hold a loudspeaker in place within its cabinet, and/or that hold the cabinet panels in place.

- **battery** Abbreviations, B, Ba, BAT. A device consisting of two or more interconnected electrochemical or photovoltaic cells that generate dc electricity. The cells can be connected in series to supply a desired voltage, in parallel to supply a desired current-delivering capability, or in series-parallel to obtain a desired voltage and current-delivering capability. Also see CELL, EDISON BATTERY, LEAD-ACID BATTERY, PHOTO-
battery alignment system that aids in navigation. For example, tri-corner reflectors can be positioned in strategic locations, and a mobile robot equipped with a...
beam-positioning magnet • beat marker

beam-positioning magnet In a three-gun color television picture tube, a permanent magnet that is used to position one of the electron beams correctly, with respect to the other two.

beam power tube A tetrode or pentode vacuum tube, in which special deflector plates concentrate the electrons into beams in their passage from cathode to plate. The beam action greatly increases plate current at a given plate voltage. It is used in some radio-frequency (RF) power amplifiers.

beam-rider control system A missile-guidance system in which a control station sends a radio beam to a missile. The beam is moved in such a way that as the missile stays within the beam, it hits the target.

beam-rider guidance 1. An aircraft landing guidance system, in which the aircraft follows a radio beam in its glide path. 2. The circuitry in a guided missile using a beam-rider control system.

beam splitter A device used to divide a light beam (as by a transparent mirror) into two components, one transmitted and the other reflected; hence, a BEAM-SPLITTING MIRROR.

beam splitting In radar, a method of calculating the mean azimuth of a target from the azimuth at which the target is first revealed by one scan, and the azimuth at which the target information ceases.

beam-splitting mirror In an oscilloscope-camera system, a tilted, transparent mirror that allows rays to pass horizontally from the oscilloscope screen to the camera and to be reflected vertically to the viewer's eye.

beamwidth of antenna The angular width of the main lobe of the pattern of radiation from a directional antenna. Generally, it is measured between the half-power points in the horizontal plane. Occasionally, it is measured in the vertical plane.

beating 1. Also called heterodyning. The combination of signals of different frequencies resulting in sum and difference frequencies. 2. The fluctuating noise heard when two audio tones, very close in frequency and very similar in amplitude, are emitted at the same time.

beat marker In the visual (oscilloscopic) alignment of a tuned automatic frequency control system that results from the beat note between the sweep-generator signal and the signal from a marker oscillator.

beat note The sum or difference frequency that results from the heterodyning of two signals or, under some conditions, of more than two signals.

beat-note reception 1. Reception in which a radio-frequency carrier is made audible by heterodyning it with a beat-frequency oscillator (BFO) to produce an audible beat note. 2. Superheterodyne reception (see SUPERHETERODYNE CIRCUIT).

beat tone A beat note in which the frequency is within the range of hearing.

beaver tail A flat or elongated radar beam, wide in the azimuth plane. Primarily used to determine the altitude of a target. The beam is moved up and down to find the target elevation.

beep A short or control signal, usually of single tone and short duration.

beeper 1. A pocket- or hand-carried transceiver—especially one for maintaining two-way contact with personnel who are away from their base: 2. An acoustic transducer that produces a beep in response to an input signal.

beetle A urea formaldehyde plastic used as a di-rective antenna consisting of a broadband array with a flat reflector and one or more helical driven elements.

belt A test or control signal, usually of single tone.

BFO Also known as a beat-frequency oscillator. Abbreviation, BFO. An oscillator used to set up audible beat frequencies with an incoming received signal and installed in the intermediate-frequency (IF) stages of a superheterodyne communications receiver. For single-sideband (SSB) reception, the BFO is set at the frequency of the received suppressed carrier. In continuous-wave (CW) Morse code reception, the BFO is set at a frequency that differs from that of the incoming signal by about 400 to 1000 Hz. The resulting tone has an audio frequency equal to the difference between the BFO frequency and the received signal carrier frequency. For reception of frequency-shift-keyed (FSK) signals, the BFO is set to such a frequency that the resulting audio beat results are appropriate for the mark and space inputs of a terminal unit or modem.

bell A hollow metal sphere at the upper end, where the antennas being open at the top and accord-ing to the undesired ion beam toward a positive electrode, but which allows the electron beam to pass to the screen. This prevents the ion beam from "burning" a permanent spot on the pho-sor of the screen.

BFO Formula for beryllium oxide. Also see BERYL-LIA.

benchmark A test standard to measure product performance.

benchmark routine A routine designed to evaluate computer software and/or hardware, producing a good indication of how well the software or hardware will perform in real-life situations. In particular, tests instructions per second and throughput, thereby producing an indication of the overall computer power in applications, such as word processing, database, spreadsheet, graphics, animation, and mathematical calculations.

bench test An extensive checkout of a piece of equipment in the test laboratory—either to find an intermittent problem, or to check for reliability.

bend An angular shift in the line of sight direction of a waveguide.

bending effect 1. The downward refraction of a radio wave by the ionosphere. 2. The low-atmosphere turning of a radio wave downward by temperature discontinuity and atmospheric inversions.

bent A continuous-wave method of measuring the distance of an aircraft from the ground, involving the transmission of an audio-modulated signal from ground and the retransmission back to ground by the aircraft. The phase shift between the two signals is proportional to the distance to the aircraft.

bent antenna An antenna that has its driven ele-ment bent, usually near the ends and at right an-gles, to conserve space.

bent gun A television picture tube neck arrangement having an electron gun that is slanted to di-rect the undesired ion beam toward a positive electrode, but which allows the electron beam to pass to the screen. This prevents the ion beam from "burning" a permanent spot on the phos- sor of the screen.
berkelium  Symbol, Bk. A radioactive elemental metal produced artificially. Atomic number, 97.
Atomic weight, 247.
beryllia  Formula, BeO. Beryllium oxide, used in various forms as an insulator and structural ele-
ment (as in resistor cores).
present in various dielectrics and alloys used in electronic components.
Bessel functions  Sophisticated mathematical functions for dealing with periodic electronic phe-
nomena in which the waveform often displays decrement. Also called cylindrical functions.
beta  Symbol, β. The current gain of a common-emitter bipolar transistor stage. It is the ratio of the
induced change of collector current to the applied change of base current: β = DC/DR.
beta circuit  The output-input feedback circuit in an amplifier.
beta cutoff frequency  The frequency at which the current amplification of a bipolar transistor falls
to 70.7% of its low-frequency value.
beta particles  Minute radioactive subatomic bits identical to the electron or positron, and emitted by
some radioactive materials. Also see BETA RAYS.
beta rays  Rays emitted by the nucleus of radioactive substances, consisting of a stream of beta parti-
cles (i.e., electrons or positrons) that move at velocities up to 186,000 miles per second. Compare ALPHA PARTICLE and GAMMA RAYS.
beta-to-alpha conversion  For a bipolar transistor, the conversion of current amplification expressed as
beta (β) to current amplification expressed as alpha (α).
betatron  A particle accelerator in which injected electrons are given extreme velocity by being pro-
pelled in circuit paths in a doughnut-shaped glass container. The term comes from the fact that
high-speed electrons constitute BETA PARTICLES.
betaview cassette recorder  The earliest scheme for videocassette recording: developed by Sony
Corporation in the 1970s. Compare VHS VIDEOCASSETTE RECORDER.
beta zinc silicate phosphor  Formula, (ZnO + 8SiO₂)₄Mn. A phosphorescent substance used to
coat the screen of a cathode-ray tube. The fluores-
cence is green-yellow.
BeV  Abbreviation of billion electronvolts. Also see ELECTRONVOLT, GEV, MEV, and MILLION ELECTRONVOLTS.
bias  A steady voltage that presets the op-
amp's noninverting input (or the inverting input of an inverter) to a known value. Also called DC-
BIAS.
bias diode  A diode having a dc voltage applied in
either forward or reverse polarity. Current flows readily through the forward-biased diode; the re-
verse-biased diode appears as an open circuit. The biased diode is the basis of clippers, limiters,
and other circuits, such as the bipolar transistor.
bias distortion  Distortion caused by operation of a
tube or transistor with incorrect bias so that the
response of the device is nonlinear.
biasing  The dc control of a circuit or device, such as a transistor. Compare BIAS CURRENT.
biasing diode  A diode having a dc bias voltage applied
in either forward or reverse polarity. Current
flows readily through the forward-biased diode; the
reverse-biased diode appears as an open circuit. The
biased diode is the basis of clippers, limiters,
and other circuits, such as the bipolar transistor.
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flows readily through the forward-biased diode; the
reverse-biased diode appears as an open circuit. The
biased diode is the basis of clippers, limiters,
and other circuits, such as the bipolar transistor.
biased search  A scheme that a mobile robot can
use to find its way to a destination or target, by
deliberately searching off to the side and then
homing in as the approach progresses. It is so
called because the general nature of the initial er-
er (bias) is known, although its exact extent need
not be known.
bias oscillator  In a magnetic recorder, an oscilla-
tor operated at a frequency in the 40-kHz to 100-
diameter range to erase prerecorded material and bias
the system magnetically for linear recording.
bias resistor  A usually fixed resistor, such as the
source resistor in a field-effect-transistor (FET) cir-
cuit or the emitter resistor in a bipolar-transistor circuit,
across which a desired bias voltage is de-
veloped by current flowing through the resistor.
bias set  A control, such as a potentiometer or vari-
able autotransformer, that facilitates manual ad-
justment of the dc bias of a circuit.
bias stabilization 1. The maintenance of a con-
stant bias voltage, despite variations in load
impedance or line voltage. It is usually accom-
plished by means of automatic voltage regulation.
2. The stabilization of transistor dc bias voltage
by means of resistance networks or through the
use of barretters, diodes, or thermistors.
bias supply  Batteries that provide dc voltage or
current for bipolar or field-effect transistors.
A line-operated unit for supplying dc bias and
consisting of a transformer, rectifier, and high-
grade filter.
bias voltage  A steady voltage that presets the op-
ating threshold or operating point of a circuit or
device, such as a transistor. Compare BIAS CUR-
rent.
biallescopes  A class of optical instruments used
for beyond-the-horizon propagation. See FORWARD SCATTER.
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for beyond-the-horizon propagation. See FORWARD SCATTER.
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for beyond-the-horizon propagation. See FORWARD SCATTER.
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for beyond-the-horizon propagation. See FORWARD SCATTER.
biallescopes  A class of optical instruments used
for beyond-the-horizon propagation. See FORWARD SCATTER.
bifurcated contact A forked contact whose parts act as two contacts in parallel for increased reliability.

bilateral amplifier An amplifier that transmits or receives in either direction equally well (i.e., the input and output can be exchanged at will).

bilateral antenna A bidirectional antenna, such as a loop antenna or a half-wave dipole.

bilateral element A circuit element or component (as a capacitor, resistor, or inductor) that transmits energy equally well in either direction. Compare UNILATERAL ELEMENTS.

bilateral network A network, usually passive and either balanced or unbalanced, that has BILATERAL SYMMETRY. Thus, the input and output terminals can be exchanged without affecting the performance of the network in any way.

bilateral symmetry 1. Exhibiting symmetry, with respect to a vertical line or plane. 2. For a network, having the property that if the input and output are reversed, the circuit behavior remains precisely the same. See BILATERAL NETWORK.

bipolar antenna A network whose use is limited to two states. Such a signal is always a digital signal.

bipolar search A method of searching the music library for a specific piece of music.

bipolar relay See BISTABLE RELAY.

bipolar transistor A transistor in which the element is mechanically coupled (as through a lever and gear system) to a pointer that moves over a temperature scale.

bimetal A union of two dissimilar metals—especially those having a different temperature coefficient of expansion. The two are usually welded together over their entire surface.

bimetalllic element A strip or disk of bimetal. When the element is heated, it bends in the direction of the metal that has the lower temperature coefficient of expansion; when cooled, it unbends. Usually, an electrical contact is made at one extreme or the other so that the element can serve as a thermostat.

bimetalllic switch A temperature-sensitive switch based on a bimetallic element.

bimetalllic thermometer A thermometer based on a bimetallic element that is mechanically coupled (as through a lever and gear system) to a pointer that moves over a temperature scale.

bimetalllic thermostat A thermostat in which a bimetallic element closes or opens a pair of switch contacts.

bimorphous cell A piezoelectric transducer that consists of two crystal plates, such as Rochelle salt, bound intimately face to face. In a crystal microphone, vibration of the transducer results in a voltage output; in a crystal headphone, an ac signal voltage impressed on the transducer causes vibratory mechanical motion.

binary A combination of bipolar and MOSFET transistors in an integrated circuit. Thus, a typical bipolar device can have MOSFET input for high impedance and bipolar output for low impedance.

binary cell In a computer memory, an element that can display either of two stable states.

binary-coded decimal notation In digital computer operations, a system of notation in which each digit of a decimal number is represented by its binary equivalent. Thus, the decimal number 327 in BCD notation becomes 0011 0010 0111. (By contrast, in pure binary notation, 327 is 101001111.)

binary-coded octal notation A method of numbering in which each base-8 digit is represented by a binary number from 000 to 111.

binary-controlled gate circuit A gate circuit controlled by a binary stage. An example is a gating transistor that receives its on/off pulses from a flip-flop.

binary counter A binary counter circuit consisting of a cascade of bistable stages. Each stage is a scale-of-two binary counter because its output is on for every second input pulse. At any instant, the total binary count in a multistage counter thus is shown by the on and off states of the various stages in sequence.

binary device or stage that accepts binary signals on its input lines, and provides a usually exclusive output (representing a decimal digit, for example).

binary digit See BIT.

binary number system The base-two system of notation. This system uses only two symbols, 0 and 1, and accordingly is easily applied to two position switching elements, relays, and flip-flops.

binary preset switch In a binary counter or binary control circuit, a selector switch that allows the circuit to be preset to deliver an output pulse only after a predetermined number of input pulses.

binary scaler In its simplest form, a single two-stage device, such as a flip-flop, which functions as a divide-by-two counter, because one output pulse results from every two input pulses. Higher-order scaling is obtained by cascading stages.

binary search A system of searching the successive division of a set of items into two parts and the rejection of one of the two until all items of the sought-for kind are isolated.

BIMOS A combination of bipolar and MOSFET transistors in an integrated circuit. Thus, a typical bipolar device can have MOSFET input for high impedance and bipolar output for low impedance.

BiMOS • binaural

binaural A union of two dissimilar metals—especially those having a different temperature coefficient of expansion. The two are usually welded together over their entire surface.
to re-create the stereo effect. The technique evolved into multichannel stereophonic repro-duction.

Binaural machine hearing Also called stereo machine hearing. The ability of a machine, such as a robot, to determine direction and distance to a source of sound, using two acoustic transducers and a computer to process their output signals. The machine determines the location of the sound source by comparing the relative amplitude and phase of the signals from the two transducers. It functions according to the same principle as human hearing, in which a person can determine the general direction and distance to a sound source by subconsciously comparing the relative amplitude and phase of the sounds arriving at the left and right ears.

Binaural sound The equivalent of a listener hearing a concert through a pair of earholes; it takes earphones to reproduce the signal. If speakers are substituted for the earphones, the listener hears monophonically, as if standing back several feet from the earholes.

Binder A material (such as lacquer) that acts as a holder and cohesive medium for the particles of another material. It is used in carbon resistors, ceramic dielectric bodies, powder cores, and resistive and metallic paints.

Binding property A property of the nucleus of an atom. The binding energy of a nucleus is equal to the difference between the nuclear weight and the sum of the weights of the lighter particles making up the nucleus. The nucleus is stable when the binding energy is high.

Binding force Any one of the electrostatic forces that acts between charged particles.

Binding post A screw-type terminal of various styles, often having a hole into which a wire or tip can be inserted and gripped. It is used for temporary indoor connections only.

Binario A semiconductor switching device that exhibits two stable states and also negative resistance.

Binoctal machine vision Also called stereoscopic machine vision. The ability of a machine vision system to provide depth and perspective data.

Uses two optical sensors spaced a fixed distance apart. The left sensor sees a slightly different image than the right, and this is perhaps minimized the physiological effects of stress.

Bipolar operation Believed by some researchers to be a practical reality, but not yet a practical reality: A living organism created by biological cloning, whose brain has been programmed exactly as a computer is programmed.

Bipolar shield An absorber shield that blocks or attenuates ionizing radiation to protect personnel working near radioactive materials.

Biochimenes1 The emission of light by a living organism. 2. The light itself so produced by living organisms.

Biomechanics An electromechanical device that simulates the workings of some part of a living body's organs. Examples are electromechanical hands, arms, and legs. Such a device is often difficult to distinguish from its biological counterpart when obscured by clothing.

Bioelectromagnetics A contraction of the words biology, mechanics, and electronics. Research, development, and manufacturing that encompasses aspects of all three fields. This is especially important in robotics.

Biometrics Mathematics, and in particular, statistics and probability, applied to biology.

Biomagnetic security system An advanced intrusion-prevention system that measures biological characteristics of the people who are authorized to enter a property. Such a machine can employ vision systems, object recognition, and/or pattern recognition to check a person's face. The machine might use speech recognition to identify people by the waveforms of their voices. It might record a hand print, a fingerprint, or an iris print, or a combination of all these things. A powerful computer analyzes the data obtained by the sensors and determines whether the person is authorized to enter the premises.

Bionics The study, design, and application of microelectronic systems that simulate the functions of living organisms.

Biotlemetry The use of telemetry to collect data from living organisms or to direct their movement.

Biotelescanner An instrument that monitors body functions via radio, often called because of the characteristic chirping sound it makes as the operator tunes by the frequency on which it occurs. 2. A parasitic oscillation in a radio transmitter, also called a spurious emission or spurt.

Birmingham wire gauge Abbreviation, BWG. Also called Stubs gauge. A method of designating the various sizes of solid wire. BWG diameters are somewhat larger than those designated on AMERICAN WIRE GAUGE diameters for a given wire-size designator.

**BIPF** Abbreviation of International Bureau of Weights and Measures.

**BIPM** The name of the International Bureau of Weights and Measures.

**Biofeedback monitor** A system that provides an indication of skin temperature and resistance to a user. Because skin temperature and resistance are affected by emotions, such as fear, nervousness, anger, etc., these monitors might be of value to people who wish to gain improved control of their emotions. For example, biofeedback has been used for pain relief by the application of such a technique.

**Biphase half-wave rectifier** An alternative term for FULL-WAVE RECTIFIER; also, each of a two-terminal full-wave rectifier device.
bistable six-degree temperature A flux meter in which the sen-
sor contains a length of bistable wire, which acts as a barometric gauge.
bistable thermocouple A thermocouple that uses the junction between bistable and antimony as one thermocouple-type meter.
bistable Having two stable states.
bistable device Any device, such as a flip-flop, the operation of which exhibits two stable states and which can be switched at will from one state to the other.
bistable multivibrator A multivibrator, the opera-
tion of which exhibits two stable states. More commonly known as a FLIP-FLOP. These circuits are abundant in digital electronic equipment. Compare ASTABLE MULTIVIBRATOR and MONOSTABLE MULTIVIBRATOR.
bistable relay A relay that has two stable states: open and closed. Successive actuating pulses open and close the relay, two consecutive pulses being required to return the relay to a given state. Also called binary relay, relay flip-flop, and electronic flip-flop.
bistatic radar A radar set in which the transmit-
ting and receiving antennas are separate.
bistate Having two states. Example: the perform-
ance of a FLIP-FLOP.
binary An acronym formed from the words binary dig-
it. The smallest or elementary unit of data in digital electronics. Represented either by logic 0 (low) or logic 1 (high). These states can be represented by any dichotomy, such as off/on, false/true, mi-
us/plus, dark/bright, red/green, etc.
binary digit The number of digital bits per unit area or volume, as the number of bits per square cen-
timeter of magnetic tape.
binary digit Abbreviation of built-in test.
binary digit density The number of digital bits per unit area or volume, as the number of bits per square cen-
timeter of magnetic tape.
binary comparator A microprocessor whose word or byte capacity is achieved through the use of in-
terrelated smaller capacity processors (e.g., a 16-bit unit derived from eight 2-bit "slaves").
bits per second (bps) The speed in BITS PER SECOND (bps) at which data bits are transmitted or trans-
mitted.
bleeder temperature The operating temperature in a bleeder. It is generally high because of power dissipation in the form of heat.

bleeding whites A flowing of the white areas of a television image into the black areas; an overload condition.

blemish See BURN.

blind flight The flying of an aircraft entirely by means of instruments and electronic communications.

blind landing A landing of an aircraft entirely by means of instruments and electronic communications.

blind zone 1. In radar operations, an area that gives blanking of circuit action, usually abrupt, through internal action or by the application of an external signal. Thus, the operation of an amplifier can be blocked (output reduced to zero) by an input signal or by excessive feedback, either of which overloads the input. 2. A parasitic oscillation in a radio transmitter.

block diagram A simplified diagram of an electronic system, in which circuits, stages, units, or devices are shown as two-dimensional boxes with the internal wiring and detailed circuitry omitted. This makes it possible to clearly show the interconnection among circuits, stages, units, or devices. It also provides a concise rendition of the overall functional concept of the system.

blocking oscillator An oscillator that turns itself off after one or more cycles. It does this as a result of an accumulation of negative charge on its input electrode (base of a bipolar transistor or gate of a field-effect transistor). The action is self-reinforcing. In the self-perpetuating type of blocking oscillator, a series of pulses consisting of trains of sine waves with intervening spaces is generated. In the single-swing type of blocking oscillator, the output consists of a series of single cycles with long intervals between them.

blocking oscillator synchronization 1. In the BLOTTING OSCILLATOR used in the vertical deflection circuit of a television receiver, the oscillator is synchronized with vertical sync pulses arriving in the video signal. 2. Synchronization of the repetition rate of any blocking oscillator with a suitable external control signal.

blocking system In a telephone system, a method of dealing with the condition of having more subscribers than connection paths. Allocation is made on a demand basis. If all channels are in use, it is impossible to make new calls. This prevents excessive degradation of the quality of existing connections.

block length The number of characters, bits, or words that compose a defined unit word or character group.

block transfer The conveyance of a word or character group in a computer register to another register or a peripheral device.

blocker transfer The conveyance of a word or character 1. In a computer register to another register or a peripheral device. 2. In a cathode-ray-tube (CRT) screen, an enlargement of the electron-beam spot, caused by poor focusing. This results in poor image resolution.

bloop 1. A radio receiver that is in oscillation, and is transmitting a signal that causes interference. 2. A parasitic oscillation in a radio transmitter. 3. In broadcasting, a statement in which a radio or television announcer makes an embarrassing error or breach of etiquette.

blow The opening of a fuse or circuit breaker as a result of excessive current.

blower A fan used to remove heat from electronic circuits. These are often used in tube-type radio-frequency (RF) power amplifiers, where much heat is generated, and in computers to cool the microprocessor and surrounding components.

blowout 1. An alternate term for BURNOUT. 2. The forceful opening of a circuit breaker. 3. The extinguishing of an arc.

blue box An accessory device (sometimes unlawfully used) that generates tones that switch a telephone circuit in the placing of calls.

blue gun The electron in a three-gun color picture tube, the beam from which strikes the blue phosphor dots.

blue ribbon program A type of contact-print reproduction in which a sheet of sensitized paper is exposed to an image on a translucent or transparent film, under strong light, and is then developed and fixed. Although this process is still used to reproduce electronic illustrations and typescripts, it has been superseded largely by other (dry) processes. 2. Loosely, any plan or design for the development of a system.

blue restorer In a three-gun color television circuit, the dc restorer in the blue channel.

blue ribbon program A computer program that has been hand-prepared and debugged completely before its first computer run.

blue voltage The signal voltage presented to the grid of the blue gun of a three-gun color picture tube.

blurring 1. BLOOMING. 2. A defocusing of a television picture or oscilloscope trace. 3. An obscuring of a signal by echoes or trailing (e.g., the slow decrement of a Morse code signal element).

B-minus Also called B-negative. The negative terminal of a B-power supply.

bnc Abbreviation for background-limited infrared photodetector.

bleed 1. The pulse-like figure on a radar scan, indicating the transmission or reflection (see A-SCAN and J-SCAN). Also called PIP.

bleeding whites A flowing of the white areas of a television image into the black areas; an overload condition.

bleeder temperature The operating temperature in a bleeder. It is generally high because of power dissipation in the form of heat.

bleeder divider

bleed transfer The conveyance of a word or character group in a computer register to another register or a peripheral device.

bleed function Solutions of the Schrodinger wave equation for a single electron surrounded by an electric field. The field varies periodically with distance from the source.

bleed wall The transition layer between adjacent ferromagnetic domains (see DOMAIN).

block A group of data words or digits. 2. A group of memory storage spaces. 3. A circuit that operates as an identifiable unit. 4. The symbol for a circuit, stage, unit, or device in a BLOCK DIAGRAM.

block diagram A simplified diagram of an electronic system, in which circuits, stages, units, or devices are shown as two-dimensional boxes with the internal wiring and detailed circuitry omitted. This makes it possible to clearly show the interconnection among circuits, stages, units, or devices. It also provides a concise rendition of the overall functional concept of the system.
Boltzmann’s principle • booster 81

### Boolean truth table

<table>
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<th>AND</th>
<th>NOT</th>
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#### Boolean functions

- In mathematical logic, a function that makes use of BOOLEAN ALGEBRA.
- In electroacoustics, a function used in a Bode diagram.
- In electronics, a function used in a Bode curve.
- In spectroscopy, a function used in a Bode plot.

### Boltzmann’s principle

**Boltzmann’s constant**

\[ k = 8.617 \times 10^{-5} \text{eV/K} = 1.38 \times 10^{-23} \text{J/K} \]

The Boltzmann’s constant is used in statistical mechanics to describe the distribution of energy among particles. It is also used in thermodynamics to calculate the entropy of a system. The Boltzmann’s constant is a physical constant that relates the microscopic properties of matter to its macroscopic properties.
booster battery 1. A battery used to forward bias a diode detector into a favorable region of its conduction curve, or to bias a bolometer into the square-law region of its response. 2. A battery supplying power to a booster.

booster 2. The amplification (usually in terms of voltage gain) provided by a booster (see especially BOOSTER, 1).

boot 1. The powering-up routine in a digital computer, in which the machine executes a series of programs to get itself ready for use. 2. The resetting of a computer, by pressing certain keyboard keys (e.g., CTRL-ALT-DEL), pressing a reset button, or by powering-down, waiting about two minutes, and then powering-up again. 3. To install a computer diskette and instruct the computer to execute one or more programs on the diskette. 4. A usually flexible protective sleeve or jacket pulled over a cable or connector, so called from its resemblance to a foot boot.

boot loader A form of computer program that operates on the BOOTSTRAP ROUTINE.

bootstrap A technique for making a device or process achieve a condition through its own actions; see BOOTSTRAP CIRCUIT, for example.

bootstrap circuit A specialized form of follower circuit that presents very high input impedance. Its chief feature is the return of the control-element resistor to a tap on the source or emitter resistor. The technique takes its name from the figurative notion that such a circuit "lifts its input impedance by its own bootstraps."

booster circuit (with junction-type field-effect transistor)

bootstrap routine 1. Also called bootstrap program. In a digital computer, and especially in a personal computer, the routine that the machine follows when first powered-up. See BOOT, 1.

2. In a digital computer, a routine in which the first few instructions put in storage are later used to complete the routine, as supplemented by operator instruction. 3. A portion of a computer program that is used to establish an alternate version of the program.

borax-aluminum cell An electrolytic cell that consists essentially of an aluminum electrode and a lead electrode in a saturated solution of sodium tetaborate (borax). After electroforming, such a cell can be used either as a rectifier or as an electrolytic capacitor.

boric acid Formula, H3BO3. A compound used variously in electronics—especially as the electrolyte in electrolytic capacitors.

bonus Formula, Cu2FeS4. A natural mineral that is a sulfide of copper and iron. Its crystalline structure makes it important in early semiconductor diodes (crystal detectors).

boron Symbol, B. A metalloid element. Atomic number, 5. Atomic weight, 10.82. It is used as a dopant in semiconductor processing.

bot 1. Abbreviation for beginning of tape. 2. Abbreviation of bottom.

bottoming Excessive movement of the cone of a loudspeaker or the diaphragm of a headphone so that the magnet or supporting structure is struck by the moving coil piston assembly. It produces a clapping sound, particularly on bass (low-frequency) audio peaks.

bounce 1. The springback or vibration of the armature of a relay in its closure. 2. An abnormal abrupt change in the brightness of the image in a television receiver or cathode-ray-tube (CRT) computer monitor.

boundary 1. In a polycrystalline substance, the area of contact between adjacent crystals. 2. The area of meeting of two regions (such as n and p) in a semiconductor.

boundary defect A condition in which a piezoelectric crystal has two regions, intersecting in a plane, with different polarizations.

boundary effect In audio systems, a pheno-menon in which the proximity of an acoustic transducer to a flat surface enhances the pickup and/or transmission of sound. Occurs because of reflection of acoustic waves from the surface.

bound charge The portion of the electric charge on a conductor that does not escape to ground when the conductor is grounded. This occurs because of induction from neighboring charge carriers.

Compare FREE CHARGE.

bound electron An electron held tightly in its orbit within an atom so that it is not ordinarily free to drift between atoms and contribute to electrical current flow.

bo-tie antenna A center-fed antenna in which the top, or feed, is placed at the halfway point of a boxcar-shaped loop. The loop is usually formed from conductors on printed circuit board, or traced by an electron micrograph. In the array of display indicates the signal quality. The transmitter output signal is fed to the vertical deflection plates of the oscilloscope. The exciter audio output is fed to the horizontal sweep input of the scope.

boxcars Long pulses with short separating spaces (with junction-type field-effect transistor)

box-shaped loop The characteristic square-loop hysteresis curve (B-H loop) that results when a sine wave of current is used to magnetize a sample of magnetic material. In this plot, which covers all four quadrants, the horizontal axis (H) displays magnetizing force, and the vertical axis (B) displays magnetization. Also see HYSTERESIS.

boys radiometer A detector for radiant energy. The device consists of a thermocouple and a galvanometer. When energy falls on the thermocouple, a voltage is produced, and this is measured by the galvanometer.

bp 1. Abbreviation of BOILING POINT. 2. Abbreviation of BANDPASS.

bps Abbreviation of bits per second.

B-plus See B PLUS.

B power supply A name used sometimes for the unit that supplies high-voltage dc required for certain electrodes of vacuum tubes, transistors, etc. 2. The positive terminal of a B power supply.

B positive Symbol for BROMINE.

bracketing A troubleshooting routine characterized by isolating progressively smaller areas in a circuit or on a printed circuit board or stage is located.

brad detector A locked-oscillator circuit that was once used as an FM detector.

brad 1. A woven network of fine metal wires used for grounding purposes. It is usually made of fine copper conductors. The increased surface-area-to-volume ratio improves the effectiveness of grounds. Also called a subfeeder jacket pulled over a cable or connector, so called from its resemblance to a foot boot.

branch In robotics and artificial intelligence (All, a set of routines or programs containing points at which a computer must select from among two or more alternatives. Such routines are used in critical processes, such as the manufacture of precision equipment.

branch point See JUNCTION POINT.

branch voltage The voltage, or voltage drop, across a branch of a circuit.

brass 1. An alloy of copper and zinc that is widely used in electronics. Compared to annealed copper, this metal has four times the resistivity (or the conductivity), half the temperature coefficient, more than twice the tensile strength, and a lower melting point (900°C). 2. A colloquialism for an old-fashioned, subdistribution center, main, or submain. Interior lighting circuits are usually branch circuits because many lights are connected to one circuit controlled by a single fuse or circuit breaker.

branch circuit In electrical wiring, a group of outlets served through a single cutout from a source of power-line ac voltage. The source can be a distribution center, subdistribution center, main, or submain. Interior lighting circuits are usually branch circuits because many lights are connected to one circuit controlled by a single fuse or circuit breaker.

branch current Current flowing through a branch of a circuit, whose magnitude, with respect to the total current of the circuit depends on the nature of the branch.

branched In molecular polymers, the condition of side chains being attached to the main chain.

branched windings Forked windings of a poly-phase transformer.

branching In robotics and artificial intelligence (All, a set of routines or programs containing points at which a computer must select from among two or more alternatives. Such routines are used in critical processes, such as the manufacture of precision equipment.

branch current (enclosed in broken lines)

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teur who handles large amounts of message traffic, particularly via Morse code. 3. A radio ama-
teur proficient in Morse code operation.

**Braun electroscope** An electroscope consisting es-
sentially of a fixed metal vane to which a movable needle is attached at a pivot. The repulsion be-
tween the two, when an electric charge is applied, causes the needle to move over a calibrated scale.

**bravo** Phonetic representation of the letter B.

**braze** The joining of two metal (usually iron or steel) parts together with a suitable metal cop-
er-alloy metal. Compare SOLDERING.

**breadboard** 1. A perforated board, a chassis, or any basic framework on which electronic compo-
nents can be mounted and quickly wired for the preliminary test of a circuit. It is so called be-
dcause the first such foundation units of this sort actually were wooden breadboards. 2. Any pre-
duction electronic prototype circuit. 3. To set up a circuit on a breadboard.

**breadboard model** 1. The preliminary model of an electronic device, often built on a breadboard (see BREADBOARD). 2. Loosely, any prototype.

**break** 1. An open circuit. 2. To open a circuit. 3. In communications, a word indicating a desire to transmit on a wavelength already occupied by ra-
dio traffic. 4. See BREAK-IN.

**break before close** Contacts, especially in a rotary selector switch, that open one circuit before closing the next one.

**breakdown** 1. A circuit or device, caused mainly by excessive voltage, current, or power. A sudden high voltage or power does not always indicate failure. 2. ALCALANCE BREAKDOWN. 3. The separation of an electronic problem or program into two, or more, parts for an easier solution.

**breakdown diode** See ZENER DIODE.

**breakdown region** The region, in a pin junction, in which avalanche breakdown occurs.

**breakdown strength** See DIELECTRIC STRENGTH.

**breakdown voltage** 1. The voltage at which cur-
rent suddenly passes in destructive amounts through a dielectric. 2. The voltage at which a gas suddenly ionizes, as in a gas tube. 3. The voltage at which the reverse current of a semiconductor junction suddenly rises to a high value (non-
destructive if the current is limited). See AVALANCHE BREAKDOWN.

**break-in** 1. A technique of radio communication in which one station interrupts a transmission from another station, rather than waiting until the end of the latter's transmission. 2. Also called Full break-in. In a radio communications transceiver or transmitter/receiver combination, extremely rapid transmit/receive switching, approaching full duplex communications. Every pause in transmission, even of only a few milliseconds, creates a “receive window” allowing reception between spoken words or Morse code elements.

**burn-in** 1. A network, usually consisting of four branches, connected so that an input signal can be applied between two opposite points and the output taken between the other two opposite points. When the component values are in a cer-
tain ratio, the voltage between the output points is zero, and the bridge is said to be balanced or set to null. 2. A circuit such as that described in (1) used for electrical measurements. 3. An audio or servo amplification system in which the load is driven from two outputs having opposite polarity, neither of which are at ground potential. 4. A communications path between or among two or more networks. This allows the subscribers in any network to obtain data from, or send data to, any other network, in effect creating a network of networks.

**bridge balance control** A potentiometer, variable capacitor, or variable inductor that is used to ad-
just a bridge circuit to balance.

**bridge-connected amplifier** 1. A dc amplifier stage in which the transistors and resistors are connected in a four-arm bridge circuit. 2. The circuit re-
spect to dc. When the bridge is initially balanced, all dc is eliminated in the output load. The input signal unbalances the bridge, which results in an amplified output signal in the load. 2. An ampli-
fi er for balancing opposing outputs across which a load can be bridged to obtain twice the power out-
put of either amplifier alone.

**bridge detector** See HALL NETWORK.

**bridge indicator** The output-indicating device (e.g., oscilloscope, or headphones) that indicates whether a bridge is balanced or un-
balanced. Also called null detector or null indi-
ger.

**bridge integrator** A null network that consists of a triaxial network with the resistance-capacitance (RC) integra-
tor circuit bridged by a capacitor. This network produces a shallow null at a single frequency de-
termined by the R and C values in the integrator.

**bridge indicator** An electromechanical or solid-state meter pair having opposing outputs across which a load can be bridged to obtain twice the power output of either amplifier alone.

**bridge rectifier** A full-wave rectifier circuit in which four rectifying diodes are connected in a bridge configuration. Each half-cycle of input voltage is rectified by a pair of diodes in opposite quarters of the bridge and in series with each other. The bridge does not require a transformer with a center-tapped secondary, as does the FULL-
WAVE, CENTER-TAP RECTIFIER circuit.

**bridge type meter** A frequency-sensitive bridge (such as the Wien bridge) that can be used to measure audio frequency. Because the bridge can be balanced at only one frequency at a time,
A radio-frequency transmission of an intelligence-bearing signal that is directed to numerous unspecified receiving stations.

An amplifier whose input impedance is so high that it can be considered infinite for practical purposes. Thus, the amplifier can be connected across a load or line without significantly affecting the operation of the system.

A voltage-dependent resistor that permits an occasionally used device (such as a bell) to be connected permanently across a regularly used device (such as a telephone) without continuously short-circuiting the latter. Thus, the bridging coupler ordinarily has very high resistance; but when the line voltage is momentarily raised, the resistance lowers and the occasionally used device is actuated, e.g., the bell rings.

The gain of a bridging amplifier expressed as the ratio (in decibels) of the power developed in the amplifier load to the power in the load to which the input terminals of the amplifier are connected.

The loss that results from the shunting of the microphone, earphone, or other transducer by a resistor, capacitor, or inductor. Generally, the loss is expressed as a power ratio in decibels.


British thermal unit

Abbreviation. Btu. The amount of heat required to raise the temperature of a pound of water by one degree Fahrenheit, in an ambient environment of slightly greater than 39°F.

British Standard wire gauge

A classification of wire sizes sometimes used in England, Australia, and New Zealand. The higher the number, the thinner the wire. The designator does not take into account any coatings on the wire, such as enamel, rubber, or plastic insulation. In the United States, the American wire gauge is more often used. See AMERICAN WIRE GAUGE.

British Standard Wire Gauge (NBS SWG) Diameters

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British thermal unit • broad response

American National Standards Institute

A logarithm, generally known as a COMMON LOGARITHM. Compare Napierian logarithm.

Brilliance

The brightness of an illuminated area.

Brilliance control

1. The BRILLIANCE CONTROL in a television receiver or computer monitor.

2. A control for adjusting the level of the tweeter output in a speaker system.

Brightness

Light, per unit area, emitted or reflected perpendicularly to a light-emitting surface.

Brightness control

1. In a computer monitor, television receiver, or oscilloscope, a potentiometer that varies the negative bias voltage on the control grid of the cathode-ray tube (CRT). The brightness of the image is inversely proportional to this negative bias voltage.

2. The control of the brightness of an illuminated area.

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broadside In a perpendicular direction; for example, broadside radiation from an antenna.

broadside array Also called broadside antenna. A phased group of antennas arranged so maximum radiation occurs in directions perpendicular to the plane containing the driven elements. This requires that all of the antennas be fed in phase. The elements can be half-wave dipoles or full-wave, center-fed conductors. Full-wave elements have a slight gain over half-wave elements. At high frequencies, this type of array is usually constructed from two driven antennas. At very-high and ultra-high frequencies there can be several driven antennas. The antennas can each consist of a single element, or they can be Yagis, loops, or other systems with individual directive properties. In general, the larger the number of elements in the entire array, the greater the gain and directivity.

broca galvanometer A device consisting of an astatic magnetic arrangement, with a coil enclosing central consequent poles. The device is characterized by fast response and high sensitivity.

brownie A deliberate lowering of line voltage by a power company to reduce load demands. Minor events of this type often pass unnoticed by the average consumer. More pronounced events produce observable effects, such as shrillness of television and cathode-ray-tube (CRT) computer-display images.

Bruce antenna A vertical collinear array that consists of several resonant sections connected by short, rigid, parallel-conductor stubs. The currents in the radiating sections are in phase. Maximum radiation and response occur broadside to the antenna (omnidirectional in the horizontal plane). Polarization is vertical. The antenna produces gain at low radiation and response frequencies, and is commonly used in repeater installations and fixed communications stations at very-high frequencies (VHF) and ultra-high frequencies (UHF).

brush A usually metal or carbon strip, blade, or block, that slides in contact with another part, as in a motor commutator.

brush holder The housing for a brush in a motor, generator, rheostat, slip-ring junction in a rotating-data transmission system, etc.

brute force 1. The transmission of a signal of excessive or unnecessary power. 2. An inefficient approach to a problem, which might solve the problem, but requires far more energy, circuits, or computer memory/storage space than the minimum needed to accomplish the same result.

brute-force filter A culmination of power, as doing low dc power supply filter, so called because of the extremely large inductances and capacitances that are generally used.

brute supply An unregulated power supply.

bucket A computer memory or a designated location in such a memory.

building-block technique The process of assembling electronic equipment by quickly connecting together already completed stages (in the form of boxes or blocks) and supplying power and signals to the setup. Also called modular technique and modular construction.

building-out circuit A short section of transmission line shunting another line; it is used for impedance matching. Also called building-out section.

Bud 1. A buffer amplifier or buffer capacitor. 2. A buffer amplifier that is placed across a transformer secondary to suppress voltage spikes and sharp waveforms—especially when the input is a square wave.

buffer capacitor A high-voltage, fixed capacitor that is placed across a transformer secondary to suppress voltage spikes and sharp waveforms—especially when the input is a square wave.

buffered output An output (power, signal, etc.) that is delivered from the generating device through an isolating stage, such as a buffer amplifier. This arrangement protects the device from variations in the external load. Compare UNBUFFERED OUTPUT.

buffer storage 1. A buffer that is used to interface between data systems with different rates of transmission. See BUFFER, 2.

bug 1. Slang for WIRETAP, 1. 2. Slang for circuit fault, 1, 2. 3. A semiautomatic key that some radiotelegraph operators use to send Morse code.

bug key See BUG, 3.

bugle signal A tone that causes the valve grid of a tube to act as a fixed grid. In digital-computer operations, a follower stage is triggered. In analog circuits, the valve grid reaches a fixed potential when the signal voltage is equal to the fixed grid voltage.

bulb A glass of soda.

burden Slang for circuit resistance.

brush discharge A cloud of repelled ions around the tip of a pointed conductor charged to a high voltage. It often produces a visible glow in the air.

brushing The housing for a brush in a motor, generator, rheostat, slip-ring junction in a rotating-data transmission system, etc.

broca galvanometer A device consisting of an astatic magnetic arrangement, with a coil enclosing central consequent poles. The device is characterized by fast response and high sensitivity.

Brown and Sharpe gauge A silicon-based strain gauge that uses a key-board, an electronic circuit that allows the operator to type about the data output. See BUFFER, 1, 2, and 3.

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buildup 1. The process whereby the voltage of a rotating generator starts at a point that is determined by the residual magnetism of the machine, and gradually increases to a voltage representing the point at which the resistance line crosses the magnetization curve 2. The (usually gradual) addition of a quantity (e.g., the buildup of charge in a capacitor).

bulk A globe-like container having any of a number of characteristic shapes from spherical to tubular and usually evacuated, for enclosing the elements of an electron device, such as a vacuum tube, gas tube, photocell, or lamp.

bulk effect An effect, such as current, resistance, or resistivity, observed in the overall body of a sample of semiconductor material, independent of the material or on its surface. Thus, a silicon diode can display junction resistance i.e., resistance offered by a junction process in a wafer of silicon, as well as bulk resistance (i.e., the effec-
bulk-erased tape Recording tape whose signal content has been removed via a bulk eraser.
bulk eraser 1. A type of power-line-frequency detector that erases an entire reel of magnetic tape without requiring that the tape be uninked and passed continuously under an erase head. This saves considerable time, but often leaves some HULK-ERASING NOISE on the tape. Also called BULK DEGAUSSER.
bulletin board In personal computing or amateur packet communications, a system that allows subscribers to leave messages for each other for access via a modem or terminal node controller.
bulletin station A station intended for the transmission of bulletins of interest to certain parties, such as military personnel or amateur radio operators. An example is W1AW in Newington, Connecticut, an amateur radio station that transmits bulletins and code practice.
buncher In a klystron, an inductivity resonator that contains two grids mounted parallel to the electron stream. The electrostatic field of the grids alters the velocity of the electrons, thus modulating the stream into bunches.
buncher grids In a klystron, the closely spaced grids that velocity-modulate the electron beam into successive bunches.
butterfly resonator A capacitively loaded tube, such as a klystron, the input cavity resonator.
butterfly voltage The radio-frequency (RF) grid-to-grid voltage in the buncher resonator of a klystron.
burst circuit A radio-frequency (RF) burst generator that is used for testing various types of equipment. Its output is intermediate between sine waves and square waves, and is convenient for rapidly appraising the perfor-
mance of such devices as amplifiers, filters, electronic switches, transducers, and loudspeakers.
butterfly capacitor A plate-type variable capacitor that has two stator sections and a single rotor section common to the two stators. External connections are made to the stators only. Thus, no wiping contact is required to the rotor, and the troubles associated with such a contact are avoided. The butterfly capacitor is actually two variable capacitors in series. The unit is so called from the shape of its rotor.
burst generator A button-shaped ceramic or silvered mica fixed capacitor. Because of its disk shape and mode of terminal connection, it offers very low internal inductance.
burst generator•button microphone A microphone in which a button-shaped carbon element is attached to a diaphragm, which is set into vibration by sound waves. This motion causes the button resistance to vary, modulating a direct current that passes through the mass of the wafer). Compare surface effect.
burst transmission A short transmission at high speed. This method of transmission saves time, but increases the necessary bandwidth of a signal by the same factor as the ratio of the high speed to the original speed.
bush 1. A main conductor in a circuit. A bus can be high in the sense that its potential is above or below ground, or it can be low or at ground reference. 2. In computer operations, a common group of paths over which input and output sig-

Bunet's formula

which is in a nitric acid solution. The zinc rod serves as the negative pole; the positive pole is a piece of hard carbon. The cell produces about 1.9 volts and delivers relatively high current.
burden See VOLTAGE BURDEN.
burn 1. A blemish on the screen of a cathode-ray tube (CRT), caused by destruction of the phosphor there. This results from prolonged focusing of an intense electron beam in one spot. 2. A blemish on the screen of a television picture tube, usually resulting from ions that reach the screen when the ion trap is not working correctly.
burn-in A long, thorough, carefully controlled pre-

Butterworth function A high-pass, low-pass, band-

burst gate timing In a color-television receiver, the timing of the gating pulse with the input sig-
nal of the burst amplifier.
butterfly circuit A combination of a butterfly ca-
pacitor and a ring, of which the stator plates of the capacitor are an integral part. The resulting structure is a compact variable-frequency tuned circuit. The ring supplies the inductance, and the butterfly supplies the capacitance. It is also called butterfly tank and butterfly resonator.

Butterworth filter A high-pass, low-pass, band-
pass or band-rejection filter, characterized by a flat passband (absence of passband ripple) and high attenuation at frequencies far removed from the passband.

Butterworth function A mathematical function that is used in the design of a BUTTERWORTH FILTER.
button 1. Usually, a small switch that is actuated by finger pressure. It is also called pushbutton and pushbutton switch. Sometimes, the term is applied only to the insulated knob or pin which is pushed to operate the switch. 2. A tiny lump of impurity material, placed on the surface of a semiconductor wafer for alloying with the wafer to form a junction. See ALLOY JUNCTION. 3. The carbon element(s) in a BUTTON MICROPHONE.
button capacitor A button-shaped ceramic or silvered mica fixed capacitor. Because of its disk shape and mode of terminal connection, it offers very low internal inductance.
button microphone A microphone in which a button-shaped carbon element is attached to a diaphragm, which is set into vibration by sound waves. This motion causes the button resistance to vary, modulating a direct current that passes through the mass of the wafer). Compare surface effect.
A single-button microphone has only one button, whereas a double-button microphone has two—one mounted on each side of the center of the diaphragm.

**buzz 1.** A low-pitched rough sound with high-frequency components, caused by the result of electrical interference from nonsinusoidal voltages generated by neighboring equipment or devices.

**2.** The waveform associated with such a sound.

**3.** Fastening two conducting surfaces by a RELIE BOND.

**buzzer** A nonringing device used principally to generate sound other than that achievable with sine waves. In an electromechanical vibrating-reed buzzer, the reed acts as an armature, which is mounted close to the core of an electromagnet. At quiescence, the reed rests against a stationary contact. When voltage is applied to the electromagnet, the reed is attracted to the core, moving away from the contact; but this breaks the circuit, the magnetism ceases, and the reed springs back to the contact. The action is repeated continuously at a frequency that depends on the reed dimensions and its distance from the core.

**bypass capacitor** A capacitor that is used to conduct an alternating current around a component or group of components. Often the ac is removed from an ac/dc signal, the dc being free to pass through the bypassed component.

**bypass** A route (either intended or accidental) through which current easily flows around a component or circuit instead of through it.

**bypassed** Also called bypassed or bypassing.

**bx** Symbol and abbreviation for armored and insulated flexible electrical cable.

**bw** Abbreviation of bandwidth.

**bwg** Abbreviation of BIRMINGHAM WIRE GAUGE.

**bwO** Abbreviation of BACKWARD-WAVE OSCIL-LATOR.

**c** Abbreviation of CENTI.

**c1** Symbol for CAPACITANCE.

**CA** Symbol for CALCIUM.

**Ca** Abbreviation of CENTI.

**cable assembly** A special-purpose cable with connectors.

**cable attenuation** Reduction of signal intensity along a cable, usually expressed in decibels per foot, hundred feet, mile, etc.

**cable clamp** A support device for cable runs in a bundle or read-write memory.

**cable communications** Telegraphy or telegraphy via a (usually undersea) cable.

**cable connector** A connector, such as a coaxial fitting, that joins cable circuits or connects a cable to a device.
### cadmium plating
The process of coating a conductor or component with cadmium to increase its resistance to corrosion.

### cadmium selenide photocell
A photoconductive cell in which cadmium selenide is the light-sensitive material.

### cadmium silicate phosphor
Formula, (CdO + SiO₂). A substance used as a phosphor coating on the screen of cathode-ray tubes; the characteristic fluorescence is light blue.

### cage antenna
A completely shielded enclosure, such as a screen room, which is covered with a grounded fine-mesh conductive screen on all sides.

### cage antenna
An antenna, usually center-fed and balanced, that consists of multiple parallel conductors arranged in a cylindrical cage configuration. The cage results in a much broader bandwidth than is the case with an antenna made up of a single conductor. Cage antennas are typically used at frequencies between about 10 and 200 MHz.

### CAN
Abbreviation for computer-assisted instruction. CAL An acronym for conversational algebraic language, a general-purpose problem-oriented computer programming language used in time-sharing systems.

### calcium

### calcium phosphate phosphor
Formula, Ca₃(PO₄)₂. A substance used as a phosphor coating on the screen of cathode-ray tubes; the characteristic fluorescence is white, as is the phosphorescence.

### calcium tungstate phosphor
Formula, CaWO₄. A substance used as a phosphor coating on the screen of cathode-ray tubes; the characteristic fluorescence is blue, as is the phosphorescence.

### calculate
To perform the steps of an intricate mathematical operation. Compare COMPUTE.

### calculating punch
A data-processing peripheral that reads punched cards, makes calculations, and punches new data into those cards or new cards.

### calculator
A machine that performs mathematical operations, especially arithmetical. Typically, the device is a small box with buttons and a miniature numeric display. Used only in mathematical applications. In contrast, a COMPUTER can be used for a much wider variety of jobs, such as word processing, graphics, and data base. Many personal computers have calculator programs; the "buttons" are actuated by pointing and clicking with a mouse.

### calculus
1. The symbolism and rules comprising a system of logic, such as BOOLEAN ALGEBRA.
2. A branch of mathematical analysis concerned with rates of change and accumulation. See DIFFERENTIAL CALCULUS and INTEGRAL CALCULUS.

### calendar age
The age of a piece of equipment, measured since the date of manufacture. Specified in years, months, and days. The actual manufacture date might alternatively be given.
can. A metal enclosure or container roughly resem- blying a tin can (though not necessarily cylin- drical), used for shielding or potting components.

cancel character. 1. IGNORE CHARACTER. 2. A control character indicating that the associated data is erroneous.

cancellation. The elimination of one quantity by another, as when a voltage is reduced to zero by another voltage of equal magnitude and opposite sign.

candle. Symbol, cd. The SI unit of luminous inten- sity. 1 cd represents 1 of the radiating power of one square centimeter of a perfect radiator at the temperature of freezing platinum.

candle power. Abbreviation, cp. Luminous inten- sity in international candles; the luminous in- tensity resulting from the burning of a sperm-whale-oil candle burning at the rate of 7.776 grams per hour.

carrying. The deliberate use of parts from operational equipment to temporarily repair or maintain operational equipment. It is a last-resort, emergency measure.

cap. 1. Abbreviation of CAPACITANCE. 2. Abbrevia- tion of CAPACITOR.

capacimeter. See CAPACITANCE METER.

capacitance. A physical property. The property exhibited by two conductors separated by a di- electric, whereby an electric charge becomes stored between the conductors. Capacitance is thought of as analogous to mechanical elasticity. Also see ELECTROCAPACITANCE.

capacitance bridge. A four-arm ac bridge for gaug- ing capacitance against a standard capacitor. In its simplest form, it has a standard capacitor in one arm and resistors in the other three.

capacitance coupling. The transfer of ac energy between two circuits or devices by a capacitor or capacitance effect. Also see COUPLING.

capacitance diode. See VARCAP.

capacitance divider. An alternating-current volt- age divider that uses capacitors, rather than re- sistors. It is used in certain oscillators, such as the Colpitts type.

capacitance filter. A filter consisting of only a high-capacitance capacitor. Because the capaci- tor cannot discharge instantaneously, it tends to maintain its voltage and smooth out the ripples in the voltage applied to it.

capacitance-inductance bridge. A combination ac bridge that can be used for either capacitance or inductance measurement. Both capacitance and inductance can be measured in terms of a stan- dard capacitance; however, some of these bridges use standard inductors in the inductance-measuring mode.

capacitance meter. A direct-reading meter for measuring capacitance. In most available types, a stable ac voltage is applied to the meter circuit, to which an unknown capacitor is connected in se- ries; meter deflection is roughly proportional to the reactance of the capacitor. Also called MI- CROFARAD METER.

capacitance ratio. In a variable capacitor, the ratio of maximum to minimum capacitance.

capacitance relay. A relay circuit that operates from a small change in its own capacitance. It consists of an RF oscillator whose tank capaci- tance is very low. When a finger is brought near to the circuit's short-circuit antenna, the attendant increase in capacitance detunes the oscillator, activating the relay. Also called PROXIMITY RE- LAY and PROXIMITY SWITCH.

capacitance-resistance bridge. A combination ac bridge that can be used for either capacitance or resistance measurement. The unknown resis- tance is measured against a standard resistor; the unknown capacitance against a standard ca- pacitor.

capacitance sensor. See CAPACITANCE TRANS- DUCER.

capacitive amplifier. See DIELECTRIC AMPLI- FIER.

capacitive attenuator. An ac attenuator whose ele- ments are capacitors in any desired combination of fixed and/or variable units. The desired atten- uation is afforded by the capacitance ratio.

capacitive coupling. The presence of coupling between circuits that uses a series capacitor for direct- current blocking. The signal passes through the capacitor, but the blocking effect allows different bias voltages to be applied to the two stages.

capacitive diaphragm. A metal plate deliberately placed in a waveguide to introduce capacitive reac- tance and, thereby, cancel an inductive reactance.

capacitive-discharge ignition. An electronic igni- tion system for automotive engines. Provides nearly constant high voltage, regardless of engine speed. A de-to-step-up converter charges a large capacitor (typically to 300 volts) when the distributor breaker points are closed; when they are open, the capacitor discharges through the ignition coil, thereby generating an ignition pulse of several thousand volts.

capacitive division. Reduction of an ac voltage by a capacitive voltage divider.

capacitive feedback. Feeding energy back from the output to the input of an amplifier or oscillator through a capacitor.

capacitive input filter. A smoothing filter for ac power supplies, in which the element closest to the rectifier is a capacitor, regardless of the com- ponents in the bridge placed subsequently.

capacitive load. A load consisting of a capacitor or a predominantly capacitive circuit.

capacitive loading. In an antenna, the addition of capacitance in series with the element(s). This raises the resonant frequency for a radiator hav- ing a given physical length. It can also serve to increase the physical length required for a radiator having a specified resonant frequency. Compare INDUCTIVE LOADING.

capacitive post. A protrusion inside a waveguide for the purpose of introducing capacitive reactance and canceling an inductive reactance.

capacitive potentialmeter. See CAPACITANCE VOL- TAGE DIVIDER.

Capacitive pressure sensor. A pressure sensor that uses a radio-frequency oscillator and a pair of metal plates separated by dielectric foam. The circuit is designed so a change in the capacitance between the plates causes the oscillator fre- quency to change. This change is sensed. A signal is sent to an analog-to-digital converter (ADC) and then to a microcomputer that calculates the extent of the pressure.

capacitive proximity sensor. A transducer used in mobile robots that detects the presence of certain kinds of objects. It consists of an oscillator whose frequency is determined by an inductance-capacitance (LC) circuit to which a metal plate is connected. When a conducting or partially con- ducting object comes near the plate, the mutual capacitance changes the oscillator frequency. This change is detected and sent to the robot controller.

Capacitive proximity sensor
capacitor A passive electronic-circuit component consisting of, in basic form, two metal electrodes or plates separated by a dielectric (insulator).
capacitor amplifier See DIELECTRIC AMPLIFIER.
capacitor antenna See CONDENSER ANTENNA.
capacitor bank A network of capacitors connected in combination, yielding a desired characteristic.
capacitor circuit The connection of a capacitor to the winding of a motor after the removal of power, to speed up the process of braking.
capacitor color code See COLOR CODE.
capacitor decade See DECADE CAPACITOR.
capacitor discharge ignition CAPACITIVE DISCHARGE IGNITION.
capacitor filter In a direct-current power supply, a filter consisting simply of a capacitor connected in parallel with the rectifier output.
capacitor input filter A filter whose input component is a capacitor. The capacitor-input power-supply filter is distinguished by its relatively high dc output voltage, but somewhat poorer voltage regulation, compared with the CHoke-input FILTER.
capacitor leakage Direct current flowing through the dielectric in a capacitor. In a good non-electrolytic capacitor, this current is normally less than 1 microampere. In an electronic capacitor, it can be up to several microamperes, depending on the capacitance and the applied voltage.
capacitor loudspeaker See ELECTROSTATIC SPEAKER.
capacitor microphone See CONDENSER MICROPHONE.
capacitor motor An ac motor that uses a capacitor in series with an auxiliary field winding for starting purposes. Initially out-of-phase current in the auxiliary field (starting winding) causes a rotating field that turns the rotor. When the rotor reaches a safe speed, a centrifugal switch disconnects the auxiliary field, and the motor continues running as an induction motor.
capacitor series resistance The ohmic loss in a capacitor. It results partly from conductor losses, and partly from losses in the dielectric material.
capacitor substitution box An enclosed assortment of capacitors arranged to be switched one at a time to a pair of terminals. In troubleshooting and circuit development, any of several useful fixed capacitance values can be thus obtained.
capacitor voltage 1. The voltage at the terminals of a capacitor. 2. The maximum voltage rating of a capacitor.
capacitor voltmeter See ELECTROSTATIC VOLT-METER.
capacitor capacity 1. A measure of a cell's or battery's ability to supply current during a given period. 2. CAPACITANCE. 3. The number of bits or bytes a computer storage device can hold. 4. The limits of numbers that a register can process.
capacitance lag In an automatic control system, a delay caused by the storing of energy by the components. For example, in a heating system, capacity lag results from the time taken to heat the air or fluid after the thermostat turns on the heat.
capillary electrometer A sensitive voltage indicator, consisting of a column of mercury in a transparent capillary tube, in which is suspended a small drop of acid. When a voltage is applied to both ends of the mercury column, the acid drop moves toward the low potential end of the column over a distance proportional to the voltage.
capstan The driven spindle or shaft of a magnetic tape recorder or transport.
capture area The effective area of a radio antenna to pick up electromagnetic signals. The larger the capture area, the greater the antenna gain.
capture effect 1. In frequency-modulation (FM) radio receivers, the effect of domination by the stronger of two signals, or by the strongest of several signals on the same frequency. 2. In an automatic-frequency-control system, the tendency of the receiver to lock onto a strong signal even when several signals near a given frequency. 3. In general, the tendency of one effect to totally predominate over other effects of lesser amplitude.
capture ratio A measure of frequency-modulation (FM) tuner selectivity, in decibels, between unwanted signals and the one being tuned in.
carbon Symbol, C. A nonmetallic element. Atomic number, 6. Atomic weight. 12.011. Carbon, besides being an invaluable material in electronics, is an important constituent of organic compounds.
carbon arc The arc between two electrified pencils of carbon or, as in an arc converter, between a carbon pencil and a metal electrode.
carbon brush A contact made of carbon or some mixture of carbon and another material, used in motors, generators, variable auto-transformers, rheostats, and potentiometers.
carbon-button amplifier An audio-frequency amplifier having as the active component an earphone whose diaphragm is attached to a carbon microphone button. The input signal applied to the earphone makes its diaphragm vibrate. The vibrating button modulates a local direct current. Amplification results from the large ratio of modulated local current to input-signal current.
carbon-composition resistor A non-inductive resistor made from a mixture of finely powdered carbon with a non-conductive substance, usually phenolic. The resulting clay-like material is pressed into a cylindrical shape, and wire leads are inserted in the ends. The resistance depends on the ratio of carbon to the non-conducting material, and on the physical distance between the wire leads. This type of resistor is useful from direct current to ultra-high radio frequencies. Compare FILM RESISTOR, WIREWOUND RESISTOR.
carbon/disk rheostat A rheostat consisting of a stack of carbon disks or washers, arranged so that a controllable pressure can be exerted on the stack. As a knob is turned, a screw increases or decreases the pressure, varying the total resistance of the stack.
carbon-film resistor A stable resistor whose resistance element is a film of carbon, vacuum-deposited on a substrate, such as a ceramic. 
carbonization The application of a coat of carbon onto an electrode, either by electroplating or by any other means.
carbon microphone A microphone that includes one or two carbon buttons. See BUTTON MICROPHONE.
carbon-paper recorder A recorder in which a signal actuated stylus writes, by impression only, through a sheet of carbon paper onto a plain sheet underneath. This eliminates the need for an ink-carrying stylus.
carbon-pile rheostat An enclosed assortment of capacitors. The capacitor-input power-supply filter is distinguished by its relatively high dc output voltage, but somewhat poorer voltage regulation, compared with the CHOke-input FILTER.
carbon-paper recorder in data acquisition, facsimile, communications, and similar applications.
carbon/silicon-carbide thermocouple A thermocouple that is a junction between carbon and silicon carbide.
carbon transfer recording A method of facsimile reception in which the image is reproduced by carbon particles sprayed on the paper, a process controlled by the received signal.
carbon-zinc cell See ZINC-CARBON CELL.
Carborundum Formula, SiC. Trade name for a synthetic silicon carbide used as a semiconductor, refractory, or abrasives. Also see SILICON CARBIDE.
Carborundum crystal Trade name for a characteristically superhard crystal of silicon carbide.
Carborundum varistor A voltage-dependent resistor made from Carborundum.
carcinotron A special kind of oscillator tube used at ultra-high and microwave frequencies.
card 1. A usually thin, rectangular board containing a PRINTED CIRCUIT, often equipped with an edge connector that makes it easy to install, remove, or replace. Common in electronic and computer equipment having modular construction.
card 2. A recorder in which a signal actuated stylus writes, by impression only, through a sheet of carbon paper onto a plain sheet underneath. This eliminates the need for an ink-carrying stylus.
cardiac monitor An electronic device that displays or records electrical tracings of the heart for medical observation or diagnosis.
cardiac pacemaker An electrical cardiac stimulator that causes the heart to beat at certain intervals. Used when the patient has heart disease that prevents the heart from regulating itself.
cardiac stimulator An electronic device (sometimes implanted in the subject) that supplies electric pulses to stimulate heart action. Also called DEFIBRILLATOR and PACEMAKER.
card image In numeric storage, the data contained on a single card.
cardiogram ELECTROCARDIOGRAM.
cardiograph ELECTROCARDIOGRAPH.
cardioid diagram A polar response curve in the cardioid pattern, showing that the device has a maximum directivity of about ±30 degrees.
cardioid microphone A microphone with a (roughly) heart-shaped sound-field pickup pattern.
cardioid pattern A microphone with a sound-field projection pattern with one sharp null in the direction opposite the single main lobe. The lobe is extremely broad. In two dimensions, the pattern is shaped somewhat like a "Valentine" heart.
cardiometer A device that indicates the pulse rate.
cardiostimulator See CARDIAC STIMULATOR.
carried mobility Symbol, μ. In a semiconductor material, the average drift velocity of electrons or holes per unit electric field.
carrier noise Modulation of a carrier when there is no input from the modulator itself; unwanted modulated carrier.
carrier noise level The noise signal amplitude that results from unintentional fluctuations of an unmodulated carrier.
carrier-on-light transmission A form of transmission in which many different signals are sent simultaneously by modulating a beam of light at multiple frequencies.
carrier-on-microwave transmission A form of transmission in which many different signals are sent simultaneously by modulating a microwave signal at multiple lower frequencies.
carrier-on-wire transmission A form of transmission in which many different signals are sent at the same time over a wire, by using radiofrequency carriers. Also called CARRIER-CURRENT COMMUNICATIONS or WIRED RADIO.
carrier oscillator In a single-sideband receiver, the radio-frequency (RF) oscillator that supplies the missing CARRIER WAVE.
carrier power The actual power represented by a radio-frequency (RF) carrier applied to an antenna, measured by either the direct or indirect method. The direct method involves determination of power according to the formula \( P = P_R \), where \( R \) is antenna current and \( P \) is antenna voltage and current, and \( P_R \) is a factor that expresses the efficiency of the system. The indirect method involves determination of power according to the formula \( P = P_R \), where \( R \) and \( P \) are antenna voltage and current, and \( P_R \) is a factor that expresses the efficiency of the system.
carrier voltage The voltage component of a carrier wave, also the amplitude of this component. Compare CARRIER CURRENT and CARRIER POWER.
carrier wave A sine wave that is modulated to convey information in wired or wireless communi-

In carrier transmission, the total deviation (low-
cardley telephony Telephone communication by WIRED WIRELESS.
carrier terminal 1. At each end of a carrier-current line or cable, the equipment for generating, modi-

carrier-to-noise ratio The ratio of carrier ampli-
tude to noise-voltage amplitude.
carrier telegraphy 1. Continuous-wave telegraphy by WIRED WIRELESS. 2. Wired-wired telegrap-
hy in which a radio-frequency carrier is modu-
lated by an audio-frequency keying wave.
carrier telegraphy Telecommunication by WIRED WIRELESS.
carrier type dc amplifier A high-frequency ac am-
plifier, ahead of which is operated a generator and transducer. A dc voltage applied to the trans-
ducer modifies the amplified signals supplied by the gen-
erator; the amplifier boosts the modulated signals, and the resultant output is rectified at a level higher than that of the dc input signal.
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carrier voltage The voltage component of a carrier wave, also the amplitude of this component. Compare CARRIER CURRENT and CARRIER POWER.
which the feed point is located at the center of the dish itself. For transmission, the radio-frequency A dish-antenna feed system in Cassegrain feed CASSEGRAIN FEED.

cascaded amplifier A multistage amplifier in which the stages are forward-coupled in succession.

cascaded carry In digital computer practice, a system of performing the carry operation (see CARRY) in which the n + 1 place receives a carry pulse only when the nth place has received carry information to generate the pulse.

cascaded thermoelectric device A thermoelectric component or circuit that consists of several cascaded sensors (see CASCADE).

cascade voltage doubler A voltage doubler circuit (see VOLTAGE DOUBLER) consisting of two diode-capacitor combinations in cascade. Unlike the conventional voltage-doubler circuit with two capacitors in the output, the cascade voltage doubler has one in the input and one in the output.

cascade A high-gain, low-noise, high-input-impedance amplifier circuit, consisting of a grounded-emitter or grounded-source input stage coupled directly to a grounded-base or grounded-gate output stage.

case temperature The temperature at a designated point on the outside surface of a component’s case or housing.

cascadecontrol 1. In an automatic control system, consisting of a grounded-emitter or grounded-source input stage coupled directly to a grounded-base or grounded-gate output stage.

catelectrostatic field, the migration toward the cathode of particles suspended in a liquid.

catastrophic failure 1. Sudden, unexpected failure of a component or circuit. 2. Failure that can result in the breakdown of an entire system. Also called catastrophic breakdown.

catch In a Klystron, the second reentrant cavity.

catcheA diode that is connected to regulate the voltage at the output of a power supply. The cathode is connected to a source of reference voltage. If the anode, connected to the source to be regulated, becomes more positive than the cathode, the diode conducts and prevents the regulated voltage from rising more than 0.3 volt above the reference voltage (for germanium diodes) or 0.6 volt above the reference voltage (for silicon diodes).

catchergridsin a Klystron, the grids through which the bunched electrons pass on their way from the buncher to the collector. Catcher grids absorb energy from the bunched electrons and present it to the collector circuit.

category In a computer system, a group of magnetic disk volumes containing information related by a common application.

category storage A computer file storage section that contains a number of categories and used by an operating system.

cathode 1. The negative electrode of a device (i.e., the electrode from which electrons move when a
current passes through the device. 2. In an electrochemical cell, the electrode that gains electrons. 3. In a diode, the positive electrode. 3. In a vacuum tube, the electron-emitting electrode (filament or indirectly heated cathode sleeve).

cathode current: The current flowing in the cathode circuit of a tube. Cathode current is the total of grid, plate, and suppressor currents, and can have an ac and dc component.

cathode dark current: The electron emission from the photocathode of a camera tube when there is no illumination.

cathode element: In a vacuum tube, an indirectly heated emitter of electrons. Also see CATHODE.

cathode emission: 1. The giving up of electrons by the cathode element of a device, such as a vacuum tube. Electrons can be emitted by either hot or cold cathodes, depending on the tube. 2. Collectively, electrons released by a cathode.

cathode heating time: The time required for the temperature of a tube cathode to increase from cold to its maximum specified operating temperature after the cathode current has been initiated. Also called cathode warmup time.

cathode luminous sensitivity: For a photomultiplier tube, the cathode’s sensitivity to light. This sensitivity figure is the ratio of photocathode current to whose light produces 1 candela. A factor of 100,000 is generally adequate to represent the difference in the limiting level of illumination for a particular tube.

cathode-ray oscillograph: An instrument that provides a permanent record, by photographic or other means, of the image on the screen of a cathode-ray tube.

cathode-ray oscilloscope: See OSCILLOSCOPE.

cathode rays: Invisible rays emanating from the cathode element of an evacuated tube operated with a positive potential on the anode and cathode. Cathode rays (electrons) cause certain substances, PHOSPHORS, to glow upon striking them.

cathode-ray scanning tube: Any tube in which an electron beam is deflected horizontally and vertically to scan an area. These include oscilloscope tubes, some computer monitors, radar displays, and television camera tubes.

cathode-ray tube: 1. An evacuated tube containing an anode and cathode that generates cathode rays when operated at high voltage. 2. An oscilloscope tube.

cavity resonance: 1. In a diode (hemispherical or tube), the terminal to which a positive dc voltage must be applied for forward-biasing the diode. Compare ANODE TERMINAL. 2. In a diode, the terminal at which a positive dc voltage appears when the diode is operating as an ac rectifier. Compare ANODE TERMINAL. 3. The terminal connected internally to the cathode element of device. 4. In a vacuum tube, an indirectly heated electron emitter.

cavity voltage: Symbol, $E_c$. The voltage between grid (or $E_{-\text{minus}}$) and the cathode or a tube; it can have both ac and dc components.

cathode protection: A method of preventing corrosive galvanic action in underground metal pipes or the submerged hulls of ships. The part to be protected is used as the cathode of a circuit through which a direct current is passed in the direction opposite to that which caused the corrosion, thus counteracting it.

cathodoluminescence: Luminescence resulting from a material’s exposure to cathode rays.

cavity • cavity laser: A cavity laser whose anode is a series of resonant cavities.

cavity oscillator: An oscillator with a cavity-tuned circuit.

cavity radiation: Energy radiated from a tiny hole in an otherwise sealed chamber. The radiation occurs at all electromagnetic wavelengths; the greater the temperature within the chamber, the greater the frequency at which the radiation has its maximum amplitude.

cavity resonance: The phenomenon whereby a hollow cavity resonates, specifically, resonance in small metal cavities at microwave frequencies.

cavity resonator: A resonant cavity whose adjustable element is a tunable resonant cavity into which radio-frequency (RF) energy is injected through a waveguide or coaxial cable. Such an instrument is useful at microwave frequencies.

cell: A battery cell, a charged unit of a battery, or the individual volumes of matter inside a capacitor.

cell constant: The constant of a detector’s sensitivity to light over its entire range of operation.

cell constant gain: The gain of a detector’s sensitivity to light over its entire range of operation.

cell element: In a device, an individual unit in a battery.

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**cavity magnetron** • **cell constant**

CCIT Abbreviation of Comité Consultatif Internationale de Radiocommunications (International Telecommunications Union). CCITT Abbreviation of Comité Consultatif International des Télécommunications (International Telecommunications Union). CCB Abbreviation of COMPACT-DISK READ-ONLY MEMORY. CDF Symbol for CADMIUM. C symbol for CERIUM. Cc Abbreviation of CAPACITOR-DISCHARGE IONIZATION. C display A radar display showing the target as a dot whose coordinates represent the bearing (horizontal) and angle of elevation (vertical). Compare A DISPLAY, J DISPLAY, and K DISPLAY.

cDm Symbol for square meter, the SI unit of luminance.

**CCD** Abbreviation of COMPACT-DISK READ-ONLY MEMORY. C symbol for CERIUM. Cc Abbreviation of CAPACITOR-DISCHARGE IONIZATION. C display A radar display showing the target as a dot whose coordinates represent the bearing (horizontal) and angle of elevation (vertical). Compare A DISPLAY, J DISPLAY, and K DISPLAY.

Arduino • Cathode • Cathode dark current: The electron emission from the photocathode of a camera tube when there is no illumination.
cell counter • center-tapped filament

cell counter A bioelectronic instrument used to count blood cells and other minute particles.
cell reversal A term that can occur in some rechargeable electrochemical cells and batteries, such as nickel-cadmium batteries. It most often results in a capacitance of the battery when it has been fully discharged.
cell-type enclosure A room designed to prevent the entrance or escape of radio-frequency (RF) electromagnetic fields, characterized by double-walled copper mesh shielding.
cellular coil A coil having a crisscross (usually multilayer) winding. Examples: lattice-wound coil, honeycomb coil, basket-weave coil.
cellular communications A radio, telephone, or television communications network that makes use of numerous fixed repeaters. Subscribers use mobile or portable transceivers that are always within range of at least one repeater. The most common form is known as cellular telephone or cellular mobile radio telephone.
celluloid A thermoplastic dielectric material that is a blend of cellulose nitrate and camphor. Dielectric constant, 4 to 7. Dielectric strength, 250 to 780 V/mil.
cellulose acetate A plastic dielectric material used as a substrate for magnetic tapes, photographic film, and insulating dielectrics. Dielectric constant, 6 to 8. Dielectric strength, 300 V to 1 kV/mil. Also see ACETATE.
cellulose acetate base See ACETATE BASE.
cellulose acetate butyrate A thermoplastic dielectric material that is an acetic and butyric acid ester of cellulose.
cellulose acetate tape See ACETATE TAPE.
cellulose A thermoplastic material from which the cellulose acetate is made.
cellulose propionate A thermoplastic molding material that is a propionic acid ester of cellulose.
Celsius scale A temperature scale in which 0 degrees is the freezing point of water, and 100 degrees the boiling point of water. Also called CENTIGRADE SCALE. Compare ABSOLUTE SCALE, and FAHRENHEIT SCALE.
cent An audio-frequency interval of 0.01 (1/100) of a half-cycle. In condition that the frequency difference between two immediately adjacent keys on a piano.
center channel In high-fidelity stereo, a phantom sound source that appears to exist midway between the left and right speakers or earpieces. The effect is caused by identical, or nearly identical, signals in the left and right channels.
center-fed A term in which the feeders are connected to the center of the radiator. center feed 1. Attaching a feeder or transmission line to the center of the radiator of an antenna. 2. Connection of signal-input terminals to the center of a coil. 3. Descriptive of paper tape whose feed holes are aligned with character hole centers. Compare ADVANCE FEED TAPE.
center frequency 1. The frequency, in a communications receiver, that is midway between the lower and upper 3-dB-down amplitude points. 2. The average frequency of a modulated carrier. 3. The carrier frequency of a modulated signal, whether or not the carrier is suppressed.
center load A component made with sheets of magnetic ceramic material, such as mixtures of barium oxide and iron oxide. Ceramic dielectrics provide high dielectric constant.
center zero meter A meter that has its zero point in the center of the scale (e.g., a dc galvanometer).
center frequency 1. The frequency, in a communications receiver, that is midway between the lower and upper 3-dB-down amplitude points. 2. The average frequency of a modulated carrier. 3. The carrier frequency of a modulated signal, whether or not the carrier is suppressed.
center-loaded A component made with sheets of magnetic ceramic material, such as mixtures of barium oxide and iron oxide. Ceramic dielectrics provide high dielectric constant.
centripetal force A force that draws a rotating body toward the axis of rotation.
centripetal switch A switch actuated by rotational motion (e.g., the automatic disconnection switch in an aircraft) or by a centrifugal force.
centripetal field The force that draws the mass of an object toward the axis of rotation.
center channel A component made with sheets of magnetic ceramic material, such as mixtures of barium oxide and iron oxide. Ceramic dielectrics provide high dielectric constant.
center frequency 1. The frequency, in a communications receiver, that is midway between the lower and upper 3-dB-down amplitude points. 2. The average frequency of a modulated carrier. 3. The carrier frequency of a modulated signal, whether or not the carrier is suppressed.
center tap A connection made to the centermost turn of a coil or to the center-value point of a resistor, filament, or capacitor pair.
center-tapped A term in which the feeders are connected to the center of the radiator. center feed 1. Attaching a feeder or transmission line to the center of the radiator of an antenna. 2. Connection of signal-input terminals to the center of a coil. 3. Descriptive of paper tape whose feed holes are aligned with character hole centers. Compare ADVANCE FEED TAPE.
center-tapped filament A tube or lamp filament that has a tap at its center.
ceramic transducer
A transducer that uses a CERAMIC PIEZOELEMENT to translate such parameters as pressure and vibration into electrical pulses.

ceramic tube
A high-temperature vacuum tube that uses a ceramic material, instead of glass, as the envelope; the tube offers low losses at high temperatures.

Cerenkov radiation
Light emanating from a transparent parent material that is traversed by charged particles, whose speed is higher than the speed of light through the material.

Cerenkov rebatron device
An apparatus for generating radio-frequency energy by passing an electron beam through a piece of dielectric having a small aperture.

ceressin wax
A yellow or white wax obtained by refining ceresin. Used as an insulant and sealant against moisture. Dielectric constant, 2.5 to 2.6.

cerium

cerium metals
A group of metals belonging to the rare-earth group: cerium, lanthanum, neodymium, praseodymium, promethium, and samarium.

cermet
An alloy of a ceramic, such as titanium carbide, and nickel, a metal. A thin film of cermet is used as a resistive element in some microcircuits. Cermet is an acronym for ceramic metal.

cerified tape
A magnetic recording tape that has been thoroughly checked and found to have no flaws.

cesium
Symbol, Cs. A metallic element of the alkali-metal group. Atomic number, 55. Atomic weight, 132.91. The oscillations of this element’s atoms have been used as atomic time standards. The element is used in some phototubes as the light-sensitive material, and in some arc lamps.

cesium-vapor lamp
A low-voltage arc lamp used as an infrared source.

cf
Symbol for CALORIUM.

cgs
Abbreviation of CENTIMETER-GRAM-SECOND.

cfad
The punched-out particle(s) constituting refuse from paper-tape punching.

chaff
The punched paper tape in which the chad is partially attached to the tape’s punched holes.

chadeless tape
Punched paper tape without CHAD.

chafing
An area that has been abraded by rubbing or scraping. 2. To produce a chafe.

chaff strips
Strips of metal foil used to create radar interference or ambiguity in locating a target by multiple reflections of the beam. Also called MIRROR.

chain broadcasting
Simultaneous transmissions from a number of broadcast transmitters connected together in a network by wire line, coaxial cable, or microwave link.

chain calculation
As performed by a calculator, a calculation that can be entered as it would normally be written (i.e., without the need for regrouping operands).

chain printer
In the readout channel of a digital computer, a high-speed printer carrying printer’s type on a revolving drum.

chain radar system
A number of radar stations along a missile flight path that are connected in a communications or control network.

chain reaction
A reaction (as in nuclear fission) that is self-sustaining or self-repeating. Unless controlled from outside, such a reaction runs to destruction.

chain switch
A switch that is actuated by pulling a light metal chain. Successive pulls turn the switch alternatively on and off.

channel
A frequency (or band of frequencies) assigned to a radio or television station. 2. See KEYWAY.

3. A subcircuit in a large system [e.g., the radio-frequency (RF) channel of a receiver, the vertical, in an oscilloscope, or some other modulator channel of a radio transmitter]. 4. The external electrical path through the semiconductor body in a field-effect transistor. 5. One of the independent audio circuits in a stereo sound system (e.g., the left channel or the right channel).

channel analyzer
A (usually multiband) continuously tunable instrument, similar to a tuned radio receiver, used in troubleshooting radio communications circuits by substituting a perfect channel for one that is out of order.

channel balance
The state in which the apparent amplitude of two or more channels is identical.

channel bank
In a transmission system, the terminal equipment used for the purpose of multiplexing the individual channels.

channel capacity
The fullest extent to which a channel can accommodate the information frequencies, bits, words, etc. to be passed through it.

channel designation
A name, number, or abbreviation given to a channel in a communications system.

channel efficiency
The possible current flow through a high impedance between the collector and emitter in a bipolar transistor.

channel frequency
The CENTER FREQUENCY of a communications channel.

channeling
Multiplex transmission in which separate carriers within a sufficiently wide frequency band are used for simultaneous transmission.

channel selection
The subdivision of a relatively wide frequency band into a number of separate subbands.

channel reliability
1. The proportion of time, usually expressed as a percentage, that a communications channel is useful for its intended purpose.

2. The relative ease with which communications can be carried out over a particular channel.

channel reversal
In stereo reproduction, interchanging the left and right channels.

channel reversing switch
In a stereo system, a switch that allows channel reversal without the need for rear positioning speaker cables or connectors.

channel sampling rate
The rate at which individual channels are sampled. For example, in the electronic switching of an oscilloscope, the number of times per second each input-signal channel is switched to the instrument.

channel selector
A switch or relay used to put any records being processed, a logical break that initiates a predetermined action, after which processing continues using the same file.

change record
A computer record that changes information in a related master record. Also called transaction record.

change tape
See TRANSACTION TAPE.

change tap
1. A frequency (or band of frequencies) assigned to a radio or television station. 2. See KEYWAY. 3. A subcircuit in a large system [e.g., the radio-frequency (RF) channel of a receiver, the vertical, in an oscilloscope, or some other modulator channel of a radio transmitter]. 4. The external electrical path through the semiconductor body in a field-effect transistor. 5. One of the independent audio circuits in a stereo sound system (e.g., the left channel or the right channel).

change dump
In computer operation (especially in debugging), the display of the names of locations that have changed following a specific event.

change file
See TRANSACTION FILE.

change of control
In a sequence of computer records being processed, a logical break that initiates a predetermined action, after which processing continues using the same file.

changer
In a high-fidelity disk player, a device that allows several disks to be played, one after the other, without the need for manually exchanging disks.

change record
A computer record that changes information in a related master record. Also called transaction record.

chad
Punched-out particle(s) constituting refuse from paper-tape punching.

chadless tape
Punched paper tape without CHAD.

channel separation
1. The spacing between communications channels, expressed in kilohertz.

2. A frequency (or band of frequencies) assigned to a radio or television station. 2. See KEYWAY. 3. A subcircuit in a large system [e.g., the radio-frequency (RF) channel of a receiver, the vertical, in an oscilloscope, or some other modulator channel of a radio transmitter]. 4. The external electrical path through the semiconductor body in a field-effect transistor. 5. One of the independent audio circuits in a stereo sound system (e.g., the left channel or the right channel).

channel slot
On a carrier modulated by numerous signals, the position or frequency of a specific modulating signal.

channel shift
The interchange of communications channels (e.g., the shift from a calling frequency to a working frequency).

channel strip
A fixed-channel amplifier for a television receiver.

channel time slot
In a frame of transmitted information, such as a television picture, a time interval designated to a channel for the transmission of a character signal or other information.

channel-to-channel connection
A device, such as a channel adapter, used to transfer data rapidly between any two channels of two digital computers, at the speed of the slower channel.

channel utilization index
The subband of the extent to which channel capacity is used. For a given channel, the index is the ratio of information rate to channel capacity, each expressed in units per second.

channel wave
An acoustic wave that travels within a region or layer of a substance because of a physical difference between that layer and the surrounding material. An example of a channel wave is the propagation of sound over a still lake.

channel width
A fixed-channel amplifier for a television receiver.

character
One of the symbols in a code.

character code
In computer operations, a digit, letter, or symbol used alone or in some combination to express information, data, or instructions.

character subscriber
In a communications or computer system, the combination of elements (e.g., bits) representing characters.

character counting
A reduction of the time interval between successive characters—especially in the binary code.
a medium. On a magnetic tape, it might be specified in characters per millimeter; on a magnetic disk, it might be specified in characters per square millimeter.

characteristic 1. A quantity that characterizes (typically) the operation of a device or circuit. Examples are emitter current, output power, and frequency deviation. 2. In floating point notation, the exponent.

characteristic curve A curve showing the relationship between an independent variable and a dependent variable, with respect to the parameter(s) for a device or circuit. Example: the collector voltage-collector current characteristic curve of a transistor.

characteristic distortion 1. In a digital signal, pulse distortion caused by the effects of the previous pulse or pulses. 2. Distortion in the characteristic curve of a component or device.

characteristic frequency The frequency peculiar to a given channel, service, or response.

characteristic impedance Symbol, Z. 1. Theoretically, the impedance that would be simulated by a given two-conductor or coaxial line of uniform construction, if that line were of infinite length, terminated by the materials used for the two conductors, the dielectric used to insulate the two conductors, the diameters of the conductors, and the spacing between them. 2. In practice, for a transmission line or waveguide, the impedance that produces no standing waves on the line, the ratio of radio-frequency (RF) voltage to RF current. This ratio is the same at all points along the length of a perfectly matched line, and depends on the physical construction of the line. Coaxial lines typically have Z0 between 50 and 100 ohms. Twinlead is available with 75-ohm and 300-ohm Z0 values. Open-wire line has Z0 between 300 and 600 ohms, depending on the spacing between the conductors. The type of dielectric (insulating material) employed to keep the spacing constant between the conductors. 3. Experimentally determined; that is, if it terminates a transmission line or waveguide, results in no reflected power from the load end of line. This is always a pure resistance; that is, it contains no reactance.

characteristic flow In floating-point arithmetic, the condition that occurs when a characteristic exceeds the upper limit specified by a standard.

characteristic spread The range of values over which a characteristic spreads. For example, if an amplifier’s output range is from 15 W to 25 W, its characteristic spread is 10 W.

characteristic underflow In floating-point arithmetic, the condition that occurs when a characteristic falls below the lower limit specified by a standard or a computer.

character modifier In address modification, a digital device that performs logical and arithmetic functions on a specific character’s location in memory.

character-oriented A device (or program) in which character locations, rather than words, can be addressed.

character printer A computer output device that prints matter in the manner of a conventional typewriter.

character reader Also called an optical scanner. In a digital computer, an input device that can read input and print directly.

character recognition The reading of a written or printed character by a computer, including its identification and encoding.

character sensing The detection of characters by a computer input device. This can be done vanably, electrostatically, magnetically, or optically.

character set The set of characters in a complete language, or in a communications system.

character signal The set of elements or bits representing a character in a digital transmission system. The signal can also represent the quantizing value of a sample.

characters per minute An expression of the speed of transmission of a digital signal. The number of characters (on average) transmitted in a period of one minute. In Morse code (CW) transmission, this is generally taken as the number of times the word ports plus the subsequent space, multiplied by five (five seconds per space following), can be sent in one minute.

characters per second An expression of the speed of transmission of a digital signal. The number of characters (on average) transmitted in a period of one second.

character string A one-dimensional character array [i.e., a list of characters that, when printed or displayed, would appear in a row or column, but not both (as in a matrix)].

character subset A classification of characters within a set.

Character A cathode-ray readout tube that displays a two-dimensional graph of a single variable with two independent variables.

characteristic underflow In floating-point arithmetic, the condition that occurs when a character...
program capable of detecting errors in another program.

checkout A test routine that ascertains whether or not a circuit or system is functioning according to specifications.

checkout routine A routine used by programmers to debug programs.

checkpoint A point in a digital-computer program at which sufficient information has been stored to avoid restarting the computation from that point.

checkpoint dump The process of recording details of a computer program run. This process might be necessary in the event of a system failure that requires reconstitution of a program or programs.

checkpointing The writing of a computer program in such a manner that, during a program run, information is frequently dumped as insurance against possible loss in the event of a system failure.

check problem A presolved problem used to check the operation of a digital computer or program.

check register In some digital computers, a register in which transferred information is stored so that it can be checked against the same information as it is received a second time.

check routine A special program designed to ascertain if a program or computer is operating correctly. Also see CHECK PROBLEM.

checksum Used as part of a summation check, a sum derived from the digits of a number. For example, the checksum of 23,335 is 16. Also called HASH TOTAL.

check symbol For a specific data item, a digit or digits obtained by performing an arithmetic check on the item, which it then accompanies through processing stages for the purpose of checking it.

check total See CONTROL TOTAL.

check word A check symbol in the form of a word or code word, and containing data from a block of records.

chelate Pertaining to cyclic molecular structure in which several atoms in a ring hold a central metallic ion in a COORDINATION COMPLEX.

chemical deposition The coating of a surface with a substance resulting from chemical reduction of a solution. In mirror making, for example, formaldehyde reduces a solution of silver nitrate, and deposits metallic silver on the surface of polished glass. Also see CHEMICALLY DEPOSITED PRINTED CIRCUIT and CHEMICAL REDUCTION.

chemical detector See ELECTROLYTIC DETECTOR.

chemical effect An alteration in the chemical makeup of a substance or solution, resulting from the passage of an electric current through it. Examples include electrolysis, electroplating, and the reduction of ores.

chemical energy Energy that is stored in the chemical bonds of a material or solution. An example is the stored energy in terms of watt hours in an electrolytic cell.

chemical load An arrangement of a chemical material or device for the passage of electricity through it. Examples: electropotter, electrolytic filter for the production of hydrogen gas, and stor- age battery.

chemically deposited printed circuit A printed circuit in which the pattern of metal lines and areas is chemically deposited on a substrate.

chemically pure Abbreviation, CP. Free from impurities.

chemical rectifier See ELECTROLYTIC CELL.

chemical reduction The process of making a chemical compound (usually in solution) into a metal, by removing the nonmetallic component from the compound. For example, when copper oxide is heated in the presence of hydrogen (a reductive agent), the oxygen (the nonmetallic component) is driven out, and copper (along with some water) remains.

chemical resistor See ELECTROLYTIC RESISTOR.

chemical switch See ELECTROCHEMICAL SWITCH.

CHIRL Abbreviation for current-hogging injection logic. A form of bipolar digital logic technology.

chirp 1. An INTEGRATED CIRCUIT. 2. A small, slab, wafer, or die of dielectric or semiconductor material, on which a subminiature component or circuit is formed or deposited.

chip capacitor A subminiature capacitor formed on a chip.

chip resistor A subminiature resistor formed on a chip.

chip tray A leaded receptacle located at a card or paper tape punching site.

Chireix-Mesny antenna A high-frequency (HF) beam antenna, in which each dipole section constitutes one side of a diamond. Cophased horizontal and vertical components of current flow in each of the diagonals, and radiation is broadband to the plane of the driven element.

chirp A rapid change in the frequency of a continuous-wave Morse-code signal. The chirp usually occurs at the beginning of each dot or dash, and can go up or down in frequency. Chirp occurs because of a change in the output impedance of an oscillating crystal or field. Modern code transmitters do not exhibit significant chirp.

chirp modulation A form of modulation in which the frequency of a signal is deliberately changed in a systematic way. Used in some radar systems.

Chirp radar A radar system that uses CHIRP MODULATION.

Chladni’s plates Conducting plates that are used to evaluate the nature of a vibration in a solid material. The plates are clamped to the material, and sand is sprinkled on the surface. This produces patterns that indicate the nature of the vibrations.

chlorinated diphenyl A synthetic organic substance used as an impregnant in some oil-filled capacitors.

chlorinated naphthalene See HALOWAX.


choker 1. To restrict or curtail passage of a particular current or frequency by means of a discrete component, such as a choke coil. 2. See CHOLE (COIL).

choker air gap A fractional-inch opening in the iron core of a filter choke usually filled with wood or plastic. The gap prevents saturation of the core when the choke coil carries maximum rated direct current.

choker coil 1. A large-value inductor that provides a high impedance to alternating current (ac), and changes it to a pulsating, rectified ac output. Such a device is characterized by distinct on and off operation.

choker amplifier A circuit that amplifies the output of a CHOPPER. Used in conjunction with a CHOPPER CONVERTER in dc amplification.

chopper converter A device that interrupts a direct current (dc) and changes it to a pulsating, rectangular-wave current or voltage that can be handled by a stable ac amplifier and rectified to supply amplified dc.

chopper power supply Also called power inverter. A circuit that delivers high-voltage ac from a dc source. The input is typically 12 volts dc, and the output is usually 117 volts rms ac. These devices facilitate the use of small appliances such as computers, television sets, and communications radios in portable and mobile environments. The output of a low-cost power inverter is generally not a good sine wave. More sophisticated inverters produce good sine waves and have a frequency close to 60 Hz.

see also See also CONTROL TOTAL.
chopper stabilization

1. Stabilization of direct-current (dc) amplification by using a CHOPPER CIRCUIT followed by a stable ac amplifier, and rectifying the amplifier output. 2. In a regulated power supply, use of a CHOPPER AMPLIFIER at the control-circuit or output regulation.

chopper-stabilized amplifier See CHOPPER AMPLIFIER.

chopper circuit A resettable fuse-like device that is used to protect an electronic circuit from overload.

chopper modulation The application of a chopper circuit to stabilize an electronic circuit.

1. A harmonious mixture of musical tones of various frequencies. 2. A straight line that joins two points on a curve (such as an arc of a circle). 3. The width of an airlift.

chord organ An electronic organ that will sound a musical chord when a key is pressed (see CHORD 1).

choreographer program A computer program similar to one originally written by Charles Lecht of Lecht Sciences, Inc. The computer operator gives commands that cause a human form, portrayed on the display screen, to make various movements. Used in animated computer graphs.

chorus Signals at very low radio frequencies (VLF), natural in origin, that sweep upward in frequency. Believed to result from lightning-generated electromagnetic fields that circulate in the magnetosphere (earth’s magnetic field). The term is derived from the sound the signals make in high-gain audio-frequency (AF) amplifiers connected directly to VLF receiving antennas.

Christiansen antenna A radio-telescope antenna for obtaining high resolution. Two straight arrays are placed at an angle, intersecting approximately at their centers. The resulting interference pattern is extremely narrow lobes.

Christmas tree A tree-like pattern on the screen of a television receiver, caused by loss of horizontal synchronization.

chroma The quality of a color: hue and saturation. 1. A tree-like pattern on the screen of a television receiver, caused by loss of horizontal synchronization.

chromatic 1. The state of being chromatic (see CHROMATIC 2). 2. A quantitative assessment of a color in terms of dominant or complementary wavelength and purity.

chromacity co-ordinates For a color sample, the ratio of any one of the three tristimulus values (primary colors) to the sum of the three.

chromaticity diagram A rectangular-coordinate graph in which one of the three CHROMATICITY COORDINATES of the color is plotted against another coordinate.

chromaticity flicker Flicker caused entirely by chromaticity fluctuation (see CHROMATICITY 2).

chromel A nickel-chromium alloy with some iron content, used in thermocouples.

chronal-alumel junction A thermocouple that uses wires of the alloys chromel and alumel.

chromel constantan thermocouple A thermocouple consisting of a junction between wires or strips of chromel and constantan. Typical output is 6.3 mV at 100°C.

chrome plating Electroplating an electrode. The duration of the interval is determined from the amount of deposit.

Clock A precision clock. Electronic chronometers often use a highly accurate and stable crystal oscillator, followed by a string of multivibrators to reduce the crystal frequency to an audio frequency (such as 1 kHz) that drives the clock motor.

choke An instrument for precisely measuring a current (dc) amplification by using a CHOPPER CONVERTER ahead of a stable ac amplifier, and rectifying the amplifier output.

CHU Call letters of the Canadian time-signal station whose primary frequency is 7.335 MHz.

CIE Abbreviation for International Commission on Illumination.

CIE Color Abbreviation for International Commission on Illumination.

CIE Color Abbreviation for International Commission on Illumination.

cinematograph An instrument that provides an accurate time base along the horizontal axis of its output record. 2. Stopwatch.

chromer 1. A nickel-chromium alloy with some iron content, used in thermocouples.

chrominance In color television, the difference between a reproduce color and a standard reference color of the same luminous intensity.

chrominance amplifier In a color television circuit, the amplifier separating the chrominance signal from the total video signal.

chrominance cancellation On a black-and-white picture tube screen, cancellation of the fluctuations in brightness caused by a chrominance signal is 6.3 mV at 100°C.

chrominance carrier In color television, a continuous signal at the frequency of the chrominance subcarrier; it is in phase with the color burst and provides modulation or demodulation in phase reference for carrier-chrominance signal.

chrominance channel In a color television, a circuit devoted exclusively to the color function, as opposed to audio and general control channels.

chrominance component, one of several circuits whose ultimate purpose is to produce a color component on the screen.

chrominance control A d-c amplifier, class AB, with a constant output voltage at 60 Hz that is used to control the color circuits of a television receiver.

chrominance demodulator In a color television receiver, a demodulator that extracts video-frequency chrominance components from the chrominance signal, and a sine wave from the chrominance subcarrier oscillator.

chrominance gain control A d-c amplifier, class AB, with a constant output voltage at 60 Hz that is used to control the color circuits of a television receiver.

chrominance modulator In a color television transmitter, a device that generates the chrominance signal from the I and Q components and the chrominance subcarrier.

chrominance primary In one of the transmission primaries (red, green, and blue) upon which the chrominance-signal waveform is superimposed. A signal component in color television that represents the hues and saturation of the color. A picture element that represents a particular hue and saturation of the color.

chrominance signal The signal component in color television that represents the hues and saturation of the color. A picture element that represents a particular hue and saturation of the color.

chrominance subcarrier In color television, the 3579.545-kHz signal that serves as a carrier for the I- and Q-signals.

chrominance-subcarrier oscillator In a color television receiver, a crystal-controlled oscillator that generates the subcarrier signal (see CHROMINANCE SUBCARRIER).

chrominance video signals Output signals from the red, green, and blue channels of a color television camera or receiver matrix.


chronometer An elapsed-time indicator in which current, flowing during a given time interval, electrolizes an electrode. The duration of the interval is determined from the amount of deposit.

chronophotograph 1. An instrument that provides an accurate time base along the horizontal axis of its output record. 2. Stopwatch.

chronometer A precision clock. Electronic chronometers often use a highly accurate and stable crystal oscillator, followed by a string of multivibrators to reduce the crystal frequency to an audio frequency (such as 1 kHz) that drives the clock motor.

chromatic fidelity See COLOR FIDELITY.

chromaticity 1. The state of being chromatic (see CHROMATIC 2). 2. A quantitative assessment of a color in terms of dominant or complementary wavelength and purity.

chromaticity co-ordinates For a color sample, the ratio of any one of the three tristimulus values (primary colors) to the sum of the three.

chronograph 1. An instrument that provides an accurate time base along the horizontal axis of its output record. 2. Stopwatch.

chronograph 1. A device that generates a chrominance signal from the I and Q components and the chrominance subcarrier.

chronograph 2. Any of the electronic devices or parts (capacitors, resistors, transistors, etc.) that are connected through wiring to form a circuit. 2. An electrical quantity required for, or arising from, circuit operation. Examples: input voltage, feedback current, stray capacitance, and circuit noise.

chronicler A drawing in which symbols and lines represent the components and wiring of an electronic circuit. Also called CIRCUIT DIAGRAM.
circuit diagram • circular magnetic wave

Schematic, schematic diagram, and wiring diagram
circuit diagram A momentary interruption of circuit operation, often caused by a break in the circuit.
circuit efficiency A quantitative measure of the effectiveness of circuit operation, customarily expressed as the ratio of the useful output power to the total input power.
circuit element See circuit component, 1.
circuit engineer An electronics engineer who specializes in circuit analysis, circuit synthesis, or both.
circuit hole A perforation within the conductive area of a printed-circuit board, for the insertion and connection of a pigtail, terminal, etc., or for connecting the conductors on one side of the board with those on the other.
circuit loading Intentionally or unintentionally drawing power from a circuit.
circuit noise 1. Electrical noise generated by a circuit in the absence of an applied signal. 2. In wire telephony, electrical noise as opposed to acoustic noise.
circuit noise level The ratio of circuit-noise amplitude to reference-noise amplitude, expressed in decibels above the reference amplitude.
circuit noise meter A meter that measures the intensity of the noise generated within a circuit.
circuit parameter See circuit component, 2.
circuit protection Automatic safeguarding of a circuit from damage from overload, excessive drive, heat, vibration, etc. Protection is afforded by various devices and subcircuits, ranging from the common fuse to sophisticated limiters and breakers.
circuit reliability A quantitative indication of the ability of a circuit to provide dependable operation as specified. See mean time before failure and mean time between failures.
circuitry 1. Collectively, electronic and electrical circuits. 2. A detailed plan of a circuit and its subcircuits. 3. Collectively, the components of a circuit.
circuit schematic See circuit diagram.
circuit simplification 1. In circuit analysis, the reduction of a complex circuit to its simplest representation to minimize labor and to promote clarity. Thus, through application of Kirchhoff’s laws, a complicated circuit could theoretically be reduced to a single generator in series with a single impedances. In circuit synthesis, the arrangement of a circuit so as to provide desired performance with the fewest components and cost-effective wiring.
circuit switching In telephony, a method of connection in which the circuit is maintained between two subscribers for the entire duration of the call. The signal path does not change. The connection is maintained even during periods of silence (no data transmitted by either subscriber) or when in a particular circuit operation.
circuit synthesis The development of a circuit under the control of multichannel switching systems and subcircuits. Compare circuit component, 1.
circuit test An instrument for checking the performance of electronic circuits. Often consists of a specialized continuity tester, but occasionally it includes a dynamic performance tester.
circuit tracking The alignment and/or prewiring of circuits for identical or optimum response. It applies equally to cascaded circuits, whose variable elements, such as tuned inductance-capacitance (LC) networks, must follow each other in step when ganged together.
circular angle The angle described by a radius vector as it rotates counterclockwise around a circle.
circular antenna A half-wave horizontally polarized antenna, whose driven element is a rigid conductor bent into a circle with a break opposite the feed point. Also called halo antenna. Used primarily at very high frequencies (VHF).
circular electric wave An electromagnetic wave with circular electric lines of flux. An example is the field in the immediate vicinity of a CIRCULAR ANTENNA.

Circular electric wave

Circular functions Trigonometric functions of the angle described by a vector rotating counterclockwise around a circle. Also see COSEcant, Cotangent, Secant, Sine, and Tangent.
circular magnet See ring magnet.
circular magnetic wave An electromagnetic wave in which the magnetic lines of flux are circular. An example is the field in the immediate vicinity of a straight-conductor antenna.

circular magnetic wave

circular mutual inductance

Circular magnetic wave

circular mutual inductance

circular vector

circular waveguide

Circulating register In a digital computer, a register in which digits are taken from locations at one end and returned to those at the other end.
circulating tank current The alternating current that oscillates between the capacitor and inductor within a tank circuit.
circulator A multi-terminal coupler in which microwave energy is transmitted in a particular direction and returned to the next circuit.
circumvention In a security or alarm system, the evasion of detection that can be done by physically avoiding regions of coverage, or by defeating the system electronically.
cis A prefix meaning “on this side of.” For example, the cislinear field is the field on this side of the moon.
citizen band Abbreviation, CB. A band of radio frequencies allocated for two-way communication between private citizens (apart from amateur and commercial services).
citizens radio service Two-way radio communication in a citizen band. In the United States, the FCC licenses users of this service without requiring them to take an examination.
c/k Abbreviation of COULomb/s per kilogram, the unit for electron charge-to-mass ratio.
c/kmol Abbreviation of coUlomb/s per kiloMole, the unit for the Faraday constant.
ckt Abbreviation of circuit.
cl Symbol for chlorINE.
cl Abbreviation of ClAMPER.
clamping The bonding of one metal to another to minimize or prevent corrosion. A common example is copper-clad steel wire, ideal for use in radio-frequency antenna systems. The copper provides excellent conduction, and the steel provides high tensile strength with a minimum of wire stretching.
clampers A device that restricts a wave to a predetermined level. Also called dc RESTorer.
clamping 1. Fixing the operation of a device at a definite dc level. Also see CLAMPER. 2. In television, establishing a fixed level for the picture signal at the start of an initial line.
clamp circuit See CLAMPER.
clamp diode A diode used to fix the voltage level of a signal at a particular reference point.
clapper In a bell, a hammer or striker that strikes the bell. In an electric bell, it is affixed to the vibrating armature.
class-B amplifier A form of electromagnetic-wave polarization in which the orientation of the electric flux rotates continuously and uniformly as the wave propagates through space. Circular polarization can occur in either a clockwise or counterclockwise sense.
circular radian The angle enclosed by two radii of a unit circle and subtended by a unit arc. Equal to about 57.296 angular degrees.
circular scan A radar scan in which the electron beam spot describes a circle centered around the transmitting antenna.
circular sweep In an oscilloscope, a sweep obtained when the horizontal and vertical smutmosial deflecting voltages have the same amplitude and frequency, but are out of phase by 90 degrees (1/4 cycle).
circular trace An oscilloscope pattern consisting of a circle obtained with a circular sweep of the electron beam.
circular waveguide A waveguide with a circular cross section.
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A waveguide with a circular cross section.
circulating register

In a digital computer, a register in which digits are taken from locations at one end and returned to those at the other end.
A field-effect transistor, or vacuum tube, in which the collector, drain, or plate current flows for approximately half the signal cycle.

class-A operation
An amplifier whose bias is adjusted to a level between that of a class-A amplifier and that of a class-AB amplifier. Output electrode current flows during more than 50 percent, but less than 100 percent, of the input signal cycle.

class-AB modulator
A modulator whose output stage is a class-AB amplifier.

class-AB operation
The operation of a transistor, field-effect transistor, or vacuum tube, in which the collector, drain, or plate current flows during the entire signal cycle.

class-AB amplifier
An amplifier whose bias is adjusted to operate at the cutoff point in the characteristic curve. Output current flows during approximately 50 percent of the input signal cycle. Efficiency is higher than that of a class-A amplifier.

class-B modulator
A push-pull modulator whose output stage is a class-B amplifier.

class-B operation
The operation of a transistor, field-effect transistor, or vacuum tube, in which the collector, drain, or plate current flows for approximately half the signal cycle.

making and breaking the circuit carrying the current to a headset or earphone. A single click results for each make and each break. Also see TIKKER.

click suppressor
See KEY-CLOCK FILTER.

click suppressor, class-A
A test-signal generator that supplies a chain of pulses identical to those supplied by the clock of a digital computer.

clock module
A complete plug-in or wire-in digital unit whose readout indicates time of day or elapsed time. Connected to a suitable power supply, it serves as either a clock or timer.

clock pulse
A time-base pulse supplied by the clock of a digital computer, expressed as a period whose reciprocal is frequency.

clock rate
See CLOCK FREQUENCY.

clock track
On a magnetic tape or disk for data storage, a track containing read or write control (clock) pulses.

clockwise
Abbreviation, cw. Rotation in a right-handed direction around a circle, starting at the top. Compare COUNTERCLOCKWISE.

clockwise-polarized wave
An elliptically polarized electromagnetic wave whose electric-intensity vector rotates clockwise, as observed from the point of propagation. Compare COUNTERCLOCKWISE-POLARIZED WAVE.

closure
A primary cell, such as the early gravity cell, designed for heavy and polarization-free service.

closure capacitance
The value for all input voltages higher than a predetermined value. Clippers can flat-top the positive, negative, or both positive and negative peaks of an input waveform. The output voltage is proportional to the angle at which the device is tipped. Used in mobile robots.

clip
A pinch-type connector whose jaws are normally held closed by a spring.

clip adjusting
An electric current audibly detectable, by

A push-pull modulator whose output stage is a class-AB amplifier.
interconnected so that a disturbance anywhere in the circuit will result in an alarm signal pinpointing the location of the disturbance.

closed-circuit signaling Signaling accomplished by raising or lowering the level of a signaling current flowing continuously in a circuit.

closed-circuit television Abbreviation, CCTV. A usually in plant television system, in which a transmitter feeds one or more receivers through a cable.

closed core A magnetic core generally constructed in an "O" or "D" configuration to confine the magnetic path to the core material. Compare OPEN CORE.

closed-core choke A choke coil wound on a CLOSED CORE. Also called CLOSED-CORE INDUCTOR.

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An unbalanced cable consisting of two concentric conductors: an inner wire and an outer, braided sleeve. The inner and outer conductors are separated by a dielectric, usually solid or foamed polyethylene. The outer conductor is generally grounded while the inner conductor carries the signals. This cable is used in community antenna television (CATV) networks, and as a transmission line connecting antennas to radio transmitters, receivers, and transceivers at low, medium, high, and very-high frequencies. It is also used in some high-fidelity sound systems—especially to connect microphones, compact-disc players, tape players, tuners, and speakers to audio amplifiers.

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coaxial cable A somewhat uncommon, but highly effective, capacitor that uses two telescoping sections of tubing. It works because there is a certain effective surface area between the inner and the outer tubing sections. A sleeve of plastic dielectric is placed between the sections of tubing. This allows the capacitance to be adjusted by sliding the inner section in or out of the outer section. Coaxial capacitors are especially useful in antenna systems for tuning and/or impedance matching. Their values are generally from a few wave-antenna to a very high value that is insulated from, and that extends upward from the top of, the lower section.

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coaxial antenna A half-wave vertical antenna that is center-fed by coaxial cable. The cable runs upward through a 1/4-wave section of tubing that composes the lower half of the antenna. The outer conductor of the cable is connected to the antenna through a shorting disk at the top. The inner conductor of the cable is connected to a 1/4-

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coaxial connector  A device used to splice coaxial line or to connect a coaxial line to a transmitter, receiver, or other piece of apparatus.

coaxial diode  A semiconductor diode housed in a cylindrical metal shell acting as one contact, and provided with a recessed, concentrically mounted end pin, which serves as the other contact.

crystal filter  A circular parametric filter using a quartz crystal as an active element.

current  A quantity characterized by a flow or transfer of electric charge resulting in voltage across a conductor or circuit.

code  A set of symbols for communications (e.g., the Morse code of radiotelegraphy and wire telegraphy in which dots and dashes correspond to letters, numbers, and marks of punctuation). 2. In a computer program, symbolically represented instructions. 3. See ENCODE.

coder/decoder  1. The representation of character in a particular code form. 2. A sequence of dots and dashes in the Morse code.

code conversion  The translation of a coded signal from one form of code to another.

code digit  A number expressed in binary form (computer code), that is, in terms of zeros and ones only.

code-directing characters  Characters added to a code word or program instruction that causes an enunciator or indicator to give a specific indication.

code file  A listing of the system or application program with the appropriate codes assigned.

code group  See CONCERTINA CODE.

code set  1. A set of symbols for communicating or representing information. 2. A set of states (e.g., the 0s and 1s of binary code) or codes (e.g., the 40 codes of the dotted decimal code of the U.S. and Canada).

codan lamp  A lamp that alerts a radio operator that a signal of satisfactory strength is being received. Also see CODAN.

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coding  In encoding and decoding equipment, a coder/decoder. Usually in a single package and operating at 8 kHz for an input signal with a passband of 3100 Hz (300 to 3400 Hz).

coding process  1. The process of converting information into another form, usually in a single package and operating at 3 kHz for a single sideband signal.

coding system  A scheme for representing information in a form suitable for storage or transmission.

coding time  See Code Time.

codan  Any of several multiconfiguration (IQ/TEL) systems. In particular, a squelch circuit that suppresses noise in a sensitive receiver in the presence of automatic gain control (AGC). The receiver is quiet until a predetermined threshold is exceeded. The name is an acronym for carrier-operated device antinoise.

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coherent bundle • cold resistance
cold rolling A method of manufacturing an induc-
tor core so that the magnetic grains are all ar-
ranged lengthwise.
cold solder joint A solder joint in which insuffi-
cient heat has been applied, resulting in a bad
connection. Compare HOT SOLDER JOINT.
cold spot 1. An area of a circuit or component
whose temperature is ordinarily lower than that
of the surrounding area. 2. A node of current
or voltage. Compare HOT SPOT.
cold weld A welded joint produced by means of
COLD PRESSURE WELDING.
coldor An optical radar system using unmodu-
lated, coherent (laser-produced) light. The term is
an acronym for coherent light detection and
ranging.
collate in data processing, to produce an ordered
set from two or more similarly ordered sets (as
punched cards).
collator In a punched-card system, a device that
collates (see COLLATE) punched cards.
collector 1. In a bipolar transistor, the elec-
tric connection to the point of deformation, whereupon
away the secondary electrons knocked out of the
flat, fine wire screen that attracts and conducts
away the primary electrons released by the mosaic.
2. In a backward-wave or traveling-wave
tube, or traveling-wave tube. Compare BACK-WAVE
COLLECTOR.
collector efficiency In a bipolar transistor circuit,
the ratio of ac power output to dc collector-power
input.
collector family For a bipolar transistor, a group
of collector current versus collector voltage
curves. Each is plotted for a particular value of
bias current (common-emitter circuit) or emitter
current (common-base circuit).
collector junction In a bipolar transistor, the jun-
tion between collector and base layers.
collector mesh In a cathode-ray storage tube, a
flat, fine wire screen that attracts and conducts
away the secondary electrons knocked out of the
storage mesh by the electron beam.
collector multiplication In a bipolar transistor,
an increase in the number of electrons at the col-
clector electrode, caused by a momentary alter-
ation of the charge density of the collector
junction by injected carriers reaching the junc-
tion.
collector resistance In a bipolar transistor, the in-
erternal resistance of the collector circuit. Compare
AC COLLECTOR RESISTANCE and DC COLLECTOR
RESISTANCE.
collector ring 1. A rotating, brush-contacted ring
electrode connected to one end of a coil in an ac
generator. 2. A similar ring which, with a brush,
uses as a connection to a rotating element, as in
a signal-gathering system. 3. The collector elec-
trode in an iconoscope.
collector transition capacitance The capacitance
between the collector and base of a bipolar tran-
sistor under normal operating conditions. This
capacitance has a limiting effect on the operating
frequency of the bipolar transistor.
collector voltage Symbol, Vc. In a bipolar trans-
isor, the voltage on the collector electrode. See AC
voltage.
In order of decreasing wavelength, the colors are red at 750 to 700 nm (7500 to 7000 Å). Also expressed in nanometers (nm). In a color television picture into its red, green, and blue components, as a result of a sudden disturbance of viewing conditions (blinking of eyes, moving of head, intermittent blocking of screen, etc.).

A transient separation of a color color breakup vertical bars—each of a different color. In a color television, the phase difference between one of the additive primaries in a color television system, lens, or film reproduces the colors of a scene.

The oscillator in a color television circuit or channel in which the camera signals and the chrominance subcarrier are combined into the color-picture signal.

In a color television receiver, a circuit that, in the absence of a color signal, delivers a negative bias to cut off the bandwidth amplifier.

A color television signal. Also see B-Y SIGNAL, G-Y SIGNAL, and R-Y SIGNAL.

In color television reception, the phase difference between an I or Q chrominance primary signal and the chrominance carrier reference. In color television, the phase difference between an I or Q chrominance primary signal and the chrominance carrier reference.

In color television, the combination of chrominance and luminance signals minus color burst and sync. In a color television picture tube, the color signal contains the sync components corresponding to the hue, saturation, and brilliance of a fixed or changing visual image. In color television, the combination of chrominance and luminance signals minus color burst and sync.
color spectrum  •  coma lobes

Angstroms; orange, yellow, green, blue, indigo, and violet at 410 to 390 nm (4100 to 3900 Angstroms).

color subcarrier  A modulated monochrome signal whose sidebands convey color information.

color-sync signal  See COLOR BURST.

color system  Also called RGB color model. A means of representing a color in terms of mathematical coordinates. This can be done in three dimensions because there are three COLOR PRI-
MARIES. Each color primary is represented by an axis. Any COMPOSITE COLOR can be repre-
sented by a unique vector. The relative amount of each color primary is given by the length of the component-color vector components along each axis.

color television  Television in which the picture approximates natural color. It operates on the ba-
sis of mixing three primary colors (red, blue, and green) of phosphors on the picture tube screen.

color television receiver  A television receiver de-
signed to reproduce color pictures.

color television signal  The signal transmitted by a color television transmitter, containing all of the information needed to reproduce a complete, full-
color, moving image.

color transmission  The television transmission of a picture in color.

color triad  On the screen of a color picture tube, one of the color cells, each of which contains one of the three phosphor dots; red, green, and blue.

color triangle  A triangle that is inscribed on a chromaticity diagram to reveal the chroma-

nary range resulting from adding the three color pri-
maries.

color TV signal  The complete signal (video, color, and sync components) required for transmitting a picture in color.

color weather radar  A computer-enhanced radar (resolution of weather patterns, usually showing various intensities of precipitation as different colors. Generally, areas of precipitation show up as violet, blue, green, yellow, orange, and red, in order of increasing intensity.

Colpitts oscillator  A radio-frequency (RF) oscilla-
tor that uses a single, untapped inductor. A combi-
nation of twoixed capacitors in series is con-
nected in parallel with the inductor. The feed-
back is controlled by the ratio of capacitances. A
per-order combination tone, derived from the comb-like appearance of the re-

sponse pattern of various output peaks displayed
during a frequency-base axis.

comb filter  A selective device that passes several narrow bands of frequencies within a larger band, while rejecting frequencies in between the narrow bands. So called because its frequency-response curve resembles the teeth of a comb when ob-
served on a spectrum analyzer. Also see COMB AMPLIFIER.

Combination  A radio-frequency resulting from the combing of two other acoustic tones. If the original tones have frequencies \( f_1 \) and \( f_2 \) (where \( f_1 \) is higher than \( f_2 \)), then the first-order combination frequencies are \( f_1 + f_2 \) and \( f_1 - f_2 \). Higher-order combination tones can result from mixing among the original tones and the first-

order combination tones.

Combination circuit  Two or more basic logic cir-
cuits, combined in such a way that the output state depends entirely on the input states.

Combination feedback  See CURRENT-VOLTAGE FEEDBACK.

Combination generator  A signal generator that pro-
vides outputs at evenly spaced frequencies. So called because, on a spectrum analyzer, its out-
put looks like the teeth of a comb. 2. A transmitted signal with many spurious signals at its output.

Command  In computer operations, the group of selected pulses or other signals that cause the

computer to execute a step in its program. 2. In-
struction.

Command chain  Part of a computer operation car-
ried out independently as a series of input/

output instructions.

Command control  In automation, electronic con-
trol, and computer operations, the performance of functions in response to a transmitted signal.

Command destruct signal  A signal for instigating the destruction of a missile in flight.

Command guidewe system  A system in which a

guided missile and its target are both tracked by

camera.

Command language  A computer language made

up of command operators.

Command link  In a command guidance system,

the section that transmits missile-steering com-

mands.

Command network  A radio communications net-
work in which the chain of command is rigor-
ously defined and followed.

Command reference  The current or voltage to

which a feedback signal is referenced in a control system or servomechanism.

Comment  A statement written into a computer

program for a documentation, rather than imple-
mentation (e.g., to describe the purpose of a step

or subroutine).

Comment field  A record or file in which instruc-
tions or explanations are given.

Commercial data processing  A commercial (rather than industrial, scientific, or personal) ap-
lication of data processing.
common-mode input capacitance

common-source circuit A field-effect transistor circuit in which the source terminal is the common (or grounded) electrode. Also called grounded-source circuit.

common-source coupling Capacitive coupling in which the drain is common to both inputs of a difference amplifier. Also called common-drain coupling.

common-mode coupling The process of coupling one tuned circuit to another by means of a capacitor that is common to both circuits.

common-mode coupling A general-coverage or communications receiver, designed primarily for listening to amateur, weather, or other non-broadcast stations. Compare BROADCAST RECEIVER.

common-mode coupling A form of interference that occurs across the terminals of a grounded system.

common-mode rejection The extent to which a differential amplifier will reject a signal presented simultaneously to both inputs in phase, or of two signals identical in amplitude, frequency, and phase applied separately to the two inputs. Also see COMMON-MODE REJECTION RATIO.

common-mode rejection ratio A ratio in a differential amplifier, the extent to which the amplifier cancels undesired signals. It is the ratio of the differential gain to the common-mode gain. Also see COMMON-MODE REJECTION.

common-mode signal The algebraic average of two signals applied simultaneously to the two ends of a balanced circuit, such as a differential amplifier. Compare COMMON-MODE INPUT SIGNAL.

common-mode input voltage The part of the input that is common to both inputs of a differential amplifier circuit. It is quantitatively defined as the arithmetic mean of the voltages at the inputs.

common-mode input voltage gain See COMMON-MODE Gain.

common-mode input voltage range The range limited by the maximum nonsaturating input voltage that can be applied to both inputs of an operational amplifier.

common-mode input impedance The impedance between ground and one of the inputs of a differential amplifier. Compare COMMON-MODE INPUT IMPEDANCE.

common-mode input capacitance The internal capacitance of the common-mode input circuit.

common-mode input current The difference in the current between the two inputs of a differential amplifier. Compare COMMON-MODE CURRENT.

common-mode input power The power difference between the two inputs of a differential amplifier. Compare COMMON-MODE POWER.
commutation 1. In a direct-current (dc) generator, periodic reversal of the current in the armature coils so that they may pass the north and south poles of the magnetic field. When the ends of each coil are connected to opposite bars of the commutator, the polarity of the current at the commutator brushes remains constant. 2. In a thyatron or silicon-controlled rectifier (SCR) circuit, momentarily reversing the polarity to cut the device off.

comparator 1. In a direct-current (dc) motor, generator, or rotating selector, an arrangement of parallel metal bars or strips on a rotating drum. As the drum turns, the bars contact one or more brushes that are in sliding contact with the commutator. 2. An electronic circuit that switches a single input sequentially to a series of output terminals, or switches a number of inputs sequentially to a single pair of output terminals.

compensation coil 1. A doped semiconductor material in which the acceptor impurity cancellation. 2. A hybrid integrated circuit (IC) that has an active element inside the integrated structure and a passive element disposed on its insulated outer surface.

compensated amplifier 1. A wideband amplifier whose frequency range is extended by special components and circuit modifications. Also see COMPENSATING CAPACITOR and COMPENSATING COIL.

compensated diode detector 1. A diode detector in which a positive dc voltage from the automatic-gain-control (AGC) rectifier is applied to the diode anode. The voltage is always proportional to the signal carrier. The arrangement allows the diode to handle a heavily modulated AM signal without producing excessive distortion.

compensated-impurity resistor 1. A resistor consisting of a doped semiconductor material to which are added controlled amounts of n- or p-type impurities. 2. A combination volume-tone control that provides bass boost at low volume levels to compensate for the ear's deficiency at low frequencies.

compensating capacitor 1. A capacitor that has a temperature coefficient of capacitance numerically equal to, but having the opposite sign from, that of another capacitor with a standard temperature of zero. When the capacitors are connected in parallel, a temperature-induced value change in the main capacitor is balanced by an equal and opposite change in the compensating capacitor; the net capacitance of the circuit does not change. This greatly reduces frequency drift. 2. In a video amplifier, a large capacitance connected between ground and a tap on the collector or drain resistor to boost low-frequency response. Compare COMPENSATION COIL. 3. A usually low-capacitance capacitor of known temperature coefficient, operated in combination with a main capacitor to reduce capacitance/timing drift of the latter to zero or to some desired positive or negative value.

compensation Adjusting a quantity, manually or automatically, to obtain precise values, or to counteract undesired variations. Example: temperature compensation of electronic components. For illustration, see COMPENSATING CAPACITOR.

compensation coil In a video amplifier, an inductor connected in series with the collector or drain resistor, or in the coupling path between stages, or both, to boost high-frequency response.

compensation filter See COMPENSATING CAPACITOR.

compensation signal A signal recorded on a tape track containing computer data, to ensure that the tape plays back at exactly the correct speed at all times.

compensation theorem An impedance (Z) in a network can be replaced by a generator having...
Any impedance discontinuity will result in complementary waves.

A transistor pair of complementary transistors, operated in a complementary-symmetry circuit or its equivalent.

The permeability of an inductor core under actual operating conditions, assuming zero loss in the conductors of the coil winding. A parallel combination of reactance and resistance.

In computer operations, a program that changes a HIGH-LEVEL LANGUAGE such as BASIC, C, C++, COBOL, or FORTRAN, into MACHINE LANGUAGE. A compiler must be written especially for the high-level language being used.

A program that converts compiler language into machine language, a routine permitting the computer itself to construct a program to solve a problem.

The difference between a number and the radix (modulus or base) of the number system. For example, the complement of 7 is equal to 3 (because 10 – 7 = 3) in the decimal (radix-10) number system. 2. Also called ones complement. In computer operations, a representation of the negative value of a binary number. All the available digits are set to 1, and then the number in question is subtracted. For example, the complement of 101 is equal to 010 because 101 – 010 = 011. The complement of 101 is 011. The complement of 1010 is 0001. 2. Also called ones complement.

A Boolean operator whose result is the same as that of another operation, but with the opposite sign, such as + or –. ON and NOR operations are complementary.

In the additive color system, system, two pigments that produce dark gray or black when combined. In the subtractive color system, colors or pigments that are opposite each other on the color wheel.

A form of bipolar logic with high operating speed and high signal density.

A device or circuit that facilitates the adjustment of a quantity, manually or automatically, to obtain precise values, or to counteract undesired variations.

The number is defined mathematically as the positive square root of –1.

Engineers and mathematicians. This number is represented as jX.

A vendor-supplied computer program that is usable without modification.

A mathematical function of a complex-number variable. A complex function 1. A complex number is a number, denoted by the expression a + jb, in which a and b are real numbers (a is the real component, b is the imaginary component). 2. A complex function of a complex variable z is a function whose domain and range are sets of complex numbers. See COMPLEX NUMBER and ARGAND DIAGRAM.

A radar target that is large enough in theory to be detected by radar, but, because of its geometry, cannot be detected. This effect is the result of phase combinations of signal components reflected from various surfaces on the target.

The range over which the output voltage of a constant-current power supply must swing in order to maintain a steady current in a varying load.

A Boolean operation whose result is the opposite of the original value. Also called INVERTER and NOT CIRCUIT.

The ease with which a material can be flexed or bent, an important characteristic of transducers (such as loudspeakers). Expressed in cm/dyne, compliance is the reciprocal of stiffness, and is the acoustical or mechanical equivalent of capacitance.

A periodic waveform composed of a sine-wave fundamental and certain harmonics in specific proportions.

An expression of inductor-core permeability, obtained from the mathematical ratio of the magnetomotive force representing the induction and electromagnetic field strength within the core.
component density The number of components (see COMPONENT, 1) in an electronic assembly.

composite circuit A circuit handling telegraphy and telephony simultaneously without causing mutual interference.

composite color A color that is not one of the COLOR PRIMARIES, but instead consists of a combination of the three color primaries.

composite color signal The complete color television signal, including all picture, color, and control components.

composite conductor A set of wires connected in parallel. The wires are often, but not necessarily, of identical size and constitution.

composite current A current having both alternating-current (ac) and direct-current (dc) components alternated at a superimposed on a direct current. Also called fluctuating current.

composite curve A curve or pair of curves showing two modes of operation, as of biased and unbiased conditions.

composite filter A filter consisting of more than one section. The sections might be, but often are not, identical.

composite video signal The television picture signal containing picture information and sync pulses.

composite-video-signal distortion Distortion of the composite video signal as evidenced by overshooting, ringing, and sync-pulse shortening.

composite voltage A voltage having both alternating-current (ac) and direct-current (dc) components alternated at a superimposed on a dc voltage. Also called fluctuating voltage.

composite wave filter Two or more wave filters (not necessarily of the same type) operated in cascade.

composition resistor A resistor made from a mixture of materials, usually finely powdered carbon and a binder.

compound A substance in which the atoms of two or more elements have united chemically to form a molecule. For example, an atom of cadmium (Cd) and one of sulfur (S) combine to form a molecule of cadmium sulfide (CdS).

compound connection A direct connection of two transistors, the amplified output of the first being further amplified by the second. The connection provides extremely high current gain. Also called DARLINGTON PAIR.

compound generator A generator that has both series and shunt fields. Also called compound-connected generator.

compound horn A horn reflector used for transmission of microwave energy. The faces of the horn approach four geometric plane surfaces as the distance from the center increases.

compound modulation A system of successive modulation, the modulated wave from one step becoming the modulating wave in the next. Also called multiple modulation.

compound motor An electric motor having both series and shunt fields. Also called compound-connection motor.

compound transistor Two or more transistors directly coupled in the same envelope for increased amplification. Also see COMPOUND CONNECTION.

compression A circuit or device that limits the amplitude of its output signal to a predetermined value, despite wide variations in input signal amplitude.

compression driver unit A loudspeaker that works into an air space connected by a throat to a horn, rather than by driving a diaphragm.

compression ratio In a system using COMPRESSION, the ratio \( A_1 / A_2 \), where \( A_1 \) is the gain (or transmission) at a reference-signal level and \( A_2 \) is the gain (or transmission) at a specified higher signal level.

compression wave A wave disturbance that travels via longitudinal motion of particles in a medium. Sound waves through air are the most common example.

compression-capacitor A high voltage air-dielectric capacitor enclosed in a case in which the air pressure is held at several atmospheres.

computer A device or machine for performing mathematical operations on data, and producing the results as information or control signals. There are numerous types, the most common being the digital computer.

computer-aided design Abbreviation, CAD. The use of computers in conceiving, developing, and perfecting new products.

computer-aided manufacturing Abbreviation, CAM. The use of automated manufacturing systems, such as assembly lines, that are partially or totally controlled by computers.

computer analysis A study of a computer program to determine whether it is operating correctly, what its weaknesses are, or how it might be improved.

computer-assisted instruction Abbreviation, CAL. The use of computers as teaching and training aids.

computer code See MACHINE LANGUAGE.

computer consciousness The degree to which a machine can be considered aware of its own existence. Until recently, this idea was considered ridiculous. But as microprocessor power continues to grow, some researchers now consider it worth thinking about.

computer-controlled catalytic converter A microprocessor-controlled system for automatically supervising gaseous emissions exhausted by a motor vehicle. An oxygen sensor monitors the exhaust stream, and the associated electronic system adjusts the air-to-fuel ratio of the carburetor to reduce smog-producing pollutants in the exhaust.

computer diode A semiconductor diode having low capacitance and fast RECOVERY TIME, thus suitting it to rapid switching in computer circuits and to very-high-frequency applications.

computer engineer A person skilled in the theory and application of computers, related equipment, and associated mathematics.

computer file See FILE.

computer graphics See VIDEO GAME.

computer-processed image The use of computers to assist in drawing and drafting, and in the processing of video images such as photographs.

computer screen 1. A window or frame in which all or part of the output of a computer is displayed. 2. The display generated by a computer.
conductivity

condenser microphone • condenser antenna
conduit  A hollow tube, made of plastic or metal, through which wires, cables, and other transmissions media are fed.

cone  The conical diaphragm of a (usually dynamic) loudspeaker.

cone antenna  An antenna in which the radiator is a sheet-metal cone or a conical arrangement of rods or wires.

Conelrad  An early amplitude-modulation (AM) broadcast protocol, intended for use in the event of a nuclear war. Now replaced by the EMERGENCY BROADCAST SYSTEM.

cone marker  A UHF marker beacon whose conical energy lobe radiates vertically from a radio-range beacon station. Aircraft in flight use such markers to accurately locate the beacon station.

cone of protection  The zone surrounding a lighting rod; in which the chances of a lightning strike are greatly reduced. The cone has an apex angle of 45°, relative to the rod. Objects entirely within this cone are unlikely to be struck (although it is still possible).

conic sections  The geometric plane figures that result from the intersection of a cone with a plane. These figures are the circle, the ellipse, the parabola, and the hyperbola.

conjugate  For a given complex number $A + jB$, the quantity $A - jB$. When complex conjugates are multiplied together, the result is $A^2 + B^2$.

conjugate bridge  A bridge in which the detector and generator occupy positions opposite to those in a conventional bridge of the same general type.

conjugate impedance  For a given complex impedance, $R + jX$, where $R$ is the resistive component and $jX$ is the reactive component, the impedance $R - jX$. The resistance is identical, the reactance is of equal magnitude, but opposite sign (capacitive as opposed to inductive, or vice versa).

conjugate law of conservation of energy  States that energy can be neither created nor destroyed, but only changed in form.

constantan  An alloy of copper and nickel used in some thermocouples and standard resistors.

constant-current  A steady current region, which remains steady during variations in load resistance. Also called constant-current supply and current-regulated supply. Compare CONSTANT-VOLTAGE SOURCE.

constant-current characteristic  A condition in which the current through a circuit remains constant—even if the voltage across the circuit increases or decreases.

constant-current curve  A graph in which the dependent variable is an electric current that levels off at a specific maximum. An example is the collector-current versus collector-voltage curve for a bipolar transistor.

constant-current driving  Power obtained from a constant-current source.

constant-current modulation  See CHOKED-COUPLED MODULATION.

constant-current power supply  See CONSTANT-CURRENT SOURCE.

constant-current recording  In sound recording, the technique of holding the maximum amplitude of the signal steady as the frequency changes.

constant power  A power supply whose current remains steady during variations in load resistance. Also called constant-power supply and current-regulated supply. Compare CONSTANT-VOLTAGE SOURCE.

constant power supply  A power supply whose current remains steady during variations in load resistance. Also called constant-power supply and current-regulated supply. Compare CONSTANT-VOLTAGE SOURCE.

constant sink  See CURRENT SINK.

constant state  The state for various system units.

constant area  The square of the horn's axial length.

constant bandwidth  Bandwidth that does not change with frequency.

constant confidence  A condition that undergoes no change in value as it flows through a changing resistance. Compare CONSTANT VOLTAGE.

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constant bandwidth  Bandwidth that does not change with frequency.
constant-current supply See CONSTANT-CURRENT SOURCE.

constant-current transformer A transformer supplied from a constant-voltage source that automatically delivers a constant current to a varying secondary load.

constant-k filter Also called a Zobel filter. A filter section of the form $Z_2/k^2$ at all frequencies, where $Z_2$ is the impedance of the series element and $Z_1$ is the impedance of the shunt element.

constant-power dissipation line A line connecting points on a family of constant-voltage characteristic curves, the points corresponding to the maximum power that can safely be dissipated by the device to which the curves apply.

constant-resistance network A circuit of resistors that, when terminated in a resistance load, presents a constant resistance to a driving source under various conditions of operation.

constant-speed motor 1. Also called a shunt motor. A motor whose speed varies little, or not at all, with variations in the armature current. 2. A motor that runs at an unvarying speed through the action of associated automatic electronic control circuits.

constant voltage A voltage that does not change as the load resistance varies. Compare CONSTANT-CURRENT SOURCE.

constant-voltage, constant-current supply A combination current-regulated and voltage-regulated source, successively delivers constant current to low load resistances and constant voltage to high load resistances.

constant-voltage drive Driving power obtained from a CONSTANT-VOLTAGE SOURCE.

constant-voltage network A power supply whose output voltage remains steady during variations in load current. Also called constant-voltage supply and voltage-regulated supply.

constant-voltage transformer A special transformer designed to deliver a constant voltage despite variations in the primary voltage. A capacitor in the device causes a winding to resonate at the line frequency (e.g., 60 Hz). This tends to maintain a more constant current than would be the case in an ordinary transformer.

constant A source (user’s) computer program statement that, when implemented, produces a predetermined effect.

consumer reliability risk 1. The chance a consumer takes when buying a component or piece of equipment that has not been subjected to quality-assurance/quality-control (QA/QC) testing. 2. An expression of the failure rate for a component or system.

content 1. The data in a computer random-access memory (RAM). 2. The data in a specific storage location, such as on a hard disk, diskette, or CD-ROM.

context 1. The environment in which a word is used in a natural language (such as English, Spanish, or Russian). Important in speech recognition and speech synthesis.

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continuity A condition of being uninterrupted—especially pertaining to current flowing in an electric circuit.

continuity test A test of the completeness of an electric circuit. Ideally, the only concern is whether the circuit is open or closed, but sometimes circuit resistance is also of interest.

contamination A condition of being open or closed.

contactor noise 1. Electrical noise that is the product of make-and-break contact action or fluctuations in conduction when the contacts are closed. 2. Sounds coming directly from contacts that are opening and closing.

contactor potential The small direct-current (dc) voltage that results from the breakdown of an electrode by electrons, when the electrode has no external voltage applied to it.

contactor pressure The pressure that holds contacts together.

contact protector A component (such as a diode, capacitor, resistor, or combination of these) that serves to suppress contact arcing.

contact rating The maximum current, voltage, and/or power specified for a given set of contacts.

contact rectifier A rectifier consisting of two dissimilar materials in direct contact. Examples: copper and copper oxide, magnesium and copper sulfide, selenium and aluminum, and germanium and indium.

contact resistance The resistance of the closed contacts of switches, relays, and other similar devices. Normally, this is a very small resistance.

contact separation See CONTACT GAP.

contact strip See TERMINAL STRIP.

contact switch An electromechanical switch that uses contacts to make and break a circuit, as compared with an electronic switch that uses semiconductor devices.

contact travel The distance over which a relay or switch contact must move to close a circuit.

contact wetting The use of mercury (a conducting liquid) to improve the action of a relay contact or contacts.

contact wipe A sliding motion between closed contacts. Helps to establish a good connection and to keep the contact surfaces clean.

container file See CONTROLLING FILE.

containerized material A conductive material containing some undesired substance. 2. A material unintentionally made radioactive.

contamination 1. The presence of an impurity in a substance. 2. The addition of a radioactive material to a substance. 3. In a coaxial cable, the tendency for the jacket material to bleed through the outer braid into the dielectric, resulting in increased loss.

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**continuous duty** The requirement of a device to sustain a 100-percent duty cycle for a prolonged period of time.

**continuous-duty rating** A maximum current, voltage, or power rating for equipment operated for extended periods at a 100-percent duty cycle.

**continuous load** A load that requires a continuous feed for a prolonged period of time.

**continuous memory** See NONVOLATILE MEMORY.

**continuous-path motion** In robotics, machine movement that occurs in a smooth fashion, rather than in discrete steps. Allows precise positioning of a mechanical arm or gripper.

**continuous power** The maximum sine-wave power that an amplifier can deliver for 30 seconds.

**continuous recorder** An instrument that provides an uninterrupted recording.

**continuous recording** A record made on a continuous sheet or tape, instead of on separate sheets or tapes. An example is a continuous-playing tape used for repeated public announcements.

**continuous spectrum** 1. The range of all electromagnetic frequencies between a specified lower limit f1 and a specified upper limit f2. 2. A range of electromagnetic frequencies that exhibits similar behavior between its lower and upper limits.

**continuous stationery** Also called linefold paper. The pack of paper a line printer uses. It consists of sheets connected by perforated or tear-off edges, folded in accordion fashion. It usually has tear-off perforated strips along either side to facilitate feed through the printer mechanism.

**continuous variable** A variable that can attain any value within a specified range of values. An example is a frequency within the control stationery amateur radio band, from 3.5 to 4.0 MHz.

**continuous wave** Abbreviation. CW. 1. A periodic wave, such as a radio-frequency (RF) carrier, that is not interrupted at any point between its normal start and termination, that is unmodulated. 2. An RF carrier that is interrupted digitally with a keying device according to some code (such as Morse), for the purpose of conveying information.

**continuous-wave laser** See CW LASER.

**contour** A control on an audio reproduction system that increases the base and treble amplitudes at low levels to compensate for the ear's natural losses in these ranges. Alternatively, this control can attenuate signals in the 3- to 15-KHz region, where the human ear is most sensitive.

**contours of equal loudness** See AUDIBILITY CURVES.

**CONTRO** An operator code that requires no compiler, or translating, interface between the operator and the computer. The program must be done in a language similar to machine language.

**contrast** 1. In a video image, the degree to which adjacent areas of a picture are differentiated. Insufficient contrast makes for a "flat" picture; excessive contrast, a "hard" picture. 2. In optical character recognition, the degree to which a character is distinguishable from its background.

**contrast control** A potentiometer for adjusting the gain of the video in a television receiver or cathode-ray-tube (CRT) computer display and, accordingly, the image contrast.

**contrast range** In an image or pattern, the brightness range from the lightest to the darkest parts.

**contrast ratio** In a video image, the ratio of maximum to minimum luminance.

**control** 1. An adjustable component, such as a rheostat, potentiometer, variable capacitor, or variable inductor, that allows some quantity to be varied at will. 2. A test or experiment conducted simultaneously with another similar test conducted under conditions lacking the factor under consideration. Thus, if 100 resistors coated with a special varnish are tested at 120°F, 100 identical unvarnished resistors could be tested (as a control) under the same conditions.

**control electrode** In a digital computer, a circuit that handles and interprets instructions and commands, particularly in the arithmetic and logic unit (ALU).

**control computer** A computer that receives signals controlling the parameters in some process and responds with signals that control those parameters.

**control counter** See CONTROL REGISTER.

**control data** 1. In a computer record having a key, information used to put the records in some sequence. 2. Information affecting a routine's selection or modification.

**control electrode** An electrode to which an input signal can be applied to control an output signal. Common examples are the base of a bipolar transistor, the gate of a field-effect transistor, and the inputs of a logic gate.

**control field** 1. In direct-current generators of the amplifying type, an auxiliary field winding used for feedback and regulation, in contrast to the self-excited field winding (which is the conventional field winding of the generator). 2. A computer record field containing control data.

**control flux** In an amplitune, magnetic flux generated by current flowing through the control winding.

**control grid** See GRID, 1.

**control grid bias** The negative dc voltage applied between ground and the control grid of a vacuum tube to establish the operating point.

**control language** Within the operating system of a computer, the command set that the operator or programmer uses to control the running of a program or the operation of peripherals. Also called job control language.

**control language interpreter** See CONTROL LANGUAGE AND INTERPRETER.

**controlled avalanche diode** Also called avalanche diode or Zener diode. A diode that has a well-defined avalanche voltage used primarily for voltage regulation in power supplies.

**controlled-carrier modulation** See QUESCENT CARRIER OPERATION.

**controlled-carrier transmission** See QUESCENT CARRIER OPERATION.

**controlled rectifier** A rectifier whose dc output can be varied by adjusting the voltage or phase of an ac signal applied to the control element. See SILICON-CONTROLLED RECTIFIER.

**controller** 1. The control signal of an electronic control (or servol) system. 2. A device, such as a specialized variable resistor, used to adjust current or voltage. 3. A computer that oversees and controls the operation of a robot or fleet of robots.

**controller function** The control of the movements of the operators of the machine. The program is used in a language similar to machine language.

**controlling file** A computer storage area encompassing several complete magnetic disk cylinders; its size can be changed to accommodate a number of files.
An assembly that provides a convergence magnet member of a spectrum series. The frequency of the last an electrostatic field for converging electron beams. Compare CONVERGENCE MAGNET.

convergence lens A lens having a real focus for parallel rays, generally a convex lens.

convergence control In computer operations, a compiler that, using the CONVERSATIONAL MODE of operation, shows the programmer whether or not each statement entered into the computer is valid, and whether or not to proceed with the next instruction.

coordinate digitizer A device for transferring data from one medium to another [e.g., a disk-to-tape converter (tape drive)]. Also called CONVERTER.

conversion time In digital computer operation, the time required for the machine to read out all the digits in a coding system.

conversion conductance See CONVERSION EFFICIENCY.

convert 1. To perform frequency conversion (see CONVERSION, 1), 2. To perform voltage conversion (see CONVERSION, 2 and 3). 3. In computer operations, to change information from one number base to another. 4. To perform data conversion (see CONVERSION, 4 and 5).

converter 1. A heterodyne mixer in which two input signals of different frequency are mixed to yield a third output signal of yet a different frequency. 2. A machine for converting direct current (dc) to alternating current (ac) (e.g., a chopper converter). 3. A transistor circuit for converting a low-voltage dc to a higher-voltage dc. 4. Conversion equipment. 5. A circuit or device that changes analog data to digital data or vice versa.

conversion 1. The process of changing direct current (dc) to alternating current (ac). 2. The process of changing direct current (dc) to alternating current (ac) (e.g., a chopper converter). 3. A transistor circuit for converting a low-voltage dc to a higher-voltage dc. 4. Conversion equipment. 5. A circuit or device that changes analog data to digital data or vice versa.

conversion gain Amplification as a byproduct of conversion.

conversion efficiency The ratio of output-signal amplification to input-signal amplification for a superheterodyne converter, a large intermediate-frequency (IF) output for a low radio-frequency (RF) input indicates high conversion efficiency.

conversion program A program for data conversion (see CONVERSION, 4 and 5).

conversion rate Also called sampling rate. The number of samples per second taken by an ANALOG-TO-DIGITAL CONVERTER.

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conversion conductance See CONVERSION EFFICIENCY.

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coordinate system A mathematical means of uniquely defining or locating a point on a line, in a plane, or in space. The most common coordinates are CARTESIAN COORDINATES (also called rectangular coordinates), consisting of numbered lines intersecting at right angles.

cordless modem A hand-controlled computer mouse that employs an infrared (IR), a very-high-frequency (VHF), or an ultra-high-frequency (UHF) transmitter and receiver. The transmitter is inside the device, and the receiver is contained either inside the computer main unit, or in a small box attached to the computer main unit by a cord. The box can be placed somewhere out of the way, for example, at the back of the desk. Then the mouse can be moved around freely. This kind is effective at distances of up to 20 or 30 feet.

cordwood A type of construction in which electronic components are sandwiched perpendicularly between layers of components. So called because it looks somewhat like stacked cordwood.

cordwood module A module containing discrete components mounted perpendicularly between two parallel printed circuits.

core 1. The body or form on which a coil or transformer is wound. Can be made of ferromagnetic or dielectric material. The properties depend on the application. 2. CORE MEMORY.

core dump Dumping core memory content to an output peripheral. Also see DUMP.

coreless induction heater An induction heater in which the body to be heated receives energy directly from the field of the energizing coil (there is no intervening core). Compare CORE-TYPE INDUCTION HEATER.

cordless 1. The bending of sound waves around a corner. 2. The bending of radio-frequency (RF) energy around an object, when the wavelength is great, compared with the size of the object.

corner effect A rounding off of the frequency response of a filter at the corner(s) [i.e., at the limit(s) of the passband].

corner frequency See CORNER.

corner reflection The reflection of a beam of light or of microwave energy or other short-wavelength energy from a corner reflector, so the beam leaves the corner in exactly the opposite direction from which it approaches. See CORNER REFLECTOR.

corner-reflection antenna A directional antenna consisting of a dipole radiator situated at the apex formed by two nonparallel, flat reflecting sheets or a single folded sheet. See CORNER REFLECTOR.

cordless mouse • corner reflector 149

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corner reflector, 2

high and microwave frequencies for television reception and satellite communications. Sometimes several half-wave dipoles are fed in phase and arranged along a common line with a single, elongated reflector. Also called tricerator reflector. A set of three flat metal surfaces or screens, attached together in a manner identical to the way two walls meet the floor or ceiling in a room. Such a device, if it is at least several wavelengths across, returns electromagnetic energy in exactly the same direction from which it arrives. Devices of this type are used as radar dummy targets and in optical and infrared (IR) wireless ranging systems.

corona A luminous discharge in the space surrounding a high-voltage conductor: caused by ionization of the air. The discharge constitutes a loss of energy.

corona effect The production of a luminous discharge, especially at the end of a pointed terminal, which is so high that the atom is ionized and forms a stream of positive ions. This stream is called corona discharge.

corona failure A form of high-voltage failure, resulting from the erosion of an object (such as an electrical insulator) by corona.

corona inherently Loss caused by energy dissipation through a corona. It occurs as a result of the emission of electrons from the surfaces of electrical conductors at high potentials, and depends on the curvature of the conductor surface, with most emission occurring from sharp points and the least from surfaces with a large radius of curvature. It is often accompanied by a blue glow and a crackling or hissing sound.

corona resistance The length of time that an insulating material can withstand a specified level of field-intensified ionization before completely breaking down.

corona shield A shield surrounding a high voltage point to prevent corona by redistributing the electrical field.

corona starting voltage The minimum voltage between two electrodes, or on a single electrode in the case of a point-to-surface corona.

corona voltmeter A voltmeter used to measure the leakage current in terms of corona discharge. It consists of a metal tube in which a central wire is mounted, the parts being connected to the voltage source. The air density in the tube is varied until corona occurs.

coupsule A tiny particle. It was the name given to the ELECTRON by some early experimenters and theorists.

coupling 1. The addition of a factor that provides greater accuracy in a measurement. 2. A change for the calibration of an instrument to increase the accuracy.

correction factor A percentage, or numerical factor, added to or subtracted from a reading to provide a greater degree of accuracy. Often used with instruments known to be inaccurate by a certain amount.

corrective feedback Feedback that is used to correct firing to a prescribed level a quantity constituting the input to a system.

corrective maintenance The repair of a circuit or system after it has malfunctioned or broken down.

corrective network A network that improves the performance of the circuit into which it is inserted.

corrective stub A combination tuning-matching stub used in some antenna systems. It matches the reactive component of the antenna impedance to the characteristics of a feed line and also eliminates any resonance that might be present at the antenna feed point.

coos relay A sealed steel relay used as a high-speed switching device and full-focus pick-up.

correlation A statistical expression or measure of the degree to which two sets of data are related. Can be given qualitatively (high-positive, low-negative, positive, zero, negative, or negative) or quantitatively (as a number between -1 and 1). Does not necessarily imply causation.

correlation detector A detector that compares a signal of interest with a standard signal at every point, delivering an output that is proportional to the correspondence between the two signals.

correlation distance The smallest distance between two antennas that results in fading of signals under conditions of tropospheric propagation. It is used at very-high frequencies (VHF) and above to determine the maximum range over which communications can be carried out reliably.

correlation tracking A method of target tracking in which phase relationships are used to determine target positions.

correspondence tracking The ability of a binocular machine vision system to tell when both of its optical systems are processing an image from the same object; also, the ability of the system to keep both sensors tracking the same object.

corrosion-corrosion-resistant A noun derived from the word corrosion that is treated to be immune to corrosion by the elements. Such substances are preferable for use in marine or tropical environments, where corrosion is especially severe.

corrosion effect The altering of data or a code as a result of a program error or machine fault.

cosine function A function of COMPLEMENTARY SYMMETRY CIRCUIT.

cosecant Abbreviation, csc. A trigonometric function: csc q = 1/csin q, where q is the hypotenuse of a right triangle and q is the side opposite q. The cosecant is the reciprocal of sine: csc q = 1/sin q.

cosecant-squared antenna A radar antenna that radiates a COSECTANT-SQUARED BEAM.

cosecant-squared beam A radar beam whose intensity varies directly with the square of the cosecant of the angle of elevation.

cosech Abbreviation of HYPERBOLIC COSECANT.

cosh Abbreviation of HYPERBOLIC COSINE.

cosine Abbreviation, cos. A trigonometric function: cos q = b/c, where b is the side adjacent to q and c is the hypotenuse of the right triangle.

cosine law The brightness in any direction from a perfectly diffusing surface is proportional to the cosine of the angle between the direction vector and a vector perpendicular to the surface.

cosine wave A periodic wave that follows the cosine of the phase angle. It has a shape identical with a SINE WAVE, but differs by 90 degrees of phase.

cosine-bhe A magnetic deflection yoke that has nonuniform windings for improved focus at the edges of a television picture. Also called anisotropy and full-focus yoke.

cosmic noise Radio noise produced by signals extraterrestrial space.

cosmic rays Extremely penetrating rays consisting of streams of atomic nuclei entering the earth’s atmosphere, or high-energy particles from outer space.

COS/MOS IC An integrated circuit (IC), such as an operational amplifier, utilizing metal-oxide-semiconductor (MOS) field-effect transistors in a complementary-symmetry (COS) arrangement.

cosine-rectangling In a commercial or industrial organization, assigning the expense associated with a service, process, or job.

cot Abbreviation of COTANGENT.

cotangent Abbreviation, cot. A trigonometric function: cot q = b/a, where b is the side adjacent to q and a is the side opposite q (in a right triangle). The cotangent is the reciprocal of tangent: cot q = 1/tan q.

coth Abbreviation of HYPERBOLIC COTANGENT.

correction effect See Feedback magnesium-Optical effect.

corrill process Dust precipitated by high voltage. Dust that has been precipitated by wind is to flow through a grounded metal chamber that contains a wire maintained at high voltage. The dust particles become charged, and adhere to the chamber walls, from which they are later collected.

coulomb A unit of the electromagnetic system of units. The unit of electric charge quantity, equal to the charge contained in 6.24 × 10¹⁸ electrons. A current of one ampere (1) represents 1 coulomb per second (C).

coulomb’s law The force between two electrically charged objects is directly proportional to the product of the charge quantities in coulombs, and inversely proportional to the square of the distance between the charge centers. This force is an attraction for opposite charges, and a repulsion for similar charges.

coupler A device that measures electrical charge quantity in coulombs. A typical version keeps a cumulative count of coulombs (ampere-seconds) by integrating current, with respect to time. Also called coulometer.

coupler counter See CELL-COUNTER.

count 1. The number of pulses tallied by a counting system in a given period of time. 2. A single response by a radioactivity counter. 3. A record of the number of times an instruction or subroutine in a computer program is executed by increasing the value of a variable by one, as stated in a FOR-NEXT loop, for example.

countdown A decreasing count of time units remaining before an event or operation occurs showing time elapsed and time remaining.

counter A circuit, such as a cascade of flip-flops, that has a number of pulses applied to it and usually displays the total number of pulses. 2. A mechanism, such as an electromechanical indicator, that tracks the number of input pulses applied to it and displays the total. 3. An electronic switching circuit, such as a flip-flop or stepping circuit, that responds to sequential input pulses applied to it, giving one output pulse after receiving a certain number of input pulses.

counter Prefix meaning "opposite to" or "contrary to." Examples: counter EMF, counterclockwise, counterclockwise-polarized wave. Counterclockwise-polarized wave An elliptically polarized electromagnetic wave whose electric intensity vector rotates counterclockwise according to the position of the point of propagation. Compare COUNTERCLOCKWISE-POLARIZED WAVE.

counterclockwise-polarized wave An elliptically polarized electromagnetic wave whose electric intensity vector rotates clockwise as observed from the point of propagation. Compare COUNTERCLOCKWISE-POLARIZED WAVE.

couter efficiency The quantity of a radiation counter or scintillation counter to incident X-rays or gamma.

countercromatic cell A cell used to counteract a direct current voltage.

coupled See CROSS, ELECTRIC MAGNETIC FIELD, and KICK-BACK.

countermeter A radioactivity instrument, such as a Geiger counter, that indicates the number of radioactive particles per unit time.

counterpoise A method of target tracking or a means of radiation detecting (RF) ground by using a grid of wires or tubing in a plane parallel to the earth’s surface or
Counterpoise ground system A counterpoise with a radius such that resonance is obtained with a quarter-wavelength antenna operated at a height of more than 0.25 wavelength above actual ground. Usually such a system consists of three or four radials measuring 0.25 wavelength each, and extending outward from the base of the antenna nearly parallel to the average terrain.

coupling aperture A hole in a waveguide that is used to transmit energy to the waveguide, or receiving energy from outside the waveguide.

coupling capacitor A capacitor used to conduct ac energy from one circuit to another. Also see CAPACITIVE COUPLING.

coupling coefficient See EFFICIENT COUPLING.

coupling diode A semiconductor diode connected between the stages of a direct-coupled amplifier. When the diode is connected in the correct polarity, it acts as a high resistance between stages when there is no signal, and does not pass the high dc operating voltage from one stage to the next. When a signal is present, the diode resistance decreases, and the signal gets through.

coupling efficiency A measure of the effectiveness of a coupling system (i.e., the degree to which it delivers an undistorted signal of correct amplitude and phase).

coupling loop 1. A single turn of a coupling transformer. 2. A small loop inserted into a waveguide to introduce microwave energy.

coupling probe A usually short, straight wire or pin protruding into a waveguide to electromagnetically introduce microwave energy into the waveguide. It acts like a miniature whip antenna.

coupling transformer A transformer used primarily to transfer alternating-current (ac) energy electromagnetically into or out of a circuit.

covariant binding forces In a crystal, the binding forces resulting from the sharing of valence electrons by neighboring atoms.

covariant bonding The binding together of the electrons of a material as a result of shared electrons or holes.

coverage 1. The area within which a broadcast or communication station can be reliably heard. 2. The shielding effectiveness of a coaxial cable.

covered sine Abbreviation of direct current, or the trigonometric functional equivalent of the versed sine of the complement of an angle (i.e., the difference between the sine of an angle and unity). Thus, covers \( q \) = 1 – \( sin \) q.

CP Abbreviation of chemicals pure.

cps 1. Abbreviation of CENTRAL PROCESSING UNIT. 2. Abbreviation of CYCLES PER SECOND. Cycles per second, to denote ac frequency, has been supplanted by Hertz. 3. Abbreviation of characters per second.

CPU Abbreviation of CENTRAL PROCESSING UNIT.

critical angle 1. In radio communications, an angle of departure that a transmitted electromagnetic field subtends, with respect to the horizon at the transmitting (TX) point, below which the ionosphere will reflect waves to the earth, and above which the ionosphere will not reliably return the signal. Such an angle (shown by the double arc marked X in the drawing) depends on the frequency of the transmitted electromagnetic wave, and also on ionospheric conditions. 2. For an electromagnetic wave or ray approaching a boundary at which the index of refraction abruptly decreases, the minimum angle of incidence (relative to a line perpendicular to a plane tangent to the boundary) at which the energy is totally reflected.

critical characteristic A parameter that has a disproportionate effect on other variables. A small change in this characteristic can result in a large change in the operating conditions of a circuit or system.

critical component A component or part that is especially important in the operation of a circuit or system.

critical coupling The value of coupling at which maximum power transfer occurs. Increasing the extent of coupling beyond the critical value decreases power transfer.

critical damping The value of damping that yields the fastest transient response without overshoot.

critical dimension The cross-sectional size of a waveguide that determines its minimum usable frequency.

critical failure A component or circuit failure that results in shutdown of a system, or a malfunction that results in improper operation.

critical field The smallest magnetic-field intensity in a magnetron that keeps an electron, emitted from the cathode, from reaching the anode.
Critical Frequency: A frequency at which a conductor after cutting through it at a right angle, specified in square inches, square millimeters, or circular mils. The total of the cross-sectional areas of all the wires in a stranded conductor.

Cross-Sectional Area 1. The surface area of a face of a conductor.

Cross-Sectional Testing: A testing method of checking a large lot of units or components. Instead of testing every device, a fraction of the devices is tested. The sampling is taken uniformly from the group (e.g., every fifth unit).

crosstalk: Undesired transfer of signals between or among telephone lines, data lines, or system components. In computer operations, this effect places a practical limit on the lengths of parallel data cables.

crosstalk Coupling: Undesired coupling between circuits, caused by crosstalk.

crosstalk Factor: See CROSS-MODULATION FACTOR.

crosstalk Level: The amplitude of crosstalk, usually expressed in decibels above a reference level.

crosstalk Loss: Loss of energy caused by crosstalk.

crowbar: An action producing a high overload on a circuit protection device.

crowfoot 1. A pattern formed by the cracking or crazing of solidified encapsulating compound, so called from its resemblance to a bird’s foot.

cryogenic Device: A device that exhibits unique electrical characteristics (such as superconductivity) at extremely low temperatures.

cryogenic Motor: A motor designed for operation at extremely low temperatures.

cryogenics: The branch of physics dealing with the behavior of matter at temperatures approaching absolute zero. Also concerned with methods of obtaining such temperatures in controlled environments.

crossover: A switch utilizing low-pass, high-pass, and/or band-pass filters to separate a signal into its low and high audio frequency components.

crosstube: Abbreviation of CATHODE-RAY TUBE.

cross-Container: An instrument that exhibits unique electrical properties at extremely low temperatures.

cross-contamination: The contamination of product due to cross-contamination in a manufacturing environment.

cross-contamination Factor: The expression of the amount of cross-contamination (or crosstop) present in a particular instance. It is equal to M1/M2, where M1 is the contamination percentage that a modulated wave produces in a superimposed unmodulated wave, and M2 is the modulation percentage of the modulated wave.

cross-modulation Circuit: See CROSS-COUPLED MULTIVIBRATOR.

cross-modulation Factor: An expression of the amount of cross-modulation (or crosstop) present in a particular instance. It is equal to M1/M2, where M1 is the contamination percentage that a modulated wave produces in a superimposed unmodulated wave, and M2 is the modulation percentage of the modulated wave.

cross-modulation: An unwanted interference between signals of different frequency when they magnetize a core of nonlinear magnetic material. Also see CROSSTALK.

cross-section: The interaction between signals of different frequency when they magnetize a core of nonlinear magnetic material. Also see CROSSTALK.

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cross-sections: The cross-sections of a conductor after cutting through it at a right angle, specified in square inches, square millimeters, or circular mils. The total of the cross-sectional areas of all the wires in a stranded conductor.

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Crossed Ray: An instrument used to determine freezing point.

cryostat: A chamber for maintaining a very low temperature for cryogenic operations. Also see CRYOGENICS.

cryotron: A switching device consisting essentially of a straight tantalum wire, around which a single-layer control coil is wound. The magnetic field generated by control current flowing through the coil causes the tantalum wire to become...
A radio-frequency (RF) probe, whose crystal probe is AT, BT, CT, DT, X, Y, and Z. Various age across the crystal. The crystal is attached (either directly or via a diaphragm) to a diaphragm or cone, which produces corresponding sound waves. The resultant vibration generates a signal whose master oscillator is crystal controlled. Low-capacitance, low-loss crystal controlled oscillator circuit to allow adjustment of the frequency over a small range. The science dealing with crystals. The orderly, redundant pattern of structure of a crystal. It is a characteristic of a given material. An oscillator whose operating frequency is determined by the dimensions of an oscillating piezoelectric quartz-crystal plate. Compare SELF-EXCITED OSCILLATOR.

crystal detector A rudimentary form of semiconductor diode consisting of a mounted lump of mineral (the crystal) in contact with a springy wire ('cat's whisker'). The point of the wire is moved to various points of contact on the crystal surface until the most-sensitive rectifying spot is found.
current tet rode • current antinode

crystal tet rode A transistor having four elements: emitter, collector, and two bases.
crystal transducer A transducer using a piezo-

crystal triode See TRANSISTOR.
cs Symbol for CESIUM.
cs Abbreviation of COMPLEMENTARY SYME-

cs Abbreviation of COSECANT.
cs Abbreviation of HYPERBOLIC COSECANT.
cs scan See C DISPLAY.
cs each Abbreviation of HYPERBOLIC COSECANT.
cubical antenna A transmission element whose

cubic equation A polynomial equation of the third
degree. Its general form is $ax^3 + bx^2 + cx + d = 0$.
cubic feet 1. A unit of volume equal to 1,728 cubic
inches. Also see CUBIC INCH or CUBIT.
cubic inch A volume of 1 cubic inch is a cube 1
inch on each edge. Also see CUBIT.
cubic tap An electrical adapter, in which a set of male prongs and three female contacts are on the sides of a molded cube. Allows three appli-
cances to be used with a single electrical socket.
cube A regular polyhedron with six identical
square faces and eight vertices. At each vertex,
there are three edges at mutually right angles. 2. The third power of a number; thus the cube of n
is written $n^3$.
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cubical antenna An antenna in which the ele-
ments form the outline of a geometric cube or rectangular prism. The most common example is the QUAD ANTENNA.
cubical antenna • current antinode

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degree. Its general form is $ax^3 + bx^2 + cx + d = 0$.
cue A condition or signal that alerts an operator,
circuit or system to act in a specific manner.
cue-circuit A device for transmitting cues used in
program control.
cueing receiver 1. A (usually miniature) radio re-
ciever used to pick up cues. Example: a receiver
carried by a technician, actor, or lecturer. 2. A re-
ciever or other pickup circuit that receives a cu-
ing pulse, which it uses to set another circuit.
cue point 1. The temperature above which a fer-
romagnetic material loses its magnetism or be-
comes paramagnetic. 2. The temperature at which the ferroelectric properties of a substance disappear.
cue temperature As a magnetized substance is
heated, the lowest temperature at which magne-
tization is lost. It is generally measured in degrees
Celsius or degrees Kelvin. For iron, this tempera-
ture is 760 degrees Celsius; for nickel, it is 356
degrees Celsius.
cue’s law For a paramagnetic substance, the ra-
tio of the magnetoization to the magnetizing force is inversely proportional to the absolute tempera-
ture.
curie Above the Curie point, the susceptibility of a paramagnetic material varies in-
versely as the excess of temperature above the Curie point increases. This law is invalid for ap-
clications at or below the Curie point.
curium Symbol, Cm. A radioactive metallic ele-
ment produced artificially. Atomic number, 96. Atomic
weight, 247.
current Symbol, I or i. The movement of charge
carriers, such as electrons, holes, or ions. Also see AMPERE.
current amplification 1. An electronic process in
which the instantaneous, average, or peak
magnitude of a current is increased. 2. The ex-
tent to which a current increases in a circuit; the ratio (always greater than one) of output
current to input current, $I_{out}/I_{in}$. Also called cur-
tent gain.
current amplifier An amplifier operated primarily
to increase a signal current. Compare POWER
AMPLIFIER and VOLTAGE AMPLIFIER.
current antinode See CURRENT LOOP.
current attenuation 1. The reduction of current
amplitude along a line. 2. The extent to which a current decreases in a line or circuit; the ratio (al-
ways less than one) of output current to input
current, $I_{out}/I_{in}$.
current balance switch A switch or relay, oper-
ated by the existence of a difference between two currents.
current-carrying capacity The maximum current (usually expressed in amperes) that a conductor or
device can safely conduct.
current coil The series coil in a nonelectronic
wattmeter. Compare POTENTIAL COIL.
current-controlled amplifier Abbreviation, CCA.
An amplifier in which gain is controlled by means
of a current applied to a control-input terminal.
current density The current (usually expressed in amperes per square centimeter) passing through a cross-sectional area of a conductor.
current drain 1. The current supplied to a load by
a generator or generator-equivalent. 2. The cur-
rent required by a device for its operation; also,
the current taken by the device during standby
period.
current echo Reflected current in a transmission
line that is not terminated in an impedance ex-
actly matching its characteristic impedance.
current-fed antenna An antenna in which the transmis-
sion line is attached to the radiator at a current
loop (voltage node). Compare VOLTAGE-FED
ANTENNA.
current feed 1. The delivery of power to a device or
circuit at a point where current dominates. Com-
pare VOLTAGE FEED. 2. In an antenna, feeding it at a current maximum.
current feedback 1. A feedback signal consisting of
current fed from the output to the input circuit of an amplifier. 2. A current increase in a circuit; the ratio (always greater than one) of output
current to input current, $I_{out}/I_{in}$. Also called cur-
tent gain.
current gain See CURRENT AMPLIFICATION.
current hogging 1. An undesirable condition that
sometimes takes place when two or more transis-
tors are operated in parallel. One device tends to
do all the work, taking all the current. The result
can be the destruction of one of the devices. The tendency of one component in a group of identical parallel-
connected components to dissipate most of the power.
current-hogging injection logic Acronym, CHIL.
A form of bipolar digital logic, similar to current
hogging logic but having the greater density char-
acteristic of injection logic.
current instruction register A register in which
are held instructions ready for execution by a
program controller.
current lag A circuit condition in which current
variations are delayed by up to 180 degrees of phase relative to voltage variations. Compare CURREN
LEAD.
current lead A circuit condition in which current
variations occur earlier than voltage variations by
up to 180 degrees of phase. Compare CURRENT
LAG.
current limiting The controlling of current so that
it does not exceed a desired value.
current-limiting resistor A series resistor in-
serted into a circuit to limit the current to a pre-
scribed value.
current loop A point on a transmission line or an-
antenna at which the current reaches a lo-
cal maximum. Compare CURRENT NODE.
current meter A usually direct-reading instru-
ment, such as an ammeter, milliammeter, or mi-
croammeter, used to measure current strength.
Also see ELECTRONIC CURRENT METER.
current-meter operation The operation of a vol-
tomer as a current meter by connecting it to re-
spond to the voltage drop across a resistor that car-
ties the current of interest.
current-mode logic A form of bipolar digital logic, similar to current
hogging logic but having the greater density char-
acteristic of injection logic.
current source capacitance The capacitance of
a point on a transmission line or an-
circuit or system to act in a specific manner.
curr-inittance • current relay

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circuit or system to act in a specific manner.
current saturation In the operation of a device such as a transistor, saturator, or magnet, the point of no further increase of current at a value beyond which no further increase occurs—even though an input parameter is further increased.

current sense amplifier An amplifier used to increase the feedback to decrease the loading of a current-sensing component.

current sensing Sampling a current (e.g., when the voltage drop across a series resistor is used as a proportional indication of the current flowing through the resistor).

current-sensing resistor A low-value resistor inserted into a circuit primarily for current sensing.

current sensitivity In a current meter or galvanometer, current (in amperes or fractions thereof) per scale division.

current-sheet inductance Symbol, I₀. The low-frequency inductance of a single-layer coil, calculated with the formula I₀ = 10.10028D/2N²/a, where D is in millihenrys, a is the coil radius in inches, N is the total number of turns, and a is the coil length in inches.

current shunt 1. A resistor connected in parallel with a voltmeter to convert it into an ammeter. 2. A resistor connected in parallel with the input of a voltage-to-current converter as the response of the amplifier proportional to input-signal current.

current sink A circuit or device through which a current is maintained.

current-sinking logic A form of bipolar digital logic. Current flows from one stage to the input of the stage immediately before.

current-stability factor In a common-base connected bipolar transistor, the ratio of dI/dV, where Iₑ is the emitter current and Iᵣ is the collector current.

current:strength The magnitude of electric current (see CURRENT) i.e., the number of carriers flowing past a given point per unit time, expressed in coulombs per second or in amperes.

current:time The time a current is used to increase or decrease current flow. A primary-to-secondary step-down transformer ratio increases the current; a primary-to-secondary step-up transformer ratio increases the current. 2. A particular transformer used to increase or decrease current flow. A primary-to-secondary step-up transformer ratio reduces the current; a primary-to-secondary step-down transformer ratio increases the current.

current:vector In a vector diagram, a line with an arrowhead showing the magnitude and phase of a current. Compare VOLTAGE VECTOR.

current-voltage feedback In an amplifier or oscillator, the process of applying some of the output current to the input. This feedback might be in phase (positive) or out of phase (negative), with respect to the input.

cursor 1. A marker that indicates the position where a character can be entered in a video display. Commonly points at transmission loss or error and word processors. 2. The sweeping line on a radar display. 3. The movable marker on a slide rule.

curve trace 1. A device that supplies a special variable test voltage to one of two cutoffs of an attenuator and the upper and lower cutoff points of a bandpass filter.

cutoff limiting Output peak clipping that results from overload in an amplifying device. Compare SATURATION LIMITING.

cutoff potential See CUTOFF BIAS.

cutoff voltage See CUTOFF BIAS.

cutoff wavelength 1. The wavelength corresponding to cutoff frequency. 2. For a waveguide, the ratio of the velocity of electromagnetic waves in a waveguide (S² = 10²⁵ meters per second) to the cutoff frequency of the waveguide in Hz. The result is thus expressed in meters.

cut 1. A device, such as a circuit breaker, that automatically disconnects a circuit, usually to prevent overload, but occasionally to prevent unloading. 2. Emergency switch. 3. Fuse.

cut-out angle In a semiconductor rectifier circuit, a phase angle slightly greater than zero degrees, at which current conduction begins. Compare CUT-IN ANGLE.

cut-in angle In a semiconductor rectifier circuit, a phase angle slightly greater than zero degrees, at which current conduction begins. Compare CUT-OUT ANGLE.

cutout base A fuse block.

cut rate 1. The speed at which a cutter moves across a surface of a blank vinyl disk during the recording process. 2. The number of cut lines per inch in a vinyl disk recording.

 CW 1. Abbreviation of CONTINUOUS WAVE. 2. Abbreviation of CLOCKWISE.

 CW laser A laser that emits energy in an uninterrupted stream, rather than in pulses.

cW monitor See KEYING MONITOR.

cW oscillator 1. In a radio receiver, a variable-frequency oscillator that produces a radioteletype graph signal in the intermediate-frequency (IF) or audio-frequency (AF) stage. The bandwidth is typically 200 Hz to 500 Hz. Some audio filters can be set for bandwidths as low as about 50 Hz.

 CW radar A radar system in which radio-frequency (RF) energy is transmitted continuously.

cW reflectance signal A sinusoidal radio-frequency (RF) signal, used to control the conductance of a synchronous demodulator in color television.

 C₀ Symbol for UNKNOWN CAPACITANCE.

cyan Blue-green, one of the three primary pigments.

cyber- A prefix that indicates relevance to, or incorporation with, computers, computer systems, and electronic control systems.

cybernetics The study of control system theory in terms of the relationships between animal and machine behavior.

cyber sapiens An expression for a computer or robot with artificial intelligence (AI) on the forefront of current technology.

cyberspace 1. Alternative expression for INFORMATION SUPERHIGHWAY. 2. Alternative expression for VIRTUAL REALITY.

cyborg Acronym of the words cybernetic and organism. 1. A human being with at least one artificial body part, such as a prostheses or artificial limbs. 2. A human being who is largely composed of robotic body parts.

 cycle 1. Abbreviation, c. One complete 360-degree revolution of the current or voltage vector in an alternating-current (ac) wave. An ac frequency of 1 cycle per second is 1 Hz (see HERTZ). 2. A complete sequence of operations.

cycle counter A device that totals the number of cycles of a phenomenon repeated during a given period.

cycle index The number of times that a particular cycle, event, or state, must be, is iterated in a computer program.

cycle index counter A variable that indicates how often a cycle or program instructions has been executed. In a program, for example, this can be accomplished by increasing, through instruction, the value of a location’s content every time a loop operation is performed.

 cycle life The number of charge-discharge cycles a rechargeable cell or battery can tolerate before becoming useless.

cycle:reset To change the value of a cycle count (making it zero or some other value).

cycle:shift See CYBORG.

cycles per second Abbreviation, cps. Archaic term for HERTZ.

cycle time Pertaining to an operation, the duration of a complete cycle.

cycle:transformer A transformer that switches a circuit or device on and off, according to a predetermined cycle. Also called programmable timer.

cyclic code See GRAY CODE.

cyclic memory In computer operations, a memory whose locations can only be accessed points in a cycle, as of a magnetic diskette.

cyclic shift The moving of data out of one end of a storage register and into it character-by-character or bit-by-bit at the other end in a closed loop (e.g., 87604 cyclically shifted one place to the right becomes 476705).

cyclic variations Periodic changes in the features of the biosphere, occurring on a daily, seasonal, or sunspot-related basis. These changes are fairly predictable.
cycling The tendency of a parameter to oscillate back and forth between two different values.
cyclotron A type of circular accelerator. An applied electromagnetic field, acting together with an intense applied magnetic field, cause charged subatomic particles to travel with increasing velocity in a spiral path between two semicircular metal boxes called dees. When the particles go fast enough in the correct path, they are expelled and strike a target in their path.
cyclotron frequency The angular frequency of a charged particle in a cyclotron. The cyclotron frequency depends on the number of times per second the magnetic field of the device is reversed.
cyclotron radiation An electromagnetic field produced by the circular movement of charged particles in a fluctuating magnetic field.
cylinder In computer operations, the combination of equal-radius tracks on the platters of a hard disk.
cylinder magnet A permanent magnet in the shape of a cylinder.
cylindrical capacitor See CONCENTRIC CAPACITOR.
cylindrical contour The most common curvature of the face of a magnetic tape recording head; it is a section of a cylinder having a constant radius of 0.5 inch to 1 inch.
cylindrical coordinate geometry A scheme for robot-arm movement. There are three coordinates, called reach, angle, and elevation. It allows precise positioning of a robot end effector within a region consisting of two concentric cylinders and all the volume in between.
cylindrical coordinates A method of locating a point in three-space in which height, distance, and angle are used to uniquely define points.
data analysis display unit  A video display peripheral for online data analysis.

data analysis display system  A data collection area that holds data only (i.e., one that does not contain program instructions).

data bank  A data file stored in a direct-access storage device, which can be drawn from by many systems through remote terminals.

data base  A computer file containing often-used information (e.g., names and addresses, or electronic part numbers). 2. A popular form of computer software that allows users to create, maintain, and modify information.

data block  A set of data bits, comprising an identifiable item.

data bus  A conductor or medium over which digital data is transmitted from one place to another within a computer.

data carrier storage  A medium of data storage outside of a computer (e.g., a magnetic disk).

data code  A set of abbreviations or codes for data characters or words.

data collection  The pickup of signals representing test data and their transmission to a computer, data processor, or recorder. Also see DATA SYSTEM.

data communication  The transmission and reception of data signals between or among points in a system.

data expiration terminal  A computer peripheral providing an input and output link to a central computer system, and that can be used offline for other functions.

data compression  1. The process of reducing the size of a data file by eliminating redundancies. 2. The process of minimizing the length of a data transmission by eliminating redundancies. 3. The process of reducing the bandwidth of a data transmission. 4. The process of reducing the dynamic range of a data transmission.

data control  The automatic control of incoming and outgoing data in a data processing system.

data conversion  The process of changing data from one form to another, e.g., from analog to digital or from digital to analog (D/A), parallel to serial, or serial to parallel.


data description  The description of a unit of data, usually in the form of a data collection code. 2. A general expression as opposed to a computer source program.

data display  A device, such as a cathode-ray tube (CRT) or liquid-crystal display (LCD), that presents data for visual examination. Compare DATA PRINTOUT.

data element  1. A component of a data signal (e.g., a number, letter, symbol, or the equivalent electrical pulses). 2. A device or circuit for acquiring or processing data. 3. A unit of data (e.g., a field in a file).

data diagram  A block diagram showing the movement of data through a data-processing system.

data format  The form of data in a record or file (e.g., character format or numerical format).

data gathering  See DATA COLLECTION.

data-handling capacity  1. The amount of data that can be stored in a memory circuit. 2. The amount of data that can be transmitted over a certain medium. 3. The rate at which data can be transferred under certain conditions.

data-handling system  A system that gathers data, routes, transmits, or receives data, but does not necessarily process it.

data item  A logical element (character, byte, or bit) describing a characteristic of a record used by a system for which there is a specific application.

data level  Descriptive, through a programming language, of the relative weight of logical elements (data items) in a computer record. Also called data hierarchy.

data link  The portion of a computer system that gathers data and, if necessary, converts it to a form acceptable by a computer.

data matrix  Variables and their possible values stored as a series of columns and rows of values in a computer memory.

data name  An operand specified in a computer program.

data pickup  1. A transducer that collects data signals from a source; it converts non-electrical data into corresponding electrical signals and delivers its output to a data processing system. 2. Data collected from an input device.

data playback  The reproduction of data signals stored by some method of data recording.

data plotter  See X-Y PLOTTER.

data printout  1. A device that prints a record of data as it is being received. 2. A permanent printed record, usually of a calculation or computation—especially the printed output of a computer peripheral device. A permanent printed record, usually of a calculation or computation—especially the printed output of a computer peripheral device.

data processing  Work performed on acquired data as in solving problems, making comparisons, classifying material, organizing files. Usually done by a computer.

data-processing equipment  A digital computer and the peripheral equipment needed to collect, store, analyze, and reduce data.

data-processing machine  A computer or system used to collate, store, analyze, and reduce data, as opposed to a computer or system used primarily to solve problems or perform routine tasks. Also called data processor.

data processor  See DATA-PROCESSING MACHINE.
data receiver • daylight lamp
data receiver At a particular point in a data-processing system, a circuit or device for receiving data from a data transmitter.
data reception Receiving data signals from some point within or outside a data-processing system.
data-reception system A data receiver and its associated equipment.
data record A computer-processed record containing a data item and specifying its format.
data recorder A machine for storing data acquired in the form of electrical signals (see DATA RECORDING).
data recording 1. The preservation of data signals by some process, such as magnetic-disk encoding, optical-disk encoding, or tape recording, for future use or as a backup. 2. A record of data signals, as on magnetic tape.
data reduction The summarization of a mass of electronically gathered data.
data-reduction system A system used to minimize the amount of data necessary to convey given information.
data representation Values and data as described by numerals, symbols, and letters (e.g., computer program instructions).
data segment As related to a particular computer process, a subunit of allocated storage containing data only.
data selector/multiplexer A digital circuit that has several or many input signals, and feeds one of them onto a common line.
data set A device that connects a data processor to a telephone or telegraph line.
data signal 1. A signal such as one of binary bit combinations that can represent data as numbers, letters, or symbols. 2. A signal current or voltage proportional to some sampled quantity, that is to be used to actuate indicating instruments during tests or measurements.
data statement A computer program statement identifying a data item and specifying its format.
data storage The preservation of data, particularly computer files, for long periods of time in nonvolatile form (no source of power is required to ensure that the data remains intact).
data storage media Hardware that preserves data, particularly computer files, for long periods of time in nonvolatile form (no source of power is required to ensure that the data remains intact). Common media include magnetic disks, magnetic tape, and optical disks.
data synchronizer A device used to synchronize data transmission within a computing or processing system.
data system 1. An arrangement for collecting, recording, and routing data in the form of electrical signals. 2. An arrangement for processing data (e.g., for correlating, computing, routing, storing, etc.).
data terminal A remote input/output device connected to a central computer.
data throughput In a computer system, the amount of data per unit time (bytes, kilobytes, megabytes, gigabytes, or terabytes per second or minute) that can be transferred from one place to another.
data transducer In tests and measurements, a transducer that converts a monitored phenomenon into a data quantity that can be used for computer analysis or calculations.
data transmission Sending data signals from a pickup point or processing stage to another point within a data-processing system; also, sending such signals to points outside the system.
data-transmission system A data transmitter and its associated equipment.
data transmission utilization measure The ratio of the useful data output of a data-transmission system to the total data input.
data transmitter A circuit or device for sending data from point to point within or outside of a data-processing system.
data unit Characters in a group that are related in a way that makes them a meaningful whole (e.g., a word, a sentence, or a set of related data entries).
data value A measure of the amount of information contained in a certain number of data bits. The greater the ratio of the actual information to the number of bits, the higher the data value.
data words In digital computer operations, words (bit groups) representing data, rather than program instructions.
DAVC Abbreviation of DELAYED AUTOMATIC VOLUME CONTROL.
David Phonetic alphabet code word for letter D.
daylight effect The modification of transmission facilities during the day because of ionization of the upper atmosphere by solar radiation.
daylight lamp An incandescent lamp whose filament is housed in a blue glass bulb, which absorbs some red radiation and transmits most of the green, blue, and violet. So called because the spectral output resembles that of typical daylight.
daylight range The distance over which signals from a given transmitter are consistently received during the day.
DC 1. Abbreviation of DIFFUSED BASE of a transistor. 2. Abbreviation of DOUBLE BREAK (relay).
dc 1. Abbreviation of DECIBELS or decibels. 2. Symbol for differential of capacitance.
dc amplifier A circuit used to amplify direct-current signals.
dc bar See DC BUS.
dc base current Symbol, Ib. The static direct current in the base element of a bipolar transistor.
dc base current Symbol, I$_{b}$R. The static direct current in the base element of a bipolar transistor.
dc beta The current amplification factor (BETA) of a common-emitter-connected transistor for a dc input (base) signal. Compare DC BETA.
dc bias Voltage, V$_{bb}$. The static direct voltage at the base element of a bipolar transistor.
dc bias A supply voltage that is added to the input of an amplifier circuit to ensure that the output signal has a dc level.
dc bias current Symbol, I$_{bb}$. The static direct current at the base of a bipolar transistor.
dc balance 1. The amount of data necessary to convey given information. 2. The ratio of the amount of data necessary to convey a given amount of information.
dc balance 1. The amount of data necessary to convey given information. 2. The ratio of the amount of data necessary to convey a given amount of information.
dc balance A circuit that converts a dc input into an ac output, with or without step-up or step-down. Also called INVERTER.
dc balance A circuit that converts a dc input into an ac output, with or without step-up or step-down. Also called INVERTER.
dc component In a complex wave (i.e., one containing both ac and dc), the current component having an unchanging polarity. The dc component constitutes the mean (average) value around which the ac component oscillates, pulsates, or fluctuates.
dc converter A dynamoelectric machine for converting low-voltage dc into higher-voltage dc. It is essentially a low-voltage dc motor coupled me-
dc component 

channically to a higher-voltage dc generator. Compare DC INVERTER.

dc coupling See DIRECT COUPLING.

dc drain current Symbol, $I_{D}$ The static direct current in the drain element of a field-effect transistor.

dc drain resistance Symbol, $R_{DS}$ The static dc resistance of an FET's drain element; $R_{DS} = V_{DS}/I_{D}$.

dc drain voltage Symbol, $V_{DSS}$ The static dc voltage at the drain element of a field-effect transistor.

dc dumping In digital computer operation, removing dc power from a computer, which would eradicate material stored in a volatile memory.

dc emitter current Symbol, $I_{E}$ The static direct current in the emitter element of a bipolar transistor.

dc emitter resistance Symbol, $R_{E}$ The static dc resistance of a bipolar transistor's emitter element; $R_{E} = V_{E}/I_{E}$.

dc emitter voltage Symbol, $V_{EBO}$ The static dc voltage at the emitter element of a bipolar transistor.

dc equipment Apparatus designed expressly for operation from a dc power supply. Compare AC EQUIPMENT and AC/DC.

dc erasure A random magnet recorder, a head supplied with a dc current for the purpose of removing data.

dc error voltage In a television receiver, the dc output of the phase detector, which is used to control the frequency of the horizontal oscillator.

dc gate current Symbol, $I_{G}$ The very small static direct current in the gate element of a field-effect transistor.

dc gate resistance Symbol, $R_{G}$ The very high, static direct resistance of an FET's gate element; $R_{G} = V_{G}/I_{G}$.

dc gate voltage Symbol, $V_{G}$ The static dc voltage at the gate element of a field-effect transistor.

dc generator 1. A rotating machine (dynamo) for producing direct current. Also see DYNAMO-ELECTRIC MACHINERY. 2. Generically, a device that produces direct current: batteries, photovoltaic cells, etc.

dc generator amplifier A special type of generator that provides power amplification. The input signal energizes the field winding of a constant-speed machine; because the output voltage is proportional to field flux and armature speed, a high output voltage is obtained. Also see AMPLIFIER.

dc grid bias Steady dc control-grid voltage used to set the operating point of an electron tube.

dc grid current Symbol, $I_{G}$ The static direct current in the control-grid element of an electron tube.

dc grid resistance Symbol, $R_{G}$ The static dc resistance in the control-grid element of an electron tube.

dc grid voltage Symbol, $V_{G}$ The static dc voltage at the control grid of an electron tube.

dc inserter In a television transmitter, a stage that adds the dc pedestal (blanking) level to the video signal.

deac Abbreviation of dynamic load characteristic.
deac power The unintended flow of direct current.
deac voltage The difference between the dc component of the current and the component that has been extracted through a capacitor or transformer.
deac voltage The reinstatement of the non-dc component into a signal from which the component has been extracted through a capacitor or transformer.
deaer A relay that reinserts the average dc component into a signal after the component has been lost because the signal passed through a capacitor or transformer.
dec Abbreviation of DUAL COLUMN STIMULATOR.
dec filter A frozen horizontal field in a magnetic tape.
dec gate resistance Symbol, $R_{G}$ The static direct resistance of the gate element of an electron tube; $R_{G} = V_{G}/I_{G}$.
dec gate voltage Symbol, $V_{G}$ The static dc voltage at the gate element of an electron tube.

dec plate resistance Symbol, $R_{P}$ The static dc resistance of the internal plate-cathode path of an electron tube; $R_{P} = V_{P}/I_{P}$.
dec plate voltage Symbol, $V_{P}$ The static dc voltage at the plate electrode of an electron tube.
dec power Symbol, $P_{D}$ Unit; watt. The power in a dc circuit: $P_{D} = E I$, where $E$ is in volts and $I$ is in amperes. Compare AC POWER. Also see POWER.
dec power supply A power unit that supplies direct current only. Examples: battery, transformer/rectifier/filter circuit, dc generator, and photovoltaic cell. Compare AC POWER SUPPLY.
dec relay A relay having a simple coil and core system for closure by direct current, which can be actuated as.
dec resistance Resistance offered to direct current, as opposed to its phase-ac resistance.
dec resistivity The resistivity of a sample of material measured using a pure dc voltage under specified conditions (physical dimensions, temperature, etc.).
dec restorer A circuit that reinserts the average dc component of a signal after the component has been lost because the signal passed through a capacitor or transformer.
dec transformer A dc-to-dec converter providing voltage step-up. The applied dc is usually first converted to ac, which is then stepped up by a transformer. The higher-voltage ac is then rectified to produce a high dc output voltage.
dec transmission 1. Sending dc power from a generating point to a point of use. 2. In television transmission, the retention of the dc component in the video signal.
dec tuning voltage The capacitance-varying dc voltage applied to a varactor in an inductance-capacitance (LC) tuned circuit.
deu Abbreviation of decimal counting unit.
dec undercurrent relay A relay or relay circuit that is actuated as a result of the dc coil current dropping below a specified level. Compare DC OVERCURRENT RELAY.
dec undervoltage relay A relay or relay circuit that is actuated as a result of the dc voltage dropping below a specified level. Compare DC OVERVOLTAGE RELAY.
dev Abbreviation of DC VOLTS or DC VOLTAGE.
dev voltage Abbreviation, dev: A voltage that does not change in polarity, an example being the voltage delivered by a battery or dc generator. Also see VOLTAGE.
deva Abbreviation of digital voltage.
deva voltage Abbreviation, deva: The rated dc voltage level in volts of a DC WORKING VOLTAGE.
devi Abbreviation of DC WORKING VOLTAGE.
devd Symbol for differential of electric displacement.
ddev Abbreviation of digital differential analyzer.
dde Abbreviation of DIRECT DISTANCE DIALING (telephone).
dde display See D SCOPE.
dde decision element.
dde symbol for differential of voltage.
dde data In frequency-modulation (FM) receivers, a dc voltage delivered by a battery or dc generator. Also see VOLTAGE.
dde deactuating pressure For an electrical contact, the pressure at which contact is made or broken at the point of operation (i.e., the muzzle pressure). Compare DC WORKING VOLTAGE.
dde 1. Unelectrified. 2. Lacking electromagnetic signals or fields. 3. Electrically or mechanically inactive.
dde band 1. A radio-frequency band on which no signals are heard. 2. A range of values for which an applied control quantity (e.g., current or voltage) has no effect on the response of a circuit.
decade box

The state wherein a moving body (such as the pointer of a meter or the voice coil of a loudspeaker) comes to rest without overswing or oscillation.

decade galvanometer See DECADE INSTRUMENT.

dead beat An unreliable contact of a relay, caused by insufficient pressure.

dead circuit A circuit that is electrically disabled.

dead end The unused end of a tapped coil i.e., the turns between the end of the coil and the last turn used.

dead-end tower A supporting tower for an antenna or transmission line that can withstand stresses caused by loading or pulling.

dead file A computer file that is not in use, but is being kept in a record.

dead front panel A metal panel that, for safety and desensitization, is completely insulated from volt- age-bearing components mounted on it; it is often grounded.

dead interval See DEAD TIME.

dead line A deenergized line or conductor.

dead period See DEAD TIME.

dead room An anechoic room in which acoustic tests and studies are made.

dead short A short circuit with extremely low (virtually no) resistance from dc into the radio-frequency spectrum.

dead space See DEAD BAND.

dead spot 1. An area in which radio waves from a particular station are not received. 2. On a vacuum-tube cathode (directly or indirectly heated), a spot from which no electrons are emitted.

dead stretch The tendency of insulating materials to permanently retain their approximate dimen- sions after having been stretched.

dead time 1. DOWN TIME. 2. An interval during which there is no response to an actuating signal. 3. In a computer system, an interval between re- quests that is allocated to prevent interference between the events.

dead volume In a pressure transducer, the zero-stimulus volume of the pressure port cavity.

dead zone See ZONE OF SILENCE.

debounced switch A switch in sensitive computer equipment used to test other programs.

debouncing The time interval following completion of a software design, a hardware inter- connection, or the manufacture of a piece of electronic equipment, during which errors and imperfections are sought and corrected.

decaying In what is called DECADE BOX. 3. A group, sometimes a unit of access, of 10 computer storage locations.

decade amplifier An amplifier or preamplifier whose gain may be adjusted in increments of 10 (×1, ×10, ×100, etc.).

decade box A group of components that provides values in 10 equal steps selected by a switch or jacks. For compactness, the components and the associated hardware are enclosed in a box or can. See, for example, DECADACAPACITOR.

decade capacitor A Klystron capacitor whose value is variable in 10 equal steps. For example, the values might be set at 100 picofarads (pF), 200 pF, 300 pF, up to 1000 pF. Compare DECADE INDUCTOR and DECADE RESISTOR.

decade counter A counter (see COUNTER, 1. 2) in which the numeric displays are divided into sections, each having a value 10 times that of the next and displaying a digit from zero to nine.

decade inductor An inductor whose value is variable in 10 equal increments. Compare DECADE CAPACITOR and DECADE RESISTOR.

decade resistor A resistor whose value is variable in 10 equal increments. Compare DECADE CAPACITOR and DECADE INDUCTOR.

decade scaler A scale of 10 electronic counters (i.e., a circuit delivering one output pulse for each group of 10 input pulses).

decametric waves Waves in the 10–100-meter band (30 to 3 MHz).

decay 1. The decrease in the value of a quantity, e.g., current decay in a resistance-capacitance circuit. 2. The gradual, natural loss of radioactivity by a substance.

decay characteristics 1. The decay of a parame- ter; usually an exponential function. 2. The per- sistance time in a storage oscilloscope.

decay curve A curve, usually logarithmic, represent- ing the function of quantity versus time for a signal decrement, the decrement of radioactivity, or other natural processes.

decay rate A quantitative expression for the rapid- ity with which a quantity decreases. Generally listed in decibels per second (dB/s) or decibels per millisecond (dB/ms).

decay time The time required for pulse amplitude to fall from 90% to 10% of the peak value. Also called TIME.

decade A 70- to 130-kHz CW radio navigation system (British).

deceleration A high-speed electron that is abruptly decelerated upon striking a target, caus- ing X-rays to be emitted.

decelerating electrode A charged electrode that slows the electrons in an electron beam.

deceleration Acceleration that results in a de- crease in speed.

deceleration time 1. The time taken by magnetic tape to stop moving after the last recording or playback has finished. 2. The time taken by a biological data storage medium, such as a hard disk, to come to rest after completion of a read or write operation, or on powering-down.

decentralized data processing Data processing in a large-scale operation; the equipment is distributed among many management groups.

decision A method of producing misleading information that has a false direction.

decision element A radar device, or radar-associ- ation processor, for deception.

decode Abbreviation, d. A prefix meaning one-tenth (10⁻¹). Examples: DECIHELI, DECIMETER.

decide Abbreviation, d. A practical unit of rela- tive gain. In terms of power, the relative gain in decibels is equal to:

$$\text{Gain (dB)} = 10 \log_{10}\left(\frac{P_{out}}{P_{in}}\right)$$

where $P_{out}$ is the output power and $P_{in}$ is the input power. For voltage, the input and output impedances are the same, the gain in decibels is given by:

$$\text{Gain (dB)} = 20 \log_{10}\left(\frac{V_{out}}{V_{in}}\right)$$

where $V_{out}$ is the output voltage and $V_{in}$ is the input voltage. For current, if the input and output impedances are the same, the gain in decibels is given by:

$$\text{Gain (dB)} = 20 \log_{10}\left(\frac{I_{out}}{I_{in}}\right)$$

decimal Code A method of defining numbers, in which each place has a value of ten times that immediate-ly to the right.
decimal-coded digit 1. A numeral from 0 to 9. 2. A numeral in the DECIMAL NUMBER SYSTEM.

decimal circuit A circuit intended for performing decommutation, including demodulators, demultiplexers, and signal separators.

declaration statement A computer source program instruction specifying the size, format, and kind of data elements and variables in a program (IEEE 610). 2. A declarative statement.

decification The extraction of a signal component from the composite signal, resulting from commutation.

decimeter waves See MICROWAVES.

decimetric waves Electromagnetic waves having lengths ranging from 0.1 meter to 1 meter (3000 MHz to 300 MHz). Also known as ultrahigh frequency (UHF).

decliner A natural-logarithmic unit equal to 0.1 hyper.

declination 1. The angle representing the deviation of magnetic north from true north; it is the angle subtended by a freely turning magnetic needle and the meridian. Compare INCLINATION. 2. Celestial latitude.

decoder A circuit or device for performing decommutation, including demodulators, demultiplexers, and signal separators.

decoder/driver A circuit or device for performing DECODING.

decoder/demultiplexer A circuit that places an input signal on a selected output line.

decoder/driver An integrated circuit containing a decoder and driver.

decoding 1. In computer and data-processing operations, DIGITAL-TO-ANALOG CONVERSION. 2. The conversion to English of a message received in a code.

decoding circuit A circuit intended for the purpose of translating a code into ordinary language.

decommutation A circuit or device for performing decommutation, including demodulators, demultiplexers, and signal separators.

decoupler A device that isolates two circuits so that a minimal amount of coupling exists between them.

decoupling The elimination or effective minimization of coupling effects, as in decoupling amplifier stages to prevent interaction through a common power-supply lead.

decoupling capacitor 1. A capacitor that provides a low-impedance path to ground to prevent undesired stray coupling among the circuits in a system. 2. The capacitive member of a resistance-capacitance (RC) decoupling filter.

decoupling filter A resistance-capacitance (RC) filter, usually inserted into a common dc line in a multistage amplifier to prevent interstage feedback coupling through the common impedance of the line.

decoupling network One or more decoupling filters.

decoupling resistor The resistive member of a resistance-capacitance (RC) decoupling filter.

decrease One whose value decreases as a result of use, wear, or the passage of time.

decreasing function A function whose curve has a negative slope at all points in the domain.

decrement 1. Also called logarithmic decrement. The rate at which a damped wave dies down. The logarithmic value is a number (usually expressed as a power of the number 10). 2. A quantity used to lessen the value of a variable. 3. To lower the value (of a register, for example) by a single increment.

decreaser An instrument for measuring the decrement of a radio wave.

decrément capacitor A variable capacitor for use in a decrément circuit. The rotor plates are shaped so that equal angular rotations correspond to the same decrement at all settings. Thus, the percent- age of capacitance change for a given angle of rotation is constant throughout the capacitance range.

decryption The conversion of an encrypted signal from a cipher into plain text, graphics, or other common recognizable form. Also see CIPHER. Compare ENCRYPTION.

decryption key An algorithm, or a set of algorithms, that reverses an encrypted signal from a ciphertext into plain text, graphics, or other commonly recognizable form. Each cipher has its own unique algorithm or set of algorithms for this purpose. The signal cannot be decrypted unless all the components of the key are present.

dedicated Assigned exclusively to a certain purpose, e.g., a dedicated facsimile (fax) line.

deductive logic A form of symbolic logic used to demonstrate that a certain conclusion will always follow given a certain set of circumstances. The logic of digital circuits is deductive. Compare INDUCTIVE LOGIC.

decommutator A circuit or device for performing decommutation, including demodulators, demultiplexers, and signal separators.

deep discharge The discharge of a cell or battery; usually done prior to recharging.

deep cycle Pertaining to a rechargeable cell or battery that can operate until it is almost completely discharged. It generally has a high amper-hour capacity.

decoupling function A function whose curve has a negative slope at all points in the domain.

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decommutator • definite-purpose component 173
range of possible applications (e.g., a video detector diode, as opposed to a general-purpose diode). Compare GENERAL-PURPOSE COMPONENT.
deinition 1. Clarity of a video image (i.e., one having good contrast and faithful tones). 2. Good in-collumns or transistors.
deffect coil One of a set of external coils carrying strong currents, which provide electromagnetic deflection of the cathode-ray beam in picture tubes, camera tubes, radar display tubes, sonar display tubes, and some oscilloscopes. Also called deflection coil.
deffecting electrode An electrode, such as a deflection plate, used to alter the direction an electron beam. Also called deflection electrode.
deflection plate In a cathode-ray tube, a plate that attracts or repels the electron beam, causing the spot to move horizontally or vertically on the screen. Also called deflection plate.
deflection torque The torque required to move the point to a meter or the pen or mirror of a recorder.
deinition 1. In a cathode-ray tube, movement of the electron beam by electric or magnetic fields. 2. Movement of the pointer of a meter or the pen or mirror of a recorder by an applied current or voltage.
deflection factor Symbol, G. The reciprocal of DEFLECTION SENSITIVITY.
deflection sensitivity Symbol, S. A quantitative measure of the extent to which the input voltage will displace the electron beam on the screen of an electrostatic cathode-ray tube. Expressed in volts per centimeter (V/cm) or volts per inch (V/in).
deflection voltage The potential difference between the deflection plates of an electrostatic cathode-ray tube. It is used to control the direction of the electron beam striking the phosphor screen.
deflection yoke An assembly of deflection coils in picture and camera tubes, and in some magnetically deflected oscilloscope tubes. The usual combination is two series-connected horizontal deflection coils and two series-connected vertical deflection coils.
deflector 1. A beam-forming plate in a beam-power tube. 2. A deflection plate in a cathode-ray tube. 3. A deflection coil or yoke in a picture tube, camera tube, or magnetic-deflection oscilloscope tube. 4. A mechanical attachment for improving the angle of radiation of a loudspeaker by spreading the higher-frequency waves.
defocusing Blurring of the image on the screen of a cathode-ray tube, caused by spreading of the electron beam.
deformation potential The voltage generated when a crystal lattice is subjected to pressure. An example is the voltage produced by a crystal microphone when acoustic waves strike the crystal.
defracting The elimination of non-synchronized echoes in a radar system.
def. Abbreviation of DEGREE.
degassing During the evacuation of a vacuum tube or similar device, the removal of gas, including that which has bonded to the glass and metal parts.
degauss See DEMAGNETIZE.
degaussing coil A device for bulk erasing magnetic tape; also called a bulk tape eraser.
degaussing 1. The process of diminishing an object; in particular, the removal of all residual magnetism. 2. The erasure of data from a magnetic or magneto optical data-storage medium.
degaussing circuit In a color television receiver, a circuit including a thermostat, voltage-dependent resistor, and coil for automatically demagnetizing the picture tube when the receiver is switched on.
degaussing coil A coil carrying an alternating current; the resulting magnetic field demagnetics objects that have become accidentally magnetized.
degeneracy In microwave practice, the appearance of a single resonant frequency for two or more modes in a resonator.
degenerate modes In microwave operations, a set of modes with the same resonant frequency or propagation constant.
degenerate parametric amplifier An inverting parametric amplifier, in which the two signals are of the same frequency, which is half the pump frequency.
degenerate semiconductor A semiconductor that behaves like a metal over a wide range of temperature (degenerate). Compare DEGENERATE.
degeneration In an amplifier, the technique of feeding a portion of the output back to the input out of phase with the input signal, to improve fidelity at the expense of gain. Also called negative feedback or inverse feedback. Compare REGENERATION.
degenerative resistor An unbypassed emitter resistor in a common-emitter bipolar-transistor circuit, or an unbypassed source resistor in a common-source field-effect transistor circuit. Signal current flowing through the resistor produces negative feedback current (degeneration), which reduces the gain of the stage, but increases the linearity of the transfer characteristic.
degression of voltage rectification For a rectifier, the ratio of the average direct output current to the root-mean-square (rms) alternating input current.
degree of rotation A measure of the extent to which a robot joint, or a set of robot joints, can be turned. Some reference axis is always used; angles are specified in degrees, relative to that axis.
degrees-to-radians conversion The conversion of angles in degrees to radians in radians. To change degrees to radians, multiply degrees by 0.01745. Compare RADIANS-TO-DEGREES CONVERSION.
defier circuit breaker A circuit breaker in which the arc occurring when the contacts open is quickly extinguished by an external magnetic device.
deionization The conversion of an ionized substance, such as a gas, to a neutral (non-ionized) state. The process changes the ions into uncharged atoms.
deionization potential The voltage at which an ionized substance becomes deionized; for example, the voltage at which a glow discharge is extinguished when the gas ions become neutral atoms at that voltage. Also called extinction potential.
deionization time The time required for an ionized gas to become neutral after the removal of the ionizing voltage.
deionization voltage See DEIONIZATION POTENTIAL.
deionizer To restore to an electrically neutral condition (i.e., to convert ions to neutral atoms, as in the deionization of a gas after the discharge in a glow tube is extinguished).
deka- A prefix meaning ten(s) (e.g., DEKAMETER).
delay 1. The interval between the instant at which a signal or force is applied or removed and the instant at which a current or output device subsequently responds in a specified manner. 2. The time required for a signal to traverse a given medium, such as air, mercury, or quartz.
delay action Response occurring some time after a stimulus has been applied or removed (e.g., the retarding opening of a delayed-dropout relay).
delay circuit 1. A circuit, such as a resistance-capacitance (RC) or resistance-inductance (RL) combination, that introduces a time delay. 2. See DELAY LINE.
delay coincidence circuit A coincidence circuit (see AND CIRCUIT) triggered by two pulses, one of which lags the other behind.
delay counter In a digital computer, a device that halts a program and runs long enough for an operation to be completed.
delay distortion 1. Distortion resulting from variations in the phase delay of a circuit or device at different points in its frequency range. 2. In a facsimile signal, the delay of different frequency components of the signal.
delayed AGC See DELAYED AUTOMATIC GAIN CONTROL.
delayed automatic gain control An automatic gain control circuit that operates only when the signal amplitude exceeds a predetermined threshold level, thus providing maximum amplification to the signal.
delayed automatic volume control See DELAYED AUTOMATIC GAIN CONTROL.
delayed hatch In relay or switch operation, contacts separating some time after the switch has been closed, but before the relay demagnetizes. Compare DELAYED MAKE.
delayed close See DELAYED MAKE.
delayed closure See DELAYED MAKE.
delayed contacts Contacts that open or close at a predetermined time after their activating signal is applied or removed.
delayed drop-in See DELAYED MAKE.
delayed dropout See DELAYED BREAK.
delayed dropout loop In security applications, a circuit or system that generates an alarm some time after a predetermined event is detected. The alarm can usually be selected or preadjusted.
delayed make A delay or switch operation, contacts closing some time after the switch has been thrown or the relay has been energized. Compare DELAYED BREAK.
delayed open See DELAYED BREAK.
delayed pull-in See DELAYED MAKE.
delayed repeater A repeater that receives and stores information, and retransmits the information later, in response to a switching or interrogation signal.
delayed repeater satellite An active communications satellite that acts as a delayed repeater (i.e., it receives and records information at one time and retransmits it at a later time).
delayed sweep 1. In an oscilloscope or radar, a sweep that starts at a selected instant after the signal under observation has started. 2. The (usually calibrated) circuit for producing a sweep, as defined in (1).
delayed updating Updating a computer record or record set so that the record fields are left unchanged until all other changes attendant to the pertinent event are processed.
delay equalizer A network that corrects DELAY DISTORTION.
delay-frequency distortion Distortion caused by variation of envelope delay within a frequency band.
delay line A device (not always a line) that introduces a time lag in a signal. The lag is the time required for the signal to pass through the device, minus the time necessary for the signal to traverse the same distance through a wire, cable, optical fiber, or free space.
delay-line memory In a digital computer, a memory that uses a delay line, associated input- and output-coupling devices, and an external regenerative-feedback path. Information is kept stored by causing it to recirculate in the line by regenerative action.
delay-line register In a digital computer, a register that operates in the manner of a DELAY-LINE MEMORY and has a register length (capacity) of an integral number of words.
delay-line storage See DELAY-LINE MEMORY and DELAY-LINE REGISTER.
delay multivibrator See NONOSTABLE MULTIVIBRATOR.
delay-power product Unit, watt-second. The figure of merit for an integrated circuit (IC) gate. Increasing gate power reduces propagation delay. Also called after PROPAGATION DELAY POWER PRODUCT.
delay relay A relay that opens or closes at the end of a predetermined time after its activating signal is applied or removed.
delay relay switch A switch having delayed make, delayed break, or both.
delay time 1. The interval between the instant a voltage or current is applied and the instant a circuit or device operates. 2. In an output pulse, the interval between the instant an ideal pulse is applied to the input of a system and the instant the output signal has its maximum amplitude. 3. The time elapsed between the presentation of a pulse to the input of a delay line and the appearance of the pulse at the output.
delay timer 1. A timer that starts or stops an operation after a prescribed length of time. 2. A delay line or switch.
delay unit In a regulated circuit, a circuit for delaying pulses.
delays 1. To erase or blank out a signal. 2. The elimination from a computer file of a record or record group. 3. To remove a computer program from memory or storage.
deletion record In the master file of a digital computer, a new record that causes existing ones to be deleted.
delimiter In digital computer operations, a character limiting a sequence of characters of which it is not itself a member.
dellinger effect The sudden disappearance of a radio signal as a result of an abrupt increase in atmospheric ionization caused by a solar eruption.
deliquescent material A material that absorbs enough moisture from the air to get wet. For example: calcium chloride, a deliquescent material, is often used to keep electronic equipment dry. Compare HYDROSCOPIC MATERIAL.
delta circuit A three-phase electrical circuit with no common ground.
delta connection A triangular connection of coils or load devices in a three-phase system, so called from its resemblance to the Greek letter delta. Compare WYE-CONNECT.
delta-matched antenna See WYE-MATCHED IMPEDANCE ANTENNA.
delta-matched-impedance antenna See WYE-MATCHED IMPEDANCE ANTENNA.
delta matching transformer In a WYE-MATCHED IMPEDANCE ANTENNA, the fanned-out (roughly delta-shaped) portion of the two-wire feeder at its point of connection to the radiator. It matches the impedance of the feeder to that of the radiator.
delamination The splitting apart, in layers, of an insulating material, such as mica or bonded plastic, used to insulate windings.
delamination 1. The omission of secondary electrons as a result of radioactivity.
delta modulation A method of analog-to-digital conversion in which a pulse density function of the input. The input can be obtained after a high-pass filter or analog to digital converter.
delta tune Also called receiver incremental tuning (RIT). In high-frequency (HF) communications transceivers, a control that allows the receiver frequency to be adjusted up to several kilohertz higher or lower than the transmitter frequency.
delta waves Brain waves having a frequency less than 7 Hz. Also see ELECTROENCEPHALOGRAM.
delco Abbreviation of DEMODULATOR.
demagnetization curve The portion of a magnetic hysteresis curve, showing reduction of demagnetization of a material.
demagnetization effect The phenomenon in which uncompensated magnetic poles at the surface cause a reduction of the magnetic field inside a sample of a material.
demagnetizer To remove magnetism from an object, either temporarily or permanently.
demagnetization time The half-cycle of an alternating current (or polarity of a direct current) flowing through a permanent magnet (as in a headphone, permanent-magnet loudspeaker, or polarized relay), that reduces the magnetic field.
demagnetizing current 1. A magnetic force whose threat of removal reduces the magnetic field of a magnetized material. 2. An effect that reduces the magnetism of a permanent magnet, such as high temperature or a physical blow.
demand factor In the use of electric power, the ratio of the consumer's maximum demand to the actual power consumed.
demand processing Descriptive of a system that processes data as it is available, without storing it.
demarcation strip An interface between a terminal unit and a carrier line.
dembrer effect The appearance of a voltage back in a semiconductor device when one of the regions is illuminated.
de modulation The process of retrieving the information (modulation) from a modulated carrier. In receivers and certain test instruments, this process is called DETECT.
demodulator 1. A circuit that recovers the information from a modulated analog or digital signal. In radio communications, such a device is usually called a DETECTOR. 2. In computer communications, a device that performs ANALOG-TO-DIGITAL CONVERSION of incoming online signals.
demand read (write) • depth of discharge
demodulator probe A diode probe that removes the modulation envelope from an applied ampli-tude-modulated signal, and presents the envelope to a voltmeter or oscilloscope.
demodulating device used to show and teach the way in which a component, circuit, or system op-erates.
Demorgan’s theorem A rule of sequential or digi-tal logic. It states that the negation of (A AND B), for any two statements A and B, is equivalent to NOT A OR NOT B. Also, the negation of (A OR B) is equivalent, logically, to NOT A AND NOT B.
demultiplexer A circuit or device that separates the components of a multiplexed signal transmit-ted over a channel.
demultiplexing circuit See DEMULTIPLEXER.
denary band A band in which the highest fre-quency is 10 times the lowest frequency.
dendrite 1. The branching (tree-like) structure formed by some materials, such as semiconduc-tors, as they crystallize. 2. The branching portion of a nerve cell; hence, the corresponding circuit element in the electronic model of such a cell.
dendritic growth 1. Dendrite (see DENDRITE). 2. The process of growing long, flat semiconduc-tor crystals.
dendron See DENDRITE. 2. Gene (abbreviation of DENSITY).
dense binary code A binary representation sys-tem, in which any possible combination of char-acters is assigned some correspondent. 
densitometer An instrument for measuring the density 1. Mass per unit volume of a material. 2. Concentration of charge carriers or of lines of flux. 3. The number of items per unit volume, area, distance, or time.
density modulation Modulation of the density, with respect to time, of electrons in an electron beam.
deposition The application of a layer of one sub-stance to the surface of another (the substrate), as in evaporation, sputtering, electroplating, silk-screening, etc.
depth finder A unique, planned arrangement of elec-tronic components in a circuit, in accordance with good engineering practice, to achieve a de-sired end result. 
depolarizing agent A compound, such as cobalt chloride, used for the primary (continued) in the depth of discharge measurement, to reduce the small-quantity response of an instrument.
depolarizer A substance that retards polarization in an electrochemical cell. An example is the manganese dioxide used in dry cells.
depolarizing agent See DEPOLARIZER.
depolarization The reduction of the net charge on one sub-stance (usually a metal) to the surface of another (the substrate), as in evaporation, sputtering, electroplating, silk-screening, etc.
depth finder See ACOUSTIC DEPTH FINDER.
depth of discharge The degree to which a carrier wave is modulated.
depth of penetration The extent to which a skin-effect current penetrates the surface of a conduc-tor.
depth sounder See ACOUSTIC DEPTH FINDER.
depth of modulation The depth of a sine wave associated with the input signal.
depth of modulation The degree to which a carrier wave is modulated.
depth of penetration The extent to which a skin-effect current penetrates the surface of a conduc-tor.
depth sounder See ACOUSTIC DEPTH FINDER.
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design-center rating A specified parameter that, if not exceeded, should provide acceptable average performance. A is the greatest number of the components so rated.
design compatibility The degree to which a transmitter and receiver are designed for the rejection of unwanted electromagnetic noise.
design engineer An engineer who is skilled in the creation of new designs and in the comparative analysis of designs.
design maximum rating See MAXIMUM RATING. design-proof test A performance test made on a newly completed circuit or device to determine the suitability of the design.
desk-Fax A facsimile transmitter that can be placed on a desk, used for wire or radio transmission and reception of still images.
desk microphone A microphone equipped with a stand that sits on a table or desk. It allows the operator to use both hands for equipment adjustment, taking notes, etc.
desktop computer A personal computer designed for nonportable use, usually equipped with a built-in hard disk, one or more diskette drives, a CD-ROM drive, and a fax/modem. It generally uses an external cathode-ray tube display, printer, and keyboard. The power supply is intended for use with 117 volt utility circuits.
desolder To unsolder joints, usually with a special tool that protects delicate parts and removes melted solder by suction.
destaticization A chemical process used to minimize the retention of electrostatic charges by certain substances.
destination 1. The point in a system to which a signal of any sort is directed. 2. In communications, a receiving station.
destination file A computer file that receives data output during a specific program run.
destination register In a digital computer, a register into which data is entered.
destrian effect Light emission resulting from the action of an alternating electric field on phosphors embedded in a dielectric.
destructive addition A computer logic operation in which the sum of two operands appears in the memory location occupied by one of the operands.
destructive breakdown A breakdown in which the effects are irreversible (e.g., permanent damage to a dielectric by excessive applied voltage).
destructive interference Interference resulting from the addition of two waves that have the same frequency, but opposite phase.
destructive read In a computer or calculator, the condition in which reading the answer erases the data in a location used in the calculation.
destructive test A test that unavoidably destroys the test sample. Compare NONDESTRUCTIVE TEST.
detab A COBOL-based computer programming language permitting the programmer to present problems as decision tables.
detail constant Pertaining to a video signal, the ratio \( V_{p_{max}} / V_{c} \), where \( V_{p_{max}} \) is the amplitude of high-frequency components, and \( V_{c} \) is the amplitude of the low-frequency reference component.
detected error In a computer system, an error that is identified, but remains uncorrected until final depends on the amount of vapor in the gas.
detection 1. See DEMODULATION. 2. The sensing of a change in the operating parameters of a circuit or system.
detection range In security applications, the radius within which transmitters or sensors can be expected to reliably operate. This radius varies, depending on the environment, the sensitivity of the receiving circuits and transducers, and the strength of the transmitted signal (if any).
detector 1. A device for exchanging or changing signals. The device can use a tape recorder or a toy radio transmitter. 2. A device that senses a signal or condition and indicates its presence.
detector balanced bias In a radar system, bias obtained from a controlling circuit and used to reduce or eliminate clutter.
detector bias Steady dc voltage applied to a detector to set its operating point.
detector blocking In a regenerative receiver, a phenomenon in which a strong signal tends to pull the detector oscillator into phase with itself, thereby causing the detector to oscillate at the signal frequency.
detector circuit A modulator circuit (i.e., one used to recover the intelligence from a modulated carrier.
detector probe See DEMODULATOR PROBE.
detector pull-in See DETECTOR BLOCKING.
detector range In a receiver or instrument, the separate stage that contains the detector circuit. Some systems, such as a superheterodyne receiver, have more than one detector. Also see FIRST DETECTOR and SECOND DETECTOR.
detent A mechanical stop used on a rotary switch to hold the switch pole securely in each selected position.
detune 1. To adjust a circuit to some frequency other than its resonant frequency. 2. To set the frequency of a receiver or transmitter to some point other than the frequency normally used. 3. To stagger-tune a receiver intermediate-frequency system.
detuning Tuning to a point above or below the frequency to which a device or system is normally (or initially) adjusted (usually the resonant frequency of the device).
detuning stub A device used for the purpose of coupling a feed line to an antenna, while choking off currents induced on the feed line as a result of the near-field radiation of the antenna.
depquatting Producing an earlier form of a computer file by substituting older records for current ones.
deuteron Symbol, D, \( 1H \), \( 2H \). Also called heavy hydrogen. The hydrogen isotope having a nucleus consisting of one proton and one neutron.
deuteron oxide Symbol, D,\( O\). Also called heavy water. This compound has wide use in nuclear research.
detector The nucleus of a deuterium atom.
detector 1. The nucleus consisting of one proton and one neutron. 2. A device or circuit for changing one form of energy into another.
detector The device independence A characteristic of a computer, that allows operation independent of the types of input/output devices used.
dew Point For a gas containing water vapor (typically air), the highest temperature at which the vapor condenses as the gas is cooled. The dew point depends on the amount of vapor in the gas.
dew-point recorder An instrument for determining and recording the temperature at which water vapor in the air condenses to a liquid.
DF Abbreviation of DIRECTION FINDER.
DF antenna An antenna that is mechanically rotatable or has an electrically rotatable response pattern for use with a direction finder.
DF antenna system Two or more DF antennas arranged for maximum directivity and maneuverability, together with associated feeders and couplers.
df Abbreviation of decifig.
dia Abbreviation of diameter.
diagram A two-terminal, bilateral, three-layer semiconductor device that exhibits negative resistance. When the applied voltage exceeds a critical value, the device conducts.
designation 1. Determination of the cause and location of a hardware malfunction in the minicomputer operations. determination of the cause of a system operation error.
diagnostic routine 1. An efficient sequence of diagnostic tests for rapid, foolproof trouble-shooting of a piece of equipment. A computer software package intended for debugging programs, or for finding the cause of a hardware or software malfunction. Also called diagnostic program, or diagnostic test.

diagnostic test 1. A test made primarily to ascertain the cause of dysfunction in electronic equipment. Compare PERFORMANCE TEST. 2. To apply a diagnostic routine to hardware faults, or to implement one to prevent such a fault. diagnoser In digital computer operations, a troubleshooting routine combining both diagnosis and editing.
diagram A usually line drawing depicting a circuit, assembly, or organization. See, for example, BLOCK DIAGRAM and CIRCUIT DIAGRAM.
dial 1. A graduated scale, arranged horizontally, vertically, in a circle, or over an arc. Used to show the distance through which a variable component (such as a potentiometer, variable capacitor, or switch) has been adjusted. A pointer may move over the scale, or the scale can be moved past a stationary pointer. 2. The graduated face of a meter. 3. In a telephone system, to press the keys or actuate the keys that establish contact with another subscriber.
dial cable A flexible cable or belt conveying motion in the form of a redundant pattern in crystalline materials, such as germanium or silicon.
dial-calibrated attenuator A variable attenuator with a dial reading directly in decibels.
dial-calibrated capacitor A variable capacitor with a dial reading directly in picofarads.
dial-calibrated inductor A variable inductor with a dial reading directly in microhenrys.
dial-calibrated potentiometer A potentiometer with a dial reading directly in output volts, percent of range, or number of turns (when resistance is a linear function), or other quantity.
dial-calibrated resistor A variable resistor with a dial reading directly in ohms, kilohms, or megohms.
dial-calibrated rheostat See DIAL-CALIBRATED RESISTOR.
dial cord A form of dial cord. Cord usually designates a fabric string, whereas a cable is a flexible, insulated line.
dial knob The knob used to turn a dial under a pointer, or to turn a pointer over a dial scale.
dial lamp See DIAL LIGHT.
dial light A small lamp sometimes used to illuminate a dial. Can also serve as a pilot light.
dial lock A small mechanism used to lock a dial at a particular setting to prevent further turning.
dial meter An AUTOMATIC DIALING UNIT.
dialing key In a telephone system, a dial that uses keys, rather than a rotary dial.
diamond antenna A phonograph "needle" having as its point a small, hard diamond.
diacritical mark 1. Either of the two principal stops (open and closed) of an electronic organ that cover the entire range of the instrument. When one is used, a note may be transcribed in several octaves. 2. Tuning fork.
diagnosis The process of recognizing and recording, a high-pass filter that reduces low-frequency response during dialing and extreme closeups.
diagnostic 1. A table of specifications for the size and format of computer file operands, and data names for field and file types.
die 1. A small wafer of useful electrical material, such as a semiconductor or a precision resistor chip. 2. A casting designed to mold molten metal into a specific configuration until the metal hardens. 3. Any small object of roughly cubical proportions. 4. To lose power or energy completely, usually unintentionally. 5. In a computer program, to produce unpredicted and useless results following an initial run.
die bonding The bonding of dice or chips to a substrate.
die casting Making a casting by forcing molten metal (such as an aluminum alloy, lead, or zinc) under high pressure into a die or mold.
dielectric A material that is a nonconductor of electricity, especially, a substance that facilitates the storage of energy in the form of an electric field. Such materials are commonly used in capacitors and transmission lines.
dielectric absorption The ability of certain dielectric materials to absorb energy from their electric charge—even after being momentarily short-circuited. Capacitors with this property must be shorted out continuously for a certain length of time before the dielectric has completely discharged.
dielectric amplifier A voltage amplifier circuit in which the active component is a capacitor having a nonlinear dielectric. A signal voltage applied to the capacitor varies the capacitance, thus varying the current. The modulated current flows through a load resistor, developing an output-voltage signal that is less than the input-voltage signal.
dielectric breakdown voltage Sudden, destructive conduction that occurs when the applied voltage exceeds a critical value.
dielectric breakdown voltage The voltage at which DIELECTRIC BREAKDOWN occurs in an insulating material. Varies, depending on the particular dielectric material, and is the voltage at which the dielectric material breaks down.
dielectric capacity Also called dielectric constant, symbol k. For a dielectric material, the ratio of the dielectric constant of the capacitor using the dielectric material, to the capacitance of the equivalent capacitor with dry air as a dielectric. Also called relative dielectric constant.
dielectric constant 1. The state of having magnetic permeability less than unity.
dielectric constant of a material, the ratio of the capacitance of a two-plate capacitor using the dielectric material, to the capacitance of the equivalent capacitor with dry air as a dielectric. Also called relative dielectric constant.
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dielectric constant of a material, the ratio of the capacitance of a two-plate capacitor using the dielectric material, to the capacitance of the equivalent capacitor with dry air as a dielectric. Also called relative dielectric constant.
diagnostic routine • diamond lattice
dielectric current 1. Current flowing over the surface of a dielectric material in response to a varying electric field. 2. Current flowing through a dielectric as a result of its finite insulation resistance.
dielectric dissipation For a dielectric material in which an electric field exists, the ratio of the lost (dissipated) electrical energy to the recoverable electrical energy.
dielectric dissipation factor The tangent of the dielectric phase angle, also equal to the reciprocal of the Q factor.
dielectric fatigue In some dielectric materials subjected to a constant voltage, the deterioration of dielectric properties with time.
dielectric guide A waveguide made from a solid dielectric, such as polyethylene.
dielectric heater A high-frequency power generator used for DIELECTRIC HEATING.
dielectric heating The heating and forming of a dielectric material, such as a plastic, by temporarily making the material the dielectric of a two-plate capacitor. This capacitor is connected to the output of a high-power radio-frequency (RF) generator. Losses in the dielectric cause its heating. Compare INDUCTION HEATING.
dielectric hysteresis See DIELECTRIC ABSORPTION.
dielectric isolation In a monolithic integrated circuit (IC), the isolation of circuit elements from each other by a dielectric film, as opposed to isolation by reverse-biased pn junctions.
dielectric lens A molded piece of dielectric material used to focus microwaves. Its operation is analogous to that of an optical lens.
dielectric loss For a dielectric material subjected to a changing electric field, the rate of transformation of electric energy into heat.
dielectric loss angle Ninety degrees minus the dielectric breakdown voltage. Also called DIELECTRIC STRESS.
dielectric strength The highest voltage a dielectric can withstand before DIELECTRIC BREAKDOWN occurs. Usually expressed in volts or kilovolts per mil of material thickness.
dielectric stress The distortion of electron orbits in the atoms of a dielectric material subjected to an electric field.
dielectric susceptibility For a polarized dielectric, the ratio of polarization to electric intensity.
dielectric tests Laboratory experiments performed to determine the dielectric characteristics of a substance—especially the dielectric constant and dielectric breakdown voltage.
dielectric wedge See DIELLECTRIC GUIDE.
dielectric wedge A wedge-shaped dielectric slug used inside a waveguide match.
dielectric wire A small dielectric waveguide that acts as a wire to carry signals between points in a circuit.
dielectric matching plate A dielectric plate used in some waveguides for impedance matching.
dielectric mirror A reflector containing a number of layers of dielectric material. Its action depends on electromagnetic energy being partially reflected from the interfaces between materials having unequal indexes of refraction.
dielectric phase angle For a dielectric material, the angular phase difference between a sinusoidal voltage applied to the material and the component of the resultant current having the same period as that of the voltage.
dielectric phase difference See DIELECTRIC LOSS ANGLE.
dielectric polarization The effect characterized by the slight displacement of the positive charge in each atom of a dielectric material, with respect to the negative charge, under the influence of an electric field.
dielectric power factor The cosine of the dielectric phase angle, or the sine of the dielectric loss angle.
dielectric puncture voltage See DIELECTRIC BREAKDOWN VOLTAGE.
dielectric rating The breakdown voltage, and sometimes the power factor, of the dielectric material used in a device, such as a relay, motor, or switch.
dielectric ratings Electrical characteristics of a dielectric material: breakdown voltage, power factor, dielectric constant, etc.
dielectric resistance See INSULATION RESISTANCE.
dielectric rigidity See DIELECTRIC STRENGTH.
dielectric-rod antenna A unidirectional antenna that uses a dielectric substance to obtain power gain.
dielectric soak See DIELECTRIC ABSORPTION.
dielectric strain The distorted internal state of a dielectric, caused by the influence of an electric field. Also called DIELECTRIC STRESS.
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dielectric wedge A wedge-shaped dielectric slug used inside a waveguide match.
dielectric wire A small dielectric waveguide that acts as a wire to carry signals between points in a circuit.
**differential-input amplifier** A differential amplifier whose output is proportional to the difference between the input signals—each applied between an input terminal and common ground.

**differential-input capacitance** In a differential amplifier, the capacitance that is the difference between the capacitances of the two input terminals.

**differential-input impedance** In a differential amplifier, the impedance between the input terminals.

**differential-input measurement** For a differential amplifier, a floating measurement made between the input terminals.

**differential-input rating** In an operational amplifier, the greatest difference signal that can be placed between the inputs while allowing proper operation.

**differential-input resistance** In a differential amplifier, the resistance between the input terminals.

**differential-input voltage** In a differential amplifier, the signal voltage presented to the floating input terminals.

**differential-input voltage range** In a differential amplifier, the range of signal voltages that can be applied between the differential input terminals without overdriving the amplifier.

**differential-input voltage rating** The maximum differential-input voltage that can be applied safely to a differential amplifier.

**differential instrument** A galvanometer or other meter in which results from the differential effect of currents flowing in opposite directions through two identical coils. Also see DIFFERENTIAL GALVANOMETER.

**differential keying** A system of break-in keying, in which all oscillators in the system are synchronized. A break or keying signal causes a key to change intermittently between two states. Either state may be used to send a particular code word. The system is typically used in radio telegraphy, telephony, or teleprinters.

**differential multiplexer** A multiplexer that selects both the high and low portion of the input signal.

**differential-alloy transistor** A semiconductor junction formed by diffusing a gas into a semiconductor at a high temperature that is below the melting point of the semiconductor. Typically, a gas containing an n-type impurity is diffused into p-type semiconductor material. Compare ALLOY JUNCTION.

**differential amplifier** A differential amplifier has two input terminals, each of which is independently connected to one of the two parts of the output signal. The output signal is the difference between the two input signals, and the output voltage is proportional to the difference between the input signals. Differential amplifiers are used in a variety of applications, including audio systems, where they are used to amplify the differences between the two input signals. They are also used in electronic circuits, where they are used to improve the accuracy of measurements.

**differential-wave field** A wave field that is characterized by a change in the phase or amplitude of the wave at two different points. Differential-wave fields are often used in the study of electromagnetic waves, where they can be used to describe the interaction between two waves. Differential-wave fields are also used in the study of sound waves, where they can be used to describe the interaction between two sound waves.

**differential-wound field** A field in a motor or generator, a field winding having series and shunt coils whose fields are opposing.

**differential-peak resistor** A resistor in which one of the two terminal leads is insulated from the other, so that the current through the resistor is not shared equally by the two leads.

**differential-resistor** A resistor in which one of the two terminal leads is insulated from the other, so that the current through the resistor is not shared equally by the two leads.

**differential-sound field** A sound field that is characterized by a change in the phase or amplitude of the sound at two different points. Differential-sound fields are often used in the study of acoustics, where they can be used to describe the interaction between two sound waves. Differential-sound fields are also used in the study of speech processing, where they can be used to describe the interaction between two auditory signals.

**differential-diffused-field** A sound field that is characterized by a change in the phase or amplitude of the sound at two different points. Differential-diffused-field fields are often used in the study of acoustics, where they can be used to describe the interaction between two sound waves. Differential-diffused-field fields are also used in the study of speech processing, where they can be used to describe the interaction between two auditory signals.
diffused transistor  A transistor in which one or both electrodes are created by diffusion. See DIFFUSED JUNCTION TRANSISTOR.

diffused-junction transistor  See DIFFUSED-BASE TRANSISTOR, DIFFUSED-MESA TRANSISTOR, and DIFFUSED TRANSISTOR.

diffusion  1. In the fabrication of semiconductor devices, the slow, controlled introduction of a material into the semiconductor, for example, the high-temperature diffusion of a n-type impurity from a gas containing it into a p-type wafer to form a diode. 2. The random velocity and movement of current carriers in a semiconductor, resulting from a high-density gradient. 3. The characteristic spreading of light reflected from a rough surface or transmitted through a translucent material. 4. The spreading-out of sound waves, for example when reflected from acoustic baffles. 5. The migration of atoms from one substance to another, as in the spreading of one gas throughout another.

diffusion bonding  A method of joining different substances by diffusing atoms of one into the other. This technique is employed in the manufacture of certain semiconductor diodes, transistors, and other devices.

diffusion capacitance  The current-dependent capacitance of a forward-biased semiconductor junction.

diffusion current  Current resulting from the diffusion of carriers within a substance (see DIFFUSION, 2).

diffusion length  In a semiconductor junction, the diffusion length is the distance a current carrier travels to the junction during its useful life due to diffusion.

diffusion process  1. The technique of processing semiconductor devices by diffusion (see DIFFUSION, 1): 2. Producing a high vacuum by means of diffusion (see DIFFUSION PUMP).

diffusion pump  A device with an efficient creation of a high vacuum in electron tubes and similar devices. In one form, the pump, in conjunction with a force pump, generates mercury vapor as the pumped medium. Gas molecules evaporated from the device diffuse into a chamber, where condensing mercury vapor traps and carries them off.

diffusion theory  The notion that, in a homogeneous medium, current density is directly proportional to the gradient of particle flux density.

diffusion transistor  A transistor whose operation is based principally on the diffusion of current carriers (see DIFFUSION, 2).

diffuser  In acoustics, a device or structure deliberately installed to spread sound waves throughout a region.

digital angle  A stylius angle of 90 degrees, relative to the surface of a phonograph disc. Compare DRAE ANGLE.

digital comparator  A digital device for comparing two digital values, one for each of the quantities A and B. A comparator that presents a digital readout.

digital control signal  A sequence of numerals that represent a measured value of a corresponding input signal. Device that can perform integration (see DIGITAL INTEGRATOR).

digital data  Information represented and processed in the form of combinations of 0 and 1, in the binary system.

digital delay circuit  A circuit that performs digital operations. 2. A logic gate.

digital device  A device that can resolve to several significant digits and often includes a fixed or floating radix point. Another advantage is the fact that there are no moving parts to wear out or be damaged by physical shock.

digital differential analyzer  Abbreviation, DDA. A device that performs digital operations.

digital display  A presentation of information (such as the answer to a problem) in the form of actual digits, as opposed to one in the form of, for example, a meter deflection. See, for example, DIGITAL ELECTRONICS.

digital electronic wattmeter  An electronic wattmeter providing a digital readout of measured values. Its levels or values vary over a continuous range.

digital electronic wattmeter  An electronic wattmeter providing a digital readout of measured values. Its levels or values vary over a continuous range. Also see DIGITAL INTEGRATOR.

digital frequency meter  A high-speed, electronic meter using high-speed electronic switching circuits and a digital readout. Such instruments are needed for frequencies from less than 1 Hz to many gigahertz.

digital HIC  A hybrid integrated circuit (HIC) designed for digital applications. Also see DIGITAL INTEGRATED CIRCUIT.

digital IC  See DIGITAL INTEGRATED CIRCUIT.

digital incremental plotter  A device that can draw, according to signals received from a computer, a plot of data describing problems to solutions. Also called a digital plotter.

digital information display  See DIGITAL DISPLAY.

digital integrator  A device that performs integration (see DIGITAL INTEGRATOR), in which increments in input variables, and an output variable, are represented by digital signals.

digital logic  A form of Boolean algebra, consisting of a combination, conjunction, or disjunction (in which the binary digit 1 has the value “true” and the binary digit 0 has the value “false” or vice versa). Logical system used.

digital logic module  A circuit that performs digital operations.

digital meter  A meter that produces a readout in discrete blocks or directly as numerals. The first, more primitive and less precise type, is known as a BAR METER. The second, more sophisticated type can resolve to several significant digits and often includes a fixed or floating radix point. This scheme eliminates the need for personnel to interpolate the reading on a scale. There is little chance for error on the part of the technician or engineer, because the readout is straightforward. Another advantage is the fact that there are no moving parts to wear out or be damaged by physical shock.

digital multiplex equipment  Equipment that accomplishes digital multiplexing or the reverse process, digital demultiplexing.

digital multiplexing  1. The combination of several or many digital signals into a single digital signal. 2. Also called digital multiplexing. The reverse process from that defined in 1, in which the original signals are obtained from the combination signal.

digital radar altimetry  A pump for fast, efficient creation of a high vacuum in electron tubes and similar devices.

digital radio或wire communication system  A system that utilizes digital techniques to enhance transmission of certain semiconductor diodes, transistors, and other devices.

digital signal  A signal that contains discrete levels or values, as opposed to signals whose levels or values vary over a continuous range. Also see DIGITAL ELECTRONICS.

digital signal processing system  A computer, graphs depicting solutions to problems.

digital signal representation  The use of digital signals to represent information as characters or numbers.
**digital signal** A signal having an integer number of discrete levels or values, as opposed to a signal whose levels or values vary over a continuous range.

**digital signal processing** A method of signal enhancement that operates by eliminating confusion between digital states. This improves dynamic range and frequency response, reduces the number of errors, and virtually eliminates noise. It is used extensively in digital communication and recording, often in conjunction with analog-to-digital (A/D) and digital-to-analog (D/A) conversion to enhance the quality of analog signals and recordings.

**digital signal** A signal having an integer number of discrete levels or values, as opposed to a signal whose levels or values vary over a continuous range.

**digital rotary transducer** A device that delivers a digital output signal proportional to the rotation of a shaft or other modulating device.

**Digital Satellite System** Abbreviation, DSS. Trade name for a satellite television (TV) system developed by RCA. The analog signal is changed into digital pulses at the transmitting station via analog-to-digital conversion. The digital signal is amplified and uplinked to a geostationary satellite. The satellite has a transponder that receives the signal, converts it to a different frequency, and downlinks it back to the earth. The downlink is picked up by a portable dish that can be placed on a balcony or patio, on a rooftop, or in a window. A tuner selects the channel that the subscriber wants to watch. The digital signal is amplified. If necessary, digital signal processing (DSP) can be used to improve the quality of reception under marginal conditions. The digital signal is changed back into analog form, suitable for viewing on a conventional TV set, via digital-to-analog (D/A) conversion.

**digit filter** A device for detecting designations. See DESIGNATION.

**digitize 1.** To express the results of an analog measurement in digital units. 2. To convert an analog signal into corresponding digital pulses.

**digital-to-analog conversion** Conversion of a digital quantity into an analog representation, such as shown by a performance curve. Compare ANALOG-TO-DIGITAL CONVERSION.

**digital transmission** A method of signal transmission in which the modulation occurs in defined increments, rather than over a continuous range. 2. A message that is sent in digital form.

**digital voltmeter** Abbreviation, DVM. An electronic instrument in which all of the characters lie in a single, flat plane.

**digital waveform** A waveform having a definite time interval between the start of one digital pulse and the start of the next pulse.

**digitizer** A display in which all of the characters lie in a single, flat plane.

**digiton** A pulse that energizes magnetic core memory elements representing a digit position in several words.

**dimension** The duration of a digit signal in a series of signals.

**dimmer** In digital communications, the interval of time assigned to one bit or one digit.

**digit-transistor box** In a digital computer, a main line (of conductors) that transfers information among various registers; it does not handle control signals.

**dielectric** A material capable of storing electrical energy when an electric field is applied to it. It consists of a medium (such as film) during the processing of that material.

**dimmer** An electronic device used for controlling the brightness of a lighted lamp. Using an amplified control, the device enables high-wattage lamp loads to be smoothly adjusted via a small rheostat or potentiometer. A photocell-type dimmer automatically controls lamps in accordance with the amount of daylight.

**dimmer curve** The function of a light-dimmer voltage output as a function of setting on a linear scale.

**DIN** Abbreviation for Deutsche Industrie Normen-gesellschaft. A German association that sets standards for the manufacture and performance of electrical and electronic equipment, as well as other devices.

**D indicator** In radar operations, an indicator combining type B and C indicators (see B DISPLAY and C DISPLAY).

**Dingley induction-type landing system** An aircraft landing system that provides lateral and vertical guidance; instead of radio, it uses the magnetic field surrounding two horizontal cables laid on or under either side of the runway.

**diode** A two-element device containing an anode and a cathode, and providing unidirectional conduction. The many types are used in such devices as rectifiers, detectors, peak clippers, mixers, modulators, amplifiers, oscillators, and test instruments.

**digit filter • diode-capacitor memory cell** A high-value capacitor in series with a high-back-resistance semi-
diode peak voltmeter A diode-type alternating-current (ac) voltmeter, in which the deflection of the direct-current (dc) milliammeter or microammeter is proportional to the peak value of the applied ac voltage.
diode probe A test probe containing a diode used as either a rectifier or demodulator.
diode recovery time The interval during which relatively high current continues to flow after the voltage across a semiconductor junction has been abruptly switched from forward to reverse. Recovery time is attributable to DIODE STORAGE.
diode rectifier 1. A diode device that converts alternating current (ac) to pulsating direct current (dc) in a power supply. 2. A small-signal diode device that drives ac to dc in the automatic gain-control (AGC) circuit of a superheterodyne receiver. Also called AGC rectifier.
diode resistor 1. A resistor usually connected to the output of a diode rectifier or diode detector. 2. A voltage-variable resistor utilizing the diode voltage regulator principle. See ZENER VOLTAGE REGULATOR.
diode voltage regulator A means of insulating an integrated-circuit chip from its substrate. The chip is surrounded by a pn junction, thus reverse-biased. This prevents conduction between the chip and the substrate.

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diode peak voltmeter • diode reception
diode reheater See DIODE HEAT TREATMENT.
diode rectification The process by which alternating current (ac) is rectified to direct current (dc) by diode action.
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diplexer transmission  The transmission of signals while receiving with the same antenna.

dip meter  A tunable radio-frequency (RF) instrument that, by means of a sharp dip of an indicating meter, indicates resonance with an external circuit. Specific names are derived from the active component used: grid-dip meter, gate-dip meter, etc.

dip needle  See INCLINOMETER.

dipolar  Also, bipolar. Possessing two poles (usually electric or magnetic).

dipolarization  See DEPOLARIZATION.

dipole  1. A pair of electrically opposite charge polars separated by a specific distance. 2. A pair of magnetically opposite poles separated by a specific distance. 3. See DIPOLAR ANTENNA. 4. See FOLDED DIPOLE.

dipole antenna  Also called dipole and doublet. A half-wavelength radiator fed at the center with a two-wire or coaxial transmission line. Each "leg" of the antenna is one-quarter wavelength long. Such an antenna can be oriented horizontally or vertically, or at a slant. The radiating element is usually straight. For a straight wire radiator, properly insulated at the ends and placed well away from obstructions, the length \( L_0 \) (in feet) at a design frequency \( f \) (in megahertz) is approximately

\[
L_0 = \frac{143}{f} \left( \frac{\lambda}{4} \right)
\]

The length \( L_0 \) (in meters) is close to \( L_0 = \frac{143}{f} \)

Because of its simplicity, this antenna is popular among shortwave listeners and radio amateurs, especially in areas below 10 MHz. A full-size antenna of this type has a feed-point impedance of approximately 73 ohms, purely resistive. Compare FOLDED DIPOLE.

dipole disk feed  A method of coupling radio-frequency energy to a disk-shaped antenna. The energy is applied to a dipole located adjacent to the disk.

dipole feed  A method of coupling radio-frequency energy to an antenna by means of a half-wave dipole. The dipole is directly fed by the transmission line, and the dipole radiates energy to the rest of the system.

dip oscillator  The oscillator that provides the signal for a dip meter.

**dia-**  Prefix 1. From Greek: "through" or "across," indicating opposition to electrical current. 2. From Greek: "direct," indicating a current that flows in the same direction.

dia-Is spoken of a DIP METER.

dipotassium tartrate  See DC SHORT.

dip needle  See INCLINOMETER.

dip pole  See DIRECT ELECTROMOTIVE FORCE.

dip polarity term  Abbreviation: DPT. An organic piezoelectric material.

dip coupling  A discrete electronic component that has been given a protective coating by dipping into a suitable material (such as oil, varnish, or wax) and draining off the surplus.

dipper  Collective term for resonance-type instruments, such as a DIP METER or DIP ADAPTER.

dip pulse  A switch or group of miniature switches mounted in a dual-inline package (DIP) for easy insertion into an integrated-circuit socket or printed-circuit board.

direct-access storage device  A computer memory in which data access time is unaffected by the data location. Also called random-access memory device.

**direct-**  Prefix 1. Directly connected, that is, without intermediaries between the two points of connection. 2. In computer science, a direct-access storage device.

direct addressing  See GRAPHIC RECORDER.

direct address  The actual address of a computer storage location (i.e., the one designated by a machine code 0). Also called absolute address or real address.

direct capacitance  The capacitance between two points in a circuit, as opposed to the capacitance between either point and other objects (including ground).

direct allocation  In digital computer operations, to specify the necessary memory locations and peripherals for a particular program when it is written.

direct coding  Computer programming in machine language.

direct control  Control of one machine by another, for example, the control of a computerized mobile telephone system by a central computer system.

direct-conversion receiver  A heterodyne receiver in which the incoming radio-frequency (RF) signal is amplified, then mixed with the RF output of a tunable local oscillator, producing an audio-frequency (AF) beat note. The AF is amplified; audio filtering can be added. Although the direct-conversion receiver somewhat resembles the superheterodyne type, it has no intermediate frequency (RF) chain, and does not normally provide single-signal reception. Also see ZERO-BEAT RECEPTION.

direct-coupled amplifier  An amplifier in which the output circuit of one stage is wired directly to the input circuit of the following stage (i.e., there is no intermediate capacitor or transformer). Such an amplifier can handle alternating-current (ac) or direct-current (dc) signals, and has wide frequency response.

direct-coupled transistor logic  Abbreviation: DCL. A type of computer architecture and switching circuit, a logic system using only direct-coupled transistor stages. See DC GENERATOR.

direct coupling  Direct connection of one circuit point to another for signal transmission (i.e., without intermediate capacitors or transformers). Because coupling devices aren't used, direct coupling provides transmission of direct-current (dc) signals, as well as alternating-current (ac) signals.

**direct-**  Prefix 1. Pertaining to electromagnetic ac-cessories for electronic equipment. 2. The transmission of power directly from a source (such as a motor) to a driven device without intermediate gears, belts, or clutches.

direct-drive robot  A robot that uses the minimum storage possible number of gears and other drive sys-
temas.

direct-drive torque motor  In a positioning or speed-control system, a servomotor connected directly to the driven load.

direct-drive tuning  A tuning or adjusting mechanism in which the shaft of the variable component (such as a potentiometer or variable capacitor) is turned directly by a knob (i.e., without gearing, dial cable, or similar linkage).

direct number  A number having a leading direction as well as magnitude; a vector quantity.

direct electromagnetic force  A direct-current (dc) voltage that does not fluctuate or pulsate.

dip needle  See INCLINOMETER.

direct ground  1. A ground connection made by the shortest practicable route. Compare INDIRECT GROUND. 2. An earth ground.
directed current A transient current induced in the same direction as the induction current when it is interrupted.

directing antenna See DIRECTIONAL ANTENNA.

direct-input circuit A circuit, especially an amplifier, whose input is wired directly to the input electrode of the active device (i.e., without a coupling capacitor or transformer).

direct-insert subroutine In digital computer operations, a subroutine directly inserted into a larger instruction sequence. It must be rewritten at every point it is needed.

direct instruction A computer program instruction that indicates the location of an operand in memory.

directional 1. Depending on direction or orientation. 2. Having a concentration in an identifiable direction. 3. Pertaining to a transducer in which radiation or sensitivity is concentrated in certain directions at the expense of radiation or sensitivity in other directions.

directional antenna An antenna that transmits and receives signals more effectively in some directions than in others. Also called beam, beam antenna, and directivity antenna.

directional 1. A directional antenna having a set of elements assembled in such a way that their combined action shapes the radiation into a unidirectional pattern. A group of antennas spaced and phased to produce unidirectional radiation and reception patterns.

directional beam 1. An antenna whose radiation or reception pattern strongly favors a specific direction. 2. The radiation or reception pattern of such an antenna.

directional characteristic The precise directional properties of an antenna or transducer.

directional Cq In amateur radio, a transmission that involves only stations in a certain direction or in a particular city, state, or country.

directional coupler A microwave device that couples an external system to waves traveling through the coupler in one direction.

directional diode A high-harmonic-semiconductor diode inserted into a direct-current control circuit. Permits unidirectional current flow.

directional filter In amateur current transmission, a filter that halves the frequency band, one half being for transmission in one direction, and the other half being for transmission in the opposite direction.

directional gain Symbol, G0. The ratio of the power that would be radiated by a loudspeaker if the free-space axial sound pressure were constant over a sphere, to the actual radiated power. Usually expressed in decibels.

directional horn A scheme for locating the source of a radio signal. An effort is made to keep the bearing of the target or guiding station constant. Therefore, the search path is as direct (as nearly a straight line) as practicable.

directional pattern See DIRECTIONIVITY PATTERN.

directional phase shifter A phase-shifting circuit in which the characteristics are different in one direction, as compared with the other direction.

directional power relay A relay that is actuated when the monitored power reaches a prescribed level in a given direction.

directional relay See POLARIZED RELAY.

directional response For any form of transducer, a radiation or sensitivity pattern that is concentrated in certain directions.

directional separation filter See DIRECTIONAL FILTER.

directional transducer A device that senses or emits some effect in an extent that depends on the direction from which the effect comes. Directional effects are often not accompanied by gain in the favored direction(s). Examples: directional microphone, directional speaker, and directional antenna.

directional variation of radio waves Changes in radio wave strength of waves that are dependent on the direction. There are various causes, including antenna directivity, ground characteristics, ionospheric effects, weather conditions, and the presence of obstructing objects.

directional wattmeter A device that can measure radio transmitter output power and can also give an indication of how well an antenna is matched to a transmission line. Such meters fall into two categories. One type has a single scale, calibrated in watts, and sometimes also in milliwatts or kilowatts (switch selectable). The meter reads either forward power or reflected power, depending on the position of a switch (dc) signal circuit or control circuit. Permits unidirectional current flow.

direction resolution 1. The smallest difference in azimuth at which a direction-finding device can detect. 2. The smallest angular separation between two targets that allows a radar set to show two separate echoes rather than a single echo.

directive In a computer source program, a statement directing the compiler in translating the program into machine language without being translated itself. Also called control statement.

directive antenna An antenna designed for best propagation or reception in one (often circular) direction.

directive gain For a directional antenna, a rating equal to 12.566(j0)/R, where R is the total radiated power per steradian in a given direction and Ps is the total radiated power.

directive horn A microwave antenna having the directivity usually of a unidirectional horn.

directivity 1. In an antenna, a directional response. 2. The degree to which the radiation or sensitivity of a transducer is concentrated in certain directions. 3. The angle between the half-power points of a directive antenna as measured on the azimuth plane. 4. In an antenna system, the ratio, in decibels, between the power in the favored direction and the power in the exact opposite direction; also called front-to-back ratio. 5. The forward power gain of an antenna, with respect to a dipole in free space. 6. The forward power gain of an antenna, with respect to an isotropic radiator in free space.

directivity diagram A graph of the radiation/response pattern of a beam antenna or other directional device, usually in a horizontal or vertical plane. Also see DIRECTIONIVITY PATTERN.

directivity factor 1. The ratio of the directivity of an antenna or transducer. 2. In acoustics, the ratio, in decibels, between the gain in the maximum direction and the gain in the minimum direction, for a transducer, such as a speaker or microphone.

directivity index 1. For an acoustic-emitting transducer, the ratio, in decibels, of E1 to E2.
direct resistance coupling

direct resistance coupling

direct scanning In television, the sequential viewing of parts of a scene by the camera—even though the entire scene is continuously illuminated.
direct scanning • discrete capacitor

direct serial file organization A technique of organizing files stored in a direct access device, in which a record can be chosen by number and amended where it is without altering other members of the file.
direct serial file organization

direct 2

direct scanning

direct sound wave A sound wave arriving directly from its source—especially a wave within an enclosure that is not altered by reflection.
direct sound wave

direct substitution 1. An exact component replacement. 2. Installing an exact component replacement.
direct substitution

direct synthesizer A device for producing random, rapidly changing frequencies for security purposes. A reference oscillator provides a comparison frequency; the output frequency is a rational-number multiple of this reference frequency.
direct synthesizer

direct voltage See DC VOLTAGE.
direct voltage

direct wave A wave that travels from a transmitter to a receiver without being reflected by the ionosphere or the ground. Compare SKYWAVE.
direct wave

direct Wiedemann effect Twisting force (torque) in a wire carrying current in a longitudinal magnetic field. Occurs because of interaction between the longitudinal field and the circular magnetic field around the wire.
direct Wiedemann effect

direct-writing instrument A device, such as a graphic recorder, that directly produces a permanent record (such as an ink trace) of the variations of a quantity.
direct-writing instrument

direct measurement Immediate measurement of a quantity, rather than determining the value of the quantity through adjustments of a measuring device (e.g., measuring capacitance with a capacitance meter, rather than with a bridge). Compare INDIRECT MEASUREMENT.
direct measurement

direct memory access Abbreviation, DMA. The transfer of data from a computer memory to some other location, without the intervention of the central processing unit (CPU).
direct memory access

direct scanning 1. In television, the sequential viewing of parts of a scene by the camera—even though the entire scene is continuously illuminated. 2. In magnetic recording, the sequential recording of data on a magnetic tape or disk. Compare DISK SCANNING.
direct scanning

direct wave

direct wave

direct writing telegraph 1. See PRINTING TELEGRAPH. 2. See TELAUTOGRAPH.
direct writing telegraph

directly heated thermistor A thermistor whose temperature changes with the surrounding temperature, and also as a result of power dissipation in the device itself. Compare INDIRECTLY HEATED THERMISTOR.
directly heated thermistor

directly heated thermocouple A thermocouple that is heated directly by signal currents passing through it. Compare INDIRECTLY HEATED THERMOCOUPLE.
directly heated thermocouple

direct memory access

directly heated thermistor

directly heated thermocouple

directly heated thermocouple

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The separation of energy at different wavelengths to pass through it at different speeds causes energy at different wavelengths to pass through a DISCRIMINATOR transformer in a DISCRIMINATOR. An ideal output device at the output of a receiver, its property of a material that is the minimum input-signal power that can be detected by an ideal output device at the output of a receiver, and the separation of a wave into its various component frequencies as when light is broken up into the color spectrum by a prism. The scattering of sound or ultrasound as it emanates from an acoustic source and the scattering of a microwave beam when it strikes an obstruction. The scattering of sound or ultrasound as it emanates from an acoustic source and the scattering of a microwave beam when it strikes an obstruction. 1. A change in the position of a point, particle, figure, or body. 2. The vector representing a change in the position of a point, particle, figure, or body. Movement of a member through a specified distance.

displacement current 1. The contri- buted. Also called LUMPED CAPACITOR. Compare DISTRIBUTED CAPACITANCE.
discrete circuit 2. A circuit comprised of discrete components, such as resistors, capacitors, diodes, and transistors, not fabricated into an integrated circuit. 3. A self-contained device that offers a specific electrical property in lumped form (i.e., concentrated at one place in a circuit, rather than being distributed). A discrete component is built especially to have a specific electrical property, and exists independently, not in combination with other components. Examples: disk capacitor, toroidal inductor, and carbon-composition resistor. Compare DISTRIBUTED COMPONENT.
discrete device 1. Any component or device that operates as a self-contained unit.
discrete element A discrete device that forms part of a larger system.
discrete inductor An inductive component that is entirely self-contained, rather than being electrically spread out. Also called lumped inductor. Compare DISTRIBUTED INDUCTANCE.
discrete information source 1. The scattering of sound or ultrasound as it emanates from an acoustic source and the scattering of a microwave beam when it strikes an obstruction. 1. A change in the position of a point, particle, figure, or body. 2. The vector representing a change in the position of a point, particle, figure, or body. Movement of a member through a specified distance.
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discrete information source 1. A source of data containing a finite number of individual elements, rather than a continuously variable parameter.
discrete part 1. See DISTRIBUTED COMPONENT. 2. See RESISTIVE COMPONENT. 3. A resistive component that is entirely self-contained, rather than being electrically spread out. Also called lumped resistor. Compare DISTRIBUTED RESISTANCE.
discrete sampling 1. Sampling of individual bits or characters, one or more at a time.
discrete thin-film component A discrete component produced by the thin-film process (e.g., thin-film capacitor, thin-film potentiometer, etc.).
discretionary wiring 1. A method of interconnecting the components and circuits on a semiconductor wafer for optimum performance. This requires a separate analysis and wiring pattern for every chip.
discrimination 1. Sharp distinction between electrical quantities of different value. 2. The detection of a frequency-modulated (FM) signal (i.e., the deviation of the frequency corresponding to the frequency or phase variations in the FM carrier). discriminator 1. A second detector for frequency-modulated (FM) signals, in which two diodes are operated from the center-tapped secondary of a special intermediate frequency (IF) transformer. The circuit is balanced for zero output when the instantaneous received signal frequency is at the unmodulated carrier frequency; the circuit delivers output when the instantaneous received signal frequency swings above or below the unmodulated carrier frequency. Also see POS- SIBLE SYMBOLOGY DISCRIMINATOR and TRAVIS DIS- CRIMINATOR.
discriminator transformer The special input transformer in a DISCRIMINATOR.
disk coil 1. See DISK WINDING.
disk dynamo A rudimentary direct-current (dc) generator in which a rotating disk rotates between the poles of a permanent magnet. The outer edge of the disk becomes positively charged; the center of the disk becomes negatively charged.
diskette A magnetic recording disk used for microcomputer data storage. housed in a square, flat case. In personal computing, there are two sizes: 5.25 inches square and 3.5 inches square. The 5.25-inch version is flexible and is sometimes called a floppy disk. Files an information-storage system in which data are recorded on rotating magnetic disks.
disk generator 1. See DISK DYNAMO. 2. A disk-type electrostatic generator.
disk memory A common misnomer for DISK STORAGE.
disk Operating System Abbreviation. DOS. Any of several command-driven operating systems commonly used in IBM-compatible personal comput- ers.
disk pack In disk files, a set of disks that can be handled as a single unit.
disk recorder A device for recording (and usually also playing back) sound or other signals on record disks.
disk record 1. Recording sound or other signals on disks. 2. A disk resulting from such a recording. See DISK.
disk rectifier A semiconductor rectifier (such as copper-oxide, selenium, magnesium-copper-sulfide, or germanium type) in which the active material is deposited on a metal disk.
disk rectance voltage The anode voltage at which the cathode of a gas tube begins to be stripped of its electron-emitting material. For safety and reasonable tube life, the anode voltage must be between the ionization and disintegration values.
disintegration voltage 1. The destructive breakdown of a material. 2. The stripping of a vacuum-tube cathode of its emissive coating (see DISINTEGRATION ELECTRODE). 3. The decay of radioactive mate- rial.
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discriminator transformer The special input transformer in a DISCRIMINATOR.
disk capacitor 1. A capacitor whose faces are deposited metal-film plates. 2. A capacitor whose faces are deposited metal-film plates. 3. A capacitor whose faces are deposited metal-film plates. 4. A capacitor whose faces are deposited metal-film plates. 5. A capacitor whose faces are deposited metal-film plates.
display mode 1. A particular method of presenting a display. For example, a character display on a video unit might consist of bright characters on a dark background, or dark characters on a light background. 2. An operating mode for a particular device, in which a display is used.
display module A self-contained unit with circuitry and readouts for indicating a numerical count.
display primaries Also called primary colors. In a color television receiver, the colors red, green, and blue. When mixed correctly, these three colors can produce any visible hue.
display-storage tube A special cathode-ray tube in which patterns and other information can be stored for later viewing. The tube has two electron guns: a writing gun and a reading (viewing) gun.
display unit A device that presents information for visual reading. Included are analog and digital cathodes, cathode-ray tubes, data printers, graphic recorders, etc. Also see DISPLAY CONSOLE.
display viability The ease with which a display can be read by an operator.
display window 1. In a panoramic display, the width of the presented frequency band in hertz. 2. The panel opening through which the indication of a display unit appears.
displayed part That portion of a number displayed in the readout of a calculator or computer. There might be digits that are not displayed, but which the machine might take into consideration when making calculations. For example, in a 10-digit calculator display, the number 212.004 might be displayed as 212.004000000. Depending on the calculator design, the machine might truncate (disregard) the undisplayed digits (148900), or take the undisplayed digits into account when making calculations.
disposable component A circuit component or machine part that is so inexpensive that it is more cost effective to discard it than to repair it when it fails.
dissipative discharge Sudden, heavy current flow through a dielectric material when it fails completely under electric stress.
dissipative tube A camera tube using a flat photocathode, upon which the image is focused by the lens system. Electromagnetic deflection from an external source. Electrons pass sequentially from the image cathode to a scanning tube at the opposite end of the camera tube. Functions: (1) electron dissector tube and (2) thiconoscope.
dissipative power The consumption of power, often without contributing to a useful end, and usually accompanied by the generation of heat.
distance mark On a radar screen, a mark indicating the distance from the radar set to the target.
distance-measuring equipment Also called ranging. A method or system that allows a robot to navigate in its environment. It also allows a central computer to track the locations of robots under its control. Can use radar, sonar, visible light, or infrared.
distance-measuring equipment In radionavigation, a system that measures the distance of the interrogator to a transponder beacons in terms of the transmission time to and from the beacon.
distance protection The use of a protective device within a specified electrical distance along a circuit.
distance relay In circuit protection, a relay that operates to remove power when a fault occurs within a predetermined distance along the circuit.
distance resolution 1. Qualitatively, the ability of a ranging system to differentiate between two objects or beacons that are almost, but not quite, the same distance away. See RANGING. 2. Quantitatively, the minimum radial separation of objects or beacons necessary for a ranging system to tell them apart. For two targets having the same azimuth bearing, the minimum distance in range for which a radar display renders them as distinct blips.
distant control See REMOTE CONTROL.
distant-core multiplier A frequency multiplier whose excitation signal is a peaked wave that has been predistorted to decrease the angle of flow in the device, thus increasing its efficiency.
distorted nonsinusoidal wave A nonsinusoidal wave whose ideal shape (square, rectangular, sawtooth, etc.) has been altered.
dissolution The condition that characterizes electrolytes (certain acids, bases, or salts in water solution) in which the molecules of the material break up into positive and negative ions.
distortion The unpleasant effect (especially in music) produced by nonharmonious combinations of sounds.
distortion meter A device used primarily to consume power, often without contributing to a useful end, and usually accompanied by the generation of heat. In an amplifier, the difference between the collector, drain, or plate input power and the usable output power.
dissipation constant For a thermistor, the ratio of the change in power dissipation to a corresponding change in temperature.
dissipation factor 1. For a dielectric material, the tangent of the dielectric loss angle. Also called loss tangent. 2. Symbol, \( D \). For an impedance (such as a capacitor), the ratio of resistance to reactance. \( D = \frac{R}{X} \). It is the reciprocal of the figure of merit (Q).
dissipation line A resistive section of transmission line, used for dissipating power at a certain impedance. Two parallel lengths of resistance wire are terminated by a large, noninductive resistor that has a voltage equal to the characteristic impedance of the line.
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distributions are often unintended, but they can be useful. Compare DISCRETE COMPONENT and LUMPED COMPONENT.
distributed constant See DISTRIBUTED COMPONENT and LUMPED COMPONENT.
distributed constant-delay line A delay line whose capacitance and inductance are distributed throughout the line. Compare LUMPED-CONSTANT DELAY LINE.
distributed inductance Symbol, Lm. Inductance that is dispersed throughout a system or component, rather than being lumped in one place, such as in a coil (e.g., the inductance of an antenna or capacitor).
distributed network 1. A network in which electrical properties (such as resistance, inductance, and capacitance) are distributed over a measurable interval, area, or volume. 2. A network whose characteristics do not depend on frequency within a given range.
distributed-parameter network A network composed of distributed components, rather than lumped components.
distributed pole In a motor or generator, a pole having a DISTRIBUTED WINDING.
distributed resistance Symbol, Rm. Resistance that is dispersed throughout a component or circuit, rather than being lumped in one place, such as in a resistor. An example is the high-frequency resistance of an antenna system.
distributed-shunt transformer A transformer having two closed cores that are perpendicular to each other.
distributed winding In a motor or generator, a winding that is placed in several slots (rather than in a single slot) under a pole piece.
distributing amplifier An amplifier having a single input and two or more outputs that are isolated from each other; it distributes signals to various points.
distributing cable 1. In cable television, the cable connecting the receiver to the transmission cable. 2. In power service, the cable running between a feeder and a consumer’s house.
distribution 1. The selective delivery of a quantity (e.g., power) distribution. 2. In statistical analysis, the number of times particular values of a variable appear. Also called frequency distribution.
distributing amplifier A low-output-impedance power amplifier that distributes a radio, television, or audio signal to a number of receivers or speakers.
distributing cable See DISTRIBUTING CABLE.
distribution center 1. The central point from which a signal is routed to various points of use. 2. In data communications, the point at which generation, conversion, and control equipment is distributed to strategic points of use.
distribution factor For a polyphase alternator, the factor by which the total voltage \( V_T \) can be determined in terms of the coil voltage \( V_c \) and the number of coils \( n \): \( V_T = nV_c \). Distribution factor \( k_d \) is defined in terms of the number of slots per phase per pole, and \( d \) is the angle between adjacent slots.
distribution function In statistical analysis, the function \( P(d) \) expressing the probability that \( F \) takes on any value less than or equal to \( d \).
distribution switchboard 1. A switchboard through which signals can be routed to or among various points. 2. A switchboard for routing electric power to points of use.
distribution transformer A step-down transformer used to supply low-voltage alternating current (ac) utility power to one or more consumers from a high-voltage line.
distributor 1. See COMMUTATOR. 2. A switching device consisting of a rotating blade and a number of contacts arranged in a circle. Accomplishes sequential switching of a voltage to a number of points in a circuit. A common example is the distributor in the ignition system of an automotive engine.
disturbance An undesired variation in, or interference with, an electrical or physical quantity.
disturbed one output In digital computers, the one output of a magnetic cell that has received only a partial write pulse train because it was last written into. Compare UNDISTURBED-ONE OUTPUT.
disturbed-zero output In digital computers, the zero output of a magnetic cell that has received only a partial write pulse train since it was last read from. Compare UNDISTURBED-ZERO OUTPUT.
dither 1. Vibrate; quiver. 2. The condition of vibration or quivering (e.g., the dither of a meter pointer). 3. To blend pixels in a digitized image to obtain various shades and colors.
divergence 1. The tendency of a collimated beam of energy to spread out. 2. The extent to which a collimated beam of energy spreads out, generally measured in seconds of arc, minutes of arc, angular degrees, or angular radians.
divergence loss Loss of transmitted sound energy, resulting from spreading.
diverging lens A lens having a virtual focus for parallel rays; generally a concave lens.
diversity reception Also called dual-diversity reception. A method of minimizing the effects of fading by using two separate, common communications at high frequencies (HF). Accomplished using two receivers whose antennas are 5 to 10 wavelengths apart. Each receiver, tuned to the same signal, feeds a common audio amplifier. The timing of the fading is different at the two antennas because of phasing effects. The composite signal, therefore, fades less than either of the component signals. Some diversity systems use three or more antennas and receivers to reduce the effects of fading even further; this is sometimes called multiple-diversity reception.
diversity transmission Also called dual-diversity transmission or multiple-diversity transmission. A scheme similar to DIVERSITY RECEPTION, except that the probability of transmission at each diversity receiver is greater than the product of the probabilities of transmission at each diversity receiver.
diverter-gate pole A well-regulated direct-current (dc) gate driver, whose shunt winding is on the main field pole, the series winding being on a diverter pole whose flux opposes that of the main pole.
divider Carrier modulation Modulation obtained by adding two identical frequency carriers that are 90 degrees out of phase.
divider circuit A parallel circuit.
divided equipment A system of modular electronic components interconnected with cables. A simple example is a radio receiver having an external power supply and internal loudspeaker.
divider probe A test probe that divides an applied signal voltage by some factor (such as 2, 5, or 10) to place it within the range of the instrument on which the probe is used.
dividing network See CROSSOVER NETWORK.
division 1. Separating a quantity into a number of equal parts, as indicated by the divisor. 2. Voltage divider. 3. See VOLTAGE DIVIDER. 4. Frequency division (see FREQUENCY DIVIDER). 4. Pulse-count division (see PULSE-COUNT DIVIDER).
division of vectors The quotient of two rectangles representing vectors determined by the principle of rationalization in algebra (i.e., by multiplying the numerator and denominator of a given division by the conjugate of the denominator, simplifying, and performing the division). 2. To find the quotient of two polar vectors; the quotient of their moduli and the difference of their arguments.
dj Abbreviation of direct current.
dk Abbreviation of dipotassium tartrate.
dk Abbreviation of direct-current (dc) generator, whose shunt winding is on the main field pole, the series winding being on a diverter pole whose flux opposes that of the main pole.
divide-by-seven circuit A three-stage binary circuit having feedback from stage three to stage one. Stage three is switched on by the fourth input pulse; at that time, the feedback pulse switches on stage one, simulating one input pulse and reducing the usual counting capacity from eight to seven.
divide-by-two circuit A circuit that delivers one output pulse for each two successive input pulses (i.e., a flip-flop).
dot • double buffering

 doubling. Compare DASH. 2. One of the small spots of red, green, or blue phosphor on the screen of a color-television picture tube or cathode-ray-tube (CRT) computer display. 3. A small spot of material alloyed with a metallic ribbon against the paper as it moves laterally across each line. Can be used to print text and/or graphics.

dot OR Externally connected circuits or functions whose combined outputs result in an OR function. Compare DOT AND.

dot pattern In computer television testing with a dot generator, dots of color (a red group, green group, and blue group) are produced on the screen. With overall beam convergence, the three groups blend to produce white.

dot-sequential system The television system in which the image is reproduced by means of primary color dots (red, green, blue) sequentially activated on the screen of the picture tube. Compare FIELD-SEQUENTIAL SYSTEM and LINE-SEQUENTIAL SYSTEM.

double-bridged mixer See BALANCED MIXER.
double-balanced modulator The output of which contains the product of the two modulating signals.
double-base diode A semiconductor diode having two anodes and one cathode.
double beam CRT See DUAL-BEAM OSCILLOSCOPE.
double-coil circuit tuning A circuit whose output and input are tuned separately. Such tuning provides increased selectivity when the input and output are resonant at the same frequency, and decreased selectivity when they are tuned to different frequencies. Also see DOUBLE-TUNED AMPLIFIER.
double circuit tuning See DUAL-CIRCUIT TUNING.
double clocking A phenomenon that occurs in some digital circuits when the input pulse is nonuniform, and appears as two pulses to the device. The device is thus actuated at twice the desired frequency.
double conversion 1. Two complete frequency conversions in a superheterodyne system. For example, the incoming signal might be converted to a 9.0-MHz first intermediate frequency (first IF), at a later stage, this signal might be converted to a 455-kHz second IF. The high first IF widely separates the signal from the image; the low second IF allows superior selectivity to be achieved at a reasonable cost. Also called dual conversion. 2. Pertaining to a superheterodyne receiver with two intermediate frequencies.
double-conversion receiver Also called double conversion superheterodyne. A superheterodyne receiver using DOUBLE CONVERSION to achieve optimum selectivity and image rejection.
double current generator 1. A dynamo-type generator supplying both alternating current (ac) and direct current (dc) from one armature winding. 2. A rotary converter operating on dc and delivering ac.
double-diode limiter A limiter in which two diodes are connected back to back in parallel, to limit both peaks of an alternating current (ac) signal.
double-doped transistor See GROWN-JUNCTION TRANSISTOR.
double diffused epitaxial mesa transistor A transistor in which a thin mesa crystal is overlaid on another mesa crystal. Also called epitaxial-growth mesa transistor.
double-machined transistor See DUAL-BEAM TRANSISTOR.
double-emitter limiter A limiter in which two diodes are in parallel, to limit both peaks of an alternating current (ac) signal.
double-tone generator A dynamo-type generator supplying both alternating current (ac) and direct current (dc) from one armature winding.
double-emitter diode See DOUBLE-EMITTER DIODE.
double-emitter diode limiter A limiter in which two diodes are in parallel, to limit both peaks of an alternating current (ac) signal.
double-ended amplifier See PUSH-PULL AMPLIFIER.
double-ended circuit A symmetrical circuit (i.e., one having identical halves), each operating on a half-cycle of the input signal. Example: a push-pull amplifier.
double-ended Zepp antenna A horizontal, collinear, center-fed antenna, in which each section measures 0.65 wavelength. This antenna gives increased gain over that of the Zepp and double Zepp (see DOUBLE ZEPP ANTENNA).
double-hump resonance curve A resonant response that is flattened by double tuning; it exhibits two separate peaks. Also see DOUBLE-TUNED AMPLIFIER.

double-hump wave See DOUBLE-PULSE WAVE.

double image television pictures, one usually fainter than the other. Caused by the signal being delayed by two different paths (one possibly attributable to reflection of the wave) and, hence, at different instants in time. The fainter image is called a GHOST.

double insulation The use of two layers of insulation on a conductor, made of different materials.

double ionization Ionization resulting from an electron colliding with an ion. In a gas, for example, a neutral atom might collide with an electron, which can knock an electron out of the atom. The atom then becomes a positive ion; it might in turn be bombarded by an electron, releasing still another electron.

double junction photovoltaic semiconductor See PHOTOTRANSISTOR.

double layer See HELMHOLTZ DOUBLE LAYER.

double local oscillator A mixer system in which a local oscillator generates two accurate radio-frequency (RF) signals separated by a fixed, high-frequency difference. The difference frequency is used as a reference.

double-make contacts A set of normally open contacts of which one closes against two others simultaneously. Compare DOUBLE-BREAK CONTACTS.

double-make switch A switch that closes a previously open circuit at two points simultaneously. Compare DOUBLE-BREAK SWITCH.

double modulation Using a modulated carrier to modulate another carrier of a different frequency.

double-play tape A thin magnetic recording tape that has approximately twice the playing time of the usual tape. Although the playing time is longer, double-play tape is more subject to jamming, and stretching to a standard thickness causes the tape to split.

double-pole Having two poles or switchable circuits (e.g., a double-pole switch).

double-pole, double-throw switch or relay Abbreviation, DPDT. A switch or relay having two contacts that can be closed simultaneously in one of two directions, or closed or open in two directions.

double precision The use of two computer words to represent a single number to gain precision.

double-pole, single-throw switch or relay Abbreviation, DPO. A switch or relay having one contact that can be opened in only one direction, or closed or open in one direction. A switch or relay having two contacts that can be closed in only one direction, to simulate two circuits.

double precision hardware Within a computer, arithmetic units permitting the use of double-precision operands, sometimes also accommodating floating-point arithmetic.

double-precision number In digital computer operations, a number represented by two words for greater precision.

double pulse reading Pertaining to a magnetic core in a computer memory, recording bits as two states held simultaneously by one core having two areas that can be magnetized with alternate polarities. For example, positive-negative could represent zero, and negative-positive could represent one.

double-pulse wave An alternating-current (ac) wave having two successive positive peaks followed by two successive negative peaks within each cycle. The output voltage of a varistor bridge has such a wave shape for an ac input.

double-pulsing station A foraminifer that transmits at two pulse rates upon receiving two pairs of pulses.

double-pumping A method of obtaining increased peak output power from a laser by pumping it for a comparatively long interval and then immediately pumping it for a short interval.

doubler 1. A circuit or device for multiplying a frequency by two. Compare FREQUENCY Doubler. 2. A circuit or device for multiplying a voltage by two. Compare VOLTAGE DOUBLER.

double probe A test probe that multiplies an applied signal voltage by two, so it can be handled more effectively by the instrument with which the probe is used.

double punching In perforating a punched card, putting two holes in one column; it is an error if it occurs in a field of a card that is part of a record.

double rail In mixer systems with two channels, each rail consists of two parallel channels. Each rail is associated with a single input circuit and a single output circuit or device. Compare DOUBLE CIRCUIT TUNING.

double reluctance A property of having separate armature windings for supplying two voltages, either of which can be direct (dc voltage) or alternating (ac voltage).

double-precision Arithmetic units permitting the use of double-precision operands, sometimes also accommodating floating-point arithmetic.

double-tuning A form of frequency-modulation (FM) discriminator with two resonant circuits. One is tuned slightly higher than the channel center frequency, and the other is tuned an equal amount below the center.

double-vue antenna A broadband, modified dipole antenna resembling two vees in line. Also see VEE ANTENNA.

double-winding generator A dynamo-type generator having separate armature windings for supplying two voltages, either of which can be direct (dc voltage) or alternating (ac voltage).

double-wye rectifier A thyrister, firing control using two rectifier diodes, each conducting for 120 degrees of the cycle. An interphase winding is used. The circuit is equivalent to two three-phase, half-wave rectifiers connected in parallel.

double-wye rectifier See DOUBLE-WYE RECTIFIER.

double-Zepp antenna A usually horizontal, straight, center-fed, full-wavelength antenna.
A retarding current, power, or voltage (see DRIVING CURRENT) on a moving body in contact with another moving body. The layer disappears at night.

In a multielement directive antenna, the element excited directly by the feeder, and the velocity distribution of the electrons.

A power amplifier stage that supplies signal energy to another device to ensure its proper operation (e.g., a current driver for a magnetic-core memory, an oscillator driving a loudspeaker).

A usually sudden dip in a performance curve. Compare UPTURN.

The effective radiated power (ERP) of a satellite.

A usually sudden dip in a performance curve. Compare UPTURN.

An oscillator that uses two field-effect transistors (FETs) in the circuit equivalent of a collector-coupled bipolar-transistor multivibrator. The drain of one stage is capacitance-coupled to the gate of the other stage.

drag magnet

A tire that moves a recording spring member.

drift field

The inherent internal electric field of a DRIFT-FIELD TRANSISTOR.

A pin used to prevent a record from slipping on the rotating turntable of a recorder or reproducer. It is similar to, and located near, the center pin of the turntable.

In a television receiver, the potentiometer used to adjust the ratio of horizontal pulse amplitude to the level of the linear portion of the sawtooth scanning current wave.

In a multielement directive antenna, the element excited directly by the feeder, and the velocity distribution of the electrons.

A set of two or more hard-disk drives in a rotating drum in which the repositioning of the recording spot.

In a vacuum tube, a space that is nearly free of alternating-current (ac) fields from the outside, and in which the repositioning of the recording spot.

In superheterodyne conversion, to down convert a signal from an active communications satellite.

A continuous belt used to transmit mechanical energy from a driving pulley to a driven pulley.

A device that moves a recording medium (e.g., tape drive and diskette drive).

A usually sudden dip in a performance curve. Compare UPTURN.

A set of two or more hard-disk drives in a rotating drum in which the repositioning of the recording spot.

A usually sudden dip in a performance curve. Compare UPTURN.
driver impedance 1. The output impedance of a driver stage. 2. The impedance "seen" from the driver stage of an amplifier, through the driver transformer, to the driver stage. It is the vector sum of driver resistance and reactance.

driver inductance In an amplifier's driver transformer, the inductance, as "seen" looking through the transformer from the driven stage into the driver stage.

driver resistance In an amplifier's driver transformer, the resistance "seen" looking through the transformer from the driven stage into the driver stage.

driver stage An amplifier stage whose chief purpose is to supply excitation (input-signal current, power, or voltage) to the next stage. Also see DRIVER.

driver transformer The transformer that couples a driver stage to a driven stage. Example: the interstage transformer inserted between the collector of a single-ended driver transistor and the two bases of a push-pull output stage in an audio amplifier.

driving current In a power amplifier, the input signal current required to produce a given amount of output power.

Driving-point admittance The reciprocal of DRIVING-POINT IMPEDANCE.

Driving-point impedance The input impedance of a network.

driving point In a power amplifier, the input signal power required to produce a given amount of output power.

drive wire The wire forming the coil around the toroidal cell in a magnetic core memory; supplies pulses to the cell.

driving-range potential In cathodic protection, the difference of potential between the anode and (protected) cathode.

driving signal 1. Drive (see DRIVE, 2). 2. In television, a signal (line frequency pulses and field-frequency pulses) at the pickup location.

driving spring In a stepping relay, the spring that moves the wiper blades.

Driving voltage In a power amplifier, the input signal voltage required to produce a given amount of output power.

DROP Abbreviation of DIGITAL READOUT.

drone A pilotless radio-controlled aircraft without a human pilot.

drone cone An undriven loudspeaker cone that is mounted in a bass-reflex enclosure with other speakers. Also called PASSIVE DIAPHRAGM.

drop 1. The output in the graph of a function. 2. In a pulse train, the decrease in mean amplitude (in percent of maximum amplitude) at a given instant after attainment of maximum amplitude.

drooping radials In a ground-plane antenna, radials that slope downward to provide a transmission-line impedance match. The slope angle depends on the characteristic impedance of the line; typically, the angle is between 45 degrees and 70 degrees, relative to horizontal.

drop 1. In wire communications, the line connecting a telephone cable to a subscriber's building. 2. See VOLTAGE DROP.

drop bar A device that automatically grounds or short-circuits a capacitor when the door of a protective enclosure is opened.

drop cable See DISTRIBUTING CABLE, 1.

drop channel In a communications system utilizing several channels, a channel that is not used.

drop-in The unintentional creation of bits when a magnetic storage device is being read from the written into. Compare DROP-OUT, 4.

drop indicator In a signaling system, such as an annunciator, a hinged flap that drops into view when the signaling device is actuated.

drop-out 1. The opening of a relay or circuit breaker. 2. In digital computer operations, variation in signal level of the reproduced tape-recorded data. Such variation can result in errors in data reproduction. 3. In the production of monolithic circuits, a special image placed at a desired point on the photomask. 4. Digit loss during a read or write operation involving a magnetic storage device.

dropout current See DROPOUT VALUE.

dropout power See DROPOUT VALUE.

dropout value The level of current, power, or voltage at which a device, such as a circuit breaker or relay, is released.

dropout voltage See DROPOUT VALUE.

dropout resistors A family of resistors providing a voltage reduction equal to the voltage drop across itself. For example, a 1000-ohm resistor in series with a 45-V battery, and carrying a current of 10 mA, will provide a voltage reduction equal to 10 V (IR = 0.01 x 1000 = 10 V), thus dropping the 45 V to 35 V.

drop relay In a telephone system, a relay that is actuated by the ringing signal. The relay is used to switch on a buzzer, light, or other device.

drop repeater A repeater intended for a terminus of a communications circuit in a telephone system.

droopingsonde A parachute-supported radiosonde dropped from a high-flying aircraft.

drums 1. A rotating cylinder coated with a magnetic material on which digital information can be recorded in the form of tiny magnetized spots. These spots are read as the drum rotates under pickup heads, or erased when the stored information is no longer needed. 2. In some graphic recorders, facsimile receivers, etc., a rotating cylinder carrying the recording sheet.

drum capacitor See CONCENTRIC CAPACITOR.

drum controller The device that regulates the recording process on a drum memory.

drum mark On a track of a magnetic drum, a character that signifies the end of a character group.

drum memory In digital computers, a memory based on a magnetic drum (see DRUM, 1). They have been largely replaced in recent years by electronic random-access memory, in the form of integrated circuits (ICs) and/or PCMCIA standard adapter cards.

drum parity The degree of accuracy in a drum recording/reproducing system.

drum programmer A device for sequencing operations. Its heart is a rotating drum, around whose surface contacts or points can be placed to activate or terminate operations at selected times.

drum receiver A facsimile receiver using recording paper or photographic film wound around a revolving drum.

drum recorder A graphic recorder in which the record sheet is wound around a rotating drum.

drum resistance 1. A resistor consisting of a hollow cylinder of resistive material. Such a resistor can be cooled by circulating air or liquid through the cylinder.

drum speed The speed, usually measured in revolutions per minute, of a rotating drum in a graphic recorder, facsimile transmitter, or facsimile receiver.

drum storage The storage of data as magnetic impulses on a cylindrical, or drum-shaped, medium. Largely supplanted in recent years by magnetic disks, optical disks, and magnetic tapes.

drum switch A sequential switch whose contacts are pins or teeth placed at points around the outside of a revolving drum.

drum transmitter A facsimile transmitter in which the sheet bearing the material to be transmitted is wound around a revolving drum.

drum-type controller A motor-driven drum switch arranged to time various operations through sequential switching.

drum variator A variator that is a hollow cylinder of nonlinear resistance material. This variator can be cooled by circulating air or liquid through it.

drum winding In a motor or generator, an armature whose coils are wound on the core, the two branches of a turn lying under adjacent poles of opposite polarity.

drunkometer An instrument for testing the extent of alcoholic intoxication. It electronically measures blood alcohol content through analysis of the subject's breath.

dry In an electric cell, a term used to describe an electrolyte that is in a semiliquid or solid state.

dry battery A battery of dry cells.

dry cell 1. A Leclanche primary cell in which the positive electrode is carbon, the negative electrode is zinc, and the electrolyte is a gel of ammonium chloride and additives. Also see CELLS and PRIMARY CELL, 2. A cell whose electrolyte is a gel or paste.

Dry circuit A circuit in which the maximum voltage is 50 mV and the maximum current 200 mA.

dry contact Contacts that neither make nor break a circuit.

dry-disk rectifier A solid-state rectifier, such as a copper-oxide, magnesium-copper-sulfide, or selenium type, that consists of a metal disk coated with a semiconductor material. The name was originally used to distinguish this rectifier from the wet electrolytic rectifier.

dry electrolytic capacitor An electrolytic capacitor whose electrolyte is a paste or solid. Compare WET ELECTROLYTIC CAPACITOR.

dry flashover voltage The breakdown voltage between electrodes in dry air when all insulation is clean and dry.

214 driver impedance • dropsonde

215 drop-tracks • dry flashover voltage

drop-tracks The tracks of radioactive particles made visible by moisture in an ionization chamber.

drop wire A wire that runs from a building to a pole (for line extension) or to a cable terminal (for cable extension).

Driver 1. A rotating cylinder coated with a magnetic material on which digital information can be recorded in the form of tiny magnetized spots. These spots are read as the drum rotates under pickup heads, or erased when the stored information is no longer needed. 2. In some graphic recorders, facsimile receivers, etc., a rotating cylinder carrying the recording sheet.

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Dry electrolytic capacitor An electrolytic capacitor whose electrolyte is a paste or solid. Compare WET ELECTROLYTIC CAPACITOR.

Dry flashover voltage The breakdown voltage between electrodes in dry air when all insulation is clean and dry.
dry pile A voltage battery containing numerous disks silivered or tinned on one face and covered with fine dusts on the other.
dry read A metal contact, generally used as a relay or switch, that moves toward or away from another fixed contact under the influence of a magnetic field.
dry-reed relay See DRY-REED SWITCH.
dry-reed switch A switch consisting of two thin, metallic strips (reeds) hermetically sealed in a glass tube. The tube is surrounded by a coil of wire. When a current flows in the coil, a magnetic field affects the reeds. In the normally open dry-reed switch, the magnetic field causes the reeds to come together and close the circuit. In the normally closed dry-reed switch, the magnetic field causes the reeds to separate, opening the circuit. Compare MERCURY-WETTED REED RELAY.
dry run 1. The preliminary operation of equipment for testing and appraisal. Such a procedure precedes putting the equipment into regular service. 2. A step-by-step, paper-and-pencil “run” of a computer program before it is machine-implemented.
dry shelf life The life of a battery cell stored without electrical use.
dry-transfer process A method of transferring printed patterns to circuit label film sheets by rubbing them onto the substrate or panel.
dry-type forced-air-cooled transformer A DRY-TYPE TRANSFORMER that is cooled by air circulated by a blower or fan. This increases the amount of power that the transformer can safely handle.
dry-type transformer A DRY-TYPE TRANSFORMER that is cooled by natural air circulation (convection), without the use of a blower or fan.
dry-type transformer A transformer that, rather than being immersed in oil, is cooled entirely by the circulation of air.
DSS Abbreviation of DUTY CYCLE.
DSSC Abbreviation of DOUBLE-SIDEBAND SUPRESSED CARRIER. Also abbreviated DSSC.
DT Abbreviation of DATA TRANSMISSION.
DTA Abbreviation of differential thermanalysis.
DT-cut crystal A piezoelectric plate cut from a quartz crystal at an angle of rotation about the z-axis of 53 degrees. It has a zero temperature coefficient of frequency at approximately 30 degrees Celsius. Also see CRYSTAL AXES and CRYSTAL CUTS.
DTL Abbreviation of DUO-TRANSCRIBER LOGIC.
DTP Abbreviation of DUTY TENDED.
DU Abbreviation of DUTY CYCLE.
dual 1. Pertaining to a combination of two components such as diodes, transistors, etc., in a single housing. The components are often carefully matched. Compare QUAD. 2. Pertaining to a device or circuit that behaves in a manner analogous to that of another operating with component and parameter counterparts. Thus, a current amplifier can be the dual of a voltage amplifier; a series-resonant circuit, the dual of a parallel-resonant circuit; or a field-effect transistor, the dual of a bipolar transistor.
dual-beam CRT A cathode-ray tube having two separate electron guns, for use in a dual-beam oscilloscope.
dual-beam oscilloscope Also called dual-trace oscilloscope. An oscilloscope having two electron guns and deflection systems; it can display two phenomena on the screen simultaneously for comparison.
dual capacitor 1. Two fixed capacitors combined in a single housing, sometimes sharing a common capacitor plate. 2. A two-section, ganged variable capacitor.
dual-channel amplifier An amplifier having two separate, independent channels [e.g., a stereo high-fidelity audio amplifier].
dual-cone speaker A cone speaker designed for a wide range of audio frequencies. One cone responds to the low (bass) and midrange audio frequencies, and a smaller cone responds to the treble (high) audio frequencies.
dual diode A discrete component consisting of two diodes in one package.
dual-diversity receiver A receiver or receiver system for DIVERSITY RECEPTION.
dual-diversity reception See DIVERSITY RECEPTION.
dual-emitter transistor A low-level silicon npn or pnpn transistor of the planar passivated epitaxial type; it has two emitter electrodes.
dual-frequency calibrator A secondary frequency standard providing two fundamental test frequencies [e.g., 100 kHz and 1 MHz].
dual-frequency induction heater An induction heater whose work coil carries energy of two different frequencies. The coils heat the work either simultaneously or successively.
dual gate 1. A digital integrated circuit (IC) consisting of two logic gate units. 2. Pertaining to a field-effect transistor (FET) with two gates or gate electrode connections.
dual-gate FET A field-effect transistor with two gate (input) electrodes.
dual-gate MOSFET A dual-oxide-semiconductor field-effect transistor (MOSFET) with two gate (input) electrodes.
dual-inline package Abbreviation, DIP. A flat, molded integrated-circuit (IC) package having terminal pins along both long edges.
dual-local oscillator See DOUBLE LOCAL OSCILLATOR.
dual meter A meter having two meter movements and scales in a single case; the arrangement permits simultaneous monitoring of two quantities.
dual modulation The modulation of a single carrier or subcarrier by two different types of modulation—each carrying different information.
dual network A network that is the dual of another network having complementary parameters. For example, a common-emitter, current-sensitive, bipolar-transistor circuit is the dual of a common-source, voltage-sensitive, field-effect-transistor (FET) circuit. Also see DUALITY.
dual operation In digital logic, the operation resulting from inverting all of the digits. Every 1 is replaced with a 0, and vice versa.
dual output power supply A power supply with two outputs. Often, one output is positive and the other is negative. In some cases, one output consists of alternating current (ac) and the other consists of direct current (dc).
dual pickup In disk reproduction, a pickup having two stylus, one for large-groove records and one for fine-groove records.
dual potentiometer A ganged assembly of two potentiometers. The resistance values might or might not be the same.
dual preset counter A preset counter that will set any type of decimal numbers.
dual rail See DOUBLE RAIL.
dual resistor See DUAL POTENTIOMETER and/or DUAL RHEDOSTAT.
dual-speaker A ganged assembly of two reproducers. The resistance values might or might not be the same.
dual stereo amplifier 1. A two-channel audio amplifier for stereophonic audio applications. 2. A two-channel linear integrated circuit (IC) for stereo amplification and reproduction.
dual-system loudspeaker See TWO-WAY SPEAKER.
dual trace In a cathode-ray oscilloscope, the use of two separate electron beams, which can show two different signals simultaneously on a single screen.
dual-trace recorder See DOUBLE-TRACK RECORDER.
dual-track recorder See DOUBLE-TRACK RECORDER.
dual use In digital computer operations, updating two sets of master files simultaneously.
DSSC Abbreviation of DOUBLE SIDEBAND.
Dry pile • dual-cone speaker
ducat 1. A narrow propagation path, sometimes traveled by microwaves, created by unusual atmospheric conditions. 2. A pipe or channel for cables and wires.
dubbing The adding of sound to a recorded magnetic tape, record disk, or film (e.g., replacing the sound track of a film in one language with that of another language.dubnium Symbol, Db. Also called unnilpentium (Unp) and unnilium (Ha). Atomic number, 105. The most common isotope has atomic weight 262. Classified as a transition metal. It has a half-life on the order of a few seconds to a few tenths of a second (depending on the isotope), is human-made, and is not known to occur in nature.
duct 1. A narrow propagation path, sometimes traveled by microwaves, created by unusual atmospheric conditions. 2. A pipe or channel for cables and wires. 3. An opening, vent, or other space for passing purposes, such as cooling and acoustic wave transmission.
duct effect see TROPOSPHERIC DUCTING
ducting The confinement of a radio wave to a duct (see DUCT, 1) between two layers of the atmosphere or between an atmospheric layer and the earth.
dudarell A carbon copper arc circuit that produces audible continuous waves. Consists of a series inductance-capacitance (LC) circuit shunting an electric arc.
Duerdoth's feedback system In an amplifier, feedback through several paths to improve response over that afforded by single-path feed-
back. In a simple application of multiple feedback, a single external loop is augmented with unby-passed emitter resistors in the amplifier stages.
Duerdoth's stability margin A feedback-amplifier stability margin equal to a 4-6 dB increase in gain at low and high frequencies over beta values between 0.3 and somewhat less than 2. For higher beta values, Duerdoth adopts an angular margin (for example, 15°); below β = 0.3, no danger of instability is present.
dummy 1. A nonoperative model of a piece of equipment, usually assembled with dummy components (see DUMMY COMPONENT, 1) for the purpose of developing a layout. 2. DUMMY ANTENNA, DUMMY COMPONENT, or DUMMY LOAD. 3. Part of a computer program that, rather than being useful for the problem at hand, only serves to satisfy some other format or logic requirement.
dummy antenna 1. A nonradiating device that serves as a load for a transmitter (i.e., it takes the place of the regular antenna during tests and adjustments of the transmitter). 2. A device containing a network of discrete inductive, capacitive, and resistive elements, inserted between a radio-frequency signal generator and receiver to simulate a standard antenna.
dummy component 1. A nonoperative component used in developing a layout or package. 2. A nonoperative component fraudulently included in a piece of equipment (e.g., an unwired transistor in a receiver circuit, a common occurrence during the early days of the transistor, when a 10-transistor radio brought more money than an 8-transistor radio, without regard to the circuit itself).
dummy instruction In a computer, a command that serves no operational purpose, other than to fill a format requirement.
dummy load 1. A load device, usually consisting of resistance without reactance, used to terminate a power generator or power amplifier during adjustments and tests. The load resistance is equal to the output impedance of the generator or amplifier.
dummy resistor A power-type resistor used as a dummy load.
dump 1. In digital-computer operations, to transfer, completely or partially, the contents of memory into a peripheral. 2. To switch off all power to a computer, deliberately or accidentally, thereby losing what is in the volatile memory.
dump and restart During a computer program run, to backtrack to the last dump point and use the data there to resume the run. Also see DUMP POINT.
dump check In digital-computer operations, the checking of all digits being transferred (see DUMP, 1) to prevent errors when they are re-transferred.
dumping To transfer the output at various stages in a computer program run to an external storage medium so that it will be available (in case of a failure) for the program’s resumption from a point other than at the beginning.
dumping resistor 1. See BLEEDER. 2. A resistor having the minimum resistance permissible in a given situation. Used to discharge a capacitor, it acts to provide an alternative path to a potentially destructive short circuit.
duo Any pair of matched components, usually in a single package.
duosonic CRT base The 12-pin base of a cathode-ray tube. Also see BIDECAL, DIMEPTAL, and MAGNAL.
duosonic socket A 12-pin tube socket. Also see DUODECAL CRT BASE.
duosonic number system A number system in which the radices also called the base or modulus, is 12. The system uses the digits 0 through 9, plus two other characters (usually A and B) to represent 10 and 11. Thus, counting proceeds as 0, 1, 2, . . . , 9, A, B, 10, 11, 12, . . . , 19, 1A, 1B, 20, 21, 22, etc. At one time, some people seriously proposed that this system replace the DECIMAL NUMBER SYSTEM for general use.
duosonic See DUAL DIODE.
duolateral coil A multi-layer, lattice-wound coil (see UNIVERSAL WINDING) in which the turns in the successive layers are staggered slightly. Also called honeycomb coil.
duplex A two pole all-pass device.
duplex 1. A mode of communication in which two channels are used so that either operator in a conversation can interrupt the other at any time. 2. The transmission of two messages over a single circuit. See DUMMY ANTENNA, at the same time.
duplex artificial line A nonradiating device that serves no operational purpose, other than to satisfy some other format or logic requirement.
duplex cable A cable consisting of a twisted pair of insulated stranded-wire conductors.
duplex channel A channel used for wired or wireless DUPLEX OPERATION.
duplex communication See DUPLEX OPERATION.
duplex diode See DUAL DIODE.
duplexer In radar communications, a device operated by the transmitted pulse to automatically switch the antenna from the receiver to the transmitter.
dumping•dust cover219
dumping • dust cover
or noise. It is usually expressed in decibels. 2. In a communications receiver, a measure of the ability to receive both weak and strong signals without excessive noise, distortion, desensitization or other undesirable effects. It is expressed in various ways, typically in decibels. 3. The ratio between the loudest and faintest sounds, or between the strongest and weakest signals, encountered in a given environment or situation. It is usually expressed in decibels.

dynamic rectifier tester An instrument that displays the response curve of a rectifier on a calibrated oscilloscope screen. During the test, the rectifier receives an alternating-current (ac) voltage with a low positive peak and high negative peak, both corresponding to the rated forward and reverse voltages (respectively) of the rectifier. The horizontal axis of the screen indicates voltage, the vertical axis indicates current, and zeros for both quantities are at center screen.

dynamic regulation In an automatically regulated system, such as a voltage-regulated power supply, the transient response of the system. Dynamic regulation is determined from maximum overshoot and recovery time when the load or line value is suddenly changed.

dynamic regulator A circuit or device providing dynamic regulation.

dynamic reproductor 1. See DYNAMIC MICROPHONE. 2. See DYNAMIC PICKUP. 3. See DYNAMIC SPEAKER.

dynamic resistance See DYNAMIC IMPEDANCE.

dynamic run See DYNAMIC CHECK. 1. See also DYNAMIC DEBUGGING.

dynamics The study of bodies, charges, fields, forces, or pulses in motion. Compare STATICS.

dynamic sequential control In digital computer operation, the computer’s changing the sequence of instructions during a run.

dynamic source current See AC SOURCE CURRENT.

dynamic source resistance See AC SOURCE RESISTANCE.

dynamic source voltage See AC SOURCE VOLTAGE.

dynamic spatial reconstructor Abbreviation, DSR. An advanced x-ray machine, developed at the Mayo Clinic, that displays organs in three-dimensional views in motion, and allows them to be electronically dissected without actually operating on the patient.

dynamic speaker A loudspeaker in which a small coil (voice coil), attached to a diaphragm or cone and carrying an audio-frequency signal current, moves back and forth in a permanent magnetic field and, accordingly, causes the diaphragm or cone to vibrate (emit sound). Compare MAGNETIC SPEAKER.

dynamic stability A measure of the ability of a robot to maintain its balance while in motion.

dynamic stop As caused by a computer program instruction, a loop indicating the presence of an error.

dynamic storage See DYNAMIC MEMORY.

dynamic subroutine A form of computer subroutine that allows the derivation of other subroutines in various forms.

dynamic test See DYNAMIC CHECK.

dynamic transconductance Transconductance determined from alternating-current (ac) signal parameters, rather than from direct-current (dc) parameters.

dynamic transducer A coil-and-magnet device that converts mechanical vibration into electric currents, or vice versa. Common examples include most microphones, headphones, and loudspeakers.

dynamic transfer characteristic An input-output characteristic determined with respect to the load of a transfer device. Also see DYNAMIC CHARACTERISTIC.

dynamic transistor tester 1. An instrument for checking the alternating-current (ac) gain of a transistor, rather than its direct-current (dc) beta. 2. An instrument for determining the condition of a transistor from its performance in a simple oscillator circuit. 3. An instrument that displays a transistor response curve, or a family of such curves, on a calibrated oscilloscope screen. Also see DYNAMIC DIODE TESTER and DYNAMIC RECTIFIER TESTER.

dynamo A mechanical generator of electricity, typically a rotating machine.

dynamo-electric machinery Rotating electric machinery. Examples: amplidyynes, generators, dynamos, rotary converters.

dynamometer 1. See ELECTRODYNAMOMETER. 2. A device for mechanically measuring the output power of a motor.

dynamometer ammeter See ELECTRODYNAMOMETER.

dynamometer voltmeter See ELECTRODYNAMOMETER.

dynamophone A dynamometer (see DYNAMOMETER, 2) that uses two telephone circuits to measure the twist of a shaft.

dynamostatic machine A machine driven by alternating-current (ac) or direct-current (dc) power for the generation of static electricity.

dynamotor A usually small self-contained motor-generator. The motor and generator portions are enclosed in a common housing, giving the machine the appearance of a simple motor.

dynaquad A ppn four-layer semiconductor device with three terminals, similar to the silicon-controlled rectifier or thyristor.

dynatron A form of vacuum tube that displays a negative-resistance characteristic, resulting in oscillation at ultra-high and microwave frequencies.
A circular orbit has eccentricity zero. As the orbit extends, the path differs from a circle. A quantitative expression for the extent to which the orbit deviates from a perfect circle, the eccentricity increases. When the eccentricity reaches 1, the object takes a parabolic path through space. If the eccentricity exceeds 1, the path is a hyperbola.

**ECC** Abbreviation of ELECTRONIC COUNTER-COUNTERMETERS.

**ECDC** Abbreviation of electrochemical diffused collector.

**ECG** Abbreviation of electrocardiogram. (Also, EKG.)

**Echelon** 1. A level of calibration accuracy. The highest echelon being the national standard for the particular measurement involved. 2. A level of maintenance in which lower ordinal numbers refer to tasks requiring progressively higher skills and technological expertise.

**Echelon grating** A diffraction grating with extremely high resolution. Generally useful only over a small range of wavelengths.

**Echo** 1. A signal that is reflected back to the point of origin. 2. A reflected or delayed signal component that arrives at a given point behind the main component. 3. A radar blip, indicating an object or thumbsdown. 4. Reflection of the signal on a telephone line, caused by improper impedance matching, or by overload of the system by too many subscribers attempting to use the system at the same time. 5. In audio systems, a circuit that causes sounds to repeat one or more times, at intervals ranging from a fraction of a second to several seconds. 6. The effect produced by a circuit, as defined in 5.

The extent to which the orbit or path of a satellite differs from a circle. A circular orbit has eccentricity zero. As the orbit becomes elliptical and deviates more and more from a perfect circle, the eccentricity increases.
echo area 

The area of a target that will return a radar signal as an echo.

echo attenuation 

The reduction in signal strength caused by absorption or scattering in the transmitted energy entering the box, which retransmits it to the receiver.

echo box 

A resonant-cavity device used to test a radar receiver by the transmitted energy entering the box, which retransmits it to the receiver.

echo chamber 

A reverberation chamber, electronic recording device, or room for acoustic tests or for simulating sonic delays.

echo check 

In data communication, a means of checking the accuracy of received data by sending it back to the transmitting station for comparison with the original data.

echo depth sounder 

See ACOUSTIC DEPTH SOUNDER.

echo eliminator 1. A device that quiets a navigational instrument after receipt of a pulse, to prevent reception of a subsequent, delayed pulse. 2. In a two-way telephone circuit, a voice-operated device that suppresses echo currents caused by conversation currents going in the opposite direction.

echoencephalograph 

An ultrasonic medical instrument that allows viewing of internal organs. Used for diagnostic purposes in certain situations, instead of the X-ray machine.

echogram 

In acoustics, a graph of the sound decrement in an enclosure. Abbreviation: ECH.

echo intensifier 

A device used at a radar target to boost the intensity of reflected energy.

echo interlace 

Radio interference resulting from a reflected signal arriving slightly later than the initial pulse.

echo matching 

In an echo-splitting radar system, the trial-and-error orientation of the antenna to find the direction from which the pulse indications are identical.

echo ranging 

An ultrasonic method of determining the bearing and distance of an underwater object.

echo send 

In an audio mixer, an output for delivering signals to external systems, such as an echo box (see ECHO, 5). It can also provide an auxiliary output for a second set of speakers, a tape recorder, or a recording device.

echo sounder 

See ACOUSTIC DEPTH SOUNDER.

edge 

Separating a radar echo into two parts so that a double indication appears on the radar screen.

echo suppression 

In a telephone circuit, a device that blocks off reflected waves, thereby minimizing audible echo.

echo suppressor 

See ECHO ELIMINATOR.

echo talk 

In a telephone system that results in distracting interference.

echo wave 

A reflected wave, such as a radio wave reflected alternately between earth’s surface and the ionosphere.

ECL 

Abbreviation of EMITTER-COUPLED LOGIC.

eclipse effect 

A decrease in the critical frequency of the E and F1 layers of the ionosphere during a solar eclipse.

ecliptic orbit 

Any orbit that lies in the same plane as the orbit of the earth around the sun (the ecliptic plane). The ecliptic plane is slanted about 23.5° from the plane of the earth's equator.

ecm 

Abbreviation of ELECTRONIC COUNTER-MEASURES.

eco 

Abbreviation of ELECTRON-COUPLED OSCILLATOR.

ecometer 

An instrument for continuously monitoring the amount of carbon dioxide in (factory) flue gases.

E core 

A transformer or transducer core having the shape of an E. Coils can be wound on one, two, or all three of the crosspieces.

eddy current 

A reflected wave, such as a radio wave reflected alternately between earth’s surface and the ionosphere.

effective area 

An ultrasonic medical instrument that allows viewing of internal organs. Used for diagnostic purposes in certain situations, instead of the X-ray machine.

effective center 

The apparent point of effective acoustic center currents induced in nearby structures by an electromagnetic field.

eddy current loss 

Power loss resulting from eddy currents induced in nearby structures by an electromagnetic field. Eddy currents in the core of a transformer give rise to such loss.

eddy-current sensor 

A terminal block with a number of contacts, attached to the edge of a printed-circuit board for easy plugging into a foundation circuit.

eddy-current testing 

The manufacture of paper, a robotic system for maintaining the width of a sheet, and bending in an evaporating bulb; they are attracted by a cold, positively charged metal plate in the bulb.

eddy-field 

The ability of a machine vision system to locate and follow boundaries. Used extensively in mobile robots.

eddy effect 

The extension of electric lines of flux between the outer edges of capacitor plates. This portion of the interplate field contributes a small amount of capacitance. Because the lines of flux are not confined to the space between plates, they can cause capacitive coupling with external bodies.

eddy-current loss 

Power loss resulting from eddy currents induced in nearby structures by an electromagnetic field. Eddy currents in the core of a transformer give rise to such loss.

eddy-current loss • effective acoustic center

A resonant-cavity device used to test a radar receiver by the transmitted energy entering the box, which retransmits it to the receiver.

echo check 

In data communication, a means of checking the accuracy of received data by sending it back to the transmitting station for comparison with the original data.
effective actuation time  The total actuation time of a relay (i.e., the sum of the initial actuation time and subsequent intervals of contact chatter).
effective address The address a computer uses in implementing an instruction (i.e., one not necessarily coinciding with the address given in the instruction).
effective amperes An effective current of 1 amperes. Also see EFFECTIVE CURRENT.
effective antenna length See ELECTRICAL LENGTH.
effective antenna resistance The radiation resistance of an antenna, as measured at the input point.
effective bandwidth The bandwidth of an ideal bandpass filter, which, at a reference frequency, has the same transfer ratio as an actual bandpass filter under consideration; it also has the same current and voltage characteristics.
effective capacitance The actual capacitance between two points in a circuit resulting from the combination of inherent, lumped, and stray capacitances.
effective conductivity Conductivity measured between the parallel faces of a unit cube of a material.
effective confusion area In a radar system, an area in which interference makes it impossible to see whether a target is present.
effective current Symbol, I_{eff}. The root-mean-square (rms) value of alternating current (see EFFECTIVE VALUE). For a sinusoidal current, I_{eff} = 0.707 I_{max}, where I_{max} is the maximum value of the current. Also called rms current.
effective cutoff See EFFECTIVE CUTOFF FREQUENCY.
effective cutoff frequency For a filter or similar device operated between specified impedances, the frequency at which insertion loss is higher than the loss at a specified reference frequency in the passband.
effective field intensity The root-mean-square (rms) value of the field-strength voltage, averaged for all points at a given radial distance from a transmitting antenna.
effective height The height of an antenna in terms of its performance as a transmitter or receiver of electromagnetic energy.
effective input capacitance The actual operative capacitance present at the input terminals of a circuit or device, caused by the shunt capacitance of the terminals themselves and the net capacitance of the circuit connected to the terminals.
effective internal resistance In an electrochemical cell or battery, a resistance that originates within the electrolyte and electrodes. This resistance is low when the current drain is low; it rises as the current drain increases. It limits the maximum current that the cell or battery can deliver.
effective isolation The condition of components or circuits being so well isolated or shielded that no significant direct coupling, capacitive coupling, or inductive coupling exists between them.
effective instruction The machine-language version of an instruction given in a computer program.
effectively bonded The condition afforded by an extremely low-resistance union between two conducting surfaces that are solidly fastened to- gether.
effectively grounded The condition of being connected to earth or to the low-potential end of a circuit by means of an extremely low-resistance connection.
effective parallel capacitance Inherent capacitance that manifests itself in parallel points in combination with any lumped capacitance.
effective parallel resistance 1. The leakage resistance that manifests itself in parallel with a dielectric (e.g., a liquid that is a capacitor). 2. Parallel-resistance effects caused by stray shunt-resistance components.
effective percentage of modulation For a complex waveform, an expression of the equivalent percentage of modulation by a pure sine wave. Given a certain proportion of power in the sidebands with modulation by a complex signal, the effective percentage of modulation is that percentage which, when the modulating signal is sinusoidal, results in the same proportion of power in the sidebands.
effective phase angle In alternating-current (ac) circuits, the phase angle, with respect to waveforms for current and voltage. When both waveforms are sinusoidal, the effective phase angle is the actual phase angle. But when harmonics are present in current or voltage, the angles differ, the phase angle being greater in capacitive circuits than in inductive circuits.
effective radiated power Abbreviation, ERP or ER of a transmitting antenna. Suppose a test antenna, A_{t}, is set up and the field strength in its favored direction at a frequency f is measured at a distance d in free space. Let the field strength thus measured be P watts per square meter. Suppose A_{r} is replaced with an isotropic radiator, and the field strength at the same frequency f is measured at the same distance d in free space. Let the radio-frequency (RF) power at the feed point of the isotropic radiator A_{r} be varied until the field strength is F, the same as it was with the test antenna A_{t}. Let this RF power be symbolized P. Then P is defined as the effective radiated power (ERP or ER) of the test antenna, A_{t}. The figure defined as in (1), measured in some direction other than the favored direction of a test antenna.
effective resistance 1. In a coupled circuit, the sum of the actual resistance of the circuit and the reflected resistance of the load. 2. See EFFECTIVE ANTENNA RESISTANCE.
effective series inductance Inherent (distri- buted) inductance acting in series with other components in a circuit. The inherent inductance of the wire in a wirewound resistor, for example, manifests itself as a result of the resistance of the wire.
effective series resistance Inherent (distributed) resistance acting in series with other components in a circuit. Thus, the inherent resistance of the wire in a coil appears in series with the inductance of the coil. Likewise, a capacitor has an effective series resistance because of the resistance of leads, plates, and connections.
effective shunt capacitance See EFFECTIVE PARALLEL RESISTANCE.
effective shunt resistance See EFFECTIVE PARALLEL RESISTANCE.
effective sound pressure The root-mean-square (rms) value of instantaneous sound pressure at a certain location in a sound cycle.
effective speed of transmission In telegraph (wire or radio) and in electronic data transmis- sion, the speed (characters per minute, bits per second, etc.) that can be reliably transmitted for a given power expenditure.
effective thermal resistance The effective temperature rise (in degrees per watt of dissipation) of a component or junction that obeys an external temperature relationship that is at equilibrium.
effective time For a computer, the time during which useful work is performed.
effective transmission speed See EFFECTIVE SPEED OF TRANSMISSION.
effective value The root-mean-square (rms) value of an alternating-current (ac) quantity. The effective value an alternating current produces in a pure resistance has the same heating effect as the free equivalent direct current. See also ROOT MEAN SQUARE.
effective voltage An effective potential of one root mean square voltage (see EFFECTIVE VALUE). See VOLTAGE.
effect of noise Symbol, E_{n}. The root-mean-square value of alternating-current (ac) voltage (see EFFECTIVE VALUE). For a sinusoidal volt- age, E_{n} = 0.707 E_{m}, where E_{m} is the maximum value of the voltage. Also called rms voltage.
effective wavelength Wavelength in terms of measured frequency and effective propagation velocity.
effects processor In audio systems, a circuit that produces various sound effects via digital signal processing.
efficiency 1. The ratio of useful power or energy output to total power or energy input to a device or system. 2. The proportion of applied audio-frequency (AF) power that a loudspeaker converts into acoustic energy. 3. See ELECTRICAL EFFICIENCY.
efficiency modulation A system of amplitude modulation in which the efficiency of a radio-frequency (RF) power amplifier is varied at an audio-frequency (AF) rate.
efficiency of rectification For a rectifier, the ratio of the direct-current (dc) output voltage to the peak value of alternating-current (ac) input voltage. For peak efficiency, the ratio is multiplied by 100.
efflorescence The giving off of water by a substance upon exposure to air. Some materials used in electronics exhibit this property. Common efflorescent compounds are hydrated iron carbonate, ferrous sulfate, and sodium carbonate.
effluent material A material exhibiting efflo- rescence. Compare DELIQUESCENT MATERIAL.
efficiency modulation A system of amplitude modulation in which the efficiency of a radio-frequency (RF) power amplifier is varied at an audio-frequency (AF) rate.
efficiency of rectification For a rectifier, the ratio of the direct-current (dc) output voltage to the peak value of alternating-current (ac) input voltage. For peak efficiency, the ratio is multiplied by 100.
efflorescent material A material exhibiting efflo- rescence. Compare DELIQUESCENT MATERIAL.
efficiency of rectification For a rectifier, the ratio of the direct-current (dc) output voltage to the peak value of alternating-current (ac) input voltage. For peak efficiency, the ratio is multiplied by 100.
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efficiency of rectification For a rectifier, the ratio of the direct-current (dc) output voltage to the peak value of alternating-current (ac) input voltage. For peak efficiency, the ratio is multiplied by 100.
in which each character is represented by eight bits.

**Electromagnet** A radio elevation display, in which the horizontal scale shows range and the vertical scale shows elevation.

**Einstein equation** The equation depicting the interconversion of mass and energy: \( E = mc^2 \), where \( E \) is energy (ergs), \( m \) is mass (grams), and \( c \) is the speed of light in a vacuum (centimeters per second).


**Einstein/DeHaas effect** The tendency for an iron or steel cylinder to become magnetized as it rotates.

**Einstein shift** The decrease in frequency and loss of energy experienced by quanta acted upon by gravitation.

**Einthoven string galvanometer** A simple galvanometer in which a silvered glass filament carrying current is mounted in a magnetic field set up by either a permanent magnet or an electromagnet. The current causes the filament to be deflected through a distance proportional to current strength, the deflection being observed through a microscope.

**EIT** Abbreviation of engineer-in-training.

**Either-or operation** The logical inclusive-OR operation.

**E-J Group** Abbreviation of Engineers’ Joint Council.

**Eka-aluminum** See Gallium.

**Eka-silicon** See Germanium.

**EKG** Abbreviation of ELECTROCARDIOGRAM (Also, ECG.)

**EKG telemetry** See ECG TELEMETRY.

**EL** Abbreviation of ELECTRONIUMESCENCE.

**Elastic time** 1. In data processing and computer operations, what appears to be the duration of a process, compared with actual processing time, as measured by external clocks, for example. 2. The accumulated time, usually expressed in hours, minutes, and seconds, that an operation takes or a machine runs.

**Elastic-time meter** An instrument that indicates the time an electronic device or system has been in operation. Most such meters are based on electronic clockwork that runs while the system is in operation, holding the count during shutdown periods. Also see ELECTROLYTIC ELAPSED-TIME METER.

**Elastance** Unit, daraf. The opposition of a capacitive element to being charged. It is the reciprocal of capacitance.

**Elastic collision** A collision between two charged particles in which neither loses energy—even though they are deflected from their normal paths.

**Elasticity** 1. The ability of a body to return to its original shape after being deformed. See YOUNG’S MODULUS. 2. See ELASTIVITY.

**Elastic limit** The maximum stress that can be tolerated by a material without being permanently deformed.

**Elastic wave** A wave in an elastic medium, such as air or water; thus, a wave that is mechanically produced.

**Elasticity** 1. Specific elastance (i.e., the elastance in darafs per cubic unit of a dielectric). 2. The ratio of electric stress to displacement.

**Elastomer** A nonmagnetic alloy used in the manufacture of radio hardware, such as chassis.

**Electrical** A branch of physics and mathematics to electricity, and in the theory and application of basic engineering and related subjects. Of particular interest to the EE are the generation of ELECTRICITY.

**Electrical stress** See DIELECTRIC STRESS.

**Electrical energy** Energy in the form of electricity.

**Electrical power** The power output in watts.

**Electrical angle** The angle assumed at any instant by the rotating vector representing an alternating current or voltage. A complete cycle is divided into 360 electrical degrees. Thus, for an alternating current (ac) sine wave, the angle is 0 degrees for zero and positive-going, 90 degrees for positive maximum, 180 degrees for zero and negative-going, and 270 degrees for negative maximum.

**Electrical attraction** The attraction between two oppositely charged bodies or particles. Compare ELECTRICAL REPULSION.

**Electrical axis** 1. Permittivity to electricity and its various manifestations. 2. See ELECTROSTATIC ELECTRICAL ABSORPTION.

**Electrical absorption** A transducer, such as a headphone, sonic applicator, or buzzer, that converts electrical energy into sound energy. Compare ACOUSTICAL-ELECTRICAL TRANSDUCER.

**Electrical angle** The angle assumed at any instant by the vector representing an alternating current or voltage. A complete cycle is divided into 360 electrical degrees. Thus, for an alternating current (ac) sine wave, the angle is 0 degrees for zero and positive-going, 90 degrees for positive maximum, 180 degrees for zero and negative-going, and 270 degrees for negative maximum.

**Electrical attraction** The attraction between two oppositely charged bodies or particles. Compare ELECTRICAL REPULSION.

**Electrical axis** In a quartz crystal, the axis through opposite corners of the hexagonal cross section. The various electrical axes are \( x, x', \) and \( x'' \) for \( x, x', \) and \( x'' \), respectively. The electrical axis is perpendicular to the mechanical axis, which runs through the crystal’s length. Also see CRYSTAL AXES and \( X \)-AXIS, 2.

**Electrical ball** An action in which a special switch changes contact position and locks itself in that position after a station has been actuated, at the same time releasing a previously actuated station.

**Electrical bandwidth** In a tuned circuit, bandwidth obtained by changing values of induc- tance or capacitance, rather than by mechanical gearing.

**Electrical bias** A current maintained in a relay coil (sometimes an auxiliary coil) to keep the relay partially closed, thus sensitizing it. Compare MECHANICAL HANG.

**Electrical bore sight** In radar operations, the tracking axis, as determined by an electrical test, such as one involving a sharp null or sharp peak response.

**Electrical center** The point at which an adjustable component (variable resistor, variable inductor, etc.) has exactly half its total value. This point does not always coincide with the physical center.

**Electrical conductance** See CONDUCTANCE.

**Electrical conduction** The flow of charge carriers through a material. The degree of conduction is indicated by the material’s value of conductance.

**Electrical conductivity** See CONDUCTIVITY.

**Electrical coupling** The coupling of two or more circuits or elements by means of electric-field effects.

**Electrical degree** 1. In a periodic waveform, the length of time corresponding to \( \lambda/4 \) of the time for completion of one cycle. 2. In space, that distance representing \( \lambda/4 \) of the wavelength in the medium through which electromagnetic energy travels.

**Electrical discharge** The flow of current out of a battery or capacitor.

**Electrical discharge in gases** The phenomenon of electrical conduction (current) by a gas, caused by sudden breakdown as a result of ionization. The discharge is often accompanied by light, as in the red glow of a neon bulb.

**Electrical-discharge machining** A method of machining metals in which the metal is vaporized by an arc formed between an electrode and the metal workpiece (anode). In this way, metal is removed in tiny bits from the surface of the workpiece.

**Electrical distance** Distance in terms of the time required for an electromagnetic wave to travel between two points in a particular medium.

**Electrical drainage** The diversion of electric currents away from underground pipes to prevent corrosion by electrolysis.

**Electrical efficiency** The ratio of the output of an electrical or electronic device to the total input. It can be expressed as a decimal or percentage. For example, for a bipolar transistor amplifier, the percent efficiency is equal to 100FE/Po, where \( Po \) is the collector input in volt-amperes, and \( FE \) is the output power in watts.

**Electrical conductivity** See CAPACITANCE.

**Electrical energy** Energy in the form of electricity (see ELECTRICITY, 1). The term is often used in place of ELECTROMAGNETIC ENERGY.

**Electrical engineer** Abbreviation, EE. A trained professional skilled in applying physics and mathematics to electricity, and in the theory and application of basic engineering and related subjects. Of particular interest to the EE are the generation of ELECTRICITY.
and distribution of electrical energy and the de-
sign and application of electromechanical devices. 

**electric engineer** • **electrical transducer**

electrical erosion In electrical contacts, the loss of metal as a result of the evaporation or transfer of metal during sparking.

electrical filter A bandpass, band-rejection, high-


electrical noise Extrinsic currents and/or volt-
geases that interfere with desired electrical quanti-

electrical polarity The distinct difference observ-

electrical quantity 1. See COULOMB and QUAN-


electrical resistance The in-phase current-

electrical sheet Sheet iron or steel used for motor

electrical short A short circuit between two or more 

electrical stiffness The ratio of armature inductance to effective arma-

electrical zero 1. A zero-output or minimum-

electric and magnetic double refraction See RERR ELECTRO-OPTICAL EFFECT and RERR SPARK.

electric arc A sustained luminous discharge in the space between two electrodes. Compare ELEC-


electric bell See BELL.

electric braze A method of brazing in which electric current generates the required heat.

electric breakdown 1. The usually sudden ioniza-

electric bending 1. See BEND, 2. See BEND.

electric circuit A network of interconnected com-

electric constant A constant used in the calculation of electrical quantities.

electric current A flow of electric charge that can be demonstrated.

electric current density The electric field strength due to a current.

electric current generator A device that produces an electric current.

electric current intensity A measure of the amount of electric current.

electric current per unit area The electric current density.

electric current total The total electric current.

electric circuit breaker A device that automatically opens an electrical circuit when the current exceeds a predetermined level.

electric charge A quantity of electricity.

electric charge density The density of electric charge.

electric charge flow The flow of electric charge.

electric charge flux The flux of electric charge.

electric charge field The electric field associated with electric charge.

electric charge flow density The electric current density.

electric charge flux density The electric current density.

electric charge flow per unit area The electric current density.

electric charge flow total The total electric current.

electric charge per unit area The electric current density.

electric charge total The total electric charge.

electric charge flux per unit area The electric current density.

electric charge flux total The total electric flux.

electric charge flow per unit length The electric current density.

electric charge flux per unit length The electric current density.

electric charge flow per unit volume The electric current density.

electric charge flux per unit volume The electric current density.

electric charge flow per unit mass The electric current density.

electric charge flux per unit mass The electric current density.

electric charge flow per unit time The electric current density.

electric charge flux per unit time The electric current density.

electric charge flow per unit area The electric current density.

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electric charge flow per unit area The electric current density.

electric charge flux per unit area The electric current density.

electric charge flow per unit area The electric current density.

electric charge flux per unit area The electric current density.
electric conduction The flow of current carriers through a conductor.

electric constant Also called permittivity of vac-uum. The fixed electrical permittivity of free space, the value of which is \(8.8542 \times 10^{-12}\) farad per meter.

electric contact See CONTACT, 1, 2.

electric contactor A device for modifying the operating voltage or power of a component or system. Compare ELECTRONIC CONTROLLER.

electric cooling 1. Cooling via PELTIER EFFECT. 2. See ELECTROSTATIC COOLING. 3. Forced-air cooling (of equipment) by electric blowers or fans.

electric current The phenomenon wherein charge carriers move in a directed manner through a material or vacuum. In most electrical conduc-
tors, current results from movement of electrons. In a semiconductor material, electric current can result from the movement of holes, as well as electrons. The proportion of holes to electrons de-

pends on the nature of the semiconductor. In a gas or electrolyte, current consists of a flow of ions. In certain situations, electric currents can result from the movement of positrons, protons, anti-protons, alpha particles, and various atomic nuclei.

electric current density See CURRENT DENSITY.

electric delay line See DELAY LINE.

electric dipole A pair of equal charges having op-
got polarity and separated by a fixed distance.

electric discharge See ELECTRICAL DISCHARGE.

electric-discharge lamp See DISCHARGE LAMP.

electric insulation See ELECTRIC INSULATION.

electric dispersion In a colloidal suspension, dis-

persion accomplished by passing an electric cur-

rent through the material.

electric electric probe A sensing device that uses a radiant

energy beam to detect objects. It generally uses a laser diode as the beam source, and a photodetect-

or or photovoltaic cell as the beam detector. The output is used to control an external machine or system.

electric fence A fence through which an elec-
tric current is passed. Anyone touching the fence will receive a shock. It is used in some prisons, and also by cattle ranchers to keep people or an-

imals contained.

electric field The space surrounding an electric charge or charged body, in which electric energy acts (electric lines of flux fill the space).

electric field intensity See ELECTROSTATIC FIELD INTENSITY.

electric field strength 1. Symbol, E. In an electro-

magnetic wave, the amplitude of the electric com-

ponent of the field, expressed in volts per meter. 2. Dielectric strength.

electric-field vector See ELECTRIC-FIELD STRENGTH.

electric fish Fish capable of generating intense elec-

tric shocks (e.g., electric eel and electric catfish).

electric flux See ELECTROSTATIC FLUX.

electric flux density Symbol, D. In an electric

field, the number of lines of flux per unit area, usually expressed in coulombs per square meter.

electric flux lines The direction of the electric field in the vicinity of a charged object. The field is de-

noted by means of "lines of flux" or "lines of force," with each line representing a designated electric field intensity. The closer together the lines, the more intense the field in a given region.

electric focusing See ELECTROSTATIC FOCUS-

ING.

electric glow The light (usually pale blue) that oc-

casionally accompanies an electric discharge in air.

electric guitar A guitar whose acoustic vibrations are con-

verted by a transducer to an electrical sig-

nal for amplification.

electric hysteresis See ELECTRO-HYSTERSIS.

electrician A professional person who installs and services electrical equipment and wiring.

electric image For solving certain problems in-

volving electricity, an array of electrical points forming an image of certain other electrical points.

electricity 1. Phenomena resulting from the exis-
tence of stationary or moving electric charge car-

riers, such as electrons, holes, and ions. 2. A branch of physics concerned with phenomena re-

sulting from the existence of stationary or movement charge carriers. 3. Electrical energy or power. 4. The voltage existing at utility outlets. In the North America, this is nominally an alternating current (ac) voltage of 117 or 234 V at 60 Hz.

electric lamp A device for producing elec-

tricity. Thus, many different devices, such as bat-
tery, dynamos, oscillators, solar cells, and ther-

moeouples, are classed as generators.

electric line A mechanical device for generat-
ing static electricity. See, for example, ELECTROSTATIC GENERATOR, VAN DE GRAAFF GENER-

ATOR, and WIMSHURST MACHINE.

electric meter 1. An instrument such as an am-

meter, voltmeter, or wattmeter, used to indicate an electrical quantity (usually directly). 2. See SLICKOWATT-HOUR METER.

electric mirror See ELECTRON MIRROR.

electric moment In an electric field of unit inten-
sity, the maximum torque exerted on an electric dipole.

electric motor A machine that converts electrical

energy into mechanical work. The familiar form is a machine in which an armature rotates between the poles of a field magnet, mechanical energy be-

ing produced at the armature’s revolving shaft.

electric niggle A needle electrode carrying high-
frequency current; it is used in surgery to cut tis-

sue and sear it immediately to prevent bleeding.

electric network See ELECTRICAL NETWORK.

electric organ See ELECTRODE ORGAN.

electric oscillations The alternate flow of electric charges in opposite directions, occurring at a de-


fined frequency or frequencies.

electric osmosis See ELECTRO-OSMOSIS.

electric piano See ELECTRON PIANO.

electric polaization 1. The orientation of flux lines in an electric field. 2. The orientation of the electric field component in an electromagnetic field.

electric potential See ELECTROSTATIC POTEN-

tial.

electric power Symbol, P. Unit, watt. The rate at which electrical energy is used. Power is energy per unit time; in the context of electricity, it is ex-

pressed as the product of current and voltage. In terms of heat losses, it is often expressed as TR (current in amperes squared, multiplied by resis-
tance in ohms).

electric precipitator See DUST PRECIPITATOR.

electric probe A pin or rod inserted into an elec-

trostatic field to sample it, or into an electromag-

netic field to sample its electric component. See, for example, WAVEGUIDE PROBE. Compare MAGNETIC PROBE.

electric radiation 1. The radiation of energy by means of electric waves. 2. The energy so radiated.

electric recording Unlike recording on paper by direct use of an electric current. The two principal types are: (1) A stylus carrying styrofoam bur-

es away (in a fine line) the metallic coating of the recording paper, exposing the dark underlying layer. (2) A stylus carrying a current that produces a line by means of electrolysis in a special paper (see ELECTROLYTIC RECORD). Compare ELECTROSTATIC PRINTING.

electric reset See ELECTRICAL RESET.

electric shock A painful electric charge, such as might remain on a capacitor after it has been in-

completely discharged.
electric rings  Colored rings formed on a plate by the electrolytic deposition of substances, such as copper or copper oxide, which provide a simple means of recording data.

electric screen  See ELECTROSTATIC SCREEN.

electric shield  See ELECTROSTATIC SHIELD.

electric shock  A physiological reaction caused by the passage of electric current through living tissue. When slight, it is characterized by tingling sensations and involuntary contractions of the muscles; a severe shock can cause paralysis, unconsciousness, heart fibrillation, and/or burns. If heart fibrillation occurs or if burns are severe, death can result.

electric spark  A momentary, luminous discharge of electricity in the space between two electrodes. Compare ARC.

electric steel  Steel that has been processed in an electric furnace.

electric strain  See DIELECTRIC STRAIN.

electric strain gauge  A device for detecting the strain that a certain stress produces in a body. Typically, such a gauge consists of one or more fine insulated wires cemented to the surface under test. As the surface becomes strained, the wire stretches, undergoing a change in electrical resistance that is proportional to the change in strain.

electric strength  See DIELECTRIC STRENGTH.

electric stress  See DIELECTRIC STRESS.

electric stroboscope  See ELECTRONIC STROBO-SCOPE.

electric surface density  The ratio of the electric charge on a surface to the area of the surface. Compare ELECTRIC VOLUME DENSITY.

electric watch  A small timepiece driven by a tiny, self-contained electrochemical cell that drives an electrical escapement or other stepping mechanism. Compare ELECTRONIC WATCH.

electric wave  See ELECTROMAGNETIC WAVES.

electric-wave filter  A circuit or device for separating signals of one frequency from those of other frequencies.

electric wind  See ELECTRODE WIND.

electrical admittance  The admittance encoun-
tered by current flowing through an electrode; the
record made by an electrocardiograph of the
heartbeat.

electrocardiograph  A machine instrument that detects and records the impulses of the heart.

electroanalysis  Catalytic action produced by electricity (see CATALYSIS).

electrocoagulation  Use of a high-frequency alter-
nating current to solidify tissue, as in arresting bleeding.

electrocardiogram  See ELECTROENCEPHALOGRA-
M.

electrocrucible  Acceleration or modification of plant growth through the application of electricity to plants, seeds, or soil.

electrocoagulation  1. Death resulting from electric shock. 2. An electric current applied for the purpose of causing death (e.g., in an ELECTRIC CHAIR).

electrode  A body, point, or terminal in a device or circuit that delivers electricity, or to which elec-
tricity is applied. A positive electrode is usually an ANODE; a negative electrode is usually a CATHODE.

electrode admittance  The admittance encoun-
tered by current flowing through an electrode; the property is entirely that of the electrode and is the reciprocal of ELECTRODE IMPEDANCE. Consists of a real-number component (ELECTRODE RESISTANCE) and an imaginary-number component that is 90 degrees out of phase (ELECTRODE SUSCEPTANCE).

electrode capacitance  The capacitance between an electrode and a reference body, such as
ground or another electrode.

electrode characteristic  The mathematical func-
tion or graph of electrode current versus elec-
trode voltage.

electrode conductance  The conductance encoun-
tered by current flowing through an electrode; the property is entirely that of the electrode and is the reciprocal of ELECTRODE RESISTANCE.

electrode current  Current entering or leaving an electrode.

electrode dark current  See DARK CURRENT.

electrode dissipation  The power lost in the form of heat in an electric current going through some part of the body.

electrode drop  Voltage drop resulting from ELECTRODE RESISTANCE.

electrode efficiency  In an electrolytic cell, the ra-
tio of the yield of metal deposited to the maximum
electrode impedance The property of the impedance encountered by alternating current flowing through an electrode: the property is entirely that of the electrode and is the reciprocal of ELECTRODE ADMITTANCE. Consists of a real-number component (ELECTRODE RESISTANCE) and an imaginary-number component that is 90 degrees out of phase (ELECTRODE REACTANCE).

electrodeless discharge Discharge in a gas tube that is not directly connected to a power source. A familiar example is the glow of a neon lamp held in a strong radio-frequency (RF) electromagnetic field.

electrodeposi 1. To deposit a substance by electrical action. Also see ELECTROPHORESIS and ELECTROPLATING. 2. A deposit that is formed on an electrode by electrophoresis or electropolating.

electrodeposition The electrical application of a layer of one material (such as a metal) on the surface of another (the substrate), e.g., electropolating, evaporation, and sputtering.

electrode potential See ELECTRODE VOLTAGE.

electrode reactance The imaginary-number component of ELECTRODE IMPEDANCE.

electrode resistance The property of the resistance encountered by current flowing through an electrode: the property is entirely that of the electrode and is the reciprocal of ELECTRODE CONDUCTANCE.

electrodermography A method of monitoring the functions of the human body by measuring the resistance between two electrodes placed on the surface of the skin.

electrode suscep 2. To precondition a material or device (e.g., a semiconductor junction) by passing a current through it for a specified period.

electroendoscopy A method of producing a complete electromuscular electrogram. It consists of a metal coat on the electrode by electrophoresis or electroplating.

electroform 1. A transparent mold or core.

electrogastrograph A recording of the electrical impulses and other functions of the stomach, formed for medical diagnostic purposes.

electrograph 1. A picture transmitting or receiving device (see FACSIMILE RECEIVER and FACSIMILE TRANSMITTER). 2. A device used for the electrotyping etching or transfer of designs.

electrographic recording A method of producing visible patterns or records, using electrodes to create discharge through an insulating material.

electrographite Synthetic graphite prepared by heating carbon in an electric furnace.

electrojet A region of high current concentration in the sky near bright auroral displays or along the magnetic equator.

electrokinetic energy The energy of electric charge carriers in a charged particle or fluid, a form of kinetic energy. The current in a wire (a flow of electrons) is a common manifestation of this form of energy. Compare ELECTROSTATIC ENERGY.

electrokinetics A branch of electricity concerned with (1) the behavior of moving charged particles (such as ions and molecules) and bodies in motion, and (2) the generation of static charges by moving liquids or solids in contact with each other.

electrolytic capacitor A component that is manufactured by rolling up aluminum foil strips separated by paper saturated with an electrolyte. When a polarized voltage is applied, the aluminum oxidizes. The oxide layer forms the dielectric for the capacitor. The layer is extremely thin, producing high capacitance per unit volume. This type of capacitor must be connected with the proper polarity in a circuit. The component can have values up to thousands of microfarads, and some units can handle thousands of volts. They are used in audio circuits and in power supplies. Compare CERAMIC CAPACITOR, MICA CAPACITOR, PAPER CAPACITOR, PLASTIC-FILM CAPACITOR, TANTALUM CAPACITOR.

electrolytic elapsed-time meter A device that indicates the time that equipment has been in operation in terms of the amount of metal dissolution of electromuscular energy. It consists of a metal coat on the surface of another (the substrate) (e.g., electroplating, evaporation, and sputtering).

electrolytic efficiency • electrokinetics
electroplated on the cathode of an electrolytic cell by energy consumed during the period.

**electrolytic gas** A gas produced by electrolysis. Examples are hydrogen (H) and oxygen (O), generated in a ratio of two to one, by the electrolysis of water (H₂O).

**electrolytic iron** Very pure iron obtained by electrolysis.

**electrolytic lever** See ELECTROMECHANICAL LEVER.

**electrolytic microphone** A microphone in which sound energy is converted into a form of electrical energy by electromagnetic induction. Common

**electrolytic record** A data record that uses a paper impregnated with a chemical that turns dark when an electric current passes through the paper under the point of a stylus.

**electrolytic rectifier** A rectifier consisting of an aluminum electrode and a lead or carbon electrode in a solution of borax or sodium bicarbonate, or in a solution of ammonium citrate, ammonium phosphate, and potassium citrate. Also called chemical rectifier.

**electrolytic refining** Extracting or purifying metals by electrolysis.

**electrolytic resistor** An emergency resistor made by immersing two wire leads in an electrolyte; the weaker the solution, the higher the resistance.

**electrolytic switch** See ELECTROCHEMICAL SWITCH.

**electrolyze** To subject something to electrolytic action.

**electrolyzer** A cell used in the production of various materials by electrolysis. See, for example, ELECTROCHEMICAL REDUCTION and ELECTROLYTIC REFINING.

**electromagnetic** Exhibiting both electric and magnetic properties (e.g., an electromagnetic wave).

**electromagnetic attraction** 1. The attraction of iron or steel to an electromagnet. 2. The attraction of an electromagnetic pole to the opposite pole of another electromagnet. A unit pole attracts another unit pole 1 centimeter away with a force of 1 dyne or 10⁻⁹ newton.

**electromagnetic circuit** See SOLENOID.

**electromagnetic deflection** In a television picture tube and some oscilloscopes, deflection of the electron beam by the magnetic fields of external horizontal- and vertical-deflection coils. Compare ELECTROSTATIC DEFLECTION.

**electromagnetic deflection coil** See DEFLECTION COIL.

**electromagnetic delay line** See DELAY LINE.

**electromagnetic energy** Energy in the form of electric and magnetic fields. A radio wave traveling through space, for example, has electric and magnetic components, between which energy oscillates.

**electromagnetic energy conversion** The conversion of electrical energy into mechanical work and vice versa, through the intermediary of an electromagnetic field.

**electromagnetic environment** A region in which electric and magnetic fields are present.

**electromagnetic field** A combination of alternating electric and magnetic fields. The electric lines of force are perpendicular to the magnetic lines of force at every point in space. The field propagates in a direction perpendicular to both the electric and magnetic lines of force. The frequency of oscillation can range from a fraction of one Hz to many quadrillions of Hz. In order from longest wavelength (lowest frequency) to shortest wavelength (highest frequency), effects of this type include radio waves, infrared, visible light, ultraviolet, X rays, and gamma rays.

**electromagnetic flux** The magnetic field surrounding a coil or conductor carrying an electric current.

**electromagnetic focusing** In a television picture tube, electron-beam focusing obtained by varying the direct current flowing through an external focusing coil.

**electromagnetic frequency spectrum** The frequency range of electromagnetic fields including radio waves, infrared, visible light, ultraviolet, gamma rays, and X rays.

**electromagnetic inductance** Abbreviation, EMI. A phenomenon in which electric devices upset the operation of electronic equipment, and certain medical devices can malfunction because of strong radio-frequency fields such as those from a nearby broadcast transmitter. The EMI is usually the result of improper or ineffective shielding in the affected device or system.

**electromagnetic lens** A coil or coil system whose magnetic field causes an electron beam passing through it to converge or diverge as a light beam does in passing through an optical lens. Compare ELECTROSTATIC LENS. Also see ELECTROMAGNETIC FOCUSING.

**electromagnetic mass** The mass that a moving electric charge is thought to possess.

**electromagnetic microphone** A microphone in which sound energy is converted into a form of electrical energy by electromagnetic induction.
electromagnetic mirror • electromagnetizer
electromagnetic mirror A reflector of electromagnetic waves (e.g., antenna elements, ionospheric layers, buildings, and hills).
electromagnetic momentum The momentum of a moving electric charge, comparable to that of matter in motion. Electromagnetic momentum is the product of electromagnetic mass and charge velocity.
electromagnetic oscilloscope 1. An oscilloscope using electromagnetic deflection. 2. See ELECTROMECHANICAL OSCILLOSCOPE.
electromagnetic pump A device used for moving conducting or semiconducting fluids. When a current is passed through the fluid, a force is exerted on the molecules of the fluid because of the magnetic field set up by the current.
electromagnetic pulse Abbreviation, EMP. 1. A broadband electromagnetic field emitted in a short, intense burst from a lightning stroke or nuclear explosion. This field can disrupt the operation of, and in some cases cause damage to, electrical and electronic apparatus. 2. In electromagnetic induction, the displacement of an electron in a conductor by the magnetic field.
electromagnetic radiation The propagation of electromagnetic fields through space; it normally occurs at approximately 300,792 kilometers per second or 186,282 miles per second.
electromagnetic reaction The reaction between magnetic field lines and a moving electric charge (e.g., a moving current) resulting in the formation of an electromagnetic force and electromagnetic momentum.
electromagnetic reconnaissance In military applications, the use of electromagnetic apparatus to detect and localize enemy activity in a certain geographic region.
electromagnetic relay See ELECTROMECHANICAL-relay.
electromagnetic repulsion The repulsion of a pole of one magnet from a pole of another electromagnetic coil (north pole opposing north pole, south opposing south). Compare ELECTROMAGNETIC attraction.
electromagnetics A branch of physics concerned with the theory and application of electromagnetism.
electromagnetic screen An electromagnetic shield that prevents electromagnetic fields from passing through. Commonly used in electronic equipment to prevent ELECTROMAGNETIC INTERFERENCE. Also used in aerospace to control electric signals into or out of electromagnetic fields to the transmission line.
electromagnetic shielding The use of an ELECTROMAGNETIC SHIELD to prevent undesired interaction among electrical and electronic devices and systems.
electromagnetic spectrum See ELECTROMAGNETIC FREQUENCY SPECTRUM and ELECTROMAGNETIC WAVELENGTH SPECTRUM.
electromagnetic switch 1. A switch actuated by magnetism produced by control current flowing through a coil wound on an iron core. 2. See ELECTROMECHANICAL RELAY.
electromagnetic theory of light The theory that light consists of electromagnetic waves that are similar to radio waves, but of shorter wavelength.
electromagnetic tube A cathode-ray tube using electromagnetic deflection (e.g., a television picture tube).
electromagnetic unit Abbreviation, emu. A unit of measure in the electromagnetic system of CENTIMETER-GRAM-SECOND (CGS) units.
electromagnetic vibrator See INTERRUPTER.
electromagnetic wavelength spectrum The wavelength range of electromagnetic fields, including radio waves, infrared, visible light, ultraviolet, X rays, and gamma rays. It ranges from millions of kilometers to a tiny fraction of one millimeter.
electromagnetic-wave polarization The orientation of the electric and magnetic fields of electromagnetic radiation. An electromagnetic field (EM) field, especially a field propagating through space. The polarization is generally parallel with the active element of a radio transmitting or receiving antenna. Thus, a vertical antenna radiates and receives fields having horizontal polarization. Some antennas radiate and receive an EM field whose polarization continually and rapidly rotates. This is elliptic polarization. If the rate of rotation is constant, it is circular polarization.
electromagnetic waves Waves produced in a conductor or styling as the result of electric current carried by those waves. Such waves have an electric and a magnetic component acting at right angles to each other. The waves propagate at right angles to both the electric and magnetic component of the EM waves.
electromagnetism 1. Magnetism resulting from the movement of electric current carriers (e.g., the magnetic field surrounding a coil of wire carrying an electric current). 2. See ELECTROMAGNETIC FORCE.
electromagnetizer A magnetizer using continuous direct current (dc) as the magnetic-field source.
electromechanical Descriptive of any device that converts energy from electrical to mechanical forms or vice versa. Examples are the motor and the generator.
electromechanical amplifier An amplifier that converts an electrical input signal into mechanical motion (vibratory or rotary), which in turn causes a change into an electrical output signal of higher current, voltage, or power.
electromechanical changer A vibrator-type interruper used primarily to chop direct current, converting it into a square-wave signal, whose amplitude is proportional to current strength. Also see CHOPPER.
electromechanical counter A device that indicates the number of pulses that have been applied to it. Typically, it has a series of dials—each capable of displaying the numerals 0 to 9 in sequence, one for each decade in the count. The dials are geared together, the train being operated by the stepping action of an electromagnetic escapement. Compare ELECTRONIC COUNTER.
electromechanical energy The energy stored by an inductor or capacitor in an electromechanical device.
electromechanical filter See ULTRASONIC FILTER.
electromechanical flip-flop See BISTABLE RELAY.
electromechanical frequency meter A usually direct-reading instrument for measuring frequency in radio or a radio-frequency portion of the electromagnetic spectrum. It works via the mechanical motion resulting from the applied signal. The two varieties are the movable-iron type and the reed type.
electromechanical modulator See CHOPPER.
electromechanical oscilloscope A gallavometer-type instrument for displaying a varying or alternating current or voltage. The signal is applied to a meter movement having a movable coil, which swings or vibrates in response to the signal. A tiny mirror cemented to the coil reflects a beam of light to a rotating mirror that sweeps the beam across a translucent screen on which the image is produced.
electromechanical recorder An instrument in which a pen or stylus is guided on a sheet of paper by the varying signal current or voltage being applied to a moving electric charge carrier (e.g., the magnetic field surrounding a coil of wire carrying an electric current). Also see ELECTROMAGNETIC RECORDER.
electromechanical relay An electromagnetic switch consisting of a multiturn coil wound on an iron core near an armature with a movable end contact. When control current flows through the coil, it becomes magnetized and attracts the armature, closing the movable contact against a stationary one.
electromechanical • electromigration
electromechanical timer A device for automatically timing a process or an observed event. Most such timers are based on an accurate clock (electric or spring driven) that opens or closes contacts at predetermined instants. Compare ELECTRONIC TIMER.
electromechanical transducer A transducer that translates mechanical signals directly into electrical ones or vice versa, without the intermediary of active devices, such as transistors or integrated circuits.
electromechanical valve A usually poppet-type valve for gases or liquids. The valve is operated by electromagnetic action and is often aided by an electronic (servo) circuit.
electromechanics The theory and application of electromagnetic devices.
electromedical engineer • electromedical engineer The branch of electronics engineering concerned with the theory, design, and application of electronic equipment for medical diagnosis or treatment.
electromechanical equipment Electrical or electronic equipment used in medical diagnosis or treatment.
electromerism Luminization in gases.
electromagnetometry The branch of metallurgy concerned with the theory, design, and application of electronic equipment for medical diagnosis or treatment.
electromagnetic coil, or box made of magnetic material (iron, steel, or special alloys) and containing a magnetic component. The magnetic flux generated by the component is confined by preventing interference with external components. Likewise, external magnetic fields are prevented from reaching the component. 2. A grounded partition, metal sheet, wire braid, or other barrier that prevents electro magnetic fields from passing through. Commonly used in electronic equipment to prevent ELECTROMAGNETIC INTERFERENCE. Also used in aerospace to control electric signals into or out of electromagnetic fields to the transmission line.

![Electromechanical relay diagram](https://via.placeholder.com/150)

The diagram shows a circuit diagram of an electromechanical relay. The relay consists of a coil, actuating mechanism, and contact mechanism. The coil generates a magnetic field when current flows through it, attracting a movable armature that closes or opens contacts, depending on the circuit configuration. The actuating mechanism is typically a gear train or a solenoid, and the contact mechanism includes stationary and movable contacts operate to interrupt or complete a circuit.
electromotion • electron gun

electromotion Motion produced by electric charges or current.
electromotive device Abbreviation, emf. Electrical pressure, the potential that causes charge carriers to move through a substance or circuit. See VOLTAGE.
electromotive series A list of metals arranged ac- cording to their ability to free electrons from the surface of the metals and an electrolyte into which they are immersed. Some metals acquire a positive potential (with respect to hydrogen, for which the potential is zero) and others, a negative potential.
electromotor A generator or motor, depending upon the context in which the term is used.
electromyogram The record produced by an ELECTROMYOGRAPH.
electromyograph An instrument for detecting, measuring, and analyzing the weak electrical currents generated by muscular activity.
electromyography The monitoring and analysis of the electrical activity of human muscles.
electron The subatomic particle that carries the unit negative charge of electricity. The electron has a mass of 9.109 × 10⁻³¹ kilogram and carries a charge of 1.602 × 10⁻¹⁹ coulomb.
electron acceleration See ELECTRON MOTION. 2. electrononarosis Loss of consciousness caused by passing a weak current through the brain. Useful in treating certain mental disorders, the process is somewhat similar to ELECTROSHOCK.
electron attaching Bonding of an electron to a neutral atom to form a negative ion. Also see ANION and ION.
electron avalanche See AVALANCHE and ELECTRON MULTIPLEMENTATION.
electron beam An intense, parallel-lineline in the spectrum of an element or compound, caused by the movement of electrons from higher to lower energy levels within the atoms. 2. An absorption line in the spectrum of an element or compound, caused by the loss of an electron from lower to higher energy levels within the atoms.
electron beam See ELECTRON STREAM. 1. electron beam binder Any element that causes intentional deflection of the electron stream in a cathode-ray tube.
electron beam focusing Reducing the size of the spot produced by the electron beam in a cathode-ray tube picture tube. This is accomplished by adjusting the direct-current (dc) bias voltage on a focusing electrode.
electron beam generator 1. See ELECTRON GUN. 2. A tube, such as a Klystron, in which velocity modulation of the electron beam generates extremely high radio frequencies.
electron beam instrument An instrument, such as a scope, that uses a focused electron beam in a cathode-ray tube.
electron beam machining Welding or shaping of material by electron beams.
electron beam magnetometer A magnetometer in which the magnetic field under measurement deflects the electron beam in a cathode-ray tube over a distance that is proportional to field intensity. 2. electron beam recording In digital computer operations, a technique whereby the output of a computer is recorded on microfilm by an electron beam.
electron beam scanning tube A tube in which an electron beam strikes a sensitized screen to produce a spot of light, which is deflected electrically or magnetically across a screen. Examples are oscilloscope tubes, storage tubes, and television picture tubes.
electron beam tube Electron tubes (such as beam-power tubes, klystrons, oscilloscope tubes, and television picture tubes), in which an electron beam is generated and controlled.
electron beam welding A method of welding in which an electron beam is focused on the work-piece to heat it.
electron-bombarded semiconductor A semiconductor wafer, plate, or junction that is acted on by an electron beam; it alters the resistance of the semiconductor to control the current in an external circuit.
electron-bombarded semiconductor amplifier See EIS AMPLIFIER.
electron bunching See BUNCHING.
electron charge See ELEMENTARY CHARGE.
electron cloud A mass of free electrons.
electron diffraction An effect that occurs when a beam of electrons passes through a crystal material. Fast-moving electrons have wave-like properties; the wavelength depends on the speed of the particles. This effect can also occur with beams of other particles, such as neutrons, protons, or alpha particles.
electron drift 1. The movement of an electron from atom to atom in a conductor, as caused by the influence of an applied voltage. 2. In a semiconductor, directed electron movement. Also see DRIFT, 1.
electron negative Having negative electrification or polarity (see ELECTRICAL POLARITY). Compare ELECTROPOSITIVE.
electron emission The emission of electrons into surrounding space by a material. Depending on the material, this effect may be initiated by applied voltage, light, thermal, electric impact, a high-voltage field, and other actions.
electron flow See ELECTRON DRIFT.
electron g-factor A physical constant that expresses the ratio of electron magnetic moment to the Bohr magneton, and equal to approximately 1.00116. Also called free-electron g-factor.
electron-gas binding forces See METALLIC BINDING FORCES.
electron-gas bonding See BONDING, 1 and METALLIC BINDING FORCES.
electron gun A composite electrode for generating an electron beam (see ELECTRON STREAM). 1. In a vacuum. In a cathode-ray tube, the gun comprises a heated cathode, control electrode, accelerating electrodes, and a focusing electrode.

electron-hole pair In a semiconductor, an electron and a related hole. Each electron in the conduc- tion band has a counterpart in the valence band, a vacancy [hole] left by the electron’s moving to the conduction band.

electron-hole pair

electron gun • electron counter

electronic 1. Descriptive of any component, de- vice, or system that functions, according to the principles of ELECTRONICS. 2. Pertaining to electrons.
electron adder A circuit (such as an operational amplifier) for performing arithmetic addition. In such a circuit, the output-signal amplitude is the sum of the input-signal amplitudes. Also see ADDER and ANALOG ADDER.
electron aid An electronic device or circuit that contributes to the operation of a nonelectronic device or system, such as a transistor. Varying the direct-current (dc) bias of the input section varies the resistance of the output section.
electron autopilot A servo system for detecting and automatically correcting an aircraft’s flight path.
electron balance An electronic scale, which uses a sensitive current-measuring device in conjunc- tion with a movable tension device.
electron balance A generator or motor, depending on the type of operation. 1. See ELECTRONIC TECHNICIAN. 2. See ELECTRONIC CARILLON.
electron circuit An electric circuit containing active electronic components, such as transistors and integrated circuits, as opposed to a circuit containing only passive elements; such as resistors, switches, heating elements, etc.
electron clock 1. An electric clock whose motor is driven by a constant-frequency oscillator (crys- tals, mechanical fork, mechanical oscillator). 2. An electronic device or circuit that produces pulses at predetermined intervals for the purpose of regulating the operation of other circuits, subsystems, or assemblies.
electron counter A device or instrument that counts or measures the number of particles, such as electrons, protons, neutrons, or alpha particles.
electron count A flow of electric current resulting from the movement of electrons among terminal devices, such as vacuum tubes, transistors, etc.
electron control 1. The science of automatically controlling machines and devices by means of electronic circuits, as opposed to a circuit containing only passive elements; such as resistors, switches, heating elements, etc.
electron counter A circuit (usually powered via a small cell or battery, or by a small photovoltaic panel) that counts or measures the number of particles, such as electrons, protons, neutrons, or alpha particles.
applied to it (see COUNTER, 1). Unlike the electromechanical counter, the electronic counter has moving parts and is therefore capable of extremely high-speed, noiseless operation.

**electronic counter-countermeasures** Abbreviation. ECM. Military procedures for interfering with a foe’s electronic countermeasures.

**electronic coupler** Coupling via electronic effects or devices.

**electronic crowbar** A switch that prevents destructive currents from flowing through the components of a circuit.

**electronic current meter** A current meter that uses an amplifier ahead of an analog or digital indicator to provide increased sensitivity.

**electronic data-processing system** 1. A unique electronic data-processing system 2. See EDP.

**electronic data-processing center** Abbreviation. EDPC. The installation of electronic equipment and accessories for processing and storing data, usually in digital form. Also see DATA PROCESSING and ELECTRONIC INFORMATION PROCESSING.

**electronic data-processing machine** Abbreviation. EDPM. A device, such as an electronic computer, used in the automatic processing of data, usually in digital form.

**electronic data-processing system** 1. A unique arrangement of machines for processing data. 2. The sequence of steps in, and the underlying rationale for, the processing of data by automatized data handling equipment.

**electronic deception** See DECEPTION and DECEPTION DEVICE.

**electronic differential analyzer** See ANALOG DIFFERENTIATOR, DIGITAL DIFFERENTIAL ANALYZER, AND DIGITAL ANALYZER.

**electronic differentiator** A circuit that performs mathematical differentiation. Also see DIFFERENTIATOR.

**electronic divider** 1. An electronic device for performing arithmetical division. In a digital computer, such a divider can be a sequence of flip-flops, each of which produces a single output for every two input pulses. In an analog computer, the output signal amplitude is equal to the quotient of two input-signal amplitudes. 2. See FREQUENCY DIVIDER. 3. A voltage divider using active components, rather than resistors.

**electronic dust precipitator** See DUST PRECIPITATOR.

**electronic efficiency** A quantitative expression for the effectiveness of an electron beam as a medium of power transmission. The electronic efficiency, in percent, is equal to $100P_{in}/P_{out}$, where $P_{in}$ is the (input) power delivered by the beam, and $P_{out}$ is the (input) power supplied to the beam.

**electronic equivalent of gravity** In equations for the acceleration, velocity, and distance traveled for an electron, the factor equal to $e/m$, where $e$ is the electron charge, $m$ is the electron mass. Also see ELECTRON MOTION.

**electronic flash** 1. A device containing a circuit or driving mechanism which uses an electronic flash tube as a light source for photography or other purposes. Also called photoflash. 2. A bright momentary light burst produced by the equipment described in 1. above.

**electronic flash tube** A tube used to produce brilliant bursts of light in photoflash units, strobe-scopes, and laser exciters. A flash tube usually contains xenon gas, which is fired by a high-voltage pulse.

**electronic frequency meter** 1. An instrument that gives direct readings of frequency in hertz, kilohertz, or megahertz on an analog scale or as a digital readout. 2. Any device that indicates the operating frequency of another device, directly or indirectly, when one is used for such purposes.

**electronic frequency synthesizer** An instrument that supplies a number of selectable frequencies derived from one or more internally generated fixed frequencies.

**electronic gas** A collection of free electrons whose behavior resembles that of a gas.

**electronic gate** 1. A logic gate that operates by electronic means. 2. A device for controlling or consist- ing of a mechanical gate controlled electronically. Similar to an electronic switch.

**electronic heating** The production of heat in an object via high-frequency energy. The two principal methods are dielectric heating and induction heating.

**electronic hygrometer** An electrical device for measuring relative humidity, whose sensitivity and stability have been increased by the addition of active amplifying devices.

**electronician** See ELECTRONICS TECHNICIAN.

**electronic lock** See ELECTRONIC LOCK, IN- DUCTION.

**electronic industries association** Abbreviation, EIA. An American association of electronic manufac-turers and engineers. It sets standards, dis- seminates information, provides industry-government liaison, and maintains public rela- tions for the industry.

**electronic information processing** The use of electronic equipment (especially digital comput- ers and attendant devices) to perform mathemat- ical operations on data entered into the system in the form of electrical signals. Also see DATA PROCESSING.

**electronic instrument** An instrument whose circuit uses active devices for increased sensitivity over that of the electrical counterpart, and for minimum loading of a device under test. Compare ELECTRICAL INSTRUMENT.

**electronic integrator** A active device (such as an operational amplifier) for performing mathemati- cal integration. Also see INTEGRATOR. 2. A quantitative expression for the effectiveness of an electron beam as a medium of power transmission. The electronic efficiency, in percent, is equal to $100P_{in}/P_{out}$, where $P_{in}$ is the (input) power delivered by the beam, and $P_{out}$ is the (input) power supplied to the beam.

**electronic intelligence** 1. Information exchanged by electronic means. Examples: radio messages, radar information, and computer data. 2. The faculties of reasoning and decision making, as apparently simulated by a high-level computer.

**electronic interference** The malfunctioning of a device because of nearby currents, voltages, or electromagnetic fields.

**electronic inverter** An electronic device for converting direct current (dc) to alternating current (ac). Typically, an inverter is a transistorized square-wave oscillator inductively coupled to ac output terminals. The dc to be inverted energies the inductors, which perform the switching function at the rate determined by the compo- nents of the circuit. Also see INVERTER. 1.

**electronic lock** A lock that will open only after ap- plication of a special coded sequence of signals.

**electronic mail** Also called e-mail. A communica- tions system that allows people to leave digital text messages for each other. It is popular among users of personal computers. Operates through the telephone lines using terminal emulation software and a modem. It can also be used via amateur radio packet communications.

**electronic microammeter** See MICROAMMETER.

**electronic milliammeter** See MILLIAMMETER.

**electronicMultiplier** A device, such as a Hall gen- erator, whose output is equal (or proportional to) the product of two inputs (i.e., it can perform arithmetic multiplication).

**electronic music** 1. Music produced by a combi- nation of electronic oscillator, amplifier, and loudspeaker. A number of successful instru- ments have been developed. See, for example, ELECTRONIC CARILLON, ELECTRONIC ORGAN, and SYNTHESIZER. 2. The electronically amplified sounds of conventional musical instruments. Also called electronic organ. A musical instrument with a key- board similar to that of a conventional organ, in which tones produced by oscillators or electrically driven reeds are processed and amplified for delivery to a system of loudspeakers.

**electronic packaging** See ENCAPSULATION.

**electronic part** 1. Any device that uses active amplifying devices. Also see ELECTRONIC INSTRUMENT.

**electronic photoflash** A bright momentary light produced by electromagnetic effects. Also called electronic flash or photoflash.

**electronic piano** A musical instrument having the keyboard of a conventional piano and provided with electronic amplification.

**electronic power supply** A power supply using transistors or integrated circuits for stabilization and output control.
electronic precipitator  See DUST PRECIPITATOR.
electronic product  Any commercially manufact-
ured device intended for purchase by the public, by industry, or by government.
electronic profilometer  An electronic instrument for measuring surface roughness.
electronic ratchet  A stair-step circuit or other ar-
rangement of circuits in the manner of an
equivalent electronic mechanical stepping switch. Also see COMMUTATOR.
electronic reconnaissance  In military applica-
tions, the use of electronic systems to locate en-
emy installations (such as radio stations, guided-missile sites, and radar bases).
electronic rectifier  A rectifier that uses active de-
ces to change alternating current (ac) to direct current (dc).
electronic regulator  A voltage regulator that uses active electronic circuits, as opposed to a rector-
type or mechanical device. See, for ex-
ample, VOLTAGE REGULATOR.
electronic relay  1. A switching circuit that uses one or more transistors, and performs the relay
function without moving parts. 2. An electronic component designed to switch when gating sig-
nals are applied, e.g., triac, diac, or silicon-controlled rectifier.
electronic stimulator  1. The effective internal col-
lector-emitter resistance of a common-emitter bipo-
lar-transistor stage. 2. The effective internal drain-source resistance of a field-effect transistor (FET) stage.
electronics  The branch of physics concerned with the behavior and application of electric charge carriers in components, devices and systems that accomplish conversion, oscillation, signal pro-
cessing, and/or switching.
electronic engineer  A trained professional skilled in the physics and mathematics of elec-
tronics, and in the theory and application of basic engineering techniques and related subjects. Compare ELECTRICAL ENGINEER.
electronics service person  An electronics techni-
cian skilled in repairing and maintaining elec-
tronic equipment. Also called electronics service technician.
electronic shutter  See KERR CELL.
electronic technician  A professional skilled in building, testing, repairing, or maintaining elec-
tronic equipment.
electron  Technology  The theory and practical application of electronics. Taught as a sub-
enginering major, usually in two-year junior colleges or technical institutes, awarding the degree of as-
sociate in arts (AA) or associate in science (AS).
electron stethoscope  A stethoscope employing 4-microphone amplifier, and ear-
phones. The amplifier gain is continuously con-
trolled to its bandwidth often selectable for emphasizing particular heart sounds and other body noises.
electron stream  1. A beam of electrons gener-
ated by a stable oscillator. 2. Any minia-
ture timepiece incorporating solid-state circuitry, not especially one using a digital readout.
electronic subtractor  An electronic circuit for per-
forming arithmetic subtraction.
electronic surge  A sudden, large increase in the current in a conductor. Can be caused by an elec-
tromagnetic pulse; can also occur when utility power is restored following a blackout.
electronic switch  1. A nonmechanical device,
such as a flip-flop or gate, whose characteristic on-off operation can be used to make and break an
electric circuit. Compare CONTACT SWITCH. 2. A device using electronic gating and sequenc-
ing circuits to present several signals alternately to the single input of an oscilloscope, allowing si-
multaneous viewing of the signals.
electronic tachometer  An instrument for meas-
uring angular velocity, usually in revolutions per minute [rpm]. Ideal, the response is indi-
sensitive of sensor voltage amplitude, showing only the number of pulses per unit time reaching the
meter circuit.
electronic thermal conductivity  The thermal-conductivity coefficient, resulting from the transfer of heat by electrons and holes.
electronic thermometer  An instrument for mea-
suring temperature as a result of variations in a
temperature-sensitive component, such as a re-
sistor, thermocouple, or thermometer.
electronic timer  An electronic circuit or device for automatically timing a process or observed event. Most are based on the time constant of a stable resistance-capacitance (RC) circuit. Compare ELECTROMECHANICAL TIMER.
electronic tube  See ELECTRON TUBE.
electronic tuning  Variation of the resonant fre-
quency of a device or circuit by changing the bias voltage or current of a controlling electronic com-
ponent.
electronic voltmeter  A voltmeter that uses elec-
tronic amplification ahead of the indicating meter to provide high input impedance and increased sensitivity. Also see FET VOLTMETER and TRANSISTOR VOLTMETER.
electronic volthommeter  A volthommeter that uses electronic amplification ahead of the indi-
cating meter to provide high input impedance and increased sensitivity.
electronic typewriter  A typewriter with a micro-
processor, word processing, and alphanumeric display. The increased efficiency of elec-
trons is the result of electromagnetic attraction or repulsion. 2. The movement of an electron as a charged mass. In an electric field, this movement simulates that of a free-falling body in a gravita-
tional field.
electron multiplication  1. In a gas discharge, the production of additional electrons as a result of collisions between electrons, atoms, and molecules with their nuclei. The increased number of elec-
trons in a semiconductor when avalanche occurs.
electron-multiplier tube  1. A vacuum tube util-
izing a sequence of secondary emissions to in-
crease current amplification. Electrons from the cathode strike a positively biased dynode with a force that dislodges secondary electrons, which, upon joining those first emitted, are reflected to a second positive dynode that contributes more secondary electrons, reflecting the total to a third positive dynode, etc. The last dynode in the chain reflects the enhanced beam to an anode collector that passes the high current to an external cir-
cuit. 2. See PHOTOMULTIPLIER TUBE.
electrophotography  Printing by means of the electro-
static transfer of ink from a printing plate across a gap to an impression cylinder.
electron optics  See ELECTRO-OPTICS.
electron orbit  See ELECTRON SHELLS.
electron oscilator  A device in which oscillation is ob-
ained by causing electrons to move in an os-
cillatory path, to travel in bunches, etc. Exam-
ple: klystron, magnetron, and traveling-wave
electron pair  Two electrons from adjacent atoms, which sometimes share the same orbits, but al-
ways produce a bond between two adjacent atoms.
electron-pair bond  The bond between an electron pair.
electron physics  The physics of electronics, usu-
ally from a highly theoretical viewpoint.
electron-proton magnetic moment ratio  A phys-
ical constant of a particle that relates the magnetic moment of the electron to that of the proton.
electron-precipitator  A device that focuses an electron beam in a manner similar to the focusing of light rays by a glass lens. Also see ELECTROSTATIC LENS, ELECTROMAGNETIC LENS, and WAVE-
GUIDE LENS.
electron magnetic moment  The energy per unit flux density available in an electron. Approx-
imately equal to 9.2848 × 10⁻²⁴ jousle per tesla.
electron mass  See MASS OF ELECTRON AT REST.
electron microscope  A microscope in which the source of illumination is an electron beam fo-
cused by electromagnetic lenses. It allows much greater magnification than is possible with opti-
cal microscopes.
electron multiplier  A vacuum tube utiliz-
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cused by electromagnetic lenses. It allows much greater magnification than is possible with opti-
cal microscopes.
2. The electrons moving between the cathode and plate in an electron tube.

**electrostatic field** A stationary electric field.

**electrostatic copier** A recording of the voltage that ensures the electrical response of the human retina to light.

**electrophotography** The production of photographs by means of electricity. See XEROGRAPHY.

**electron-trap** A light-intensity meter using a photoelectric sensor and a meter, but usually not incorporating an amplifier. Compare ELECTRONIC PHOTOMETER.

**electron-tracer** An irrational fear of electricity, a psychological condition sometimes exhibited by victims of serious electric shock.

**electrophoretic effect** Sound heard by a person when an alternating current is passed through some part of the body.

**electrophoresis** The movement of dielectric particles through a liquid in which they are suspended, produced by the electric field between electrodes immersed in the suspension.

**electrophoresis equipment 1.** Any device intended for the purpose of depositing a dielectric material onto a metal by means of electrophoresis. 2. Any equipment in which electrophoresis occurs.

**electrophoresis scanner** A device that senses the movement of charged particles caused by electrophoresis effects.

**electrophoretic deposition** A type of deposition in which a low-voltage direct current passing through a colloid suspension of dielectric polymer particles deposits them as a coating on a metallic body (the anode in the process). It can provide a better coating than one obtained with spray painting or dipping.

**electrophorus** • electrostatic field 251

**250 electron stream • electrophorus**

**2.** The electrons moving between the cathode and plate in an electron tube.

**3**

**electrostatic amplifier** See DIELECTRIC AMPLIFIER.

**electrostatic charge** A simple device used to demonstrate electrostatic generation and induction. It consists of a smooth metal plate at the end of an insulating handle and an accompanying cake of resin, hard rubber. The cake is rubbed with cat’s fur, making it negatively charged. The metal plate is touched to the charged cake; by induction, it acquires a positive charge on the face that touched the cake and a negative charge on the opposite face. When the plate is lifted and its top face touched momentarily with the finger or grounded, the negative charge leaks off, often with a sharp spark, but the positive charge remains.

**electrostatic circuit** Any equipment in which electrophoresis is utilized for the purpose of depositing a dielectric material onto a metal by means of electrophoresis.

**electrostatic deflection** A simple device used to demonstrate electrostatic generation and induction. It consists of a smooth metal plate at the end of an insulating handle and an accompanying cake of resin, hard rubber. The cake is rubbed with cat’s fur, making it negatively charged. The metal plate is touched to the charged cake; by induction, it acquires a positive charge on the face that touched the cake and a negative charge on the opposite face. When the plate is lifted and its top face touched momentarily with the finger or grounded, the negative charge leaks off, often with a sharp spark, but the positive charge remains.

**electrostatic field** An electric field that uses electrostatic effects to reproduce printed material.

**electrostatic energy** The potential energy contained in an electrostatic field (e.g., the energy in a charged capacitor). Compare ELECTRIC NET ENERGY.

**electrostatic field** A stationary electric field.
electrostatic field intensity  An expression of the strength of an electrostatic field. Usually expressed in volts per meter, millivolts per meter, or microvolts per meter.

electrostatic flux  The flux existing around an electrostatic field. It is expressed in coulombs per meter per volt or volt-meters.

electrostatic focusing  In a cathode-ray tube, electron-beam focusing achieved by varying the dc bias voltage on a focusing electrode. Compare ELECTROMAGNETIC FOCUSING.

electrostatic galvanometer  A galvanometer operating on the principle of the electrostatic voltmeter.

electrostatic generator  A device for producing high-voltage electric charges; e.g., a Van de Graaff generator.

electrostatic headphone  A device similar to an electrostatic speaker, but held against the head for private listening. Incoming audio signals cause attraction and repulsion among charged plates, resulting in acoustic vibration.

electrostatic hysteresis  The tendency of some dielectrics (especially ferroelectric materials) to saturate and retain a portion of their polarization when an alternating electric field to which they are exposed reverses polarity. This causes the charge to lag behind the charging force.

electrostatic induction  The charge acquired by a body inserted into an electric field. Compare ELECTROMAGNETIC INDUCTION.

electrostatic lens  An assembly of deflecting plates or cylinders, whose electric field causes an electron beam to converge or diverge in much the same way as a visible light beam passing through an optical lens. Compare ELECTROMAGNETIC LENS.

electrostatic loudspeaker  See ELECTROSTATIC SPEAKER.

electrostatic memory  A memory unit in which information bits are stored in capacitive cells swept by the scanning electron beam.

electrostatic microphone  See CAPACITOR MICROPHONE.

electrostatic phase shifter  See PHASE-SHIFTING CAPACITOR.

electrostatic potential  In an electric field, the potential energy represented by the voltage between the two elements creating the field, or between any two points within the field.

electrostatic precipitator  A device by which air impurities, such as DUST PRECIPITATOR.

electrostatic printer  A computer output peripheral in which the printing medium, a fine dust, is fused by heat onto paper that has been charged according to the data being represented.

electrostatic process  1. Any process that uses electrostatic action. 2. A method of photography in which visual images are converted to electrostatic images.

electrostatic recording  A method of recording that employs a signal-controlled electric field.

electrostatic relay  A high-input-impedance relay consisting of two polarity-controlled contacts; opposite charges on the contacts close the relay, and like charges open it.

electrostatics  The branch of electricity concerned with electrical charges at rest. Compare ELECTRODYNAMICS and ELECTRONICS.

electrostatic screen  A shield against electric flux consisting of a number of straight, narrowly separated rods or wires joined at only one end. The shield has little effect on magnetic flux. Also called Faraday shield.

electrostatic separator  A device for separating fine particles from a mixture by exposing the mixture to an intense electrostatic field.

electrostatic series  A list of materials arranged in this sequence: any one of them becomes positively electrified when rubbed with another lower in the list, or negatively electrified when rubbed with another higher in the list. Compare ELECTROMOTIVE SERIES.

electrostatic shield  Any metallic enclosure designed to confine an electric field.

electrostatic speaker  A loudspeaker whose vibrating diaphragm is one of two plates in a large air-dielectric capacitor, the other being a closely spaced metal plate or plug. An audio voltage applied to the plates causes them to vibrate. Also called capacitive loudspeaker and capacitor loudspeaker.

electrostatic voltmeter  A high-input-impedance relay consisting of two polarity-controlled contacts; opposite charges on the contacts close the relay, and like charges open it. A cathode-ray tube in which visual images are converted to electrostatic images. See ELECTROSTATIC FIELD STRESS.

electrostatic voltmeter  A device for producing high-voltage electric charges; e.g., a Van de Graaff generator.

electrophotography  See XEROGRAPHY.

electrothermics  The study and application of the heating effects of electricity in conductors and conductive media. Also called THERMAL RECORDER.

electrotellurograph  An instrument for measuring ground currents.

electrotherapeutics  See ELECTROTHERAPY.

electrotherapy  The treatment of disorders or diseases by electrically induced heat—especially by DIATHERMY.

electrothermal  1. Pertaining to electrically generated heat. 2. Pertaining to a combination of electric and heat.

electrothermal device  A device whose operation depends on the heat generated by an electric current, e.g., a thermometer, high-voltage electric charges; e.g., a Graaff generator. See ELECTROSTATIC GENERATOR.

electrothermal instrument  A hot-wire or thermo-couple-type meter.

electrothermistor recorder  See ELECTRIC RECORDING, and THERMAL RECORDER.

electrothermometer  See ELECTROTHERMAL.

electrotonic  Pertaining to ELECTROTONUS.

electrotomus  Modification of a nerve’s sensitivity by passing a constant current through it.

electro-ultrafiltration  In physical chemistry, filtering a colloidal suspension by electro-osmosis.

electrovalency  The number of atoms and the resulting creation of ions.

electrowin  The deposition of certain metals in a solution in capillary tubes when an electric current passes through the solution.

electrolysis  The study and application of the electrical excitation of nerves and the resulting creation of ions.

electrolysis  The study and application of the electrical excitation of nerves and the resulting creation of ions.

electrolytic  Pertaining to ELECTROLYSIS.

electrolyte  A natural alloy of gold and silver.

electrolyte dollars  1. See ELECTRODE. 2. A circuit component intended for a specific purpose. 3. A specific part of an antenna array (e.g., driven element or parasitic element) that serves a fundamental, unique substance whose atoms are of only one kind (examples: aluminum, carbon, silicon, and sulfur). There are more than 100 elements, some man-made. Elements combine to form compounds. A circuit component such as an ANTENNA that can be taken as a unit because it performs a special function. 6. In digital computer
elliptical load line
See ELLIPTIC FILTER.

elliptical filter
The center point.


E₠, Symbol for MAXIMUM VOLTAGE.

Abbreviation of ELECTROMAGNETIC INTER-
FERENCE.

elliptical polarization
Polarization characterized by elliptical rotation of the wave vector at a given point.

electrical conductivity
A semiconductor containing one undoped chemical element.

electric charge
See ELEMENTARY CHARGE.

electromagnetic field
A vector field containing electric and magnetic fields.

-.y
-.x

ellipse
A geometric figure having the Cartesian-plane formula (x-a)²/b² + (y-b)²/c² = 1, where a and b are constants, and x₀ and y₀ represent the center.

elliptical polarization
See ELLIPTIC FILTER.

electrometer
A device used to measure minute quantities of electric charge.

electron
A minute charged or uncharged particle within the atom (i.e., electron, proton, neutron, quark, etc.). 3. In theory, a subatomic particle that cannot be broken down into smaller particles.

electromagnetic emission
A sequence of radio communication emission types. See EMISSION MODE.

electromagnetic emission code
A printed circuit

electromagnetic wave
A wave in which the rotation of the electric-intensity vector at one point describes an ellipse.

electromagnetic waves
Waves radiated between the antenna or fed into a transmission line.

elliptical orbit
A satellite orbit that is not a perfect circle. In theory, all satellites deviate slightly from perfectly circular orbits. Sometimes a satellite is deliberately put into an orbit that is greatly elongated. The closer the satellite is to the earth, the faster it moves.

electromagnetic compatibility
A system of abbreviating the various types of radio communication emission types. Emissions are designated according to the modulation method used (e.g., continuous waves, amplitude modulation, single-sideband with suppressed carrier, frequency modulation, pulse modulation, etc.).

electromagnetic coupling
The rate at which energy is radiated from the antenna or fed into a transmission line.

electromagnetic spectrum
The radiation spectrum of a substance that emits energy (e.g., the light spectrum of an incandescent metal). Emissions are classified according to the modulation method used (e.g., continuous waves, amplitude modulation, single-sideband with suppressed carrier, frequency modulation, pulse modulation, etc.).

element
A unidoped chemical element.

elliptical groove recording
1. A phonograph record into which grooves are embossed, rather than scribed.

elliptical load line
See ELLIPTIC FILTER.

elliptical orbit
A satellite orbit that is not a perfect circle. In theory, all satellites deviate slightly from perfectly circular orbits. Sometimes a satellite is deliberately put into an orbit that is greatly elongated. The closer the satellite is to the earth, the faster it moves.

elliptical polarization
Polarization characterized by elliptical rotation of the wave vector at a given point.

electrode
A conductive filament element of a vacuum tube.

electron
A minute charged or uncharged particle within the atom (i.e., electron, proton, neutron, quark, etc.). 3. In theory, a subatomic particle that cannot be broken down into smaller particles.

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A wave in which the rotation of the electric-intensity vector at one point describes an ellipse.

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elliptical polarization
See ELLIPTIC FILTER.

elliptical function
See ELLIPTIC FUNCTION.

elliptical orbit
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emissivity • empirical design

source at a particular temperature, and \( W_e \) is the energy emitted by a blackbody (i.e., a theoretically perfect radiator) at the same temperature.

emittance For an energy-radiating source, the radiant energy per unit area of radiating surface.

emitted electron An electron that has left an atom of a material and has escaped into surrounding space or entered a neighboring material.

emitter 1. A body that discharges particles or waves (see EMISSION). 2. In a semiconductor device, the area, region, or element from which current carriers are injected into the device. In a transistor symbol, the emitter is that electrode shown with an arrowhead.

emitter-base junction In a bipolar transistor, the boundary between base and emitter regions.

emitter bias Emitter current or voltage maintained to set the operating point of a bipolar transistor.

emitter bulk resistance The portion of the resistance of the semiconductor material in a transistor that affects emitter resistance.

emitter-coupled logic A bipolar form of digital logic, abbreviated ECL.

emitter-coupled multivibrator A two-transistor multivibrator circuit in which the emitters share a common resistor.

emitter-coupled phase inverter A transistor phase inverter in which the output-phase component is taken from the collector and the in-phase component from the emitter of the same transistor. Another transistor is often used to amplify the in-phase component so that both outputs are equal in magnitude.

emitter-follower A transistor circuit in which the output signal is applied to the base, and the output signal is taken from the emitter resistor. Gain is always less than unity; output impedance is low.

emitter-input circuit See COMMON-BASE CIRCUIT.

emitter junction See Emitter-base junction.

emitter resistance Symbol, \( R_e \). The resistance of the emitter electrode in a bipolar transistor. 2. External resistance connected to a transistor's emitter terminal.

emitter stabilization In a common-emitter transistor stage, an emitter resistor that stabilizes the circuit against temperature variations.

emitter-to-base junction See emitter-base junction.

emitter voltage Symbol, \( V_e \). The voltage at the emitter electrode of a bipolar transistor.

Emin, Emp 1. Abbreviation of ELECTROMAGNETIC PULSE. 2. Abbreviation of electromagnetic power.

emphasis Modification of the amplitude-versus-frequency output or response of an audio circuit, for the purpose of optimizing signal intelligibility.

emphasizer An audio-frequency device with a specially tailored response, intended to maximize intelligibility of a voice.

Empire cloth Varied, cumbersome. Used as an insulating sheet or tape.

empirical Observable, derived from experimentation.

empirical curve A curve plotted from data acquired from observations, tests, and calculations, rather than from mathematical laws or other theory.

empirical design The design of electronic circuits by cut-and-try methods and, to some extent, through intuition arising from experience (i.e., practical as opposed to theoretical design).

empirical probability Probability estimated from experience and observations. This method is often used in quality-control and reliability procedures of a communications system.

empty medium A computer storage medium, such as a magnetic tape or disk, that is ready to accept data (i.e., rather than being completely blank, it contains the signals necessary for processing the to-be-added data).

EMU, emu Abbreviation of ELECTROMAGNETIC UNIT(S).

emulator In computer engineering, a sophisticated device that substitutes for a similar device or stage in the computer, and thereby provides a basis for experimenting and troubleshooting without disturbing the equivalent part of the computer. \( E_m \) Symbol for voltage remaining at null.

enable To initiate the operation of a circuit or device by applying a pulse or trigger signal.

enable pulse 1. A pulse that initiates the operation of a circuit or device. 2. A binary pulse that augments a write pulse to make a magnetic core change state.

enabling gate A digital device that regulates the length of a pulse for specialized use.

engineered wire Wire that is insulated by a thin coat of baked enamel. Commonly used in coil winding because the thin enamel allows for a maximum number of turns in a given volume for a given wire gauge.

encapsulant A material, such as potting resin, used to embed (encapsulate) a component, circuit, or device.

encapsulated circuit A component, circuit, or device embedded in plastic or wax (see encapsulation).

encapsulated component An electronic part that is embedded in plastic or wax (see encapsulation).

encapsulating material See encapsulant.

encapsulation The embedding of a circuit or component in a solid mass of plastic or wax. The mold or container remains as part of the assembly after the plastic is solidified. Protects against the environment, and/or against the effects of physical vibration. Compare POTTING.

encephalogram See EEG.

encephalograph See ELECTROENCEPHALOGRAPH.

encephalograph machine See EEG.

end-around carry In a computer, a carry produced in the most significant position, causing a carry into the least-significant position.

end-around shift In digital computer operations, the transfer of characters from one end of a register to the other end (shift). Also called SHIFT.

end bell 1. The part of a motor housing that supports the bearing and protects internal rotating parts. 2. A clamper fastened to the back of a plug or receptacle. 3. Either of the two frames of a transformer that contains the mounting lugs.

end bracket See END BELL.

end cell A cell intended for series operation in conjunction with a storage battery. As the voltage of the battery drops, the end cell can be added into the circuit.

end effect 1. In a tapped coil, losses because of in-dwound currents flowing in the inductance and distributed capacitance of the unused end of the coil. 2. EDGE EFFECT in a capacitor. 3. An effective capacitance at the ends of an antenna, resulting from air discharge. This lowers the resonant frequency slightly below that predicted by theory. The effect is exaggerated by the proximity of objects, such as trees and buildings, or when the antenna is placed close to the earth.

end effector The device or tool connected to the end of a robot arm (e.g., a gripper, screwdriver, drill, or soldering iron).

end-fed antenna An antenna whose lead-in or feeders are attached to an end of the radiator.

end feed A method of feeding electromagnetic fields to an antenna by connecting the transmission line to the end. Ordinarily, the antenna must be a multiple of 0.5 wavelengths long for end feed to be effective.
end-fire antenna • end point 259

end-fire array
See END-FIRE ARRAY.

end-fire array Also called end-fire antenna. A phased antenna in which the greatest radiation/response takes place off one or both ends. The array consists of two or more parallel driven elements, all of which lie in a single plane. A typical system might consist of two half-wave dipoles, fed 90 degrees out of phase and spaced one-quarter wavelength apart in free space. This produces a unidirectional directivity pattern. Two elements might be driven in phase and spaced 1 wavelength apart, producing a bidirectional pattern. These systems show some power gain, in their favored directions, compared to a single half-wave dipole. The larger the number of elements, with optimum phasing and spacing, the greater the gain.

endodyne reception See ZERO-BEAT RECEPTION.

end-of-charge voltage For a rechargeable cell or battery, the voltage at full charge (i.e., just after disconnection of the charging apparatus and before use).

end-of-data mark A code or character signaling that all the data in a computer storage medium has been read or used.

end-of-discharge voltage For a rechargeable cell or battery, the voltage at the termination of a discharging cycle, immediately before the unit is taken out of use and the charging apparatus is connected.

end-of-field mark In computer operations, a "flag" code that signals when the end of a field has been reached.

end-of-file mark In computer operations, a code instruction that signals when the last record in a file has been read.

end-of-line unit The last device or circuit in a chain.

end-of-message character A character or code signaling the end of a message.

end-of-run The end of a computer program or program run, as indicated by the program.

end-of-tape mark A physical marker at the end of a magnetic tape (e.g., something that can be sensed by methods other than that used to read the tape).

end-of-tape routine A computer program that handles the processing needed after the last record on a reel of magnetic tape has been reached.

end-on armature A relay armature that moves in the direction of the current flow.

end-on directional antenna See END-FIRE ANTENNA and END-FIRE ARRAY.

endoradiograph An X-ray picture, derived or enhanced by the introduction of substances into the body.

endondiosoine A tiny pill-enclosed transducer and radio transmitter for sensing physiological conditions in the stomach and intestines; it transmits corresponding signals to instruments outside.

endothermic reaction A chemical reaction producing cold (i.e., one in which kinetic energy is reduced). Compare ENOTHERMIC REACTION.

end-plate magnetron A magnetron whose oscillation frequency is increased by a positive and a negative end plate, the electric field between them causes the electrons to move axially while spinning clockwise.

end point 1. For a precision potentiometer, the shaft position between the last and first positions of measurement. 2. The point at which a time interval or operational sequence ends. 4. The end-point voltage of a primary or Edison storage cell.

energize To apply operating power and input signals to a circuit or device.

energized The condition of a circuit or device that is powered or excited.

energy Symbol, W. Common units: joule, watt-hour, and kilowatt-hour. 1. The capacity for doing work. Some common forms of energy are electrical, mechanical, and thermal. Also see CONSERVATION OF ENERGY, KINETIC ENERGY, and POTENTIAL ENERGY. 2. The transformation of energy performed by electric power. The unit used by utility companies is the kilowatt-hour (kWh), equal to the product P, where P is power in kilowatts and t is the period (hours) during which the power is used.

energy-band diagram A diagram depicting the various energy levels within the atom of a conductor, semiconductor, or insulator.

energy barrier The natural potential gradient across a semiconductor junction. In the absence of an applied voltage, the gradient, not measurable from the outside, prevents total interaction between the n- and p-type materials.

energy cell 1. A usually small primary or secondary cell—especially the kind used in hearing aids and electronic watches. 2. A capacitive type direct-current (dc) source (see ENERGY-STORAGE DEVICE).

energy consumption 1. The conversion of energy from one form to another by a component, circuit, system, or machine, in the process of performing some useful task. 2. The amount of energy involved in the process defined in 1.

energy conversion The transformation of energy from one form to another. See also CONSERVATION OF ENERGY and ENERGY TRANSFORMATION.

energy-conversion device A component, circuit, system, or machine that changes energy from one form to another. See also CONSERVATION OF ENERGY.

energy density 1. For an energy-producing cell, such as an electrochemical cell, the ratio of available energy to cell mass. It is expressed in joules per gram or watt-hours per kilogram. 2. For an energy-producing cell, the ratio of available energy to cell volume. Expressed in joules per cubic centimeter or in watt-hours per cubic centimeter.

energy gap In the energy-level diagram for a semiconductor or insulator, the region between the valence and conduction bands representing the minimum energy required to make the electron pass from the valence to the conduction band (i.e., to become a current carrier). Also called FORBIDDEN ENERGY GAP.

energy level A constant-energy state, such as one of the energy levels of an electron in an atom. 2. A diagram showing the energy levels (in electronvolts) of electrons in the various shells of an atom. 2. A diagram showing variations in power that correspond to variations in current in a channel.
energy loss In any system, the energy that is un-
avoidably lost (i.e., it is not converted into useful work). Also see ENTROPY and POWER LOSS.
energy of a charge The energy level of an elec-
trostatic charge. It is Q/2 e, where Q is the quantity of electricity in coulombs, and e is the potential in volts.
energy product An expression of the effectiveness of a permanent magnet. The magnetic flux den-
sity is multiplied by the magnetic field strength to obtain the energy product, specified in gauss-
sterktes.
energy redistribution A mathematical process for
determining the effective duration of an irregular pulse. The instantaneous power output of the ir-
regular pulse is integrated from the start to the end of the pulse. Then, a rectangular pulse is con-
structed having the same peak power and the same total energy content (area under the power curve). The length of this rectangular pulse is considered to be the effective duration of the ir-
regular pulse.

energy state The condition of an electron, as ex-
pressed by its position and velocity, with respect to the position and velocity of other electrons.
energy-storage capacitor A usually high-value ca-
pacitor used primarily to store the charge used to fire a lamp (as in a flashlight unit), create a spark discharge (as in electronic ignition), or per-
form some similar function.
energy-storage device 1. SEE CAPACITOR. 2. A small, electrochemical component offering very high capacitance (e.g., several farads) and low leakage current (less than 1 pA). It has a number of applications, including long-interval timing, power-supply filtering, and energy-cell service. Its active ingredients are compressed powders.
energy stored in capacitor The electrical energy in the field between the plates of a charged ca-
pacitor. In this instance, energy W = Q^2/2C, where Q is the quantity of electricity in coulombs, C is the capacitance in farads, and E is the voltage in volts.
energy stored in inductor The magnetic energy in the field surrounding an inductor carrying cur-
rent. In this instance, energy W = L I^2/2, where W is the energy in joules, L is the inductance in hen-
rys, and I is the current in amperes.
energy transformation The conversion of one form of energy into another, as with a transducer.
engine analyzer An instrument for checking the performance of an automobile engine. In addition to measuring voltage and resistance throughout a car's electrical system, the instrument measures engine speed, can dwell angle, and other factors.
engineer 1. A person who designs machines, cir-
cuits, and other devices. 2. A person who devel-
ops methods of utilizing machines, circuits, or other devices more efficiently, or for new applica-
tions. 3. To design or implement an apparatus.
engineering The science of applying scientific laws to technical problems and designing practical de-
vices. Also see ELECTRICAL ENGINEER and ELECTRONICS ENGINEER.
enhanced-carrier demodulation A method of reducing distortion in the demodulation of amplitude-modulated (AM) signals. A properly phased and synchronized local carrier is added to the signal in the demodulator.
enhancement mode Operation characteristic of an ENHANCEMENT-TYPE MOSFET.
enhancement-type MOSFET A metal-oxide semi-
conductor field-effect transistor (MOSFET) in which the channel directly under the gate elec-
trone is widened (enhanced) by a negative gate voltage in the n-channel unit or by a positive gate voltage in the p-channel unit. Compare DEPLETION-TYPE MOSFET.
eniac An electronic computer developed at the University of Pennsylvania. The name is an acronym for Electronic Numerical Integrator And Calculator.
enic Abbreviation of voltage negative-impedance converter.
enrichment In a mixture of different isotopes of a
given element, the increase in the relative con-
centration of one particular isotope.
ensemble 1. A collection of devices that functions
together as a complete unit. 2. In music recording,
the ability of all the musicians to hear each other
during the session. 3. A set of random mathemat-
ical functions, all starting at the same point.
esni Abbreviation of EQUIVALENT-NOISE-SIDE-
BAND INPUT.
entladungsstrahlen Ultraviolet radiation emitted by
electric arcs. At atmospheric pressure, the wavelength is approximately 40 to 90 nanometers,
equal vectors

epitaxial device A semiconductor device built by means of EPITAXIAL GROWTH.

epitaxial film A single-crystal semiconductor material deposited onto a single-crystal semiconductor substrate.

epitaxial growth Growing monocrystalline silicon on a silicon wafer by precipitating silicon from a gas in which silicon is placed. Epitaxy is secured between the precipitate and the wafer.

epitaxial layer A semiconductor layer exhibiting epitaxy. Also see EPITAXIAL GROWTH.

epitaxial mesa transistor See DOUBLE-DIFFUSED EPITAXIAL MESA TRANSISTOR.

epitaxial planar transistor A planar transistor having an epitaxially grown collector on a low-resistivity substrate, and a diffused base and emitter.

epitaxial process See EPITAXIAL GROWTH PROCESS.

epitaxial transistor A transistor in which an epitaxial layer into which a base region later is diffused and an emitter region alloyed is grown on the face of a semiconductor wafer, which serves as the collector. Also see DOUBLE-DIFFUSED EPITAXIAL MESA TRANSISTOR.

epitaxy The condition in which atoms in a thin film of single-crystal semiconductor material grown on the surface of the same kind of wafer continue their characteristic alignment. Also see EPITAXIAL GROWTH.

E-plane The plane of an antenna containing the electric field.

E-plane bend See E BEND.

E-plane junction A waveguide junction whose structure changes in the plane of the electric field.

epoxy resin A synthetic resin used to encapsulate electronic equipment, or as a cement. Epoxy resins are based on ethylene oxide or its derivatives.

EPROM Abbreviation of erasable programmable read-only memory.

Eq 1. Abbreviation of electronic power unit.

Epoxidation of epoxy resin.

Eq 1. Abbreviation of equation.

equation solver A (usually analog) computer for solving linear simultaneous equations or for determining the roots of polynomials.

equalization 1. The use of an EQUALIZER to make the frequency response of a line, amplifier, or other device uniform over a given frequency range.

2. The use of an EQUALIZER to modify the frequency response of a line, amplifier, or other device.

equalizer A circuit or device, such as a compensated attenuator, that allows the user to tailor the frequency response of a line, amplifier, or other device. Sometimes used in sophisticated high-fidelity stereo amplifier systems, to obtain a desired bass/midrange/treble frequency output.

equalizer circuit breaker A form of circuit breaker that trips in the event of unbalance in an electrical system.

equalizing current A current that flows in the circuit of two compound generators connected in parallel.

equalizing network A circuit used to equalize a line.

equalizing pulses In a television signal waveform, several pulses (preceding and following the vertical sync pulse and having a repetition rate of twice the power-line frequency) that start the vertical retrace at the correct instant for good interface.

equal-loudness curves See AUDIBILITY CURVES.

equal vectors Vectors having the same magnitude and the same direction. They do not necessarily originate at the same point. Compare IDENTICAL VECTORS.

epitaxial device • equation solver
equivemt inductance • equivalent wye

action as the inductance distributed throughout a circuit.

equivemt input offset current For a differential amplifier, the difference between currents flowing into the inverting and noninverting inputs when the output voltage is zero.

equivemt input offset voltage For a differential amplifier, the input voltage required to reduce the output voltage to zero.

equivemt input wideband noise voltage For a differential amplifier, the ratio Vn/Vm, where Vn is the root-mean-square (rms) output-noise voltage, and Vm is the direct-current (dc) voltage gain.

equivemt length of antenna 1. The electrical length of an antenna, as measured in degrees or wavelengths. 2. The free-space length of an antenna. 3. The length d (in feet) of a quarter-wave resonant antenna at a specific frequency f (in megahertz), given by the formula d = 234/f. 4. The length (in feet) of a half-wave resonant antenna at a specific frequency f (in megahertz), given by the formula d = 468/f.

equivemt length of electric dipole The distance, measured in a straight line, separating the points that represent the charge centers of an electric dipole.

equivemt length of feed line The electrical length of a feed line as measured in degrees or wavelengths. Generally, this is equal to 1/7 times the line length in free-space wavelengths, where v is the VELOCITY FACTOR of the line, expressed as a fraction between 0 and 1.

equivemt length of magnet The distance separating the poles of a magnet. In a bar magnet, these poles are not exactly at the ends. The actual equivalent length is about 83% of the length of the bar magnet.

equivemt noise-offset bandwidth The range of frequencies over which the noise voltage can be measured.

equivemt power In a two-terminal system, the effective power dissipated in the system and measured at the terminals when the input signal is a sinusoidal waveform of frequency f, given by the formula P = Vrms x Imax f.

equivemt ripple ripple noise

equivemt time The effective duration of some phenomenon, such as a pulse.

equivemt voltage same as EQUIVALENT VOLT.

equivemt wye In a three-phase system, a wye-connected circuit from a standpoint of impedance and phase. Also see DELTA CONNECTION, EQUIVALENT DELTA, WYE CONNECTION, and WYE EQUIVALENT CIRCUIT.

equivemt Y See EQUIVALENT WYE.

eqvocation A condition in which the meaning of a word depends on certain parameters.

ER Abbreviation of ECHO RANGING.

Er Symbol for EBIRUM. E4 Symbol for voltage drop across a resistance.

erasable storage In computer operations, any storage medium holding information that can be erased.

erasable PROM A programmable read-only memory (PROM) from which the data can be removed, usually by exposure to ultraviolet light. Also see PROM.

erase To obliterate or remove a signal, especially a recorded one, as in the erasure of recorded material from a magnetic tape or the data from a computer disk.

erase button A pushbutton that actuates the circuit supplying a signal that erases stored material (as displayed on a storage oscilloscope).

erase current In an electromagnetic erase head, the current flowing through the coil of the head.

erase head In a tape recorder, a head used to erase recorded material from tape. It can contain a permanent magnet (see ERASE MAGNET) or an electromagnetic whose coil carries erase current.

erase magnet In a tape recorder, a high-frequency typically 30 to 80 kHz oscillator that supplies erase current.

erase signal A signal that causes recorded material in the head to be erased (see ERASE). For a material in the head, the erase signal is the voltage drop across a resistor.

erasing speed The rate at which successive storage devices are erased, as in a charge-storage tube.

erasure 1. In tape-recording and digital-computer operations, the process of erasing a recorded signal (see ERASE). 2. An erasure accomplished by the process described in 1, above.


e register In a computer, a register used in double-precision calculations.

E,, E signal In color television, the resultant signal that is the difference between the original full red and full blue signals.

ER Abbreviation of ELECTRORETINOGRAPHY.

Erg Abbreviation of ELECTRODE. A. A unit of work. It is the work done by a force of one dyne (10^-5 newton) acting through a distance of one centimeter.

ekgograph An instrument used to measure and record heart sounds.

ekgometer An instrument for measuring energy consumed or work accomplished.

epton See ER.

E, Symbol for ROOT-Mean-Square Voltage. ERP Abbreviation of EFFECTIVE RADIATED POWER.

er error 1. In calculations and measurements, the difference between a true value and an observed or calculated value. 2. In electronic circuits, especially those of automatic control systems, the difference between the required and the actual signal level. 3. Generally, the maximum plus- or minus-error per measurement is multiplied by the number of measurements.

er error amplifier An amplifier for boosting error curr...

er error-checking code An error-checking code that, in addition to the function indicated by its name, also indicates the correct code.

error-correcting code An error-detecting code that, in addition to the function indicated by its name, also indicates the correct code.

error-correcting telegraph A digital communications system in which an improbable or incorrect character is not accepted as the event that such a character is received, the receiver instructs the transmitter to send that character again.

error correction 1. The restoration of mutilated, corrupted, or missing data in a digital system.
especially in magnetic data storage media, such as tapes and disks. In digital communications, any message character (designation) automatically eliminates (to the greatest possible extent) errors in data from a transmitter (source). Source error correction (destination) automatically eliminates (to the greatest possible extent) errors in data from a transmitter (source).

error current An error signal that is a feedback current for automatically correcting a system.

error curve A bell-shaped curve that describes the distribution of errors in measurement around a true value.

error-detecting code In computer operations, a character-coding system that ensures that an impossible combination (forbidden characters) will be generated by an error (for error detection).

error-detecting routine A computer program that detects errors by checking the validity of data.

error detection and feedback In computer operations, a system in which an error (sensed by an error-detecting code) automatically generates a request to repeat the suspect signal.

error detector A sensor that responds to an error signal by delivering a signal proportional to the error.

error diagnostics As performed by a compiler, detecting and indicating the presence of errors in the source language statements.

error flag As produced by a compiler, a list of source language statement faults.

error message During a computer program run, a statement (displayed on a peripheral) of what is the error.

error of measurement The positive or negative difference between the value of an actual measurement and the true (or most probable) value.

error range For a data item, the range of values for which the specified error is acceptable.

error rate In data transmission, the ratio of errors transmitted to the data transmitted.

error rate damping A damping that involves adding to an error signal another signal that is proportional in phase to the error.

error ratio 1. In a received message, the number of incorrect characters divided by the total number of characters represented as a fraction between 0 and 1 or as a percentage by multiplying the fraction by 100. 2. A measure of distortion in a signal.

error range The number of inaccuracy received bits divided by the total number of received bits.

error routine A computer program segment that is input when an error is detected so that an appropriate action is taken (correct the error, repeat the process, etc.).

error-sensing circuit A circuit that samples the output current or voltage of a power supply, amplifier, or control system, compares this output with a standard value, and delivers a feedback (correction) signal whose amplitude is proportional to the difference between the actual operating quantity of the system and a standard reference quantity. The signal is fed back to the input of the system for automatic correction.

error tape In data processing, a record tape designed and used for storing errors for subsequent study.

error voltage An error signal that is a feedback voltage for automatically correcting a system.

Es Symbol for EINSTEINIUM.

Eskaldi diode See TUNNEL DIODE.

E scope See E DISPLAY.

escape character In computer operations, a character indicating that the next character belongs in a new group.

escapement A (usually oscillating) mechanical or electromechanical device that stores energy (often in a spiral spring) on one swing, and returns that energy on the next swing. Such a mechanism advances a shaft progressively in a clock or watch.

escape velocity 1. The minimum velocity (about 25,000 miles per hour or seven miles per second) required for a space vehicle to completely escape the gravitational field of the earth. 2. The minimum velocity required for an electron to escape the electrical influence of an atomic nucleus.

etching 1. The process of thinning a quartz-crystal plate by slowly eroding one or both of its faces with hydrofluoric acid to finely tune the resonant frequency. Compare ODD HARMONIC.

etcher 1. Also called luminescent ether. A nonvaporized fluid once thought to fill air spaces, convey waves (radio, light, etc.), and sustain fields. 2. A volatile liquid occasionally used in electronics as a solvent (e.g., ethyl oxide (C₂H₅)₂O).

ether drift The postulated motion between a material body and the ether (see ETHER, 1). The concept was checked by Michelson and Morley, who failed to find the maxwell waves relative to the ether. This eventually led to scientific rejection of the so-called ether theory of the propagation of light.

etherial body and the ether (see ETHER, 1).

ether 1. See CONSTANTAN. 2. The ground transponder beacon in the British rebecca-eureka radar navigational system (see REBECCA-EUREKA SYSTEM).


eutronic 1. A form of reaction in which mixed liquids solidify when cooled. 2. The solid substance resulting from a reaction as defined in 1.

eutectic alloy A metallic alloy with a specific melting point, made via eutectic process.

eutectic bond A connection between two dissimilar metals, facilitated by a third metal alloyed, via eutectic process, to the adjoining faces.

ev Symbol for ELECTRONVOLT.

evacuation The removal of air or other gases from a tube or chamber, specifically, the envelope of a vacuum tube that houses the internal elements.

evaporation 1. A technique for electrically depositing a film of a selected metal on a metallic or non-metallic surface. A filament of the metal to be deposited is heated by an electric current in a vacuum chamber, which makes filament particles travel to the (nearby) object to be coated, where they condense on the object. A third method, a piece of the metal to be deposited is laid on or wrapped around a filament of some other metal. 2. Electron emission by a hot cathode.

evaporation theory The theory that electrons will acquire sufficient escape velocity to leave a material when the energy acquired by (or imparted to) the electron exceeds the work function of the material. Also see WORK FUNCTION.

eV Symbol for ELECTRONVOLT.

etching 1. Chemically eating away a metal to form a desired pattern, such as an etched circuit; 2. Thinning a quartz-crystal plate by slowly eroding one or both of its faces with hydrofluoric acid to finely tune the resonant frequency.

ET Cut crystal A piezoelectric plate cut from a quartz crystal at an angle of +66°, with respect to the z-axis. Also see CRYSTAL AXES and CRYSTAL CUTS.

ETD Abbreviation of ELECTRONVOLT.

etch factor The ratio of the depth to the width of an etched track in an etched circuit.

etching 1. Chemically eating away a metal to form a desired pattern, such as an etched circuit; 2. Thinning a quartz-crystal plate by slowly eroding one or both of its faces with hydrofluoric acid to finely tune the resonant frequency.

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ether 1. Also called luminescent ether. A nonvaporized fluid once thought to fill air spaces, convey waves (radio, light, etc.), and sustain fields. 2. A volatile liquid occasionally used in electronics as a solvent (e.g., ethyl oxide (C₂H₅)₂O).

ether drift The postulated motion between a material body and the ether (see ETHER, 1). The concept was checked by Michelson and Morley, who failed to find the maxwell waves relative to the ether. This eventually led to scientific rejection of the so-called ether theory of the propagation of light.

ethical slave A machine, especially a smart robot, that is treated in the manner of a slave, based on the notion that a machine cannot have "feelings." Some researchers fear that the use of ethical slaves could lead to technological nightmares. For example, robots might be used as soldiers in a marauding offensive army; the commanders could rationalize that there is nothing immoral about the war because there is no loss of life on their side.

E-transformer A differential transformer whose primary is wound on the center leg of an E core, the secondaries being wound on the outer legs.

E transformer A differential transformer whose primary is wound on the center leg of an E core, the secondaries being wound on the outer legs.

Ettinghausen effect A phenomenon somewhat like the HALL EFFECT. It occurs when a metal strip, carrying current, is placed into a magnetic field perpendicular to the plane of the strip: corresponding points on opposite edges differ in potential.

Eu Symbol for EUROPIUM.

euromagnetometer 1. An instrument for measuring the amount of oxygen in the air. 2. An instrument for analyzing gases.
even line field  •  excited state

The number of minority carriers is given by

\[ \text{minority carriers} = \frac{N_d - N_i}{2} \]


A

B

C

exciter 1. An amplifier or oscillator (or a system of such units) that supplies the input (driving) signal to the output amplifier in a radio transmitter, or to a similar device. A small direct-current (dc) generator that supplies direct current to the field winding of an alternating-current (ac) generator. 2. See INDUCTION COIL. 3. A concentrated filament, high-intensity incandescent lamp used in sound-on-film recording and reproduction and in some types of electromechanical television. 2. In a facsimile transmitter, the lamp illuminating what is being scanned.

exciter relay In an electromechanical generator, the relay that activates the direct-current (dc) field excitation during machine startup.

exciter response 1. A change in the exciting voltage of a motor when the field-circuit resistance changes. 2. A change in the operating conditions of a radio frequency exciter, as a result of a change in the impedance at the input of the final amplifier.

exciter voltage 1. The exciting voltage at the input to the amplifier. 2. The exciting output voltage from a power amplifier. Also called EXCITATION VOLTAGE.

excitation energy 1. Symbol: Eo. A quantity of energy associated with an excited state of an atom or molecule, which is necessary for the transition from the ground state to the excited state. 2. The energy of the protons, in this instance, is greater than the ground state.


excitation purity In color television, complete saturation of a hue (i.e., there is no contamination by other colors, and the saturated hue is distributed uniformly).

excitation voltage 1. The signal voltage that achieves, or is required for, excitation (see EXCITATION; 1. 2. 3. 4. 5.). 5. Electrical voltage required by a transistor.

excitation-anode current 1. In a mercury-pool tube, an auxiliary anode whose operation maintains the cathode spot when no output current is being drawn from the tube.

exchange 1. To reverse the contents of two memory banks. For example, if the memory banks are called A and B, an exchange is the placing of the contents of memory B into memory A, and the placing of the contents of memory A into memory B. The original contents are removed. 2. A two-way sequence of data transmissions. 3. A designated location in a telephone circuit.

exchange line A telephone line.

exchange unit A computer code derived from a file to full or normal size after it has been compressed.

exclusive-OR Also called EXCLUSIVE OR. An operator that resembles a suit of armor, and that greatly magnifies the force of physical movements. A human operator occupies the interior. Thus, for example, the operator might use the machine to throw a football 2500 yards, or to run 50 miles an hour, or to smash through walls. Primarily a tool of science fiction writers, this machine is within the scope of current technological development.

exclusive-OR element A two-valued logic function in which the output is 1 if both inputs are 1 or both are 0 (same). The input-signal voltage.

exclusive-OR operator A logic gate that delivers an output pulse whose width is present at one or more of a set of input terminals, and absent from one or more of another set of input terminals. Also called EXCLUSIVE OR.

exclusive-OR operator A computer code derived from a file to full or normal size after it has been compressed.
expandable In digital logic, a gate that can be provided with an unlimited number of input lines in conjunction with other gates.

expanded memory In personal computer systems, memory beyond the basic 640 kilobytes (640 KB), up to several megabytes (1 MB). This memory resides in integrated circuits (ICs) in the computer, and is normally not retained when power is removed. Compare EXTENDED MEMORY.

expanded-scale meter A meter having a scale designed to display a narrow range of values. Such a meter used for monitoring the 117 V power line might have a scale reading 100 to 140 V, instead of a conventional scale beginning at zero.

expanded sweep 1. In an oscilloscope, speeding up the deflection of the beam during a selected portion of the trace. 2. The circuit for the action described in 1.

expander A circuit for increasing the dynamic range over which a signal or quantity can vary. A typical example is the volume expander, a device that greatly increases the amplitude of strong signals while weakening, or having no effect on, signals of low amplitude.

expansion 1. In communications, the process of increasing the bandwidth of a signal, restoring it to form after it has been compressed. 2. In communications, a process in which stronger components are amplified more than weak ones, restoring a signal to its normal dynamic range after it has been compressed. 3. In computer operations, the restoration of a file to full or normal size after it has been compressed. 4. The widening of a meter scale. 5. The widening or speeding up of an oscilloscope trace. Compare COMPRESS.

expansion chamber A cloud chamber for viewing the paths of radiation particles. It consists of a closed glass cylinder containing humid air and a piston. An electric field is applied through the cylinder, the piston is pulled quickly, and the volume of the chamber expands. The temperature inside falls below the dew point, a cloud is formed, and droplets of water condense on ions, making visible the paths of radiation particles through the cylinder walls.

expansion ratio In communications, the inverse of the compression ratio.

expansion time For an expansion chamber, the interval during which expansion occurs. The interval is kept short to ensure that the temperature will drop low enough for vapor condensation. Also, the possibility of continuing gas motion distorting the particle tracks.

expectation In probability theory, the middle value (average or mean) of a random variable.

expending A system that, for economy, is best discarded instead of repaired when it fails. Also called DISPOSABLE COMPONENT.

experiment One or a series of carefully planned tests carried out under controlled conditions to perform a task or to test a hypothesis.

experimental chassis See ELECTRONIC CHASSIS.

experimental model A prototype of an electronic circuit or device. A produced solid or a model generated for performance or functional tests or as a model against which theory and design can be checked.

experimental service A special, nonautomate radio service intended for on-the-air testing of new methods and equipment.

experimental station A station specially licensed to operate on specific frequencies in the experimental service.

expert system Also called rule-based system. A form of artificial intelligence (AI) that allows a computer or smart robot to act as a highly talented specialist in a specific field. An example is the use of a computer to help a physician diagnose a complex disease. A smart robot might be used as a surgical assistant.

exploring coil A pickup coil for sensing a signal or magnetic field. Sometimes called a sniffer.

exploring electrode 1. A sampling electrode sealed in a discharge tube for measuring ionization at the point of insertion. 2. A test probe.

exposure meter 1. A usually simple instrument for measuring light intensity—especially for photographic purposes. A common form consists of a self-generating photocell connected to a direct-current microammeter. 2. A device that indicates the amount of ionizing radiation that has been received over a given period of time.

external damping device A device that indicates the amount of ionizing radiation received in a given area, or by a given sample, or by a person, over a specified length of time. 2. The extent to which a photographic film has been darkened or otherwise modified by visible light, infrared, ultraviolet, or rays.

external capacitor A component or system that, for economic reasons, is best discarded instead of repaired when it fails. Also called DISPOSABLE COMPONENT.

external controls 1. Manual or screwdriver-adjusted controls connected externally to an oscillator or sweep generator to lower its frequency. 2. A sampling electrode sealed in a discharge tube for measuring ionization at the point of insertion. 3. Also called exploring electrode 1. 4. Also called exploring electrode 2.

external damping 1. The continuous reduction in the value of a quantity, according to the equation \( y = e^{-x} \), which depicts the natural decay curve. 2. Also called exponential decay. See EXPONENTIAL DECAY.

external critical damping resistance The resistance or other means which stronger components are amplified more than weak ones, restoring a signal to its normal dynamic range after it has been compressed. 3. A resistor or short-circuiting bar connected temporarily between the terminals of a meter to keep its movement immobile during transportation.
external feedback  
Negative or positive feedback through a separate path outside of and around the main circuit. Example: negative feedback through a resistance-capacitance (RC) path between the output terminals and the input terminals of an amplifier.

Extra-class license  
An amateur radio license that conveys all available amateur operating privileges in the United States. The highest class of amateur license.

extract 1. To remove a signal or quantity from some product containing it, or from its source. Examples: extracting a fifth harmonic from a complex signal, extracting the direct-current (dc) component from a signal containing both alternating current (ac) and dc. 2. To derive a factor (e.g., to extract a root). 3. To separate certain classes of information from an aggregate of information.

extract instruction  
In computer operations, the instruction to generate a new word by the serial arrangement of designated segments of specified words.

extractor 1. A circuit or device for removing a signal (or a signal component) from another circuit or device. A demodulator probe, for example, extracts the modulation from a modulated signal. 2. A device for removing unused active devices from a circuit board. Such extractors can also employ heat to desolder, as well as remove the devices.

extraneous component  
A usually undesired inherent effect that results from the physical nature of a component or device. Examples: distributed capacitance of a coil, internal inductance of a capacitor.

extraneous emission  
Undesired emission from a signal or device. Compare INTRINSIC EMISSION, also extraneous noise.

extraneous response  
The unintended response of a circuit or device (e.g., image response in a superheterodyne communications receiver).

extraneous root  
The solution of an equation derived from another equation, one or more roots that satisfy the derived equation but not the original one.

extraneous signal  
A superfluous and potentially interference-causing signal.

extraneous zone  
The portion of the earth including most of the eastern hemisphere. When propagation forecasts are made, this region is one of three longitude zones specified.

eyelet connection  
A connection made by fastening conductors together with an eylet or by soldering leads or pigtails to an eylet.

eyepiece  
A small lens system for viewing an oscilloscope screen through a camera setup.

eye zone  
A portion of the earth including most of the eastern hemisphere. When propagation forecasts are made, this region is one of three longitude zones specified.

external feedback  
Negative or positive feedback through a separate path outside of and around the main circuit. Example: negative feedback through a resistance-capacitance (RC) path between the output terminals and the input terminals of an amplifier.

external load  
See EXTERNAL IMPEDANCE.

external loudspeaker  
See EXTERNAL SPEAKER.

externally caused  
Failure of a circuit or component resulting from unfavorable environmental factors.

external memory  
In computer operations, a memory unit outside of the computer mainframe.

external power supply  
A power supply unit situated apart from the powered equipment. Such separation is helpful in eliminating the disturbing effects of heat, hum, and vibration associated with internal power units.

external Q  
For a microwave tube, the quantity 1/(1/Q + 1/(gjc)), where Qg is the loaded Q and Qjc is the unloaded Q.

external S-meter  
A signal-strength meter connected to the output terminals of a generator or amplifier.

external S-meter  
A superfluous and potentially interfering device that drives it. Such isolation is helpful in eliminating the undesirable effects of vibration and acoustic feedback.

external storage  
In computer operations, storage media (such as magnetic diskettes or tapes) that are outside of the computer.

extinction potential  
See DEIONIZATION POTENTIAL.

extinction voltage  
See DEIONIZATION POTENTIAL.

extremity high frequency  
Abbreviation, EHF. A frequency near the upper limit of the radio-frequency spectrum—especially one in the 30- to 300-GHz band.

extremely low frequency  
Abbreviation, ELF. Pertaining to a signal or current within the audio-frequency (AF) range, but not used for audio applications. 2. Electromagnetic emissions from a cathode-ray tube (CRT), resulting from the currents in the deflecting coils and/or electron beam.

extrinsic base-resistance/collector-capacitance product  
Units: seconds, milliseconds, and microseconds. For a bipolar transistor, the product RbCc, where Rb is the base resistance and Cc is the collector capacitance. This product is a time constant that determines the high-frequency operating limit of the transistor.

extrinsic conductance  
For a material, the conductance resulting from impurities or such extrinsic factors as environmental conditions.

extrinsic properties  
For a semiconductor material, properties resulting from doping (e.g., altered resistivity or majority/minority carrier differentiation). Also see EXTRINSIC SEMICONDUCTOR.

extrinsic semiconductor  
A semiconductor material, such as germanium or silicon, to which a superfluous and potentially interfering material has been added to give the semiconductor a desired resistivity and polarity. Compare INTRINSIC SEMICONDUCTOR.

extrinsic transconductance  
Symbol, gEx. For a bipolar transistor, the first derivative of collector current, with respect to base-emitter voltage. It is the ratio of a small change in collector current (dIc) to the small change in base-emitter voltage (dVbe) that produced it, collector voltage being constant: gEx = dIc/dVbe.

extrusion  
The process of forming a material such as metal or plastic, by forcing it through dies. Many pieces of electronic hardware are mass produced in this manner: Examples are insulating rods and tubes, metal cans, and metal tubing.
The time required for the amplitude of a pulse to decrease from 90 percent of its peak amplitude. Compare RISE TIME.

**false add** A logic add (i.e., addition without carries).

**false alarm** Improper operation of an electronic security system, resulting in actuation of the device when no breach of security has occurred.

**false precision** See MISLEADING PRECISION.

**false retrieval** The incorrect specification of criteria for information to be selected for retrieval so that an unwanted item of data is selected. Also called false drop.

**fan-out** Any group of components, circuits, ratings, or characteristics, classed together because of some common or analogous feature or application. Examples: IC family, family of curves, and family of equations.

**family of curves** A group of curves plotted on the same axes, that depict the performance of a circuit or device at several levels of a third parameter (e.g., curves showing transistor collector current vs. collector voltage for several levels of base current).

**fan-in** A logic add (i.e., addition without carries).

**fan-out** 1. A common output terminal feeding a number of output lines. 2. In digital computer terminals feeding a number of output terminals.
operations, the number of outputs that can be fed by a logic circuit. Compare PAR-IN.

fan-out • fatigue 1. The tendency of circuits or materials with time.

fatigue 1. The degradation of the performance of circuits or materials with time. 2. The tendency of antenna (see NEAR FIELD, 2).

far infrared. Also called far IR. The lower-frequency portion of the infrared (IR) spectrum.

faraday An electrical quantity approximately equal to 9.65 × 10⁴ coulombs; it is the quantity of electricity required in electrolysis to free 1 gram atomic weight of a univalent element. The equivalent and preferred unit is the COULOMB. Also called Faraday constant.

Faraday cage See ELECTROSTATIC SCREEN.

Faraday constant See FARADAY.

Faraday cylinder A cylindrical metal shield placed around electrical equipment or circuits to prevent electromagnetic fields from affecting the equipment or its surroundings.

Faraday rotation 1. A change in the polarization of an electromagnetic wave as it passes through a medium. 2. Constant random fluctuations in the polarization of radio signals as they pass through the earth’s ionosphere. This phenomenon affects signals having linear polarization at frequencies below 10 GHz. It has little or no effect on circularly polarized signals, or on signals at frequencies above 10 GHz. It can be a problem with some satellite communications links.

Faraday effect See MAGNETO-OPTICAL ROTATION.

Faraday disk dynamo See DISK DYNAMO.

Faraday shield See ELECTROSTATIC SCREEN.

Faraday’s law The voltage induced in a conductor moving in a magnetic field is proportional to the rate at which the conductor cuts the magnetic lines of force passed through it in a given time.

Faraday’s laws of electrolysis 1. In electrolysis, the mass of a substance liberated from solution is proportional to the strength and duration of the current. 2. For different substances liberated by the same current, the ratio of the time, the masses are proportional to the electrochemical equivalents of the substances. Also see ELECTROCHEMISTRY, EQUATION, ELECTROLYSIS, 1, and ELECTROLYTE.

faradic cure The induced alternating current produced by an induction coil.

faradmeter An alternate term for MICROFARAD GUAGE.

far field 1. The region beyond the near field of an antenna (see NEAR FIELD, 1). 2. The region be-

far zone See SLOW FIELD, 1, 2.

fast access storage In a computer memory, the section from which information can be most quickly accessed, depending on the relative speed of other system devices.

fast-break, fast-make relay A relay that opens and closes rapidly.

fast-forward playback In a videotape recorder, the playing back of the tape at faster than real-life speed. It allows the viewer to move very quickly ahead in a program, and also to watch the images so as to know when to resume normal replay.

fast-forward relay A relay that closes rapidly and opens slowly.

fatigue factor A troubleshooting instrument or device.

fatigue The property of responding to repeated stress or pressure. Also see fatigue, 1.

fatigue resistance 1. A design scheme for an electronic or computer device or system so that if a component or circuit fails, the system will continue to operate, although perhaps at reduced efficiency. The operator is notified of the problem so that it can be repaired with minimal downtime. 2. In a computer system, the property of being as nearly sabotage-proof as possible.

fault tolerance Total redundancy in an electronic or computer system so that if a component or circuit fails, the system will continue to function at full efficiency. Every component has a backup that automatically takes over in case of failure. The operator is notified of the problem, so the defective part or circuit can be replaced while the backup keeps the circuit working continuously at 100-percent capacity.

feather plate A storage battery plate consisting of a lead grid containing a chemical electrolytic paste.

feedback 1. The transmission of current or voltage from the output of a circuit or device back to the input, where it interacts with the input signal to modify operation of the device. Feedback is positive when it is in phase with the input, and is negative when it is out of phase. 2. To input the result at one point in a series of operations to another point, the method by which one system monitors its actions and makes necessary corrections.
feedthrough terminal

A terminal mounted tightly in a hole in a chassis or wall; it consists of a screw going through a feedthrough insulator. Connections can be made to either end of the screw.

**feedthrough capacitor**

A capacitor whose design is like that of a feedthrough terminal; it is mounted in a hole in a chassis. The center screw or wire is the "high" terminal of the capacitor, to which connections can be made above or below the chassis. The body of the device is the "low" terminal of the capacitor; it is soldered to the chassis or secured with a nut.

**feedthrough component**

A passive device permanently installed in a panel or plate (e.g., a FEEDTHROUGH CAPACITOR or FEEDTHROUGH INSULATOR).

**feedback**

In a controlled-feedback circuit, the device that determines the amount of feedback.

**feedback resistance**

1. The internal base resistance of a point-contact transistor.
2. The resistance in a feedback loop.

**feedback transfer function**

The transfer function of a feedback loop exclusively.

**feedback winding**

A special winding on a magnetic amplifier or saturable reactor, for the introduction of feedback currents.

**feeder cable**

1. A communication cable running in a primary route from a central station or in a secondary route from a main feeder cable as a means of making connections to distribution cables.
2. In a cable television system, the cable carrying transmission from the head end to the trunk amplifier. Also called TRUNK CABLE.

**feeder loss**

Loss of energy resulting from resistance in, or radiation from, feeder lines.

**feeding**

In character recognition, a system in which documents go into the transport of a character reader, specified rate.

**feed pitch**

The distance between feed holes.

**feed reel**

The tape supply reel of a tape recorder.

**fermium**

Symbol, Fm. A radioactive metallic element that is artificially produced. Atomic number, 100. Atomic weight, 257.

**ferric oxide**

A red oxide of iron consisting principally of ferric oxide and one or more other metals. After being powdered and sintered, ferrites exhibit low eddy-current loss at high frequencies and make ideal core material for inductors and switching elements. Also used in television deflection yokes and in miniature antennas. Also see FERROSPINELS.

**ferrite antenna**

See FERRITE-ROD ANTENNA.

**ferrite bead**

1. A magnetic storage device in the form of a bead of ferrite powder fused onto the signal conductors of a memory matrix. 2. A tiny ring of ferrite that can be slipped over a wire or cable to choke off radio-frequency (RF) currents.

**ferrite core**

A coil or switching-element core made from a ferrite; specifically, in a core memory, a small magnetic toroid that retains its polarity when charged by a pulse.

**ferrite core memory**

A magnetic memory in which ferrite cores are interconnected by a network of input and output wires.

**ferrite isolator**

A device used in the antenna circuit or for front end of a receiver to prevent overload while maintaining a linear response. Used mostly at ultra-high and microwave frequencies.
ferrite loopstick • field coil

ferrite loopstick **See FERRITE-ROD ANTENNA.**
ferrite memory **A static memory using ferrite cores.** See CORE MEMORY.
ferrite-rod antenna **Also called loopstick antenna.** A small antenna that can be used for wireless reception at frequencies below approximately 20 MHz. This antenna consists of a coil wound on a solenoid, high-permeability, powdered-iron core, usually less than 20 centimeters (cm) long and 1 cm in diameter. A series or parallel capacitor, in conjunction with the coil forms a tuned circuit. The operating frequency is determined by the resonant frequency of the inductance-capacitance (LC) combination. Response is maximum off the sides of the coil, and a sharp null occurs off the ends. This antenna has narrow bandwidth. The null can be oriented to minimize system response to undesired local signals or hummed noise. Compare SMALL LOOP ANTENNA.
ferrite switch **A device that regulates the flow of power through a waveguide. The electric-field vector is rotated, resulting in a high degree of attenuation when activated, but little or no attenuation when not activated.**
ferrroelectric 1. Producing dielectrically. 2. A ferroelectric material.
ferrroelectric amplifier **See DIELECTRIC AMPLIFIER.**
ferrroelectric capacitor **A capacitor in which a ferroelectric material is used.**
ferrroelectric cell **See FERROELECTRIC CAPACITOR.**
ferrroelectric crystal **A crystal of ferroelectric material.**
ferrroelectric flip-flop 1. A flip-flop based on the hysteresis of a ferroelectric capacitor. Compare FERRORESONANT FLIP-FLOP. 2. A flip-flop using one or two ferroresonant circuits instead of semiconductor devices. Compare FERROELECTRIC FLIP-FLOP. 3. A digital counter using ferroresonant flip-flops, rather than semiconductor devices. 4. An inductance-capacitance (LC) circuit in which the coil is a saturable reactor. Because of coil nonlinearity, the circuit is resonant at only one value of alternating-current (ac) voltage, and exhibits both negative resistance and inductive output impedance. 5. A soft phonograph needle made from a material having high resistance to wear and fatigue. 6. A crystal of ferroelectric material used as an element in certain crystalline materials. The effect is analogous to the magnetization of a ferromagnetic material by a magnetic field.
ferrroelectric-luminescent Permittivity to a ferroelectric cell that emits light.
ferrroelectric material **A nonlinear dielectric material that exhibits a change in capacitance (or resonant frequency) when an electric field acts on it.** Examples: barium titanate, barium strontium titinate, potassium dihydrogen phosphate, guanadine. Aluminum sulfate hexahydrate (GAS), Rochelle salt, and triglycine sulfate.
ferrromagnetism 1. Pertaining to a substance that conducts a magnetic field with relative ease. 2. Pertaining to a material in which a magnetic-field change causes the material to change its state, which in turn results in a measurable current flow.
ferrromagnetic-core inductor A coil of wire designed to introduce inductive reactance into a circuit or system, wound around a core consisting of ferrromagnetic material which greatly increases the inductance for a given number of turns. With proper design and choice of core material, the Q factor (selectivity attainable) can be extremely high. The core confines much of the magnetic flux within itself. When the coil current exceeds a certain level, core saturation occurs, and further increases in the current will not produce a corresponding increase in magnetic flux. This decreases the effective inductance, and reduces the efficiency because power is dissipated as heat in the core.
ferrromagnetic material **A substance that concentrates magnetic lines of flux relative to their concentration in free space. Iron, powdered iron, and ferrite are examples.**
ferrromagnetic resonance **The point at which the permeability of a magnetic material peaks at a microwave frequency.**
ferrromagnetic spinels Highly permeable and resistive ceramic-like materials. The low eddy-current losses and high permeability of these materials suit them for use as cores in radio-frequency (RF) transformers and inductors. Also see FERRITE.
ferrromagnetic tape Magnetic tape used for winding closed transformer cores.
ferronatometer **An instrument for testing hysteresis and permeability in steel and iron.**
ferron detector **See IRON-PURITIS DETECTOR.**
ferronosonant circuit **An inductance-capacitance (LC) circuit in which the coil is a saturable reactor.**
ferronosonant counter **A digital counter using ferroresonant flip-flops, rather than semiconductor devices.**
ferronoresonant flip-flop 1. A flip-flop using one or two ferroresonant circuits instead of semiconductor devices. Compare FERROELECTRIC FLIP-FLOP. 2. A flip-flop using one or two ferroresonant circuits instead of semiconductor devices. Compare FERROELECTRIC FLIP-FLOP. 3. A flip-flop using one or two ferroresonant circuits instead of semiconductor devices. Compare FERROELECTRIC FLIP-FLOP. 4. A flip-flop using one or two ferroresonant circuits instead of semiconductor devices. Compare FERROELECTRIC FLIP-FLOP. 5. A device that regulates the flow of power through a waveguide. The electric-field vector is rotated, resulting in a high degree of attenuation when activated, but little or no attenuation when not activated.

**F**
fert current meter An ammeter, milliammeter, or microammeter having a self-contained amplifier that uses field-effect transistors. Also see ELECTRIC CURRENT METER.
fert op-amp 1. An operational amplifier composed of field-effect transistors and associated components. 2. An operational amplifier having a field-effect transistor in its input stage.
fert voltmeter A voltmeter using a field-effect transistor amplifier for high-impedance input. Also see ELECTRONIC VOLTMETER.
fert VOM A volt-ohm-milliammeter (VOM) using a field-effect transistor amplifier for increased sensitivity and high input impedance. **FF** Abbreviation of FLP-FLOP. **fF** Abbreviation of FEMTOFARAD. **FFI** Abbreviation of FUEL-FLOW INDICATOR.
fiber **1. A tough, vulcanized insulating material.** 2. A flexible bundle of optical fibers having a lens at each end; it is used to view areas that are otherwise inaccessible to view.
fiber optic scrambler **A fiberscope in which a center section of fibers in the core is deliberately dis-oriented before the bundle is encapsulated; when cut, one half can decode the image encoded by the other half.**
fiberscope **A flexible bundle of optical fibers having a lens at each end; it is used to view areas that are otherwise inaccessible to view.**
fiber stylist **See FIBER NEEDLE.**
fiber switch **A device that regulates the flow of power through a waveguide. The electric-field vector is rotated, resulting in a high degree of attenuation when activated, but little or no attenuation when not activated.**

**F**
magnetic field **The degree to which a circuit or device responds to the creation and use of magnetic fields.**

**F**
field 1. A volume of space in which a force is operative. See, for example, ELECTRIC FIELD and MAGNETIC FIELD. 2. Half of a video image, consisting of either of the even-numbered lines, or all the odd-numbered lines. 3. A computer record subdivision containing an information unit (e.g., a bank account record might have deposits as a shield). 4. A device that regulates the flow of power through a waveguide. The electric-field vector is rotated, resulting in a high degree of attenuation when activated, but little or no attenuation when not activated. 5. A sideband of interest in which the carrier is suppressed. Also see FIELD-COMPENSATION METER.

**F**
field circuit breaker **A circuit breaker designed to control the field excitation of a motor or other device.**

**F**
field coil 1. The winding on the pole of a motor or generator. 2. The winding on the pole of an electromagnetic speaker. 3. The main coil of a relay. 4. The fixed coil in an electromyomoter.
For a transistor, the **Q factor** or **Q** factor of a tuned circuit is the ratio of reactance to resistance. Also called **figure of merit**.

**Figure of merit**

**Field Day** is an amateur radio, an annual contest sponsored by the American Radio Relay League (ARRL) that simulates emergency communication conditions. It occurs during the last full weekend in June.

**Field direction** is the direction in which an electric field or magnetic field exerts its force.

**Field effect** is the phenomenon in which the flow of current carriers in a solid substance is controlled by an external electric field. A useful application is the **field effect transistor** (FET).

**Field-effect transistor** abbreviation, **FET**. A non-biased semiconductor amplifying device in which a high-impedance gate electrode controls the flow of current carriers through a thin bar of silicon (rarely, germanium) called the **channel**. Ohmic connections made to the ends of the channel constitute **source** and **drain** electrodes. Also see **JUNCTION FIELD-EFFECT TRANSISTOR**, **METAL-OXIDE SEMICONDUCTOR FIELD-EFFECT TRANSISTOR**, and **JUNCTION METAL-OXIDE FIELD-EFFECT TRANSISTOR**.

**Field-effect varistor** a nonlinear dual-terminal semiconductor device capable of maintaining a voltage of cutoff for a range of voltages.

**Field-emission microscope** an instrument for examining the atomic structure of high-melting-point metals; it magnifies more than 2 million times. The metal to be examined is made into a needle that is subjected to 5 to 30 kV; the electrons emitted by the tip of the needle form an image on a fluorescent screen.

**Field forcing** the act of controlling a motor by changing the magnetic field in the windings.

**Field frequency** in television, the product of frame frequency and fields per frame (in the United States, 60 per second).

**Field intensity** 1. The strength of an electric or magnetic field. 2. The strength of an electromagnetic field, usually expressed in microvolts per meter or millivolts per meter.

**Field intensity meter** see **FIELD-STRENGTH METER**.

**Field ionization** the tendency for atoms to be ionized in a gas by a high-intensity electric field. The ionization occurs mostly near the poles of the electric field.

**Field-ion microscope** a high-resolution field-emission microscope that uses helium ions instead of electrons. The ions are repelled by the tip of the metal needle, forming an image on a fluorescent screen. Also see **FIELD-EMISSION MICROSCOPE**.

**Field length** record field size in applicable units, usually bytes, characters, or words.

**Field magnet** 1. The permanent magnet in a dynamic speaker. 2. A similar magnet in an earphone, generator, microphone, motor, photo pickup, transducer, etc.

**Field pickup** 1. A probe or sensor for insertion into an electric or magnetic field. 2. An on-location radio or television program (i.e., one coming from outside the studio). Also called **remote** or **NEMO**.

**Field resistor** a resistive component consisting of an insulated form with a thin layer of conductive material.

**Field rhesostat** the rhesostat whose setting determines the amount of current flow through the field coil of a motor or generator.

**Field scan** a form of television scanning in which the lines are scanned alternately.

**Field-sequential system** a color-television system in which the image is reproduced by means of primary color fields (red, green, and blue) flashed sequentially on the screen of the picture tube. Compare **DOT-SEQUENTIAL SYSTEM** and **LINE-SEQUENTIAL SYSTEM**.

**Field strength** see **FIELD INTENSITY**.

**Field-strength meter** an instrument for measuring the radio-frequency (RF) voltage of a signal reaching a chosen location. The instrument consists essentially of a radio detector equipped with a portable antenna and an output meter.

**Field telephone** a rugged, portable telephone system for outdoor use.

**Field test** a test of equipment under actual operating conditions (i.e., outside the laboratory or factory).

**Field winding** see **FIELD COIL**, **field winding** in a power transformer, the coil that supplies heating power to the filament of a vacuum tube. Also called **FIELD COIL**.

**Field voltage** symbol, $V_F$. The voltage across the filament of an electron tube.

**Field-type bolometer** a **BOLOMETER** in which the sensitive element is a wire filament. Examples: barreter, incandescent lamp, and wire-wound resistor.

**Field multiplier** an instrument for measuring the radio-frequency (RF) voltage of a signal reaching a chosen location. The instrument consists essentially of a radio detector equipped with a portable antenna and an output meter.

**Field-strength meter** an instrument for measuring the radio-frequency (RF) voltage of a signal reaching a chosen location. The instrument consists essentially of a radio detector equipped with a portable antenna and an output meter.

**File** a nonessential data part used, for example, in a file's header to identify the file type and version. Also called **file label**.

**File conversion** the process of converting data from one common format, data source, or application to another.

**File identification** a code that identifies a file.

**File label** file identification in which the first records include an identifiable set of characters unique to the file; it conveys such information about (for example, a tape file as a description of content, generation number, record number, date of writing, etc.). Also called **HEAER LABEL**.

**File layout** the layout of the contents of a file; usually defined by the system or specified by a program.

**File maintenance** to delete, add, or correct records in a file. Unlike updating, which is done to reflect changes in events recorded in the file, file maintenance ensures that the contents of the file are accurate records of the necessary data.

**File management** a method of storing and recalling data from computer storage media, such as magnetic disks.

**File name** the name of a computer file, the alphanumeric character set that identifies and describes the file. It generally consists of one to eight characters, often including an extension of one to three characters. In some computer operating systems, filenames can be much longer (e.g., up to 32 characters). See **FILENAME EXTENSION**.

**Filename extension** a group of one, two, or three characters following the main body of a FILE-NAME, and separated from it by a period (.). Generally denotes the application or purpose of the file. The extension **BAK**, for example, denotes a backup file; **TXT** denotes a text file; **BMP** denotes a bit-mapped graphics file.

**File organization** the way words, bits, or records are physically arranged in the storage medium for a file; possibly including the method of access (sequential, alphabetical, random, etc.).

**File-oriented programming** computer programming that uses a general file and record control program to simplify 1/0 coding.

**File-oriented system** a system having file storage as its basis.

**File print** a hard copy (printout) of the contents of a file.

**File processing** the operations associated with making and using files.

**File protection** preventing the possibility of writing over data files before they are made available for use. It is usually done by having a program check file labels.

**File reconstitution** restoring a partially or completely damaged file by updating a previous generation of the file using a file of interim transactions.

**File recovery** following the interruption of file processing because of system failure, the procedure for reestablishing the file’s condition as necessary for the resumption of processing without losing accuracy.

**File section** part of a file in certain consecutive locations on a storage medium.

**File security** protective and security measures (e.g., the issuance of clearances, status markers, etc.) as they relate to computer files.

**File set** a collection of interrelated files stored on one disk or tape and transferred as a group (package).

**File system** a system having file storage as its basis.

**Filethought** the way words, bits, or records are physically arranged in the storage medium for a file; possibly including the method of access (sequential, alphabetical, random, etc.).

**Filler** a nonessential data part used, for example, to bring a record to a standard size.
filter transmission band See FILTER PASSBAND.

finger 1. A metal disk or plate attached to a component for the purpose of radiating heat. 2. A projection in an irregular heat sink.

finger pitch 1. A device that senses and/or controls the resistance through the human finger during various parts of the heart cycle.

fingertips rules See FLEMING’S LEFT-HAND RULE, FLEMING’S RIGHT-HAND RULE, and RIGHT-HAND RULE FOR WIRE.

finite finish Lead attached to the last turn of a coil. Also called outside lead. Compare START LEAD.

film 1. See THIN-FILM MEMORY.

film capacitor A capacitor in which the electrodes are plated on the faces of a thin film of plastic or other dielectric material.

film chain A system designed for the transmission of inputs over a television system. This requires synchronization of the movie frame rate with the television frame rate.

film frame A single picture on a strip of motion-picture film.

film-frame blanking interval The interval during which a film frame is blanked out as motion-picture film moves through a camera, projector, or pickup. The blanking action allows a frame to move into position without blurring the image as seen by viewers.

film integrated circuit A monolithic circuit whose elements are films formed on an insulating substrate.

film pickup A photocell, photodiode, or phototransistor circuit used to pick up recordings from the sound track of motion-picture film.

film reader A device for converting data on film into digital form for a computer.

film recorder An apparatus that records data as a sound pattern on film. Compare FILM REPRODUCER.

film reproducer An apparatus that plays back data recorded on photographic film. Compare FILM RECORDER.

film resistor Also called carbon-film resistor or metal-film resistor. An electronic component consisting of a mixture of ceramic, carbon, and/or metal, applied to a cylindrical form in a thin layer to obtain a desired value of resistance. The cylindrical form is made of an insulating substance, such as porcelain. The film can be deposited on this form by various methods, and the value tailored as desired. Metal-film units can be made to have nearly exact values. Film type resistors usually have tolerance of ±10%. A main advantage of film-type resistors is that they, like ceramic-composition units, do not have much inductance or capacitance. A disadvantage, in some applications, is that they cannot handle as much power as carbon or wirewound, or composition wirewound, units, or as wirewound types. Compare CARBON COMPOSITION RESISTOR, WIRE-WOUND RESISTOR.

film scanning The conversion of a movie into a visual form by television.

film speed 1. The speed at which motion-picture film moves intermittently through a camera, projector, or pickup, measured in feet or frames per second. 2. A measure of film’s light sensitivity, given as an ASA (American Standards Association) or DIN (European) number; in either system, the higher the number, the greater the light sensitivity.

filter 1. A circuit or device that passes alternating currents at other frequencies while attenuating or blocking currents at other frequencies. Examples: BANDPASS FILTER, BAND-REJECTION FILTER, HIGH-PASS FILTER, and LOW-PASS FILTER. 2. An inductance-capacitance (LC) or resistance-capacitance (RC) circuit for removing the ripple from the output of a power-supply rectifier. 3. A transparent disk with special optical properties placed in front of a camera lens for a special photographic effect. 4. A character patterned to control the elimination or selection of characters in another pattern. 5. A device or program that separates information, according to certain specifications or characteristics. 6. A machine word that specifies the elements to be treated in another machine word; also called MASK.

filter attenuation In a selective filter, the power, current, or voltage loss, in decibels, that occurs within the passband.

filter attenuation band In a selective filter, the frequency band outside the passband; that is, the frequency range over which signals are significantly attenuated.

filter bank In audio applications, a set of band-pass filters, each of which covers a specific portion of the audio-frequency (AF) spectrum. There is some (minimal) overlap between the passbands of the filters; an AF signal of a specific frequency will always pass through at least one of the filters, but will never pass through more than two filters within a reasonable amount of time.

filter center A place where information is modified for transmission to aircraft pilots. Such information can include weather data, course changes, or other instructions.

filter choke An inductor that provides inductive reactance in a wave filter or power-supply filter while also blocking direct current.

filter crystal A piezoelectric crystal used in a CRYSTAL RESONATOR.

filter cutoff The frequency or frequencies at which the transmission/frequency figure of a filter is below its maximum value by a prescribed amount, usually 3 dB, representing the half-power point(s).

filter discrimination The amount of fluctuation in the insertion loss of a bandpass, band-rejection, high-pass, or low-pass filter. This fluctuation is measured at various points in the filter passband.

filter inductor See FILTER CHOKE.

filter passband The frequency range over which a selective filter passes signals with minimum attenuation.

filter resistor See FILTER CHOKE.

filter slot In a waveguide, a slot that acts as a choke to suppress undesirable modes.

filter stopband See FILTER ATTENUATION BAND.
firing circuit • fixed-frequency oscillator

firing circuit Any circuit, such as a phase shifter, that permits adjustment of the firing angle of a silicon-controlled rectifier (SCR) or similar device, or which delivers the required pulse or other signal to initiate firing.

firmware 1. Programs (software) in nonvolatile computer memory [e.g., in a read-only memory (ROM)], that can't be changed by replacement with an alternate unit. 2. Unalterable internal interconnections that determine what a computing device or system can do. Also called MICRO PROGRAM.

first detector In a heterodyne receiver, the signal frequency detector. Compare SECOND DETECTOR.

first filter capacitor The input capacitor in a capacitor-input power-supply filter.

first Fresnel region A portion of a directional transmitted electromagnetic ray, shaped generally like a paraboloid with the apex at the transmitter and the axis in the direction of transmission. Any point in the first Fresnel zone is in such a position that the sum of the lengths of the paths from the point to the receiver, and the point to the transmitter, is no greater than 0.5 wavelength more than the distance from the transmitter to receiver.

first harmonic The fundamental frequency in a complex waveform from which multiples are generated.

first-in/first-out Acronym. FIFO. A read-write memory commonly used as a buffer to smooth out the flow of data bits in a digital system. The output bits are in the same order (sequence) as the input bits. If a data bit x goes into the FIFO before data bit y, then y will always emerge from the FIFO before y. Compare PUSHDOWN STACK.

first-in/last-out See PUSHDOWN STACK.

first law of thermodynamics Quantities of heat can be converted into mechanical work, and vice versa. Also see MECHANICAL EQUIVALENT OF HEAT.

first level address See ABSOLUTE ADDRESS.

first selector The selector that responds to the first-digial pulses when a telephone number is dialed.

fishbone antenna An untuned, wideband directional antenna of the general end-fire type. Consists of a number of antenna elements, each capacitively coupled to the resistor-terminated transmission line in a collinear array. It is so-called from its resemblance to the skeleton of a fish.

fishpaper A chemically treated, vulcanized fiber paper used for electrical insulation.

fish pole A microphone boom that can be held in the hand.

fist In radiotelegraphy and wire telegraphy, an operator's manual sending style.

fitting A device intended to mechanically fasten a wire or cable in place.

fivetive-element code A five-impulse telegraphic code that describes a character (e.g., Haudot, which also includes start and stop elements).

five-layer device A semiconductor device containing four pin junctions. Examples: diac and triac.

five-level code A teletype code that utilizes five binary elements to define a character.

fix 1. In direction finding, the point at which two lines of direction intersect. 2. In electronics maintenance, to repair successfully. 3. To subject an in-process circuit board to a solution or other medium to stop a photographic action permanently. Also, the solution in which such photosensitive materials can be immersed to halt development.

fixed bias Bias voltage or current supplied from a fixed external source (such as a battery or power supply) independent of the operation of the biased device. Compare AUTOMATIC BIAS.

fixed block length Blocks of data having a fixed number of words or characters, as required because of hardware limits on input and output.

fixed component Any component (e.g., a capacitor, inductor, or resistor that has an unalterable value).

fixed contact A contact that does not change state a second time, after the first change of state, until the next digital signal appears.

fixed contactor A nonadjustable contactor whose contacts are permanently closed when the movable contacts are in the de-energized position. Also see CONTACTOR.

fixed-frequency oscillator A receiver that is preset to receive signals of one frequency.

fixed-frequency receiver A receiver that is preset to receive signals of one frequency.

fixed-frequency transmitter A transmitter that is preset to radiate signals of one frequency. Such a transmitter can contain a self-excited or crystal-controlled oscillator.

fixed inductance A nonadjustable inductor (i.e., one having an unalterable value of inductance).

fixed-length record A record in which word or character size is constant. Compare VARIABLE-LENGTH RECORD.

fixed logic Applicable to computer or peripherals whose logic can only be altered internally by changing connections.

fixed memory A nonvolatile readout computer memory that can only be altered mechanically.

fixed placement file A file that has been allocated a fixed location in storage.

fixed-point system A notation system in which a single set of digits represents a number, and the radix point (in the decimal system, the decimal point) can only be placed in one position for the value being expressed. Also see FLOATING-POINT CALCULATION.

fixed resistor A nonadjustable resistor (i.e., one having an unalterable value of resistance).

fixed-sequence robot A robot that performs one task or set of tasks, making exactly the same movements every time. The sequence is programmed in the robot controller via firmware. Many assembly robots and toy robots are of this type. Compare FLEXIBLE AUTOMATION.

fixed station A radio station operating from a station point that is not mobile.

fixed-step potentiometer A potentiometer whose output is varied in one or more discrete steps by fixed-resistor sections. Also see POTENTIOMETER.

fixed wireless 1. A cellular communications network in which some, or all, of the end users are at fixed locations. This is increasingly popular as an alternative to conventional hard-wired telephone and Internet access. 2. The use of wireless equipment such as cell phones and wireless-modem–equipped computers, at fixed (rather than mobile or portable) locations.

fixed word length Applicable to the organization of information in storage in which each computer word stored has a fixed number of characters or bits.

fixture A piece of hardware used in equipment setup (e.g., microwave couplers, joints, sections, etc.).

fl. Abbreviation of FOOT-LAMBERT.

flag 1. A piece of information added to a data item that gives information about the data item. 2. A label attached to a character or word to delineate a field boundary. 3. An indicator that an operation is complete and need not be done by the program.

flag event A program condition that causes a flag to be set.

flag line An input pulse to a microprocessor that depends on specific external instructions. Indicates a certain condition or change of state.

flagpole antenna 1. Any of several vertical UHF or VHF antennas consisting of a radiator mounted atop a coaxial pipe or cable (see, for example, COAXIAL ANTENNA). It takes its name from its resemblance to a flagpole. 2. A vertical antenna formed by shunt-feeding a pole already in existence, such as a flagpole. This can be done to conceal the antenna.
The hyperbolic cross section of a horn antenna or loudspeaker.

A tendency for a video image to appear, and conveying rotary motion from one to another is simply a matter of changing one task to another is simply a matter of changing software. Compare FIXED-SEQUENCE ROBOT.

Flexible automation The ability of a robot or system to do various different tasks. Changing from one task to another is simply a matter of changing software. Compare FIXED-SEQUENCE ROBOT.

Flexible cable A flexible cable. A device for joining two shafts (cellulose nitrate) used sometimes as a binder in composite wiring. Also called cable. A computer file containing unfolded documents.

Flexible contact A contact made from flat, metal spring stock; it is usually bent or curved. Also called cable. A compound-wound resistor.

Flexible frequency The frequency range in which the dependent variable is substantially constant. For example, in amplifier operation, an output signal whose component fundamental frequencies and their harmonics are in the same proportion as those of the input signal being amplified.

Flexible flow A fluid that can be bent, coiled, or knotted. Also called cable. A simple way of indicating certain relationships in the behavior of electrical generators and motors. If the thumb, index finger, and middle finger of the left hand are positioned so that they are at right angles to each other, the middle finger points in the direction of current flow. Compare FLEMING'S RIGHT-HAND RULE.

Flexible manufacturing system A system that can be bent, coiled, or knotted. Also called cable. A compound-wound resistor.

Flexible resistor An insulated, wirewound resistor that can be bent, coiled, or knotted. Also called cable. A simple way of indicating certain relationships in the behavior of electrical generators and motors. If the thumb, index finger, and middle finger of the left hand are positioned so that they are at right angles to each other, the middle finger points in the direction of current flow. Compare FLEMING'S RIGHT-HAND RULE.

Flexible transmission line 1. A transmission line that is free of standing waves. Also see MATCHED TRANSMISSION LINE. 2. See FLAT-RIBBON LINE.

Flicker 1. The effect created by such action (as in a flickering light). 2. A tendency for a video image to appear, and conveying rotary motion from one to another is simply a matter of changing software. Compare FIXED-SEQUENCE ROBOT.

Flicker 2. A photographic camera flash. 2. To vaporize a material (such as magnesium) in an electron tube being evacuated, to absorb gases. 3. Flashover.

Flicker factor The factor at which the faces of a horn speaker are curved or turned outward.

Flicker frequency The frequency range in which the dependent variable is substantially constant. For example, in amplifier operation, an output signal whose component fundamental frequencies and their harmonics are in the same proportion as those of the input signal being amplified.

Flicker response A response characteristic in which the dependent variable is substantially constant over a specified range of values of the independent variable. For example, in amplifier operation, an output signal whose component fundamental frequencies and their harmonics are in the same proportion as those of the input signal being amplified.

Flickering of a modulated signal. A set of curves depicting the uneven frequency response of human hearing. Also called AURAL CURVES.
flight teleoperator servicer • floating-point system

A computer program or a human operator. The most sophisticated machines use TELEOP-ERATOR and/or TELEPRESENCE so that a human can perform dangerous work without being placed at personal risk.

flight test A test to airborne electronic equipment in actual flight. 2. Any test made as in 1.

floating-point system A floating point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part] where a number is expressed in exponential notation using a floating point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part]. Important in the operation of microprocessors, especially in computer systems.

floating-probe relay A bistable computer memory that stores bits of data as flip-flop states.

flip flop A bistable memory element that can store two different states, a 1 and a 0, on its two output terminals. A flip-flop has two stable states, one corresponding to 1 and the other to 0.

flooding A command that corrects for the vertical component (inclination) of the earth’s magnetic field. The bar must be designed differently in different geographic locations, because the inclination varies from place to place. Inclination is greatest near the geomagnetic poles, and is zero at the geomagnetic equator.

flop A bright, hard glass. Dielectric constant, 7 to 9. Dielectric strength, 30 to 150 kV/mm. Also see GLASS.

flip-earth A monolithic semiconductor device (such as a diode, transistor, or integrated circuit), in which lead-like terminals are provided on one face of the chip for bonding.

flip-chip bonding A scheme for making connections between a semiconductor chip and a header, in which leads are not run between chip and header. Instead, lead-like projections are electrodeposited as terminals around one face of the chip, which is then registered with the header terminals and bonded to them.

flip-flop 1. See BISTABLE MULTIVIBRATOR. 2. A voltage relay that locks in alternate positions upon receiving successive actuating pulses.

flip-flop key In a video display, a key that, when pressed, allows viewing of one half of the screen and then the other.

flip-flop memory A bistable computer memory that stores bits of data as flip-flop states.

flip-flop relay See BISTABLE RELAY.

float charging The constant charging of a storage battery, keeping the battery at or near the fully charged state.

flotation A storage battery connected in parallel with a generator, which supplies the load; the battery, always completely charged, helps during high-current demands.

floating 1. A property or parameter that does not need to be specified and can assume any value within the range of a specified range. 2. A floating point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part] where a number is expressed in exponential notation using a floating point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part]. Important in the operation of microprocessors, especially in computer systems.

floating-ac or floating dc A support for a microphone, consisting of a heavy base that rests on the floor, and an adjustable, vertical boom that allows the microphone to be set at various heights.

floppy disk A flexible magnetic disk used in recording, as in computer and data system storage. It usually refers to a 5.25-inch diskette.

floppy disk drive A digital-computer program.

flow A. The movement of current carriers under the influence of an electric field. 2. See ANGLE OF CONDUCTION. 3. A series of interconnected events in a time sequence.

flow angle See ANGLE OF CONDUCTION.

flow meter A digital-computer program.

flow direction The method of delineating an event as a point or as a line. A model for the details of an event is usually used to follow the flow of material as it changes form or as it moves from one place to another.

flowline A line showing flow direction on a chart or map.

flowmeter An instrument for measuring liquid flow rate.

flow relay A relay that is actuated by a predetermined amount of fluid flow.

flow test A test to airborne electronic equipment. 2. Any test made as in 1.

fluorescent A semiconductor device, for example, that has no net current flowing through it.

floating instrument An instrument whose signal terminals are above ground.

floating I/O port An input/output (I/O) terminal that is not loaded or driven.

floating junction A junction (in a semiconductor device, for example) that has no net current flowing through it.

floating neutral A circuit with a variable common voltage reference.

floating paraphase inverter A dual-transistor adaptation of the paraphase inverter. The second stage receives its input signal from a tap on the load resistor of the first stage and provides the additional phase shift that is required.

floating-point calculation An electronic calculation using a floating-point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part] where a number is expressed in exponential notation using a floating point number [i.e., a number whose value is represented by two sets of digits, a fixed-point part (see FIXED-POINT SYSTEM) and a floating-point part]. Important in the operation of microprocessors, especially in computer systems.

floating-point device An electronic circuit that actuates a servomechanism’s movement.

floating probe A test electrode (wire or plate) inserted in a discharge tube at a desired point to sample the potential gradient, but which acquires a misleading negative charge, with respect to the gas cloud, because electrons traveling faster than positive ions tend to accumulate on the probe.

floating zero A control system in which the reference point is easily moved.

floating zone In a semiconductor ingot undergoing purification, a molten zone in which impurities float. The material in the zone is melted by the radio-frequency (RF) field of an external heating coil, which is passed along the ingot to move the molten zone to one end; picking up impurities along the way and concentrating them at the end that is later sawed off.

float switch A switch operated by a float, such as in a pump sump.

flooding 1. Participulate felt used on phonograph turntables to protect disks from being scratched. 2. To coat with flocking.

flooding gun In a storage (image-holding) oscilloscope, the electron gun that sprays the storage target with low-velocity electrons and makes the image visible on the viewing screen. The gun is mounted next to one pair of deflection plates.

flow stand A support for a microphone, consisting of a heavy base that rests on the floor, and an adjustable, vertical boom that allows the microphone to be set at various heights.

fluctuating current A current that is not constant, 7 to 9.9. Dielectric strength, 30 to 150 kV/mm. Also see GLASS.

flow of material The movement of current carriers under the influence of an electric field. 2. See ANGLE OF CONDUCTION. 3. A series of interconnected events in a time sequence.

fluid analog The comparison of electric current flow to the movement of a simple fluid. Also see FLUID ANALOGY.

fluid capacitor See WATER CAPACITOR.

fluid computer A digital computer that uses fluid capacitors and/or fluid analogues to store data as fluid; uses no electronic circuits or moving parts.

fluid damping The use of a viscous fluid to damp a mechanical member’s movement.

fluid-flow alarm An electronic circuit that actuates an alarm when fluid flowing through pipes or other channels changes from a predetermined rate.

fluid-flow control A servomechanism that automatically maintains or adjusts liquid flow through pipes or other channels.

fluid-flow gauge See FLUID-FLOW METER.

fluid-flow indicator See FLUID-FLOW METER.

fluid-flow meter An instrument that indicates fluid flow rate through pipes or other channels.

fluid-flow switch In a fluid-cold system, a switch that actuates an alarm when the fluid slows or stops.

fluidics 1. A form of digital logic in which circuits operate by means of fluid flow. 2. A branch of physics concerned with the behavior of fluids; more commonly called fluid dynamics.

fluid-level control A servomechanism that automatically maintains the level of a fluid in a tank.

fluid-level gauge A digital-computer program.

fluid logic Operations carried out by varying the flow and pressure of a gas or liquid in a circuit of channels. Also see FLUID COMPUTER.

fluid ounce (U.S.) Abbreviation, fl. oz. A unit of volume equal to 29.57 cubic centimeters. Also see FLUID OUNCE.

fluid ounce (imp.) A unit of volume equal to 100 cubic centimeters. Also see FLUID OUNCE.

fluid pressure alarm An electronic circuit that actuates an alarm when fluid pressure rises or falls beyond specified limits.

fluid-pressure control A servomechanism that automatically maintains or adjusts fluid pressure in pipes or other channels.

fluid-pressure gauge See FLUID-PRESSURE METER.

fluid-pressure indicator See FLUID-PRESSURE METER.

fluid pressure meter An instrument that indicates the pressure of a fluid in a pipe or other channel.

fluid valve See FLUID-MECHANICAL VALVE.

fluorescence The property of some materials to glow when excited by a stimulus, such as ultraviolet light, or an electron beam. Compare PHOTOLUMINESCENCE.

fluorescence meter A digital-computer program.

fluorescent A semiconductor device, for example, that has no net current flowing through it.

fluorescent lamp A digital-computer program.

fluorescent materials Materials that glow when irradiated, but cease to glow when the source of excitation is removed. An example is the phosphor coating on the screen of a cathode-ray tube (CRT).
fluorescent screen A transparent or translucent plate (such as the end of a cathode-ray tube or fluorescent-coated with phosphors that glow when struck by an electron beam, or by high-energy electromagnetic radiation, such as ultraviolet or X-ray). fluorescent tube A mercury-vapor glow lamp discharge tube having a glass tube whose inner wall is coated with a phosphor that emits light when excited by the ultraviolet glow discharge in the vapor.

fluorescent X rays X rays radiated by the atoms of a material that has absorbed X radiation. During initial exposure, energy absorbed from the radiation raises the energy level of electrons in the atom; when the electrons return to their normal energy levels, they radiate some of the absorbed energy.


fluoroscope A device used for viewing the internal structures of objects. A screen coated with material that fluoresces when exposed to X rays is mounted in one end of a light-tight viewing hood. When an object is placed between the screen and an X-ray tube, an image is produced on the screen. In medical applications, this device has been supplanted by methods that do not use ionizing radiation; nuclear magnetic resonance imaging (NMR) is one example.

fluoroscopy The art of using a fluoroscope in the inspection of materials and parts or in medical examination.

fly A form of mounting in which there is little or no projection from the panel surface.

flutter 1. In a high-frequency superheterodyne receiver, a rapid fluctuation in signal strength, caused by tuning and detuning of the oscillator stage. This usually results from poor direct-current (dc) power supply regulation. 2. Repetitive, rapid fluctuations in the output of a sound reproducer. Also see WAVE. 3. An echo effect sometimes observed in rooms or auditoriums of poor acoustic design.

flyback A device for directing an electron beam in a television receiver to a point on the viewing screen; also called backspot. The distance from the center of the viewing screen to a point on the screen is also called the deflection from the center.

flyback transformer In a television receiver circuit, the horizontal output transformer. The unit supplies horizontal scanning voltage and kickback voltage, which is rectified to produce the high-voltage direct-current (dc) anode potential. Also see FLICKER and RICHBURG POWER SUPPLY.

flywheel effect An anode see under FOCUS. Also see PRINCIPAL FOCUS.

flyback checker An apparatus that senses the presence of short or open circuits in motors, transformers, and generators, by measuring the amount of flyback (kickback).

flyback power supply See RICHBURG POWER SUPPLY.

flyback time The time taken for the electron beam in an oscilloscope tube, picture tube, or camera tube to return to its starting point after it has reached the point of maximum deflection.

flywheel synchronization A form of television scanning synchronization used when the received signal is very weak. The synchronization signals from the transmitter are seized by the receiver, which then produces its own local pulses based on the rate of these pulses.

flywheel tuning A timing dial mechanism in which the control shaft has a flywheel for the smoother tuning action afforded by the added momentum.

FM Symbol for FERMIUM.

FM Abbreviation of FREQUENCY MODULATION. Fm. Abbreviation of MODULATION FREQUENCY.

FM-AM Pertaining to equipment that will operate with either amplitude-modulated or frequency-modulated signals.

FM-AM multiplex A method of frequency multiplexing using both amplitude and frequency modulation of a carrier wave.

FM broadcast band The 88- to 108-MHz frequency band, within which channels spaced 200 kHz apart occupy positions from 88.1 to 107.9 MHz.

FM detector See DISCRIMINATOR, RATIO DETECTOR, and SLOPE DETECTOR.

FM-FM Frequency modulation by one or more FM subcarriers.

FM limiter In a frequency-modulation circuit, a stage which holds the amplitude of the signal to a constant value. The limiter can be active (e.g., an amplifier-limiting transistor) or passive (e.g., a diode clipped).

FM multiplex See MULTIPLEX ADAPTER.

FM noise Unintentional modulation of a frequency-modulated transmitter, resulting from noise in the audio-input stages.

FM-PM A system of modulation in which a carrier is phase modulated by frequency-modulated subcarriers.

FM radio A radio system in which the signal is frequency-modulated; the distance to the target is measured in terms of the beat note between transmitted and reflected waves.

FM repeater A two-way radio system composed of a simultaneously operating receiver and transmitter, the latter of which retransmits (usually on a different frequency) the signal picked up by the receiver. The system is usually tower- or hilltop-mounted; and is used to extend the range of two-way communications in a communications network.

FM stereo The use of multiplex methods to transmit and receive stereophonic programs in an FM channel. Also see MULTIPLEX ADAPTER.

FM tuner A compact radio receiver that handles frequency-modulated (FM) signals, and delivers its low-amplitude audio output to a high-fidelity line input. Compare AM TUNER and AM-FM TUNER.

focal length Symbol, F. The distance from the center of a lens or dish antenna to the principal focus. Also see PRINCIPAL FOCUS.
fork oscillator

A switch operated by the foot, generally used for the purpose of turning a playback or recording system on and off. Often used for taking dictation.

forbidden band

See ENERGY GAP.

forbidden character code

An error-finding code using forbidden characters: combinations of prohibited bits. Also called forbidden combination.

forbidden energy band

See ENERGY GAP.

force 1

Symbol, F. Units: newton, dyne, poundal. The agency or influence that accomplishes work.

force 2

An operator interjection made during a program run that causes the computer to execute a branch instruction; it is usually necessary when a condition responsible for halting a program must be bypassed.

forced coding

Programming that minimizes the time required to retrieve information from storage. Also called minimum latency programming or minimum access programming.

forced oscillations

Oscillations in a circuit, such as in an inductance-capacitance (L-C) tank, that result from continuously applied alternating-current (ac) excitation. Compare FREE OSCILLATIONS.

foreground job

A relatively high-priority, short-running program that is carried out by interrupting a low priority. Long-running program. Compare BACKGROUND JOB.

force pump

In a multistage vacuum system, the first pump that reduces the pressure considerably below atmospheric pressure. Also see DIFFUSION PUMP and VACUUM PUMP.

force summing device

In control computers, a device that is physically moved by a force being transduced.

foreshortened addressing

In control computers, the mixing of available storage by using simplified addressing instructions.

fork oscillator

An audio frequency oscillator controlled by a tuning fork. The dimensions of the fork determine its vibration frequency and, accordingly, the frequency of the oscillator.

folded dipole

A half-wavelength, center-fed antenna constructed of two parallel wires with their ends connected together. It has the same length as a simple dipole antenna, but the feed-point impedance is four times that of the ordinary dipole. Instead of approximately 73 ohms, the folded dipole presents a resistive impedance of about 300 ohms. This makes the folded antenna desirable for use with high impedance, parallel-wire transmission lines. It also can be used to obtain a good match with 75-ohm coaxial cable when four antennas are connected in phase, or with 50-ohm coaxial cable when six antennas are connected in phase. Compare DIPOLE ANTENNA.

folded horn

A loudspeaker having a horn whose flared sides are divided into several zigzagging chambers: that is, the horn is, in effect, folded to squeeze a required length into a small cabinet.

folded-horn enclosure

See LABYRINTH SPEAKER.

folded pattern

An oscilloscope image having an elongated time axis obtained by successive horizontal sweeps—each placed slightly lower on the screen than the preceding one. The folded-pattern technique provides a time axis several times longer than the screen width.

folding frequency

In a system where sampling is made at uniform frequency increments, the frequency corresponding to half the sampling rate in hertz.

folding pattern

The technique used in television to present an image on a cathode-ray tube with a longer time base than the tube’s horizontal sweep. A folded pattern technique provides a time axis several times longer than the screen width.

folding width

In a TV picture, the effect in which a moving object has a black border following it.

following blacks

In a television picture, the effect in which a moving white object has a white border following it.

following whites

In an oscilloscope or television circuit, the potentiometer that controls the voltage on the focusing electrode of the cathode-ray tube and, accordingly, the sharpness of the image.
form 1. The core or frame upon which an inductor is wound. 2. A vessel, such as a mold, in which the shaping of a product occurs. 3. A medium that creates an unwanted electrical path.

Fourier transform A mathematical operation that transforms a function of time into a function of frequency. It is not especially useful for the control of electronic or mechanical devices.

Fourier currents In an electronic organ, an audio filter that shapes the wave of a tone so that the tone will have the desired characteristics. 

Fourier transform A high-level computer programming language used in certain robots, automated factories, medical electronic devices, and electronic games developed in the 1970s to facilitate computer control of equipment in astronomical observatories.

Fourway A high-level computer programming language developed in the 1950s, and still used in some current applications. It is not especially useful for the control of electronic or mechanical devices.

FOSSDIC Acronym for foil optical scanning devices for input to computer.

Foster-Seeley discriminator A discriminator circuit in which the diodes are operated from a single-tuned, centered-tapped secondary of the input transformer. The center tap is also capacitively coupled to the top of the transformer’s primary coil. Compare TRAVIS DISCRIMINATOR.

foucs FPs 1. Abbreviation of feet per second. 2. Abbreviation of frames per second. 3. Abbreviation of foot-pound-second (fps), a chiefly British system of units.

fps system of units The British system of units of measurement that uses the foot for length, the pound for mass, and the second for time. Compare CENTIMETRE-GRAM-SECOND and INTERNATIONAL SYSTEM OF UNITS.
Fractional exponent An exponent indicating that a number is to be raised to a fractional power (e.g., 10\(^{1/2}\)). The numerator of the exponent indicates the power and the denominator indicates the root that must be taken of the result. Thus, \(a^{m/n}\) is equal to the \(m\)th root of \(na\).

Fractional gain Amplification less than unity. A notable example is the transfer function of a source follower or emitter follower.

Fractional uncertainty See RELATIVE UNCERTAINTY.

Frame 1. A single, complete video image, scanned in \(1/30\) second in conventional television receivers.
2. A single motion-picture (film) image.
3. In packet communications, a fundamental unit of data. The three types are called information (I) frame, supervisory (S) frame, and unnumbered (U) frame.
4. One of a recurring cycle of pulses.
5. In pulse-code modulation (PCM), a cyclic word group making up a complete composite modulator cycle.
6. A digital representation of a set of objects, useful in robotics and artificial intelligence (AI).

Frame alignment The condition in which the receiver, or receiving apparatus, is in correct alignment with the signal to be received. In television, for example, this results in true rendition of the picture. Incorrect frame alignment (misalignment) might result in the picture being split with the top and bottom interposed. For other types of signals, misalignment would result in garbled reception.

Frame alignment signal In television, a transmitted signal that is used to ensure that frame alignment occurs in the receiver. It is a form of synchronizing pulses.

Frame-alignment time slot In a transmitted television frame, an interval of time that is used for the purpose of transmitting a frame-alignment signal. There might or might not be other signal information transmitted during this time interval.

Frame frequency The number of frames of a motion picture film that come into position per unit of time in a camera, projector, or pickup.

Frame of reference Geometric relationships used to describe the location of a body in space.

Frame rate The number of frames of a video signal so that the top and bottom of the transmitted and received pictures line up.

Frame synchronizing signal 1. In pulse amplitude modulation (PAM), a coded pulse indicating initiation of a commutation frame.
2. In pulse-code modulation (PCM), a signal used to identify an information frame.

Franklin antenna A vertical collinear array that produces omnidirectional gain because of phasing among the individual components.

Franklin (Benjamin Franklin, 1706–1790) Abbreviation, Fr. A name that has been suggested for the unit of electric charge. 1 fr is the charge that exerts a force of 1 dyn on an equal charge at a distance of 1 centimeter in a vacuum.

Franklin oscillator A dual-terminal, audio/radio-frequency (AF/RF) oscillator circuit. Consists of a two-stage, resistance-capacitance (RC) coupled amplifier, with a tuned inductance-capacitance (LC) tank in the input gate circuit, and with capacitive feedback from the second drain to the first drain. Also see SOLID STATE and BATTERY.

Frankuohe region The area surrounding a radiating antenna, throughout which the energy appears to come from a single point located near the actual antenna.
frequency converter 1. An active or passive device for changing the frequency of a signal. 2. The mixer in a superheterodyne circuit.

frequency correction Manual or automatic resetting of a deviated frequency to its original value.

frequency counter An instrument that counts signal cycles or pulses over a standard time base (a frequency measurement). Often used to accurately measure the frequencies of radio or television signals; in this application, it is a precision FREQUENCY METER.

frequency cutoff See CUTOFF FREQUENCY.

frequency detector See FREQUENCY VOLTAGE DETECTOR.

frequency deviation 1. The degree to which a frequency changes from a prescribed value. Thus, if the frequency of a 1000-Hz oscillator drifts between 990 and 1010 Hz, the deviation is ±10 Hz. 2. In a frequency-modulated (FM) signal, the amount of instantaneous frequency shift above and below the unmodulated carrier frequency.

frequency-deviation meter Used in radio broadcasting and communications and broadcasting. The instantaneous frequency deviation of a signal is monitored or transmitted.

frequency distortion The process of changing a signal from one frequency to another, usually without altering the signal bandwidth. In some cases, a signal is turned “upside down” by this process (e.g., an upper-sideband (USB) signal might be changed to a lower-sideband (LSB) signal). Generally accomplished by means of a MIXER.

frequency function See PROBABILITY DENSITY FUNCTION.

frequency function • frequency response 301

cast stations or a frequency meter used in electronic generating stations.

frequency multiplier A circuit or device whose output frequency is a multiple of the input frequency. See, for example, FREQUENCY DOUBLER.

frequency-multiplying transformer A magnetic amplifier that generates harmonics of the supply frequency. The effect results from the nonlinearity of the transformer core material.

frequency offset 1. The difference between an actual frequency and the desired frequency. 2. In a communications transceiver, the difference between the receiver frequency and the transmitter frequency. In some modes, such as single-sideband (SSB), the offset is normally zero. In other modes, notably continuous-wave (CW) Morse code, the offset is normally several hundred Hz. See FREQUENCY SPLIT.

frequency overlap 1. A common band of frequencies between two adjacent channels in a communications system. 2. A common frequency region shared by two or more communications systems. 3. An overlapping of frequencies in a communications system.

frequency record A phonograph test disk containing various frequencies at specified amplitudes.

frequency rejection The elimination, usually by a filter, of a single frequency or narrow band of frequencies from a mixture of frequencies. Compare FREQUENCY TRIMMER.

frequency relay A frequency-sensitive relay (see SELECTIVE RELAY).

frequency response A performance characteristic that describes the operation of a device or circuit over a specified range of signal frequencies (e.g., the gain-versus-frequency characteristic of an amplifier).
frequency response recorder A graphic recorder that automatically plots a frequency-response curve during test.

frequency run A test, or test sequence, that determines the loss characteristics of a circuit as a function of the operating frequency.

frequency scanning 1. A controlled fluctuation of the transmitter frequency in a frequency-agile radar or communications system. 2. In a programmable, digital communications receiver or transceiver, a form of simultaneous digital monitoring of two or more channels. 3. The frequency-response change in a spectrum analyzer.

frequency scaler See SCALGR.

frequency-selection sensor A sensor that passes or rejects phenomena at certain frequencies while ignoring those at other frequencies.

frequency-selective relay See SELECTIVE RELAY.

frequency-sensitive bridge A bridge, such as the Wien bridge or resonance bridge, that can be balanced at only one frequency for a given set of bridge-arm values.

frequency separator In a television receiver, the circuit that separates horizontal- and vertical-scan sync pulses.

frequency-keeping Abbreviation, FSK. A method of synthesizing a signal transmission. The logic 1 (high or mark) and the logic 0 (low or space) pulses are sent at a specified carrier frequency, and the logic 0 (or space) pulses are sent at a higher frequency slightly higher or lower than the logic 1 pulses. This is the most primitive form of frequency modulation (FM). The difference between the mark and space frequencies is called the shift, and is usually between 5 and 10 kHz. Compare AUDIOFREQUENCY-SHIFT KEYING.

frequency split 1. The difference between the receiver frequency and the transmitter frequency in a communications repeater. 2. See FREQUENCY OFFSET.

frequency spotting The setting-up of signals at reference frequencies (usually harmonics of a standard-frequency oscillator), and their use in identifying unknown frequencies. Also see FREQUENCY CALIBRATOR.

frequency spread The ratio of \( f_2 \) to \( f_1 \), where \( f_1 \) is the lower frequency in a given range of frequencies and \( f_2 \) is the highest frequency. Compare FREQUENCY SPAN.

frequency stability The degree to which a frequency remains constant during variations in temperature, current, voltage, and similar factors. It is specified in Hertz (Hz) or kilohertz (kHz), or megahertz (MHz), or in parts per million per unit of the variable parameter.

frequency standard A signal source of a precise frequency, against which other sources of frequency can be calibrated. See specifically PRIMARY FREQUENCY STANDARD and SECONDARY FREQUENCY STANDARD.

frequency sum In a beat-frequency system, the quantity \( f_1 + f_2 \), where \( f_1 \) is the lower frequency and \( f_2 \) is the higher frequency. Compare FREQUENCY DIFFERENCE.

frequency swing See FREQUENCY DEVIATION.

frequency synthesizer A generator of signals at a precise frequency or set of frequencies, generally adjustable in discrete frequency steps. It is used for test or communications purposes. The signals are derived from a single-frequency source, usually a crystal oscillator. Also see SIGNAL GENERATOR.

frequency tolerance The acceptable amount by which a frequency can vary from its intended value. The tolerance can be specified as a percentage of the stated frequency, or as a range of parts per million, or as a certain number of hertz (Hz), kilohertz (kHz), or megahertz (MHz). Example: 3.675000 MHz ± 10 Hz.

frequency-to-voltage converter A device or circuit that delivers an output voltage that is proportional to the input frequency.

frequency translation 1. The conversion of a given frequency band from one part of the electromagnetic spectrum to another, without changing the actual separation of channels for the overall width of the band. 2. See FREQUENCY CONVERSION.

frequency transmission The passage of a frequency or band of frequencies from a mixture of frequencies through a filter or other circuit. Compare FREQUENCY TRANSDUCTION.

frequency tripler See TRIPLER.

frequency-variation method A method of determining the figure of merit (Q) of a tuned circuit by varying the frequency of the applied test voltage from resonance (f0) to a high point (f1) and a low point (fl). At the high and low points, the circuit voltage is 0.707 times the voltage at resonance. The figure of merit then is calculated from the formula

\[
Q = \frac{f_1 - f_l}{f_0} \cdot \frac{f_0}{f_1}
\]

front and rear converter See FREQUENCY-TO-VOLTAGE CONVERTER.

frequency-versus-wavelength conversion See WAVELENGTH-PEERIOD-FREQUENCY RELATIONSHIPS.

frequency spread See FREQUENCY SPREAD.

frequency span The difference between the lowest frequency in a given range of frequencies and \( f_1 \)–\( f_2 \). See FREQUENCY SPAN.

fringe A controlled fluctuation of the antenna zone between the antenna and the FRAUNHOFER REGION. The size of the Fresnel region depends on the wavelength of the radiated energy.

frictional The resistance to mechanical motion when one material is rubbed against another. Friction was one of the earliest sources of human-made electricity (see FRICIONAL ELECTRICITY and ELECTRIC MACHINE). Electrical resistance, opposition to the flow of electricity, is analogous to friction.

frictional electricity Static electricity generated by rubbing one material against another.

frictional electric machine See ELECTRIC MACHINE.

frictional error The change in parameters of a phonograph pickup, resulting from friction with the disc surface.

frictional loss A decrease or impairment in the efficiency with which energy is converted into useful work, caused by friction between moving parts.

fringe field A region in which a signal falls to the minimum field strength necessary for satisfactory operation of an electronic device.

fringe howl A howling sound that occurs when the transistor first begins to oscillate, obscuring the signal. The term is used because the circuit is operated at the fringe of oscillation.

fringe area The region in which the images from a set of bright cathode-ray tubes (CRTs) are projected onto a reflective screen, in a manner similar to the way the film is projected in a movie theater.

frontal mirror Also called first-surface mirror. A mirror that has its reflective material on the front, instead of on the back.

front-to-back ratio Abbreviation, f/b. An expression of the ability of a unidirectional antenna to concentrate its radiation or response in its favored direction. This specification is nearly always given in decibels (dB). The field strength in the favored direction is compared with the field strength exactly opposite the favored direction at the same distance from the antenna in free space, at the same frequency, and with the same power applied to the antenna feed point. Measurements can be made with a calibrated field-strength meter. Compare FRONT-TO-SIDE RATIO.

front-to-side ratio Abbreviation. f/s. An expression of the directivity of a unidirectional or bidirectional antenna system. This specification is nearly always given in decibels (dB). The field strength in the favored direction(s) is compared with the field strength at right angles to the favored direction(s) at the same distance from the antenna in free space, at the same frequency, and with the same power applied to the antenna feed point. Measurements can be made with a calibrated field-strength meter. Compare FRONT-TO-SIDE RATIO.

front alarm A device or circuit that responds to the presence of frost and actuates an alarm. Such alarms are sensitive to temperature, moisture, or both.

FRUGAL Acronym for FORTRAN rules used as a general application language.

FRUSA Abbreviation for fast-rolled up solar array, such as the type used in spacecraft and communications satellites.

f scan In radar operations, a display in which the central blip represents the target at which the antenna is pointed horizontally, and vertical displacement of the blip indicates corresponding horizontal and vertical aiming errors.

FSK Abbreviation, FREQUENCY-SHIFT KEYING.

FSM Abbreviation of FIELD-STRENGTH METER.

FSR Abbreviation for feedback shift register.

ft Abbreviation of foot or feet.
FT-cut crystal • full-scale sensitivity

FT-cut crystal A piezoelectric plate cut from a quartz crystal at an angle of 45°, with respect to the x-axis. Also see CRYSTAL AXES and CRYSTAL CUTS.

ft. lb Abbreviation of FOOT-POUND.

ft. lb Abbreviation of FOOT-POUND.

Fuchs antenna A simple antenna consisting of a single-wire radiator without feeder or transmission line, connected directly to the transmitter. It is usually an odd multiple of 0.25 wavelength long. When a good radio-frequency (RF) ground is used, this antenna can be effective at high frequencies, although part of its radiated field is often inside the transmitter building.

fuel alarm A sensing circuit that actuates an alarm when the fuel in a tank or reservoir falls to a prescribed level.

fuel cell A generator that produces electricity directly from a reaction between fuel substances, such as hydrogen and oxygen.

fuel-flow alarm An electronic circuit that actuates an alarm when fuel flow changes from a prescribed value.

fuel-flow control A servo system that automatically maintains or corrects the flow rate of a fuel.

fuel-flow gauge See FUEL-FLOW METER.

fuel-flow indicator See FUEL-FLOW METER.

fuel-flow meter An instrument for measuring fuel flow rate.

fuel-flow switch A switch that is actuated by fuel flowing in pipes or other channels.

fuel gauge An instrument consisting of a transducer that senses the level of liquid fuel in a tank and delivers a proportional output current or voltage, and an electric meter whose needle is deflected in proportion to the current or voltage and, therefore, to the fuel level. Alternatively, the meter can be a direct-readout digital device, showing the number of gallons remaining in the tank, and/or the extent to which the tank is full (fraction or percentage).

fuel meter See FULL-SCALE METER.

fuel-pressure indicator An instrument for measuring fuel pressure in fuel tanks or other fuel sources.

fuel-pressure meter See FUEL-PRESSURE INDICATOR.

full adder In a digital computer, an adder circuit that can handle the carry signal, as well as the binary elements that are to be added. Also see ADDER and CARRY. Compare HALF ADDER.

full bridge A bridge-rectifier circuit in which each of the four arms contains a diode. By comparison, the three-quarter bridge contains a resistor in one arm; the half bridge, resistors in two arms; and the quarter bridge, resistors in three arms.

full-duplex system In data communications, a system that transmits data in both directions simultaneously and continuously. Compare HALF-DUPLEX SYSTEM.

full-focus yoke See COSINE YOKE.

full-house A multichannel radio-control model plane system that allows the use of a realistic complement of working control surfaces.

full-load current The output current from a source when the load is maximum (that is, the load resistance is minimum).

full-load power The power drawn from a source when the load is maximum (that is, the load resistance is minimum).

full-load voltage The output voltage of a source when full power is drawn (i.e., when the load is maximum) (that is, the load resistance is minimum).

full-load wattage See FULL-LOAD POWER.

full-wave bridge rectifier Full-wave current (ac) voltage. The successive output voltage of a source when full power is drawn (i.e., when the load is maximum) (that is, the load resistance is minimum).

full-wave doubler See FULL-WAVE VOLTAGE DOUBLER.

full-wave detector A detector circuit using two diodes in a full-wave, center-tap rectifier configuration.

full-wave doubler See FULL-WAVE VOLTAGE DOUBLER.

full-wave voltage doubler A rectifier that delivers a half-cycle of pulsating direct-current (dc) voltage for each half-cycle of applied alternating-current (ac) voltage. The successive output half-cycles have the same polarity. Compare FULL-WAVE RECTIFIER and FULL-WAVE, CENTER-TAP RECTIFIER. Compare HALF-WAVE RECTIFIER.

full-wave rectifier A rectifier that delivers a half-cycle of pulsating direct-current (dc) output voltage for each half-cycle of applied alternating-current (ac) voltage. The successive output half-cycles have the same polarity. Compare FULL-WAVE RECTIFIER and FULL-WAVE, CENTER-TAP RECTIFIER. Compare HALF-WAVE RECTIFIER.

full-wave vibrator 1. A vibrator-type power supply, an interrupter that closes contacts on both ends of its swing, thus causing direct current (dc) to flow through the transformer in alternate directions. 2. A vibrator-type rectifier that closes in both directions.

full-wave voltage doubler A voltage doubler circuit whose direct-current (dc) output has a ripple of twice the alternating-current (ac) supply frequency. Compare HALF-WAVE VOLTAGE DOUBLER.

function A mapping between two sets of quantities or points A and B, such that: (1) for each y in B, there exists at least one corresponding x in A; and (2) for each x in A, there exists exactly one y in B. In this case y is said to be a function of x. This can be written y = f(x). The set A is called the domain of f, the set B is called the range of f.

functionally maintains or corrects the flow rate of a fuel.

function of variables A mathematical expression, using symbols, relating variables e.g., the expression x = y + z is a function of variables x, y, and z. The behavior and application for which a device or system is designed. 4. Part of a computer instruction specifying the operation to be done.

functional design In data communications, a system in which the equipment will properly operate. As a battery discharges, the voltage decreases; when the battery drops to the FE point, the battery will not be able to recharge.

functional test A performance test of a device or circuit, to see that it behaves as intended in the environment in which it will be used.

function generator 1. A signal generator whose output is any of several selectable waveforms.
The quantitative measure of gain-level linearity voltages in a circuit with gain. A function between two currents or gain function gain control + vice, or system increases current, voltage, or power. Applicable especially to active devices, such as transistors and integrated circuits (ICs), and to amplifiers and filters that use them. Also used to express the directional properties of some antenna systems. Usually specified in decibels (dB). See AMPLIFICATION, CURRENT AMPLIFICATION, DECIBEL, VOLTAGE AMPLIFICATION, and POWER AMPLIFICATION.

Gain control 1. To adjust the gain of an amplifier. 2. A potentiometer used to adjust amplifier gain.

Gain function A function between two currents or voltages in a circuit with gain.

Gain bandwidth product Symbol, \( f \). The frequency at which the gain of a bipolar transistor is equal to 1 (no amplification or loss) in the common-emitter configuration. The \( f \) represents an absolute upper limit for the frequency at which a bipolar transistor will work as an amplifier. Any attempt to design an amplifier using a bipolar transistor at a frequency higher than its \( f \) will inevitably fail. Compare ALPHA CUTOFF FREQUENCY.
gainer-linearity • gama rays

The drop in gain of an amplifier at high- and low-frequency extremes.

gain control. See DIFFERENTIAL GAIN CONTROL.

gain stability The degree to which the gain of a system remains constant during changes in related factors, such as temperature, supply power, and loading.

gain temperature coefficient The extent to which the full-scale current varies over a certain temperature range, expressed in parts per million per degree Celsius (ppm/°C).

galactic noise Radio noise propagated from the plane of our galaxy, and especially from the center, located in the direction of the constellation Sagittarius. It is of significance in space communications and radio astronomy.

galena Formula, PbS. Natural lead sulfide, which in nature takes the form of bluish-gray, cubical crystals.

gallium Symbol, Ga. Atomic number, 31. Atomic weight, 69.72. One of the constituents of the semiconductor compound GALLIUM ARSENIDE.

gallium arsenide Formula, GaAs. A compound of gallium and arsenic, used as a semiconductor material. It is noted for its low-noise characteristics.

gallium-arsenide diode A diode in which the semiconductor material is processed gallium arsenide.

gallium-arsenide varactor A low-noise, micro-wave varactor in which the semiconductor material is gallium arsenide.

gallium-phosphide A light-emitting diode in which the semiconductor material is processed gallium phosphide.

galopipic ghost A form of radio-control system in which the elevation and rudder can be moved to the desired extent.

galton whistle A device for producing high-frequency acoustic waves (ultrasound), similar to a baton.

galvanic cell Generic term for any electrochemical human) skin. This phenomenon is a useful indicator in physiology, psychology, and criminology.

Galvanic taste A sharp, metallic taste experienced when a small electric current is passed through the tip of the tongue.

Galvanism (After Luigi Galvani, 1737-1798) The production of an electric current by chemical action, as in a battery.

Galvanize To coat steel with zinc to forestall corrosion.

Galvanometer A sensitive, bi-directional current meter. Used in various electrical tests—especially as a null indicator in bridge operation. Also see MICROAMMETER.

Galvanometer constant The number by which a galvanometer reading must be multiplied in order to obtain the current in microamperes, milliampere, or amperes.

Galvanometer recorder A graphic recorder in which a mirror in a movable-coil galvanometer reflects a beam of light to a moving strip of photographic film.

Galvanometer shunt A resistor placed in parallel with a galvanometer to decrease its sensitivity. Also see SHUNT RESISTOR.

Galvanometry The use of galvanometers to determine the intensity and direction of electric currents.

Galvanoplastics The science of ELECTROPHORESIS and ELECTROPLATING.

Galvanoscope An instrument for detecting and showing the direction of very weak electric currents.

Galvanotherapy The use of electric currents to produce heat in the body of a human or animal.

Gamma ferric oxide A form of oxides of iron used in formulation of magnetic recording tape.

Gamma match A linear transformer for matching on an unbalanced (usually coaxial) feed line to a balanced (usually half-wave) antenna. The outer conductor of the center conductor runs for a short distance parallel to the radiator, making a right-angle bend before connecting to the radiator.

Gamma match A linear transformer for matching on an unbalanced (usually coaxial) feed line to a balanced (usually half-wave) antenna. The outer conductor of the center conductor runs for a short distance parallel to the radiator, making a right-angle bend before connecting to the radiator.

Gamma section See GAMMA MATCH.

gang To mechanically couple components (pots, etc.) for operation by a single knob.

gang capacitor A variable capacitor consisting of sections of the same shaft for simultaneous variation. It is usually specified by the number of sections (e.g., four-gang capacitor).

gang capacitors Separate variable capacitors mechanically connected together (e.g., by belt or gear drive) for simultaneous operation. Compare GANG POTENTIOMETER.

ganged potentiometers Separate potentiometers mechanically connected together (e.g., by belt or gear drive) for simultaneous variation. Compare GANG CAPACITOR.

ganged potentiometer A potentiometer consisting of sections mounted on the same shaft for simultaneous variation. Usually specified according to the number of sections (e.g., dual potentiometer).

gang printer In digital computer and data processing, an electromechanical printer capable of printing an entire line at one time.

gang punch 1. To punch identical or nonvarying information into the cards of a group. 2. A machine for this operation.

gang swatch See GANGED POTENTIOMETERS.

gang switch See MULTISWITCH.

Gantt chart A chart of activity versus time used in industry as an aid in making decisions regarding the allocation of resources for specific activities (e.g., as applied to PERT [project evaluation and review techniques]).

gap A space between electrodes or magnetic poles. Also see SLOT, GANGED CAPACITORS.

gap closing 1. The point at which the gap is opened. 2. A spark gap.

gap coupling Separation of metal cylinders separated by air gaps.

gap filling Modification of an antenna for the purpose of eliminating nulls in the directional pattern.

gap insulation See SLOT INSULATION, 1, 2.

gap loss In a reproducing head, the loss that occurs because of GANGED CAPACITORS.

gap-type protector A spark gap used to protect equipment from high-voltage transients.

gau voltmeter See NEEDLE GAP and SPHERE GAP.

gap width In a magnetic recording head, the width of the gap (taken parallel with the face). Compare GAP DEPTH.

garbage 1. In digital computer operations, a colloquialism for useless or incorrect data. 2. Colloquialism for unreadable signals or severe intermodulation in a radio communications circuit. 3. Colloquialism for an unsound theory.

garble 1. Garbled message. 2. Also called scrumble. To purposely render communications or data unintelligible to everyone, except the intended recipient(s). See SCRALLER CIRCUIT.

garnet maser A maser that uses natural or synthetic garnet as the stimulated material. Also see ELECTRON SPIN MASER.

gas One of the states of matter, characterized by molecules that are widely separated and are in constant (e.g., as applied to PERT (project evaluation and review techniques).
constant during the gas discharge and which ac-
cordingly delivers a constant output voltage.
gated amplifier An amplifier whose input is ef-
cctively switched on and off by gating signals.
gated buffer A low-voltage, high-current driver,
used for differentiation in a multivibrator circuit.
gated multivibrator A multivibrator using a gate
effect transistor as the driver, which has the prop-
erty of delivering a high current for a short time
gate-protected MOSFET A MOSFET with an inter-
terconnected gate network.
gate turn-off voltage The voltage at which the gatejunction of a junction field-effect transistor (JFET)
enters avalanche.
gate-source voltage The voltage at which a field-
effect transistor, the maximum voltage permitted
between the gate and drain electrodes.
gate turn-off voltage The voltage at which the gate-
controlled semiconductor switch, the low value of
gate current that causes the device to switch off.
gate voltage 1. The voltage applied to the gate
electrode of a field-effect transistor. See GATE-
SOURCE VOLTAGE. 2. The instantaneous gat
cathode voltage in a silicon-controlled rectifier.
3. The voltage across the gate winding of a mag-
netic amplifier.
gate winding In a magnetic amplifier; a winding
that produces gating action.
gating 1. The process of using one signal to switch
another (or part of another) on or off for a desired
interval. 2. Selecting a part of a waveform for observa-
tion or for control purposes.
gauge 1. Any device, such as a METER, used for
the purpose of measuring the magnitude of a quant-
it. 2. Wire data and measurements (see diana
WIRE GAUGE, 1, 2, 3). 3. Sheet metal thickness
(see. 10 gauge).
gaussian distribution In statistics, the symmetri-
cal-shaped curve described by GAUSSIAN CURVE.
gaussian curve See BELL-SHAPED CURVE.
gaussian distribution In statistics, the symmetri-
cally-shaped function used in the design of lowpass
filters. The Gaussian re-
sponse is characterized by low band-edge selec-
tivity, high transition bandwidth, negligible step
response overshoot, and low step-response delay
time.
gaussian noise Electrical noise whose amplitude-
versus-frequency characteristic is described by
the GAUSSIAN DISTRIBUTION.
gaussian waveform A waveform that results in
minimal side lobes in a pulse-compression system.
gaussmeter See FLUXMETER.
gauss’ theorem in electromagnetism: A statement
that the magnetic flux through any closed surface
is equal to the total electric charge passing through
the boundary of the surface.
A geometric sequence is a sequence in which each term after the first is obtained by multiplying the preceding term by a constant. For example, the sequence 2, 4, 8, 16... is a geometric sequence where each term is obtained by multiplying the previous term by 2.

The general equation for a geometric sequence is given by:

\[ a_n = a_1 \cdot r^{(n-1)} \]

where:
- \( a_n \) is the nth term of the sequence,
- \( a_1 \) is the first term of the sequence,
- \( r \) is the common ratio,
- \( n \) is the term number.

The sum of the first \( n \) terms of a geometric sequence is given by:

\[ S_n = a_1 \cdot \frac{1 - r^n}{1 - r} \]

For \( |r| < 1 \), the sum of an infinite geometric sequence is given by:

\[ S_\infty = \frac{a_1}{1 - r} \]

The term \( a_n \) can also be expressed in terms of the previous term as:

\[ a_n = a_{n-1} \cdot r \]

A generating station is a place where electrical energy is produced. This can be done through a variety of methods, such as through the use of a generator/motor or a direct-current (dc) voltage applied to the capacitor is rapidly spinning variable capacitor. A direct-current (dc) voltage applied to the capacitor is rapidly spinning variable capacitor.

A generating station is a place where electrical energy is produced. This can be done through a variety of methods, such as through the use of a generator/motor or a direct-current (dc) voltage applied to the capacitor is rapidly spinning variable capacitor. A direct-current (dc) voltage applied to the capacitor is rapidly spinning variable capacitor.

A general packet radio service is a form of packet radio designed for mobile use. Subscribers pay for the volume of data they send and receive, rather than for the time they spend accessing the network. This optimizes the efficiency of the network, both from an engineering standpoint and a financial standpoint. See PACKET COMMUNICATIONS.

A general-purpose bridge is see UNIVERSAL BRIDGE.

A general-purpose component is a component designed or used for a wide range of applications. For example, a general-purpose germanium diode is useful as a detector, mixer, limiter, clipper, meter rectifier, automatic-gain-control (AGC) rectifier, and curve changer.

A general-purpose computer is a computer that can be used in a number of applications for which it was not specifically designed.

A general-purpose diode is a small-signal semiconductor diode that is useful for a variety of applications, such as detection, light-duty rectification, limiting, logic switching, etc.

A general-purpose function generator is a nonpecialized function generator that is capable of generating a variety of different waveforms.

A general-purpose program is a program for the solution of a class of problems or for a specific problem, according to certain parametric values. Also called program routine.

A general-purpose relay is any relay that can be used in various situations, such as for switching alternating or direct currents.

A general-purpose tester is an instrument, such as a voltmeter, ammeter, that offers several test capabilities.

A general-purpose transistor is a transistor that can be used in several applications, such as audio amplification, detection, and oscillation.

A geodetic system is a mathematical system in which each term after the first is obtained by multiplying the preceding term by a constant.

A geodetic survey is the measurement of the earth's surface, including the topography and the geometry of the earth. This is often done using geodetic equipment, such as a geodetic surveying instrument.

A geophysical survey is the measurement of the earth's magnetic field, which is important for understanding the earth's interior.

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A geodetic system is a mathematical system in which each term after the first is obtained by multiplying the preceding term by a constant.

A geophysical survey is the measurement of the earth's magnetic field, which is important for understanding the earth's interior.
**geometric symmetry** In a bandpass or band-rejection filter, a condition in which the response is identical on either side of the center frequency. Also called mirror-image symmetry.

<table>
<thead>
<tr>
<th>geomanium dioxide</th>
<th>Formula, GeO. A gray or white powder obtainable from various sources; it is reduced in an atmosphere of hydrogen or helium to yield geomanium, a semiconductor material.</th>
</tr>
</thead>
<tbody>
<tr>
<td>germanium junction diode</td>
<td>A germanium diode that contains a pn junction.</td>
</tr>
<tr>
<td>germanium photocell</td>
<td>A photodiode cell consisting of a reverse-biased germanium point-contact diode or germanium junction diode.</td>
</tr>
<tr>
<td>germanium point contact</td>
<td>The contact between a pointed metal wire and a germanium wafer, as in a point-contact diode or point-contact transistor.</td>
</tr>
<tr>
<td>germanium rectifier</td>
<td>A power rectifier that contains a germanium pn junction.</td>
</tr>
<tr>
<td>germanium transistor</td>
<td>A transistor in which germanium is the semiconductor material. Such a transistor has lower internal resistance and greater temperature drift than a silicon transistor.</td>
</tr>
<tr>
<td>German silver</td>
<td>A copper-nickel-zinc alloy used in some resistance wires. Also called nickel-silver.</td>
</tr>
<tr>
<td>G6V</td>
<td>Abbreviation of ground effect vehicle.</td>
</tr>
<tr>
<td>g-force</td>
<td>See JACOB.</td>
</tr>
<tr>
<td>g-force</td>
<td>See GRAVITY.</td>
</tr>
<tr>
<td>Giorgi system</td>
<td>A copper-nickel-zinc alloy used in some resistance wires. Also called nickel-silver.</td>
</tr>
<tr>
<td>GJG</td>
<td>Abbreviation of GROUND TO GROUND.</td>
</tr>
<tr>
<td>glide-path transmitter</td>
<td>A radio-frequency transmitter that produces a guidance beam for aircraft landing purposes. The aircraft follows the beam toward the runway.</td>
</tr>
</tbody>
</table>

**glide slope** See GLIDE PATH.

**g line** A microwave conductor consisting of a round wire coated with a dielectric.

**glitch** 1. In a television image, a narrow, horizontal interference bar that moves vertically. 2. A very short and unwanted high-amplitude transient that recurs irregularly in an electronic system.

**glide-path transmitter** A radiotelegraph antenna used to confuse enemy radar systems.

**glitter** In radar, an echo or set of echoes that results from the passage of current through ionized gas in a partially evacuated tube. The color of the glitter is characteristic of the particular gas used.

**glow discharge** The luminous electrical discharge resulting from the passage of current through ionized gas in a partially evacuated tube. The color of the glow is characteristic of the particular gas used.

**glow discharge microphone** A device that produces audio-frequency currents from the action of sound waves in a glow-discharge tube.

**glow discharge tube** A partially evacuated tube that contains two or more electrodes. The rared gas in the tube glows when a sufficient voltage is applied to the electrodes. See DISCHARGE LAMP, FLUORESCENT TUBE, and NEON BULB.

**glow lamp** See DISCHARGE LAMP.

**glow modulator tube** A gas tube whose luminous electrical discharge produces audio-frequency currents from the action of sound waves in a glow-discharge tube. The color of the glow is characteristic of the particular gas used.

**glow switch** In fluorescent light circuits, an electronic switch containing two bimetallic strips that make mutual contact when heated by the glow discharge.

**glow tube** See DISCHARGE LAMP, FLUORESCENT TUBE, GLOW MODULATOR TUBE, NEON BULB, and STROBOSPHERE.

**glow voltage** See BREAKDOWN VOLTAGE.

**glimpse** A brief, fleeting, and usually incomplete observation.

**glimpse** A brief, fleeting, and usually incomplete observation.
A subatomic particle that is believed to bind quarks together (coined by Prof. Murray Gell-Mann of California Institute of Technology).

GM Abbreviation of Geiger-Müller. See, for example, DIFFUSED-BASE TRANSISTOR.

g Abbreviation of gram. Also symbolized g.

gm Abbreviation of GRAM-CALORIE.

gm-cm Abbreviation of GRAM-CENTIMETER.

gm-cm/gm Abbreviation of GRAM-CENTIMETER/GRAM-AMOUNT.

A pair of diodes connected in reverse series. Each subband carries its own specific data.

A germanium point-contact diode having a fine gold wire whose point is bonded to the germanium wafer. Its principal features are high forward current and almost constant, low reverse current.

The diffusion of gold into the base and collector regions of a diffusion-mesa transistor; it shortens carrier storage time.

A set of proportions used in the design of some speaker cabinets. The width (W) is 4/5 of the height (H); the depth (D) is 3/4 of the width. These correspond to a ratio H:W:D = 1000:625:500. These proportions are thought by some acoustics engineers to result in the best possible sound quality.

See ELECTROSCOPE.

An early dynamo for generating radio-frequency power. The high frequency energy was not generated directly by the machine, but by resonant circuits and frequency multiplying interaction between components.

Golf Standard phonetic alphabet code word for the letter G.

generater 1. Generically, any radio direction finder. 2. An inductive coupler having a secondary coil rotated by a dial calibrated to read azimuth. The coupler, when used with a suitable antenna system, comprises a direction finder.

gradient The rate at which a variable quantity increases or decreases. See, for example, VOLTAGE GRADIENT.

gradient microphone A microphone whose output varies with sound pressure. Also see PRESSURE MICROPHONE.

A full bridge rectifier (i.e., one having a diode in each arm).

Trade name for a specialized written alphabet used for entering data into a handheld computer using a stylus. The entry of data into a handheld computer using a stylus. See HANDHELD COMPUTER.

graph 1. A representation of data, particularly a depiction of the manner in which one variable or set of variables changes, with respect to another. Can be in the form of discrete points, curves, bars, columns, pie-shaped slices, etc. 2. A curve or set of curves in a coordinate system.

The solution of problems through the use of graphic devices, such as vector diagrams, load lines, Nyquist plots, topological flow diagrams, etc.

See SCHEDULE METHOD.

A device that makes it easy for lay people to use a computer. Commands are given by making choices among items displayed on the screen. Popular versions use symbols, called icons, along with a pointing device, such as a mouse or trackball.

Records of data in the form of graphs, charts, tables, diagrams, etc. A device for tailoring the amplitude-versus-frequency response of a high-fidelity audio system. Consists of a splitter, several audio filters, and a mixer. The gain of each filter is adjustable via a slide potentimeter. The potentiometers are arranged on the front panel in such a way that their relative positions show the approximate shape of the response curve.

A device for entering data into a handheld computer using a stylus. See HANDHELD COMPUTER.

graphical 1. Pertaining to or suitable for graphic instruments. 2. Pertaining to or involving the use of graphic instruments, such as vector diagrams, load lines, Nyquist plots, topological flow diagrams, etc.

A device that makes a permanent recording of signal amplitude as a function of some independent variable (such as time, frequency, or direction).

In process control, a panel of illuminated lights or dials that display the status of a process.
graphic recorder | An instrument in which a signal-driven pen or stylus makes a permanent record of a quantity in graphical form. The paper passes at a controlled speed beneath the pen.

graphs | 1. Diagrams, charts, photos, tables, or similar material designed to convey information. 2. The process of solving problems or equations with the aid of graphs.

graphite | A soft form of carbon used in resistors, attenuators, contacts, brushes, vacuum-tube plates, cathode-ray tube coatings, etc.

graphite-line resistor | An emergency, makeshift resistor consisting of a pencil line drawn on a piece of paper. The heavier the line for a given width and length, the lower its resistance.

graphophane | Archaic term for photographic tablet.

grappling planning | A scheme that a robot arm and gripper use to get hold of a particular object. It can use a vision system, a bar-code reader, tactile sensing, and/or proximity sensing. The robot control software must be programmed to recognize the input from these devices, and to seek out the object.

group | The background noise (noise floor) on the display of a spectrum analyzer; it also appears on the spectrum display of a radar display.

grasshopper fuse | A special type of spring-operated fuse. When it burns out, it actuates an alarm that alerts personnel of a possible circuit or system malfunction.

gratitude | Calibrated gridwork, as on the face of an oscilloscope or spectrum-analyzer screen.

grating | A set of parallel, closely spaced, equidistant conductors and/or supports. When an electromagnetic field has a wavelength comparable to the conductor spacing passes through the plane containing the conductors, diffraction occurs, producing an interference pattern. An adaptation of this device, the DIFFRACTION GRATING, is used to separate visible light into its constituent spectral colors.

grating reflector | A metal antenna reflector consisting of numerous parallel, straight, closely spaced conductors. When the conductor spacing is much smaller than the wavelength, the set behaves like a solid sheet of metal.

Gratz rectifier | A form of full-wave rectifier circuit in a three-phase, alternating-current system.

gravitation | The universal force of attraction between material bodies—especially that force evidenced by the earth’s drawing of bodies toward its center, causing them to have weight.

2. Abbreviation, g. The rate at which a free-falling mass accelerates in a vacuum in the earth’s surface; equal to 9.802 m per second per second (m/s²). 3. The rate at which a free-falling mass accelerates in a vacuum in the vicinity, or at the surface, of an astronomical object, such as a planet or star.

green body | A radiating body exhibiting constant spectral emissivity at all wavelengths. That is, the emitted energy is the same at all wavelengths and all frequencies.

grey code | A computer code in which the expressions representing sequential numbers differ in only one bit.

grey scale | A reference scale for use in black-and-white television and video display images, consisting of several defined levels of brightness with neutral color.

grid | A form of tin that exhibits some properties of a semiconductor at temperatures below 18 degrees Celsius.

grid dip meter | 1. A dip meter that contains a vacuum-tube oscillator: the indicating microammeter is in the grid circuit. It shows some characteristic of a circuit, program, or system. 2. A dip meter that contains a vacuum-tube oscillator: the indicating microammeter is in the grid circuit. It shows some characteristic of a circuit, program, or system.

grid dip oscillator | See GRID-DIP METER.

grid dissipation | 1. The amount of power given up by the grid circuit of a vacuum-tube amplifier. 2. The maximum amount of power that a tube can safely dissipate as heat in the grid.

grid drive | See GRID EXCITATION.

grid-driving power | The signal power required by the control grid of a power tube.

grid emission | Electron or ion emission by the control grid of a vacuum tube.

grid excitation | Signal voltage or power applied to the control grid in a vacuum-tube amplifier circuit.

grid impedance | Symbol, Zg. The internal impedance of the grid-cathode path in a vacuum tube.

grid input impedance | The impedance of the grid input section of a vacuum-tube circuit. It is a complex combination of grid impedance and the impedance of input-circuit components.

gridistor | A special form of field-effect transistor with several channels.

grid-limiter resistor | A resistor connected in series with the grid circuit of a power tube to limit grid current during the positive half-cycle of grid-signal voltage.

grid loading effect | The tendency of the internal grid-cathode path of a vacuum tube to load a tuned circuit—especially when the grid draws current.

grid locking | A vacuum-tube fault in which the grid potential has become positive because of excessive grid electron emission.

grid mesh | The structure of a grid (e.g., gauze or a metal screen).

grid neutralization | See GRID-NEUTRALIZED AMPLIFIER.

grid-neutralized amplifier | A neutralized radio-frequency power amplifer in which the neutralizing capacitor is connected from the plate of the tube to the free end of a center-tapped grid-tube transformer.

grid north | In the grid system of navigation, the direction most nearly corresponding to geographic north.

grid-plate capacitance | See PLATE-GRID CAPACITANCE.

grid pool tube | A gas-discharge tube in which the cathode is a pool of mercury.

grid power loss | Driving-power loss in the grid input circuit of a power amplifier.

gridded tube | A high-value resistor connected between the control grid and ground in a vacuum-tube amplifier circuit.
grid return The circuit path through which the control grid of a vacuum tube is returned to ground or to the negative grid bias supply.

grid-separation circuit A vacuum-tube circuit in which the control grid is grounded. See COMMON-GRID CIRCUIT.

grid swing The peak-to-peak variation of a grid modulation signal.

grid tank A resonant inductance-capacitance circuit operating in the control grid circuit of a vacuum tube. Compare PLATE TANK.

grid tank capacitance The capacitance required to tune a GRID TANK to resonance.

grid tank inductance The inductance of the coil in a GRID TANK.

grid tank voltage The alternating-current (ac) voltage developed across the grid tank of a vacuum-tube circuit.

grid tuning Tuning of a vacuum-tube circuit by varying the capacitance, inductance, or both in the GRID TANK.

grid voltage 1. Symbol, $V_g$. The direct-current (dc) bias voltage applied to the control grid of a vacuum tube. 2. Symbol, $V_{gac}$. The voltage of the radio-frequency (RF) or audio-frequency (AF) signal in the grid circuit.

grille A covering for an acoustic speaker, used primarily to support the speaker cone, but also for aesthetic appeal.

grille cloth A durable fabric often used for speaker grilles in high-fidelity sound systems. It transmits sound at all audio frequencies, but protects the speaker(s) and provides an attractive physical appearance.

grasping See ROBOT GRIPPER.

grounded An elastic washer inserted through a grommet.

groove 1. See KEYWAY. 2. The fine, spiral line cut into a phonograph disc when it is manufactured.

groove angle On a phonograph disk, the angle between the walls of the unmodulated groove.

groove speed In a phonograph recording or reproducing system, the speed of the cutting needle or needle, with respect to the disc. The speed is greatest near the outer edge of the disc, and least near the center.

groove angle $\theta$ - Groove angle (usually 90°)

gross content The overall amount of data contained in a message. It can be expressed in bytes, words, or other units.

gross index One of a pair of indexes, used to give a reference in the line index, a supplement, both indexes are used to locate computer records in storage.

gross-motion planning The methodology that a robot uses to navigate in a general area without running into objects, knocking things over, falling down stairs, or losing its balance. It is often performed using a COMPUTER MAP of the work environment.

ground 1. The earth in relation to electricity and magnetism. 2. An electrical connection to the earth.

ground bus A conductor connected to an earth ground, and to which devices in a system are individually connected. The common ground points (e.g., chassis of the individual devices are not directly connected to each other, so ground loops are avoided. This scheme minimizes the probability of ELECTROMAGNETIC INTERFERENCE to or from the system. Compare GROUND LOOP.

ground clamp A device that provides a mechanical and electrical bond between a conductor and a ground rod or pipe. It is generally capable of passing a large amount of current.

ground clutter 1. In a surface-based radar system, echoes from nearby buildings, hills, and other objects, producing blips or blurs near the center of the screen. 2. In radar operations, an interference pattern on the screen, caused by accidental grounding in the system.

ground conductivity The case with which the earth will carry electrical current. Saltwater has the best conductivity; dark, moist soil and fresh water (because of the mineral content rate from fair to good. Sandy soil has the poorest ground conductivity.

ground conduct A pipe housing one or more ground leads.

ground conductor An electrical conductor, such as a chassis, to which zero-potential terminals of circuit components are connected.

ground constants The conductivity and dielectric constant of the earth for a particular kind of terrain and soil at a given location. Affects the behavior of radio antenna systems and electrical utility systems. Usually, high conductivity (low resistance) and low dielectric constant are desirable characteristics.

ground-controlled antenna Abbreviation, GCA. In air navigation, a ground radar system that provides information for radio-directed aircraft approaches.

ground-controlled interception Abbreviation, GCI. A ground radar system by which an aircraft can be directed to intercept enemy aircraft.

ground current 1. A direct electric current flowing into the earth from an electrical or electronic device, or into a device from the earth. 2. An alternating current flowing between the earth and a device. 3. An electric current flowing through the earth between two points. 4. A current flowing in the normal ground (low potential) line of a circuit.

ground detector A device that indicates whether or not a given circuit point is at direct-current ground potential.

grounded antenna See MARCONI ANTENNA.

grounded-base circuit See COMMON-BASE CIRCUIT.

grounded-cathode circuit See COMMON-GRID CIRCUIT.

grounded-collector circuit See COMMON-COLLECTOR CIRCUIT.

grounded-cathode circuit See COMMON-CATHODE CIRCUIT.

grounded-colector circuit See COMMON-COLLECTOR CIRCUIT.

grounded circuit See COMMON-BASE CIRCUIT.

grounded-emitter circuit See COMMON-Emitter CIRCUIT.

grounded-grid circuit See COMMON-GRADE CIRCUIT.

grounded-gate circuit See COMMON-GATE CIRCUIT.

ground detector An outlet with a receptacle having a ground contact that can be connected to equipment grounding conductors.

grounded-source circuit See COMMON-SOURCE CIRCUIT.

grounded system A set of electrical conductors or a transmission line in which one conductor is deliberately grounded.

ground effect 1. Modification or distortion of the ideal free-space directivity pattern of an antenna by obstacles, terrain, and absorption by the earth.

ground loop An closed current path resulting from improper grounding of the components in a system. A loop is formed when two devices are connected to each other, and also to separate earth grounds or to a single earth ground via conductors of appreciable length. The loops can act as antennas, increasing the likelihood of ELECTROMAGNETIC INTERFERENCE to or from the system. The use of a single GROUND BUS is preferred.

grounded vertical antenna A vertical radiator mounted at the earth's surface or at the surface of a body of water, and connected to the earth by ground wires or by a grounding rod. The radiator can be any physical length, but it is tuned to resonance at the operating frequency.
The center conductor of the cable is connected to the base of the radiator, and the shield is con-
ected to a ground system. Radial wires, usually buried just below the surface, minimize losses.
The antenna can be made resonant on several frequencies by inserting multiple loading coils or
traps in the radiator. The chief advantages of this antenna are unobtrusiveness and ease of instal-
lution. The main problems are marginal efficiency and susceptibility to human-made electro-
magnetic noise. See also RADIAL. 1. Compare GROUND-PLANE ANTENNA.
ground noise 1. Electrical noise that results from a faulty ground connection. 2. Background noise.
ground 3. In wire circuits, such as a telephone system, electrical noise that results from fluctuations in
ground current.
ground plane 1. A metal plate or a system of hori-

tzontal rods or wires mounted high on a mast, at the base of a vertical antenna; to provide a radio-
frequency ground at a point several wavelengths
above the surface of the earth. Also see GROUND-
PLANE ANTENNA. 2. In noise and interference
tests, a sheet metal structure used to simulate the skin of an aircraft or missile. 3. On a circuit
board, a thin metallic sheet, usually bound to the
underside, that serves as a common ground and
RF shield.
ground-plane antenna A vertical radiator oper-
ated against a system of quarter-wave radials, elevated at least a quarter wavelength above
the earth's surface and fed with coaxial cable. The center conductor of the cable is connected to
the base of the radiator, and the shield is con-
ected to three or four quarter-wave radials that
run outward from the base of the radiator. At shorter wavelengths, a disk or cone can replace the
radials. The chief advantages of this an-
tenna are simplicity and high efficiency. The
main problem is susceptibility to human-made electro-
magnetic noise. See also RADIAL. 1. Compare GROUND-MOUNTED VERTICAL ANTENNA.
ground plate A metal plate buried in the earth to
provide a low-resistance ground connection.
ground indicator Abbreviation, GIP. A computer
system that gives a continuous indica-
tion of an aircraft's position in terms of heading,
eclipsed time, and, with respect to the sur-
face. This provides a more useful indication of
the aircraft's potential for an off-speed flight
because it is not affected by high-altitude winds.
ground potential See ZERO POTENTIAL. 3
ground protection The use of a GROUND-FAULT
INTERRUPTER.
ground-reflected wave A radio wave component
that results from ground reflection.
ground reflection The reflection of a radio wave by
the earth.
ground resistance The direct-current resistance
of a connection to the earth, or the resistance be-
tween two points through the earth. The magni-
itude of the resistance depends on several factors:
composition of the soil, amount of moisture, soil
electrolytic action, and the area of contact with
the earth.
ground return 1. The point or path used to return
a circuit to ground for completion. 2. In radar,
echoes returned from the earth's surface (includ-
ing reflections from objects on it).
ground-return circuit A circuit, such as a single-
wire telephone line, in which earth ground forms
one leg of the circuit. Compare METALLIC CIR-
CUT.
ground rod A strong metal rod driven deep into
the earth as a point of ground connection.
group speed The speed of an aircraft or missile,
relative to the surface of the earth.
ground state The least-energy level of all possible
states in a system.
ground support equipment Electronic surface-
based apparatus upon which the functioning of a
weapons system is dependent.
ground switch A device used to ground an outside
antenna during idle periods. Also called lightning
switch, ideally, almost no current or voltage
should be allowed to leak across the switch, even
when not in use.
ground-to-air communication Radio or radar
transmission from a land station to an aircraft in
flight.
ground-to-ground 1. Pertaining to communica-
tions between land-based stations. 2. Pertaining
to missiles intended for use between points on
the surface of the earth.
ground-to-ground communication Communica-
tions between land-based stations.
groundtrack For an earth-orbiting satellite, the
path followed by the point on the earth's surface
from which the spacecraft appears directly over-
head. For most satellites, this path shifts toward
the west for each succeeding orbit, because the
earth rotates eastward underneath the satellite. For
geostationary satellites, the point never
changes position on the surface. For satellites in
equatorial orbits, the track follows the equator.
group wave wave in wireless communications
and broadcasting, an electromagnetic (EM) wave that
consists of three distinct components: the direct
wave (radio wave), the ground-reflected wave, and
the surface wave. The direct wave is significant only
when the transmitting or receiving antennas are connected by a line through
free space without obstructions. The reflected
wave, after returning from the earth's surface or
a human made structure, combines with the direct
wave if any at the receiving antenna. The surface
wave travels in electrical contact with the earth.
This occurs only with vertically polarized EM fields
at frequencies below about 15 MHz. Below about
300 kHz, the surface wave propagates for hun-
dreds or even thousands of miles. Sometimes the
surface wave is called the ground wave.
ground wire A conductor between an equipment
and a ground connection, either for circuit com-
pleton or for safety.
group 1. A series of computer storage locations
containing a specific record or records. 2. The
data in these locations. 3. A record set having a
common key value in a sorted file.
group busy In a telephone system, an audio signal
indicating that all of the lines in a group are in
use.
group code In digital communications, an error-
detecting code used to verify a character group
transferred between terminals.
group delay 1. In a modulated signal, a delay in the
transmission of data.
grouped-frequency operation In a two-wire com-
munication system, the grouping of directional signals into certain frequency bands.
grouped records A set of data records in which
the key of one record identifies the entire set.
grouping 1. The arrangement of data into blocks
or periods. On a phonograph disc, the insertion of
gaps in the arrangement of grooves. 3. Any peri-
odic irregularity in the spacing of a data trans-
mission. 4. The bunching of grooves on a disc
recording. 5. In a facsimile system, occasional
spacing errors between recorded lines. 6. A mass
of data arranged into groups, according to com-
on-specific characteristics.
group mark 1. In telegraphy, an indicator that sig-
als the end of a data unit. 2. A character indi-
cating the end of a character group; usually, it is
a logical record that is addressed and processed
as a unit.
group velocity The velocity at which a group
of waves or a pulse is propagated.
Groove cell A closed-circuit primary cell in which
the positive electrode, platinum, is immersed in
nitric acid; the negative electrode, zinc, is im-
mersed in sulfuric acid. The nitric acid is held in
a porous cup, surrounded by a larger jar of sul-
phuric acid.
from the first initial of Dr. George Groubau, inven-
tor of the device, and the stringy appearance of the wire.

GTO Abbreviation of GOTO.

guard band A narrow unoccupied band of frequen-
cies at the upper and lower limits of an assigned
channel; its purpose is to prevent adjacent-
channel interference by ensuring adequate
separation between channels.

guard circle On a phonograph disk, an inner
groove that prevents collision of the pickup with
the spindle at the center of the disc.

guard circuit An auxiliary circuit added to an
alternating-current bridge to compensate for the
effects of stray capacitance in the bridge arms.

One of its several forms is the WAGNER
GROUND.

guarded input An input-terminal arrangement in
which one terminal, maintained at the proper po-
tential, shields the entire input-terminal com-
nination.

guarding A method of short-circuiting a leakage
current to ground. On a printed-circuit board,
guarding is usually accomplished by the use of a
large conducting foil surface near critical compo-
nents.

guard relay A relay that ensures that only one
channel will be selected to a line circuit when
other line relays are in operation.

guard ring A metal ring (or other configuration)
surrounding but separate from, a charged body
or terminal, for the purpose of evenly distribut-
ing the electric charge over the latter's surface.

guard shield A shield that encloses the input cir-
cuit of an amplifier or instrument.

guard terminal An GUARDED INPUT, the termi-
nal that shields the combination.

guard wire A grounded wire that is intended to
catch and ground a broken high-voltage line.

Gudden-Pohl effect The tendency of an ultraviolet
radiated phosphor to glow momentarily when
subjected to an electric field.

GUI Acronym for GRAPHICAL USER INTERFACE.

Can be spelled out or pronounced "gossy.

guidance Electronic control of the path or course
of a robot, missile, or other vehicle.

guidance system The complete electromechanical
system for control of a robot, missile, or other ve-
cicle. It consists of hardware and software. The
hardware includes beacons, sensors, drive sys-
tems, rockets, etc. The software interprets data
from, and transmits commands to, the hardware.

The nature of the hardware and software depend
on the application.

guidance tape In a guided missile, a magnetic tape
containing computer instructions for steering the
missile in a designated course.

guide See WAVEGUIDE.

guide connector See WAVEGUIDE CONNECTOR.

guided missile A missile whose progress to a tar-
get is controlled electronically by signals from a
control station or by sensing equipment aboard the
missile.

guided propagation A form of radio-wave propa-
gation in which air masses of different temperatures
or humidity levels cause refraction and/or reflec-
tion of electromagnetic waves, guiding signals
over long distances with very little attenuation.

Commonly observed at very high and ultra high
frequencies.

guide elbow See WAVEGUIDE ELBOW.

guide flange See WAVEGUIDE FLANGE.

guide gasket See WAVEGUIDE GASKET.

guide junction See WAVEGUIDE JUNCTION.

guide load See WAVEGUIDE LOAD.

guide slot See KEYWAY.

guide wavelength See WAVEGUIDE WAVE-
LENGTH.

Guillemot effect The tendency for a strip of ferro-
magnetic material to become straight in a strong
magnetic field. This is a form of MAGNETO-
STRICTION.

Guillemotine line In radar operations, a special
pulse-forming network for controlling modulation
pulse duration.

guillotine capacitor A variable capacitor in which
a sliding (instead of rotary) plate moves between
two stator plates. Its name results from its re-
semblance to the infamous beheading apparatus.

gulp Several bytes of digital information.

gun See ELECTRON GUN.

gunn diode A semiconductor diode that can oper-
ate as an oscillator in the ultra-high-frequency
(UHF) and microwave parts of the radio spec-
trum. Oscillation takes place as a result of a neg-
ative-resistance effect in which, within a certain
range of applied voltages, the current decreases
as the voltage increases. The device is not partic-
ularly efficient. Only a small fraction of the input
power results in useful signal output. The fre-
quency and oscillation stability are sensitive to
changes in temperature and bias voltage. See GUN
EFFECT, NEGATIVE RESISTANCE.

Gunn effect A semiconductor phenomenon named
after J. Gunn of International Business Machines
(IBM) who first observed and studied it in the
1960s. In certain types of diodes having a nega-
tive-resistance characteristic, oscillation occurs
when the applied voltage is within a certain
range. See GUN DIODE, NEGATIVE RESIS-
TANCE.

Gunn-effect circuit Any circuit exploiting the
Gunn effect, especially a GUNN OSCILLATOR.

Gunn oscillator A discrete semiconductor mi-
crowave oscillator using a GUNN DIODE.

Gunplexer A microwave transmitter consisting of a
Gunn-diode oscillator connected to a horn an-
tenna. Usually, the entire device is a compact,
self-contained unit. The output power is low.

When the device is placed at the focal point of a
large dish antenna with the horn pointing toward
the dish reflector (conventional dish feed), consid-
erable transmission range is possible. Used pri-
marily by experimenters, and in wireless commu-
nications links. See GUN DIODE.

guutta percha A hard, rubberlike, organic insulat-
ing material. Dielectric constant, 3.3 to 4.9. Di-
electric strength, 203 to 508 kV/in.

guayed tower In radio communications or in mi-
crowave links, a structure that is supported by one
or more sets of guy wires to add strength and
to prevent collapse.

guying The support of a radio communications or
microwave-link tower by the use of one or more
sets of guy wires.

guy insulator Also called egg insulator. An insula-
tor designed to electrically break a guy wire while
maintaining its ability to support a structure.

Such an insulator has two slots with holes placed
at right angles, in such a position that the wire
will not separate even if the insulator breaks. The
stress exerted on the insulator is compression,
and the insulating material is stronger under this
type of stress than under tension (pulling).
half-wavelength

Symbol λ/2. The distance that corresponds to 180 degrees of phase as an electromagnetic (EM) field is propagated in free space, it is related to the frequency by a simple equation:

\[ L_0 = 492f \]

where \( L_0 \) represents the displacement in meters. In general, if \( v \) is the velocity factor (expressed as a ratio) in a given medium, then:

\[ L_0 = \frac{492}{v} \]

and

\[ L_0 = 150v \]

Compare FULL WAVELENGTH, QUARTER WAVELENGTH.
half-wave loop antenna  A loop antenna having a circumference of 0.5 wavelength with a break opposite the feed point. It is, in effect, a HALF-WAVE DIPOLE bent into a circle or square (although any symmetrical configuration can be used). The circle is the most efficient configuration.

Hall-effect modulator  A device that uses the HALL EFFECT to modulate a signal, or to mix two signals.

halide  A compound of a HALOGEN. Examples: sodium iodide, used as a scintillating crystal; ammonium chloride, used as the electrolyte in a dry cell.

Halwacks effect  The phenomenon observed by Halwacks in 1888 in which ultraviolet light falling on a polished zinc plate causes a negatively charged electroscope to which it is connected to discharge.

halluci nation  In complex computers and artificially intelligent systems, the generation or appearance of data for no apparent reason.

halo  See AFTERGLOW and PERSISTENCE.

halo antenna  A horizontally polarized antenna, consisting of a circular half-wave dipole whose ends are capacitance loaded. Commonly used at very high frequencies (VHF).

halogen  Abbreviation, hal. A group of five very active nonmetallic elements whose similar chemical properties put them in Group VIIA of the periodic table; they are: oxygen, bromine, chlorine, fluoride, and iodine.

Halowax  A chlorinated naphthalene wax used as an impregnant for paper capacitors. Dielecric constant, 3.4 to 5.5. Resistance, $10^{14}$ to $10^{15}$ ohms.

halt  A stop during the execution of a computer program run, often resulting from a HALT INSTRUCTION.

halt instruction  An instruction in a computer program that causes a break in the program’s execution, as by BASIC’s STOP command, for example.

hand  Colloquialism for AMATEUR RADIO operator.

hand radio  See AMATEUR RADIO.

Hamilton’s principle  Also called the principle of least action. Motion tends to occur in such a way that the integral of the product of kinetic energy and elapsed time is minimal.

hammer 1. The striking member in a WHEEL PRINTER. 2. The clapper in an electric bell or gong.

hammer-and-wheel  See WHEEL PRINTER.

Hamming code  An error correction code used in some digital communications circuits.

handicap  Also called body cosippucitance. Capacitive coupling effects between a circuit and the human body (e.g., as evidenced between an operator’s hand and a device having extremely high impedance and poor grounding and/or shielding).

hand generator  An electric generator operated by turning a hand crank.

handheld computer  Also called personal digital assistant (PDA), or personal computing device. The names PalmPilot and Palm are proprietary (Palm Computing, Inc.) and refer to specific families of handheld computers, although they might someday become generic and refer to handheld computers in general. A battery-powered portable computer, smaller than a notebook computer, and used for simple tasks such as note-taking and record keeping. Some units incorporate wireless modems for connection to the Internet. Others include paging, wireless fax, videoconferencing capability, remote-control capability, and other features. Many units can recognize a specialized form of handwriting so users can enter data with a pen-like device called a stylus.

Handie-Talkie  Abbreviation, HT. Tradename for a portable transceiver small enough to be held in the hand during operation.

hand key  Also called brass pounder. An old-fashioned, hand-operated telegraph key, operated by manual downward pressure.

handoff  In cellular communications networks, the changeover of reception from, and transmission
to, a mobile or portable set from one repeater to another as the subscriber moves from one cell to another. When the subscriber is moving rapidly—for example, driving along a freeway, in a railcar, or an airplane—often. When a subscriber is moving slowly, for example, walking along a trail, such transfers occur rarely. When a subscriber is in a fixed location, such transfers do not normally occur.

hand-operated device A device manipulated directly and manually by the operator’s hand(s). Also called manual device.

hand receiver 1. A single earphone that must be held against the ear. 2. A telephone receiver.

hand rules See FLEMING’S LEFT-HAND RULE, FLEMING’S RIGHT-HAND RULE, and RIGHT-HAND RULE FOR WIRE.

handset See CANDLEPHONE.

handshaking 1. A controlled, periodic exchange of synchronizing pulses between a digital transmitter and receiver. 2. In a digital communications system, a method of error correction. The receiver detects nonstandard or improbable character sequences, and instructs the transmitter to repeat them for double-checking.

hand-type pointer In an electric meter, a spearlike pointer (resembling the hand of a clock), as opposed to a knife-edged pointer.

hand-wired Pertaining to electronic equipment wired by hand, rather than being assembled on printed-circuit boards. This form of construction is rarely seen nowadays, except in some radio-frequency power amplifiers.

hang AGC An automatic gain-control (AGC) circuit whose action is sustained for a brief interval after an actuating signal has passed, an advantage in some applications. Also called fast-attack/slow-release AGC.

hangover In sound operations, the blurring or smearing of low-frequency (bass) notes by a poor damping plan, or a loudspeaker.

hangup 1. In phonograph operation, the state in which the same material is played repetitively (i.e., the same material is played over and over in a loop). 2. In digital-computer operations, an unexpected break-down period in which no work runs as a result of software or hardware failure. Sometimes called UNEXPECTED HALT.

hand antenna See LASY-H ANTENNA.

hard copy 1. In digital computer operations, a readable document (resultant) of material being translated to a form understood by a computer. 2. Generally, written or typed documents, as opposed to a computer data file, such as diskettes, tapes, CD-ROM, etc.

hard disk An electromechanical data storage medium commonly used in personal computers. Consists of several rigid disks, called platters, coated with a magnetic material.

hard-drawn wire High-tensile-strength unannealed wire.

hard dump See HARDWARE DUMP.

hard magnetic material High-retentivity magnetic material.

hardness 1. The property that causes a material to resist penetration, deformation, scratches, etc. 2. The penetrability of ultraviolet rays, X rays, or other ionizing radiation. Generally, the radiation hardness increases as the wavelength decreases, and as the photon or particle energy increases.

hardness tester A device for measuring the hardness of a solid in terms of the force required to penetrate its surface. Also see HARDNESS, 1.

hard radiation In general, any radiation with high penetrating power. Usually, this term is used in reference to short-wavelength (high-energy) ultraviolet rays or X rays.

hard solder Solder that melts at a comparatively high temperature. Compare SOFT SOLDER.

hard vacuum A nearly perfect vacuum, that is, a medium essentially devoid of atomic or subatomic particles.

hardware 1. Collectively, electronic circuit components and associated fittings and attachments. 2. In a computer system, the electronic and electromechanical components (e.g., integrated circuits, keyboards, and disk drives) associated with operation. Compare SOFTWARE.

hardware availability ratio A figure depicting the availability of a computer system to do productive work, as a percentage, it is given by the formula:

\[
A = \frac{100}{10 - t_d/t_a}
\]

where: \(A\) is the availability ratio, \(t_a\) is the operational time, and \(t_d\) is the downtime over a specified period time.

hardware check A check on data being transferred within a computer, as done by hardware (e.g., a parity check).

hardware cloth A finely woven wire screen sometimes used in place of a metal plate for an antenna element, an antenna reflector, or a shielded enclosure. Especially useful when free-air circulation is required.

hardware dump During a computer program run, data sent to a storage device for later evaluation; it occurs at the time of a failure. Also called AUTOMATIC HARDWARE DUMP.

hardware engineer A person who designs and perfects the actual electronic circuitry in a system. The hardware engineer is not involved with the programming of the system.

hardware recovery A computer system’s ability to recover from a failure (e.g., to proceed from the point of failure).

hardware serviceability ratio See HARDWARE AVAILABILITY RATIO.

hardware wire A two-conductor circuit for direct-current connection; one wire carries direct current in one direction, the other carries direct current in the opposite direction.

hard-wire telemetry See WIRE-LINK TELEMETRY.

harmonic 1. Symbol, \(H\). In a complex sound or signal wave, a component whose frequency is a multiple of the FUNDAMENTAL FREQUENCY by a whole-number factor of 2 or more. 2. Pertaining to whole-number multiples of the FUNDAMENTAL FREQUENCY of a sound or signal, as defined in 1.

harmonic analysis 1. The evaluation of the harmonic content of a complex wave. See, for example, HARMONIC WAVE ANALYZER, SCHEDULE METHOD, 2. SPECTRUM ANALYZER, AND WAVE ANALYZER. 2. See FOURIER ANALYSIS.

harmonic analyzer See HARMONIC WAVE ANALYZER, SPECTRUM ANALYZER, AND WAVE ANALYZER.

harmonic antenna An antenna operated at a harmonic of the lowest frequency at which it is resonant. For example, a half-wave dipole cut for 7.0 MHz but used for transmitting and receiving at 21.0 MHz, is functioning at the third harmonic.

harmonic attenuation Reduction of the amplitude of harmonic components in a complex wave using filters, tuned amplifiers, or special modes of operation.

harmonic attenuator A circuit, device, or method of operation (such as a filter, tuned amplifier, special biasing, or special bypassing) for reducing the amplitude of harmonics.

harmonic component See HARMONIC in composition See HARMONIC DISTRIBUTION.

harmonic content The amount of harmonic content present in a complex wave. Also see HARMONIC DISTORTION PERCENTAGE and HARMONIC RATIO.

harmonic-cut crystal Also called overtone crystal. A quartz crystal that, when operated in the proper circuit, oscillates at a harmonic of the fundamental frequency dictated by its thickness.

harmonic detector A detector tuned to respond to a harmonic of a signal.

harmonic distortion 1. The generation of harmonics by the circuit or device by which the signal is processed. Also see HARMONIC DISTORTION PERCENTAGE and HARMONIC RATIO.

harmonic distortion meter See DISTORTION ME- TERY.

harmonic-distortion percentage In a signal containing harmonics, the harmonic energy as a per- centage of the total signal energy (fundamental plus all harmonics). Also called total harmonic distortion (THD).
harmonic distribution For a given signal, the various frequencies and amplitudes of its harmonics, specified within a certain range of frequencies.

harmonic elimination The complete removal of one or more harmonics from a complex wave using a filter or special mode of operation.

harmonic eliminator A circuit or device, such as a band-suppression filter, for removing harmonics.

harmonic filter 1. A bandpass filter for transmitting the odd harmonics of a complex input wave. 2. A band-suppression filter for removing one or more harmonics of a complex input wave.

harmonic frequency In a complex wave, the frequency of a component that is a multiple of the fundamental frequency by a whole-number factor of two or more. 2. A frequency that is a whole-number (two or more) multiple of another frequency to which it is referred. Compare NONTOLLAR FREQUENCY.

harmonic generator 1. An oscillator operated so that it generates strong harmonics of the fundamental frequency. 2. See FREQUENCY MULTIPLIER. 3. See HARMONIC AMPLIFIER.

harmonic intensification See HARMONIC ACCELERATION.

harmonic intensifier See HARMONIC ACCCELERATOR.

harmonic interference Interference resulting from the harmonics of radio or test signals.

harmonic motion Periodic motion typified by a swinging pendulum or described by the plot of a sine wave.

harmonic oscillator A crystal oscillator whose output frequency is a harmonic of the crystal frequency.

harmonic percentage See HARMONIC-DISTORTION PERCENTAGE.

harmonic producer 1. An oscillator that uses a tuning fork to establish the fundamental frequency. The output can be an odd or even harmonic of this frequency. 2. See FREQUENCY MULTIPLIER. 3. A nonlinear circuit used in a calorimeter to generate markers at integral multiples of the fundamental frequency.

harmonic ratio In a complex wave, the ratio of harmonic energy to total signal energy (fundamental plus all harmonics). 2. In a complex wave, the ratio of harmonic energy to fundamental-frequency energy.

harmonic reducer See HARMONIC ATTENUATOR.

harmonic reduction See HARMONIC ATTENUATION.

harmonic resonance Resonance of an antenna or circuit occurring at a frequency measured as a characteristic of the applied signal frequency.

harmonic ringing In wire telephony, the use of alternating-current signal harmonics for selective ringing.

harmonic series of tones A set of audio-frequency tones in which the frequencies can be specified by \(2f, 3f, 4f, \ldots\) and so on.

harmonic suppression See HARMONIC ELIMINATION.

harmonic suppressor See HARMONIC ELIMINATOR.

harmonic tolerance The harmonic content permissible in a given system.

harmonic totalizer An instrument for measuring total harmonic distortion. See, for example, DISTORTION METER.

harmonizer A circuit that changes the frequency of an audio signal, or produces an output at several audio frequencies from an input having only one audio frequency. Used in sound recording for special effects.

harness A tied bundle of wires or cables for wiring electronic equipment.

harp antenna A vertical antenna consisting of a number of wires that fan out from point to point along a horizontal supporting wire.

hartley A unit of digital information equivalent to 3.32 bits. Used in certain computer applications.

Hartley oscillator A radio-frequency (RF) oscillator that uses a single inductor with a tap on the windings to provide the feedback. The amount of feedback is controlled by the position of the coil tap. A variable capacitor in parallel with the inductor determines the oscillating frequency and allows for frequency adjustment. The circuit uses about 25 percent of its output power to produce feedback. The other 75 percent of the power can be delivered to external circuits or devices. Compare COLPITTS OSCILLATOR.

hash 1. Electrical noise, especially wideband noise with a characteristic hissing sound in a radio receiver. 2. Undesirable or purposelessly meaningless data, usually in a hash total (checksum).

hash filter A radio-frequency filter for eliminating HASH noise in a radio receiver.

hashsum Symbol, Hs. Also called unilocusum (Uno). Atomic number, 108. The most common isotope has atomic weight 265. Classified as a transition metal. It is human-made and not known to occur in nature.

haybridge An alternating-current bridge for measuring the inductance and Q of an inductor in terms of resistance, frequency, and a standard capacitance.

haywire Loose, disorderly, or apparently careless wiring.

hazard Abbreviation of HAZARD.

headroom Capacity of the head in a receiver (see HEADER, 1). A header located on a magnetic tape file (see HEADER, 2). A computer disk or tape drives, the distance between the head and the magnetic medium. 2. In audio operations, the spacing between tape-unit head electrodes; also called gap width.

header 1. A procedure or command that identifies the head of a tape or magnetic-recorder head so that a proper relationship to the moving tape is maintained.

head amplifier A self-contained amplifier or preamplifier in the head of a microphone or sound-on-film pickup.

head degausser A device used for the purpose of demagnetizing the head of a tape recorder. Unwanted magnetization can build up because of direct-current components in the driving signal.

head demagnetizer See HEAD DEGAUSSER.

head end In a television network or system, the location from which signals are sent to subscribers.

header 1. A header located on a magnetic tape file (see HEADER, 2).

header label A header recorded on a magnetic tape file (see HEADER, 2).

header 1. In computer disk or tape drives, the distance between the head and the magnetic medium. 2. In audio operations, the spacing between tape-unit head electrodes; also called gap width.

heading The direction taken by a vehicle with reference to some point (such as a radio beacon, true north, or magnetic north).

headlight In radar operations, a small rotating antenna.

headphone A small acoustic transducer worn on the ear to establish the fundamental frequency. The output can be an odd or even harmonic of this frequency.

headphone receiver A portable radio receiver, usually for AM and/or FM broadcast, consisting of a pair of headphones or a headset with the radio built into it.

head room 1. In a high-fidelity sound system, the amount of headroom left in the over-all amplifier so that the voice coil moves freely i.e., without rubbing against the pole piece. 2. In a tape recorder, the region between the maximum recording level and the level at which the magnetic core of the equipment, and the amplitude at which tape overload occurs, is specified in decibels.
heater 1. The filament of an indirectly heated vacuum tube. 2. The filament in an indirectly heated thermistor.

heater-voltage coefficient The amount of frequency change per unit of fluctuation in the filament voltage of a Klystron.

heat exchanger A device or system that removes heat from a hot body and transfers it to another body or to the surrounding air.

hectograph A high sensitivity device used for the purpose of locating objects in visible darkness. The tube consists of a cathode-ray device that is sensitive to infrared radiation.

heat gradient The temperature difference between two points on a body, divided by the distance between the two points.

heating element 1. See HEATER. 2. The resistance element (such as a strip or coil) that generates heat in an electric-heating device.

heat loss 1. Heat emitted by conduction, convection, or radiation from a body at a relatively high temperature.

heatsink 1. A metal having a specific gravity of 5.0 or higher. Examples: iron (7.85 to 7.88), lead (11.3), nickel (8.6 to 8.9), mercury (13.6), platinum (21.4).

heatsink resistance Power loss as a result of the heating effect of an electric current.

heat of fusion The amount of heat required to melt a unit mass of a solid that has reached its melting point.

heat of radioactivity Heat generated during the process of radioactive disintegration.

heat of reaction The amount of heat required to convert 1 gram of a liquid to a vapor without raising its temperature.

heat output 1. See HEAT IN, HEAT OUT. 2. The output (such as heat) from a device or system.

heat pipe A make-and-break device, that disconnects a circuit when the temperature reaches a certain minimum level.

heat detector A sensor of heat. See, for example, BOLOMETER, INFRARED DETECTOR, MICRO-RADIOMETER, RADIOMETER, THERMOMETER, THERMOCOUPLE, and THERMOMETER.

heat detector recorder See THERMAL RECORDER.

heat device A device that converts electric energy into mechanical energy.

hectowatt Abbreviation, hW. A unit of power equal to 100 watts. Seldom used; power in this range is usually expressed in terms of the watt or the kilowatt.

height finder An altitude-measuring radar system.

heat process indicator Abbreviation, HPI. A radar displaying the height of a target, its angular elevation, and the slant range.

heat transfer 1. The movement of heat from one point to another by radiation, conduction, convection, or evaporation.

heatwave Pertaining to the heating of a dielectric material subjected to a high voltage.

heat unit 1. See BRITISH THERMAL UNIT. 2. See CALORIE. 3. See KELVIN.

heat waves See INFRARED RAYS.

heat writer See THERMAL RECORDER.

Heaviside-Campbell bridge A form of mutual-induction bridge.

heating element The amount of heat emitted by a heating element (such as a strip or coil) that generates heat in an electric-heating device.

heating element 1. A metal having a specific gravity of 5.0 or higher. Examples: iron (7.85 to 7.88), lead (11.3), nickel (8.6 to 8.9), mercury (13.6), platinum (21.4).

heatsink resistance Power loss as a result of the heating effect of an electric current.

heat of fusion The amount of heat required to melt a unit mass of a solid that has reached its melting point.
helicoidal beam antenna

S100 HELICAL ANTENNA, HELICAL LINE. The helix in a backward-wave oscillator or traveling wave tube. Sometimes called a helical beam antenna.

helicoidal potentiometer

A potentiometer whose resistance is a wire wound into a coil of several turns. The slider moves over the wire (or the larger coil) from one end to the other as the slider coil turns through several complete revolutions. Also called MULTITURN POTENTIOMETER.

helicoidal scanning

Radiating scanning by an antenna that moves vertically as it moves horizontally, producing a signal to the radiant beam.

helicoidal sweep

See SPIRAL SWEEP.

helicoidal transmission line

See HELICAL LINE.

helicoidal cone

An antenna used at ultra-high and microwave frequencies, consisting of a helical raditor within a cone-shaped reflector.

helicoidal recorder

An instrument recorder using a spiral method of scanning. The recording stylus is usually drum-shaped.

helicoidal coil

A device consisting of two crossed-wire windings in which an inductively coupled secondary winding rotates. The primary windings carry currents that differ in phase by 90 degrees. Rotating the secondary coil provides 360 degrees of continuously variable phase shift.

helicoidal double layer

An intermolecular layer between a metal and an electrolyte in which it is immersed. It is formed when the adhesive force between the metal and electrolyte decreases the surface tension of the metal, causing positive ions to migrate from the metal into the liquid. The metal, charged negatively, and the electrolyte, charged positively, form a capacitor whose dielectric is the Helmholtz layer.

helicoidal resonator

An acoustic (sound) chamber whose geometry, in combination with the size of a small opening, results in resonance at a specific frequency.

helicoidal effect

Abbreviation of hybrid electromagnetic (see, for example, HYBRID ELECTROMAGNETIC WAVE).

helicoidal form factor

The ratio of the length of an object with ends that have unlike faces. For example, a helix.

helicoidal line

See HELICAL LINE.

helicoidal number

A number, 4.0026, that is used by motor-driven devices that drive a motor to keep sunlight trained upon a specific target.

helicoidal scanner

A servo-controlled motor-driven device that drives a mirror to keep sunlight trained upon a specific target.

helicoidal tube

A single-layer coil. That which is cololated, i.e., used by one signal.

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See HELICAL ANTENNA.

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A single-layer coil. That which is cololated, i.e., used by one signal.

helicoidal antenna

See HELICAL ANTENNA.

helicoidal line

See HELICAL LINE.
sharp handpass filter, whose output actuates an alternating-current (ac) voltmeter. The internal oscillator is tuned such that different components of the balanced-modulator output sideband pass successively through the filter. The amplitude-versus-frequency function of the input signal is determined by noting the meter readings as the internal oscillator is tuned.

**heterodyne wave meter** See HETERODYNE FREQUENCY METER.

**heterodyne whistle** See HETERODYNE, 2.

**heterogeneous** Pertaining to a group of objects or devices that have differing characteristics.

**heterogeneous radiation** Any broadband form of radiation. In particular, broadband radio waves, infrared radiation, visible light, ultraviolet, X rays, or gamma rays.

**heterodysis** The HYDROLYSIS of a compound into two oppositely charged ions.

**heteropolar generator** An electric generator in which the active conductors move through magnetic fields. First in one direction, then in the other direction. This is done by means of rotation in a nonuniform magnetic field. Most generators in common use are of this kind.

**heuristic knowledge** In artificial intelligence (AI), a form of machine knowledge in which a computer learns from trial and error. As a complex program is repeatedly run over a period of time, the number of errors per run approaches zero.

**heuristic program** In artificial intelligence (AI), a program with which the computer solves a problem by trial and error, often learning in the process so that mistakes will not be repeated on subsequent runs.

**Hevesy’s alloy** Ferromagnetic alloys that contain one or more non-magnetic metals (such as aluminum, copper, or manganese).

**hexadecimal number system** An alphanumeric, base-16 system of number notation used in some computers. The system uses the usual digits plus the letters A through F to represent the numbers 10 through 15 (each place can only hold one symbol).

**hex inverter** A collection of six digital inverters, or NOT gates, contained within one package, usually in an integrated circuit.

**HI** Symbol for HAFNium.

**HF** Abbreviation of HIGH FREQUENCY.

**Hg** Symbol for MERCURY.

**HIG** Abbreviation in radiotransmission, a nondirectional homing beacon.

**hi** 1. Contraction of HIGH 2. Radiotelegraph symbol. HI is a laugh, often verbalized by radio amateurs.

**high** Abbreviation of HYBRID INTEGRATED CIRCUIT.

**HIGH** Abbreviation of HIGH-INFORMATION DELTA MODULATION.

**high-level hierarchical password protection** Also called multilevel password protection. A security feature that prevents unauthorized use of a computer, network, or database. The password levels allow users various degrees of control over the host machine.

**high-1** 1. Contraction of HIGH-FIDELITY. 2. In video recording, the addition of sound having high fidelity.

**high 1** Pertaining to a circuit point or condition at some potential above ground. 2. The logical digit 1. 3. The condition of having relatively large magnitude (e.g., HIGH FREQUENCY and HIGH VOLTAGE). 4. Pertaining to the upper portion of a range, as in HIGH BAND or HIGH FREQUENCY.

**high 2** 1. The frequency band of an audio-frequency signal superimposed on the signal being recorded, for improving linearity and dynamic range. 2. A collection of six digital inverters, or NOT gates, contained within one package, usually in an integrated circuit.

**high boost** In sound recording and reproduction, the emphasis of high frequencies in an operating spectrum. Also called HIGH-FREQUENCY COMPENSATION.

**high-C circuit** A tuned circuit having high capacitance and low inductance at a given frequency. Such a circuit is characterized by high selectivity and low voltage. Compare HIGH-L-C CIRCUIT. Also see LC CIRCUIT.

**high contrast** In an image, a limited range of gray values between black and white, or a similar condition in a color image (overbright whites, little shadow detail). Also see CONTRAST.

**high definition** In facsimile or television, a condition of minute detail so that the original scene is faithfully reproduced.

**high-definition television** Abbreviation, HDTV. A method of getting enhanced detail into a television (TV) picture for obtaining better quality, compared with standard analog TV. There are several different schemes. The most noticeable feature is the crispness of the picture. This is vividly apparent in big-screen installations, where there has traditionally suffered from image blurring. A standard TV picture has 525 lines per frame, but HDTV systems can have more than twice that number. Another important difference is that HDTV is digital; this minimizes susceptibility to interference. Interlacing is used in some systems.

**high-density bipolar-3 code** A communications or digital code in which two logic high lines can occur in sequence, without the need for an intervening logic low to separate them.

**high-efficiency linear amplifier** A LINEAR AMPLIFIER with higher operating efficiency than is obtainable with conventional class-B linear amplifiers. Efficiencies on the order of 60% at 100% modulation are possible.

**high-energy materials** See HARD MAGNETIC MATERIALS.

**high-energy particle** 1. A SUBATOMIC PARTICLE that has been given high velocity by a particle accelerator. 2. High-speed subatomic particles emitted by the sun during a solar flare, or arriving from outer space.

**high-energy physics** The discipline dealing with the characteristics, properties, and applications of HIGH-ENERGY PARTICLES.

**higher-order language** See HIGHER-LEVEL LANGUAGE.

**high fidelity** Abbreviation, hi-fi. Pertaining to an audio-frequency system that is very faithful to the signal it is processing (i.e., one characterized by extremely low distortion and wide frequency response).

**high frequency** Abbreviation, HF. Pertaining to frequencies in the 3- to 30-MHz band (wavelengths from 10 to 100 meters). Also see RADIO SPECTRUM.

**high-frequency alternator** A dynamo for generating radio-frequency energy.

**high-frequency bias** In a tape recorder, a high-frequency sinusoidal signal superimposed on the signal being recorded, for improving linearity and dynamic range.

**high-frequency compensation** See HIGH BOOST.

**high-frequency converter** See SHORTWAVE CONVERTER.

**high-frequency crystal** See HARMONIC CRYSTAL.

**high-frequency direction finder** Abbreviation, HDF. A direction finder operated at high radio frequencies (i.e., between about 3 MHz and 30 MHz). See HETERODYNE HEATING.

**high-frequency heating** Electronic heating of materials by high-frequency energy. See, for example, ELECTRIC HEATING AND INDUCTION HEATING.

**high-frequency resistance** See RADIO-FREQUENCY RESISTANCE.

**high-frequency speaker** See TWEETER.

**high-frequency trimmer 1.** In older high-frequency communications receivers, a low-value variable capacitor operated in parallel with a usually fixed tuning capacitor to set the high-frequency end of the tuning range. See, for example, OSCILLATOR TRIMMER. 2. A variable capacitor used in conjunction with a larger tuning capacitor, the function of which is to permit precise tuning of the larger device.

**high-impedance-state output current** Pertaining to tests that ensure that an integrated circuit will not overload a bus line.

**high-impedance voltmeter** A voltmeter having an input impedance of at least several megohms.

**high-information delta modulation** A compounded form of delta modulation, operating at considerably higher signal levels than standard delta modulation.

**high 1** 1. A tuned circuit having high inductance and low capacitance at a given frequency.

**high-level audio signal** An audio-frequency signal that has been preamplified (e.g., the output of a compact-disc player). Compare LOW-LEVEL AUDIO SIGNAL.

**high-level current 1.** Pertaining to the testing of interconnector leakage in an integrated circuit (IC) having multiple emitter inputs. 2. The current flowing into an IC input at minimum high-level voltage.

**high-level language** Also called higher-order language. A computer programming language in which the operator is easily able to communicate with the machine. It generally serves as an interface between a human programmer and the MACHINE LANGUAGE. Examples are BASIC, C, C++, COBOL, and FORTRAN.

**high-level modulation** In an amplitude-modulated transmitter, introduction of the audio at the final stage of radio-frequency amplification, permitting 100% modulation of the full power signal.

**high-level output current 1.** Pertaining to the testing of drive capability and fanout of an integrated circuit (IC). 2. The current flowing from an IC output when in the high state.

**high-level recovery** Hardware recovery using data not involved in the failure, such as that on a magnetic storage medium. Also see HARDWARE RECOVERY.

**highlight** 1. A bright area in a television picture. 2. In computer data processing, the defining or setting off of a block of data (such as text), with the intention of relocating, editing, or deleting it.

**high-noise immunity logic** Abbreviation, HNIL. A form of bipolar digital logic designed for minimum sensitivity to noise. Also known as high-threshold bipolar logic.

**high order** Descriptive of the relationship between bits or digits in a word or number. Of two digits,
the one holding the higher place value is the high-order digit (e.g., 2 is the high-order digit in 25).
horizon • horizontal flowcharting 343

hole mobility • horizon

hole mobility  The ease with which a hole moves within a semiconductor. Also see CARRIER MOBILITY.

hole storage  See CARRIER STORAGE.

horizontal flowcharting  A flowcharting in a bipartite notation at a given radio frequency, representing the maximum communications range via the ground wave under normal conditions. Also see OTHER HORIZONTAL FLOWCHARTING.

horizontal  1. Pertaining to objects or effects in a plane perpendicular to a line connecting the zenith (the point directly overhead) and the nadir (the point directly underfoot). 2. Pertaining to that which is parallel to an assumed flat surface. 3. Pertaining to width deflection on a cathode-ray tube. 4. A wavefront recording made on photographic film by the process of HOLOGRAPHY.

horizontal amplifier  A circuit or device that provides HORIZONTAL AMPLIFICATION. Compare VERTICAL AMPLIFIER.

horizontal angle of deviation  In a television receiver circuit, the automatic frequency control (AFC) that keeps the receiver’s horizontal scanning in step with that of the camera at the transmitting station.

horizontal axis  That which is parallel to an assumed flat surface.

horizontal blanking  Gain provided by the horizontal channel of a device, such as an oscilloscope, cathode-ray electrocardiograph, or television receiver. Compare VERTICAL AMPLIFICATION.

horizontal beamwidth  A four-layer pnpn semiconductor device, in which the outer p and n layers serve as emitter and collector, the inner layer being the base. This places a p layer between the base and collector, resulting in a transistor that provides high alpha as a result of carrier multiplication by the additional junction in the series.

horizontal beamwidth  In a semiconductor, an impurity that can cancel holes by releasing electrons to fill them.

horizontal blanking  The transmission of a wave and its subsequent return to the earth from the ionosphere; it is of importance mainly at low, medium, and high frequencies.

horizontal coordinates  See CARTESIAN COORDINATES.

horizontal drive control  A station radiating a beam for use as a base station.

horizontal convergence control  In an electromechanical device or robot that exhibits characteristics of a living being, especially, an ANDROID.

horizontal AFC  A magnet whose pole pieces are concentric.

homocentric  In artificial intelligence (AI), a computer or robot that exhibits characteristics of a living being, especially, an ANDROID.

honeycomb  A plot of horizontal field strength, usually in polar form. Compare VERTICAL-FIELD-STRENGTH DIAGRAM.

honeycomb coil  A multilayer coil having a UNIVERSAL WINDING.

honeycomb winding  A helical winding where the turns are closely spaced at the axis.

horizontal deflection  In an electrostatic cathode-ray tube, the lateral movement of the electron beam on the screen. Compare VERTICAL DEFLECTION.

horizontal deflection coils  The pair of coils that produces the magnetic field to horizontally deflect the electron beam in an electronic cathode-ray tube. Also see DEFOCUS COIL.

horizontal directivity  Gain provided by the horizontal channel of a device, such as an oscilloscope, cathode-ray electrocardiograph, or television receiver. Compare VERTICAL AMPLIFICATION.

homeostasis  A core that is not solid throughout—especially one that has a central mounting hole.


holocamera  A camera for making holograms. Also see HOLOGRAM, 1 and HOLOGRAPHY.

hologram  A wavefront recording made on photographic film by the process of HOLOGRAPHY.

horizontal flowcharting  By changing the frequency of the light transmitted, various magnifications of the image can be obtained. Produces a true three-dimensional image. 2. A visible, three-dimensional display projected in the air or underwater by means of lasers. They are often used at outdoor music concerts and other events.

holography  A method of producing a wavefront recording of an object illuminated by laser light. The result, an interference pattern, appears magnified in an ordinary diffuse light. But when a point source of illumination is used, especially a laser, an image appears that is constructed from that point source.

homeostasis  The condition of being in static equilibrium.

homing station  See BASE STATION.

homing  1. Guidance by means of an electronic signal from a particular station to a receiving station, such as a radio horizon, to maintain a course toward the beacon. 2. Guidance by means of some form of emission from a target object. The emission can be acoustical, thermal, or electromagnetic energy.

homing antenna  A direction-finding antenna—usually on a mobile vehicle.

homing beacon  A radiating beacon for use in direction finding by mobile vehicles.

homing device  A receiving device mounted on a mobile vehicle, and that continuously indicates the direction of a selected transmitting station that is the vehicle’s destination.

homing relay  A stepping relay that returns to its initial position after each switching sequence. Also see STEPPING SWITCH.

homing station  See HOMING REACTOR.

homondy  A field whose lines of flux in one plane pass through a single point.

homonymous  In a television receiver circuit, the automatic frequency control (AFC) that keeps the receiver’s horizontal scanning in step with that of the camera at the transmitting station.

homonymous field  1. For a specific location, the circle on the celestial sphere midway between the zenith (the point directly overhead) and the nadir (the point directly underfoot). 2. Also called visual horizon.

horizontal  A plot of the horizontal field strength, usually in polar form. Compare VERTICAL-FIELD-STRENGTH DIAGRAM.

horizontal field strength  The field strength of signals in an equipment, for example, an oscilloscope or graphic recorder. Compare VERTICAL CHANNEL.

horizontal field-strength diagram  A plot of horizontal field strength, usually in polar form. Compare VERTICAL FIELD-STRENGTH DIAGRAM.

horizontal flowcharting  Flowcharting the movement of documents or files, rather than the data hits themselves, through a digital system.

horizontal flowcharting  Flowcharting the movement of documents or files, rather than the data hits themselves, through a digital system.

horizontal flowcharting  Flowcharting the movement of documents or files, rather than the data hits themselves, through a digital system.
horizontal frequency  In television circuits, the horizontal scanning frequency (i.e., the frequency at which horizontal deflection occurs) is 

344  horizontal frequency • horizontal synchronization

horizontal frequency response  The gain vs. frequency characteristic of the horizontal channel of an oscilloscope or graphic recorder. Compare VERTICAL FREQUENCY RESPONSE.

horizontal gain  At a specified frequency, the overall amplification of the horizontal channel of an oscilloscope or graphic recorder. Compare VERTICAL GAIN.

horizontal-gain control  A control, such as a potentiometer, for adjusting horizontal gain. Compare VERTICAL-GAIN CONTROL.

horizontal hold control  In a television receiver, the control for adjusting the horizontal oscillation frequency to prevent horizontal tearing of the picture. Compare VERTICAL-HOLD CONTROL.

horizontal hum bars  Dark, horizontal interferen-
cies in a television picture, caused by HUM interference.

horizontal linearity  The precision of gain and deflection in the horizontal channel of an oscilloscope, graphic recorder, or television receiver. A linear picture is a faithful (undistorted) reproduction of original image. Compare VERTICAL LINEARITY.

horizontal-linearity control  In an oscilloscope or television receiver, the control with which horizontal linearity is adjusted. Compare VERTICAL-LINEARITY CONTROL.

horizontal line frequency  See HORIZONTAL FREQUENCY.

horizontal lock  See HORIZONTAL-HOLD CONTROL.

horizontal polarized wave  An electromagnetic wave whose electric lines of flux are horizontal. Compare VERTICAL POLARIZED WAVE.

horizontal multivibrator  In a television receiver, a 15.750-kHz multivibrator that generates the horizontal sweep signal. Compare VERTICAL MULTIVIBRATOR.

horizontal oscillator  In a TV receiver, the oscillator that generates the horizontal sweep signal. Compare VERTICAL OSCILLATOR.

horizontal output stage  In a television receiver, an output amplifier following the horizontal oscillator and nonlinear amplifier section. Also called FLYBACK TRANSFORMER.

horizontal output transformer  In a television receiver, the output transformer in the horizontal-output amplifier section. Also called FLYBACK TRANSFORMER.

horizontal polarization  Pertaining to an electromagnetic wave whose electric lines of flux are horizontal. In general, when the radiating element of the antenna is horizontal, the electric lines of flux in the transmitted waves are horizontal, and the antenna is most sensitive to incoming signals whose electric lines of flux are horizontal. Compare VERTICAL POLARIZATION.

horizontal positioning control  See CENTERING CONTROL.

horizontal quantity  The quantity measured along the X-axis of a graph represented by the horizontal view of an oscilloscope beam. Compare VERTICAL QUANTITY.

horizontal recording  See LATERAL RECORDING.

horizontal repetition rate  See HORIZONTAL FREQUENCY.

horizontal resolution  In a television picture, the number of picture elements (pixels) that can be discerned in a horizontal scanning line. Compare VERTICAL RESOLUTION.

horizontal retrace  In a cathode-ray device, such as an oscilloscope or television receiver, the rapid return of the electron beam to its starting point after completing a horizontal sweep of the screen. Compare VERTICAL RETRACE.

horizontal retrace blanking  In oscilloscopes and television receivers, the automatic cutoff of the electron beam during a horizontal retrace period, preventing an extraneous line on the screen during the period. Compare VERTICAL RETRACE BLANKING.

horizontal scanning  1. The lateral sweeping of the electron beam in a cathode-ray tube. 2. The sampling of X-axis values in a repetitive or nonrepetitive sweep of that axis.

horizontal scanning frequency  See HORIZONTAL FREQUENCY.

horizontal sensitivity  The signal voltage required at the input of a horizontal channel for full horizontal deflection. Also see HORIZONTAL GAIN. Compare VERTICAL SENSITIVITY.

horizontal signal  A signal serving as a horizontal reference quantity. Compare VERTICAL SIGNAL.

horizontal sweep  1. In a cathode-ray tube, the horizontal movement of the spot on the screen; in particular, the movement from left to right, during which a line of the image is formed on the screen. Compare vertical sweep.

horizontal sweep frequency  The frequency at which horizontal sweep occurs; in a television receiver, it is generally 15.750 kHz. Also called horizontal sweep rate. Compare VERTICAL SWeeP FREQUENCY.

horizontal sweep generator  A circuit that produces horizontal sweep signal. Compare VERTICAL SWEEP GENERATOR.

horizontal sweep rate  See HORIZONTAL SWEEP FREQUENCY.

horizontal-sync discriminator  In a television receiver, a circuit that compares horizontal sweep phase with the phase of the signal from the horizontal sweep oscillator.

horizontal synchronization  In a television receiver, synchronization of the horizontal component of scanning with that of the transmitting camera. Also see HORIZONTAL SYNC PULSE. Compare VERTICAL SYNCHRONIZATION.
A radar display in which the target is represented. Also see DELAY RELAY.

Abbreviation of HOUR. (Also, h.)

whose structure changes in the magnetic-field plane. Also see WAVEGUIDE JUNCTION and WAVEGUIDE TEE.

The observation that an ac electrical or electromechanical system oscillates back and forth, relative to some mean mode of operation (“hunts” for the mode), sometimes by introducing an alternating-current voltage of the same frequency and amplitude as the hum, but opposite in phase.

See HOT-WIRE METER.

humidity sensor A pickup whose resistance or capacitance varies proportionally with ambient humidity.

humidity interference Electrical interference resulting from HUM in any of its various electrical forms (see HUM, 1–4).

The amount of moisture in the air. Also see ABSOLUTE HUMIDITY and RELATIVE HUMIDITY.

humidity meter See ELECTRIC HYGROMETER and HOT-WIRE HYGROMETER.

A ground loop that results in undesired hum in the output of an amplifier.

A nonelectronic audio oscillator similar to the fork oscillator, but using a thick, metal reed, instead of a tuning fork. A carbon microphone button attached to the reed provides the feedback path necessary for sustained oscillation.

hum modulus Undesirable modulation of a radio signal or audio amplifier output signal by HUM interference.

hum 1. Alternating current having a frequency of 60 Hz.
2. Residual ripple in the output of a power supply, having a frequency of 60 Hz or 120 Hz, depending on the type of rectifier circuit used. 3. An electromagnetic field of long wavelength, usually originating from utility lines and having a primary frequency of 60 Hz. 4. The effects of low-frequency electromagnetic fields or currents, such as moving horizontal bars on a television screen. 5. An acoustic disturbance of long wavelength (low pitch).

human engineering 1. The branch of engineering devoted to interacting with humans being the machines and instruments they operate. Both a science and an art, the discipline is concerned with the safest and most efficient design, arrangement, and operation of equipment.

The interface between a sophisticated electronic device and a human operator.

hum interference Also called artificial interference. Electromagnetic interference to radio and television receiving systems or to data terminals, originating from artificial sources (such as radio transmitters, certain electrical appliances, and internal-combustion engines) of the manner and form(s) different, some affecting only a narrow band or frequency, and others a wide band of frequencies.

humanoid robot A robot that bears structural resemblance to a human being (e.g., has arms, a head, and legs). In its most advanced form, such a robot is an ANDROID.

A ground loop that results in undesired hum in any of its various electrical forms (see HUM, 1–4).

hum-balance potentiometer A potentiometer connected across an alternating-current power supply, with its slider grounded. At a certain setting, hum interference is nulled.

hum bars See HORIZONTAL HUM BARS.

hum bucking coil An auxiliary coil used in conjunction with the field and voice coils of an electronic speaker. Reduces hum interference via HUM BUCKING.

hum field The magnetic field surrounding a conductor carrying hum-frequency alternating current, eventually opening a magnetic tape reel.

humidifier A unit that increases the moisture in the air. See HUMIDITY.
that arise from points in the medium that have already been passed. HV Abbreviation of HIGH VOLTAGE. 
H vector A vector representing the magnetic field of an electromagnetic wave. Compare E VEC. 
wv Abbreviation of HECTOVOLT. 
H-wave mode In a waveguide, a mode of transmission in which the electric lines of flux are at right angles to the direction of the waveguide. Also called transverse-electric (TE) mode. 
by Occasional abbreviation of HENRY. The SI ab. v. and symbol, H, is preferred. 
hybrid Descriptive of a device that is an offspring of other devices or a product of dissimilar technolo- 
gies (but using elements of each). See, for example, HYBRID JUNCTION and HYBRID COIL. 
hybird active circuit An active circuit (such as an am- plifier, oscillator, or switch) using a combina- 
tion of two dissimilar active devices (e.g., transis- 
tors and vacuum tubes). 
hybrid coil A special type of bridging transformer used in wire telephony to prevent self-oscillation in a repeater amplifier that operates in both di- rections. 
hybrid computer A computer system incorporating more than one major computer technology. Examples: analog/digital and digital/neural- network. 
hybrid electromagnetic wave Abbreviation, HEM wave. An electromagnetic wave whose electric- 
field and magnetic-field vectors are both in the di- rection of a wavefront. 
hybrid IC See HYBRID INTEGRATED CIRCUIT. 
hybrid integrated circuit Abbreviation, HIC. An integrated circuit (IC) using both integrated and microminiature discrete components (i.e., one combining both monolithic and thin-film con- struction). 
hybrid junction 1. See MAGIC TEE. 2. A four- 
terminal device, such as a transformer circuit, special- 
transformer, or waveguide assembly, in which a signal applied to one pair of terminals divides and appears at the other pair of terminals. 
hybrid microcircuit A microcircuit containing dis- 
fused thin-film elements interconnected with separate chip elements. 
hybrid parameters See H PARAMETERS. 
hybrid tee See HYBRID JUNCTION, 1. 
hybrid transformer See HYBRID COIL. 
hydroacoustic Pertaining to the sound of fluids, especially water, under pressure. 
hydroacoustic transducer A transducer that con- verts energy from the high-pressure flow of a fluid into acoustic energy. 
hydrodynamic pressure The pressure of a fluid in motion. Compare HYDROSTATIC PRESSURE. 
hydroelectric Pertaining to the production of elec- tricity by water power, as by a generator turned by water power. 
hydroelectric machine A device for generating electricity from high-pressure steam escaping from a series of jets. 
hydroelectric power See WATER POWER. 
hydrogen Symbol, H. A gaseous element. Atomic number, 1. Atomic weight, 1.00794. Used in making semiconductor materials, it is the lightest and most abundant element in the universe. 
Compare DEUTERIUM and TRITIUM. 
hydrogen atmosphere The nonionizing atmos- 
phere in which semiconductor materials are melted and processed, and in which semiconduc- 
tor crystals are grown. Occasionally, helium is used instead of hydrogen. 
hydrogen atom A single atom of the element hy- drogen, consisting of one electron and one pro- ton. 
hydrogen-ion concentration See pH. 
hydrogen lamp A glow-discharge lamp that pro- duces light by means of the ionization of rarefied hydrogen gas. Visible light is emitted at discrete wavelengths. 
hydrostatic Elect. Pertaining to fluids in motion or the forces behind such motion. 
hydrostatics The branch of science dealing with the behavior of fluids at rest. 
hydrostatic pressure The pressure of a fluid at rest. Compare HYDRO_DYNAMIC PRESSURE. 
hygrograph A device for measuring relative humidity. A common application is in the measurement of relative atmospheric humidity. 
hygrometer A graphic recorder indicating humidity and temperature on the same chart, both as functions of time. 
hygrohalometric zone In the upper atmosphere, a region in which the distance between air molecules is comparable to the wavelengths of audible sound. As the altitude increases within this zone, the upper-frequency limit of effective sound propagation decreases. At altitudes above this zone, no audible sound can be propagated. 
hyperbola A conic-section curve satisfying the equation: 
\[(x - x_0)^2/a^2 - (y - y_0)^2/b^2 = 1\]
where x and y are the independent and depen- dent variables, x_0 and y_0 are the coordinates of the center, a is half the length of the major axis, and b is half the length of the minor axis. 

**hygroscopic**

**Material** A material that absorbs moisture from the air, but not enough to get wet. 

**Hygroscopic** A humidity-sensitive relay or switching circuit. 

**Hygrothermograph** A graphic recorder indicating humidity and temperature on the same chart, both as functions of time. 

**Hyperbolic angle** An angle subtended by a sector of a hyperbola in a manner analogous to that in which a circular angle is subtended by an arc of a circle. 

**Hyperbolic-cosine horn** See Catenoidal horn. 

**Hyperbolic error** 1. In an interferometer, a miscal- culation in the direction of arrival of a signal. The signal from one antenna in the system can be as- sumed to be in phase with the signal from an- other antenna, when actually the two com- ponents differ by an integer number of whole wavelengths. 2. The angular error, in degrees, minutes, and seconds, used to determine a miscal- culation of phase in an interferometer. 

**Hyperbolic face contour** See HYPERBOLIC GRIND. 

**Hyperbolic functions** 

**Hyperbolic sine** A hyperbolic function. 

**Hyperbolic tangent** A hyperbolic function. 

**Hyperbolic angle** 

**Hyperbolic** A scalar quantity derived in the course of a vector calculus calculation. 

**Hyperbolic curve** The shape (approximately hyper- bolic) to which the face of a magnetic recording head is ground. It provides optimum contact with the tape and ensures good high-frequency re- sponse. 

**Hyperbolic horn** A horn antenna whose cross- sectional area is a hyperbolic function of the distance along the axis. 

**Hyperbolic logarithm** See NAPIERIAN LOGAR- RITHM. 

**Hyperbolic navigation** A radionavigation system in which the operator of an aircraft or boat deter- mines position by comparison of two received sig- nals. The two transmitters radiate signals from known positions and with known timing charac- teristics. The time delay from each transmitter is determined, resulting in two hyperbolic curves on a map. The point of intersection of the curves is the location of the aircraft or ship. 

**Hyperbolic radian** A unit of measure derived from a hyperbolic angle. A hyperbolic radian is the hy- perbolic angle that encloses an area of 0.5 when the distance along the x-axis to the hyperbola is unity. Also see HYPERBOLIC ANGLE. Compare CIRCULAR RADIAN. 

**Hyperbolic trigonometry** The branch of mathe- matics dealing with the theory and application of hyperbolic angles and their functions. 

**Hypercardioid microphone** A unidirectional mi- crophone with exceptional sensitivity in front, and minimal responsiveness from the sides and rear. 

**Hypercardioid pattern** A directional CARDIOID PATTERN with high directivity, an extended response, or minimum feedback, or a combination of these effects. 

**Hyperfocal Distance** The shortest distance to a plane that can be focused without degrading definition at infinity. 

**Hyperfrequency wave** See MICROWAVES. 

**Hyperkarat** See HIPERNICK. 

**Hyperon** Any one of various particles having a mass greater than that of a neutron or a proton. 

**Hypermultiplication** The production of an increased voltage across a biological membrane.
hypsometer

An altimeter in which a thermistor (connected to a battery and current meter) is immersed in a boiling liquid. Because the liquid’s boiling point is proportional to altitude, it affects the resistance of the thermistor and, hence, the deflection of the meter.

hysteresis curve

A response curve depicting hysteresis in a magnetic material, a dielectric, or a servo system. A graph of the extent to which a variable quantity lags the effect or stimulus that causes it to change (e.g., a curve showing the effect of response delay in a thermostatically controlled heating/cooling system).

hysteresis cycle

A complete hysteresis curve.

hysteresis distortion

Signal distortion in iron-core components, such as coupling transformers, resulting from hysteresis in the iron.

hysteresis error

In a meter, a difference in indications for increasing and decreasing current, an effect caused by hysteresis in iron meter parts.

hysteresis heater

An induction heater in which heating results from hysteresis loss in the load.

hysteresis loss

Power loss caused by hysteresis in a magnetic material exposed to an alternating magnetic field, or in a dielectric material exposed to an alternating electric field. It is characterized by the generation of heat.

hysteresis meter

An instrument that determines the hysteresis loss in a ferromagnetic material in terms of the torque produced when the material is rotated in a magnetic field, or vice versa.

hysteresis motor

A synchronous motor that does not require direct-current excitation, and does not have salient poles. It is started by means of hysteresis losses that the rotating magnetic field causes in the secondary.

hystericton

For a ferromagnetic material, hysteresis loss in ergs per cubic centimeter of material per cycle of magnetization.

hysteresis loop

See HYSTERESIS CURVE.

hysteresis constant

For a ferromagnetic material, hysteresis loss in ergs per cubic centimeter of material per cycle of magnetization.

hysteresis

1. The tendency of a magnetic material to saturate and retain some of its magnetism after the alternating magnetic field to which it is subjected reverses polarity, thus causing magnetization to lag behind the magnetizing force. 2. A similar electrostatic action in a ferroelectric dielectric material. 3. In a servo system, the condition in which a variable quantity lags the effect or stimulus that causes it to change. The plot for this is a double-line HYS-TERESIS CURVE.

hysteresis brake

A brake whose retarding action comes from hysteresis in a permanent-magnet motor.

hysteresis clutch

A magnetic clutch whose output torque (for synchronous drive or continuous slip) comes from hysteresis in a permanent-magnet motor.

hysteresis coefficient

In a sample of iron whose volume is one cubic centimeter, the energy in ergs dissipated during one cycle of magnetization. Also called coefficient of hysteresis.

hysteresiscope

An oscilloscope that is specially designed to display the hysteresis curve of a material. Compare HYSTERESISCOPE.

hysteresigraph

A graphic recorder that displays or records the hysteresis curve for a material. Also see HYSTERESISCOPE.

hysteresismeter

See HYSTERESIS METER.

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An instrument that determines the hysteresis loss in a ferromagnetic material in terms of the torque produced when the material is rotated in a magnetic field, or vice versa.

hysteresis motor

A synchronous motor that does not require direct-current excitation, and does not have salient poles. It is started by means of hysteresis losses that the rotating magnetic field causes in the secondary.

hysteresis constant

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See HYSTERESIS CURVE.

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I 1. Symbol for the unit imaginary number, the square root of -1. Also, i. 2. Subscript for INSTANTANEOUS VALUE. 3. Symbol for INTRINSIC SEMICONDUCTOR. 4. Symbol for ANGLE OF INCIDENCE. 5. Symbol for INSTANTANEOUS CURRENT. Also, i, j. 6. Symbol for a unit vector parallel to the x-axis. 7. Symbol for INCIDENT RAY.

$I_a$ Symbol for the ac component of a COMPOSITE CURRENT.

$I_d$ Symbol for AUDIO-FREQUENCY CURRENT.

IAGC Abbreviation of INSTANTANEOUS AUTOMATIC GAIN CONTROL.

IADVC Abbreviation of INSTANTANEOUS AUTOMATIC VOLUME CONTROL.

$I_{le}$ Symbol for plate power-supply current. 2. Occasional symbol for plate current (usually, $I_{pl}$).

IBM Abbreviation for International Business Machines Corporation.

IC 1. Abbreviation of INTEGRATED CIRCUIT. 2. Abbreviation of INTERNAL CONNECTION.

$I_c$ 1. Symbol for transistor COLLECTOR CURRENT. 2. Occasional symbol for grid current (usually, $I_g$).

ICAD Abbreviation of integrated control and display.

ICAS Abbreviation of INTERMITTENT COMMERCIAL AND AMATEUR SERVICE.

$I_{le}$ Symbol for the static reverse collector (leakage) current in a common-emitter-connected transistor with an open-circuited base.

$id$ loading 1. In an antenna, power-line system, or other structure, the additional stress caused by accumulation of ice. 2. The weight or thickness of ice a structure can safely withstand.

$I_{ic}$-removal circuit A high-voltage, low-frequency power supply used to heat certain antennas to melt ice that accumulates on them.

ICET Abbreviation of Institute for the Certification of Engineering Technicians (National Society of Professional Engineers).

ICME Abbreviation of International Conference on Medical Electronics.

$I_{le}$ Symbol for the collector cutoff current (static leakage current) of a bipolar transistor (see CUT-OFF CURRENT).

icon In a graphical computer interface, a symbol that aids the user in recognizing a selection that can be made.

iconoscope A camera tube in which an electron beam scans a photosensitive mosaic on which the image is focused. The light-sensitive droplets of the mosaic form tiny capacitors with the insulated, metallic backplate of the mosaic, each capacitor becoming charged by the light of the picture. As the electron beam scans the mosaic, each capacitor discharges as the beam strikes it, delivering an output pulse proportional to the light intensity at that spot in the picture.

ICP Abbreviation of the Institute of Clinical Pathology.

ICQ Abbreviation of INTERRUPTED COMMUNICATIONS.

$IC$ Abbreviation of INTERRUPTED COMMUNICATIONS.

ICBS Abbreviation of interconnected business system.

$ICW$ Abbreviation of INTERRUPTED CONTINUOUS WAVE.

Identification division The division (one of four) in a COBOL program that describes and identifies the program being compiled.

Identification, friend or foe Abbreviation, IFF. A technique in which a radar station transmits an interrogating signal and the station questioned replies automatically with a suitable pulse or other signal if it is aboard a friendly aircraft or vessel. If it is aboard an enemy vehicle, the station gives no reply or sends an unsatisfactory one.

Identifiable A data file identification label in an input/output device, or a label that identifies a specific storage location.

Identity element A logic element that, upon receipt of two input signals, provides an output that is logic 1 (high) only if the input signals are both logic 1 (high) or logic 0 (low).

Idiodynamic Possessing the photoelectric properties of a true crystal.

ID display See I SCAN.

Idle channel A measurement of the energy in the channel between the transmitter and receiver. Sometimes called a blank.

Idle wheel In a phonograph or magnetic tape recorder, an auxiliary, rubber-coated wheel that transfers rotary motion from the motor pulley to the platter or the rim of the capstan flywheel.

Idle time The period during which data processing equipment, although operable, is not in use.

Idling Standby equipment operation, as when vacuum-tube filaments in a radio-frequency power amplifier are kept hot—even when the amplifier is not actually being used to transmit a signal.

Idling current The current flowing in a device during a standby period, as opposed to operating current. Also called STANDBY CURRENT.

Idling frequency 1. A digital character that conveys no information, but helps maintain synchronization between the transmitter and receiver. Sometimes called a blank.

Idler Character A digital character that conveys no information, but helps maintain synchronization between the transmitter and receiver. Sometimes called a blank.

Idler wheel In a phonograph or magnetic tape recorder, an auxiliary, rubber-coated wheel that transfers rotary motion from the motor pulley to the platter or the rim of the capstan flywheel.

Idling time The period during which data processing equipment, although operable, is not in use.

Idling voltage The voltage required by or measured in a device that is in standby mode.

$Id$ Symbol for drain cutoff current in a field-effect transistor.

IDFT Abbreviation of instrumentation online transcriber.

IDP 1. Abbreviation of INDUSTRIAL DATA PROCESSING. 2. Abbreviation of INTEGRATED DATA PROCESSING. 3. Abbreviation of INTERMODULATION DISTORTION PERCENTAGE.

$Id_{oa}$ Symbol for DRAIN CURRENT AT ZERO GATE VOLTAGE in a field-effect transistor.

$Id_{oa}$ Symbol for EMISSOR CURRENT.

ICGSC Abbreviation of integrated electronic component.
In color television, the reference illuminance that represents a symbol in a character set.

The amount of luminous flux received by the eye, as compared with the voltage actually needed for ignition of an internal-combustion engine. See INDICATED HORSEPOWER.

ignition potential 1. The minimum voltage needed to cause electrical discharge in an internal combustion engine.

ignition potential 2. A set of input terminals with a load connected to the opposite end.

ignition reserve A device for adjusting the sensitivity, and a microammeter. More sophisticated devices include direct-current amplification.

Image 1. In a superheterodyne circuit, a spurious response whose frequency differs from that of the desired signal by twice the intermediate frequency. A picture on the screen of a television receiver or computer display. A pattern on the screen of an oscilloscope tube. A picture on the mosaic of a television camera tube. A duplicate of a computer storage area that is in another part of storage or on another medium.

image admittance The reciprocal of IMAGE IMPEDANCE.

image antenna An imaginary “mirror” antenna below the effective radio-frequency (RF) ground surface, at a depth equal to the height of the true radiating antenna above effective RF ground.

image attenuation constant The real-number part of the IMAGE TRANSFER CONSTANT. Also see IMAGE PHASE CONSTANT.

image compression Any of various methods by which the number of bytes in a digital image can be reduced, without significant degradation of image quality. The two most common methods are JPEG (Joint Photographic Experts Group) image compression and fractal image compression. Other schemes include MPEG (Moving Picture Experts Group) image compression and Indeo, developed by Intel Corporation. Fractal image compression can provide a compression factor of as much as 100:1 without significant degradation of image quality.

image converter 1. A device that changes an invisible image into a visible image. Examples include the special-purpose converted, and photographic apparatus for infrared, ultraviolet, and X-ray wavelengths.

image dissection See DISSECTOR TUBE.

image effect The effect of reflection of electromagnetic waves from the ground. An IMAGE ANTENNA appears to radiate from a point beneath the effective RF ground plane. The depth of the image antenna below the effective RF ground plane is equal to the height of the actual antenna above the effective RF ground plane.

image frequency The frequency of the image response in a superheterodyne radio receiver. See IMAGE, 1.

image impedance The property of a network in which the load impedance is “seen,” looking into the output terminals with the generator connected to the opposite end, and the generator impedance is “seen,” looking into the input terminals with a load connected to the opposite end.

image intensification An increase in the brightness of the display on a cathode-ray tube.

image intensifier A device that increases the brightness of the image produced by a beam of electrons or X rays hits a fluorescent screen.

image interference A type of interference that can occur in superheterodyne circuits. It occurs when there is a sufficiently strong signal on the IMAGE FREQUENCY.

image orthicon See ORTHICON.

image phase constant The imaginary number part of the IMAGE TRANSFER CONSTANT. Also see IMAGE ATTENUATION CONSTANT.

image potential The potential energy of a charged particle at a given distance from a metal surface. The metal surface acts in a way similar to a mirror; a reflected image of the object, having equal charge but opposite polarity, is formed on the other side of the image plane.

See DISSECTOR TUBE.

image ratio See SIGNAL-TO-IMAGE RATIO.

image rejection In a superheterodyne radio receiver, the suppression or elimination of IMAGE INTERFERENCE by means of a selective circuit, such as a radio-frequency preamplifier.

image response In a superheterodyne receiver, an undesired response to signals removed from the desired frequency by twice the intermediate frequency. See IMAGE TRANSFER CONSTANT.

image transfer constant A number depicting the transfer of power network. It has the same value, regardless of the direction of transmission through the network, also see IMAGE ATTENUATION CONSTANT and IMAGE PHASE CONSTANT.
imaginary axis In a vector diagram of complex impedance, the axis of the imaginary-number component (jX).
imaginary number A real-number multiple of the positive square root of -1. Engineers depict the position of an imaginary number by the lowercase letter j. Mathematicians use the lowercase letter i. Engineers write complex numbers in the form jX and mathematicians write Xi, where X is a real number.
imaginary-number component The imaginary-number part of a COMPLEX NUMBER.
imax Abbreviation of maximum current.
im distortion meter INTERMODULATION METER.
im distortion percentage See INTERMODULATION DISTORTION PERCENTAGE.
imitation The transmission of false signals for purposes of deception. For example, during wartime, the signals from an enemy station might be recorded and retransmitted.
immediate access 1. The ability of a computer to store and retrieve data in a minimal amount of time. 2. Computer storage that can be accessed in a minimal amount of time.
immediate address An instruction address that is used as an address. 
imeter See INTERMODULATION METER.
imittance Impedance or admittance; a contrac-
tion of IMPEDANCE and ADMITTANCE. Example: a negative-impittance circuit.
immutual knowledge Knowledge that can be kept
indefinitely in the form of detailed computer
files. Some scientists and sociologists believe that
this will eventually have a profound effect on the
way that future generations view history.
impact excitation See SHOCK EXCITATION.
impact strength 1. The energy required to fracture the material un-
der shock loading. Impatt diode Acronym for impatt avalanche tran-
sit time diode. A microwave semiconductor (sil-
corn or gallium arsenide) diode exhibiting negative resistance resulting from the combined effects of charge-carrier transit time and impact avalanche breakdown. It is used as an oscillator or ampli-
fier. IMPATT oscillator A microwave oscillator that uses an IMPATT DIODE.
impedance Symbol, Z. Ohm. The total opposition
offered by a circuit or device to the flow of al-
ternating current. It is the vector sum of RESISTANCE and REACTANCE. This is a COM-
PLEX NUMBER whose real-number component is not imaginary, and whose imaginary-number com-
ponent is reactance jX. Mathematically, Z = R + jX.
impedance angle The angle between the resis-
tance and impedance vectors in an IMPEDANCE TRIANGLE.
impedance arm The network branch that contains one or more impedances, as opposed to an arm that contains only resistance (or predominately, reactance). Also called impedance leg.
impedance branch See IMPEDANCE ARM.
impedance bridge 1. An alternating-current (ac) bridge commonly used to measure resistance, inductance, capacitance, and resistive components associated with induc-
tors and capacitors, from which impedance can be calculated. 2. Sometimes, an ac half-bridge circuit in which an unknown impedance is com-
pared with a known resistance. 3. A radio-
frequency bridge circuit whose balancing element reads impedance directly in ohms.
impedance bump A discontinuity in the char-
acteristic impedance of a radio-frequency transmis-
sion line. It is often caused by the use of improper splicing techniques.
impedance coil See CHOKE COIL.
impedance-coupled amplifier An amplifier using capacitor/coil combinations for interstage and output load coupling.
impedance drop 1. In an alternating-current circuit, the complex sum of the resistance drop and reactance drop.
impedance ground A ground connection in which the impedance at the operating frequency is de-
termined by a network of resistors, capacitors, and/or inductors.
impedance leg See IMPEDANCE ARM.
impedance magnetometer A device that is used for measuring small local variations in the inten-
sity of the earth's magnetic field. A small change in the intensity of the magnetic field will cause a change in impedance of a nickel-iron wire having high permeability.
impedance match The condition (for maximum power transfer) when the transmitting impe-
dance equals the receiving impedance, or when a suitable transformer is inserted between different impedances for matching purposes. Also see IMPEDANCE MATCHING.
impedance matching 1. The adjustment or modi-
fication of two impedances so that they are identi-
cal, that is, the two resistive components are equal, and the two reactive components are equal. 2. The insertion of a suitable transformer or network between two circuits having different impedances, for the purpose of optimizing power transfer.
impedance-matching network A network of dis-
crete components, often adjustable, that is used to match a circuit having a certain impedance to a circuit having a different impedance. An example is the inductive-capacitive (LC) coupler, also called a transmatch, commonly used to match a radio transmitter to an antenna system.
impedance-matching transformer See IMPED-
ANCE TRANSFORMER.
impedance meter See Z METER.
impedance plethysmograph An electronic device used to measure changes in the chemical content of body cells.
impedance poles See POLES OF IMPEDANCE.
impedance ratio The quotient of two impedances that are related in some situation, such as impedance match or impedance mismatch. The impedance ratio of a transformer is equal to the square of the turns ratio.
impedance transformer 1. A transformer for con-
verting an impedance to a different value. The turns ratio is equal to the square root of the impedan-
ces ratio. 2. An emitter follower or source follower circuit, used primarily to match a high impedance to a lower impedance. 3. A shortcircuited transmission-line section used to match or convert impedances at radio frequencies.

\[
\begin{align*}
\text{impedance triangle} & \quad \begin{tikzpicture}
\draw (-4,0) -- (0,0) -- (0,4) -- cycle;
\node at (0,0) {Z};
\node at (3,3) {X};
\node at (-1.5,-1.5) {T = 2\pi f_0/L};
\node at (-4,0) {Primary};
\node at (0,4) {Secondary};
\end{tikzpicture} \\
& \quad \text{impedance transformer}
\end{align*}
\]
impulse relay 
A relay that is able to close or open completely when driven by a short pulse.

impulse speech rate of a telephone dialing device as it transmits pulses.

impulse timer 
A synchronous-motor-driven timer with dial that controls many circuits, it can advance by a number of specified increments, as controlled by an integral stepping mechanism.

impulse transmission 
A method of transmission in which defined impulses are used to denote changes in signal content or format.

impurity 
A substance added to a semiconductor to alter its electrical properties.

impurity atom 
In a processed semiconductor material, an atom of an IMPURITY material that produces either n- or p-type properties to the semiconductor.

impurity density 
In the manufacturing process of a semiconductor material, the amount of impurity added to the original semiconductor.

impurity ion 
In a crystal, an ion in a space between atoms, or one taking the place of an atom.

impurity level 
1. The energy existing in a semiconductor material as a result of doping the addition of an impurity. 2. See IMPURITY DENSITY.

impurity material 
See IMPURITY.

Indian 
Abbr. for INDIUM.

index 
1. Symbol for the nth root of current in a series of values.
2. Abbreviation of INPUT. 3. Abbreviation of INCH.

inaccuracy 
1. The state or condition of instrumental change between the actual value of a parameter and the value indicated by an instrument. 3. The percentage of instrument error.

inactive leg 
Within a transducer, an electrical component or group of components that remains unchanged when the stimulus (quantity being transduced) is applied, specifically, a Wheatstone bridge element in a transducer.

inactive lines 
In a conventional television picture, blank lines that do not contribute to the visible part of the image. Approximately half of these lines are at the top of the screen; the other half are at the bottom.

inactive time 
The period during which a radioactives counter is insensitive to ionizing agents.

incandescence 
The state of glowing from intense heat, as when a metal becomes white hot from an electric current passing through it.

incandescent lamp 
A filament-type lamp. The filament becomes so hot when an electric current passes through it that it can produce visible light.

inch 
Abbreviation, in. A unit of linear measure in the English system; 1 in. = 2.54 centimeters = 0.0254 meter.

incising 
See JOGGING.
index of modulation. In frequency modulation, the ratio of carrier frequency deviation to modulating frequency.

index of refraction. Symbol, n. The ratio \( v_2/v_1 \), where \( v_1 \) is the speed of energy propagation in the first medium through which the energy passes, and \( v_2 \) is the speed in the second medium.

index register. Abbreviation, XR. In digital computer operations, a register holding a modulator that allows data to be directly addressed (each program refers to an index register when addressing storage locations). Also called MODIFIER REGISTER.

index word. A word (bit group) containing a modifier that will be added to a basic instruction when it is executed during a program run.

India. High-grade mica mined in India. Its excellent dielectric properties make it useful for capacitor stacks, high Q radio-frequency circuits, and other critical applications.

indicated horsepower. Abbreviation, ihp. Horsepower calculated from data or ratings, as opposed to measured horsepower.

indicated horsepower-hours. Abbreviation, shp-hr. Horsepower-hours based on calculation of indicated horsepower.

indicating face. A face that provides some signal (such as a protruding pin) to show that it has been blown.

indicating instrument. An instrument, such as a meter, that provides direct readings of a measured quantity, as opposed to an instrument, such as a bridge, that must be manipulated and whose operation must often be followed by calculation.

indicating lamp. A lamp that is marked or coded so that when it is on or off it conveys information.

indicator. 1. Meter (see METER). 1, 2. See MONITOR. 3. See ANNUNCIATOR. 4. In a computer, a device that can be set by a specific condition (e.g., by a negatire result or error indicator).


indicative response. Symbol, I/R. The sum of the transient and steady-state responses to a unit function.

indirect addressing. In computer programing, a 1. Means in which the address in an instruction refers to a different location containing another address, that can specify yet another address or an operand. Also called multiple-address addressing.

indirect coupling. Collectively, capacitive and inductive coupling, as opposed to direct coupling.

indirect ground. An unintentional ground connection, e.g., accidental grounding of part of a circuit or one obtained through a roundabout path. Compare DIRECT GROUND.

indirect light. Light that has been reflected from one or more surfaces. Compare DIRECT LIGHT.

indirectly controlled. Influenced by a directly controlled parameter, but not itself directly controlled.

indirectly grounded. Connected to earth or to the lowest-potential point in a system inadvertently or through a roundabout path (e.g., by means of an indirect ground). Compare DIRECTLY GROUNDED.

indirectly heated cathode. An electron-tube cathode consisting of a cylindrical or rectangular sleeve coated with a substance that is a rich emitter of electrons; it is heated by a filament inside the cylinder.

indirectly heated thermistor. A thermistor whose temperature is changed by a built-in heater (filament) operated by the control current.

indirectly heated thermocouple. A meter thermocouple heated by a small heater (filament) through which the signal current passes.

indirect material. A semiconductor substance in which electrons move from the conduction band to the valence band in discrete jumps or steps.

indirect measurement. The measurement of a quantity by comparing it with a similar quantity, using an instrument that requires adjustment or manipulation (rather than a simple meter). For example, resistance can be measured with a bridge, instead of an ohmmeter. Compare DIRECT MEASUREMENT.

indirect piezoelectricity. In a piezoelectric crystal, the application of a voltage for the purpose of producing a strain on the crystal. A piezoelectric buzz operates on this principle.

indirect scanning. A method of video scanning, in which a fast-moving spot of light scans the film or an object and is passed through the film (or reflected by the object) to a photocell.

indirect wave. 1. In communications, a wave that arrives at a receiver after having traveled via reflection, refraction, or both. 2. A radio wave propagated via the ionosphere. 3. A wave reflected from some object, such as the moon or a meteor trail. 4. A wave received from a satellite, originating from a distant earth station.


induction heating. The heating of metallic work by radio-frequency currents induced in it as a result of the intense alternating magnetic field within the coil. Compare ELECTRIC HEATING.

induction loss. Loss due to the flux of a current-carrying conductor because of inductive coupling to a nearby conductor.

inductance. A property of an inductor, that when it is on or off it conveys information. Also called INDEX.

inductance-capacitance meter. A direct-reading instrument consisting of a combination of inductance and capacitance in a circuit, such as a filter, a parallel-resonant circuit, or a series-resonant circuit. Pertaining to a device for measuring inductance and capacitance (e.g., LC BRIDGE, MAXWELL BRIDGE, and OWEN BRIDGE).

inductance-capacitance-bridge. An alternating-current bridge for measuring inductance in terms of a standard inductance or a standard capacitance. See, for example, HAY BRIDGE, MAXWELL BRIDGE, and OWEN BRIDGE.

inductance-capacitance resistance. See IMPEDANCE BRIDGE.

inductance-coil. See INDUCTOR.

inductance filter. A filter using only an inductor, usually a coil of wire.

inductance-resistance. Time constant. The time constant (see ELECTRICAL TIME CONSTANT) of a circuit containing, ideally, only inductance and resistance. Matherematically, it is the product of the seconds. L is the inductance in henrys, and R is the resistance in ohms. Also called LR time constant.

inductance standard. A highly accurate, stable inductor used in precision measurements. Also see PRIMARY STANDARD and SECONDARY STANDARD.

induction. 1. The ability of an alternating, pulsating, or otherwise changing current flowing in one circuit to set up a current in a nearby circuit. The circuits need not be physically connected, but need only be linked by magnetic lines of flux. Also see SELF-INDUCTION. 2. The phenomenon whereby a body becomes electrically charged by the field surrounding a nearby charged body. Also see ELECTRIC CHARGE.

induction coil. A special high-voltage step-up transformer having an open core and a vibrator-interrupter in series with the primary winding, which carries direct current from a battery. The current is broken up into short pulses by the interrupter, and a high alternating-current voltage is generated in the secondary winding.

induction compass. A compass whose indications depend on current flowing in a coil revolving in the earth's magnetic field. Compare GYROCOMPASS and MAGNETIC COMPASS.

induction factor. The ratio of total current to nonproductive current in an alternating-current circuit.

induction field. The portion of an electromagnetic field that returns to a radiator, such as a coil, as opposed to the RADIATION FIELD.

induction frequency converter. A form of component failure that causes the ore to become hot enough to melt. Symbol, In. A metallic element. Atomic number, 49. Atomic weight, 114.82. Used as a high-power, radio-frequency current to melt.

induction load. Loss due to the flux of a current-carrying conductor because of inductive coupling to a nearby conductor.

induction modulator. See ELECTROMECHANICAL MODULATOR.
inductance in series with the element(s). This reduces the resonant frequency for a radiator having a given physical length. It can also serve to reduce the physical length required for a radiator.

In an antenna, the addition of inductive loading can be specified in megahertz, f. Also see inductive reactance, inductive trimmer.

inductive reactance Symbol, \( X_L \). Inductance \( L \) in Hertz, \( f \), has the unit imaginary-number quantity; \( X_L = \frac{\mu L}{f} \), where \( X_L \) is in ohms, \( f \) is the frequency in Hertz, \( L \) is the inductance in henrys, and \( \mu \) is the unit imaginary number (the square root of -1). Inductive reactance is the voltage per unit of current in an inductive circuit. There are two kinds of inductive reactance: self-inductive reactance and mutual inductive reactance. Inductive reactance is the inductive reactance of a coil having a movable core.

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inductive tuning A form of reasoning that demonstrates that a certain conclusion is highly probable, given a certain set of circumstances. This is of interest to researchers in artificial intelligence (AI). Compare DEDUCTIVE LOGIC.

inductive viscosity A form of reasoning that demonstrates that a certain conclusion is highly probable, given a certain set of circumstances. This is of interest to researchers in artificial intelligence (AI). Compare DEDUCTIVE LOGIC.

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inertia relay • information superhighway

inertia relay A time-delay relay whose operation is slowed by the addition of weights or other attach-
ment species.
inertia switch A switch that can sense a distur-
bance of its inertia.
inference engine A circuit that gives instructions to a computer or robot, by applying programmed rules to commands issued by a human operator. Comprises the functional portion of an EXPERT SYSTEM.
infinite Pertaining to a quantity or region that has no defined limits.
infinite baffle A loudspeaker baffle having no openings for the passage of sound from the front to the back of the speaker cone.
infinite-impedance detector A detector that of-
fers the very high input impedance of a gate-
source circuit and the large-signal capabilities of a diode detector. Audio-frequency output is taken across the source resistor, which is bypassed for radio-frequency signals. There is no drain resis-
tor. Drain current increases with the input signal from a very low value at zero signal level.
infinite-impedance detector

infinite line See INFINITE TRANSMISSION LINE.
infinite regress A reasoning pattern (either hu-
man or machine-based) that is fallacious because it defines or explains something in terms of itself.
infinite sample space In statistics, a sample space having no definite limits.
infinite series A mathematical series in which the number of terms is limitless. For example, \( a = 0.1 + 0.06 + 0.006 + 0.0006 + \ldots \).
infinesimal 1. A quantity, such as a differential, that approaches zero as the limit. 2. Pertaining to a quantity whose magnitude is extremely small or negligible. 3. Pertaining to an extremely small change in a quantity or measured value.
infinite transmission line A theoretical transmis-
sion line with normal characteristics, but extend-
ning away from the signal generator or receiver for a limitless distance.
infinity Symbol, \( \infty \). A quantity that is unlimited in duration or dimension. A quantity that increases without limit is sometimes said to "approach in-
finitude."
infix notation A system of logical operation nota-
tion wherein operands are separated by opera-
tors, thus, \( A \& B \), where the ampersand means AND. Compare PREFIX NOTATION.
Infobahn See INFORMATION SUPERHIGHWAY.
infobond On a printed circuit board, a form of wiring on the side opposite the components. The wiring is used in place of the foil normally on such a circuit board.
information 1. Collectively, data or communica-
tions, excluding the symbols or signals used to describe, present, or store them. 2. The result of data processing (i.e., that which is derived from the compilation, analysis, and distillation of data).
information bits In an encoded signal, data char-
acters or digits that can be treated to give infor-
mation (excluding control characters).
information center A storage bank designed for use by many different subscribers, via computer.
information channel A channel through which data and associated signals are transmitted and received.
information feedback system In message trans-
mision, a control system in which intelligence received at a terminal is returned to the sending unit for automatic verification.
information gate A device or circuit that opens and closes an information channel.
information processing Anything that uses data to derive conclusions, to produce other data, or to take specific actions, and whose func-
tioning can be explained entirely on the basis of data-processing operations. This includes com-
puters and smart robots. Many (but not all) sci-
entists believe that animals are also included; some believe that human beings qualify as well.
information retrieval In digital computer and data-
processing operations, the categorizing and storage of information and the automatic recall of specific file items. Also see ACCESS TIME.
information separator An indicator that sepa-
rates items of information or fields in a (usually variable length) record.
information storage In digital computer and data-
processing operations, holding information in memory pending retrieval.
information superhighway 1. General expression for a worldwide network consisting of computers (personal, remote, educational, industrial, and govern-
ment) interconnected by telephone lines. 2. See INTERNET.
infracentral A massive, evolving, somewhat controversial data communication network link-
ing computers, television, and telephone sys-
tems. It uses high-speed, high-volume data links. Communication technologies include fiberoptics, radio-frequency repeaters, microwaves, geosta-
tionary satellites, and low-earth-orbit (LEO) satel-
ite systems.
information word A character group representing stored information and managed, as a unit, by hardware or software.
infrared Pertaining to electromagnetic energy in a band whose wavelength is longer than that of vis-
ible light, but shorter than that of microwave en-
ergy.
infrared communication Communication by key-
ing or modulating infrared rays.
infrared counter-figuremeasure A military tac-
tic in which action is taken against an enemy in-
frared countermeasure.
infrared countermeasure A military tactic using countermeasure methods to cripple enemy in-
frared equipment.
infrared detector A device that senses the pres-
ence of infrared energy. Some such detectors an-
bolometers, radiometers, radiomicroimeters, and photoscillos.
infrared emitting diode Abbreviation, IRED. A semi-conductor diode, such as the gallium-
arsenide type, that emits infrared rays when a current passes through the p-n junction in the forward direction.
infrared guidance A navigation and reconnais-
sance system using infrared rays.
infrared homing The method whereby a guided missile uses infrared rays to guide it to its target.
infrared light See INFRARED RAYS.
infrared motion detector See MOTION DETEC-
TOR and INFRARED.
infrared photography Photography in which the scene is illuminated with infrared light or emits infrared rays, and the film is infrared sensitive.
infrared radiation See INFRARED RAYS.
infrared rays Radiation at frequencies in the IN-
FRARED region. Also (somewhat mistakenly) cal-
lared heat rays.
infrared remote control 1. The use of an infrared link, usually over short line-of-sight distances, for the purpose of controlling the operation of electronic equipment. A common example is the local remote control of a television receiver or high-fidelity system. 2. A small box, containing buttons, a transmitter and an infrared-emitting diode, used for local remote control of de-
vices, such as television receivers and high-
fi loudspeaker systems.
infrared spectrum The region of the electromag-
netic spectrum in which INFRARED radiation is

infrasonic Pertaining to extreme low-frequency acoustics, and sends a signal to an alarm. Such INFRASONIC waves can be caused by various actions such as walking on a wooden floor, opening or closing a door, etc.
infrasound Acoustic disturbances in the air, whose frequencies are lower than about 20 Hz, and whose wavelengths are longer than about 55 feet (17 meters).
inharmonic distortion Distortion in which the fre-
quences of extraneous components are not har-
monically related to the fundamental frequency. It is sometimes experienced when a tone-burst signal is applied to a loudspeaker.
inherent component A usually extraneous prop-
certainty possessed by a device because of its internal peculiarities. Thus, an inductor has inherent ca-
tances, an inductor has inherent inductance.
inherent error In an extended calculation, an er-
ror carried through from one of the earlier steps.
inhibit 1. In digital computer and logic operations, to prevent an action or block the input of data by means of a pulse. 2. To delay an action or process.

inhibit gate A pulse-activated gate circuit that acts as a delay circuit.

inhibitor 1. A device or circuit that produces a pulse or signal that prevents an action, or that blocks data input. 2. An additive, such as an organic liquid, that delays the hardening of a mixture, such as an encapsulating compound.

inhibit pulse In a computer, a drive pulse that prevents other pulses from changing the direction of magnetization in the cells of a magnetic core memory.

inhibit signal In digital computer and logic operations, the signal that causes an INHIBIT action.

initial drain 1. The current supplied by a battery or cell at its rated voltage. 2. The current delivered by a rechargeable battery or cell when it is put into use immediately after receiving a full charge.

initial failure The first failure occurring in the operation of a circuit or device.

initial instructions A resident computer routine used to aid program loading. Also called initial or start-up instructions.

initial ionizing event In the operation of a radiactivity counter, the first event that starts the chain of similar events constituting the count.

initialization A computer program instruction that sets the value of a variable to zero.

initial permeability Permeability in the low magnetic region of a material.

initial time delay Abbreviation: ITD. In acoustics, the elapsed time between the instant the direct sound wave is first heard, and the instant the first echoes (reflected sound waves) arrive.

initialize See TRIGGER.

injection 1. The process of sending a signal into a circuit or device. 2. Introducing charge carriers (electrons or holes) into a semiconductor.

injector 1. An element or electrode for INJECTION. 2. A device or circuit that injects a signal into another device or circuit.

injector electrode See INJECTOR.

ink In the printing of matter for optical character recognition, the squeezing of ink into a matrix, and the placement of image on the characters' center.

ink-vapor recorder See INK MIST RECORDER.

inline Abbreviation of INCH-POUND.

instead The part of an electrode that passes through the external shell or case of a component.

inline coupling capacitor The main portion of a COBOL computer program, responsible for the primary operations.

inline processing The action peculiar to a system that processes data almost immediately upon receipt (i.e., one that need not be capable of storing a lot of unprocessed data).

inline readout In digital computer operations, a readout device that displays digits side-by-side horizontally.

inline subroutine A subroutine that must be written each time it is needed, as compared with one that can be accessed by a program branch.

inline tuning Tuning of all the stages of a channel, such as an intermediate-frequency amplifier, to the same frequency.

inner conductor The inner wire or rod of a coaxial cable or coaxial tank. It generally carries the signal, and is isolated from the surrounding environment by the grounded OUTER CONDUCTOR.

inorganic Consisting of materials other than carbon compounds; therefore, it is not related to living things.

inorganic electrolyte Any electrolyte that is completely inorganic: containing no compounds of carbon.

in-phase The condition in which alternating or pulsing waves or wave phenomena are in step with each other at all points. Compare OUT-OF-PHASE.

input See INPUT/OUTPUT.

input bias current The bias current required by an operational amplifier.

input capacitance Symbol, C, the input capacitance of a circuit or device, as "seen" from the input terminals. Compare OUTPUT CAPACITANCE.

input choke The first choke in a choke-input filter (i.e., that capacitor electrically nearest the rectifier output electrode).

input clamp current The current from an input when the input is in a state below ground potential. A test for the input clamp diode.

input clamp voltage Symbol, G, The internal conduction of a circuit or device, as "seen" from the input terminals: it is the reciprocal of INPUT RESISTANCE. Compare OUTPUT CONDUCTANCE.

input coupling capacitor Compare INPUT CAPACITOR.

input coupling transformer See INPUT TRANSFORMER.

input current Symbol, I, The current delivered to a circuit or device. 2. Current flowing in the input of a circuit or device.

input device 1. A device, such as an input transformer, that couples energy or information to a circuit or device. Compare OUTPUT DEVICE. 2. A device through which another device receives energy or information.

input equipment Collectively, input devices used with a computer.

input in-phase voltage In an operational amplifier, the error voltage at the input terminals when a feedback loop operates around the amplifier.

input isolation A diode network that provides increased fan-in for a logic circuit. Also see FAN-IN.

input offset current The input offset current required by an operational amplifier.

input offset voltage The potential that has to be applied between the input terminals for a zero output voltage.

input/output control The part of a computer system that coordinates activity between a central processor and peripherals.

input/output module See INPUT/OUTPUT EQUIPMENT.
input/output routine A routine for simplifying the programming of standard input/output equipment operations.

input/output switching The allocation of more than one channel to peripherals for communication with a central processor.

input/output voltage differential At a given load current, the potential difference that is necessary for an integrated circuit to operate according to its output voltage specifications.

input power Symbol, Pt. 1. The power presented to the input terminals of a circuit or device. Also called POWER INPUT. Compare OUTPUT POWER. 2. The operating power of a circuit or device (i.e., the power-supply requirement).

input protection In an integrated circuit, a means of preventing damage to the device from excessive voltage at the input, such as transient spikes or the result of malfunctioning of some other circuit.

input record 1. A computer record of immediate interest that is ready for processing. 2. During a computer program run, a record read into memory from an input device.

input recorder A device that makes a permanent record of the signals or data input to a circuit or system.

input register In a computer, a register that receives data from a peripheral relatively slowly and then passes it on to a central processor at a faster speed (i.e., a functional unit). Also see REGISTER.

input resistance Symbol, R. The internal resistance of a circuit or device, as "seen" from the input terminals. Compare OUTPUT RESISTANCE.

input resistor 1. In a velocity/modeled tube, the resonator in which electron bunching occurs.

input routine A computer program section that manages data transfer and between an external storage medium and a memory input area.

input sensitivity 1. The level of input signal amplitude that results in a certain signal-to-noise ratio at the output of a device. The specified signal-to-noise ratio is usually 10 or 20 dB. 2. The level of input signal in a frequency-modulated device, required to produce a specified amount of noise quieting. The specified level of noise quieting is usually 20 dB. Alternatively, 12-dB SINAD ratio of signal to the level of noise and distortion) can be specified. 3. The minimum level of input voltage required to actuate a logic gate.

input signal The signal current, voltage, and power presented to the input terminals of a circuit or device for processing.

input tank In a double-tuned stage of a transmitter or power generator, the tank circuit in which the input signal is resonated. This is generally the base or gate circuit. Compare OUTPUT TANK.

input terminals Terminals (usually a pair) associated with the input section of a circuit or device. Compare OUTPUT TERMINALS.

input transformer The transformer that delivers signal voltage or power to the input circuit of a network or device. Compare OUTPUT TRANSFORMER.

input uncertainty The combination of all parameters that result in adverse behavior in an operational amplifier.

input unit In a digital computer, the device or circuit that receives information from peripherals.

input voltage 1. Symbol, E, or V. The voltage presented to a circuit or device. Compare OUTPUT VOLTAGE. 2. The voltage across the input leg or electrode of a circuit or device. Compare OUTPUT VOLTAGE. 2.

input voltage drift For an integrated circuit (IC), the time- and temperature-dependent change in output voltage divided by the IC's open-loop voltage gain.

input-voltage offset For a differential amplifier, the input signal voltage at the differential input that results in zero output voltage.

input-voltage range The range, in volts, over which the input voltage can fluctuate in an integrated circuit so that the common-mode rejection ratio (CMRR) specifications are not exceeded.

input winding The signal winding of a magnetic amplifier.

inquiry A programmed request for information stored in a computer.

inquiry display terminal A video display/keypad terminal used to make an inquiry to a computer system, and display the response.

inquiry station A terminal from which an inquiry can be sent to a central computer.

inrush The initial surge of current that occurs when voltage is first applied to the primary winding of a transformer with no load connected.

inscription To convert data to a form on a document that is readable by a character-recognition device, the input data through the use of magnetic ink, for example, insect robot A member of a fleet of robots, all of which are under the control of a single computer.

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instantaneous amplitude instantaneous automatic gain control Abbreviation, IAGC. An automatic gain control whose operation almost immediately follows a change in signal amplitude.

instantaneous automatic volume control Abbreviation, IAVC. An instantaneous automatic gain control system for the immediate control of volume in receivers and audio-frequency amplifiers.

instantaneous companding A form of companding that operates according to the instantaneous amplitude of the input signal.

instantaneous contacts Timer contacts that open or close almost immediately upon application of the control signal.

instantaneous current Symbol, i. i. The value of an alternating or fluctuating current at a particular instant in the cycle.

instantaneous disc A phonograph disc that can be played back immediately after being recorded.

instantaneous frequency The frequency of a signal at a particular moment in time. The instantaneous frequency changes in frequency-modulated or phase-modulated signals.

instantaneous power 1. In a single-sideband, suppressed-carrier signal, the power at a specified instant in time. It varies between zero and the peak envelope power (PEP) of the signal. 2. The output power of an audio amplifier at a specified instant in time.

instantaneous power output The rate of power delivery to a load at a given instant.

instantaneous relay A relay, such as a fully electronic type having no moving parts, that shows virtually no delay in its operation.

instantaneous sample A measurement obtained by instantaneous sampling.

instantaneous sampling The measurement of wave or signal amplitude at a specific moment in time. See, for example, instantaneous CURRENT and instantaneous VOLTAGE.

instantaneous speech power In the output of an audio amplifier, the instantaneous value of power in a speech wave as opposed to that in a sine wave. Also see instantaneous VALUE and SPEECH POWER.

input tank

The term arises because the system functions like an ant hill or beehive, in which the individual machines are " stupid," but the system as a whole is "smart." Such robots often have six legs, like insects. Compare AUTONOMOUS ROBOT.

insert A (usually metallic) bushing that can be molded into a plastic part (or pressed into it after molding is completed) to provide a bearing sleeve or threaded hole.

insert core A ferromagnetic core whose position can be adjusted to vary the inductance of the coil surrounding it.

insert edit 1. A magnetic tape recording, a section of tape on which new audio is recorded over existing audio. 2. The process of recording new audio over existing audio in a defined interval on a magnetic tape.

insertion gain In a circuit or system, the gain resulting from the amplifier inserted into the system; it is usually expressed in decibels. Compare INSERTION LOSS.

insertion loss Loss of energy or gain by placing certain devices or subcircuits (filters, impedance matchers, etc.) in a circuit. It is usually expressed in decibels. Also see INSERTION RESISTANCE.

insertion phase shift The difference in phase produced by a circuit installed in an electrical transmission line.

insertion resistance The resistance of a component or instrument that is introduced into a circuit. Thus, the internal resistance of a microphone becomes an insertion resistance in the circuit in which the meter is connected for current measurement.

inside antenna See INDOOR ANTENNA.

inside antenna ID. Abbreviation. (ID) The innermost diameter of a body or figure having two concentric diameters. Compare OUTSIDE DIAMETER.

inside lead See START LEAD.

inside radiation See INDOOR RADIATION.

inside robber A voice-coil centering device within a loudspeaker.

inst 1. Abbreviation of INSTRUMENT or INSTRUMENTATION. 2. Abbreviation of INSTANT.

instability Inconsistency in the operation of a circuit or device in the parameters of a device, or in an electrical quantity. It can be attributed to a number of causes, including temperature, loading, age, humidity, negative resistance, and radioactivity.

instantaneous tape number An identification number given to a reel of magnetic tape by the processing facility.

instantaneous value, instant. The point in time at which an event occurs, or at which a quantity reaches a particular value.

instantaneous Occurring at a specified moment, or instant, of time.

instantaneous gain amplitude The amplitude, specified in amperes, volts, or watts, of a signal, specified at a particular moment in time.

insect robot • instantaneous speech power 369

The measurement of wave or signal amplitude at a specific moment in time. See, for example, instantaneous CURRENT and instantaneous VOLTAGE.
instantaneous value • instrument transformer

instantaneous value The magnitude of a fluctuating value at a selected instant in time. See, for example, instantaneous CURRENT, instantaneous POWER, instantaneous SPEECH POWER, and instantaneous VOLTAGE. Compare AMPLITUDE, and EFFECTIVE VALUE.

instantaneous voltage Symbol, or or . The value of an alternating or fluctuating voltage at a particular instant in the cycle.

instant loop In electronic security applications, a circuit that actuates an alarm without delay when an intrusion is detected.

instruct In digital computer operations, a set of bits defining an operation. Consists of an operation code specifying the operation to be performed, one or more operands or their addresses, and one or more modifiers or their addresses (to modify the operand or its address).

instrument address In a computer memory, the address of a location containing an instruction.

instrument address register Also called program counter. A register that holds instruction addresses so that the retrieval of the instructions from memory can be controlled during a program run.

instrument code Also called INSTRUCTION SET. The symbols and characters that compose the syntax of a computer programming language.

instrument format In a computer’s basic machine code, a format indicates how characters or digits are used to represent the codes within the machine instruction set.

instrument modification In a computer instruction, a change in the instruction code that makes the computer execute the routine when the modified routine is encountered again.

instrument register A register in a computer containing the address of the current instruction. Also called CONTROL REGISTER (abbreviation, CREG).

instrument set 1. The range of commands that form a programming language. 2. See INSTRUCTION CODE.

instrument storage A memory circuit that stores instructions or programs.

instrument time The time required for a control unit to analyze and implement a computer program.

instrument word In digital computer programming, a word containing the instruction code (type of operation to be performed) and the address part (location of the associated data in storage).

instrument A device for measuring electrical quantities or the performance of electronic equipment. A meter provides a direct indication, other devices, such as a bridge, must be adjusted, the measured quantities being determined from one or more adjustments (sometimes augmented with calculations).

instrument error See INSTRUMENT ERROR.

instrument amplifier Also called INSTRUMENTATION AMPLIFIER. A high-gain, wideband amplifier that increases the sensitivity of an instrument (such as an oscilloscope, meter, or data-logging recorder) and thereby increases the usable range.

instrumentation approach system See INSTRUMENT APPROACH NAVIGATION SYSTEM.

instrumentation planning Planning and providing instruments and instrument systems for the collection and, sometimes, storage and analysis of data.

instrumentation amplifier 1. A form of integrated-circuit voltage amplifier designed for high linearity, high input impedance, and high-common mode rejection. It is intended for use with electronic instruments. 2. See INSTRUMENT AMPLIFIER.

instrument chopper A refined chopper for converting a direct-current (dc) signal to alternating current (ac) for an instrument, such as a volt- meter or recorder.

instrument error Discrepancy in measured quantities resulting from inaccuracy of the instrument used, insertion resistance, environmental factors, operator error, etc.

instrument flight Also called blind flight. Aircraft flight guided by navigational instruments and signals alone. Required when visibility is extremely poor.

instrument fuse A fast-acting, low-current fuse used to protect a sensitive instrument, such as a galvanometer, milliammeter, and/or microammeter.

instrument lamp A light or lamp that illuminates the face of an instrument to facilitate viewing in dark.

instrument landing Also called blind landing. Aircraft landing guided entirely by instruments. A required when visibility is poor and landing is imperative at a given location at a given time.

instrument landing station The radio or radar station in a blind-landing system (see INSTRUMENT LANDING SYSTEM).

instrument landing system Abbreviation, ILS. The complete instrument and signal system (on the ground or in an aircraft) required for an INSTRUMENT LANDING.

instrument multiplier See MULTIPLIER PROBE.

instrument preamplifier An external, sensitive amplifier for nonconductive test that has an internal input amplifier. Also see INSTRUMENT AMPLIFIER.

instrument relay See METER RELAY.

instrument resistance See METER RESISTANCE.

instrument shunt A resistance connected in parallel with a current-measuring instrument, used to increase the range of currents that can be measured.

instrument transformer A transformer used to change the range of an alternating-current meter.

integral number Pertaining to integers (positive or negative whole numbers) or quantities that can be represented by integers.

intractable In automatic control operations, a control action delivering a corrective signal proportional to the time that the controlled quantity has differed from a desired value.

integrating In a relay or switch, a contact that carries current to be switched.

integral horsepower A motor rated at one horsepower.

integral multiple A whole multiple of a number. Thus, a harmonic is an integral multiple of fundamental frequency f, f/2, f/3, , etc.

integral number See INTEGER.

integrate 1. To perform the function of mathematical or electrical INTEGRATION. 2. To construct a circuit on a piece of semiconductor material.

integrated Constructed on a single piece of material, such as a semiconductor wafer.

integrated amplifier An audio-frequency (AF) amplifier having a preamplifier, intermediate amplifier, and output amplifier on a single chassis.

integrated circuit An integrated circuit, a fixed capacitor in which one plate is a layer of material diffused into the substrate, the dielectric is a thin-oxide film grown on the top of the first layer, and the other plate is a metal layer deposited on top of the oxide film.

integrated circuit Abbreviation, IC. A circuit whose components and connection “wires” are made by processing distinct areas of a chip of semiconductor material, such as silicon. Classified according to construction (e.g., monolithic IC, thin-film IC, hybrid IC).

integrated data processing Abbreviation, IDP. The detailed electronic classification, sorting, storage, and mathematical processing of data within a coordinated system of equipment, usually at one location.

integrated electronics The branch of electronics that is concerned with the design of integrated circuits.

integrated resistor See DIFFUSED-LAYER RESIS-TOR.

integrated Services Digital Network Abbreviation, ISDN. A communications network or connection intended primarily for Internet access via telephone lines. Allows significantly higher data speeds than the conventional digital connection. In addition, it is possible to use a digital system, such as a computer, online simultaneously with an analog voice communication.
integrating circuit  See INTEGRATING NETWORK.
integrating galvanometer  A device for measuring the change in electric flux produced in a coil in an electric field. Even very slow changes can be measured.
integrating meter  An instrument whose indication is a summation (usually) of an electrical quantity that is time-dependent. E.g., amper-hour meter and watt-hour meter.
integrating motor  An electric motor that follows the integral of the input signal. The angle of rotation of the motor shaft is equal to the integral of the input waveform.
integrating network  A four-terminal network whose output voltage is proportional to the time integral of the input voltage. It can be a passive resistance-capacitance (RC) circuit or it can use an operational amplifier. Compare DIFFERENTIATING NETWORK.

integrating networks

integrating photometer  A photometer whose reading is the average candlepower at all angles in one plane.
intraduction 1. The process of determining a mathematical function when its derivative is given. 2. The process of finding the value of a function.
intraductor circuit  A circuit with a central processor and peripherals in a computer system.
intraductor groove  On magnetic tape used as a computer storage medium, the interval between recordings, caused by starting and stopping the tape.
intraductor network  A comparatively simple two-way communication. Most personal computing software is of this type, in contrast to programs that carry out all their functions without operator intervention (other than initialization).
intraductor program  A computer program that in which the machine and its operator engage in two-way communication. Most personal computing software is of this type, in contrast to programs that carry out all their functions without operator intervention (other than initialization).
intraductor receiving 1. A part of a computer program or a hardware device that will prevent interference between parts of a computer system. 2. The part of the internal circuit that permits a control word to be transferred to the processor when the CPU issues an instruction.
intraductor space 1. A magnetic field generated when a conductor is connected at one end, the fingers of one contact being interleaved with those of the other. 2. A magnetic field generated when a conductor is connected at one end, the fingers of one contact being interleaved with those of the other.
intraductor stub  A magnetron having a cathode surrounded by a metal tubing that is electrically connected at opposite ends in the common mode of the interference signal. Compare STAND-ALONE PHOTOVOLTAIC SYSTEM.
intraductor transmission  Capacitance between or among electrodes—especially between the plate and control grid of a vacuum tube.
intraductor interface  A photometer whose reading is the average candlepower at all angles in one plane.
intraductor interface routine  A computer program routine that links one system to another.
intraductor interface signal  1. A signal that conveys data or information from one circuit or device on the behavior of another, as in induction. 2. The ability of one component to modify the behavior of another component of the same kind. Example: capacitor interchangeability, transistor interchangeability. Also see INTERCHANGEABILITY.
intraductor interface space  The three-unit interval between video detector and video amplifier stages. Compare SPLIT-SOUND RECORDING.
intraductor interface wave  A periodic wave of high-amplitude and long-amplitude regions.
intraductor interface filter  See INTERFACE FILTER.
intraductor pattern  A regular pattern of high-amplitude and long-amplitude regions, lines, or complicated waveforms, produced when waves of identical frequency from two or more sources combine in varying phase. Such patterns can be observed with sound, radio waves, infrared, visible light, ultraviolet, X-rays, and gamma rays. The phenomenon is of interest in acoustic engineering, the design of radio antenna systems, and in many other fields which may be particularly optical.
intraductor stub  A length of twin-lead feeder cut to appropriate length, connected to the antenna input terminals of a television receiver, and short-circuited at the opposite end. A stub of the correct length reduces the intensity of an interfering signal and, as a waveform, keeps it out of the receiver. Also see STUB.
interference trap  A wavetrap that suppresses interfering signals at the rejection frequency of the trap.

interferometer  1. A radio telescope having two antennas spaced at a distance of many wavelengths, providing greater resolution than a single antenna. Pioneered by M. Ryle of England and J.L. Pawsey of Australia. 2. Any device that displays an INTERFERENCE PATTERN for testing or experimental purposes.

interfix  A method used in information-retrieval systems that eliminates ambiguity in the responses to inquiries by describing the relationship between keywords in a record.

interframe  A method of digital IMAGE COMPRESSION developed by MPEG (Motion Picture Experts Group). It operates by eliminating redundant data from between image frames. Compare INTRAFRAME.

interharmonic beats  Beat notes produced by various combinations of the harmonics of a signal.

interim storage  See TEMPORARY STORAGE.

interior label  On a magnetic tape used as a computer-storage medium, a label recorded at the begin-ning of the tape. Compare EXTERIOR LABEL.

interior protection  1. In electronic security applica-tions, a set of sensors contained entirely within the region to be protected. 2. The installation and operation of a security system whose sensors are all within the region to be protected.

interlace  A video image field produced by INTERLACED SCANNING.

interlace field  A video image field produced by INTERLACED SCANNING.

interlace scan  A display of a video image, the alternate presentation of the even- and odd-line fields. This process increases the obtainable image resolution for a given refresh rate, but can result in “jerkiness” of the image when rapidly moving objects are portrayed.

interlace factor  A number expressing the extent to which two fields are interlaced. Also see INTERLACED SCANNING.

interleaving  In multiprogramming, the inclusion in a program of segments of another program so that both can be effectively executed simultane-ously.

interlock switch  See ELECTRICAL INTERLOCK.

intermediate amplifier  In a cell or battery, the resistance in a circuit or device, as “seen” from the input terminals. Compare INTERNAL OUTPUT IMPEDANCE.

intermediate band  The radio telescope having two antennas spaced at a distance of many wavelengths, providing much greater resolution than a single antenna. Pioneered by M. Ryle of England and J.L. Pawsey of Australia.

intermediate-frequency (IF)  Abbreviation, IF. In a superheterodyne circuit, the frequency of the signal that results from beating the incoming signal with an intermediate frequency signal produced by the local oscillator.

intermediate-frequency amplifier  In a superheterodyne circuit, the fixed-frequency amplifier that amplifies the intermediate-frequency signal. Also see INTERMEDIATE FREQUENCY.

intermediate circuit  Usually, the intermediate-frequency amplifier in a superheterodyne circuit, but sometimes including the second period, as in amateur (hobbyist) activity or infre-quent commercial service. ICAS ratings are higher than continuous commercial service (CCS) ratings. Compare CONTINUOUS COMMERCIAL SERVICE.

intermediate duty  A DUTY CYCLE of less than 100 percent, but greater than zero. Generally, an operating duty cycle of 25 to 50 percent.

intermediate-duty rating  The dissipation or power rating of a component, circuit, or system, under conditions of intermittent use, usually a 25-percent to 50-percent DUTY CYCLE.

intermediate operation  Operation characterized by often long nonoperating intervals. Intermittent operation is often random, whereas on-off opera-tion tends to be regular.

intermittent  A shortwave detector, automatic gain control (AGC), and oscillator stages.

intermittent-frequency converter  See IF CONVERT-ER.

intermittent-frequency interference  Interference from signals at the intermediate frequency of a receiver or instrument.

intermittent-frequency selectivity  The selectivity of an intermediate-frequency (IF) channel alone, usually determined by the characteristics of the bandpass filter(s) in the IF chain.

intermittent-frequency transformer  A coupling transformer designed for use in an intermediate-frequency amplifier.

intermittent-pack drive  In a tape recorder, a speed-reducing drive system in which an interme-diate-wind convey motion from the motor shaft to the tape. Also see SPEED-REDUCING DRIVE SYSTEM.

intermittent pack wheel  See EDDIE WHEEL.

intermittent repeater  In wire telephony, a re-peater inserted into a line or trunk at some point other than the end.

intermittent result  Obtained during a program run from the execution of a subroutine, a result that is used again as an operand in deriving the final result.

intermittent section  Any of the internal sections of a multisection filter. Thus, the middle section of a three-section filter.

intermediate section  Any of the internal sections of a multisec-tion filter. Thus, the middle section of a three-section filter.

intermediate section  Any of the internal sections of a multisec-tion filter. Thus, the middle section of a three-section filter.

intermediate storage  In a computer system, a storage medium for temporarily holding totals or working figures. Also called WORK AREA.

intermediate subcarrier  A modulated or unmodu-lated subcarrier that modulates either a carrier or another intermediate subcarrier.

intermittent  1. Pertaining to a circuit fault, such as an open or short circuit, that occurs some of the time, but not all the time. 2. See INTERMITTENT DIRECT CURRENT.

intermittent-duty rating  The dissipation or power rating of a component, circuit, or system, under conditions of intermittent use, usually a 25-percent to 50-percent DUTY CYCLE.

intermittent operation  Operation characterized by often long nonoperating intervals. Intermittent operation is often random, whereas on-off opera-tion tends to be regular.

intermittent signal  An interrupted signal resulting from the intermittent operation of a circuit or device.

intermodulation  Abbreviation, IM. 1. The (usually undesired) modulation of one signal by another, caused by nonlinear processing of the signals. 2. The heterodyning of components in the sidebands produced by an amplitude-modulated (AM) or single-sideband (SSB) transmitter.

intermodulation distortion  Abbreviation, IMD. 1. The ratio of flux absorbed in one channel by signals in another; it is caused by nonlinear processing of the signals. 2. Pertaining to IF INTERMODULATION.

intermodulation-distortion percentage  Abbreviation, IDP. The degree to which a low-frequency test signal modulates a higher-frequency test sig-nal when both are applied simultaneously (in a prescribed amplitude ratio) to a device under test. IDP = 100b – a/d, where b is the peak-to-peak amplitude of the unmodulated high-frequency wave, a is the peak-to-peak amplitude of the modulated high-frequency wave, and c is the peak-to-peak amplitude of the modulated IF frequency.

intermodulation meter  An instrument for mea-suring percentage of intermodulation distortion (IMD). The instrument combines a dual-frequency signal generator, filter circuits, and percent-of-modulation meter. Also see INTERMODULATION-DISTORTION PERCENTAGE.

intermodulation noise  Electrical noise produced in one channel by signals in another; it is caused by INTERMODULATION.

internal absorbance  The ratio of flux absorbed in a substance to the flux leaving at the entry surface of the substance. The absorbance is not reflected at the exit surface.

internal amplification  A method used in information-retrieval systems that eliminates ambiguity in the responses to inquiries by describing the relationship between keywords in a record.

internal impedance  The impedance in a circuit or device, as “seen” from the input terminals. Compare INTERNAL INPUT IMPEDANCE.

internal input impedance  The impedance in a circuit or device, as “seen” from the input terminals.

internal noise  Electrical noise generated within a circuit, as opposed to that picked up from out-side. Such noise comes from transistors, diodes, integrated circuits, resistors, and any other com-ponent through which current flows.

internal output impedance  The impedance in a circuit or device, as “seen” from the output termi-nals. Compare INTERNAL INPUT IMPEDANCE.

internal resistance  1. The resistance of a device, as opposed to added resistance. See, for example, METRIC RESISTANCE. 2. The resistance of a cell or battery, the equivalent resistance, resulting from imperfect conductivity of the electrolyte and electrodes, which limits the maximum deliverable current.

internal thermal shutdown  In an integrated cir-cuit, the junction temperature of the functional components. 3. The extent to which distortion as defined in 1 occurs. See INTERMODULATION-DISTORTION PERCENTAGE.

intermodulation-distortion percentage  Abbreviation, IDP. The degree to which a low-frequency test signal modulates a higher-frequency test sig-nal when both are applied simultaneously (in a prescribed amplitude ratio) to a device under test. IDP = 100b – a/d, where b is the peak-to-peak amplitude of the unmodulated high-frequency wave, a is the peak-to-peak amplitude of the modulated high-frequency wave, and c is the peak-to-peak amplitude of the modulated IF frequency.

intermodulation meter  An instrument for mea-suring percentage of intermodulation distortion (IMD). The instrument combines a dual-frequency signal generator, filter circuits, and percent-of-modulation meter. Also see INTERMODULATION-DISTORTION PERCENTAGE.

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A unit of inductance, equal to 1.00018 absolute henry.

A unit of energy, equal to 1.00018 absolute joule.

See CONTINENTAL ORTHODOX CHURCH.

A unit of electrical resistance, equal to the ratio between two circuit stages.

A coupling transformer used for the INFORMATION SUPERHIGHWAY.

A device for producing a secondary points, yielding high energy.

A computer program that can convert instructions given in a high-level language (BA- SIC, for example) into the machine language that a computer uses; if it is not resident in the computer's nonvolatile memory, it must be loaded each time the machine is activated.

The transfer of a signal between two circuit stages, such as those of an amplifier. Common forms of interstage coupling include direct coupling, capacitive coupling, transformer coupling, diode coupling, and optoisolator coupling.

A semiconductor diode used between two circuit stages.

A coupling transformer used between two circuit stages. It provides direct current isolation, and also can match purely resistive impedances.

A condition in a digital communications signal, a condition in which a given signal overlaps with one or more other symbols (either immediately preceding it or immediately following it), upsetting the ability of the receiver to decipher signals in certain time intervals. The phenomenon is sometimes a problem in time-division multiplexing—especially at data speeds near the maximum for the system.

A unit of liquid volume, equal to 1.00018 absolute liter.

A device for measuring a continuous range of values between two defined points.

A method of digital IMAGE COMPRESSION that it contains.

The coding of data using only data points, events, or quantities.

A specific period of time, with defined beginning and ending points.

Finding a value that falls between two values listed in a table, indicated by a dial, plotted on a graph, derived by estimate, or given by intermediate calculation. For example, if a linear variable capacitor has a value of 100 pF when its dial is set to 10, and 140 pF when the dial is set to 20, then the capacitance when the dial reads 15 (midway between 10 and 20) can be assumed to be 120 pF (midway between 100 pF and 140 pF). When functions are not linear, interpolation is usually not exact.

The logical AND operation.

A unit of power, equal to 1.00018 absolute watt.

The transfer of a signal between two circuit stages, such as those of an amplifier. Common forms of interstage coupling include direct coupling, capacitive coupling, transformer coupling, diode coupling, and optoisolator coupling.

A unit of liquid volume, equal to 1.00018 absolute liter.

A coupling transformer used between two circuit stages.

A method of digital IMAGE COMPRESSION that it contains.

The coding of data using only data points, events, or quantities.

A specific period of time, with defined beginning and ending points.

A device for operating equipment over a precisely defined time interval.

A device that provides power to an equipment for a precise interval upon application of a simple initiating signal or action. See also INTERVAL-OVERLAP.

The seven-unit interval between edges of code groups in telegraphy. Compare INTERCHARACTER SPACE.

The testing of a device using only data that it contains.

Western Union's private facsimile system.

A method of digital IMAGE COMPRESSION developed by MPEF (Maccou Picture Experts Group) and JPEG (Joint Photographic Experts Group). It operates by eliminating redundant data within image frames. Compare INTERFRAME.

A bipolar transistor with a layer of intrinsic semiconductor between one of its pin junctions.

The number of minority carriers exceeding 10^10 carriers per square centimeter in a semiconductor.

The flow of electron/hole pairs in an intrinsic semiconductor subjected to an electric field.
intrinsic flux A quantity equal to the product of the intrinsic flux density and the cross-sectional area in a magnet.

intrinsic flux density The increased flux density of a magnet in its actual environment, as compared with the flux density resulting from the same magnetizing force in a perfect vacuum.

intrinsic mobility Electron mobility in an intrinsic semiconductor. Also see CARRIER MOBILITY and MOBILITY.

intrinsic Q The value of the Q, also known as the FIGURE OF MERIT, for an unloaded circuit. This value is generally higher than the value when a load is connected to the circuit.

intrinsic semiconductor A semiconductor whose characteristics are identical to those of a pure crystal of the material. In this condition, the semiconductor is nearly an insulator. Example: highly purified germanium or silicon before n- or p-type impurities have been added. Compare EXTRINSIC SEMICONDUCTOR.

intrusion alarm A set of electronic sensors and associated circuitry composing a system that detects and warns of the presence of unauthorized personnel within a specific region.

interruption sensor A sensor (such as a photocell, ultrasonic detector, or capacitive transducer) that responds to a nearby body by delivering an actuating signal to an intrusion alarm.

INV Abbreviation of INVERTER.

inv Abbreviation of INVERSE.

invar A nickel-steel alloy (36% nickel) having a low temperature coefficient of linear expansion (1 ppm/°C). Invar is used in electronic equipment where mechanical distortion resulting from temperature changes must be negligible, and in magnetostrictive circuits (see MAGNETOSTRICTION).

inverse 1. Opposite in nature (e.g., an inverse relation).
2. Of opposite sign (e.g., a negative current or voltage).
3)2. Also called INVERSE CHARGE CHARACTERISTIC.
2. Of opposite sign [e.g., a negative current or voltage].
3. An operation of opposite kind; thus, subtraction is the inverse of addition, and division is the inverse of multiplication.

inverse beta The beta of a transistor operated with the emitter and collector interchanged.

inverse bias See REVERSE BIASE.

inverse characteristics The characteristics of a bipolar transistor when operated with the emitter and collector reversed.

inverse conduction See REVERSE CONDUCTION.

inverse cube law A principle relating the intensity of an effect to the reciprocal of the cube of the distance from the source. The magnetic field around a solenoidal coil of wire obeys this principle.

inverse distance law The inverse-square law applied to the propagation of radio waves, assuming that the waves do not encounter obstacles.

inverse feedback See DEGENERATION.

inverse fourth-power law A rule of propagation for certain complex forms of energy: I = k/d^4, where I is the intensity of the field, d is the distance from the source, and k is a constant.

inverse impedances Impedances (Zn and Zp) that are the reciprocal of another impedance (Zs), satisfying the relationship: ZsZn = ZsZp. Also called RECIPROCAL IMPEDANCES.

inverse leakage The flow of a small static reverse current in semiconductor devices.

inverse-parallel circuit See BACK-TO-BACK CIRCUIT and BACK-TO-BACK CONNECTION.

inverse peak voltage See PEAK INVERSE VOLTAGE.

inverse piezoelectric effect Mechanical movement in a piezoelectric material, caused by application of voltage.

inverse resistance See REVERSE RESISTANCE.

inverse resonant See PARALLEL RESONANCE.

inverse-square law The energy or power intensity of a phenomenon is inversely proportional to the square of the distance from the source. This is often applied to quantitative reasoning about radiant energy, electromagnetic energy, and acoustic energy. Thus, if the distance doubles, the energy or power drops to 1/4 its previous value.

inverse Wiedemann effect See DIRECT WIEDEMANN EFFECT.

inversion 1. A reversal of the normal vertical temperature gradient of the atmosphere, often resulting in long-distance tropospheric radio-wave propagation.
2. Speech scrambling (see SCRAMBLER CIRCUIT).
3. Phase inversion (see PHASE INVERTER).
4. Changing direct current into alternating current, often increasing the voltage (see INVERTER).

inverted amplifier A push-pull, grounded-gate, field-effect-transistor (FET) amplifier.

inverted-L antenna An antenna having a horizontal radiator and a vertical feeder or lead-in attached to one end of the radiator. The entire arrangement resembles an upside-down L. The overall length is generally 3/4 to 5/4 wavelength.

inverted speech See SCRAMBLED SPEECH.

inverter 1. Also called power inverter. A device that converts direct current (dc) into alternating current (ac), often of a much higher voltage (e.g., 12 Vdc into 117 Vac). Also called an INVERTER.
2. In a differential amplifier or operational amplifier, the input circuit that produces a phase reversal between the input and output. Compare NONINVERTING INPUT.

inverting amplifier An amplifier providing a 180° phase shift between input and output. Compare NONINVERTING INPUT.

inverting transponder In a communications satellite, a transponder in which the downlink band is “upside-down” in frequency relative to the uplink band. That is, the highest downlink frequency corresponds to the lowest uplink frequency, and the lowest downlink frequency corresponds to the highest uplink frequency. Compare NONINVERTING TRANSPONDER. See also DOWNLINK, TRANSPONDER, UPLINK.

invisible failure In a computer system, a hardware or software failure whose effect on the system is unnoticeable in a given application. A failure that is invisible in one application might be vividly apparent in some other application.

invister A unipolar semiconductor material, capable of operation at very high frequencies.
involution  

Raising a number to a power: squaring, cubing, etc. Compare EVOLUTION.

inward/outward-dialling  

Also called direct dialing. In a telephone system, a method of dialing in which calls can be made to and from branch exchanges without assistance.

I/O  

Abbreviation of input/output (see INPUT/ OUTPUT).

Io  

Symbol for OUTPUT CURRENT.

iodine  

Symbol I. A nonmetallic element of the halogen family. Atomic number, 53. Atomic weight, 126.905. Also see HALOGEN.

ion  

A charged atom (i.e., one that has gained one or more electrons [a negative ion, or anion] or lost one or more electrons [a positive ion, or cation]).

ion burn  

A spot burned on the screen of a cathode-ray tube by negative ions from the cathode striking a single point on the faceplate with high intensity for long periods.

ion concentration  

1. The number of ions, expressed as a percentage or as a number per unit volume, in a substance. 2. Ionization density in the atmosphere.

ion exchange resins  

Granular resins that contain acid or base groups, and that trade ions with salts in solutions. The resins play a part in the purification of water for various industrial processes.

ionic binding forces  

In a crystal, the binding forces that occur when valence electrons of one atom are joined to those of a neighboring atom whose outer shell they fill.

ionic bond  

In a solid, a bond between atoms, formed as a result of the attraction between oppositely charged ions (ions).

ionic conduction  

Conduction, as in a gas or electrolyte, by ion migration (positive to the cathode, negative to the anode).

ionic crystal  

A lattice whose ionic nature is held together by the electric forces between ions. Also see IONS, IONIC BOND, IONIC CONDUCTION.

ionic current  

Current caused by ion movement in a gas or liquid. Also see ION, IONIZATION, and IONIC CONDUCTION.

ionic semiconductor  

A semiconductor in which the carrier is an ion, as opposed to an electron or hole.

ionic switch  

See ELECTROCHEMICAL SWITCH.

ionization  

1. The loss or gain of one or more electrons by an atom. Also see ANION, CATION, and ION. 2. The formation or existence of significant numbers of ions in a gas, liquid, or solid (e.g., ionization of the upper atmosphere).

ionization chamber  

An enclosure containing a gas and a pair of electrodes between which a high voltage, such as X rays or radioactive particles, passing through the walls of the chamber ionize the gas, creating an ionization current that is proportional to the intensity of the radiation.

ionization density  

The extent to which ionization exists in an ionized layer of the atmosphere.

ionization gauge  

A form of vacuum tube that can be used to measure the hardness of a vacuum. It consists of a cathode, an anode (plate), and a positively charged grid. Plate current flows as a result of ionization of the atoms within the tube. The more nearly perfect the vacuum, the lower the plate current.

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A form of vacuum tube that can be used to measure the hardness of a vacuum. It consists of a cathode, an anode (plate), and a positively charged grid. Plate current flows as a result of ionization of the atoms within the tube. The more nearly perfect the vacuum, the lower the plate current.

ionization current  

1. Current in an ionized gas (such as air). 2. Current flowing in an electrolyte. 3. Current in an ionization chamber. Geiger-Müller tube, or similar gaseous device. 4. In gas tube, current flowing after the ignition potential has been reached. 5. Negative grid current resulting from gassiness in a vacuum tube.

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A form of vacuum tube that can be used to measure the hardness of a vacuum. It consists of a cathode, an anode (plate), and a positively charged grid. Plate current flows as a result of ionization of the atoms within the tube. The more nearly perfect the vacuum, the lower the plate current.

ionization potential  

The voltage at which a substance (especially a gas) ionizes. Also called (for a gas) ignition potential (see BREAKDOWN VOLTAGE).

ionization pressure  

In an ionized gas, the pressure increase resulting from the ionization, as compared with the same volume and mass of gas when not ionized.

ionization resistance  

See CORONA RESISTANCE.

ionization smoke detector  

A device that senses the presence of smoke or other particles as a result of ionization of the upper atmosphere).

ionospheric disturbance  

See IONOSPHERIC STORM.

ionosphere  

1. Any of several ionized regions at specific altitudes above the earth’s surface. These layers cause absorption and refraction of electromagnetic (EM) fields at some radio frequencies. The D layer exists at an altitude of about 30 miles (50 km) and is ordinarily present only on the daytime side of the planet. This layer does not contribute to, and in fact sometimes hinders, wireless communications. The E layer, about 50 miles (80 km) above the surface, also exists mainly during the day, but nighttime ionization is sometimes observed. The E layer can facilitate medium range radio communication at certain frequencies. The uppermost regions are the F1 and F2 layers. The F1 layer, normally present only on the daylight side of the earth, forms at about 125 miles (200 km) altitude; the F2 layer exists at about 500 miles (800 km) more or less around the clock. Sometimes the distinction between the F1 and F2 layers is ignored, and they are spoken of together as the F layer.

ionospheric forecasting  

Predicting ionospheric conditions. Radio propagation data is derived from such predictions.

ionospheric layers  

The respective layers of the ionosphere: D layer (at an altitude of about 30 mi or 50 km), E layer (at an altitude of about 50 mi or 90 km), the F1 layer (at an altitude of about 125 mi or 200 km), and the F2 layer (at an altitude of about 180 mi or 300 km). The F1 layer is generally present only in the daytime.

ionospheric propagation  

Propagation of radio waves by means of reflection or refraction by the ionosphere. Also see HOP; INCIDENT WAVE; IONOSPHERE; MULTIHOP PROPAGATION; REFLECTED WAVE; and SKYWAVE.

ionospheric storm  

Turbulence in the ionosphere, usually accompanied by a magnetic storm and caused by high-speed particles emitted from an eruption on the sun.

ion sensor  

A device whose operation is based on the detection of ions and the delivery of a proportionate voltage. Examples are the Geiger counter, halogen gas leak detector, mass spectrometer, and vacuum gauge.

ion spot  

See ION BURN.

ion trap  

See BENT-GUN CRT.

ion-trap magnet  

A usually double magnet used with a television picture tube to deflect the ion beam away from the screen. This prevents IGN BURN.

I/O  

Port that of a computer providing, via a connector, a path through which data can enter from, or exit to, peripheral equipment.

I  

Abbreviation of PLATE CURRENT. 2. Abbreviation of PEAK CURRENT.

1-phase carrier  

In color television, a carrier separated by 57 degrees from the color subcarrier.

1-picture  

A video image that is coded using only data that it contains.

Ips  

Abbreviation of INCHES PER MINUTE.

Ips  

Abbreviation of INCHES PER SECOND.

IR  

1. The product of current and resistance (see, for example, IR DROP). 2. Abbreviation of INSTRUMENT RESISTANCE. 3. Abbreviation of INPUT/OUTPUT.

I  

Symbol for IODIUM.

I  

Symbol for CURRENT in a resistor.

I  

Symbol for RADIO-FREQUENCY CURRENT.
Iridescence A sparkling, colorful appearance in a material, resulting from refraction, internal reflection, and interference in light waves passing through the substance. It is especially noticeable in quartz and certain gems.

Iridium Symbol Ir. A metallic element of the platinum group. Atomic number, 77. Atomic weight, 192.964. Its deci-
sion upon a receiving surface.


Iron/Constantan thermocouple A thermocouple consisting of a junction between wires or strips of IRON and CONSTANTAN.

Iron core A transformer or choke core made from iron or steel. The core is usually laminated to reduce eddy current loss.

Iron-core IF transformer An intermediate-frequency transformer having a core of powdered iron, a form of iron that has the advantage of high permeability while greatly minimizing eddy currents.

Iron-core transformer A transformer whose coils are wound on a core of laminated iron or steel.

Iron loss Power lost in the iron cores of transformers, inductors, and electrical machinery as a result of eddy currents and hysteresis.

Iron magnet A permanent magnet consisting of magnetized iron or a mixture of iron and nickel.

Iron oxide A compound of iron and oxygen, whose most familiar form is common rust. The several varieties have characteristics that depend on the number of iron and oxygen atoms in the iron-oxygen molecule. See, for example, MAGNETITE and RED OXIDE OF IRON.

Iron pyrites Formula FeS₂. Natural iron sulfide that occurs as bright yellow crystals in its natural state.

Iron-vane meter An alternating-current meter whose movable element, a soft iron vane, carries the pointer and pivots near a similar, stationary vane. The vanes are mounted in a multturn coil of wire. The current flows through the coil, resulting in the resulting magnetic field magnetizing the vanes. Because the magnetic poles of the vanes are identical, they repel each other; the movable vane is deflected (against the torque of returning springs) over an arc proportional to the current, carrying the pointer over the scale.

Irradiance The amount of radiant flux impinging on a unit surface area; it is generally specified in watts per square meter (W/m²).

Irradiation 1. Exposure of a device to radioactivity or X rays. 2. The total radiant power density that is incident upon a receiving surface.

Irrational number A number that cannot be expressed as the quotient of two integers. Its decimal expansion is nonterminating and nonrepeating.

Irregularity 1. The condition of being nonuniform, or rapidly fluctuating, rather than constant. 2. A departure from normal operating conditions. 3. Nonuniformity in a surface. 4. Nonuniform distribution of matter. 5. Nonuniform distribution of data.

Irregular wave A wave disturbance, or the plot of such a disturbance versus time, that has a complex, periodic, repeating nature.

IR viewer A device that allows observation of images at infrared wavelengths. See SNIFFERSCOPE and SNOOPERSCOPE.

ISO Abbreviation for International Standards Organization.

ISO 6960 A standard format for producing CD-ROM (COMPACT DISK READ-ONLY MEMORY) mass storage media for use with computers. It is a part of the YELLOW BOOK scheme.

Isobar 1. An atom whose nucleus has the same weight as that of another atom but differs in atomic number. 2. On a weather map, a line connecting points of equal pressure. Also see BAR. 3. Isochromal phenomena 1. Effects occurring at regular time intervals. 2. Effects of equal duration.

Isochromatic Also orthochromatic. 1. The quality of having or producing natural visible-light hues. 2. Color sensitivity excluding a response to red.

Isochronal See ISOCRONE.

Isochrone On a map, a line connecting points of equal time in radio-signal reception. It is useful in radio-location and radioa-vigation.

Isodose Having identical resonant frequencies or wavelengths.

Isolating diode A diode used (because of its unidirectional conduction) to pass signals in one direction, but block them in the other direction.

Isolating resistor A high-value resistor connected in series with the input circuit of a voltmeter or oscilloscope to protect the instrument from stray pickup. In most voltmeters, this resistor is built into the probe.

Isolating transformer A power transformer, usually having a 1:1 turns ratio, for isolating equipment from direct connection to the power line.

Isolation The arrangement or operation of a circuit so that signals in one portion are not transferred to (nor affect) another portion.

Isolation amplifier See ISOLATING AMPLIFIER.

Isolation diode 1. An in integrated circuit, a reverse-biased diode that is formed in the substrate to prevent cross-coupling and grounds. 2. See ISOLATING DIODE.

Isolation capacitor See ISOLATING CAPACITOR.

Isolation transformer See ISOLATING TRANSFORMER.

Isolator See OPTOELECTRONIC COUPLER.

Isomer A form of molecularly integrated circuit, in which the semiconductor is removed in certain places for the purpose of isolating different parts of the circuit.

Isomagnetic Having equal magnetic intensity.

Isometric Arranged that has the same volumetric number or chemical formula as some other substance, but, because of a difference in the atomic structure, is an entirely different substance. An example is carbon; it can be either graphite (by far the more common form) or diamond.

Isophote On a graph of visible-light intensity, a curve joining points of equal brightness.

Isoplanar An integrated-circuit configuration in which isolating barriers or metal oxides are fabricated among the bipolar elements.
isothermal process A physical or chemical process in which there is no temperature change as other factors vary. Compare ENDOOTHERMIC REACTION and EXOTHERMIC REACTION.

isotope An atom having the same number of protons as another atom, thereby composing the same chemical element, but having a different number of neutrons. Thus, deuterium is an isotope of hydrogen. Some isotopes are radioactive [e.g., carbon 14 (an isotope of the more-common carbon 12)]. The two extra neutrons in carbon 14 make it less stable than carbon 12.

isotopic antenna A theoretically ideal antenna that transmits and/or receives electromagnetic fields equally well, and with 100-percent efficiency, in all directions in three-dimensional free space.

isotropic radiator A theoretically ideal radiating element that transmits electromagnetic fields equally well, and with 100-percent efficiency, in all directions in three-dimensional free space.

I(tov) Symbol for suppressor current.

I(TD) Abbreviation for INITIAL TIME DELAY.

Item 1. Component. 2. Any one of a number of similar or identical components, circuits, or systems.

iteration Repeating a series of arithmetic operations to arrive at a solution to a problem. Computers are commonly programmed to do this thousands, millions, or billions of times. Such a program must include a statement of acceptable accuracy so that it knows when to leave the iteration loop.

iterative impedance In a network consisting of identical, cascaded sections, the input impedance of a section to which the output impedance of the preceding section is made equal.

iterative routine A program or subroutine that provides a solution to a problem by iteration.

iterative transfer constant Symbol, P. A property of ITERATIVE IMPEDANCE networks. If \( I_1 \) is the network input current and \( I_2 \) is the network output current, then \( P = \log(I_1/I_2) \).

ITU Abbreviation for International Telecommunication Union.

ITV 1. Abbreviation for INDUSTRIAL TELEVISION. 2. Abbreviation for INTERACTIVE TELEVISION.

I-type semiconductor See INTRINSIC SEMICONDUCTOR.

I \(_1\) Symbol for current in a reactance.

I \(_2\) Symbol for current in an admittance.

I \(_3\) Symbol for current in an impedance.

-ize A suffix used, with some liberty, to form verbs from nouns. In electronics, this commonly refers to procedures or processes (e.g., to ANODEIZE, ELECTROCIZE, PLASTICIZE, or TRANSISTORIZE).

J 1. Abbreviation for JOULE. 2. Symbol for JACK or CONNECTOR. 3. Symbol for EMISSIVE POWER.

j (operator) The square root of −1; an imaginary number (usually denoted \( j \) in mathematics). As- signed to reactance values depicted on the vertical axis of the resistance-reactance (RX) plane in impedance vector diagrams, and whose currents are 90 degrees out of phase with the current in the reactive part of an alternating-current circuit.

jack A receptacle for a plug. A plug (a male connector) is inserted into a jack (a female connector) to complete a circuit or removed from it to break a circuit.

jack panel A (usually metallic) panel in which a number of jacks are mounted, usually in some order or sequence as denoted by labels.

jack panel

jackscrew In a two-piece connector, a screw for mating or separating the halves of the connector.

Jacob's law A principle concerning the behavior of motors. An electric motor develops maximum power when \( E_o = 2E_{uo} \), where \( E_o \) is the applied voltage and \( E_{uo} \) is the back voltage.

JAES Abbreviation for Journal of the Audio Engineering Society.

jaff Colloquial term for radar jamming that combines electronic and chaff techniques.

jag Distortion caused by temporary loss of syncro- nization between the scanner and recorder in a facsimile system.

jam input 1. A means of setting a logic line to the desired condition by directly applying the desired high or low voltage. 2. A voltage applied to a logic line to force it high or low.

jammer 1. A radio transmitter or station used for the purpose of JAMMING communications be-
tween or among other stations. 2. A radio opera-
tor who engages in the practice of deliberately
jamming communications between or among
other stations.

jamming The deliberate use of countermeasures,
such as malicious transmission of interfering sig-
tals, to obstruct communications.

jamming effectiveness The extent to which JAM-
MING is able to disrupt a service. It can be ex-
pressed quantitatively as the ratio of jamming
signal voltage to jammed signal voltage. It can
also be determined according to the percentage
data that is effectively obliterated.

JAN Abbreviation of JOINT ARMY-NAVY.

jantet A system for point-to-point communication
via meteor-trail forward scatter. It is generally
used at very high frequencies (VHF).

Jansky noise Wideband, high-frequency electromag-
netic noise generated by objects in interstellar
and intergalactic space.

J antenna An end-fed half-wave antenna having a
quarter-wave, parallel-wire matching section. The
antenna, when oriented vertically, resembles the letter J.

JEDAC Acronym for Joint Electronic Device Engineer-
ing Council.

jerk The rate of change of acceleration; the third
derivative of displacement.

JETEC Acronym for Joint Electron Tube Engineer-
ing Council.

jewel bearing A low-friction bearing used in elec-
tronic meters and other sensitive devices. It takes
its name from a jewel pivot (such as a sapphire) in
the groove of which rides the pointed end of a ro-
tating shaft. Also called jeweled bearing or jeweled
jezebel A passive sonobuoy used in military appli-
cations. It detects enemy submarine noises, and
transmits by radio to a monitoring station.

JFFT Abbreviation of function field-effect transistor.

JHHE Abbreviation of JOULE HEAT GRADIENT.

jig A device constructed especially for the purpose
of holding an equipment or circuit board during its
repair.

jitter A (usually small and rapid) fluctuation in a
phenomenon, such as a quantity or wave, be-
cause of noise, mechanical vibration, interfering
signals, or similar internal or external distur-
bances. It is used especially in reference to cathode-ray-tube (CRT) displays.

J/K Abbreviation for joules per kelvin.

J/K metric Abbreviation for joules per kelvin.

J antenna Radiator

Marching section

Coaxial line

J antenna

Janus antenna array (from Janus, an ancient Ro-
man god.) A Doppler-navigation antenna array radiating forward and backward beams.

jar 1. (From Leyden jar) An obsolete unit of capac-

tance equal to 1/900 microfarad.

JASA Abbreviation for Journal of the Acoustical So-
ciety of America.

j-carrier system In carrier-current (twisted/wire-
head) telephony, a point-to-point system that pro-
vides 12 telephone channels at frequencies up to
40 kHz.

JCEPT Abbreviation of Joint Council on Educational
Television.

JCL Abbreviation of job control language.

J-display A radar display having a circular time
base. The transmitted pulse and reflected (target)
pulse are spaced around the circumference; dis-
tances can be measured circumferentially be-
tween them.

JEDEC Acronym for Joint Electronic Device Engineer-
ing Council.

jerking The rate of change of acceleration; the third
derivative of displacement.

JETEC Acronym for Joint Electron Tube Engineer-
ing Council.

jewel bearing A low-friction bearing used in elec-
tronic meters and other sensitive devices. It takes
its name from a jewel pivot (such as a sapphire) in
the groove of which rides the pointed end of a ro-
tating shaft. Also called jeweled bearing or jeweled

jezebel A passive sonobuoy used in military appli-
cations. It detects enemy submarine noises, and
transmits by radio to a monitoring station.

jitter A (usually small and rapid) fluctuation in a
phenomenon, such as a quantity or wave, be-
cause of noise, mechanical vibration, interfering
signals, or similar internal or external distur-
bances. It is used especially in reference to cathode-ray-tube (CRT) displays.

J/K Abbreviation for joules per kelvin.

J/K metric Abbreviation for joules per kelvin.

jig A device constructed especially for the purpose
of holding an equipment or circuit board during its
repair.

jitter A (usually small and rapid) fluctuation in a
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between which voltage is applied. The movable plate(s) is displaced over a distance that is proportional to the potential, against the torque of a return spring.

**Kelvin balance** An apparatus for measuring current or magnetic field. A coil is attached to each end of the beam of a balance, and coils ride dimples between the stationary coils. Current flows through all coils, making one pair attractive and the other repulsive, thus unbalancing the beam. Balance is restored by sliding a weight whose position along a graduated scale indicates the current strength.

**Kelvin contacts** Electrical contacts designed to eliminate the effect of lead resistance on the accuracy of measurement. Two leads run to each test point, one lead carrying the test signal and the other leading directly to the measuring instrument.

**Kelvin double bridge** A special bridge for measuring very low resistance (0.1 ohm or less). The arrangement of the bridge reduces the effects of contact resistance that causes significant error when such low resistances are connected to conventional resistance bridges.

Kendall-Heaviside layer (A.E. Kendall, 1961–1939, Oliver Heaviside, 1850–1925) An early name for, ionized regions in the upper atmosphere. These regions reflect and refract radio waves at certain frequencies. There are several layers at different altitudes. Also see IONOSPHERE and IONONOMIC LAYERS.

**Keraunograph** A meteorological instrument designed for detecting distant electrical storms. In its simplest form, it consists of a galvanometer connected in series with an antenna and ground.

**Keraunophone** A radio-receiving KERAUNOGRAPH.

**Kernel** Inside an electrical conductor, a line along which the magnetic field strength is zero. Generally, this line is near the center of the conductor.

**Kerr cell** A nitrobenzene-filled cell that makes use of the KERR ELECTRO-OPTICAL EFFECT. It can function as an electric light shutter or control.

**Kerr electro-optical effect** The tendency of certain dielectric materials to become double-refracting in an electric field.

**Kerr magneto-optical effect** The tendency of glass and some other solids and liquids to become double-refracting in a magnetic field.

**Kerst induction accelerator** See Betatron.

keV Abbreviation of KiloELECTRONVOLT.

**Kew magnetometer** A special magnetometer used to measure the intensity of the earth's magnetic field, and also the magnetic declination at a given point on the earth's surface. The device is designed for very high accuracy, using magnifying lenses.

1. See DECRYPTION KEY. 2. A projection or pin that guides the insertion of a plug-in component into a holder or socket. 3. A digit or group used to locate or identify a computer record (but not necessarily part of the record). 4. A specialized hand-operated switch used to make and break a circuit repetitively to form the dot and dash signals of Morse code telegraphy. Primarily of historical interest. Used by some amateur radio operators for hobby purposes. 5. Slang for principled or moral.

**keyboard** An array of lettered or numbered, low-torque push buttons, used to enter information into a computer, telegraph, teletypewriter, or automatic control system.

**keyboard computer** A digital computer in which the input device is an electrical keyboard of the typewriter or calculator type.

**keyboard entry** The operation of a keyboard to enter information into a computer for processing.

**keyboard key** A device for automatically sending Morse code using a typewriter-like keyboard, rather than a paddle or straight key. Each key on the keyboard, when pressed, produces the complete character and a space following it. Most keyboard keyers have buffers to allow typing well ahead of the code being sent, with insertion of all the correct spaces. The speed range is usually from about 5 words per minute (wpm) to 60 or 70 wpm, although some keyboard keyers are programmed for speeds over 100 wpm.

**keyboard lockout** A keyboard interlock in a data transmission circuit that prevents data from being transmitted while the transmitter of another station on the same circuit is operating.

**keyboard send-receive unit** A teletypewriter lacking an automatic input device.

**key cabinet** In a telephone system, a facility that shows a subscriber which lines are busy and which lines are open.

**key chip** A chirping sound in a received signal, resulting from slight frequency shift when a radiotelegraph transmitter is keyed. It does not occur with a well-designed transmitter.

**key-click filter** An inductance-capacitance (LC) or resistance-capacitance (RC) filter for smoothing a keying wave to eliminate KEY CLICKS. It functions by optimizing the rise and decay times of the keyed waveform.

**key clicks** Excessive bandwidth of a radiotelegraph signal that can result when a keyed signal has rise and decay times that are too rapid. Produces characteristic clicking or popping sounds, with resulting interference, in receivers tuned to frequencies near that of the transmitted signal. A KEY-CCLICK FILTER can eliminate this.

**keyboard** An automatic device for keying a radiotelegraph transmitter or wire telegraph circuit. The keyer can operate perforated tape, a cymbal, drum, or other similar recording.

**keyboard adapter** A modulated-signal detector that produces a direct-current signal having an amplitude proportional to the audio component of the signal. The adapter provides the keying signal for a frequency-shift exciter in radio facsimile transmission.

**key escrow** A controversial system in which the government is provided with certain components of decryption keys to all communications ciphers, according to laws that would allow the government to eavesdrop on personal communications or transactions after getting a court order. The key components are held in a secure place, that is, in “escrow,” unless and until the necessary court order is obtained. See DECRYPTION KEY.

**keying** 1. The modulation of a carrier by switching it on and off. It is commonly used in radiotelegraphy. 2. The modulation of a carrier by switching its frequency between two defined values. It is also called FREQUENCY-SHIFT KEYING (FSK) and it is used in data transmission. 3. The modulation of a carrier with an audio tone that is switched on and off. The carrier can be modulated via amplitude modulation (AM), frequency modulation (FM), pulse modulation, or any other form that will convey the audio tone. It is occasionally used in radiotelegraphy at very high frequencies (VHF) and above. Also called audio keying. 4. The modulation of a carrier with an audio tone whose frequency is switched between two defined values. The carrier can be modulated via amplitude modulation (AM), frequency modulation (FM), pulse modulation, or any other form that will convey the audio tone. It is commonly used in data transmission. Also called AUDIO FREQUENCY-SHIFT KEYING (AFSK).

**keying chirp** A rapid change in the frequency of a continuous-wave signal, occurring at the beginning of each code element. The AGC acts when the horizontal sync pulse appears; it is inactive between pulses. This prevents unwanted actuation of the AGC by noise transients and picture-signal elements. Also see FREQUENCY-SHIFT KEYING (FSK).

**keying error rate** In data transmission, the ratio of incorrectly keyed signals to the total number of signals keyed.

**keying filter** See KEY-CCLICK FILTER.

**keying frequency** 1. In audio-keyed radiotelegraphy, the audio frequency (tone) of the dot or dash signals (as opposed to the carrier frequency). 2. In radiotelegraphy, the transmission speed is expressed in KEBY WPM. For example, if the R3 WPM, it means that the keyer produced the tone for three seconds per time that a black-line signal occurs while an object is scanned in a facsimile system. **keying monitor** A device or an indicator to listen to the keying of a radiotelegraph transmitter to determine the clamping time.

**keying speed** The speed (in words per minute) of a telegraph or telegraph-radio transmission.
keying transients 1. Transients arising from the keying of a radiotelegraph transmitter or wire telephone circuit. 2. Transients that arise from the repetitive making and breaking of any circuit.

keyless ringing In a telephone system, ringing that begins as soon as the calling plug is put in the appropriate jack on the jack panel.

key pulse In telephone operations, a signaling system in which the desired numbers are entered by pressing corresponding pushbuttons or keys.

key punch A keyboard-operated machine for recording information by perforating a tape or cards.

keyshelf A shelf that supports manually operated telephone switchboard keys.

key station The master (control) station in a communications or control network.

keystoning A form of video image distortion in which the top of the picture is wider than the bottom, or vice versa. Thus, the image area is shaped like a trapezoid, rather than a rectangle.

kg/m² Symbol for KILOGRAMS PER SQUARE METER, the SI unit of density.

k-H layer See REDUNDANT FREE SPACE LAYER.

kHz Abbreviation of KILOHERTZ.

kick 1. To place into sudden operation, as by the quick, forcible closing of a switch or the rapid application of an enabling pulse. 2. See TRIGGER.

kickback 1. The counter EMF that appears across an inductor when current is interrupted. 2. See FLYBACK.

kickpower supply A high-voltage power supply using the flyback principle. See FLYBACK.

knee joint A waveguide coupling used in radar. The joint is flexible, or can consist of an air gap, to allow rotation of the antenna.

Kikuchi lines A characteristic spectral pattern produced by the electrons scattered when an electron beam strikes a crystal.

killer 1. A pulse or other signal used to disable a circuit temporarily (e.g., a blanking pulse). 2. In personal computing, an application of such importance that it alone serves as the motivation for someone to purchase or upgrade a system. Common examples are word processing and online communications.

killer circuit 1. A circuit that disables some function of a system, such as the audio in a television receiver. 2. The blanking circuit in a television receiver. A circuit that prevents responses to side-lobe signals in a repeater or transponder.

Kilo Pronunciation, KEY-loo. Phonetic alphabet code word for the letter K.

kil- Abbreviation, k. A prefix meaning thousand(s). In digital data applications, a prefix meaning 210 (1024) bits. Also see BIT.

kilobit A unit of digital data equal to 210 (1024) bytes. Also see BYTE.

kilocalorie Abbreviation, kcal. A large unit of heat; 1 kcal equals 1000 calories. See CALORIE.

kilocycle Abbreviation, Kc. A unit of radioactivity equal to 3.7 x 1012 disintegrations per second. 1 Kc equals 1000 curies. Also see CURE, MEGACURE, MICROCURIE, and MILLICURE.

kilojoule Abbreviation, J. A unit of high power; 1 kW equals 1000 watts. Also see WATT.

kilowatt-hour Abbreviation, kWh. A unit of high power; 1 kW equals 1000 watts. Also see WATT.

kilowatt-hour Abbreviation, kWh. A common unit of electrical energy; 1 kWh equals 1000 watt-hours, or the equivalent of 1000 watts dissipated for a period of one hour. Also see ENERGY, KILOWATT-POWER, POWER, WATT-HOUR, and Watt-SECOND.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere Apparent Power in an alternating-current circuit; 1 kVA equals 1000 W. Also see POWER.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere active Abbreviation, kVA. A unit of high power; 1 kVA equals 1000 VA. Also see VA.

kilovolt A prefix meaning 1000 volts (kilovolts).

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere active Abbreviation, kVA. A unit of high power; 1 kVA equals 1000 VA. Also see VA.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.

kilovolt-ampere reactive Abbreviation, kVAR. A motorized meter for recording (electrical) power consumption in kilovolt-amperes reactive. It is equal to a reactive power of 1000 watts.

kilovolt-ampere reactive Abbreviation, kVAR. A unit of high power; 1 kVAR equals 1000 var. Also see VAR.
frequencies. It is a dangerous antenna because of electrostatic buildup, a tendency to attract light-ning, the possibility of its breaking loose, and the risk that it might contact utility lines.

**k** Abbreviation of KILOJOULE.

**k-line programming** A computer command by which an artifi-cially intelligent robot can learn as it does a job, so it will have an easier time doing the same job in the future. The robot controller actually learns from the robot’s mistakes.

**Klipsch horn** A loudspeaker that includes a folded, low-frequency horn housed in a corner enclosure.

**km** Abbreviation of KILOMETER.

**k-luge** 1. A crude, useless, or grossly inefficient machine or process. 2. A hastily contrived proto-type of a circuit or device, put together for the purpose of testing a concept, but not intended as a representative of a production unit.

**klydonograph** A device that photographically records the voltage gradient in the presence of an electric field.

**klystron** A microwave tube whose operation is based on the velocity modulation of an electron beam by buncher and cavity reentrant cavities.

**klystron amplifier** A microwave amplifier using a klystron.

**klystron harmonic generator** A frequency-multiplying power amplifier using a klystron. It is used at microwave radio frequencies.

**klystron oscillator** A klystron operated as a self-excited microwave oscillator.

**klystron repeater** A microwave amplifier in which a klystron is inserted in a waveguide boosts the am-pitude of an incoming signal.

**km** Abbreviation of KILOMETER.

**knee** 1. A sharp bend in a response curve for a device, usually indicating the onset of conduction, saturation, cutoff, pinchoff, or limiting action. It applies especially to semiconductor diodes and transistors. 2. The characteristics of a device when it is operated at a point in the vicinity of a sharp bend in its response curve.

**knee noise** Electrical noise generated by rapidly repeating current fluctuations at the knee in a Zero diode.

**knife-edge diffraction** The lessening of atmospheric signal attenuation when the signal passes over a sharp obstacle and is diffracted.

**knife switch** A switch composed of one or more flat blades roughly resembling knife blades, which are slid firmly between the jaws of pinching con-tacts to close a circuit.

**knob** 1. A (usually round and insulated) finger dial for adjusting a variable electronic component, such as a potentiometer, variable capacitor, or rotary switch. 2. A solid round insulator usually having a low diameter to height ratio. 3. A small ball- or rod-shaped electrode or protuberance.

**knocker** A fire-control radar subassembly of syn-chronizing and triggering circuits.

**knocker** An area in a metal box or chassis that is easily removed by tapping or knocking to provide an opening.

**knot** A unit of speed, corresponding to 1 nautical mile per hour. A speed of 1 knot is about 1.15 statute miles per hour; a speed of 1 statute mile per hour is about 0.868 knots. It is used by mariners for specifying speeds at sea, and also occasionally by meteorologists in specifying wind speeds.

**knowledge** The data in a computer and in mass-storage media, accumulated over time and capable of being put to practical use.

**kOhm-OERSTED**

**Kolster decremeter** An absorption wavemeter with a movable scale; it permits measurement of the decrement of a radio wave.

**Kooiman antenna** A unidirectional antenna consisting of stacked full-wave center-fed driven elements, and a reflecting screen.

**Kotner/Killer** Trade name for an acoustically absor-bent object that reduces sound echoes that can occur in enclosed rooms. The name results because the device works best when placed in a corner (where two walls meet).

**Kovar** An alloy of cobalt, iron, and nickel. It is used mostly in glass-to-metal seals because it has characteristics of both kinds of material.

**Kozanowski oscillator** A small, positive-grid vacuum-tube UHF oscillator circuit using two tubes having cylindrical elements, and a pair of parallel-wire tanks.

**Krypton** Symbol for KRYPTON. Atomic number, 36. Atomic weight, 83.80. Krypton is present in trace amounts in the earth’s atmos-phere.

**k** In radar operations, a modified A-scan used in aiming antennas in which two pips are displayed; their relative amplitudes indicate the antenna-aiming error.

**k series** A series of spectral lines for the shortest wavelengths of radiation from the innermost electron shell of a radiating atom.

**R3s** Abbreviation of Keyboard send-receive unit.

**Ru band** A band of microwave frequencies between approximately 12 and 18 GHz.

**Kundt’s law** The index of refraction of a medium does not change continuously with wavelength in the absorption bands.

**Kunde tube** A device used to measure the speed of sound in gases under various conditions. Suspended particles in the gas form standing waves that can be easily seen. Knowing the frequency of the disturbance and the distance between nodes of the standing waves, the speed can be deter-mined. The pressure and density of the gas, as well as temperature and humidity, affect the speed.

**kurchatovium** See RUTHERFORDIUM.

**kV** Abbreviation of KILOVOLT.

**KVA** Abbreviation of REACTIVE KILOVOLT-AMPERE.

**kVAR** Abbreviation of REACTIVE KILOVOLT-AMPERE.

**kVARH** Abbreviation of KILOVAR-HOUR.

**kWh** Abbreviation of KILOWATT-HOUR.
ladder network A network consisting of several L sections in cascade. See L SECTION, 1, 2, 3.

ladder-type attenuator An attenuator consisting of a ladder network equipped with a switching circuit for selecting the output at various sections.

ladder network • lamp driver 397

lambert wave An electromagnetic disturbance that travels along the surface of an object. An example is the surface wave characteristic of low-frequency propagation.

lambert, Symbol Λ. The centimeter-grain-second (cg) unit of luminance, equal to the brightness of an ideal diffuse surface that radiates or reflects light at 1 lumen per square centimeter. The SI (preferred) unit of luminance is the candela per square meter (cd/m²); 1 lambert equals 10⁴ cd/m². Also see CANDELA.

lambert’s law of illumination The illumination of a surface by a point light source is inversely proportional to the square of the distance between the surface and the source. If the surface is not perpendicular to the rays, the illumination is proportional to the cosine of the angle of incidence.

laminated armature An armature for a motor or generator, made of stacked laminations.

laminated contact A switch contact consisting of a number of laminations—each contacting a conducting counterpart.

laminated core A core for a transformer, choke, relay, or similar device, made of stacked laminations.

laminated disk A layered recording disk.

laminated pole A pole within a motor, generator, relay, electromagnet, or similar device, made of stacked laminations.

lamination 1. A relatively thin sheet of metal cut to a required shape to be stacked with other similar sheets to form a laminated core or pole. 2. A relatively thin sheet of plastic that is bonded together and heat-formed with other similar sheets to produce a sheet or piece of desired thickness and strength.

lamp A device for converting electrical energy into visible light. The term includes a number of devices (e.g., arc lamp, fluorescent tube, incandescent lamp, mercury-vapor lamp, and neon bulb).

lamp-bank resistor A makeshift heavy-duty resistor consisting of several incandescent lamps arranged so that they can be switched in various series, parallel, and series-parallel combinations to vary the resistance provided by the filaments.

lampblack Carbon obtained from soot deposited by a smoky flame. The substance is used as the basic material for some resisters.

lamp cord A two-wire insulated cord, used with low-wattage alternating-current appliances at 117 volts. The wire is usually stranded copper equivalent to American Wire Gauge (AWG) #16.

lamp dimmer See DIMMER.

lamp driver A usually single-stage circuit for amplifying a small pulse to drive an indicator lamp.
lamp extractor  A special tool used to insert or extract miniature lamps for electronic equipment.

lamp jack  A receptacle with a spring release that holds a small incandescent bulb. The bulb is removed and replaced by pushing and twisting.

lamp-type expander  A volume expander in which the tungsten filament in an incandescent lamp is replaced by a red-emitting resistor.

lamp-type readout  For counters, calculators, and digital meters, a readout device in which each digit is indicated by a lamp.

LAM  Abbreviation of LOCAL AREA NETWORK.

land 1. The flat, reflective surface between pits on a compact disc (CD). Compare PIT. 2. The thin violin wall between grooves on a phonograph record. 3. A bonding point in a microcircuit. 4. Pertaining to earthbound communications stations.

landing camera  See POLAROID CAMERA.

landing beacon  The aircraft landing-beam transmitter. Also see LANDING BEAM.

landing beam  A highly directional airport radio signal beamed upward to guide aircraft landing during conditions of poor visibility.

landing line  A telephone or telegraph circuit completed with wires.

landmark beacon  Any beacon that is not an airway or airport beacon.

land mobile service  Two-way radio service between a base station and mobile land vehicles, or among mobile land vehicles.

land mobile station  A radio station aboard a mobile, earthbound vehicle.

land return  Ground reflection of radar signals back to the transmitter.

land station  A fixed ground station.

Langmuir ion  An electrically charged particle, such as a grain of dust or droplet of water, resulting from the accumulation of ions.

Langmuir dark space  In a luminous gas discharge, the dark region around a negatively charged probe inserted into the positive column. Compare CROOKES' DARK SPACE.

Langmuir's law  See CHILDS' LAW.

language  In digital-computer operations, any one of the detailed systems for representing data, instructions, and procedures through the use of symbols and symbol sequences. See MACHINE LANGUAGE, ASSEMBLY LANGUAGE, COBOL, FORTRAN, and BASIC.

language laboratory  An electronic contribution to the teaching and learning of languages. It consists of recordings in a language being studied and all the equipment associated with recording, playback, and monitoring. Students listen to the speech of experts in the language record, listen to, and later erase their own utterances in the language.

language translation 1. The conversion of statements in one computer language to equivalent statements in another. 2. The conversion of one written natural language into another (e.g., French to Russian) by means of a computer program.

language translator 1. An assembly program, compiler, or other routine used for translation between computer languages. 2. A high-level program that allows a computer to translate one written natural language into another (e.g., Chinese to Italian).

l. See INVERTED-L ANTENNA.

lantaren battery  A moderate-sized electrochemical battery usually rated at 6 volts. Derived its name from its original use as a power source for portable lamps. One type has spring contacts on the top. Another type has thumbcrew terminals. The non-rechargeable battery consists of 4 zinc-carbon or alkaline cells. Some rechargeable sets are rechargeable, consisting of nickel-cadmium (NiCd) or nickel-metal-hydride (NiMH) cells. This type of battery can provide enough energy to operate a low-power radio transceiver. Two units connected in series, or four units in series-parallel, make a 12-volt battery that can power a small portable Citizen Band (CB) or amateur radio station.


large-signal analysis  The rigorous study of circuits and devices that process large signals.

large-signal component 1. A coefficient or parameter such as amplification, transconductance, or dynamic resistance, measured under conditions of large-signal operation. Compare SMALL-SIGNAL.

large-signal component 2. A relatively high-amplitude signal that traverses so large a part of the operating characteristic of a device that nonlinear portions of the characteristic are usually encountered. Compare SMALL SIGNAL.

large-signal equivalent circuit  For a given transistor circuit, the equivalent circuit at high signal levels (i.e., at amplitudes approaching saturation and cutoff levels). Also see EQUIVALENT CIRCUIT.

large-signal equivalent circuit 2. A device designed for operation at high signal levels.

large-signal equivalent circuit 3. A form of assemblage, transconductance, or dynamic resistance, measured under conditions of large-signal operation. Also see LARGE SIGNAL and LARGE-SIGNAL EQUIVALENT CIRCUIT.

large-signal equivalent circuit 4. A device designed for operation at high signal levels.

large-signal equivalent circuit 5. A coefficient or parameter such as amplification, transconductance, or dynamic resistance, measured under conditions of large-signal operation. Compare SMALL-SIGNAL.

large-signal operation  The use of a circuit or device at signal levels sufficiently high so that nonlinear portions of the characteristic are usually encountered. Compare SMALL-SIGNAL OPERATION.

large-signal transistor  See POWER TRANSISTOR.

large-signal voltage gain  In an integrated-circuit amplifier, the voltage gain under open-loop conditions, determined as the difference in the output voltage divided by the difference in the input voltage. It is usually specified in volts per millivolt or volts per microvolt.

Larmor orbit  The path followed by a charged particle in a constant magnetic field. Because of interaction between the external field and the field generated by the particle, the charged particle travels in a circular path.

laryngoscope  See THROAT MICROPHONE.

LASCR  Abbreviation of LIGHT-ACTIVATED SILICON CONTROLLED RECTIFIER.

LASCS  Abbreviation of LIGHT-ACTIVATED SILICON-CONTROLLED SWITCH.

laser  To emit coherent electromagnetic energy in the visible-light spectrum. See LASER.

laser acronym  For light amplification by stimulated emission of radiation. A device that produces coherent radiation in the visible-light range. That is, between 750 and 390 nanometers (one nanometer is 10−9 meter). Some devices that produce coherent radiation in the infrared, ultraviolet, or X-ray parts of the spectrum are also referred to as lasers. Lasers can be either continuous or pulsed, and are characterized by coherent, monochromatic emissions. The peak intensity ranges from a few microwatts to many megawatts.
laser disk A method of reproducing sound in which a laser is used to recover the sound from a compact disk.
laser eye surgery A method of repairing the retina of the eye without cutting the eyeball, using laser beams to push loose retina tissue back into place.
laser gun A colloquial term for a weapon that makes use of a laser as a device of destruction.
laser optical videodisc system A system in which a low-powered laser reads audio and video information from a videodisc and delivers it to a television receiver.
laser ranger A radar-like device using intense light instead of microwaves.
laser show A three-dimensional, midair display having motion, made by using lasers in various combinations.
laser surgery The application of a laser in medicine for the purpose of assisting in, or actually performing, operations on human subjects.
laser welding Welding (especially of tiny pieces) with heat produced by a laser beam.
lassing The emission of coherent electromagnetic energy in the visible-light spectrum. See LASER.
latt. Abbreviation of LATITUDE.
latch 1. A feedback loop in a symmetrical digital circuit, such as a flip-flop, used to maintain a given state. 2. A simple logic circuit storage element that consists of two gates as a unit. 3. To maintain a closed (energized) state in a pair of relays. 4. A contact that is controlled by the movement of another contact during the relay's operation.
law 1. The time taken by a digital computer to deliver information from its memory. 2. In a serial storage system, the access time less the word time.
law of heredity See LAW OF CHARGES.
law of inverse squares See LAW OF INDUCTION.
law of reciprocity See C这款车. 
law of natural growth See EXPONENTIAL GROWTH.
law of natural decay See EXPONENTIAL DECREASE.
law of nature See LAW OF NATURE.
law of normal distribution See LAW OF NATURE.
law of normal growth See LAW OF GROWTH.
law of octals Chemical activity occurs between two atoms lacking valence electrons, and continues until the requirement of eight electrons is satisfied for all but the first orbit, where only two electrons are required. Of interest in the study of semiconductors.
law of radiation See QUANTUM THEORY.
law of reflection For a ray of energy striking a smooth reflective surface, the angle of reflection is equal to the angle of incidence, with respect to a plane tangent to the surface at the point of incidence.
law of thermodynamics See CIRCUIT.
layer 1. A complete coil winding consisting of turns laid side by side (not on top of each other). 2. In a semiconductor device, a region having unique electrical properties (e.g., n-layer). 3. A region of the ionosphere. See LAYERS.
layer 1. A coil winding consisting of adjacent turns on the reel. If severe, this transfer can cause drop-in or drop-out in a computer. In audio applications, it can sometimes be heard as a delayed echo or a faint sound occurring just prior to the actual recorded sound.
layer winding A coil winding in which the turns are arranged in two or more concentric layers.
layersound coil An inductor wound in layers, one on top of the other. Also see LAYER. 1. Compare BAND. 2. See BAND.
laurel The arrangement of components on a chassis, printed circuit board, or panel.
lazy-H antenna An antenna consisting of two vertically stacked collinear elements, producing both horizontal and vertical directivity.
lb Abbreviation of LIBERATION, also, Lb (preferred).
lb Abbreviation of POUND.
band A radio-frequency band extending from 390 MHz to 1.55 GHz. For subdivisions of this band, see Ls, BAND, Ls BAND, Lz, BAND, Ls, BAND, Lz, BAND, Ls, BAND, Lz, BAND, Ls, BAND, Lz, BAND, Lz, BAND, Ls, BAND, Lz, BAND, and Lz, BAND.
lc A. Abbreviation of LIQUID CRYSTAL, also abbreviated as. 2. Abbreviation of INDUCTANCE-CAPACITANCE. 3. Symbol for LC CONSTANT.
lead-acid battery  A set of two or more lead-acid cells connected in series, usually housed in a common enclosure. Some batteries of this type, notably automotive batteries, are made from sets of lead-acid cells having a free-floating liquid acid. Other cells have a restrained "pasted" electrolyte. These batteries are popular in consumer electronic devices that require a moderate amount of current. They are also used in uninterruptible power supplies (UPSs) for personal computers. See LEAD-ACID CELL.

lead-acid cell  A rechargeable electrochemical having an electrolyte of sulfuric acid. The electrodes are lead (negative) and lead dioxide (positive). Produces about 1.5 volts under no-load conditions when fully charged. A large cell of this type can store several tens of ampere-hours. Smaller units have less capacity but more versatility. Their main advantage is reasonable cost, considering that they can be charged and discharged many times.

lead-in wire  1. A single wire, used as a feed line for a shortwave receiving antenna. 2. The feed line for a television receiving antenna. 3. A wire feed-in lead from a telegraph key to a radio. 4. A wire used for a transmission in or out of a measuring instrument.

lead-in • least-significant digit

lead-in • lead frame  In a telephone system, a carrier having a frequency between approximately 68 kHz and 10 MHz. It can be used in wire-transmission or radio links.

lead • lead frame  A section of the L BAND extending from 465 MHz to 510 MHz.

lead • lead frame  Abbreviation, LC. The product of the inductance and capacitance required for resonance at a given frequency.

lead • lead frame  Abbreviation of INDUCTANCE-CAPACITANCE BRIDGE.

lead • lead frame  In radar, a phase-shift circuit containing series capacitance and shunt resistance; it produces a leading phase shift. Compare LAG NETWORK.

lead • lead frame  A lead-sulfide photocell used as a light-sensitive material in some photoconductive cells.

lead • lead frame  A synthetic piezoelectric lead zirconate titanate crystal used as an electrical insulator.

lead • lead frame  The zero-signal current flowing through the primary of a transformer.

lead • lead frame  Collectively, magnetic lines of flux around the primary and secondary of a transformer.

lead • lead frame  In a digital meter, the inductive reactance caused by leakage inductance in the primary or secondary circuit of a transformer.

lead • lead frame  Descriptive of an insulating material, measured in siemens. It is equal to the reciprocal of the leakage resistance in ohms.

lead • lead frame  Descriptive of a capacitor in which the dielectric is not a perfect insulator. 2. Descriptive of imperfect shielding in a coaxial transmission line. It can also refer to a waveguide with imperfect shielding.

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lead • lead frame  In radar, a phasing process that eliminates false echoes resulting from the signals of other radar sets.

lead • lead frame  A communication circuit reserved exclusively for a specific user.

lead • lead frame  Abbreviation, LSB. The digit having the lowest place value in a binary number.

lead • lead frame  Abbreviation, L. The number in a digit that is at the extreme right (i.e., the one having the lowest place value).
least upper bound The smallest value of a parameter that can be obtained without changing some characteristic of the circuit, program or system.

Lecher frame A stubby assemblage of LECHER WIRES.

Lecher lines See LECHER WIRES.

Lecher wires A circuit segment consisting of two parallel wires or rods joined by a coupling loop on one end, the other end being open. A short-circuiting bar is moved along the wires to vary the effective length of the circuit. Radio-frequency energy is inductively coupled into the system through the loop, and the bar is slid along to various response points, as indicated by a meter or lamp coupled to the wires. The frequency can be determined by measuring the distance between adjacent response points. It is used at very high frequencies (VHF), ultra-high frequencies (UHF), and microwave frequencies. Also called Lecher frame and Lecher wires.

lepartagne cell See DRY CELL 1.

LED See LIGHT-EMITTING DIODE.

LED phototransistor A phototransistor that is optoelectronic in which the light source is a light-emitting diode and the light-sensitive component is a phototransistor.

LEDE Abbreviation for LINE TYPE, OSCILLATOR.

LEF See LIGHT-EMITTING FILM.

left-hand lay See DIRECTION OF LAY.

left-hand motor rule See FLEMING'S LEFT-HAND RULE.

left-hand polarized wave See COUNTERCLOCKWISE-POLARIZED WAVE.

left-hand taper A potentiometer or rheostat taper in which most of the resistance is in the counterclockwise half of rotation as viewed from the front.

left justified An item of data that occupies consecutive locations, starting at the left-hand end of its area; empty locations might appear consecutively at the right-hand end if the item needs fewer positions than have been provided.

left shift A shift operation in which the digits of a word are displaced to the left; the effect is multiplication in an arithmetic shift.

level 1. Any one of the three main branches of a circuit or network; also called ARM or BRANCH. 2. In a computer program, a path in a routine or subroutine.

level-0 security In communications, the implementation of security measures such that the circuit is protected to the extent of a typical hard-wired link. The encryption is anticipated to be unbreakable for at least 12 months, and preferably for 24 months or more. The technology is updated at least every 12 months, and preferably every 6 months.

level-1 security Also called wire-equivalent security in communications. In communications, the implementation of security measures such that the circuit is protected to the extent of a typical hard-wired link. The encryption is anticipated to be unbreakable for at least 12 months, and preferably for 24 months or more. The technology is updated at least every 12 months, and preferably every 6 months.

level-2 security Also called commercial-level security. In communications, the implementation of security measures such that the circuit is deemed safe for ordinary commercial transactions. The encryption is anticipated to be of such a nature that engineers believe it would take a hacker at least 10 years, and preferably 20 years or more, to break the cipher. The technology should be updated at least every 10 years, but preferably every 3 to 5 years, and more often if possible.

level-3 security Also called mil-spec security. In communications, the implementation of security involving the most sophisticated forms of encryption and personnel restriction that a government can muster.

level control 1. A functional plateau or echelon.

level-0 security • life 405 level-2 security • life 405

level clipper See CLIPPER.

level comparator 1. An automatic gain control (AGC) that effectively reduces amplitude variations in a received signal. 2. An automatic gain control in telegraph receiving equipment.

level controller The adjustment of amplitude or threshold. 1. A potentiometer or other variable component for adjusting the amplitude or threshold of a quantity.

level indicator See VOLUME INDICATOR.

level meter See CLIPPER.

level-triggered flip-flop A flip-flop that responds to voltage levels, rather than to the frequency of an input signal.

lever switch 1. A switch designed for rapid making and breaking of a circuit. 2. A radiotelegraph key.

Lewis antenna A form of antenna used at ultra-high and microwave frequencies. It resembles a loop supported on a post and powered by a current generated by a circuit breaker during a short-circuit.

Leyden jar See LEYDEN JAR.

Leyden jar [Leyden, Holland (also Leiden), site of the invention in 1745 by Peiter van Musschenbroek, 1692-1761.] The first practical capacitor.

Leyden jar See LEYDEN JAR.

Leyden vial See LEYDEN JAR.

L.H.D. Abbreviation of LOAD/HOLD/DUMP.

library A computer program controlling a DATABASE.

LIFO See ELL.

L.J. Symbol for LITHIUM.

L.L.B. See LAW LIBRARY.

L.M.S. See LECHER WIRES.

L.P. See LIGHT-DETECTOR FACING.

Lászlo B. See LÁSZLÓ BONE.

least upper bound • life 405

level-0 security • life 405

level-2 security • life 405

level-3 security • life 405

level control 1 • life 405

level comparator 1 • life 405

level controller 1 • life 405

level indicator 1 • life 405

level meter 1 • life 405

level-triggered flip-flop 1 • life 405

lever switch 1 • life 405

Lewis antenna 1 • life 405

Leyden jar 1 • life 405

L.H.D. 1 • life 405

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lifter A device in a magnetic tape recorder that removes the tape from the recording and playback heads under fast-forward and rewind conditions.

light Visible electromagnetic radiation occurring in the wavelength band of about 750 nanometers (red light) to 380 nanometers (violet light) included sometimes in the category of light are infrared and ultraviolet rays.

light-activated silicon-controlled rectifier Abbreviation, LASCRI. A silicon-controlled rectifier that functions both as a phototransistor and a high-duty bistable electronic switch, allowing high currents to be switched by means of a light beam.

light-activated silicon-controlled switch Abbreviation, LASCXS. A pnpn device that acts simultaneously as a photocell and electronic switch.

light adaption 1. The process whereby the eye adjusts itself to an increase or decrease in illumination. 2. Similar action in photoelectric devices.

light amplifier A solid-state amplifier using an input photoluminescent cell and an output photocell, or some similar pair of components. The device is essentially an optoelectronic coupler with gain.

light-beam communication A system of communication in which a beam of light between transmitting and receiving stations is modulated or interrupted to convey intelligence. A laser is commonly used because of its very narrow divergence, allowing maximum communication range.

light-beam meter An electric meter using a light-beam pointer.

light-beam pointer A slender beam of light that replaces the pointer in a moving-coil meter. The light beam comes from a small incandescent lamp and is reflected by a mirror attached to the coil. When the coil moves, a spot of light moves over the scale of the meter.

light-beam receiver The receiver in a light-beam communication system.

light-beam recorder A graphic recorder using a light-beam pointer. In this device, a small spot of light traces a pattern on moving photographic film, which is subsequently developed to produce a permanent record.

light-beam transmitter The transmitter in a light-beam communication system.

light cable A cable, consisting of numerous thin optical fibers, through which light can be transmitted for communication or control purposes. See, for example: LIGHT-WAVE TELEPHONE.

light changer A device that modulates a light beam by interrupting it repetitively.

light detection and ranging Acronym, ladar. A navigation and surveillance system in which laser light scans in a manner similar to that of RADAR.

light dimmer See DIMMER.

lighted pushbutton A pushbutton switch containing a light-emitting film that glows to show when the switch is on. Also called illuminated pushbutton.

light-emitting diode Abbreviation, LED. A semiconductor device that emits visible light when forward biased. Also see LASER DIODE.

light-emitting film A thin phosphor film that comes luminescent when a high-frequency voltage is applied across its surface. Also see ELECTROLUMINESCENCE and ELECTROLUMINESCENT CELL.

light flasher An electronic circuit or simple automatic flasher switch for flashing a lamp at regular intervals.

light flicker See LOAD FLICKER.

light hood See HOOD.

light-induced electricity See PHOTOELECTRICITY.

light load A load that is a fraction of the usual value for a given application. That is, its resistance or impedance is several times higher than normal.

light meter An electronic instrument for measuring the intensity of light. It generally consists of a photodiode, a battery, and a direct-current microammeter connected in series. A direct-current amplifier can be used to increase the sensitivity.

light microsecond A unit of electrical distance; the distance that light, or any electromagnetic disturbance, travels in free space in 1 microsecond. Approximately equal to 300 meters.

light modulation Variation of the instantaneous brightness of a visible light beam in synchronization with the instantaneous amplitude of a modulating signal. Also see LIGHT MODULATOR.

light modulator A device with which a beam of light can be modulated by an electrical signal.

light negative Pertaining to negative photoductivity, the decrease in conductivity of a photosensitive material under illumination. Compare LIGHT POSITIVE.

lighting The discharge that occurs between positive and negative poles in the atmosphere. Common in and near areas where heavy rainfall is occurring. It also can occur in snow storms, in sand storms, and over erupting volcanoes. Generally, the negative pole is in a cloud and the positive pole is at the surface of the earth, resulting in a flow of electrons from cloud to ground. Some lightning occurs as a flow of electrons from ground to cloud, or between two clouds. Such discharges sometimes attain current levels of millions of amperes. It is not a total guarantee of protection, however.

lighting arrester A device that bypasses high-voltage pulses from most nearby lightning discharges to the earth, helping to protect electronic equipment connected to an outdoor antenna or power line. It is used as an input device in some computers and terminals.

lightning arrester 1. A device containing a tiny photosensor in its tip. The tip of the light pen is touched to the screen of a cathode-ray tube to sense the beam when it passes the spot of contact. It is used as an input device in some computers and terminals.

lightning strike The discharge that occurs with lightning. The peak current is typically several tens of thousands of amperes, but in some cases can exceed 1,000,000 amperes. A stroke can consist of one discharge or several individual discharges in rapid succession.

lightning switch See GROUND SWITCH.

light-operated relay See PHOTOELECTRIC RELAY.

light-operated switch A PHOTOELECTRIC RELAY, or a switch operated by such a relay.

light pen A probe containing a tiny photosensor in its tip. The tip of the light pen is touched to the screen of a cathode-ray tube to sense the beam when it passes the spot of contact. It is used as an input device in some computers and terminals.

light pipe 1. An OPTICAL FIBER. 2. A cable consisting of numerous optical fibers in a bundle. See FIBEROPTICS.

light positive Pertaining to positive photoductivity, when the conductivity of a photosensitive material increases under illumination. Compare LIGHT NEGATIVE.

light quantum See PHOTON.

light ray A thin beam of light. Theoretically, a ray emerges from a point source (i.e., it has no width). Light receivers See LIGHT-HEAM RECEIVER.

light relay A photoelectric device that operates a relay, according to fluctuations in the intensity of a light beam.

light-sensitive cathode Also called photocathode. A cathode that is completely covered with a photosensitive substance.

light-sensitive diode A semiconductor diode usable as a photoconductive cell. Such diodes are available as both junction and point-contact types.

light-sensitive material A photoconductive or photosensitive substance.

light-sensitive resistor See PHOTOCONDUCTIVE CELL.

light sensor 1. A light-sensitive device, such as a photocell, photodiode, phototransistor, or...
**light source** Any generator of light. Under some conditions, the source is regarded as a point.

**light spectrum** See ELECTROMAGNETIC THEORY OF LIGHT.

**light-spot scanner** Also called flying-spot scanner. A television camera using (as a source of illumination) a spot of light that scans what is to be televised.

**light transmitter** See LIGHT-HEAM TRANSMITTER.

**light valve** 1. An electromagnetic device for varying the intensity of light passing through its adjustable aperture. 2. See KERR CELL.

**light-wave telephony** Telecommunication by means of modulated light transmission, usually through an OPTICAL FIBER.

**light-year** Abbreviation, ly. Pertaining to astronomy, a unit of distance equal to the distance traveled by light in one year in a vacuum: 9.460 55 × 1012 meters (5.878 × 1012 miles).

**likelihood** In probability and statistics, the chance that an event will occur or that an outcome will be realized. Also see PROBABILITY. 1. 2. 3.

**lim** Abbreviation of LIMIT.

**lima** Pronunciation, LEE-muh. Phonetic alphabet code word for the letter L.

**limen** A unit that has been proposed as the minimum audible change in frequency that can be detected by at least half of a group of listeners.

**limit** 1. The lowest or highest frequency in a band. 2. In mathematics, a fixed value that a variable approaches. 3. The upper and lower extremes in the performance range of a device or system.

**limit bridge** A bridge used to check a component (e.g., resistance, capacitance, or inductance) in terms of the tolerance limits, rather than the nominal (named) value, of that component. Also see LIMITER. 1. 2. 3.

**limited integrator** A circuit that integrates two input signals until the corresponding output signal exceeds a certain limit.

**limited stability** A characteristic of a circuit or system, wherein given only the input signal and applied voltages are within certain maximum and minimum limits.

**limiter** A device whose output signal amplitude remains at some predetermined level, despite wide variations in input amplitude.

**limiting** The restriction of the maximum peak amplitude of a signal to a designated level.

**limiting error** The anticipated maximum value of the absolute error in a computation.

**limiting resistor** See CURRENT-LIMITING RESISTOR.

**limiting resolution** As a measure of video image resolution, the maximum number of lines for picture height that can be discriminated on a test chart.

**limit switch** A switch that is actuated when a monitored quantity (e.g., current, voltage, or illumination) reaches the limit of its range.

**line** 1. A wire, cable, or waveguide, along which electrical or electromagnetic energy travels from one defined place to another. 2. One lengthwise path in which a force, such as electricity or magnetism, is evidenced. Such a line of flux has theoretically zero width.

**line advance** 1. The physical separation between the centers of adjacent scanning lines in a television system. 2. Line feed in a data transmission system.

**line amplifier** An amplifier in a telephone line or similar channel, or one feeding such a line from the input end.

**linear** 1. In a straight line. 2. In the manner of a straight line. Thus, linear response is indicated when one quantity varies directly with another; the graph of this response is a straight line (i.e., one of constant slope). 3. The characteristic of a signal that is a replica of another (e.g., an amplifier output signal of the same waveform as that of the input signal). 4. A mathematical or physical relationship in which a change in one quantity (the independent variable) is directly proportional to a change in another quantity (the dependent variable). See LINEAR FUNCTION.

**linear amplifier** 1. An amplifier for which a linear relationship exists between input and output parameters (e.g., a high-fidelity audio amplifier). 2. A class-AB radio-frequency power amplifier that does not distort the envelope of an amplitude-modulated (AM) or single-sideband (SSB) signal. It is commonly used by amateur radio operators.

**linear array** A directional antenna having equally spaced, in-line elements.

**linear circuit** 1. A circuit whose output is a faithful reproduction of the input. See LINEAR AMPLIFIER, 2. LINEAR OSCILLATOR, 3. LINEAR RESPONSE, 1, 2, 3, and LINEAR TAPER. 2. In a cathode-ray-tube image, absence of compression or stretching or any performance range or value range.

**linear differential transformer** A device that converts the physical position of an object into an output voltage or current. The voltage or current is directly proportional to the displacement.

**linear distortion** Amplitude distortion in which the output and input signal envelopes are proportional (in the absence of spurious frequencies).

**linear equation** See FIRST-DEGREE EQUATION.

**linear function** 1. In Cartesian two-space, a function of the form y = mx + b, where the coordinates (any real number) and y, where the coordinates (any real number) and b is the point on the y-axis at which the graph crosses the y-axis. Any function in any number of dimensions whose graph appears as a straight line in the Cartesian system of coordinates.

**linear increment** A switch that is actuated when a monitored quantity (e.g., current, voltage, or illumination) reaches the limit of its range.

**linear integrator** A device for integrating the output of a parallel system. See LINEAR INTEGRATED CIRCUIT.

**linear integrator** An integrated circuit designed for analog operations (such as signal amplification, oscillation, nondigital regulation, analog instrumentation, and similar applications). Compare DIGITAL INTEGRATED CIRCUIT.

**linearity** 1. The degree to which performance or response approaches the condition of being linear, expressed in dB or mV per millimeter. Also see LINEAR AMPLIFIER, 1. LINEAR CIRCUIT, 2. LINEAR OSCILLATOR, 3. LINEAR RESPONSE, 1, 2, 3, and LINEAR TAPER. 2. In a cathode-ray-tube image, absence of compression or stretching of any portion of the image, that is, an undistorted reproduction.

**linearity control** In a cathode-ray-tube display, the potentiometer used to correct image linearity.

**linearity error** The difference between a theoretically linear function and the actual function, as observed under experimental conditions.

**line modulation** 1. Modulation in which the instantaneous amplitude of the input signal is directly proportional to the instantaneous amplitude of the output signal. 2. Modulation in which the instantaneous amplitude of the input signal is inversely proportional to the instantaneous amplitude of the output signal. 3. Modulation in which the instantaneous amplitude of the input signal is directly proportional to the frequency or phase deviation of the output signal.

**line motor** A motor in which the fixed and rotor are parallel and straight.

**line oscillator** 1. An oscillator whose alternating current output amplitude varies linearly with its direct-current input. 2. A line-type oscillator.

**line programming** A method of determining the optimum value for a certain set of linear equations. Generally, this is done by finding the point on a plane space closest to some point not on the plane.

**linear quantizing** A method of quantizing in which all of the intervals are of equal size or duration. An example is a linear analog-to-digital converter circuit.

**linear reflex detector** See INFINITE-IMPEDANCE DETECTOR.

**linear response** 1. A response in which the value of the dependent variable is equal or directly proportional to the value of the independent variable. Thus, the graph of the response function is a straight line over the range of existing values. Compare LOGARITHMIC RESPONSE, 1 and SQUARE-LAW RESPONSE, 2. A type of response in which sensitivity (such as current) varies directly with another quantity (such as voltage). Compare LOGARITHMIC RESPONSE, 2 and SQUARE-LAW RESPONSE, 2. High-distortion response. Also see HIGH FREQUENCY. 1. 2.

**linearity** A scale in which all of the divisions represent the same differential and are equally spaced. On a linear scale, a given difference...
linear transformer

always has the same physical length, no matter where on the scale it appears. For example, the interval between 3 and 4 on a linear scale is the same as any interval between x and x + 1, where x is any real value on the scale.

linear sweep In a television or oscilloscope circuit, the scanning of the electron beam across the screen at a constant speed. Also see LINEAR, 1, LINEAR RESPONSE, 1, and LINEARITY, 2.

linear taper In a potentiometer or rheostat, resistance variation that is directly proportional to shaft rotation. Thus, half the total resistance corresponds to movement of the shaft over half the arc of full rotation. Compare LOG TAPER. Also see TAPER, 2.

linear time base For an oscilloscope, the base provided by sweeping the electron beam horizontally at a uniform rate. Also see LINEAR SCAWP.

linear track On a video tape, the track that contains audio information that accompanies the video data. It was so named because it is a single, straight track, in contrast to the video tracks, which are angled.

linear tracking In a turntable system, a design scheme in which the lateral movement of the stylus, as the disc is played, occurs in a straight line, rather than in an arc.

linear transformer A radio-frequency transformer consisting of a section of transmission line.

line balance The degree of electrical similarity between transmission line conductors, or between a conductor and ground, in a circuit.

line-balance converter A device used to isolate the outer conductor at the end of a coaxial line from ground.

line characteristic distortion Fluctuations in the duration of received signal impulses in text data communications, caused by changing current transitions in the wire circuit.

line circuit The telephone system relays equipment associated with stations connected to a switchboard.

line code A code between the digits in processing equipment and the pulses representing the digits in a line transmission.

line conditioning In data communications, the modification of private or leased lines by adding compensating reactances to reduce amplitude variations or phase delays over a band of frequencies.

line contact stylus A needle used to reproduce stereo high-fidelity sound from vinyl discs. It has a characteristic oblate ellipsoidal shape.

line coordinate A symbol identifying a specific row of cells in a matrix; a specific cell can be located with an additional column coordinate.

line cord A flexible two- or three-wire insulated cable connecting equipment to the power line by means of a plug that mates to a standard electrical outlet.

line current 1. Current flowing from a power line into equipment. 2. Current flowing in a transmission line.

line current 3. Current flowing into a parallel or resonant circuit.

line diffuser A circuit that creates minor vertical oscillations of the spot on a television screen, making the individual scanning lines less noticeable.

line driver An integrated circuit capable of transmitting logic signals through long lines.

line drop The voltage drop along a line supplying power to a device.

line equalizer See EQUALIZER.

line fault A discontinuity in a transmission line, resulting in signal loss at the receiving end of a circuit.

line feed In a text data transmission system, the movement of the paper, platen, or cursor to allow for printing or displaying an additional line of text.

line filter A circuit that provides an impedance match in an audio circuit, and also can adapt balanced to unbalanced audio transmission lines (or vice versa).

line noise 1. Electrical noise (as received by a radio) arising from fluctuations of current or voltage in a power line. 2. Noise in a data transmission line.

line-of-sight distance The maximum distance over which an ultra-high-frequency (UHF) or microwave signal can be directly transmitted along the surface of the earth. It is slightly more than the maximum optical line-of-sight distance.

line oscillator See LINE-TYPE OSCILLATOR.

line plug The plug terminating a line cord. Also see PLUG, 2.

line printer A machine that prints the results of a computer run, line by line.

line radio See WIRED RADIO.

line regulation Automatic stabilization of power line voltage.

line-segment system The color television system in which the image is reproduced by means of primary color lines (red, green, and blue) sequentially beamed across the screen of the picture tube. Compare DOT-SEQUENTIAL SYSTEM and FIELD-SEQUENTIAL SYSTEM.

line of cleavage See CLEAVAGE.

lines oscillator See LINE-TYPE OSCILLATOR.

line supervision In electronic security systems, a method of monitoring circuit characteristics to detect possible tampering.

line 1. The main power-line switch to a system. 2. Within a piece of electronic equipment, the switch that opens and closes the circuit to the incoming power line.

line-type amplifier A radio-frequency amplifier in which the tuned circuits are transmission lines consisting of parallel wires, rods, or tubing, or of coaxial cable sections.

line-type oscillator A radio-frequency oscillator in which the tuned circuits are transmission lines consisting of parallel wires, rods, tubing, or of coaxial cable sections.

line unit In a wire data transmission system, the terminal unit, or device that converts the text signals into electrical pulses and vice versa.

line voltage 1. The voltage between the conductors of a transmission line. 2. The voltage between the conductors of a transmission line.

line-voltage monitor See POWER-LINE MONITOR.

linguistics The study of languages, including structure, etymology, and phonetics.

link 1. The small coupling coil used in link coupling. 2. A communication path between two radio facilities for the purpose of extending the range of one, as between a remote pickup point and a broadcast transmitter. 3. A data connection between two different computers. 4. The act or process of creating a signal path or data connection, as defined in 1, 2, or 3. 5. In a digital computer, a branch instruction, or an address in such an instruction, used to cause a subroutine to return some point in the main program.

linkage Coupling between separated conductors or devices through the medium of electric or magnetic lines of flux.
liquid-pressure alarm

**link circuit** A closed-loop coupling circuit having two coils of a few turns of wire; each coil is placed near one of the circuits to be coupled.

**link coupling** Low-impedance coupling via a small (usually one-turn) input or output coil fed by a twisted pair or a coaxial line.

**liquid** A substance characterized by a level of molecular motion intermediate between that of gases and solids; liquids have the ability (like gases) to take the shape of a container and are only slightly compressible. Compare GAS, PLASMA, and SOLID. Also see STATE OF MATTER.

**liquid absorption** For a solid material, such as di-electric, the ratio of the weight of liquid absorbed by the material to the weight of the material.

**liquid capacitor** See WATER CAPACITOR.

**liquid cell** See ELECTROLYTIC CELL.

**liquid conductor** See ELECTROLYTE.

**liquid cooling** Use of circulating water, oil, or other fluid to remove heat from components or equipment, such as microprocessors or power equipment.

**liquid crystal** A liquid exhibiting some of the characteristics of a crystal. Also see NEMATIC CRYSTAL and SMECTIC CRYSTAL.

**liquid-crystal display** Abbreviation, LCD. A flat-panel display noted for its thin profile, light weight, and low power consumption. The simplest devices are used in calculators, meters, wristwatches, and radios. More sophisticated displays are used in computers and portable video units. This type of display can operate at a much lower voltage than a cathode-ray tube (CRT). This makes it ideal for portable electronic systems in which batteries are used. Older displays of this type can be difficult to read from certain viewing angles. This situation has improved in recent years with the advent of active-matrix, also known as thin-film-transistor (TFT), displays.

**liquid-filled transformer** A transformer filled with a protective liquid insulator, such as oil.

**liquid flow** An electronic circuit that actuates an alarm when the flow of a liquid through pipes or other channels changes from a desired rate.

**liquid-flow control** A servo system that automatically maintains or corrects the rate of liquid flow through pipes or other channels.

**liquid-flow gauge** See LIQUID-FLOW METER.

**liquid-flow meter** An instrument that indicates the rate at which a liquid moves through pipes or other channels.

**liquid-flow switch** In a liquid-cooled system, a switch that actuates an alarm when the liquid slows or stops.

**liquid-jet oscillograph** A graphic recorder using an ink jet galvanometer to trace the pattern on a paper chart.

**liquid laser** A laser in which the active material is a liquid.

**liquid-level alarm** An electronic device that actuates visual or audio signal devices when the surface of a liquid inside a tank rises or falls to a predetermined level.

**liquid-level control** A servo system that automatically maintains the liquid in a tank at a predetermined level.

**liquid-level gauge** An electronic system that provides direct readings of the level of a liquid in a tank.

**liquid-level indicator** See LIQUID-LEVEL GAUGE.

**liquid-level meter** See LIQUID-LEVEL GAUGE.

**liquid load** See WATER LOAD.

**liquid-pressure alarm** An electronic circuit that actuates an alarm when the pressure of a liquid changes.

**liquid-pressure alarm** A servo system that automatically maintains or corrects liquid pressure in pipes or other channels.

**liquid-pressure gauge** See LIQUID-PRESSURE METER.

**liquid-pressure indicator** See LIQUID-PRESSURE METER.

**liquid-pressure meter** An instrument that provides direct readings of liquid pressure in a pipe or other channel.

**liquid-pressure switch** A switch that actuates an external circuit or device when the pressure of a liquid changes.

**liquid rheostat** See WATER RHEOSTAT.

**liquid valve** See ELECTROMECHANICAL VALVE.

**liquid Laser** A digital-computer language written in the form of lists. A program can be directly interpreted as data, and vice versa. The entire language is derived from a few basic functions. Programs are easy to debug. It is used in artificial intelligence (AI) research. Also see LANGUAGE.

**Liquid figure** Any of several curves resulting from the combination of two harmonically related sine waves. These figures are familiar in electronics; they are obtained when signals are applied simultaneously to both axes of an oscilloscope. It is also called Lissajous pattern.

**listening angle** 1. To print serially the records in a file or in memory. 2. To print (instruct a computer to display) every item of input data in a program. 3. A one-dimensional array of numbers.

**listener fatigue** Physiological symptoms, such as headaches, caused by prolonged listening to certain sounds (e.g., a pure sine wave or poorly reproduced music).

**listening angle** In stereo sound reproduction, the angle between the speakers, with respect to the listener. This angle can vary from zero to 180 degrees. Larger angles result in increased apparent channel separation.

**listening test** The subjective evaluation of audio equipment by listeners.

**liter** Abbreviation. 1. A metric unit of volume equal to 1.00E7 SI. liquid quarts or 0.908 U.S. dry quarts. 2. A liter is the volume of 1 kilogram of water at 4°C and under a pressure of 1 Pascal.

**liter-canners** It is usually applicable to source language instructions, operands that specify the value of a constant, rather than an address of a location in which the constant is stored.


**lithium battery** See LITHIUM CELL.

**lithium cell** A type of electrochemical cell with exceptional energy-to-mass ratio and long shelf life. There are several variations in the chemical makeup; they all contain lithium, a light, highly reactive metal. These units can be manufactured to supply 1.5 to 3.5 volts, depending on the particular chemistry used. This cell can last for years in very-low-current applications such as memory backup.

**Litzendraht wire** See LITZ WIRE.

**Litz wire** A woven wire having a number of copper strands, each separately enamelled to insulate it from the others. The wire is woven so that inner strands come to the surface at regular intervals. The part of the room in which the acoustic concentration is greatest.

**live** 1. Electrically activated (i.e., sustaining voltage or current). 2. Being broadcast as it occurs. 3. Acoustically reflective, as in a LIVE ROOM (contrasted with one that is acoustically absorbent).

**live end** 1. In a recording or broadcasting studio, the part of the room in which the acoustic concentration is greatest. 2. In a utility circuit, the wire or terminal that carries 117 volts alternating current (the ungrounded end).

**live end/head dead** Pertaining to a room that is acoustically reflective (live) on one end, and acoustically absorbent (dead) at the other end.

**live room** A room with little or no acoustically absorbent material in its ceiling, walls, and floor, with the result that echoes and reverberation are pronounced. Compare DEAD ROOM.

**LL** Abbreviation of LIQUID CRYSTAL.

**LL band** A section of the L BAND that extends from 150 to 1350 GHz.

**LLL** Abbreviation of LOW-LEVEL LOGIC.

**lm** Preferred abbreviation of LUMEN.

**lm/ft** Abbreviation of lumens per square foot. Also see LUMEN.

**link coupling** A subroutine, entered by a branch instruction from a main routine, that executes a branch instruction returning control to the main routine.

**link fuses** A fuse consisting of an exposed length of wire.

**link neutralization** Neutralization achieved by out-of-phase current fed back via link coupling from the output to the input of an amplifier. Also called INDUCTIVE NEUTRALIZATION.

**linking receiver** A radar receiver whose amplitude response is linear for small signals, but logarithmic for large signals.

**lip microphone** A small microphone operated close to or in contact with the lips.

**liquid jet oscillograph** A graphic recorder using an ink jet galvanometer to trace the pattern on a paper chart.

**liquid laser** A laser in which the active material is a liquid.

**liquid-level alarm** An electronic device that actuates visual or audio signal devices when the surface of a liquid inside a tank rises or falls to a predetermined level.

**liquid-level control** A servo system that automatically maintains the liquid in a tank at a predetermined level.

**liquid-level gauge** An electronic system that provides direct readings of the level of a liquid in a tank.

**liquid-level indicator** See LIQUID-LEVEL GAUGE.

**liquid-level meter** See LIQUID-LEVEL GAUGE.

**liquid load** See WATER LOAD.

**liquid-pressure alarm** An electronic circuit that actuates an alarm when the pressure of a liquid changes.
load antenna

The modernization of the antenna system to increase its effective length and thereby lower its resonant frequency. It also increases the bandwidth of the system.

loading coil

An inductor inserted in a circuit to increase its inductance or provide some special effect, such as canceling capacitive reactance. See LOADED ANTENNA and PUPIN COIL.

loading factor

The ratio of source impedance to load impedance before the introduction of loading circuits.

loading inductance

1. The inductance present in a load. 2. An inductance used as a load.

loading routine

Also called loading program. A routine permanently in memory; it allows a program to be loaded into memory from an external storage medium.

load life

The longevity of a device in terms of the number of hours it can withstand its full power rating.

load line

In a group of voltage-current (EB curves), a line connecting points of equal resistance (R/I) that are equal to a particular value of load resistance (impedance).

load power

The power dissipated in a load.

load regulation

Automatic stabilization of load resistance (impedance) at a constant value.

load resistance

1. The resistance present in a load. 2. A resistance used as a load.

load stabilizer

A device for holding load current or voltage to a constant value.

loadstone

Alternate spelling of LODESTONE.

load wattage

The power consumed by a load.

load voltage

The voltage developed across a load.

load voltage stabilization

Automatic regulation of load voltage.

lobe

In the directivity pattern of a transducer, a figure, such as a circle or ellipse enclosing an area of intensified response. Applicable especially to antennas.

lobe (pattern of horizontal half-wave antenna)

lobe (pattern of horizontal half-wave antenna)
local station • logarithmic voltmeter

local station A station situated within the same general area as the receiver, as opposed to a dis- tant station.

local system library A computer program library containing standard software associated with a specific system.

local transmission The sending of signals to re- ceivers in the same general locality as the trans- mitter, as opposed to long-distance transmission.

local trunk In a telephone system, the intercon- necting line between local and long-distance lines.

location In digital computer operation, a memory position (often a register) specified by an address and usually described in terms of the basic stor- age unit a particular system uses (e.g., a charac- ter is a location in a character-oriented machine).

location counter A register in the control section of a computer containing the address of the in- struction being executed.

locked groove A continuous blank groove around the inside of a phonograph record. When the disc is done playing, this groove keeps the stylus from running into the label or sliding across the disc.

locked oscillator 1. A fixed-frequency oscillator, such as a crystal-controlled oscillator. 2. See BRADLEY DETECTOR.

lock-in A state of synchronism, as when a self-excit ed oscillator is synchronized (locked-in) with a standard-frequency generator.

lock-in amplifier A detector that makes use of a balanced amplifier. The output is the difference between the collector or drain currents of the two devices.

locking circuit See HOLDING CIRCUIT.

locking relay See LATCHING RELAY.

lock-out 1. To prevent a hardware unit or routine from being activated (e.g., when there would be a conflict between operations using the same areas of memory). A safeguard against an attempt to refer to a routine in use.

lock-up relay An electromagnetic relay that can be locked in the actuated state nonmechanically (i.e., by means of an electromagnet or permanent magnet).

locus The set of all points located by stated condi- tions (e.g., the locus of secondary points that are all equidistant from a primary point is a sphere).

lodestone A natural magnet; a form of the mineral magnetite.

log 1. Abbreviation of LOGARITHM. 2. A continu- ous record of communications kept by a station, or a record of the operation of an equipment.

log10 Abbreviation of common logarithm (base-10 logarithm). Also called Briggsian logarithm.

logarithm Abbreviation, log. The power to which a fixed number \(a\), called the base, must be raised to equal a given number \(x\). For example, \(10^2 = 100\). The common logarithm bases are 10 and the transcendental number \(e\), approximately equal to 2.71828. See COMMON LOGARITHM and NAPELIAN LOGARITHM.

logarithmic amplifier An amplifier whose output- signal amplitude is proportional to the logarithm of the input-signal amplitude.

logarithmic curve A graphical representation of a logarithmic function, having the form \(y = k \cdot \log x\), where \(k\) is a nonzero real number constant, and \(x\) is a positive real number (the logarithmic base).

logarithmic decrement See DECREMENT.

logarithmic graph Also called log-log graph. A graph in which the \(x\) and \(y\) axes are both in- cremented logarithmically. Compare SEMILOG- ARITHMIC GRAPH.

logarithmic horn A horn whose diameter varies directly, according to the logarithm of the dis- placement along the axis. See HORN.

logarithmic mean See GEOMETRIC MEAN.

logarithmic meter A current meter or voltmeter whose deflection is proportional to the logarithm of the quantity under measurement. The incre- ments on the scale of such an instrument are closer together in the upper portion.

logarithmic rate of decay See EXPONENTIAL DE- CREASE.

logarithmic rate of growth See EXPONENTIAL INCREASE.

logarithmic response 1. Response in which the value of a dependent variable is at every point proportional to the logarithm of the independent variable. 2. A type of response in which a quantity (such as current) varies directly with the log- arithm of another quantity (such as voltage).

logarithmic scale A graduated scale in which the coordinates are positioned, according to the log- arithm of the actual distance from the origin.

logarithmic voltmeter See LOGARITHMIC METER.

logical comparison An operation in which two op- erands are compared for equal value.

logical connectives Words connecting operands in a logical statement; the truth or falsity of the state- ments can be determined from their content and the connectives' meanings.

logical diagram 1. A graphic representation of a logic function (e.g., AND, NAND, NOR, OR, and XOR). 2. The design of a device or system repre- sented by graphic symbols for logic elements and their relationships.

logical flowchart The logical steps in a program or subroutine represented by a set of symbols.

logical function An expression for an operation in- volving one or a combination of logic operators.

logical gate See LOGIC CIRCUIT.

logical input current The range of voltages over which the logic trip level occurs, from low to high or high to low. It is usually expressed in volts for the low state and the high state; for example, low is +1 to +5 volts; high is +4 to +6 volts.

logical instruction A command to execute a logical function.

logical level 1. One of the two logic states 0 or 1 (on or off, high or low). 2. Of the two logic states, that which represents the "true" condition. 3. The volt- age amplitude of digital signals in a logic system.

logical probe A test probe with a built-in amplifier equal to a given number \(x\). Suppose \(x = 3\) or, where \(x\), and \(y\) are real numbers. Then, \(\log x = y\). The most common logarithmic bases are 10 and the transcendental number \(e\), approximately equal to 2.71828. See COMMON LOGARITHM and NAPELIAN LOGARITHM.

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logarithmic voltmeter See LOGARITHMIC METER.

log, • logic probe

log, • logic probe
logic relay  •  long-term input offset voltage stability  •  Lorentz force

logic relay  See BISTABLE RELAY.

logic swing  In a logic circuit, the difference between the voltage corresponding to the high state and the voltage corresponding to the low state.

logic symbol  1. A symbol used to represent a logic element in a circuit diagram. 2. A symbol used to represent a logic connective.

logogram  A high-level computer programming language used for robot control and as an education aid. It is especially useful for teaching children how to operate computers and computerized robots. Statements are simple enough so that elementary-school children can learn to write short programs.

log periodic antenna  Also called log periodic dipole array (LPDA). A broad-spectrum, multiband directional antenna in which the lengths and spacing of the radiator and elements increase logarithmically from one end of the antenna to the other.

log polar navigation  A computerized navigation system in which polar-coordinate data is converted into rectangular-coordinate data. In the transformation process, the logarithm of the radius (range) is taken. This results in improved image resolution at close range, although it sacrifices resolution at greater ranges.

log taper  In a potentiometer or resistor, resistance variations that correspond to the logarithm of shaft rotation, or vice versa. Compare LINEAR TAPER. Also called logaritmic taper.

longitude  1. The arc parallel to the equator measured from the prime meridian of the earth to the prime meridian drawn through the point of interest. 2. The angular distance measured from the plane of the equator to the plane of any reference meridian. 3. The angle between the plane of a reference meridian and the plane of a reference plane. Also see COORDINATE.

longitude antenna  A computer programming technique in which a data item identified by a key is selected from an array.

longitude 1. A single-wire antenna whose length is greater than the wavelength of the wave fed to it for propagation. Also see LONG-WIRE ANTENNA. 2. In wire telegraphy, an electrical line that has great physical length. 3. In electronics theory, a transmission line of indeterminate length, but whose characteristics remain stable and predictable to infinity.

longitude antenna  A cathode-ray tube screen on which the image remains for a time after the electron beam has passed.

loop 1. A direct telephone line connecting a subscriber’s station to a long distance switchboard. 2. A computerized navigation system in which two processors, each having its own operating system, are used with switches so that they can use common peripherals. Also see SWITCH.

loop checking  A method of checking the accuracy of a series of instructions that terminates when some specified condition is satisfied by a test, at which point the next instruction in the main program is obeyed.

loop antenna  1. A small portable receiving antenna of the form of a wire coil. 2. A half-wave conductor bent into a circle or square. It can be used for transmitting and receiving.

loopback  1. A one- or two-turn coil for low-impedance coupling. Also see LINK. 2. In a computer program run, the repetitious execution of a series of instructions that terminates when some specified condition is satisfied by a test, at which point the next instruction in the main program is obeyed.

loop antenna  A small, portable receiving antenna of the form of a wire coil. A half-wave conductor bent into a circle or square. It can be used for transmitting and receiving.

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loop response time  In a security system, the length of time between the first sensing of an abnormal condition (e.g., an intrusion) and the recognition of that condition by the controller.

loopstick antenna  See FERRITE-ROD ANTENNA.

loop test  A means of locating a discontinuity in a circuit by creating a closed loop, including the suspected fault point.

loop coupling  Coupling that transfers only small amounts of energy, as when a primary and secondary coil are spaced so far apart that the coefficient of coupling is small. Compare CLOSE COUPLING.

looped amplification  See FEEDBACK FACTOR.

looping plug  A double plug-socket unit for simultaneously plugging into two phone jacks. Completes (loops) the circuit between the two jacks.

long line 1. A single-wire antenna whose length is greater than the wavelength of the wave fed to it for propagation. Also see LONG-WIRE ANTENNA. 2. In wire telegraphy, an electrical line that has great physical length. 3. In electronics theory, a transmission line of indeterminate length, but whose characteristics remain stable and predictable to infinity.

long persistence screen  A cathode-ray tube screen on which the image remains for a time after the electron beam has passed.

long-play record  A broad-spectrum, multiband directional antenna in which the lengths and spacing of the radiator and elements increase logarithmically from one end of the antenna to the other.

long-range communication  1. Radio communication between stations separated by distances too great for ground-wave propagation to be effective. Also see TELEPHONE SERVICE, communications that require the dialing of an area code in addition to the local exchange number.

long-distance loop  A direct telephone line connecting a subscriber’s station to a long distance switchboard. 2. A computerized navigation system in which two processors, each having its own operating system, are used with switches so that they can use common peripherals. Also see SWITCH.

long-distance navigation  A radionavigation system that operates at frequencies of 100 kHz. It operates on the hyperbolic principle. See LORAN.

long-range navigation  A long-range radionavigation system in which two processors, each having its own operating system, are used with switches so that they can use common peripherals. Also see SWITCH.

long-range radar  A high-level computer programming language used for robot control and as an education aid. It is especially useful for teaching children how to operate computers and computerized robots. Statements are simple enough so that elementary-school children can learn to write short programs.

longitudinal current  Strength of cosmic rays arriving at different longitudes on the surface of the earth. Also see LONGITUDE.

longitudinal redundancy  A computer condition, generally affecting magnetic tape records, in which the bits in each track of a record do not meet the required parity. Also see LONGITUDINAL REDUNDANCY CHECK.

longitudinal redundancy check  A parity check performed on a block of characters or bits (for example, on a track of a magnetic disk). A parity character is generated and transmitted as the last character of the block; thus, each longitudinal block has either even or odd parity.

longitudinal wave  A wave in which the movement of particles in a medium is parallel with the direction of propagation.

longitudinal parity  Parity associated with bits recorded on one track of a magnetic storage medium to indicate whether the number of bits is even or odd.

long-term drift  Stability reckoned over a period of weeks, months or years, as contrasted to that noted for brief intervals of time (minutes or less).

long throw  A speaker design term that describes a woofer having thru-the-factors, as determined, the objective is to provide good low-frequency response with low distortion.

long waves  Low-frequency radio waves, particularly those in the frequency range of 30 kHz to 300 kHz (10 km to 1 km).

long wire antenna  A horizontal or sloping wave antenna measuring a full wavelength or more and fed at a high-current point or at one end. As the wire is made longer, the main radiation/response lobes get more nearly in line with the antenna, and their amplitudes increase. As the wire is made shorter, the main lobes get farther from the axis of the antenna, and their amplitudes decrease. This antenna can produce high gain and excellent low-angle radiation, provided it is straight, is at least several wavelengths long, and is clear of obstructions. However, it cannot be rotated conveniently to change the direction in which maximum gain occurs. Also, a great deal of real estate is needed at medium and high frequencies.

loop input signal  A signal introduced into a feed back control loop.

looping plug  The regular, intermittent breaking of the direct-current path at the transmitting end of a transmission line; also called DIAL PULSING.

loop resistance  The resistance of the electrical path around a complete loop (see LOOP). 1.

loop response time  In a security system, the length of time between the first sensing of an abnormal condition (e.g., an intrusion) and the recognition of that condition by the controller.

loopstick antenna  See FERRITE-ROD ANTENNA.

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loop response time  In a security system, the length of time between the first sensing of an abnormal condition (e.g., an intrusion) and the recognition of that condition by the controller.

loopstick antenna  See FERRITE-ROD ANTENNA.

loop test  A means of locating a discontinuity in a circuit by creating a closed loop, including the suspected fault point.

loop resistance  The resistance of the electrical path around a complete loop (see LOOP). 1.

loop response time  In a security system, the length of time between the first sensing of an abnormal condition (e.g., an intrusion) and the recognition of that condition by the controller.
loss Energy that is dissipated without doing useful work in a circuit or system. See POWER LOSS.

loss angle For an insulating material, 90 degrees minus the PHASE ANGLE.

loss index For an insulating material, the product of the POWER FACTOR and the DIELECTRIC CONSTANT.

lossless data compression A process in which the number of bits in a data file is reduced by eliminating redundancies, without sacrificing any of the precision or detail in the file. Compression of text and programs must usually be lossless. Image compression need not generally be lossless. Compare LOSSY DATA COMPRESSION.

lossless line A perfect transmission line (i.e., one having no resistance loss, no dielectric loss, and no radiation loss). It is not realizable in practice, but useful in some theoretical calculations.

loss tangent See DISSIPATION FACTOR.

lossy data compression A process in which the number of bits in a data file (especially a digital image) is reduced by eliminating redundancies, with some sacrifice of precision or detail. In image compression, some loss can usually be tolerated, allowing larger compression ratios than would be possible if zero loss were mandatory. Lossy compression is not generally acceptable for text files and programs. Compare LOSSLESS DATA COMPRESSION.

lossy line A line or cable having comparatively high or excessive attenuation per unit length.

loudness The amplitude of sound, especially in audio reproduction equipment, such as a high-fidelity stereo amplifier. Also called VOLUME.

loudness control See COMPENSATED VOLUME CONTROL.

loudness curves See AUDIBILITY CURVES.

loudness switch/button In a high-fidelity audio amplifier, a switch or button that can be actuated when music is played at low loudness. Increases the volume of the bass relative to the midrange and treble.

loudspeaker A transducer that converts electrical impulses into sound waves of sufficient volume to be heard easily by a number of listeners situated at some distance from the device. Also called speaker.

loudspeaker damping See DAMPED LOUD-SPEAKER.

loudspeaker dividing network See CROSSOVER NETWORK.

low 1. The logical digit 0. 2. Of relatively small magnitude (e.g., LOW VOLTAGE and LOW FREQUENCY).

low band 1. The low or lowest frequency band used in communications, testing, or processing in a given situation. 2. Television channels 2 to 6 (54 to 88 MHz). 3. In two-way radio operations, those radio channels between 30 MHz and about 70 MHz.

low battery 1. The condition of a battery needing replacement or recharging. 2. An indicating device that shows when a battery needs to be recharged or recharged.

low-battery bias current The current into a device, such as a light-emitting diode (LED) and associated circuitry, that gives a visible indication of the condition of LOW BATTERY.

low-capacitance probe A test probe in which capacitance has been minimized to reduce loading and detuning of the circuit under test.

low earth orbit Acronym, LEO. An artificial satellite orbit that is comparatively low in altitude, resulting in a short orbital period (in some cases less than 2 hours). Also see LEO SATELLITE SYSTEM.

low-energy criterion See VON HIPPEL BREAK-DOWN THEORY.

lower band A highpass filter that removes low-frequency parasitics of a frequency lower than that being processed by the amplifier or generated by the oscillator in which they occur.

low-end 1. A logic term for the more negative of the two (binary) logic levels. 2. Having an amplitude that is below that normally available in comparable circuits or systems. 3. In computer operations, pertaining to programming languages (such as assembly language or machine language) that control the machine, but do not directly interface with the operator.

low-level audio signal In audio operations, a signal that has not been amplified by any means (e.g., the output of a dynamic microphone). Compare HIGH-LEVEL AUDIO SIGNAL.

low-level contact A switch or relay contact intended for use with low values of current and voltage.

low-level input current 1. A test used to check an input jack or resistor in an integrated circuit to ensure that the fan-in is as specified. 2. The current flowing from an input when the highest low-level input voltage specified is applied to the input of the device.

low-level language A computer programming language in which each instruction has only one equivalent machine code. Examples are machine language and assembly language. Compare HIGH-LEVEL LANGUAGES.

low-level logic Abbreviation, LLL. In digital computer operations, any logic system that operates at low voltage or current levels.

low-level modulation Modulation of a radio or television transmitter at a stage preceding the final radio-frequency (RF) power amplifier.

loss lowest usable frequency Abbreviation, LUF. The lowest frequency that can be used successfully at a given time for communication via the ionosphere. Compare MAXIMUM USABLE FREQUENCY.

loss low-pass filter A highpass filter that removes low-frequency audio noise from the modulating waveform of a broadcast station. The result is a lower level of transmitted hum and rumble.

lossy 1. Pertaining to radio frequencies in the band from 30 kHz to 300 kHz (wavelengths from 10 kilometers to 1 kilometer). Also see RADIO SPECTRUM. 2. Pertaining to audio frequencies below 500 Hz.

lossy compression 1. In video-amplifier design, special measures, such as use of high coupling and bypass capacitances, to boost low-frequency gain. 2. Use of special circuits to increase the low-frequency response of an audio amplifier. Also see BASS BOOST.

lossy frequency response A frequency response that has not been amplified by any means directly interface with the operator.

lossy material A material, particularly a dielectric, having low electrical loss at a given frequency. Also see LOSS.

lossy noise Pertaining to circuits, especially weak-signal communications receiving amplifiers and converters, designed to generate the smallest possible amount of internal noise.

lossy noise down converter In a satellite television receiving system, a circuit that converts the signals from the dish antenna to frequencies that correspond to the channels on a conventional television set.

lossy order The lesser-value place(s) of characters or digits in the hierarchy of a group (number or word). For example, 5 and 6 are low-order digits in the number 123,456.

low-order position The extreme right-hand (least significant) position in a number or word.

low-pass filter A combination of capacitance, inductance, and/or resistance, intended to produce large amounts of attenuation above a certain frequency and little or no attenuation below that frequency. The frequency at which the transition occurs is called cutoff. At cutoff, the power attenuation is 3 dB with respect to the minimum attenuation. At frequencies below cutoff, the power attenuation is relatively small. At frequencies above cutoff, the power attenuation is more than 3 dB. The simplest circuit consists of a series inductor or a parallel capacitor. The inductance-capacitance (LC) circuit has a combination of series inductors and parallel capacitors. In the resistance-capacitance (RC) circuit, resistors are substituted for the inductors. Compare BAND-PASS FILTER and BAND-REJECTION FILTER.

low-power Abbreviation, LP. Power considerably lower than that ordinarily encountered in a...
particular application. The term is arbitrary; several hundred volts might be regarded as low power in one situation; whereas a fraction of a volt would be implied in another.

low-print recording tape Magnetic tape that is too slow to print through than conventional tape.

low Q For a circuit component, or a circuit low, the ratio of reactance to resistance L/X. This is a relative term because a particular Q value considered low in one situation might be high in other circumstances. Also see FIGURE OF MERIT. 1. low tension See LOW VOLTAGE.

low voltage 1. A voltage considerably lower than that ordinarily encountered in a particular application. The term is arbitrary; several hundred volts might be regarded as low in one situation, and a fraction of a volt would be implied in another. 2. In a television receiver, the supply voltage applied to all points other than the high-voltage circuit or the picture tube.

low-voltage rectifier In a television receiver, the rectifier that supplies power for the low-voltage stages. See LOW VOLTAGE. 2.


L pad An attenuator consisting of a series arm and a shunt arm, arranged in such a way that the schematic representation of the circuit resembles an inverted capital letter L. It is noted for its constant impedance or resistance or impedance as the amount of attenuation is varied.

LFB Abbreviation of LIGHTED PUSHBUTTON.

L band A section of the L BAND extending from 390 to 465 MHz.

lpnm Abbreviation of lines per minute; the output speed of a line printer.

lpw Abbreviation of lumens per watt; lm/W is preferred.

Lr Symbol for LAWRENCIUM.

L = L + R – Lr The lumped capacitance and inductance components. Compare DISTRIBUTED-CONSTANT DELAY LINE.

Lumped resistor A discrete component (i.e., one that is self-contained). Compare DISTRIBUTED COMPONENT.

lumped constant The total value of any single electrical property in an electrical or electronic component.

lumped-constant delay line A delay line having discrete capacitance and inductance components. Compare DISTRIBUTED-CONSTANT DELAY LINE.

lumped impedance A reactance and/or resistance manifested in a definite location. Examples are ordinary components, such as capacitors, inductors, and resistors.

lumped inductor See DISCRETE INDUCTOR.

carrier parameter Any circuit parameter that can be considered as a discrete parameter—even if it is not made up of a single component.

lumped resistor See DISCRETE RESISTOR.


luminance The unit of luminance, equivalent to one LUMEN per square meter. 1 lux = 1 lumen per square meter.

luminance channel In a color television circuit, the channel that processes the Y SIGNAL.

luminance constant The symbol for LAWRENCIUM; more commonly, 1.450 to 1.550 GHz.

luminous flux Lumen-hour The energy in visible electromagnetic radiation.

luminous energy The rate of transfer or flow of luminous energy.

luminous flux The total value of any single electrical property in a luminescent cell.

luminous intensity Luminous flux divided by the actual radiant intensity divided by the actual radiant intensity at a given wavelength.

luminous energy The energy in visible electromagnetic radiation.

luminosity factor Abbreviated K, and expressed in lumens per square foot. It is the ratio of luminous intensity divided by the actual radiant intensity at a given wavelength.

luminous flux The total value of any single electrical property in a luminescent cell.

luminosity factor A simple voltage regulator.

L-type antenna See INVERTED-L ANTENNA.

L-type antenna A section of the L BAND extending from 900 to 950 MHz.

L-type power amplifier A section of the L BAND that extends from 725 to 780 MHz. See LOW VOLTAGE. 1.

lumen Abbreviation. lm. and sometimes lm. The unit of luminous flux, that is equal to the light that is emitted in one steradian (the unit solid angle) by a uniform point source of one candela. Also see CANDLE POWER, LUMINANCE, LUMINOUS INTENSITY, SOLID ANGLE, and STERADIAN.

lumen-hour Abbreviation. lm-hr. The amount of light that a source having a luminous flux of one LUMEN delivers in a time period of one hour.

luminous A complete and self-contained lighting system, for television-studio use or photographic use. The kit includes all of the needed parts and accessories.

luminous flux The amount of light emitted or scattered by a surface. This property is expressed in candelas per square meter (cd/m²).

luminous intensity Channel in a color television circuit, the channel that processes the Y SIGNAL.

luminous flux See SIGNAL.

luminescence The production of visible light, but not heat, by a material stimulated by radiation or electron bombardment. See ELECTROLUMINESCENT CELL and LUMINESCENT SCREEN.

luminescent cell See ELECTROLUMINESCENT CELL.

luminescent screen A cathode-ray tube whose screen is coated with a material that glows under the influence of ionizing radiation, X rays, or electron bombardment. Compare LIGHT AMPLIFIER.

luminous energy Luminous flux divided by the actual radiant intensity divided by the actual radiant intensity at a given wavelength.

luminous flux The energy in visible electromagnetic radiation.

luminous intensity Luminous flux divided by the actual radiant intensity divided by the actual radiant intensity at a given wavelength.

luminous energy The energy in visible electromagnetic radiation.

luminous flux The rate of transfer or flow of luminous energy.

luminous intensity Luminous flux divided by the actual radiant intensity divided by the actual radiant intensity at a given wavelength.

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luminous energy The energy in visible electromagnetic radiation.

luminous flux The rate of transfer or flow of luminous energy.

luminous intensity Luminous flux divided by the actual radiant intensity divided by the actual radiant intensity at a given wavelength.
the force, either attractive or repulsive, between two objects that are magnetized, or between a magnetic pole and a magnetic material, such as iron or steel.

A straight line joining the poles of a magnet.

A device or body of material that has the ability of the computer to use that data in an artificially intelligent computer system, and for making new magnets. A substance that becomes several machine-language instructions when operated on by a compiler.

Machine code
A computer program in machine language by an assembler, compiler, interpreter, or monitor system.

machine language
Computer program instructions and data represented in binary form. In the hierarchy of programming languages, it is the lowest: the computer works directly with it. All high-level languages are translated to machine language by an assembler, compiler, interpreter, or monitor system.

machine learning
In artificial intelligence, a computer’s ability to learn through repeated calculations for particular problems.

machine logic
1. The way that a computer’s functional parts are interrelated. 2. The facility whereby a computer solves problems.

machine operation
The performance by a computer of a built-in function (e.g., subtraction).

machine operation
A person participating in implementing and overseeing the processing of computer programs.

machine word
In computer operations, the address of a memory location composed of the full number of bits normally handled by each register of the machine.

machining
In industrial robotics, the mechanical modification of parts during assembly. Examples: drilling, welding, sanding, polishing, and painting.

Mach number
1. The velocity of a body moving through a fluid relative to the speed of sound in the medium. 2. Not to be confused with MACH UNIT.

macro
Prefix denoting extremely large. Compare MICRO-.

macro assembly program
An assembly program whose source statements are translated to several machine-language instructions.

macroinstruction
A source program instruction that becomes several machine-language instructions when operated on by a compiler.

macroknowledge
In artificial intelligence, knowledge in the large sense (i.e., knowledge about information). Example: a set of definitions in an expert system. Compare MICRONOINTELLIGECE.

macroprogram
A computer program consisting of macroinstructions.

magnet charger
A device that produces changes in current by means of magnetic-field effects. It is used as an oscillator or amplifier.

MADT
Abbreviation of MICROALLOY DIFFUSED TRANSISTOR.

MAG
Abbreviation of MAGNETIC AMPLIFIER. An iron core that uses the principle of the saturable reactor to obtain amplification. In its simplest form, it consists of input and output coils wound on a core of square-loop magnetic metal. The input coil consists of two identical windings connected in series-opposition so that currents in the output winding cannot induce voltage in the input winding. The output coil is connected in series with a load and an alternating-current (ac) supply. A small ac signal applied to the input winding causes a large change in the impedance of the output winding and, therefore, a large change in the voltage across the load.

magnetic analysis
See MASS SPECTROMETER.

magnetic attraction
1. The force that causes a magnetic pole to draw to itself a piece of iron and other magnetic metals, and the ability to attract or repel other magnets. Also see ELECTROMAGNET, PERMANENT MAGNET, and TEMPORARY MAGNET.

magnet armature
See KEEPER.

magnet battery
A group of several magnets placed together in parallel (i.e., with similar poles touching or resting nearby) to act as a single magnet.

magnet charger
A device that produces an intense magnetic field for restoring weakened magnets or for making new magnets.

magnetic field
1. Pertaining to MAGNETISM. 2. Possessing MAGNETISM. 3. Capable of being magnetized. See MAGNETIC MATERIAL.

magnetic air-gap
A space between two magnetic poles that is neither the same (in which case the force is repulsive) nor opposite (in which case the force is attractive).

Magnetic amplifier
An iron core device that uses the principle of the saturable reactor to obtain amplification. In its simplest form, it consists of input and output coils wound on a core of square-loop magnetic metal. The input coil consists of two identical windings connected in series-opposition so that currents in the output winding cannot induce voltage in the input winding. The output coil is connected in series with a load and an alternating-current (ac) supply. A small ac signal applied to the input winding causes a large change in the impedance of the output winding and, therefore, a large change in the voltage across the load.

magnetic balance
An instrument for measuring the force, either attractive or repulsive, between two objects that are magnetized, or between a
magnet and a magnetic substance. The device can also be used for measuring the intensity of a magnetic field, either from a permanent magnet, an electromagnet, or from the earth.

**magnetic bias** A steady magnetic force applied to another magnetic field, so that the latter's qus-.

**magnetic bottle** A container envisioned for atomic fusion reactions, and that would consist of a magnetic field. Conventional containers cannot withstand the extremely high temperatures involved in atomic fusion.

**magnetic braking** See ELECTROMAGNETIC BRAKING.

**magnetic bridge** An instrument comparable to the WHEATSTONE BRIDGE, used to measure mag-.

**magnetic bubble memory** See BUBBLE MEM-.

**magnetic capacity** The maximum magnetization a given material can receive.

**magnetic card** A computer storage medium in the form of a card that can be selectively magnetized or demagnetized to represent data.

**magnetic cartridge** A variable-resistance phono-

**magnetic centering** Centering the beam in a tele-

**magnetic circuit** The closed path determined by a magnetic flux or by a set of lines of flux.

**magnetic clutch** A clutch in which the magnetism of one rotating member causes a second member to lock in and rotate. There need not be physical contact between the two.

**magnetic core** The winding in an electromagnet or similar device.

**magnetic compass** A direction-indicating device using a horizontally suspended magnetic needle as the indicator. The needle tends to point in the direction of the north geomagnetic pole. Compare GYROCOMPASS.

**magnetic component** See ELECTROMAGNETIC COMPONENT.

**magnetic conductivity** See PERMEABILITY.

**magnetic constant** The absolute permeability of a vacuum, equal to 1.26 x 10^-6 H/m.

**magnetic controller** A controller that uses electro-

**magnetic core** The iron core of an electromagnet, choke, transformer, relay, or similar device.

**magnetic coupling** See INDUCTIVE COUPLING.

**magnetic course** In navigation, a course refer-

**magnetic decay** The passage of magnetic lines of flux through separate materials or cir-

**magnetic deflection** See ELECTROMAGNETIC DEFLECTION.

**magnetic density** The concentration of magnetic flux in a region, expressed as the number of lines per unit area of cross section.

**magnetic dip** At a particular location on the earth's surface, the angle between the terrestrial magnetic field and a horizontal line.

**magnetic dipole** 1. A molecule or particle with a north and south magnetic pole. 2. Any pair of adj-

**magnetic direction** Centering the beam in a tele-

**magnetic disk** A rotating disk coated with a layer of magnetic material for the recording, storage and retrieval of information. They are available in various sizes, configurations, and storage capa-

**magnetic doublet** See DOUBLET, 2.

**magnetic drive** A device in which mechanical movement is conveyed from one moving part to another by means of a magnetic clutch.

**magnetic drum** See DRUM.

**magnetic effect of electric current** The presence of a magnetic field around a conductor carrying electric current.

**magnetic equator** Also called geomagnetic equator. An imaginary circle around the earth, along which a magnetic needle shows no dip. It is near, but slightly displaced from, the geographic equator, and is midway between the geomagnetic poles.

**magnetic field** The magnetic field, the change in magnetic flux as a function of time.

**magnetic field density** The absolute permeability of a vacuum, equal to 1.26 x 10^-6 H/m.

**magnetic feedback** Feedback by means of inductive coupling between the output and input cir-

**magnetic flux** The absolute permeability of a vacuum, equal to 1.26 x 10^-6 H/m.

**magnetic flux linking** The passage of magnetic lines of flux through separate materials or cir-

**magnetic flux density** See FLUX DENSITY.

**magnetic focus** The space around a magnetic pole or magnetized body in which magnetic energy storage is possible.

**magnetic field** The space around a magnet, or another magnet, within its field.

**magnetic field strength** See MAGNETIC INTEN-

**magnetic field strength** The space around a magnet, or another magnet, within its field.

**magnetic gap** A space separating the materials in a magnetic circuit. This break is either an air space or one filled with a comparatively thin piece of nonmagnetic material (e.g., the gap in a choke-coil core).

**magnetic head** See MAGNETIC PICKUP HEAD.

**magnetic hysteresis** See HYSTERESIS.

**magnetic inclination** See MAGNETIC DIP.

**magnetic induction** 1. The magnetization of a magnetic material, such as iron or steel, when it is placed in a magnetic field. 2. The induction of an alternating voltage in a conductor by a nearby alternating magnetic field. Also see ELECTRO-

**magnetic insterity** The tendency of a mag-

**magnetic iron oxide** A magnetic recording medium to deteriorate with time.

**magnetic iron oxide** The powdery state of finely divided particles of magnetic material. Also see MAGNETIC CHARACTER.

**magnetic constant** The absolute permeability of a vacuum, equal to 1.26 x 10^-6 H/m.

**magnetic current** A steady magnetic force applied to another magnetic field, so that the latter's qus-

**magnetic cyclotron** A direction-indicating device using a horizontally suspended magnetic needle as the indicator. The needle tends to point in the direction of the north geomagnetic pole. Compare GYROCOMPASS.

**magnetic core** The iron core of an electromagnet, choke, transformer, relay, or similar device.

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**magnetic field density** The absolute permeability of a vacuum, equal to 1.26 x 10^-6 H/m.
magnetic memory. See RETENTIVITY. 2. A digital memory circuit using magnetic fields to store data bits. Examine BUBBLE MEMORY.
magnetic meridian. The circle of the celestial sphere that passes through the zenith and earth’s magnetic poles.
magnetic mine. A naval mine detonated by a magnetic field that is closed by the proximity of the steel hull of a ship.
magnetic modulator. A core-type device that is somewhat similar to a magnetic amplifier used for amplitude modulation. Modulating current passes through the control winding, and the carrier current through the output winding.
magnetic moment. Unit: joule per tesla. For a magnet, the product of pole strength and the distance between poles.
magnetic needle. The pivoted magnetic pointer in a magnetic compass.
magnetic north. See NORTH MAGNETIC POLE.
magnetic oxide. Iron oxide used as the sensitive coating of magnetic recording tape.
magnetic pickup. 1. A phonograph pickup of the variable-reluctance type (see VARIABLE-RELUCE-
TANCE PICKUP). 2. A magnetic transducer (such as a piano cartridge, tape recording head, or similar input element).
magnetic pickup head. In a tape recorder, the transducer that receives magnetic impulses from the passing tape and converts them into magnetic impulses that magnetize spaces on the passing tape. Compare MAGNETIC PICKUP HEAD.
magnetic recording medium. 1. A magnetic cylinder, disk, drum, tape, or wire used in the recording of sound or data. 2. The sensitive material with which any of these is coated.
magnetic remanence. See RESIDUAL MAGNETISM.
magnetic repulsion. The force that causes a magnetic pole to push away a similar magnetic pole, although they are not in mutual contact. Thus, two north poles repel each other, as do two south poles. Compare MAGNETIC ATTRACTION.
magnetic recording head. In a tape recorder, the transducer that receives current impulses (analogous of the original sound vibrations) from an amplifier and converts them into magnetic impulses that magnetize spaces on the passing tape. Compare MAGNETIC PICKUP HEAD.
magnetic resistance. See CYCLotron.
magnetics. 1. Collectively, magnetic components and equipment. 2. Collectively, magnetic materials. 3. A branch of physics dealing with magnets and magnetism.
magnetic saturation. The condition in which a magnetic material passes all of the magnetic lines of flux that its permeability allows. Increasing the intensity of the magnetizing force will produce no increase in magnetization.
magnetic scan. See ELECTROMAGNETIC DE-
LECTION.
magnetic shield. See ELECTROMAGNETIC SHIELD.
magnetic shielding. 1. Enclosing a magnetic field to confine its flux, thus preventing interaction with outside bodies. 2. Devices (such as boxes, cans, or shells of iron, steel, or a magnetic alloy) used for the purpose of confining magnetic flux.
magnetic shift register. A shift register using magnetic flips flops.
magnetic shunt. A device that allows the useful magnetic flux of an instrument’s magnet to be controlled. The device consists of a piece of magnetic material near the magnet in an electrical measuring instrument.
magnetic south. See MAGNETIC SOUTH POLE.
magnetic speaker. 1. A loudspeaker that is essen-
tially an enlarged earphone with a horn that con-
veys and intensifies the sound from the vibrating diaphragm. 2. A loudspeaker in which the vibra-
tion of a diaphragm or reed in the field of a per-
manent magnet is conveyed by a pin to a paper or composition cone. Compare DYNAMIC SPEAKER.
magnetic storage. 1. A data bank or memory that stores information in the form of magnetic fields. 2. The data on a magnetic tape or disk.
magnetic storm. A disturbance in the earth’s mag-
netic field that typically follows a solar flare. Of-
ten causes interference to radio communications at low, medium and high frequencies.
magnetic strip. A strip of powdered iron or ferrite on the back of an identification card, bank cash car or credit card, that carries a code to identify the account number and verify that the secret en-
try code (if any) is correct, or that the credit is good for the purchase.
magnetic susceptibility. See SUSCEPTIBILITY.
magnetic switch. 1. In security systems, a switch kept open by the presence of a magnet attached to a door, window, or other movable object. When the object is moved, the magnet moves away from the switch, closing the switch and actuating an alarm. 2. A REED SWITCH operated by a mag-
etic field.
magnetic tape. Plastic tape coated with a film of magnetic material, it can be magnetized along its length to record sounds, video signals, and computer information.
magnetic-tape core. A strip of magnetic metal wound spirally to create a toroid (donut) shape. Such a core is sometimes used in chokes or transformer cores. Also see TOROID.
magnetic tape deck. See TAPE DECK.
magnetic-tape drive. See TAPE TRANSPORT.
magnetic tape head. See MAGNETIC PICKUP HEAD and MAGNETIC RECORDING HEAD.
magnetic-tape library. In a computer installation, the place where magnetic tape files are kept, or magnetic tape files and the records needed to use them.
magnetic tape parity. As a safeguard against los-
ing information bits during the transfer of infor-
mation between magnetic tape and a memory device, a technique in which an extra bit is gener-
ated and added to characters under certain con-
tions, to make the output uniform temporarily.
magnetic tape reader. A tape deck for playing back data on magnetic tape.
magnetic tape recorder. A recorder-reproducer using magnetic tape.
magnetic test coil. See SEARCH COIL.
magnetic thick film. A film of magnetic material at least 10 μm in thickness, deposited on a sub-
strate. Compare MAGNETIC THICK FILM.
magnetic thin film. A film of magnetic material, less than 10 μm in thickness, deposited on a substrate. Compare MAGNETIC THICK FILM.
magnetic transducer. A transducer that uses a coil, magnet, or both, to convert displacement into variable magnetic fields or electric currents. Common varieties are the induction type, trans-
former type, and generator type. Compare CAPACITIVE TRANSDUCER, CRYSTAL TRANS-
DUCE R, and INDUCTIVE TRANSDUCER.
magnetic tuning. In a microwave oscillator, a means of tuning in which a ferrite rod in the car-
tivity resonator is made to have adjustable magneti-
sation so that the resonant frequency of the cavity varies and the frequency of the oscillator is thus adjustable. It is also used at ultra-high fre-
frequencies (UHF) and occasionally at very high fre-
frequencies (VHF).
magnetic-vane meter. See IRON-VANE METER.
magnetic vector. In an electromagnetic field, the vector representing the magnetic component. It is perpendicular to the electric vector.
magnetic viscosity. A property of certain materi-
als, described in terms of the time required to magnetize a given substance to a specified level.
magnetic whirl. One of the circular magnetic lines of flux around a straight conductor that carries electric current.
magnetic shielding • magnetic whirl
magnetic wire  The thin wire used in wire recording and playback. See WIRE RECORDER.
magnetism  The property of having or causing a magnetic field. It occurs when magnetic dipoles are aligned and when electric charge carriers are in motion.
magnetite  A natural magnetic oxide of iron. Also see MAGNETITE.
magnetization curve  A curve depicting the magnetization of a material versus the applied magnetic force. See, for example, HYSTERESIS CURVE.
magnetizer  A device for magnetizing magnetic materials, as in the making of permanent magnets. Also see MAGNET CHARGER. Compare DEMAGNETIZER.
magnetizing current  1. A current that sets up a magnetic field of useful intensity. 2. The half-cycle of an alternating current or the polarity of a direct current flowing through a coil wound on a permanent magnet (as in a headphone, permanent-magnet loudspeaker, or polarized relay) that increases magnetic field strength. Compare DE-MAGNETIZING CURRENT. 3. The field current of a dynamo.
magnetotive force  1. Magnetotive force (in Gilberts) divided by spatial distance (in meters). 2. The intensity of a magnetic field that causes a material to become magnetized.
magnet keeper  See KEEPER.
magnet motor  See PERMANENT-MAGNET MOTOR.
magnetooptic  See PERMANENT-MAGNET GENERATOR.
magnetocardiogram  Abbreviation, MCG. A record, made by a MAGNETOCARDIOGRAPH, of the pulsating magnetic field of the heart. It is used as a diagnostic aid.
magnetocardiograph  An instrument that produces a record of the pulsating magnetic field generated around the torso by natural ion currents in the heart.
magnetoelectric generator  See MAGNETOELECTRIC GENERATOR.
magneto fluid mechanics  See MAGNETOHYDRODYNAMICS.
magneto dynamics  See MAGNETOHYDRODYNAMICS.
magneto dynamics  See MAGNETOHYDRODYNAMICS.
magnetotactic  A propulsion path for radio waves between two points that have the same geomagnetic longitude on the surface of the earth. The radio waves tend to travel with the geomagnetic field lines of flux at some frequencies under certain conditions.
magnetotaxis  The study of the effects of the geomagnetic field on the propagation of radio waves.
magnetogenerator  See PERMANENT-MAGNET GENERATOR.
magnetograph  An instrument for automatically recording a magnetic field.
magnetohydrodynamic generator  A device using magnetohydrodynamic principles to generate electric power directly from gases. In the generator, a hot gas is passed through an intense magnetic field; a pair of collector plates picks up electrons from the ionized gas.
magnetohydrodynamic gyroscope  A gyroscope whose spin is obtained by a rotating magnetic field circulating a conducting fluid, such as mercury, around a closed loop. Also see MAGNETOHYDRODYNAMICS.
magnetohydrodynamic power generator  See MAGNETOHYDRODYNAMIC GENERATOR.
magnetohydrodynamics  Abbreviation, MHD. The theory and application of phenomena produced by electrically conductive fluids and gases in electric and magnetic fields.
magnetometer  An instrument for measuring the strength and direction of magnetic fields.
magnetometric force  Abbreviation, mmf. Unit, ampere. The phenomenon that is sometimes descriptively called magnetic pressure. It is analogous to electromagnetic force (and to water pressure) and is the agent that produces a magnetic field.
magneton  See BOHR MAGNETON.
magneto-optical rotation  The tendency of a magnetic field to rotate the plane of polarization of light passing through a substance. Also see KERR MAGNETO-OPTICAL EFFECT.
magneto-optical technology  A computer data-storage technology that uses lasers to guide the read/write head in a magnetic disk drive. This greatly increases the amount of data that can be effectively stored on, and retrieved from, a magnetic disk.
magneto-optical valve  See KERR MAGNETO-OPTICAL EFFECT.
magnetopause  The high-altitude limit of the MAGNETOSPHERE.
magnetoplasma dynamics  See MAGNETOHYDRODYNAMICS.
magnetoresistance  The phenomenon whereby the resistance of a material, such as a semiconductor, changes when it is exposed to a magnetic field. Also see MAGNETORESISTOR.
magnetoresistor  A material (such as bismuth wire, indium antimonide, or indium arsenide) whose resistance varies with the strength of a magnetic field in which it is placed.
magnetosphere  In the upper atmosphere, a region extending thousands of kilometers from the earth, in which charged particles are trapped by the earth's magnetic field.
magnetostatic field  A stationary magnetic field, such as that produced by a permanent magnet.
magnetostriiction  The expansion or contraction of such material, as in the making of permanent magnets. Also see MAGNET CHARGER. Compare DEMAGNETIZER.
magnetization curve  A curve depicting the magnetization of a material versus the applied magnetic force. See, for example, HYSTERESIS CURVE.
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magnetizer  A device for magnetizing magnetic materials, as in the making of permanent magnets. Also see MAGNET CHARGER. Compare DEMAGNETIZER.
main path • manual

main path In a computer program, the sequence of instruction executed disregarding the execution of subroutines.

main program The part of a computer program other than a subroutine.

main routine See MAIN PROGRAM.

mainals 1. In a power-distribution center, the lines that supply the entire system; an example is the set of lines leading into a house. 2. The utility wires and associated outlets in a house or building.

maintainance The process of keeping a system, circuit, or component in operating condition, with minimal down time.

maintenance routine A computer program used by computer personnel for diagnosis during a regular service interval.

major beats The principal beats produced in a seismolectric signal; they are the sum and/or difference of two fundamental frequencies. Compare MINOR BEATS.

major face In a hexagonal quartz crystal, one of the three larger faces. Compare MINOR FACE.

majority carrier The predominant charge carrier in processed semiconductor material. Electrons are the majority carriers in n-type material; holes are the majority carriers in p-type material. Compare MINORITY CARRIER.

majority logic A logic gate in which the output is high whenever the majority of its inputs is high, regardless of which inputs are high. Thus, in a five-input gate of this type, the output is high when any three or more of the inputs are high.

major loop The principal path for the circulation of information or control signals in an electronic system (e.g., major feedback loop). Compare MINOR LOOP.

make 1. The closing of a pair or set of contacts. 2. To close a pair or set of contacts.

make-before-break contacts A pair of contacts in which the movable arm closes with the next contact before breaking with the previous one. Compare BREAK-BEFORE-MAKE CONTACTS.

make time The time required for a relay to latch completely, or for a switch (either mechanical or electronic) to close completely. Compare BREAK TIME.

male plug A plug having one or more protruding contacts in the form of pins, blades, or prongs. Compare FEMALE PLUG and HERMAFRODITIC PLUG.

Malter effect The tendency for a layer of semiconductor having a high secondary emission ratio to become positively charged when bombarded by electrons. This occurs when a thin insulator separates the semiconductor from a metal plate. The insulator must be very thin (on the order of 10⁻⁷ meters). This results in a potential difference of up to about 100 volts.


manganese-dioxide depolarizer In a dry cell, manganese dioxide mixed with powdered carbon, the mixture being a depolarizing agent. Also see DEPOLARIZER.

manganin A low-temperature-coefficient alloy used in making wire for precision resistors. A typical composition is copper (84 percent), manganese (12 percent), and nickel (4 percent).

manipulator A robot arm and end effector, as used in automated manufacturing, or in use with computer-service personnel for diagnosis and repair.

man-made interference See HUMAN-MADE INTERFERENCE.

man-made static See HUMAN-MADE INTERFERENCE.

manometer An instrument for measuring gas or vapor pressure—especially at low levels.

manpack A portable radio transceiver that can be used while walking.

mantissa 1. The portion of a logarithm to the right of the decimal point. Thus, in 3.952902 (log₁₀ 8964), the mantissa is 0.952902. 2. The fixed point part of a number in scientific notation; thus, in 4 × 10⁻³, the mantissa is 4.

manual 1. Actuated or operated directly by mechanical means, rather than automatically. 2. A book, or a set of online information files, detailing the operation and maintenance procedures for a device or system. Compare INSTRUCTION MANUAL.

manual input Use of a keyboard, mouse, trackball, or other electromechanical input device to enter data into a computer. Compare DIRECT ENTRY, TELETYPE ENTRY.

manual operation In data processing, an operation in which automatic machines are not involved.

manual telegraphy Telegraphy that consists of signals transmitted by a hand-operated key and recorded by hand (pen, pencil, or typewriter).

manual tuning Tuning performed entirely by adjusting variable circuit components by hand.

manual word generator A device by which an operator can originate information words for input into a computer memory.

manufacturing automation protocol In a factory using computer-controlled robots, the set of standards for data communication between the robots and the controller and/or between individual robots. It keeps the factory operating smoothly.

MAR Abbreviation of MEMORY-ADDRESS REGISTER.

Marconi antenna A quarter-wave radio transmitting or receiving antenna operated against an earth ground. See MARCONI EFFECT.

Marconi effect The undesired tendency of an entire receiving antenna system, including lead-in or feeders, to act as a MARCONI ANTENNA.

margin 1. A gap or space between two objects, such as adjacent plates of a capacitor. 2. Clearance. 3. The maximum error that can be tolerated without risk of improper or abnormal operation. 4. In a cutoff amplifier, the range of adjustments in which the error frequency is acceptable.

marginal relay A relay having a small difference between its on and off currents or voltages.

marginal test As performed on equipment in a cutoff amplifier, a test to either determine the cause of an intermittent malfunction, or verify an equipment's operating tolerances.

marine broadcast station A coastal station that broadcasts information of interest to shipping; also, a station used in mechanical processes, etc.

marine radio Radio communications between seagoing vessels or between vessels and shore stations.

marine radionavigation station A land-based radio-navigation station whose transmitted signals are used for taking bearings.

mariner's compass See MAGNETIC COMPASS.

marker 1. A pip that indicates a particular frequency on a response curve displayed on an oscilloscope screen. 2. A character that identifies the end of a data set. Also called MARK (see MARK, 4). Compare MARKER.

marker beacon Individual-coded-signal transmitters placed along a radio range and indicating features of the course marked by them. Compare BEACON.

marker frequency 1. A known frequency that can be used to identify a spot-frequency harmonic of a frequency-standard signal. 2. A known accurate signal used to identify the limit of a radio band. 3. The frequency at some point on a response curve as identified by a marker pip (see MARKER).

marker generator An oscillator that supplies a marker pip (see MARKER).

mark hold In telegraphy, an unmodulated signal meaning information is not being sent.

mark reading The reading by an optical scanning device of marks made in specific areas of a document; the process also includes the marks' conversion to digital signals for input to a computer.

mark scanning See MARK READING.

mark sensing A process similar to MARK READING, except that the marks are sensed electrically.

marker trap A wire trap that supplies a dip-type marker pip when used in conjunction with a radio-frequency test oscillator (see MARKER).

market-capture device A device that scans a bar-black binary label printed on a carton or other package for recognition, and indicates the price of the merchandise on the readout of the checkout register.

mass/energy-space ratio In radiotelegraphy, the ratio of the duration (mark) of a dot to the interval (space) between successive dots.

Marx generator An impulse-type high-voltage direct-current generator circuit in which several direct-current generators are connected in series through spark gaps, producing a high-voltage pulse for each discharge.

maser A low-noise microwave amplifying device in which energy-state molecules of ammonia or ruby to fall to the low-energy state and, as a result, to emit large amounts of energy as an output signal. The name is an acronym for micrometeor amplification by stimulated emission of radiation.
mask 1. A kind of stencil through which plating, electrodeposition, or diffusion can be done. 2. The chart at the display of a cathode-ray oscilloscope.

masking 1. The use of a MASK of any type. 2. The tendency of a mask to obscure a phenomenon to obscure another. It applies especially in audio systems, where certain sounds impair the ability of a listener to hear other sounds that occur at the same time. 3. The extent to which one effect or phenomenon obscures another.

mass 1. The quantity of matter in a body. Like weight, mass is expressed in kilograms in the metric (SI) system and in pounds in the English system. For a given piece of material, mass can be determined by dividing the weight by the acceleration of gravity.

mass data 1. Data in excess of the maximum amount that can be stored in the main (internal) storage unit of a digital computer (i.e., that can only be accommodated by external media such as magnetic disks or tapes).

mass energy equation In geometry (E) is the product of a given mass (m) and the square of the speed of light (c^2) E = mc^2. It is also called the Einstein equation.

mass number 1. Symbol, A. A number representing the total of neutrons and protons in the nucleus of an atom. The approximate mass of an atom is equal to A × m_n, where m_n is the total proton mass. 2. The number indicating the sum of nucleons and neutrons in an atom. It is usually written following the symbol for the element: thus, U-238 is uranium having 238 nucleons. An isotope of an element will have a different mass number than that of the normal atom.

mass spectrometer Abbreviation, MS. An instrument that permits rapid analysis of chemical compounds via the MASS SPECTRUM.

mass spectrum An electron spectrum that can be used to identify a chemical element. Different elements have unique mass-to-charge ratios. This results in each element having a unique mass spectrum.

mass storage In a computer system, a magnetic or optical storage medium capable of holding large amounts of data. Examples: magnetic diskette, magno-Moscow diskette, external hard disk, compact disk-read-only memory (CD-ROM), and magnetic tape.

mass unit See ATOMIC MASS UNIT.

master 1. The primary or main element or device in a system. 2. A primary data medium or recording from which copies are made. 3. A primary reference standard. See the following several definitions.

master clock 1. In a digital computer, the primary generator of timing pulses. 2. A standard time clock that drives other (slave) clocks, or to which clocks of lesser accuracy can be referred.

master console See MASTER GAIN CONTROL.

masurium See TECHNETIUM

mass data The principal gain control in a transistorized, single-frequency audio amplifier or mixer (i.e., the one used to adjust the gain (volume) of the entire system).

mass data master control 1. The main control circuit in a system. 2. A point from which signals or programs are distributed to communications or broadcast system.

mass data master Data also called archives. In a computer storage library, data elements that remain unaltered for a long time, and from which copies are made.

mass data file A computer file of data used routinely and remaining unchanged for a long time.

mass data file control The principal gain control in a computer system, the equipment with panel instruments and controls, which permits operations to be governed, monitored, and controlled by a human operator.

mass data master control 1. The main control circuit in a system. 2. A point from which signals or programs are distributed to communications or broadcast system.

mass data library tape See MASTER PROGRAM FILE.

mass data master oscillator (Abbriviation, MO). The master oscillator in an electronic system (e.g., the oscillator stage in an oscillator-amplifier type of radio transmitter). This oscillator can be either self-excited or crystal-controlled.

mass data master oscillator-power amplifier Abbreviation, MOPA. A type of transmitter or signal generator in which a frequency-determining oscillator drives a power amplifier, which in turn delivers an output signal. Because the oscillator is isolated, the matching that is required to deliver the maximum power to the load will have a greater stability than one in which the oscillator alone supplies power to the load.

master pattern The etching pattern used for manufacturing a batch of identical printed-circuit boards.

master program file A reel of magnetic tape on which is recorded the programs regularly used in a data-processing installation. It is also called master library tape.

master readout In a data-processing system, the current record (usually stored on a disk or tape) that will be used for the next computer run.

master relay A relay that operates other (slave) relays. Compare SLAVE RELAY.

master switch A switch that can activate or deactivate an entire installation or system.

master tape 1. In sound recording and reproduction, a magnetic tape that contains material from which other tapes and discs can be made. 2. In automation, a magnetic tape on which is recorded the basic signal sequence for controlling a process and other recorders. 3. In data processing, a magnetic tape that must not be erased.

master volume control See MASTER GAIN CONTROL.

mass data storage 1. The primary or main element or device in a system. 2. A primary data medium or recording from which copies are made. 3. A primary reference standard. See the following several definitions.

master clock control 1. In a digital computer, the primary generator of timing pulses. 2. A standard time clock that drives other (slave) clocks, or to which clocks of lesser accuracy can be referred.

mass detector In a computer system, an equipment with panel instruments and controls, which permits operations to be governed, monitored, and controlled by a human operator.

mass data master control 1. The main control circuit in a system. 2. A point from which signals or programs are distributed to communications or broadcast system.

mass data master data 1. Data also called archives. In a computer storage library, data elements that remain unaltered for a long time, and from which copies are made.

mass data file master A computer file of data used routinely and remaining unchanged for a long time.

mass data master control 1. The main control circuit in a system. 2. A point from which signals or programs are distributed to communications or broadcast system.

matched components Circuit components (capacitors, coils, diodes, resistors, transistors, etc.) that are carefully selected for similar or particularly compatible operating characteristics.

matched load A load with input and output impedances matched to the input line and output load, respectively. 2. A load designed for separating a signal with a particular waveform from other signals and noise.

matched impedance A usually non-reactive impedance that has the same value as that of another impedance with which it is operated. Maximum power is transferred between impedances that are matched.

matched line A purely resistive load, the impedance of which is the same as the characteristic impedance of the feed line. This results in optimum power transfer from the line to the load.

matched pair A pair of matched components of the same type (e.g., a matched pair of single-packet transistors). A computer file of data used routinely and remaining unchanged for a long time.

matched transmission line A transmission line terminated in a purely resistive impedance whose value is identical to the characteristic impedance of the line. Such a line transfers all of its energy to its far end without reflection; no standing waves are on the line.

matched input An inductance-capacitance (LC) network in a matched transmission line that has a characteristic impedance of a load to the output impedance of a signal generator.

matched output See SUB-TO-MATCH.

matched transformer An audio-frequency (AF) or radio-frequency (RF) transformer used to match the characteristic impedance of a line to the load impedance of a device.

matchcode A transistorized, single-frequency audio oscillator that can be used to monitor trans-
maxima and minima • Maxwell's equations

maxima

Local maxima

maxima

- The study and solution of maximum, minimum, and inflection points on the curve of a function.

maximal flatness
- For an amplifier or network, the condition in which peaks are not present in the normal passband response.

maximum
- Abbreviation, max. The highest value in a range or set. Also see MAXIMA AND MINIMA and PEAK.

maximum available gain
- Abbreviation, MIG. The amplification provided by a circuit or device whose input and output impedances are correctly matched to source and load.

maximum current
- Symbol, I or Imax. The highest value reached by an alternating-current half cycle or by a pulse current. Also called PEAK CURRENT. 2. The highest value of current in a series of current values.

maximum power
- Symbol, P or Pmax. The highest value of power that an equipment can be called upon to supply. 2. The highest value of power in a series of measurements or calculations.

maximum-power discharge current
- For a cell or battery, the current at which the greatest amount of power is delivered.

maximum power output
- See MAXIMUM POWER.

maximum power transfer
- The condition in which the largest amount of power is delivered by a source to a load.

maximum power transfer theorem
- Maximum power is transferred from a generator to a load when the impedance of the load equals the internal impedance of the generator. Compare COM- PENSATION THEOREM, NORTON'S THEOREM, RECIPROCITY THEOREM, SUPERPOSITION THEOREM, and THEVENIN'S THEOREM.

maximum rating
- 1. The highest value of a quantity (e.g., current, voltage, or power) that can safely be used with a given device. 2. The highest value of a quantity afforded by a given device (e.g., maximum capacitance of a variable capacitor).

maximum record level
- 1. In a magnetic tape, magnetic disk, or phonograph disc, the highest amplitude of input signal that can be recorded with an acceptable amount of distortion. 2. The recording-head current or power that results in third-harmonic distortion of three percent.

maximum usable frequency
- Abbreviation, MUF. The highest frequency that can be used successfully at a given time, between two specific geographic locations, for communication via the ionosphere.

maximum voltage
- 1. Abbreviation, V or Vmax. The voltage applied across a diode or transistor in the forward direction. 2. The highest value of voltage in a series of voltage measurements or calculations.

maxterm form
- 1. In mathematical calculations, the factored form of a function, expressed as a product of sums. For example, the maxterm form of a term is given as f(x) = x1 + x2 + x3. 2. In digital logic, the highest value of voltage in a series of voltage measurements or calculations.

MeC
- Abbreviation of MONOSTABLE BLOCKING OSCILLATOR.

MeC
- Abbreviation of MAGNETOCARDIOGRAM.

MeC
- Abbreviation of MONOSTABLE CONTINUOUS WAVE.

Mc/s
- Abbreviation of MONTE CARLO METHOD.

Meadom oscillator
- provided with a feedback circuit containing a four-bridge, one arm of which is a quartz crystal, and another, a tungsten-filament lamp acting as a nonlinear resistor. Also called bridge-stabilized oscillator.

mean
- 1. A general term meaning average. 2. See ARITHMETIC MEAN. 3. See GEOMETRIC MEAN.

mean 1.
- In an object that is normally charged, the average charge per unit distance, area, or volume. 2. In a capacitor carrying a fluctuating current, the average amount of charge held by the plates.

mean free path
- 1. In acoustics, the average distance that sound waves travel before striking a barrier or reflecting surface. 2. The average distance that sound waves travel between reflections (echoes) in a chamber. 3. In a gas tube, the average of all the free paths of electrons at a specified temperature.

mean life 1.
- Symbol, L. The average life of a radioactive substance (i.e., the time taken for 1/e = 0.368 of the substance to disintegrate). 2. The time required for excess carriers injected into a semiconductor to recombine with carriers of opposite sign. Also called average life.

mean proportional
- See GEOMETRIC MEAN.

mean time before failure
- Abbreviation, MTBF. The average length of time that a component or system will perform before the first failure occurs. It is generally specified in hours.

mean time between failures
- Abbreviation, MTBF. The average length of time that a component or system will perform before the first failure occurs. It is generally specified in hours.

measured
- A quantity that is presented to an instrument for measurement.

measured service
- Any service in which charges are assessed per unit-time usage block. Online computer services are a common example. In some cases, other factors, such as distance, affect the cost per unit time; most long-distance telephone services fall into this category.

measurand
- A quantity that is measured with an instrument.

predicted the existence of electromagnetic waves, whose later discovery made radio possible.

Maxwell's law
- Also called Maxwell's rule. Every part of an electric circuit is acted upon by a force tending to move it in the direction that results in the maximum magnetic flux being enclosed.

maxwell-turn
- A unit of magnetic coupling (linkage) equal to one maxwell per turn of wire in a coil linked by magnetic flux. Also see MAXWELL.

maxwell-voltage
- A unit of magnetic coupling equal to one maxwell-volt of voltage in a series of current measurements or calculations.

Maxwell's equations
- A set of four equations developed by James Clerk Maxwell in 1864 and 1873, describing vector quantities pertaining to points in space subjected to varying electric and magnetic forces. Through his classic presentation, Maxwell predicted the existence of electromagnetic waves, whose later discovery made radio possible.

Maxwell bridge
- A four-arm alternating-current bridge for measuring inductance against a standard capacitance.

Maxwell's equations • measurand 437

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measurement 1. The process by which the magnitude, extent, or duration of a parameter is found. 2. The value of a parameter, as obtained, according to 1.

measurement error The difference between the measured value and its true value. Also see NEGATIVE ERROR OF MEASUREMENT and POSITIVE ERROR OF MEASUREMENT.

measurement range In a measuring device, the range within which the error is smaller than a specified value.

mechanical analogs Familiar mechanical devices, systems, or effects with which certain electrical counterparts can be compared for ease in teaching or understanding (e.g., inductance compared with mass, capacitance with elasticity, voltage with pressure, and current with velocity).

mechanical axis In a quartz crystal, the axis perpendicular to the faces of the hexagon. Also see Y-AXIS, 2.

mechanical bandwidth Bandwidth obtained by reducing ratio gearing of the tuning mechanism. Compare ELECTRICAL BAND-SPREAD.

mechanical bias 1. A steady pull applied by a spring to the armature of a relay to sensitize it by decreasing the distance that the armature must move to close the contacts. 2. Bending of a relay frame to position the armature closer to the magnet for the purpose defined in 1.

mechanical damping Damping action obtained entirely by mechanical devices (such as weights, dampers, etc.).

mechanical equivalent of heat The amount of mechanical work required to produce a unit quantity of heat. The mechanical equivalent of 1 calorie is 4.184 joules, or 1.83 joules can be converted into 1 calorie of heat.

mechanical equivalent of light The expression of luminous energy in equivalent power units. In practical measurements, this is taken as the total power output of a lamp minus the power absorbed by a transparent jacket used to remove the infrared and ultraviolet rays.

mechanical filter See ULTRASONIC FILTER, 1.

mechanical joint A union of electrical conductors consisting exclusively of a junction or splice made without braiding, soldering, or welding.

mechanical load An electromagnetic device that uses the output of an electrical source. Such devices include actuators, brakes, clutches, meters, relays, etc.

mechanical rectifier A vibrator or commutator used to change an alternating current into a direct current by selecting and passing only positive or negative half-cycles. Also see ELECTRICAL MECHANICAL RECTIFIER.

mechanical scan A mechanical device for scanning an object or scene and breaking it into horizontal lines that are converted to signals. A device that scans the reproducer lamp in a mechanical television receiver. See, for example, NIPROW DISK.

mechanical switch A switch actuated by moving or sliding a lever, pressing a button, or otherwise applying mechanical pressure.

mechanical time constant For a torque motor, the ratio of moment of inertia to damping factor. Also see ELECTRICAL TIME CONSTANT.

mechanical wave filter See ULTRASONIC FILTER, 1.

mechanics The branch of physics concerned with forces and motion and the laws of gases and liquids. It is subdivided into kinematics and kinetics.

mechatronics Combination of the words mechanics and electronics, referring to the use of electromechanical devices (especially robots) in manufacturing. The term was originally coined in Japan.

median 1. The middle value in a sequence of numbers. For example, in the series: 1, 2, 3, 4, 5, 6, 7, the median is 4. Compare ARITHMETIC MEAN and GEOMETRIC MEAN. 2. In a statistical distribution, the value s in the domain so that the area under the curve for all values less than s is equal to the area under the curve for all values greater than s.

medical electronics See ELECTRICAL ENGINEERING.

medical robot 1. A robot used in a doctor’s office, or in a hospital to assist doctors and nurses. There are various applications, some of which have provoked controversy (e.g., robotic surgical assistants). It generally performs simple, noncritical tasks. It has been suggested as a means of entertaining hospital patients—especially children. 2. See BIOMECHANISM.

medium In a computer system, that storage device onto or into which data is recorded for input into memory (e.g., magnetic disk, magnetic tape, optical disk, etc.).

medium-frequency Abbreviation, MF. Pertaining to frequencies in the range 300 kHz to 3 MHz, representing wavelengths from 1000 meters to 100 meters.

medium of propagation The substance (or vacuum) through which electromagnetic energy is transmitted (e.g., outer space, the atmosphere, or dielectric material).

medium-scale integration A method of manufacturing integrated circuits, in which there are at least 10, but less than 100, individual gates on each chip. Abbreviated MSI.

megabyte Abbreviation, MB. A unit of digital data equal to 220 (1,048,576) bytes. Also see BIT.

megabaud Abbreviation, MB. A unit of electrical energy or of work; 1 MWh = 106 Wh = 1,000,000 Wh.

megawatt-hour Abbreviation, MWh. A large unit of electrical energy; 1 MWh = 106 Wh = 1,000,000 Wh. Also see ELECTRONVOLT.

megawatt-hour Abbreviation, MW. A unit of electrical power; 1 MW = 106 W = 1,000,000 W. Also see ELECTRONVOLT.

megavolt Abbreviation, MV. A unit of extremely high voltage; 1 MV = 106 V = 1,000,000 V.

megavolt-ampere Abbreviation, MVA. Also see VOLT-AMPERE.

mechanical equilibrium The state of a system in which there is no change. Compare ELECTRICAL TIME CONSTANT.

mechanical noise Abbreviation, MN. A unit of noise produced by the MELTBACK PROCESS.

megawatt-ampere Abbreviation, MA. A unit of extremely high reactive power; 1 MVA = 106 VA = 1,000,000 VA. Also see VOLT-AMPERE.

mechanical tension 1. Medium voltage. A relative term, but generally referring to common alternating-current utility voltage (e.g., 117 volts or 234 volts). 2. Pertaining to waveforms, to medium frequency components (see MEDIUM-FREQUENCY) i.e., those in the 300 kHz to 3 MHz range.

megatron Abbreviation for MEGOHM(s). Also see RESISTANCE.

mechard Abbreviation for MEGOHM(s). Also see RESISTANCE.

megavit calibration Abbreviation, MCI. A large unit of radioactivity equal to 3.71 × 1010 disintegrations per second; 1 MCI = 1012 curies. Also see CURIE.

megacycle See MEGAHERTZ.

megacoulomb Abbreviation, MC. A unit of charge that is equivalent to 3.71 × 1010 coulombs.

mechanical filter A switch actuated by moving or sliding a lever, pressing a button, or otherwise applying mechanical pressure.

mechanical tension Medium voltage. A relative term, but generally referring to common alternating-current utility voltage (e.g., 117 volts or 234 volts).

megohmmeter A special ohmmeter for measuring resistances in the megohm range.

megohm-microfarad For a capacitor, the product of leakage resistance (megohms) and capacitance (microfarads). Also see MEGOHM MICROFARAD.

meissner circuit An oscillator tuned by means of LECHER WIRE (parallel-conductor resonant circuits). It is used primarily at ultra-high frequencies (UHF).

Meissner effect In a superconducting material, the abrupt loss of magnetism when the temperature of the material is reduced to a value below that required for superconductivity.

meissner oscillator See MEISSNER CIRCUIT.

mechanical equivalent of light A unit of luminous energy in equivalent power units. In practical measurements, this is taken as the total power output of a lamp minus the power absorbed by a transparent jacket used to remove the infrared and ultraviolet rays.

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megohm-microfarad For a capacitor, the product of leakage resistance (megohms) and capacitance (microfarads). Also see MEGOHM MICROFARAD.
melting point  Abreviation, mp. The temperature at which a solid starts becoming liquid at a pressure of one atmosphere. Compare FREEZING POINT and MIXTURE MELTING POINT.

memory 1. The section of a digital computer that records information until it is needed. In personal computers, the term generally refers to RANDOM ACCESS STORAGE and READ-ONLY MEMORY, contained in integrated circuits (ICs). Compare STORAGE. 2. See MEMORY DRAIN.

memory address register  In computer storage, a register in which is stored the address of operands in other locations.

memory area  A portion of computer memory reserved for a specific type of data. Also called area.

memory capacity  As a function of the number of memory locations available, the number of bytes that can be stored. It is usually specified in kilobytes, megabytes, or gigabytes. Also see GIGABYTE, KILOBYTE, and MEGABYTE.

memory cycle  The period of execution of a sequence of operations. 2. The complete operational cycle for inputting data to memory or retrieving it.

memory dialing  In a telephone set, a feature that allows dialing of stored digits. The simplest version is the "redial" feature, in which the most recently dialed number is automatically redialed at the touch of a button. Some sets can store several different numbers, usually including area codes, and sometimes country codes as well.

memory dump  In computer operations, to either print out what is stored in some or all of the memory locations or transfer the data from a bank of memory cells to some external storage medium.

memory effect  See MEMORY DRAIN.

memory guard  In a computer, hardware or software that keeps certain memory locations from being addressed by a program being run.

memory location  In computer memory, a place where an information unit (word or character) can be stored; the stored information can be retrieved by appropriate addressing instructions.

memory organization packets  In artificial intelligence (AI) and expert systems, a method of arranging information into general rules or statements. The statements are used by software to deal with diagnoses, etc.

memory power  Computer memory efficiency in terms of data processing (cycle) speed.

memory protection  A hardware device in a multiple programming computer that prevents programs from being altered by other operating programs in the installation.

memory register  In a digital computer, a register used in all instructions and data transfers between the memory and other sections of the machine.

memory unit  See MEMORY.


menu  In computer operations, a list of commands for using various functions of the system.

megahertz  Abbreviation for megahertz.

mercury  Symbol, Hg. A metallic element. Atomic number, 80. Atomic weight, 200.59. The only metal that is liquid at room temperature. It is used extensively in switches, certain high-voltage rectifiers, high-vacuum pumps, and thermometers.

mercury arc  The arc discharge occurring in mercury vapor between solid or liquid (mercury) electrodes. The discharge is ultraviolet in nature.

mercury-arc rectifier  A heavy-duty rectifier tube utilizing ionized mercury vapor. The two general types are MERCURY-VAPOR RECTIFIER and MERCURY-POOL RECTIFIER.

mercury battery  Also called mercury-zinc battery. A set of two or more mercury cells stacked one atop the other, electrically connected in series. The resulting battery provides 12 volts. See MERCURY CELL.

mercury cadmium telluride  Formulas HgCdTe. An alloy used as a semiconductor in certain transistors, integrated circuits, and infrared detectors.

mercury cell  Also called mercury-zinc cell. An electrochemical device containing a liquid zinc electrode, small enough to fit inside a wristwatch. The unit is housed in a steel container and has a mercury-zinc oxide cathode, amalgamated zinc anode, and potassium hydroxide and zinc-oxide electrolyte. The potential difference under no-load conditions is 1.35 volts, with a high ratio of stored energy per unit mass. The cell has a flat discharge curve; voltage remains essentially constant until the charge is almost depleted, and then the voltage drops rapidly. There has been a decrease in the use of mercury cells and batteries in recent years, because mercury is toxic. Unless these cells are disposed of in a special way, the mercury from them can cause dangerous contamination of soil and water.

mercury delay line  A delay line in which delay is obtained by propagating the signal through a pipe of mercury.

mercury diffusion pump  A vacuum diffusion pump using mercury vapor.

mercury element  A portion of computer memory.

mercury jet switch  A multipoint switch using a jet of mercury instead of the conventional wiper arm, for high-speed operation and reduced wear.

mercury memory  A recirculating memory using a mercury delay line. Also see DELAY LINE and DELAY-LINE MEMORY.

mercury-pool cathode  In certain industrial electron tubes, such as the igniton, a cathode electrode consisting of a pool of mercury.

mercury-pool rectifier  A type of mercury-arc rectifier whose cathode is a pool of mercury. In one type, the arc is initiated by tilting the tube momentarily to bring the mercury into contact with a third electrode, thus causing a starting current to flow through the pool. In another type, the igniton, a starter electrode is in continual contact with the mercury.

mercury pump  See MERCURY DIFFUSION PUMP.

mercury rectifier  See MERCURY-POOL RECTIFIER AND MERCURY-VAPOR RECTIFIER.

mercury relay  A relay in which at least one of the contacts is mercury.

meson  A phe- nomenon occasionally exhibited by nickel–cadmium cells. Compare STORAGE.

meson memory  A memory effect occasionally exhibited by nickel–cadmium cells. Compare STORAGE.

mesotrophic  A condition for signals in which significant instants pass at identical average speeds, such as bits per second.

mesotrons  A form of field-effect transistor combining certain structural features of the transistor and a vacuum tube. Also see MESOTRON.

mesothen  A program in which the cell structure of the transistor is similar to a vacuum tube.

mesophase  A phase of matter between the crystalline and liquid states.

mesostransistors  Diffused planar transistor in which the silicon area around the base has been etched away to reduce collector-to-base capacitance; the base-emitter region remains elevated like a high plateau (mesa).

mesofet  A form of field-effect transistor combining certain depletion-mode and enhancement-mode properties. A Schottky barrier forms the gate electrode.

meson  A combination of the elements that form a closed path in a network. 2. The closed figure (such as the delta or star) obtained by connecting polyphase windings together. 3. A grid, screen, or similar structure in a vacuum tube.

mesoservice 3. A service that provides fully the current and voltage relations in a network of meshes (see MESH, 1).

mesy circuit  A push-pull ultra-high-frequency (UHF) oscillator whose gate or base tank is a pair of parallel wires short circuited by a slider; the drain or collector tank is a similar pair of wires. The frequency is varied by moving the sliders along the wires.

mesosynchronous  A condition for signals in which significant instants pass at identical average speeds, such as bits per second.

meson  An unstable nuclear particle first observed in cosmic rays. It is electrically posi- tive, negative, or neutral. Its mass lies between that of the electron and proton.
mesotron. See MESON.
message 1. In communications, a body of information sent from a source (transmitter) to a destination (receiver). 2. Data entered into a transaction-processing system.
message switching system. A data communications system having a central computer that receives messages from remote terminals, stores them, and transfers them to other terminals as needed.
metadyne. See DC GENERATOR AMPLIFIER.
metal. An elemental material that exhibits several familiar properties (such as luster, ductility, malleability, good electrical and heat conductivity, relatively high density, and the ability to emit electrons). Common examples are aluminum, copper, gold, lead, and silver. Compare METALOID and NONMETAL.
metal base transistor. A bipolar transistor in which the base is a metal film, and the emitter and collector are films of n-type semiconductor material.
metal-ceramic construction. The building of certain electronic components using bonding ceramic parts to metal parts. Also see CERMET.
metal-film resistor. A fixed or variable resistor in which the resistance element is a metal film deposited on a substrate such as a plastic or ceramic.
metal finder. See ORIGINAL MASTER.
metal negative. See ORIGINAL MASTER.
metal-oxide varistor. A resistance in which the resistance material is a film of tin oxide deposited on a substrate.
metal-oxide semiconductor field-effect transistor. Abbreviation, MOSFET. A field-effect transistor in which the gate electrode is not a junction (as in the junction field-effect transistor), but a thin metal film insulated from the semiconductor channel by a thin oxide film. Gate-control action is entirely electrostatic. Also called insulated gate field-effect transistor. Also see DEPLETION-TYPE MOSFET, DEPLETION-ENHANCEMENT-TYPE MOSFET, and ENHANCEMENT-TYPE MOSFET.
metal-oxide resistor. A resistor in which the resistance material is a metallic oxide, such as zinc oxide.
metal plate rectifier. See METALLIC RECTIFIER.
metal tube. A vacuum tube housed in a metal envelope for self-shielding and mechanical ruggedness.
metamer. A visible-light beam that is identical in color (hue), but different in concentration (saturation), with respect to a reference color.
meteor. A cloud of ions left in the upper atmosphere as a meteor passes. This cloud tends to reflect radio signals at certain frequencies for a short period of time. During a meteor shower, there could be a sufficient number of such trails to allow continuous over-the-horizon communication when other over-the-horizon modes are unusable. See METEOROGRAPH.
meteorograph. An instrument for the simultaneous measurement of various meteorological phenomena such as temperature, humidity, etc.
meteorology. The science of the atmosphere, especially the study of weather and climate. (Not to be confused with METROLOGY.)
meteor-scatter propagation. The reflection of radio signals from the ionized trails produced by meteors as they pass through the upper atmosphere. This can result in over-the-horizon radio communication or reception. A meteor produces a trail that persists for a few tenths of a second to several seconds, depending on the size of the meteor, its speed, and the angle at which it enters the atmosphere. This is not sufficient time for the transmission of very much information, but during a meteor shower, ionization can be almost continuous. Meteor-scatter propagation has been observed at frequencies considerably above 30 MHz. See METEOR-trail reflections.
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MADT. A MICROALLOY TRANSISTOR having a small, encapsulated circuit, containing croelement, transistor, coil, semiconductor device, or transformer) mounted on a wafer and used in a MICROCIRCUIT.

microprocessor • microcomputer 1. A computer contained within a single integrated circuit (IC). The simplest such devices perform only elementary functions and are available for a few dollars. More sophisticated devices control radio receivers and transmitters, television sets, automobiles, aircraft, and robots. The most advanced devices can be programmed to provide electrical impulses to control erratically functioning body organs, move the muscles of paralyzed persons, and transcribe speech to writing or vice versa. Compare MICROPROCESSOR. 2. In general, any small computer.

microcryostat A crystal that is invisible to the naked eye.

microcure A small unit of radioactivity equal to 3.71 × 10^{-6} disintegrations per second or 10^{-6} curie. Also see CURIE.

microelectrode 1. An electrode used in MICRO-ELECTROLYSIS. 2. A tiny electrode, especially one of those used in integrated circuits and in certain biological applications.

microelectrolysis Electrolysis of tiny amounts of material. Also see ELECTROLYSIS.

microelectronic circuit 1. A tiny electronic circuit other than an INTEGRATED CIRCUIT (i.e., one assembled in a small space with small discrete or integrated components). 2. See MICROCIRCUIT.

microelectronic device See MICROELECTRONIC CIRCUIT.

microelectronics The branch of electronics dealing with extremely small components and circuits fabricated on substrates. Also see INTEGRATED CIRCUIT.

microelectroptoscopy Electrophoresis of single particles.

microelectromagnet A very sensitive Electromagnet used to detect minute quantities of electricity.

microelement A tiny component (capacitor, resistor, coil, semiconductor device, or transformer) mounted on a wafer and used in a MICROCIRCUIT.

microelement wafer A microcircuit on which a microelement is mounted or deposited.

microfarad Abbreviation, µF. A unit of capacitance equal to 10^{-6} coulombs/volt. Also see Farad.

microfarad meter 1. A dynamometer-type meter that indicates the value of a capacitor directly in microfarads. Such instruments operate from an alternating-current power line. 2. A direct-current milliammeter.

microfiltered A method of storing printed or photographic information. The page is reduced and arranged sequentially on a strip of film, usually 35-mm size. The film is inserted into a projecting device for retrieval of the information.

microgalvanometer A highly sensitive GALVANOMETER.

microgauss A magnetic unit equal to 10^{-6} tesla.

microgram A metric unit of weight or mass equal to 10^{-6} gram.

microgroove record A phonograph disc with a very fine groove (200 to 300 per inch), designed for playback at 33⅓ revolutions per minute (rpm).

microhenry Symbol, µH. A unit of inductance, equal to 10^{-6} (0.000001) H.

microhm Symbol, µΩ. A unit of low resistance, reactance, or impedance, equivalent to 10^{-6} (0.000001) ohm.

microhertz A unit of low resistivity, equal to 10^{-6} (0.000001) ohm-cm. See OHM-CENTIMETER and RESISTIVITY.

microhmmeter An instrument for measuring ultra-low resistance. Such an instrument must have a special provision for canceling the effects of contact and lead resistance.

microinch A unit of linear measure equal to 10^{-6} (0.000001) inch.

microinstruction A machine-code instruction that controls the operation of a computer directly (i.e., it is a “wired-in” or hardwired instruction, or one set by DIP switches, independent of programs loaded into the machine).

microknowledge In artificial intelligence (AI), detailed machine knowledge. It includes logic rules, computer programs, and data in memory. Compare MACHINEKNOWLEDGE.

microliter A very small unit of radioactivity equal to 10^{-6} (0.000001) liter.

microlock A special form of phase-locked-loop system, used especially with radar to improve the signal-to-noise ratio.

micromanipulator A machine that permits handling tiny parts, used as an example of its use in placing connections close together in microcircuits.

micrometer 1. An instrument for measuring very small thicknesses, diameters, etc.

micrometer • micromodule A highly sensitive GALVANOMETER.

micromag A magnetic unit equal to 10^{-6} tesla.

micromodule A small, encapsulated circuit, consisting of smaller components. The components
microphone amplifier
A sensitive, low-distortion, low-noise amplifier used in voice wireless transmitters and public address systems. Most amplifiers of this type have a tailored frequency response, passing audio between about 300 Hz and 3000 Hz, and attenuating audio outside this range. The range 300 Hz to 3000 Hz is sufficient to convey intelligible voice signals, and also allows for audio-frequency-shift keying (AFSKR) and slow-scan television (SSTV) audio input.

Microphone
A device that converts sound waves, especially speech and music, into electrical voltage analogs. Microphones can be discrete, can consist of integrated circuits, or can be a combination of both. The module is easily removed and replaced by means of a plug-in socket.

microphone boom
A device used to hang a microphone, with the base out of the way. It is often used in radio broadcasting.

microphone hummer
A suppressor that coordinates the actions of a computer, the use of a routine that is stored specifically in the memory, instead of elsewhere.

microphone input
In an audio amplifier, a jack or other receptacle provided for connection to an external microphone. It can also be used with other low-level audio apparatus. The jack is connected to a MICROPHONE AMPLIFIER that provides high gain with minimum internal noise.

microphone oscillator
See HUMMER.

microphonics
The technology of electronic systems using tiny electronic components. Also see INTEGRATED CIRCUIT, MICROELECTRONIC CIRCUIT, MICROELEMENT, MICROELECTRONIC WAFER, and MICROWAFER.

microvolt
An extremely small number of volts, equal to $10^{-6}$ (0.000001) volt.

microvoltmeter
A sensitive instrument for measuring very small voltages, especially those accompanying signals in producing transistors and integrated circuits. Not to be confused with photovoltograph, a photograph taken through a microscope.

microphotograph
A photograph taken with a microscope.

microphysics
The branch of physics concerned with atoms, molecules, and subatomic particles.

microprocessor
A device consisting essentially of a MICROSYSTEMS ELECTRONICS that provides a computer a specific function, independent of those established by programs being run or by the monitor program. Also see MICROINSTRUCTION.

microprogramming
In the direction of a computer, the use of a routine that is stored specifically in the memory, instead of elsewhere.

micropropagation
The propagation of a computer circuit in a specified frequency band or sub-band.

microwave
Radio-frequency electromagnetic energy at wavelengths shorter than about 10 centimeters, but longer than infrared energy. See also MICROWAVE FREQUENCIES.

microwave antenna
A dish antenna for use at microwave frequencies.

microwave acoustics
A technology that converts sound waves, especially speech and music, into electrical voltage analogs.

microwave acoustical transducer
A device that converts sound waves into electrical signals. Similar to a SELSYN. It is used for such purposes as rotator-direction reading.

microwave acoustics
A technology of electronic systems using tiny electronic components. Also see INTEGRATED CIRCUIT, MICROELECTRONIC CIRCUIT, MICROELEMENT, MICROELECTRONIC WAFER, and MICROWAFER.

microwave telemetry
The technology of electronic systems using tiny electronic components. Also see INTEGRATED CIRCUIT, MICROELECTRONIC CIRCUIT, MICROELEMENT, MICROELECTRONIC WAFER, and MICROWAFER.

microwave transistor
A transistor whose semiconductor properties and special fabrication enable it to operate at microwave frequencies.

microwave tube
A KYLSTRON, MAGNETRON, or similar tube, used to generate or amplify microwave radio-frequency signals.

midge
Abbreviation, M. The region whose limits are immediately above and below a MIDFREQUENCY; the limits are usually specified for a specified frequency.

midgeband
The frequency range from the lower to the upper frequency in a specified band of frequencies.

midpoint voltage
The voltage at the terminals of a cell or battery when it has been discharged halfway (i.e., when the amount of energy used up is equal to the amount of energy remaining).

midrange
Pertaining to audio frequencies in the midrange. Also see MIDFREQUENCY.

midrange speaker
A loudspeaker operating most efficiently at frequencies in the middle of the frequency spectrum.
audio spectrum. Such a speaker is intermediate in performance between a WOOFER and a TWEETER.

midsection The center section of a multisectio filter having an odd number of sections; thus, the second section of a three-section filter.

migration See ION MIGRATION.

mini 1. See MICROPHONE. 2. See MICROFARAD. 3. See MICROTER.

mil Abbreviation of military.

mil 1. A unit of linear measure; 1 mil = 10^-3 (0.001) inch = 0.0254 mm. 2. Thousand, as in n parts per mil.

mile Abbreviation, m or mi. A large unit of linear measure; 1 mi = 1,609 km = 5,280 feet.

military robot A robot designed and used for the purpose of executing some task in warfare. The two general types are: human-operated and computer-controlled. An example of a human-operated military robot is an aircraft that is flown by remote control by a ground-based pilot. The same robot, or a whole fleet of them, might be flown by a computer using sophisticated EXPERT SYSTEMS.

mill A telegraph operator’s typewriter.

Miller oscillator A crystal oscillator circuit in which the crystal is connected between the control grid and ground. The tuned tank is connected in the output circuit. The internal capacitance of the active device provides feedback capacitance, sometimes called conventional crystal oscillator.

milli- Abbreviation, m. A prefix meaning thousandth (10^-3). millimeter A usually direct-reading instrument for measuring current in the milliamphere range. milliampere Abbreviation, mA. A unit of current equal to 10^-3 (0.001) ampere.

milliampere-hour Abbreviation, mAh. A unit of low current drain or charging rate, equal to 10^-3 (0.001) ampere-hour. Also see AMPERE-HOUR AND BATTERY CAPACITY.

milliliter Abbreviation, mL. A unit of low pressure equal to 10^-3 (0.001) bar or 100 Pascal.

milliliter curie Abbreviation, mCi. A small unit of radioactivity equal to 3.71 x 10^10 disintegrations per second, or 10^-3 (0.001) curie. Also see CURIE.

milliradian Abbreviation, mrad. A small-used unit of capacitance, equal to 10^-3 (0.001) farad or 1000 microfarads.

milligram Abbreviation, mg. A metric unit of weight equal to 10^-3 (0.001) gram.

millihenry Abbreviation, mh. A unit of inductance, equal to 10^-3 (0.001) henry.

millihorsepower Abbreviation, mhp. A unit of power equal to 10^-3 (0.001) horsepower or 0.746 watt. Also see HORSEPOWER.

mils Abbreviation, mL. A small unit of brightness equal to 10^-3 (0.001) lambert.

millimeter A metric unit of volume equal to 10^-3 (0.001) liter.

milliampere A usually direct-reading instrument for measuring low electric potential. Its sensitivity is provided by a high-gain amplifier operated ahead of the indicating meter.

millivoltpotentiometer Abbreviation, MVP. A potentiometer-type null instrument for accurately measuring small direct-current voltages, such as those delivered by a thermocouple. Also see POTENTIOMETRIC VOLTMETER.

millivolts per meter Abbreviation, mV/m. A unit of radio-frequency (RF) field strength. It refers to the RF voltage (in millivolts) developed between an antenna and ground, divided by the height (in meters) of the antenna above ground. Compare MICROVOLTS PER METER.

milliwatt Abbreviation, mW. A unit of power equal to 10^-3 (0.001) watt.

milliwattmeter An instrument for measuring power in milliwatts. Such instruments usually obtain their sensitivity from a built-in preamplifier. The result is high resolution.

millisec cross A radio-telescope antenna, consisting of two coil phased or arrays with a common centering lobe. The result is high resolution.

millisecond Abbreviation of MINIMUM. 2. Abbreviation of MINUTE.

millimeter A small unit of length equal to 10^-3 (0.001) meter or 0.03937 inch.

millimeter waves Waves between 0.6 and 10 mm (frequencies from 30 to 500 GHz).

million A prefix meaning billion (10^9).

million A small unit of pressure equal to 10^-3 (0.001) atmosphere. Also see CURVATURE.

millicurie Abbreviation, mCi. A small unit of radioactive dosage; 1 mCi = 10^-3 (0.001) curie.

minima Points along a curve at which a function reaches a local minimum value. Also see MAXIMA AND MINIMA.
relative to the mainlobe. Also see MAIN LOBE, SIDE LOBE.

**minor loop** A subordinate path for the circulation of information or control signals in an electronic system (e.g., many feedback loops). Compare MAJOR LOOP.

**minute** 1. Abbreviation, min. A unit of measure of time equal to 60 seconds or 1/60 hour. 2. Also called minute of arc. Symbol (°). A unit of arc measure equal to 1/60 angular degree or 60 seconds. 3. General term meaning “extremely small.”

**MIT** Abbreviation of memory-information register.

**mirror** 1. A device consisting chiefly of a highly polished or silvered surface that reflects a large part of the radiation (such as light) striking it. 2. Radar-interference material (see CHAFF). 3. To reflect, as by a mirror.

**mirror galvanometer** A galvanometer in which a mirror is moved by the coil. The mirror either reflects a spot of light along an external scale, or it reflects the scale, which is then read through a small telescope.

**mirror-galvanometer oscillograph** See ELECTROMECHANICAL OSCILLOSCOPE.

**mirror image** 1. An image or curve that is exactly reversed relative to a straight line or flat plane, compared to a reference image or curve. Compare REFLECTED IMAGE. 2. For a quarter-wave Marconi antenna, the extra quarter-wave element supplied by the earth. 3. For an antenna at a distance d from a conducting plane, an effective antenna at an equal distance d below the ground plane.

**mixer** 1. The exchange or interaction of energy between or among stations on board moving or stationary land, waterborne, or airborne vehicles. 2. Radio communications between at least one fixed station and one or more moving or stationary land, waterborne, or airborne stations.

**Mobile radio service** See MOBILE COMMUNICATIONS.

**mobile receiver** A radio, television, or other receiver aboard a moving or stationary land, waterborne, or airborne vehicle.

**mobile-relay station** A fixed station that receives a signal from a MOBILE STATION and retransmits it to one or more other mobile stations.

**mobile station** A station installed and operated aboard a moving or stationary vehicle. The vehicle might be on land, under water, or in the air. Compare PORTABLE STATION.

**mixed-base notation** A number system in which each digit is a non-negative integer in the range 0 to m - 1, where m is the base (see MIXED NUMERATION). It is a positional system with a mixed radix. It is used to represent base m numbers in a more compact form.

**mixed modulation** Modulation of several kinds coexisting in a system. Thus, a small amount of undesired frequency modulation might accompany amplitude modulation, or vice versa.

**mixdown** 1. The combination of two or more signals that are unequal, and thus do not satisfy the conditions for maximum power transfer.

**mismatch factor** For a load not perfectly matched to a source, the ratio P1/P0, where P1 is the power a matched load would absorb from the source, and P0 is the power actually absorbed by the mismatched load.

**mixture melting point** Abbreviation, mmp. The temperature at which a mixture of solid substances starts turning into a liquid at 1 atmosphere of pressure. This melting point depends upon the melting points of the substances and their relative concentration in the mixture. Also see MELTING POINT AND MISTURE.

**mixer** 1. A device, such as a transistor or semiconductor diode, used to mix two input signals and deliver an output equal to their difference (see MIXING). 2. See AUDIO MIXER. 3. Any device that combines two or more impedances, yielding one output signal whose nature is determined by the characteristics of the circuit.

**mixer noise** Electrical noise that occurs in a MIXER.

**mixing** Combining several signals so that some deputed mixture of the original signals is obtained. Compare MODULATION.

**mixture** 1. A combination of two or more signals that retain their characteristics—even when they interact to produce beat-frequency products. 2. A diffusion of one substance throughout another, without a solution or a chemical reaction resulting.

**mode purity** In a modulated radio-frequency signal, the condition in which no undesirable types of modulation exist. For example, a frequency-modulated signal in which there is zero amplitude modulation.

**model** 1. One of the ways a given resonant system can oscillate. 2. One of the ways that electromagnetic energy can be propagated through a device or system. See MODES OF PROPAGATION. 3. The method or scheme which intelligence is conveyed in a communications or broadcast signal. See EMISSION MODE.

**MODES OF PROPAGATION** Two or more signals that are made to have many characteristics in common.

**modulator** A device that combines two or more signals, yielding one output signal whose nature is determined by the characteristics of the circuit.

**modulator-decoder** A device for combining and dividing the different frequencies, modes, or modes of modulation in a signal.

**modulator-demodulator** A device that combines two or more signals, yielding one output signal whose nature is determined by the characteristics of the circuit.

**modulation** The exchange or interaction of energy between or among stations on board moving or stationary land, waterborne, or airborne vehicles. 2. Radio communications between at least one fixed station and one or more moving or stationary land, waterborne, or airborne stations.
modes of propagation  The configurations in which microwave energy can be transmitted through a waveguide. 

modes of resonance  In a microwave cavity, the configurations in which resonant oscillation can exist, depending on the way the cavity is excited. 

modification 1. Changing the configuration of a circuit, device, or system, usually to a minor extent, to tailor its characteristics for a specific purpose. 2. Changing some aspect of a signal for a specific purpose (e.g., reducing the emission bandwidth to allow more signals to fit within a given band of frequencies). 3. In computer operations, changing program addresses and instructions by performing logic and arithmetic on them, as if they were data. Also see PROGRAM MODIFICATION.

modified alternate mark inversion  A signal that is similar to alternate mark inversion (AMI), but contains certain differences that are specified by a rigorous set of standards for the particular signal.

definer  A data item used to change a computer program instruction so that it can be used to implement different successive operations. Also see PROGRAM MODIFICATION.

modifier register  See INDEX REGISTER.

modify  To perform a MODIFICATION to a circuit, device, system, signal, program address, etc.

modulating frequency  The frequency, usually a high-frequency wave, at which the AMPLIFIER produces a modulated wave.

modulated amplifier  A usually high-frequency amplifier whose output is varied in some way for the purpose of conveying intelligence. Compare MODULATED OSCILLATOR. In the amplitude modulation of an amplifier, there is little or no disturbance of the carrier frequency. Also see MODULATION.

modulated beam 1. An electron beam (as in a cathode-ray tube), whose intensity is varied by a desired signal. 2. A light beam whose intensity is varied for communications or control purposes.

modulated carrier  A carrier wave whose amplitude, frequency, or phase is varied to convey intelligence.

modulated continuous wave  Abbreviation, mcw. A high-frequency carrier wave modulated by a continuous, lower-frequency wave, as in MCW telegraphy.

modulated CW  See MODULATED CONTINUOUS WAVE.

modulated electron beam  See MODULATED BEAM, 1.

modulated light beam  See MODULATED BEAM, 2.

modulated oscillator  A usually high-frequency oscillator whose output is varied in some way to convey intelligence. Compare MODULATED AMPLIFIER. Also see MODULATION.

modulated-squaring pattern  See GEAR-WHEEL PATTERN and SPOT-WHEEL PATTERN.

modulated stage  A transmitter, amplifier, or oscillator in which the signal information is impressed on the carrier.

modulated wave  See MODULATED CARRIER, modulate, modulator, modulated stage, and MODULATION.

modulation characteristic  For an amplitude-modulated wave, the ratio of the instantaneous amplitude of the modulated signal to the instantaneous modulating voltage.

modulation coefficient  Symbol, M. A figure expressing the depth (extent) to which a signal is amplitude-modulated. For a signal in which the upward modulation is equal to the downward modulation, \( M = (E_c - E_s)/E_c \), where \( E_c \) is the peak-to-peak voltage of the unmodulated signal, and \( E_s \) is the peak-to-peak voltage of the modulated signal. For full (100%) modulation, \( M = 1 \).

modulation depth  See DEPTH OF MODULATION.

modulation distortion 1. In a modulated signal, envelope distortion introduced by the modulation process or by the receiver circuit. 2. External cross modulation (see CROSS MODULATION, 1).

modulation envelope  See ENVELOPE, 1.

modulation-envelope distortion  Undesirable distortion in the ENVOLPE of the modulating intelligence in an amplitude-modulated or single-sideband signal at the output of a radio transmitter.

modulation factor  See MODULATION COEFFICIENT.

modulation frequency  Abbreviation, fm. The frequency of a modulating signal.

modulation linearity  In a modulated signal, the degree to which the instantaneous signal amplitude or frequency follows the instantaneous amplitude of the modulating signal.

modulation meter  See PERCENTAGE-MODULATION METER.

modulation monitor 1. A linear detector with a pickup coil (or antenna) and headphones for listening to an amplitude-modulated signal. 2. See PERCENTAGE-MODULATION METER.
biased diode or diode bridge, that can perform either modulation or demodulation.

**modulator** An electronic stage that delivers excitation current, voltage, or power to a modula-
tion circuit.

**module** An assembly containing a complete self-
contained circuit (or subcircuit), often miniatur-
ized and made for plug-in operation.

**modulator** Any instrument, such as a percent-
age-modulation meter, used to measure the de-
gree of modulation of a signal. Often, it can also mea-
sure other signal characteristics (e.g., carrier shift, extraneous amplitude modulation, and ex-
taneous frequency modulation).

**modulator check** In computer operations, a tech-
nique for verifying the validity of a number used as an operand. The number being so checked is di-
buted by another number to produce a remain-
der (check digit) that goes with the number. After the number is, for example, transmitted through some part of a computer system, it is again di-
buted by the original divisor, and if the remainder is the check digit, the data has retained its in-
tegrity.

**modulus** 1. Absolute magnitude. Also see ABSO-
LUTE VALUE and IMPEDANCE. 2. Abbreviation, mod. In computer operations, a whole number that indicates the number of digits in a counter se-
quencies through in each cycle. 3. Abbreviation, mod. A number (constant or coefficient) express-
ing the degree to which some property is pos-
sessed by a material or body (e.g., modulus of elasticity, shear modulus, and bulk modulus). 4. A constant by which a logarithm to one base must be multiplied to obtain a logarithm of the same number to another base.

**modulus of elasticity** The stress-to-strain ratio in a material under elastic deformation.

**moire** In a television or facsimile picture, an effect produced by the convergence of straight lines. When the lines are nearly parallel to the scanning lines, the converging lines appear irregular.

**moisture meter** See ELECTRIC HYGROMETER and ELECTRONIC HYGROMETER.

**mol** Abbreviation of MOLE.

**molecular conductance** See MOLECULAR CONDU-
CANCE.

**molecular polarization** Any molecule in an electric field, whether due to a small displacement of the posi-
tive and negative electrical centers. This results in an electric moment.

**molar solution** A solution, such as an electrolyte, containing 1 mol of solute per liter of solvent. Compare NORMAL SOLUTION.

**mold** 1. To form matter into a desired shape, as by pouring liquefied material into a container or li-
quidating the material in a liquid container, then allow-
ing the liquid material to solidify. In hot molding, the material is forced into the container and then cooled to hardness; in cold molding, the material is shaped without heat and it solidifies with time.

2. The hollow container used to shape a material, as in 1.

**molded capacitor** A capacitor that is molded into a protective body of insulating material. Also see MOLD, 1. and MOLDED COMPONENT.

**molded ceramic-dielectric capacitor** A ceramic-dielectric capacitor enclosed in a molded housing. Also see MOLD, 1. and MOLDED COMPONENT.

**molded coil** See MOLDED INDUCTOR.

**molded component** A part (such as a capacitor, coil, or resistor) that is completely enclosed in a protective material (such as a plastic) that is molded around it. Also see MOLD, 1. and MOLDED COMPONENT.

**molded electrolytic capacitor** A solid-dielectric electrolytic capacitor enclosed in a molded hous-
ing. Also see MOLD, 1. and MOLDED COMPONENT.

**molded glass capacitor** A glassplate-dielectric ca-
pacitor enclosed in a molded glass housing. Also see GLASS CAPACITOR; MOLD, 1. and MOLDED COMPONENT.

**molded inductor** An inductor that is molded into a protective housing of insulating material. Also see MOLD, 1. and MOLDED COMPONENT.

**molded mica capacitor** A mica-dielectric capaci-
tor enclosed in a molded housing. Also see MICA CAPACITOR; MOLD, 1., and MOLDED COMPONENT.

**molded resistor** A resistor that is molded into a pro-
tective housing of insulating material. Also see MOLD, 1. and MOLDED COMPONENT.

**molded resistor** A resistor that is encapsu-
lated in a protective molding compound, such as epoxy resin. Also see MOLD, 1. and MOLDED COMPONENT.

**molecular** Abbreviation, mol. 1. The amount of sub-
stance in a system containing as many specified entities (atoms, molecules, ions, subatomic parti-
cles, or groups of such particles) as there are atoms in 12 grams of carbon 12. 2. It is also called the Avogadro constant. A unit of quantity in chemistry, equal to approximately 6.022 × 10²³.

**mole** See MOLECULAR ELECTRONICS.

**molecular circuit** See MONOLITHIC INTE-
GRATED CIRCUIT.

**molecular conductance** For a solution, such as an electrolyte, the product of specific conductivity and the volume (in liters) of a solution that contains 1 gram molecule of the solute. Also see SOlUTION; 1. and 2.

**molecular conductivity** See MOLECULAR CON-
DUCTANCE.

**molecular electronics** The technique of process-
ing a single block of material so that separate ar-
rays from the functions of different electronic components. The entire block constitutes a cir-
cuit (e.g., a MONOLITHIC INTEGRATED CIR-
CUIT).

**molecular magnets** According to the molecular theory of magnetism, the elemental magnets formed by individual molecules.

**molecular theory of magnetism** Each molecule in a piece of magnetic metal is itself a magnet (pos-
sessing a north and a south pole). These tiny magnets are thought to be normally oriented at random, but when the material is magnetized by an external force, they align themselves with each other.

**molecular weight** Abbreviation, mol wt. In a molecule of a substance, the sum of the atomic weights of the constituent atoms.

**mol wt** Abbreviation of MOLECULAR WEIGHT.

**molybdenum symbol Mo**. A metallic element.

**moment** The tendency to produce motion around a point, as by torque, or the product of a quantity and the distance to a point. The moment of force is expressed as the product \( F_d \), where \( F \) is force and \( d \) is distance.

**momentary-contact switch** A switch that main-
tains contact only while it is held down. Such a device is usually a pushbutton switch, although it might be a toggle switch, a slide switch, or a lever switch.

**momentary switching** Switching of short dura-
tion, often characterized by a quick make and break, accompanied by a momentary activation of the switch. Compare DELLW SWITCHING.

**moment of inertia** For a torque motor, the inertia of the armature around the axis of rotation. Also see MOMENT.

**monitor** 1. Abbreviation of MONITOR. 2. Abbreviation of MONAURAL.

**monatomic** 1. Pertaining to a molecule with only one replaceable atom or radical.

**monatomic molecule** A molecule having a single atom (e.g., argon, helium, and neon). Compare DIATOMIC MOLECULE.

**monaural** 1. Pertaining to an audio system having only one channel. 2. Pertaining to hearing with one ear.

**monaural recorder** A single-track recorder, as op-
posed to a stereophonic recorder.

**Monel metal** An alloy of nickel (67%), copper (28%), iron, manganese, and other metals (5%). Its resistivity is approximately 42 microh-}

**monolithic** An assembly containing a complete self-
contained circuit (or subcircuit), often miniatur-
ized and made for plug-in operation.

**monitor system** A computer program usually stored in the read-only memory (ROM) supplied by the hardware vendor. It controls the imple-
mentation of programs written by the user, and the operation of peripherals associated with

**monoscope** A special cathode-ray tube that pro-
duces a stationary picture for testing television equipment. Its name is a contraction of monitor and scope.

**monitor** 1. A device that allows the sampling of a signal or quantity. Examples: line-voltage monitor, television monitor, and modulation monitor. 2. A cathode-ray-tube (CRT) computer display.

**monitor head** A separate playback head included in some tape recorders for listening to the tape as it is being recorded.

**monitoring** The act, process, or technique of ob-
serving an action while it is in progress or check-
ning a quantity while it is varying. Examples: carrier monitoring, modulation monitoring, and line-voltage monitoring.

**monitoring amplifier** An auxiliary amplifier used in monitoring an audio-frequency system.

**monitoring antenna** A usually small pickup an-
tenna used with a signal monitor or monitoring receiver.

**monitoring key** In a telephone system, a device used to listen to a two-way conversation.

**monitoring receiver** A radio or television receiver used specifically to monitor a transmission di-
rectly.

**monitoring station** In a security system, a central control location from which personnel can ob-
serve the input from sensors, cameras, and other devices at remote locations throughout the se-
cured area.

**monitor system** A computer program usually stored in the read-only memory (ROM) supplied by the hardware vendor. It controls the imple-
mentation of programs written by the user, and the operation of peripherals associated with
In an audio amplifier, the characteristic sound of a single-sideband (SSB) signal when the receiver is mistuned, or when the receiver is set for the wrong sideband and elevation simultaneously.


MONOCRYSTALLINE MATERIAL. A single-element device, such as a filament-type lamp, thermistor, voltage-dependent resistor, barreter, etc.

MONOLAYER A fine thin film having a thickness of one molecule.

MONOLITHIC INTEGRATED CIRCUIT. An integrated circuit (IC) formed in a single block or wafer of semiconductor material. The name is derived from the Greek monolithos ("one stone"). Compare HYBRID INTEGRATED CIRCUIT and THIN-FILM INTEGRATED CIRCUIT.

MONOMETALIC Containing or using only one metal.

MONOMOLECULAR Layer. See SINGLE-MOLECULAR LAYER.

MONOPHONIC SYSTEM A single-channel sound system. Compare STEREO SYSTEM.

MONOPHONIC TELEPHONE. A telephone or similar device that has only a single earphone or loudspeaker. Compare STEREO TELEPHONE.

MONOPHASE POWER SYSTEM. A single-phase electrical system that uses one phase of alternating current.

MONOPULSE In radar and electronic-navigation operations, using one pulse to determine azimuth and elevation simultaneously.

MONOSPEAKER A loudspeaker that reproduces most of the full audio range. Also called extended range speaker. Compare TWEETER and WOOFER.

MONOSTABLE Having one stable state.

MONOSTABLE BLOCKING OSCILLATOR. Abbreviation, MBO. A blocking oscillator that behaves somewhat like a one-shot multivibrator. The oscillator delivers a single output pulse each time it receives an input (trigger) pulse.

MONOSTABLE MULTIVIBRATOR A multivibrator that delivers one output pulse for each input (trigger) pulse. Also called one-shot circuit and single-shot multivibrator. Compare ASTABLE MULTIVIBRATOR and HISTABLE MULTIVIBRATOR.

MONOSTATIC REFLECTIVITY The property whereby, for certain reflectors (such as a triconic reflector), all incident rays are reflected in exactly the opposite direction from which they arrive.

MORSE CODE 1. Telegraphy (wire or radio). 2. To signal by means of the Morse code.

MORSE CODE. Either of two similar binary codes used in radio and wire telegraphy. It uses short pulses (dots or dits) and long pulses (dashes or dits) to represent letters of the alphabet, numerals, and punctuation marks. It usually refers to the CONTINENTAL CODE, but occasionally it refers to the AMERICAN MORSE CODE.

MOS Abbreviation of metal-oxide-semiconductor. A multivibrator that has only one stable state.

MOSCAPACITOR A capacitor using metal-oxide-semiconductor (MOS) technology. It is used in MOS integrated circuits. A silicon substrate forms one electrode (generally p-type material). An oxide layer forms the dielectric. An electrode forms the other plate of the capacitor. The capacitance might be variable by changing the applied voltage at the metal gate electrode.

MOSFET Abbreviation of METAL-OXIDE-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR.

MOSFET. Abbreviation of metal-oxide-semiconductor field-effect transistor.

MULTIVIBRATOR A device for generating pulses (dots or dits) and long pulses (dashes or dits) and is used in electronic pacemakers or communications equipment.

MULTIVIBRATOR. A device for generating pulses (dots or dits) and long pulses (dashes or dits) and is used in electronic pacemakers or communications equipment.

MULTIVIBRATOR 

MOTION DETECTOR A device for sensing the movement or stopping of a body, such as a rotating shaft. Various sensors are used in different detectors: magnetic, photoelectric, capacitive, etc.

MOTION SENSOR A device for sensing the movement or stopping of a body, such as a rotating shaft. Various sensors are used in different detectors: magnetic, photoelectric, capacitive, etc.

MOTION PICTURE PICKUP. In television operations, a camera lens that can be used for picking up scenes directly from motion-picture film.

MOTION SENSOR. In security systems, a device that produces an output signal whenever anything moves within a certain area. Such equipment might use infrared, ultrasonic, microwave, capacitive effects, thermal sensors, air-current detectors, sound detectors, video cameras, or a combination of these.

MOTION PICTURE PICKUP. In television operations, a camera lens that can be used for picking up scenes directly from motion-picture film.

MOTHERBOARD. In a computer or data processing device, the circuit board on which most of the main circuitry is mounted.

MOTHER CRYSTAL. A natural quartz crystal from which is produced the piezoelectric plates and other components used in electronics.

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MOOG SYNTHESIZER. An electronic device that can be made to simulate virtually any sound, including that of musical instruments and the human voice, through the use of several audio oscillators, whose output can be controlled to produce tones of various harmonic content, duration, attack, and decay periods.

MOON BOUNCE. Also called earth-moon-earth (EME). Radio communication, usually at very-high frequencies (VHF) or ultra-high frequencies (UHF), in which the moon is used as a passive reflector. This is a popular mode among some amateur radio operators.

MONOCHROMATIC 1. Consisting of one color of visible light. The brightness can vary from black to maximum.

MONOCHROMATIC POWER DENSITY. At a given temperature, the energy radiated in one square centimeter of blackbody surface per second per unit wavelength range. Also see BLACKBODY and BLACKBODY RADIATION.

MONOCHROMATIC SENSITIVITY. Sensitivity to light of one color only.

MONOCHROME TELEVISION. Black-and-white television.

MONOCLINIC CRYSTAL. A crystal having three axes of unequal length; two of them intersect obliquely and are perpendicular to the third (e.g., the type of crystal found in one form of sulfur (monoclinic sulfur)).

MONODRONE MATERIAL. See SINGLE-CRYSTAL MATERIAL.

MONOFACET. A device that can be electrically stimulated to produce light. It is used in electronic pacemakers or communications equipment.

MONOFACET. A device that can be electrically stimulated to produce light. It is used in electronic pacemakers or communications equipment.

MONOGENE MICROSCOPE. A form of imperfect crystal. The deformation mechanism of a loudspeaker.

MONIONER. A mold that has been electroformed from a master phonograph disc.

MONOGRANULAR MATERIAL. A mold that has been electroformed from a master phonograph disc.

MONOGRAM. A machine for converting electrical energy into mechanical energy. The driving mechanism of a loudspeaker.

MONOLOGUE. A repetitive, low-frequency sound that is usually observed in multifunctional audio circuits. It was so named because of its resemblance to the sound of a motorboat.
motorboating filter • M scan

MOTORBOATING caused by unwanted positive feedback. Also see DECOUPLING FILTER.

motorboating filter A device commonly used with a receiver to convert electric input power into torque.

motor capacitor An electronic component of the receiver that is used to stabilize the receiver's frequency and to provide a path for the energy stored in the radiofrequency field to be dissipated as heat.

motor constant The ability of a motor to convert mechanical energy into electrical energy at a constant speed.

motor-controlled A device that is used to control the speed of a motor.

motor-driven relay An electronic relay whose contacts are opened and closed by a rotating motor.

motor effect Magnetic force between adjacent current-carrying conductors.

motor-generator A combination of motor and generator in a single machine assembly. A common arrangement is a low-voltage motor turning a high-voltage generator. The machine shafts can be coupled, or the motor can turn the generator through a belt, chain, or gear train.

motor meter A meter in which the movable element is essentially a continuously rotating motor. See, for example, KILOWATT-HOUR METER.

motor-run capacitor A power-factor boosting capacitor connected (together with its auxiliary winding) in parallel with the main winding in an induction motor. Also see CAPACITOR MOTOR.

motor-speed control A method of controlling the speed of a motor by varying the magnitude and/or phase of its current. Electronic devices usually use diode, triac, or transistor circuits.

motor-start capacitor A capacitor that, with an auxiliary winding, is switched into a motor circuit during the starting period, and is automatically disconnected (with the winding) after the motor reaches normal running speed. Also see CAPACITOR MOTOR.

motor starter See STARTING BOX.

mould See MOLD.

mount 1. A mechanical device with which a component is attached to a circuit board or chassis. 2. The attachment of a circuit board to a chassis. 3. The hardware with which an antenna is attached to a mast. 4. The hardware with which a microphone is attached to a boom or other support. 5. In general, any attaching hardware.

mounting time A term used to describe the time it takes for a device to be mounted in a chassis. See also MOUNTING FLANGE.

mounting flare The portion of a speaker frame, usually made of metal, that is equipped with holes for attachment to a cabinet or panel.

mouse A pointing device commonly used with personal computers to control the movement of the cursor on a display screen.

mouth The radiating end of a horn (antenna, loudspeaker, etc.).

MOV Abbreviation of METAL-OXIDE VARISTOR.

movable-coil meter See FARISONAL METER.

movable-coil modulator See ELECTROMECHANICAL MODULATOR.

movable contact The traveling contact in a relay or switch. Compare FIXED CONTACT.

movable-iron meter See IRON-VANE METER.

movies on demand In television, a system that makes it possible for subscribers to choose the programs they want to see, and also to choose the viewing times for the programs.

moving-coil galvanometer A galvanometer whose movable element is a coil of fine wire suspended or pivoted between the poles of a magnet.

moving-coil microphone See DYNAMIC MICROPHONE.

moving-coil motor The driving mechanism of a moving-coil DYNAMIC SPEAKER.

moving-coil pickup See DYNAMIC PICKUP.

moving-coil speaker See DYNAMIC SPEAKER.

moving-conductor microphone See VELOCITY MICROPHONE.

moving-diaphragm microphone A headphone used as a sensitive indicator in alternating-current bridge measurements.

moving element In an electromagnetic device, the portion that moves physically under variable operating conditions.

moving-film camera An oscilloscope camera in which the film is drawn past the lens continuously at a constant speed, rather than being advanced frame by frame, as in a motion-picture camera.

moving-iron meter See IRON-VANE METER.

moving-vane meter A sensitive magnetically operated device in which the film is advanced frame by frame, as in a motion-picture camera.

moving-coil galvanometer A galvanometer whose movable element is a coil of fine wire suspended or pivoted between the poles of a magnet.

moving-coil microphone See DYNAMIC MICROPHONE.

moving-conductor microphone See VELOCITY MICROPHONE.

moving-diaphragm microphone A headphone used as a sensitive indicator in alternating-current bridge measurements.

moving element In an electromagnetic device, the portion that moves physically under variable operating conditions.

moving-film camera An oscilloscope camera in which the film is drawn past the lens continuously at a constant speed, rather than being advanced frame by frame, as in a motion-picture camera.

moving-iron meter See IRON-VANE METER.

moving-vane meter See IRON-VANE METER.

moving-coil meter Abbreviation of METER.

moving-coil pickup See DYNAMIC PICKUP.

moving-coil speaker See DYNAMIC SPEAKER.

moving-conductor microphone See VELOCITY MICROPHONE.

moving-coil galvanometer A galvanometer whose movable element is a coil of fine wire suspended or pivoted between the poles of a magnet.

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moving-conductor microphone See VELOCITY MICROPHONE.

moving-coil meter Abbreviation of METER.
multimedia 1. In computing, the use of video, voice, music, electromechanical control, and/or data transfer at the same time. Useful in education, entertainment, business, and gaming applications.
2. The use of voice, images, data, and/or video in a communications system or network, and, in particular, in wireless applications. An example is videoteleconferencing between a corporate office and the user of a handheld computer equipped with a wireless modem.

multimedia computer A personal computer designed especially for multimedia use. It includes a sound board, speakers, a microphone, and a CD-ROM (compact-disc read-only memory) drive. It often has a large-screen, high-resolution monitor (17 inches or greater diagonal measure).

test oscillator A device that allows two or more transmitters simultaneously operating in different modes (e.g., one using single-sideband (SSB) and another using frequency modulation (FM)). 2. The transmission of visible light or infrared energy through an optical fiber in more than one mode at the same time.

multipath delay In MULTIPATH RECEPTION, the lag between signal components arriving at different paths. 2. A receiver, the difference in arrival time of multipath signals. Also see MULTIPATH DELAY.

multipath fading In radio communication, variation in the received signal that result from propagation of the transmitted signal that are propagated over different paths. At low, medium, and high frequencies, this effect is usually the result of thermionic fluctuation. At very-high and ultra-high frequencies, it could occur as a result of changes in the state of the intervening atmosphere or, occasionally, reflection from objects, such as aircraft.

multipath reception The processing of transmitted data after the signal has been received and separated into its individual components. Also see MULTIPATH DELAY, MULTIPATH FADING RECEPTION.

multimode A circuit consisting of several sections printed or deposited on separate layers, which are then overlapped. Multimode devices are also made by simply stacking one on top of the other. Compare SINGLE LAYER COIL.

multimode fiber A fiber in which the core is wide enough to support several transverse modes at the same time. Also called multi-mode fiber. Compare SINGLE MODE FIBER.

multifrequency channel Abbreviation, MTS. In television broadcasting, audio transmitted on more than one channel to provide stereo sound to subscribers.

multichannel television A television system that operates on more than one channel at the same time. The individual channels might contain identical information, or they might contain different signals.

multichannel analyzer A test instrument, such as a spectrum analyzer, that splits an input into several channels for testing.

multichannel loop system A communications system in which more than one signal is transmitted over a single channel. The signals are transmitted simultaneously on separate, interconnected cables.

multicore A coil having more than two contacting positions.

multicore transformer A bipolar transformer having several emitters connected in parallel in the transistor structure.

multiflap A cathode-ray tube (CRT) having more than one electron gun.

multiflap propagation Propagation of a radio wave by several successive reflections between the surface of the earth and the ionosphere.

multiflap circuit A circuit consisting of several sections printed or deposited on separate layers, which are then overlapped.

multigun CRT A cathode-ray tube (CRT) using more than one electron gun.

multigun antenna A directive antenna having more than one active element. Such antennas include phased arrays and parasitic arrays. Common examples are the LOG-PERIODIC ANTENNA, the QUAD ANTENNA, and the YAGI ANTENNA.

multiband receiver A device that allows to two or more signals to be transmitted simultaneously on a single carrier wave. Also see MULTIPLE-CHANNEL RECEIVER.

multichannel 1. A circuit consisting of several sections printed or deposited on separate layers, which are then overlapped.
2. A computer terminal acting as a modem by virtue of its accepting and transmitting data over its input/output devices and a data channel.

multiresistor A device that allows two or more signals to be transmitted simultaneously on a single carrier wave. Also see MULTIPLE-CHANNEL RECEIVER.

multiplexer Pertaining to a communications or broadcasting system in which multiplexing is used. See MULTIPLEXING, 1, 2, 3.

multiplexer adapter A special circuit (or auxiliary unit) used in frequency-modulated radio receivers for stereophonic reception from a station transmitting a mono-channel broadcast. Also see MULTIPLEXING, 1 and MULTIPLEX STEREO.

multiplex code The transmission of multiple signals on a single carrier wave, communications channel, or data channel. Also see MULTIPLE-CHANNEL RECEIVER, 2, 3.

multiplexing 1. A process in which a comparatively low-frequency carrier is modulated, then mixed with a signal that has a higher frequency. Also see SUBCARRIER and SUBCARRIER MODULATION AUTHORIZATION. 2. The simultaneous transmission of numerous relatively low-frequency signals on a single carrier having a higher frequency. Also called frequency-division multiplexing.
3. The transmission of numerous signals on a single channel by breaking each signal into timed fragments (intervals) and transmitting the fragments in a rotating sequence. Also called time-division multiplexing.

multipurpose meter A meter sometimes used for testing some other instrument, such as a test oscillator.

multipurpose relay A relay that can be used for a variety of different applications.

multiframe 1. In radio communication, a technique that allows two or more transmitters simultaneously operating in different modes (e.g., one using single-sideband (SSB) and another using frequency modulation (FM)). 2. The transmission of visible light or infrared energy through an optical fiber in more than one mode at the same time.

multiframe reception The processing of transmitted data after the signal has been received and separated into its individual components. Also see MULTIPATH DELAY, MULTIPATH FADING RECEPTION.

multiframe transmission 1. Transmission of a signal over two or more paths. Also see MULTIPATH RECEPTION. 2. See MULTIPATH PROPAGATION.

multiframe transmission The use of multiplexing to broadcast both channels of a stereophonic program on a single carrier wave. See MULTIPLEXING, 1, 2.

multiplexer A device that allows to two or more signals to be transmitted simultaneously on a single carrier wave. Also see MULTIPLE-CHANNEL RECEIVER.
MIDI. A computer language used in electronic music. It “tells” the computer when to play a note, how long to play it, and how loud to play it. It also sets the tempo of the music, based on how long a note is held.

Formula, KH

See TIME SHARING.

prefix multiplier

A prefix that, when affixed to the name of a quantity (e.g., Hertz and byte) indicates the amount, usually a power of 10 or a power of 2, by which that quantity is to be multiplied. Also called prefix multiplier, multiplier prefix.

MUS setting magnetron See MULTICAVITY MAGNETRON.

multiskip propagation

See MULTIHOP PROPAGATION.

multistage device

A device having several stages operating in cascade or otherwise coordinated with each other (e.g., a multi-stage amplifier).

multistage feedback

Feedback (positive or negative) between several stages in a system, as opposed to feedback between the output and input of a single stage.

multistage oscillation

Oscillation resulting from positive feedback between or among two or more stages of an amplifier chain, as opposed to oscillation occurring between the output and input of a single amplifier stage.

multistage X-ray tube

A X-ray tube providing electron acceleration by means of successive ring-shaped anodes—each biased to a higher voltage than the preceding one.

multisegment magnetron See MULTICAVITY MAGNETRON.

multitap oscillator

Oscillation occurring between the input and output of a single amplifier stage.

multitap X-ray tube

A X-ray tube providing electron acceleration by means of successive ring-shaped anodes—each biased to a higher voltage than the preceding one.

multitap

A relay having more than two contacts. See, for example, SELECTOR RELAY.

multitap switch

A switch having a number of poles and contacts.

multitester

An instrument, such as a multimeter or a combined signal generator and oscilloscope, that performs a number of different test functions.

multitap recording

1. A recording on two or more tracks (e.g., multitrack disk and multitrack tape). 2. Making a recording on a tape or disc with two or more tracks.

multitap loop antenna

An antenna having more than one wire in its radiating section. In early flat-top antennas, such wires were usually connected together at one end.

multiturn antenna

A multiwire antenna

An antenna having more than one wire in its radiating section. In early flat-top antennas, such wires were usually connected together at one end.

multiturn antenna

An antenna having more than one wire in its radiating section. In early flat-top antennas, such wires were usually connected together at one end.

multitask

A method of increasing a quantity, magnitude, or rate by some desired factor. See, for example, FREQUENCY MULTIPLIER and VOLTAGE MULTIPLIER.

multiplexing

1. The arithmetic process whereby a certain factor is added to itself the number of times indicated by another factor (the multiplier).

2. A method of increasing a quantity, magnitude, or rate by some desired factor. See, for example, FREQUENCY MULTIPLIER and VOLTAGE MULTIPLIER.

multiplexer

1. See FREQUENCY MULTIPLIER.

2. See VOLTAGE MULTIPLIER.

3. A circuit or device for performing arithmetic multiplication.

4. See VOLT METER MULTIPLIER.

multitap amplifier

A frequency-multiplying amplifier (such as a doubler, tripler, or quadrupler), whose output circuit is tuned to an integral multiple of the input frequency. Compare STRAIGHT-THROUGH AMPLIFIER.

multitap photobute

See PHOTOMULTIPLIER TUBE.

multiplexing

1. A system of wire telephony in which two or more messages can be sent simultaneously in one or both directions over the same line.

2. A system of radiotelephony in which two or more messages can be sent simultaneously on the same carrier wave.

multiplexing telephony

1. A system of wire telephony in which two or more messages can be sent simultaneously in one or both directions over the same line.

2. A system of radiotelephony in which two or more messages can be sent simultaneously on the same carrier wave.

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multitap photobute

See PHOTOMULTIPLIER TUBE.
quarter-note lasts. It controls the operation of a music synthesizer, and allows two or more syntheticers to communicate.

musical quality See TIMBR.

musical scale A series of tones between a given tone and its second harmonic, spaced in intervals of 8 octaves. The most common example can be found on a piano. Variations exist (e.g., 13-note scale, six-note scale, five-note scale).

music chip An integrated circuit for producing various musical effects (such as tones, percussi-

music power For a power amplifier, the short-term output power obtained in the reproduction of music waveforms, in contrast to root-mean-square (rms) or effective power output.

music synthesizer A set of oscillators, usually operated with a computer, used to create or playing electronic music. Also see MOOG SYNTHESIZER and MUSIC INSTRUMENT DIGITAL INTERFACE.

music under Pertaining to low-volume, continuous background music, often added to presentations, radio and television advertisements, educational programs, etc.

muting 1. Disabling a receiver or amplifier under no-signal or weak-signal conditions. 2. Softening or muffling a sound.

muting A set of oscillators, usually operated with a computer, used to create or playing electronic music. Also see MOOG SYNTHESIZER and MUSIC INSTRUMENT DIGITAL INTERFACE.

mutual antenna coupling Electromagnetic coupling between or among antennas when they are placed too close together. Usually, it is an undesirable phenomenon.

mutual capacitance Inherent capacitance between two conductors.

mutual-capacitance attenuator An attenuator that, in its simplest form, is essentially a shielded, two-plate variable capacitor.

mutual conductance See TRANSCONDUCTANCE.

mutual impedance An impedance shared by two or more branches of a circuit.

mutual inductance Symbol, M. Unit, henry. The property shared by neighboring inductors or inductive devices that enables induction to occur. A mutual inductance of 1 henry is present when a current change of 1 ampere per second in one inductor induces 1 volt across another inductor. Also see INDUCTANCE.

mutual-inductance attenuator An attenuator consisting essentially of two coupled coils (input and output), whose spacing can be gradually changed.

mutual-inductance bridge See CAREY-FOSTER MUTUAL-INDUCTANCE BRIDGE.

mutual induction The action whereby the magnetic field produced by alternating current in one conductor produces a voltage in another isolated conductor.

mutual interference 1. See ADJACENT-CHANNEL INTERFERENCE. 2. Any kind of interference between or among radio-frequency communications circuits.

mutually exclusive events Two or more events (or data points) so that the occurrence of one prevents the occurrence of the other(s). That is, two events cannot take place simultaneously.

MV 1. Abbreviation of MEGAVOLT. 2. Abbreviation of MULTIVIBRATOR.

mV Abbreviation of MILLIVOLT.

MV Abbreviation of MEDIUM VOLTAGE

mV/m Abbreviation of millivolts per meter.

MVP Abbreviation of MILLIVOLT POTENTIOMETER.

MW Symbol for MEGAWATT.

mW Symbol for MILLIWATT.

mw Abbreviation of MEDIUM WAVE.

MWH Abbreviation of MEGAWATT-HOUR.

mW RTL Abbreviation of milliwatt resistor-transistor logic or low-power resistor-transistor logic.

Mx Abbreviation of MAXWELL.

Mycalex Trade name for an insulating material consisting of mica bonded with glass. Dielectric constant, 6 to 8. Rejection, 10 exp. ohm-cm.

Mylar A DuPont registered trademark. A tough, plastic insulating material commonly used as a magnetic tape base. Dielectric constant, 2.8 to 3.7. Dielectric strength, 7000 V/mil.

Mylar capacitor A capacitor in which the dielectric film is Mylar.

Mylar tape Magnetic recording tape using a Mylar film as the substrate.

myogram See ELECTROMYOGRAPH.

myograph See ELECTROMYOGRAPHY.

myogram Abbreviation, mym. A metric unit of linear measure equal to 10 kilometers (10^3 meters).

myriameter Abbreviation, mym. A metric unit of linear measure equal to 10 kilometers (10^3 meters).

myriametric waves British designation for electromagnetic energy having wavelengths from 100 kilometers down to 10 kilometers, corresponding to frequencies from 3 kHz up to 30 kHz.
nanowatt  Abbreviation. nW. A unit of low power; 1 nW equals 10⁻⁹ watt.
nanowattmeter  A meter for measuring power in the nanowatt range.
NAP  Abbreviation of nuclear auxiliary power.
naper  See NIFER.
Napierian base  Symbol, e. An irrational number, equal approximately 2.718282, and used as the NAPIERIAN LOGARITHM base.
Napierian logarithm  Abbreviation. In or log.. A logarithm to the base e (see NAPIERIAN BASE). Also called NATURAL LOGARITHM. Compare COMMON LOGARITHM.
NAPU  Abbreviation of nuclear auxiliary power unit.
narrative  A computer program statement that, rather than being an instruction, merely describes the purpose of what follows (usually the steps in a routine or a block of instructions) as a debugging or program modification aid. In a program written in BASIC, such a statement is preceded by the abbreviation REM, for remark. Also called COMMENT.
narrowband  1. A frequency band in which the difference between upper and lower limits is small compared with bandwidths typical of the service specified. 2. Pertaining to a radio-frequency emission whose bandwidth is limited or restricted. 3. Pertaining to a circuit or device that operates over a comparatively small range of frequencies. 4. In a digital network, a channel having a bandwidth of 64 kbps or less.
narrowband amplifier  An amplifier whose pass-band is restricted to a fraction of the frequency spread common to the amplifier’s application.
narrowband FM  See NARROWBAND FREQUENCY MODULATION.
narrowband frequency modulation  Abbreviation. NBFM or NFM. Frequency modulation in which the maximum instantaneous frequency deviation is no greater than the highest modulating frequency.
narrowband interference  Signal interference whose bandwidth is narrow, compared with that of the circuit affected.
narrowband voice modulation  Abbreviation, NBVM. A scheme via which an analog voice signal is compressed into a band of frequencies narrower than that normally required for effective communication.
narrow bandwidth  Pertaining to a radio-frequency emission whose bandwidth is comparatively narrow (e.g., a small fraction of the available spectrum space in the frequency band being used).
narrow-sector recorder  A directional radio receiver for locating sources of atmospheric noise.
NAPT  Abbreviation of National Association of Broadcasters.
NATIONAL  Abbreviation of National Association of Broadcasters (NAB). A countrywide organization of radio and television broadcasters.
National Bureau of Standards  Abbreviation, NBS. An agency in the U.S. that maintains values for physical constants in the Standard International (SI) System of Units. It also maintains radio broadcast stations that transmit standard time and frequency signals.
National Electrical Manufacturers Association  Abbreviation, NEMA. A countrywide organization of manufacturers of electrical and electronic equipment and supplies.
National Electric Safety Code  Abbreviation, NEC. Safety regulations and procedures issued by the National Fire Protection Association for the installation of electrical wiring and equipment in the United States. Although the code is advisory from the Association’s standpoint, it is enforced by various degrees by local authorities.
National Television Standards Committee  Abbreviation, NTSC. A U.S. organization of television companies and other interested organizations. It developed the original black-and-white and color television standards that were approved by the Federal Communications Commission.
natural decay curve  See EXPONENTIAL DECAY.
natural antenna frequency  The fundamental resonant frequency of an electromagnetic antenna.
natural disintegration  1. The decay of a radioactive substance as a result of the continuous emission of particles and rays. 2. Also called half-life. The time required for half of a quantity of a radioactive substance to decay into a different isotope or element.
natural electricity  1. Atmospheric electricity. 2. The electricity in living organisms, that is, BIOELECTRICITY.
natural frequency  See NATURAL RESONANT FREQUENCY.
natural-growth curve See EXPONENTIAL INCREASE.

natural interference Interference from atmospheric and celestial sources, as opposed to human-made interference.

natural language A spoken or written human language (such as French or Japanese), as opposed to a computer language (such as machine language, C++, or LISP). Translation between natural language and machine language is important in optical character recognition, speech recognition, and speech synthesis.

natural logarithm See NAPIERIAN LOGARITHM.

natural magnet A material, such as magnetite (lodestone), found in nature and exhibiting permanent magnetism.

natural magnetism Magnetism found in some natural materials (see NATURAL MAGNET) and in the earth itself.

natural number 1. Any nonnegative whole number, that is, a member of the set \( \{0, 1, 2, 3, \ldots \} \).
2. See NAPIERIAN BASE.

natural period The time required for one complete wave cycle to occur in a device at its NATURAL RESONANT FREQUENCY.

natural radiation Noise in the form of radiation emitted by natural radioactive substances, cosmic rays, and the earth's radiation, or background GROUND RADIATION.

natural resonance Resonance resulting from the unique physical constants of a body, circuit, or system. Also called NATURAL RESONANT FREQUENCY.

natural resonant frequency 1. The frequency at which a circuit or device responds with maximum amplitude to applied signals. 2. The frequency at which a device generates maximum energy. 3. The frequency at which an object vibrates at maximum amplitude.

natural wavelength The wavelength corresponding to the NATURAL RESONANT FREQUENCY of a circuit, device, or system.

nautical mile A nautical unit of linear measure equal to 1.852 kilometers (1.908 statute miles).

navigable Abstraction of navigation. 1. Abstraction of navigation. 2. Abstraction of navigational nautical.

Navigation The science or art of navigation and aeronavigation system used at very low or low frequencies over long distances.

NAVAIDS Abbreviation of NAVIGATIONAL AIDS.

navigational A radar system in which a ground radar scans the immediate vicinity of an airport, observes the flight activity, and transmits such information to aircraft in flight. The name is a contraction of the term navigation and ranging.

navigation electronic device or system, such as radar or radio direction finding, that assists in the navigation of vehicles on land, at sea, or in the air.

navigation beacon A beam that provides aircraft and ships with navigational aid.

NAWAS Abbreviation of National Attack Warning System.

near ultraviolet That part of the ultraviolet spectrum nearest the visible light wavelengths. These are the least-penetrating ultraviolet rays. They are also called soft ultraviolet.

near video on demand In television, a local service that can give a condition, event, or signal.

NEG Abbreviation of NEGATIVE ELECTRIFICATION. 1. In voice communications, a word often used for “no,” especially when interference is present or signals are weak. 3. Pertaining to a real number less than zero. 4. An image whose shadings are opposite to those in the scene.

negative acceleration A decrease in speed or velocity, also called deceleration.

negative acknowledgment character In a handshaking or forward-error-correction (FEC) system, a response by the receiving station that indicates a missed bit or hits.

negative angle 1. An angle in the third or fourth quadrant in a system of rectangular coordinates. 2. An angle measured clockwise from the positive x-axis in a rectangular coordinate system. Compare POSITIVE ANGLE.

negative bias A steady, negative direct-current voltage or current applied continuously to an electrode of a device, such as a transistor to establish the operating point.

negative bus See NEGATIVE CONDUCTOR.

negative charge An electric charge consisting of a quantity of NEGATIVITY, that is, of negative electricity. Also see CHARGE, 1, ELECTRIC CHARGE; and UNIT ELECTROSTATIC CHARGE. Compare POSITIVE CHARGE.

negative conductor The conductor or wire connecting a negative terminal of a current, power, or voltage source. Compare POSITIVE CONDUCTOR.

negative electricity See NEGATIVE CHARGE and NEGATIVE ELECTRIFICATION.

negative direct current Electrification characterized by an excess of electrons. For example, when a glass rod is rubbed with a silk cloth, the cloth becomes negatively charged because electrons are transferred from the glass to the cloth. Similarly, when a neutral atom acquires an extra electron, the atom becomes negatively charged because it has an excess of electrons. Compare A POSITIVE ELECTRIFICATION.

negative electrode 1. An electrode connected to the negative terminal of a current, power, or voltage source. 2. The negative output terminal of a device, such as a battery or generator. Compare POSITIVE ELECTRIFICATION.

negative error of measurement An error of measurement in which the difference between the measured value and the most probable value is negative. Compare POSITIVE ERROR OF MEASUREMENT.

negative exponent In mathematical notation, an exponent indicating that a number is to be raised to the negative power of.
negative feedback Amplifier An amplifier in which negative feedback is used to improve performance or modify response.

negative function A trigonometric function having the negative sign. In a rectangular coordinate system, the sine function is negative in the third and fourth quadrants, the cosine in the second and third, and the tangent in the second and fourth. Compare POSITIVE FUNCTION.

negative gain A misnomer for FRACTIONAL GAIN, arising because fractional gain can be expressed in negative decibels.

negative ghost In a television picture, a ghost with a negative (see NEGATIVE, 4) shading.

negative ground In a direct-current power system, the connection of the negative pole to common ground.

negative image 1. A picture in which the blacks, whites, and grays are in between are the reverse of those in the scene (see NEGATIVE, 4). 2. An abstract image that has the reverse shading described in 1.

negative impedance An impedance that displays the same behavior as that of NEGATIVE RESISTANCE.

negative ion An atom with an excess of electrons and, consequently, a net negative charge. Also called ANION. Compare POSITIVE ION.

negative-ion generator A device for generating negative ions and circulating them into the surrounding air. This is believed by some people to be beneficial to health.

negative lead See NEGATIVE CONDUCTOR.

negative-feedback filter A power supply filtering in which the choke coils and capacitors are in the negative direct-current lead, rather than in the positive lead (the usual position). One advantage of this arrangement is the lower insulation requirements of the choke (resistor) resistance. Also see N-CURVE, NEGATIVE RESISTANCE REGION, NEGATIVE RESISTOR, and S-CURVE.

negative light modulation In television image transmission, the condition in which transmitted brightness is increased by a decrease in the initial intensity of light. Compare POSITIVE LIGHT MODULATION.

negative line See NEGATIVE CONDUCTOR.

negative logic 1. Binary logic in which a high negative state represents logic 0. 2. Binary logic in which a low positive state represents logic 0 and a high positive state represents logic 1. Compare POSITIVE LOGIC.

negative measurement error See NEGATIVE ERROR OF MEASUREMENT.

negative modulation Amplitude-modulated television transmission in which the transmitted power decreases as image brightness increases. Compare POSITIVE MODULATION.

negative modulation factor For an amplitude-modulated wave having unequal positive and negative modulation peaks, a ratio expressing the maximum negative deviation from the average for the envelope. Compare POSITIVE MODULATION FACTOR.

negative number A real number less than zero (i.e., one to which the minus sign is assigned).

negative peak The maximum negative instantaneous current or voltage in an alternating-current waveform.

negative-peak voltmeter An electronic meter for measuring the negative peak voltage of an alternating-current waveform.

negative phase-sequence relay A relay that responds to the negative phase sequence in a polyphase circuit. Compare POSITIVE PHASE-SEQUENCE RELAY.

negative picture modulation See NEGATIVE MODULATION.

negative picture phase In a television signal, the picture-signal voltage swing from zero to negative, in response to an increase in brightness. Compare POSITIVE PICTURE PHASE.

negative plate The negative member of a battery cell; electron flow is from the plate through the external circuit.

negative pole See NEGATIVE ELECTRODE.

negative zero 1. Pertaining to temperature-compensating capacitors having a temperature coefficient of capacitance that changes sign within a specified temperature range.

negative potential 1. The potential measured at a negative electrode, with respect to the positive electrode or to ground.

negative resistance 1. A decrease in voltage across a device as the current through it increases, and an increase in voltage as the current decreases. 2. A decrease in current through a device as the voltage across it increases, and an increase in current as the voltage decreases. This is opposite to the behavior of an ohmic (positive) resistance. Also see N-CURVE, NEGATIVE RESISTANCE REGION, NEGATIVE RESISTOR, and S-CURVE.

negative-resistance amplifier A simple circuit in which a negative-resistance device, such as a TUNNEL DIODE, cancels the positive resistance of the circuit. causing amplification or oscillation. Compare negative-resistance device.

negative-resistance diode 1. See TUNNEL DIODE. 2. A reverse-biased germanium diode (and occasionally a silicon diode) that exhibits NEGATIVE RESISTANCE.

negative-resistance magnetic A split-anode magnetic tube operated at a combination of anode voltage and magnetic field strength corresponding to cutoff; it exhibits negative resistance to voltage applied symmetrically between the anode halves. The frequency of oscillation is determined by an external tank circuit.

negative-resistance oscillator An oscillator that consists of a negative-resistance device connected across a tuned circuit. The arrangement oscillates because the negative resistance cancels the positive resistance (losses) of the tuned circuit. See, for example, NEGATIVE-RESISTANCE MAGNETRON and TUNNEL-DIODE OSCILLATOR.

negative-resistance region In certain devices, a portion of the voltage-versus-current curve having negative slope (i.e., the current decreases as the voltage increases, or vice versa). Also see N-CURVE, NEGATIVE RESISTANCE, and S-CURVE.

negative-resistance repeater A repeater that produces gain by means of NEGATIVE RESISTANCE effects.

negator Any device exhibiting NEGATIVE RESISTANCE.
neodymium • neper
eodymium-YAG laser A laser that uses neodymium and yttrium-aluminum-garnet (YAG) crystal. It is used in medical applications, such as surgery and various other jobs where high precision is required. Generally, it is a low-to-medium-power laser.
eometachrograph An instrument used in psychology to measure complex reaction time. Compare NEOMATACHROMETER.
neomatachrometer An instrument used in psychophysics to measure simple reaction time. Compare NEOMATACHROMOGRAPH.
neon Symbol, Ne. An inert-gas element. Atomic number, 10. Atomic weight, 20.179. Neon, present in trace amounts in the earth’s atmosphere, is used in some glow tubes, readout devices, and indicator lamps.
neon bulb A gaseous-discharge lamp which contains a neon-filled gas bulb. It has a characteristic pink glow and is ignited by a firing voltage for the particular unit. Also called neon glow lamp and neon tube.
neon-bulb flip-flop A flip-flop circuit bistable multivibrator using two neon bulbs as the bistable components.
neon bulb gate A gate circuit containing a neon bulb biased below the firing point. A trigger voltage added to the bias voltage raises the applied voltage and fires the bulb, producing an output pulse.
neon-bulb logic Logic circuits composed of neon bulb gates.
neon-bulb memory See NEON-BULB STORAGE.
neon-bulb multivibrator A multivibrator using two neon bulbs as switching components.
neon-bulb oscillator A simple relaxation oscillator consisting essentially of a neon bulb, capacitor, resistor, and direct-current supply. The frequency of the sawtooth-wave output depends principally on the capacitance and resistance values. The maximum operating frequency is limited to about 5 kHz by the ionization time of the gas.
neon-bulb overmodulation indicator The application of a neon-bulb overvoltage indicator as a resonator for amplitude-modulated radio-frequency signals. The bulb flashes each time the modulation percentage exceeds a predetermined value. Also called neon bulb modulation alarm.
neon-bulb overvoltage indicator A relatively simple circuit in which a neon bulb flashes each time a voltage monitored by the circuit exceeds a predetermined value. The flash shows that the portion of the wave presented to the bulb has exceeded the firing potential.
neon-bulb peak indicator See NEON-BULB OVERVOLT.
neon-bulb ring counter A ring counter composed of neon bulbs. The maximum counting speed is limited by the ionization time of the neon bulbs to approximately 300 events per second.
neon-bulb sawtooth generator A relatively simple relaxation oscillator using a neon bulb, capacitor, and resistor. The output is a sawtooth wave, whose frequency is determined principally by the capacitance and resistance values.
neon-bulb scale-of-two circuit A scale-of-two circuit (frequency divider) using neon bulbs as the bistable elements.
neon-bulb storage A storage (memory) device composed of neon bulbs. A fired bulb (representing a bit of stored information) remains fired until turned off by an erase signal.
neon-bulb stroboscope A stroboscope in which a neon bulb supplies the light flashes. The circuit is essentially that of the neon-bulb oscillator, the flash rate being continuously variable by an adjustable frequency control.
neon-bulb voltage regulator A simple circuit utilizing the constant voltage drop across a neon bulb as a variable voltage regulator. The usual circuit configuration is a neon bulb and current-limiting resistor in series with a power supply.
neon-bulb volume indicator A neon-bulb overvoltage indicator used in some tape recorders to show when the volume exceeds a predetermined level—especially when the volume is high enough to cause an unacceptable amount of distortion.
neon glow lamp See NEON BULB.
neon lamp See NEON BULB.
neon pilot lamp A neon bulb used as a pilot lamp operated from the power-line circuit of an electronic equipment. Also called neon pilot light.
neon tube See NEON BULB.
NEP Abbreviation of NOISE EQUIVALENT POWER.
neper Abbreviation, Np. A Napierian-logarithmic unit used in analyzing the ratio of power levels. Np = log (P2/P1)/(1/2), where P2 and P1 are the power values being compared and is the Napierian logarithm base, equal to approximately 2.71828. The neper is related to the decibel (dB), a similar unit based on common logarithms, in the following manner: 1 Np = 8.686 dB; 1 dB = 0.1151 Np.
Nernst effect The appearance of a voltage between the opposite edges of a metal strip that is conducting heat longitudinally when the strip is placed in a magnetic field perpendicular to the plane of the strip. Nernst effect
NEP Abbreviation of Noise equivalent temperature.
effect An electric or magnetic quantity (e.g., NET CAPACITANCE). 2. Colloquialism for communications network. See NETWORK.
net identification A password or other special identification used in a radio network.
net capacitance The resultant capacitance in a circuit in which capacitances act in combination with each other.
net component The total value of two or more passive components of the same sort. See, for example, NET CAPACITANCE, NET CURRENT, NET IMPEDANCE, NET INDUCTANCE, NET POWER, NET REACTANCE, NET RESISTANCE, and NET VOLTAGE.
net current The current flowing in a circuit in which currents aid or oppose each other.
net gain For an amplifier, the amount of gain remaining after all losses in the device have been subtracted.
net impedance The impedance of a circuit in which impedances act in combination with each other.
net inductance The inductance of a circuit which and impedances act in combination with each other.
net loss For an amplifier or other system, the algebraic sum of gains and losses between two points in the system.
net power The resultant power observed when power signals aid or oppose each other in a single circuit or system.
net radiometer A device for measuring the difference in intensity between radiation reaching the earth’s surface and radiation leaving it. This is generally visible light or infrared radiation from the sun.
net reactance Symbol, X. The combined inductive reactance (X L) and capacitive reactance (X C) in a circuit or device.
net resistance The resistance of a circuit in which resistances act in combination with each other.
net voltage The resultant voltage at a point where voltages aid or oppose each other.
NET 1. A circuit arrangement of electronic components, sometimes redundant in its design (e.g., resistance-capacitance (RC) network). 2. A group of interconnected computers, communications stations, or other facilities, often organized for simultaneous operation and data transfer. 3. To conduct research or gather information using a group of interconnected computers, communications stations, or other facilities.
network analog A circuit or combination of circuit elements used to express and solve a mathematical relationship between the variables.
neural network A computer system that uses artificial intelligence to recognize patterns in data.
neural network 1. A circuit arrangement of electronic components, sometimes redundant in its design (e.g., resistance-capacitance (RC) network). 2. A group of interconnected computers, communications stations, or other facilities, often organized for simultaneous operation and data transfer. 3. To conduct research or gather information using a group of interconnected computers, communications stations, or other facilities.
network analysis

The rigorous examination of a network to determine its properties and performance. (See COMPUTER NETWORK SYNTHESIS.)

network analyzer

An analog or digital circuit for simulating and analyzing a network (see NETWORK). Used in the design and analysis of electronic circuits and systems.

network current

The current flowing through a component in a network. The algebraic sum of currents in any mesh of a network is zero.

network current source

A current source that supplies a constant current to a network.

network diagram

A graphical representation of a network, showing the components and their interconnections. (See SIGNAL FLOW DIAGRAM.)

network equation

An equation that represents the behavior of a network. It relates the voltages and currents in the network to the input and output signals.

network filter

A passive or active device that filters out unwanted frequencies from a signal. It can be used to improve signal quality or to isolate specific components of a signal.

network function

A mathematical representation of the behavior of a network. It relates the input and output signals of a network.

network gain

The ratio of the output signal to the input signal in a network. It is a measure of the amplification or attenuation provided by the network.

network impedance

The impedance of a network is the complex ratio of the voltage to the current at a given frequency.

network synthesis

The process of designing a network to achieve a desired set of performance characteristics.

network topology

The arrangement of nodes and links in a network. It describes the structure of a network and affects its performance.

neuroelectricity

Low-voltage electricity in the nervous system of a human being or animal.

neuron

A nerve cell, a living organism.

neurotransmitter

A chemical or electrical signal released by a neuron to communicate with another neuron or cell. It is essential for the transmission of information in the nervous system.
nickel-iron battery See Edison Battery.

nickel-metal-hydride Chemical symbol, NiMH. A material used in certain rechargeable electrochemical cells and batteries. This type of cell or battery is less likely than nickel-cadmium units to develop battery memory or memory drain, in which the ampere-hour capacity is reduced because of repeated partial discharging. In addition, the chemicals in NiMH cells and batteries are less toxic than those in NICADS. Compare Ni-CAD, Ni-CAD. 1. Small, rechargeable, nickel-based electrochemical battery, similar to the nickel-cadmium (NICAD) type. 2. Loosely, a nickel-metal-hydride cell. See Ni-CAD, Ni-CAD.

nickel-metal-hydride battery 1. A small, rechargeable, nickel-based electrochemical battery, similar to the nickel-cadmium (NICAD) type. 2. A nickel-metal-hydride cell. See Ni-CAD, Ni-CAD.

nickel-oxide diode A diode fabricated from nickel-oxide semiconductor material.

nickel silver An alloy of copper, nickel, and zinc, sometimes used for making resistance wire. Also called German silver.

Nicol prism An optical component for producing or analyzing plane-polarized light. It consists of two prisms of Iceland spar cemented together. Light entering the device at the interface, where the ordinary ray is totally reflected and the extraordinary ray passes through, both rays being plane-polarized perpendicular to each other.

NIDA Abbreviation of numerically integrating differential analyzer.

NF Abbreviation of NOISE IMPROVEMENT FACTOR.

NF Pe Chemical symbol for Ni-CAD.

noise-effect A phenomenon sometimes observed at frequencies below approximately 500 kHz. Directional signals received between sunset and the following sunrise appear to come from a source that moves slowly back and forth.

noise-effect finding In radio direction-finding, in accurate or uncertain readings resulting from the night effect.

noise Range The distance over which signals from a given transmitter are consistently received after sunset.

Ni junction In a semiconductor device, the junction between an n-type and a p-type layer.

ni 1. Colloquialism for negligible. 2. British expression for zero. Also, naught. 3. Colloquialism for nothing.

NIHM Chemical symbol for Ni-CAD.


nitrocellulose. See CELLULOSE NITRATE.

nitrogen Symbol, N. A gaseous element. Atomic number, 7. Atomic weight, 14.007. Nitrogen is the most-abundant component (about 78%) of the Earth's atmosphere.

Niton Al A trade name for NETWORK INTERFACE UNIT.

Nixonite A trade name for cellulose acetate, a plastic.

Nixonol A trade name for cellulose nitrate, a plastic.

NICE Abbreviation of National Joint Computer Conference.

n layer A semiconductor layer doped to provide current carriers that are predominantly electrons. Compare P LAYER.

n-level logic 1. A multilevel form of logic, with n different possible states. 2. In a computer, the connection of up to n logics gates.

NLR 1. Abbreviation of non-linear resistor. 2. Abbreviation of NON-LINEAR RESISTOR.

NLS Abbreviation of NO-LOAD SPEED.

N/m² Abbreviation of neumann per meter squared (pascals).

N m/kg Newton meters squared per kilogram, the SI unit of the gravitational constant.


NMOS A metal oxide semiconductor device made on a p-type substrate whose active carriers, electrons, migrate between n-type source and drain contacts.

NMR 1. Abbreviation of NUCLEAR MAGNETIC RESONANCE. 2. Abbreviation of NORMAL-MODE REDUCTION.

n-n junction In a semiconductor device, especially an integrated circuit, the junction between two n-type regions having somewhat different properties (sometimes designated n, and n+).

NO Abbreviation of NORMALLY OPEN.

No Symbol for NOBELIUM.

no-address instruction In digital computer operations, an instruction requiring no reference to storage or memory for its execution.


Nobili's rings See ELECTRIC RINGS.

noble Chemically iner or inactive. For example, noble metals: silver, gold, platinum.

noble gas An inert rare gas (such as argon, helium, krypton, neon, or xenon). It is used in electronic light tubes.

noble metal A comparatively nonreactive metal (such as gold, silver, or platinum).

noctovision A televisiotn system using infrared rays instead of visible light to scan the object. This makes it possible to televise images in complete visual darkness (hence, the prefix nocto-, meaning "night").

no-charge machine fault time Unproductive computer time resulting from errors or a malfunction.

node Point See NODE.

node 1. The terminal point at which two or more branches of a circuit meet, or that is common to two circuits. 2. In a standing wave system, a zero point or minimum point, e.g., current node. Compare LOOP, 1, 2. A database management system expression defining the location of information about a record, user, field, etc. 4. A point at which a satellite crosses the equator. See also ASCENDING NODE, DESCENDING NODE.

node1 1. Oxide particles that protrude above the surface of magnetic tape. 2. In a planar pattern design, evaluation or pickup characteristics (as for antennas, microphones, loudspeakers), a small peak aligned in a direction other than that of the main lobe.

no-field release In the starting box for a shunt motor, the electromagnet that normally holds the arm in full-running position; it is connected in series with the field winding. When the field current is lost, the arm is released, disconnecting the armature for safety. Compare NO-VOLTAGE RELEASE.

noise 1. A random-frequency current or voltage signal extending over a considerable frequency spectrum and having no useful purpose, unless it is intentionally generated for test purposes. 2. Dissonant, interrruptional sound; unlike harmonious sound, it is disagreeable. 3. In audio operations, unwanted hiss and/or hum. 4. Extra bits or bytes that must be removed from digital data before it can be useful.

noise abatement The elimination or reduction of noise intensity—especially a measure in a program concerned with noise pollution in the environment.

noise analysis The measurement of the amplitude and spectral distribution of noise and the determination of its character.

noise analyzer An instrument for evaluating the nature of noise in a communications system. See, for example, NOISE MEETER. Noise analyzers are sometimes adapted for vibration analysis.

noise-balancing system A bridge circuit inserted between a receiver and antenna for balancing out interferential signals resulting from nearby power-line leaks or similar causes.

noise bandwidth Abbreviation, NBW. A figure obtained by dividing the maximum output, or power output, vs. frequency curve of a device by the power amplitude at the noise frequency of interest.

noise behind the signal Noise caused by, but exclusive of, a signal.

noise blanker A device that cuts off one of the intermediate-frequency stages of a radio receiver during a noise pulse. The noise blanker is effective against high-amplitude impulses of short duration.

noise-canceling antenna A specialized receiving antenna system that uses two elements, one intended for receiving primarily the desired signal(s) and the other intended for receiving primarily local human-made noise. The outputs from the two elements are combined so that the noise impulses appear out of phase, but of equal amplitude. Because one element is located in a favorable position for reception of desired signals while the other element is not, the desired signals do not cancel at the receiver input. As a result, the signal-to-noise ratio is greatly improved, compared with the use of the signal antenna alone.

noise-canceling microphone A microphone that discriminates against background sounds. It is usually directionally and relatively insensitive, requiring the user to talk directly into it at close range.

noise clipper A biased-diode circuit used as an automatic noise limiter. The device cuts off all signals above a predetermined amplitude on the theory that noise peaks are high-level transients usually directional and relatively insensitive, reducing the power output, vs. frequency curve of a device by the power amplitude at the noise frequency of interest.

noise cutover A phenomenon sometimes observed from a cloud that moves slowly back and forth.

noise frequency A specialized receiving antenna system that uses two elements, one intended for receiving primarily the desired signal(s) and the other intended for receiving primarily local human-made noise. The outputs from the two elements are combined so that the noise impulses appear out of phase, but of equal amplitude. Because one element is located in a favorable position for reception of desired signals while the other element is not, the desired signals do not cancel at the receiver input. As a result, the signal-to-noise ratio is greatly improved, compared with the use of the signal antenna alone.

noise node The terminal point at which two or more branches of a circuit meet, or that is common to two circuits. 2. In a standing wave system, a zero point or minimum point, e.g., current node. Compare LOOP, 1, 2. A database management system expression defining the location of information about a record, user, field, etc. 4. A point at which a satellite crosses the equator. See also ASCENDING NODE, DESCENDING NODE.

no-load speed Abbreviation of NO-LOAD SPEED (NLS)
noise-current generator  A noise generator that supplies a useful current. Compare NOISE-VOLTAGE GENERATOR.

noise digit  A digit (usually zero) generated during normalization of a floating-point number. See NORMALIZE.

noise diode  A reverse-biased semiconductor diode that produces a standard noise voltage.

noise elimination  The nearly complete removal of noise effects from a system. Noise can never be eliminated altogether because the movement of electrons and atoms generates some electrical and thermal noise. However, in some digital systems, the effects of noise can be almost totally overcome. Compare NOISE SUPPRESSION.

noise equivalent power  Abbreviation, NEP. The power that produces an rms signal-to-noise ratio of 1 in a detector.

noise factor  For a circuit, especially a communications receiver or weak-signal amplifier, the ratio \( R_1/R_0 \), where \( R_0 \) is the signal-to-noise power ratio of an ideal circuit, and \( R_1 \) is the signal-to-noise ratio of the circuit under test. Compare NOISE FIGURE.

noise figure  The NOISE FACTOR of a circuit, expressed in decibels. If \( N \) is the noise factor expressed as a ratio, then noise figure \( NF \) can be determined by \( NF = 10 \log_{10} N \).

noise filter  A filter design that suppresses noise that would otherwise enter an electronic circuit (e.g., a power-line noise filter).

noise floor  In communications, the level of noise in microvolts that determines the weakest signal that can be heard or accurately received. 2. In a spectrum analyzer, the level of noise in microvolts that determines the weakest signal that will be visibly displayed.

noise generator  A device for generating precise amounts of noise voltage for test purposes.

noise grade 1  The relative level of radiofrequency background noise, over all electromagnetic frequencies, in a particular geographic location. The noise grade is generally lowest near the poles and highest near the equator. 2. The mathematical function of relative electromagnetic noise intensity versus latitude and longitude.

noise immunity  The degree to which a circuit or device is insensitive to extraneous energy—especially noise signals.

noise-improvement factor  Abbreviation, NIF. For a radio receiver, the ratio \( SN/Sx \) where \( SN \) is the input signal-to-noise ratio and \( Sx \) is the output signal-to-noise ratio.

noise killer  1. See AUTOMATIC NOISE LIMITER. 2. See NOISE FILTER. 3. See NOISE BLANKER.

noiseless alignment  See VISUAL ALIGNMENT.

noise level 1  The amplitude of ambient electrical noise generated outside an electronic system of interest. 2. The amplitude of electrical noise generated in an electronic system of interest. 3. The intensity of ambient acoustic noise.

noise limited  See AUTOMATIC NOISE LIMITER.

noise margin  In a binary logic circuit, the difference between operating and threshold voltages.

noise-measuring set  See NOISE METER.

noise meter  An instrument for measuring acoustic noise level. It consists essentially of a sensitive, multirange voltmeter provided with a microphone, amplifier, and attenuators. The meter scale reads noise level directly in decibels.

noise power  The power component of a noise signal.

noise power ratio  The ratio of noise power at the output of a circuit (such as a receiver) to the noise power at the input.

noise pulse  A random, short-duration noise burst whose amplitude exceeds the average peak noise level.

noise quieting  In a radio receiver, the reduction (in decibels) of background noise, with respect to a signal of interest.

noise ratio  See NOISE POWER RATIO.

noise-reducing antenna  A receiving antenna having in a facsimile or facsimile signal, the waveband extending between zero and the maximum frequency of modulation.

noise reduction  See NOISE SUPPRESSION.

noise residue  The residual output (see NULL VOLTAGE, NOISE) of a balanced bridge, caused entirely by noise.

noise silencer  A noise-limiting circuit that removes noise power transmitted with little or no effect on the signal from which the noise is removed. Compare NOISE CLIPPER.

noise source  See NOISE GENERATOR.

noise spike  See NOISE PULSE.

noise suppression  1. In communications, the reduction of noise amplitude to a level that is non-competitive with desired signals. 2. In audio recording and reproduction, reduction of unwanted noise (e.g., hiss) to the greatest extent possible without degrading the fidelity of the desired audio. Compare NOISE ELIMINATION.

noise suppressor  A device for eliminating electrical noise or reducing its amplitude. See, for example: AUTOMATIC NOISE LIMITER and NOISE BLANKER.

noise temperature  At a given frequency, the temperature of a passive system that has the same noise power per unit bandwidth as that observed at the terminals of a device under test.

noise voltage  The voltage component of an electrical noise signal.

noise-voltage generator  A signal generator that supplies an alternating-current waveform containing random-frequency pulses of relatively uniformly distributed over a given frequency spectrum. Compare NOISE-CURRENT GENERATOR.

noisy mode  During normalization of a floating-point number, the generation of digits, excluding zero, as part of the fixed-point part (see NORMALIZE).

NOL 1. Abbreviation of National Ordinance Laboratory. 2. Abbreviation of Naval Ordnance Laboratory.

no-load current 1  (e.g., drain, plate, or collector current) when a device is not delivering output to an external load.

no-load losses  Losses in an unloaded transformer or motor. Also see NOISE-REDUCING ANTENNA.

no-load voltage  The open-circuit output voltage of a power supply, amplifier, generator, or network.

nominal  Named, rated, or specified. The nominal value of power output, power drain, or power dissipation. Also see NOMINAL VALUE.

nominal band  A device for eliminating electrical noise. Compare NOISE FILTER.

nominal bandwidth 1. For a filter, the difference \( f_2 - f_1 \), where \( f_1 \) is the nominal lower cutoff frequency and \( f_2 \) is the nominal upper cutoff frequency. 2. For an allocated communication channel, the total bandwidth, including upper and lower guard frequencies. 3. The intended and specified bandwidth of a given channel, regardless of the bandwidth of the signal on that frequency at any given time.

nominal capacitance  The rated ("label") value of a capacitor. Also see NOMINAL VALUE.

nominal current  The rated ("nameplate") value of required current or of current output. Also see NOMINAL VALUE.

nominal horsepower  The rated ("nameplate") horsepower of a machine, such as a motor. Also see NOMINAL VALUE.

nominal impedance  The rated impedance of a circuit, such as a motor. Also see NOMINAL VALUE.

nominal inductance  The rated ("label") value of a coil's inductance. Also see NOMINAL VALUE.

nominal line pitch  In a television raster, the average center-to-center separation between adjacent lines.

nominal line width  1. For a television raster, the factor 1/n, where n is the number of lines per unit width for the direction in which the lines progress. 2. In facsimile, the average center-to-center separation of scanning or recording lines.

nominal power factor  The rated ("nameplate") value of power factor of a device. Also see NOMINAL VALUE.

nominal power rating  The rated ("nameplate") power of a device. Also see NOMINAL VALUE.

nominal resistance  The rated ("label") value of a resistor or similar device. Also see NOMINAL VALUE.

nominal speed  The highest speed of a data-processing machine, disregarding slowdowns because of factors other than computational operating a balanced transmitting and usually some form of noise-balancing system for reducing electrical noise picked up by the antenna.

nominal value  A named, specified, rated, or labeled value, given without reference to tolerance.

nominal value • noise reduction  • nominal value

noise reduction • nominal value

noise reduction • nominal value

noise reduction • nominal value
nonharmonic oscillations

This can differ significantly from the actual value. For example, the nominal value of a capacitor might be ±10%, the amplitude varies in the three zeros between the first 1000. The nonharmonic oscillations of a device (such as a semiconductor diode operated in its square-law region through which they are passed simultaneously. Also see METER and MIXING.

nonlinear network A circuit that produces distortion in an input waveform; the output and input waves are not related by a linear function.

nonlinear quantizing A method of signal quantizing in which the intervals are not all the same size or duration.

non linear resistor A resistor whose value varies with applied voltage. Also see VOLTAGE-DEPENDENT RESISTOR.

nonlinear response An response for which the corresponding plot is not a straight line; doubling the independent variable, for example, does not double the dependent variable.

nonloaded 1. Pertaining to components, circuits, or devices in which the instantaneous output signal amplitude is not directly proportional to the instantaneous input signal amplitude. The graph of instantaneous output versus instantaneous input is not a curve. A straight line. Example: CLASS-A AMPLIFIER. 2. Pertaining to components, circuits, or devices in which the specified value is not directly proportional to some other specified input value. Example: NONLINEAR CAPACITOR.

nonlinear bridge See VOLTAGE-SENSITIVE BRIDGE.

nonlinear capacitor A capacitor whose value varies with applied voltage. Also see VOLTAGE-VARIABLE CAPACITOR.

nonlinear coil See SATURABLE REACTOR.

nonlinear dielectric A material (such as processed barium-strontium titanate) whose dielectric constant varies with applied voltage.

nonlinear distortion Distortion caused by nonlinear response of an amplifier or component. This causes different parts of the signal to be amplified or transmitted by different amounts; therefore, the input and output waveforms may not differ from those in the input signal.

nonlinear inductor See SATURABLE REACTOR.

nonlinear resistor A resistor whose value varies with applied voltage. Also see VOLTAGE-DEPENDENT RESISTOR.

nonblocking system In a telephone communications network, a system that ensures a circuit will be completed when necessary. That is, at no time is it impossible to make a connection to be made. Under conditions of extremely heavy usage, the quality of communications might be degraded, but it is not possible to block the call (i.e., the call cannot be cut off).

nonconductor A material that is not a good conductor of electricity. Examples: glass, ceramics, plastics, and certain metals.
generate a signal on its own. Compare OSCIL-
LATING DETECTOR.
nonoscillating detector 1. Existing in three spatial dimensions. 2. Pertaining to a circuit that cannot be fabri-
cated on a two-dimensional board without the use of jumpers. Compare NONOSCILLATING.
nonpolar 1. Having no pole(s). 2. Pertaining to atoms that share electrons to complete their outer shells. 3. Not polarized nor requiring polar-
ization. Example: a 100-pF disk ceramic capaci-
tor is nonpolar because it can be used in circuits without consideration of voltage polarity.
nonpolar crystal A crystal in which lattice points are identical.
nonpolarized electrolyte capacitor An elec-
trolytic capacitor that has no definite negative and positive terminals and, consequently, can be used in alternating-current circuits, as well as in direct-current circuits. See also NONPOLAR, 3.
nonpolarized electrolyte paste A paste used in the manufacture of electrolytic capacitors.
normally closed A switch that, when the switch is not energized, is closed. Compare NONREVERSIBLE.
normally open A switch that, when the switch is not energized, is open. Compare NONREVERSIBLE.
normative Pertaining to a circuit or system op-
erated in its usual or most common manner.
nonsynchronous Pertaining to circuits, devices, sys-
tems, or phenomena described in lay terms, using common graphics and little or no mathematics. An example is the lowest explanation of the oper-
ation of a spread-spectrum radio transmitter.
nonsynchronous vibrator A power-supply vibra-
tor that is essentially a single-pole, double-throwswitch providing no mechanical rectification. A separate rectifier must be used. Compare

**VIBRATOR-TYPE RECTIFIER.** Also see VIBRA-
TOR-TYPE POWER SUPPLY.
nonsynchronous wavefront ( admiration) A wavefront whose curve cannot be represented by the equation y = c sin

\[ \sin(\alpha + \beta) \]

where a, b, and c are constants. \( \alpha \) is the dependent variable (usually instantaneous am-
plitude or frequency), and \( \beta \) is the independent variable (usually time), for any real number val-
ues of a, b, and c. Examples: BACK-TO-BACK
SAWTOOTH, SAWTOOTH, and SQUARE WAVE.

The parameters of these waveforms are defined by the equation of the OR circuit. NOR circuit A gate that performs the functions of a NOR circuit.
norm The average or ambient condition.

**BELL-SHAPED CURVE.** Also see NONOSCILLATING DETECTOR.
normal position • notch sweep

normal position In a switch or relay, the state of the contacts when the device is at rest.

notch amplifier An amplifier containing a notch filter or other arrangement that permits it to reject one frequency or a band of frequencies while passing all higher and lower frequencies.

notch antenna An antenna with a slot in the radiating surface, for the purpose of obtaining a directional response.

notcher See NOTCH FILTER.

notcher-peaker A circuit or device that can be set to perform either as a NOTCH FILTER or PEAK FILTER.

notch filter A circuit that exhibits high attenuation at and near a single frequency and little or no attenuation at all other frequencies. This type of device is used in some radio communications receivers, and can reduce interference caused by strong, unmodulated carriers within the passband. The notch frequency is adjustable, so that the deep null can be tuned to any frequency within the receiver passband. A properly designed circuit can produce attenuation in excess of 40 dB in the center of the notch. Some sophisticated types, especially audio designs, can provide more than 60 dB of attenuation at the notch frequency. Audio notch filters employ operational amplifiers with resistance-capacitance (RC) circuits. In some audio notch filters, the notch frequency is adjustable. Compare BAND-REJECTION FILTER.

notch gate In a radar, a gate that determines the minimum and maximum range.

notch sweep An oscilloscope sweep that expands only a small portion (notch) of the pattern on the screen, leaving the portions on either side of the notch untouched. Thus, the first dozen or so cycles might appear at the normal sweep speed, the next two cycles expanded, and the remaining two or three at the normal sweep speed.

NOT circuit A logic circuit that provides an output pulse when there is no input pulse, and vice versa. Also called COMPLEMENTER, NEGATOR, and INVERTER.

note_nte, note_nte_nte A portable personal computer, also called a laptop computer. It is about the size of a typical three-ring notebook, and generally contains a DISKETTE DRIVE, a HARD DISK, a MODEM, and attachments for peripherals, such as printers. It uses rechargeable batteries and can be operated for approximately two to six hours between battery charges.

NOT gate A digital circuit that inverts a logical condition either from high (logic 1) to low (logic 0) or vice versa. Also called an inverter.

NOT-OR circuit A logical OR CIRCUIT combined with a NOT CIRCUIT.

novelty calculator See SPECIAL-PURPOSE CALCULATOR.

November Phonetic alphabet code word for the letter N.

novice 1. A beginner class of amateur radio licensee. 2. Any beginner or inexperienced practitioner.

no-voltage release In the starting box for a shunt motor, the electromagnet that normally holds the arm in full-running position. It is connected directly across the power line to disconnect the motor in the event of power failure. When the arm is released, it falls to its off position, thereby preventing burnout that would result if the motor were connected to the line in the full-running position when power resumed. Compare NO-FIELD RELEASE.

n.o.y. scale A scale of apparent acoustic noise, based on a linear function instead of the more common logarithmic function.

np 1. Symbol for NEPTUNIUM. 2. Symbol for number of primary turns in a transformer.

npn transistor A bipolar transistor in which the emitter and collector layers are n-type semiconductor material, and the base layer is p-type semiconductor material. Compare PNP TRANSISTOR.

NPS Abbreviation of NEGATIVE POSITIVE ZERO.

npo capacitor A fixed capacitor exhibiting temperature-compensate whereby the storage varies over a wide temperature range, in which the coefficient has negative, positive, and zero values.

npb Symbol for counts per second.

N radiation X rays emitted as a result of an electron becoming an N electron.

NRD Abbreviation of NEGATIVE-RESISTANCE DIODE.

n region See N LAYER.

nrz Abbreviation of NONRETURN TO ZERO.

n scan See N DISPLAY.

n scope Colloquialism for a radar set using an N DISPLAY.

nse Alternate abbreviation of N O N R E T U R N S C H E D U L E.

n²/s² Newton-meters per square meter, the unit of dynamic viscosity.

n-space A coordinate system in n variables. It is generally used for mathematical interest. The coordinates are written (x₁, x₂, . . . , xₙ) and are called ordered n-tuples.

n²/s² The kilogram per second. See N²/S².

n²/s² The second. See N²/S².

n²/s² The second. See N²/S².

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n²/s² The second. See N²/S².
null frequency • Nyquist diagram

null frequency The frequency at which a frequency-sensitive circuit, such as a Wien bridge or twin-tee network, can be balanced.
null meter See BRIDGE DETECTOR.
null method See ZERO METHOD.
null point In a balanced circuit, such as a bridge or potentiometer, the point of zero output voltage (or current) or minimum output voltage (or current).
null potentiometer 1. The variable resistor that constitutes one arm of a four-arm bridge and is used to balance the bridge. 2. A potentiometric circuit using the null method to compare one voltage with another. Also see POTENTIOMETER, null detector 1. A code having a character set restricted to digits.
nuclear control A method of programming computer-controlled mechanical devices, used in some early robots. An automated system in which number sequences fed to a digital computer cause it to control machines or processes in a manufacturing operation.

n zone See N LAYER.
A computer check for an odd parity check.

odd line In a conventional television picture, one of the 262.5 odd-numbered horizontal lines scanned by the electron beam in developing the odd-line field. Compare EVEN LINE.

odd-line field On a conventional television screen, the complete field obtained when the electron beam has traced all the odd-numbered lines.

odd-line interface See ODD-LINE FIELD.

odd parity check A computer check for an odd number of ones or zeros in digital data.

Oex Trade name for a series of autonomous robots developed by Oedex, Inc. They use legs for locomotion. Noted for their ability to maneuver in places that most robots cannot reach.

odograph An electromechanical or electronic plotter that traces the path of a vehicle on a map, or on the image of a map as portrayed on a display screen.

odometry A method of speed, velocity, and/or position sensing. It is commonly used in mobile robotics and related applications.

occupancy A frequency band used by at least one transmitting station regularly.

occupied bandwidth For a given emission, the continuous band of frequencies \( f_2 - f_1 \) for which the mean (average) radiated power above \( f_1 \) and below \( f_2 \) is 0.5 percent of the total mean radiated power.

occupied orbit In an atom, an orbit in which an electron is present.

Ocean Phonetic alphabet code word for the letter O.

odometry Abbreviation of OPTICAL CHARACTER RECOGNITION.

oct Abbreviation of OCTAL.

octal Abbreviation, oct. Based on the number eight.

octal number system The base-eight system of number notation. It uses digits 0 through 7. Compare BINARY NUMERICAL SYSTEM and DECIMAL NUMERICAL SYSTEM.

octal notation See OCTAL NUMBER SYSTEM.

octal number system The base-eight system of number notation. It uses digits 0 through 7. Compare BINARY NUMERICAL SYSTEM and DECIMAL NUMERICAL SYSTEM.

odd harmonic In a complex waveform, a harmonic that is an odd-numbered multiple of the fundamental frequency \( f_0 \). Compare EVEN HARMONIC.

odd-harmonic intensification In a complex waveform, emphasis of the amplitude of odd harmonics, with respect to that of even harmonics, a property of some multivibrators and nonsinusoidal waves.

odd number A number that is not divisible by two.

odometry A method of speed, velocity, and/or position sensing. It is commonly used in mobile robotics and related applications.

odometer An electromechanical device that indicates the speed of, and distance covered by, a moving vehicle or robot. Some such devices give a constant position indication, via mathematical integration of the speed (velocity), relative to time. It can function in one, two, or three dimensions.
off-air alarm A device that gives a visible or audible indication when the carrier of a transmitter is lost. In its most rudimentary form, the device consists of a radio-frequency relay that actuates a bell, buzzer, horn, or lamp.

off-center display A radar display whose center point does not correspond to the location of the antenna.

off-center-fed antenna An antenna in which a feeder is attached to one side of the center point of the radiator. See, for example, WINDOM ANTENNA.

off-center feed The connection of a feed line to an antenna radiator at some point other than the physical center of the radiator.

Ohm's law The statement of the relationship among current, voltage, and resistance. In a direct-current circuit, current varies directly with voltage and inversely with resistance: \( I = \frac{V}{R} \), where \( I \) is the current in amperes, \( V \) is the voltage in volts, and \( R \) is the resistance in ohms. For alternating current, Ohm's law states that \( I = \frac{V}{X + Z} \), where \( X \) is the reactance and \( Z \) is the impedance.

ohms per square The resistance (in ohms) between two parallel edges of a square of thin-film resistance material.

ohms-per-volt A specification that indicates the usual bandwidth of a voltmeter. In general, the higher the rating, the better. When measuring voltage in high-impedance circuits, the rating should be as high as possible. Field-effect transistor (FET) voltmeters and vacuum-tube voltmeters have the highest ratings.

oil-burner control An electronic system for starting and stopping the operation of an oil burner to prevent pullback and to interrupt the supply when the flame becomes erratic.

oil calorimeter A calorimeter used to measure power in terms of the rise in temperature of oil heated by the electrical energy of interest.

oil capacitor A capacitor impregnated or filled with oil, such as high-grade castor or mineral oil. Also see OIL DIELECTRIC.

oil circuit breaker A circuit breaker filled with a fluid such as high-grade castor or mineral oil. Also see OIL DIELECTRIC.

oil diffusion pump A heavy-duty transformer, through which current is circulated for heat removal and arc prevention.

oil dielectric A highly refined oil used as an electric insulating medium, between the plates of a capacitor. Familiar examples are castor oil, mineral oil, and the synthetic oil chlorinated diphenyl.

ohmmeter An instrument for the direct measurement of electrical resistance in a circuit or transmission line.

offset Adjustment range The change in offset voltage, in millivolts or in microvolts, that can be affected by means of the external offset adjustment circuits.

offset current For an operational amplifier, the input current when the offset voltage is zero.

offset voltage For an operational amplifier, the particular value of direct-current bias voltage required at the input to produce zero output voltage.

off state 1. The condition of an off-on circuit or device, such as a flip-flop, that is off. Compare ON STATE, 2. The condition in which a circuit or device is shut down. Compare ON STATE, 2.

d-off state voltage The voltage across a semiconductor device, such as a diode, rectifier, or thyristor, when the device is in its normal off (nonconducting) state. Compare ON STATE VOLTAGE.

off target jamming In radar or radio jamming, the use of a remote jamming transmitter that will not be detected by the receiving station.

off time The period during which no useful work is being performed, as of equipment when it is not functioning because of a circuit breakdown.

Ohm's law \[ E = I \times R \]

Ohm's region A resistance exhibiting OHMIC RESPONSE.

ohmic contact A usually very-low-resistance connection between two materials that provides bilateral linear conduction. It exhibits none of the properties of a rectifying junction or a nonlinear resistance.

ohmic heating 1. Heating caused by current passing through a resistive material (i.e., \( I^2R \) losses in the material). 2. In an electric field, heat generated by charged particles when they collide with other particles.

ohmic loss Loss resulting from the direct-current resistance in a circuit or transmission line.

ohmic region The portion of the response curve of a negative-resistance device that exhibits positive (ohmic) resistance. The X/Y curve of a tunnel diode, for example, has two such positive-slope regions with a negative-slope (negative-resistance) region between them.

ohmic resistance A resistance exhibiting OHMIC RESPONSE.

ohmic response Response that follows OHM'S LAW: \( I = \frac{E}{R} \). In strictly ohmic devices, neither resistance nor reactance changes with current or voltage. Compare NONOHMIC RESPONSE.

ohmic value Electrical resistance expressed in ohms, or in multiples or fractions of ohms (kilohms, megohms, milliohms, etc.).

oil capacitor A capacitor filled with a fluid such as high-grade castor or mineral oil. Also see OIL DIELECTRIC.

oil calorimeter A calorimeter used to measure power in terms of the rise in temperature of oil heated by the electrical energy of interest.

oil diffusion pump See OIL PUMP.
oiled paper Insulating paper impregnated with oil for waterproofing and to increase its dielectric strength.
oiled-filmed cable A cable whose insulation is impregnated with oil that can be maintained at a constant pressure.
oiled-filmed capacitor See OIL CAPACITOR.
oiled-filmed circuit breaker See OIL CIRCUIT BREAKER.
oiled-filmed transformer A transformer whose case is filled with an insulating oil.
oil fuse cutout A fuse cutout that is filled with an insulating oil. Compare OPEN-FUSE CUTCUT.
oil-immersed transformer See OIL-FILLED TRANSFORMER.
oil-immersed capacitor See OIL CAPACITOR.
oil pump A vacuum diffusion pump using oil instead of mercury. Also see DIFFUSION PUMP.
oil switch A switch enveloped by insulating oil.
OLKT Abbreviation of online real time (operation).
OLT Amateur radio jargon for OLD MAN: chief (male) operator, or husband of female operator.
omega A phase-dependent navigational system using single-frequency, time-shared, I/CW transmissions from two or more locations.
omibearing A navigational bearing obtained by means of OMNIRANGE.
omibearing course An electromechanical device in which an OMNIRANGE signal and vehicle heading information are combined, the output being a navigational bearing in a specified direction.
omibearing indicator Abbreviation, OBI. An omibearing converter with a dial and pointer.
omibearing line In an OMNIRANGE system, one of the imaginary lines extending from the geographic center of the omnirange.
omibearing selector A device that can be set manually to a selected omnibearing.
omiconstant calculator A calculator that adds or multiplies numbers in succession in such a manner that the intermediate geometrically increasing exponents of a single button is repeatedly pressed.
on-directed 1. Pertaining to a device that responds equally well to acoustic or electromagnetic direction in three dimensions. 2. Pertaining to a device that radiates acoustic or electromagnetic energy equally well in any direction in three dimensions. 3. Also, NONDIRECTIONAL. Pertaining to an antenna that radiates energy equally well in any azimuth (horizontal) direction.
on-directional antenna See NONDIRECTIONAL.
on-directional hydrophone A hydrophone that picks up underwater sounds coming from any direction.
on-directional radio range See OMNIRANGE.
on-directional range station Abbreviation, ORS. A navigational system for OMNIRANGE.
on-directional range system Abbreviation, ORS. A navigational system for OMNIRANGE.
on-graph A Morse-code generator that operates via marked or perforated paper tape.
onmeander A radionavigation system in which each station in a chain broadcasts a beam in all directions. It usually operates at very-high frequencies (VHF) or ultra-high frequencies (UHF). Pilots of aircraft home on a particular station by tuning in and noting its bearings.
on-OM Abbreviation for OPTICAL MARK RECOGNITION.
on air See ON THE AIR.
oncall channel An assigned radio channel of which exclusive, full-time use is not demanded.
on-course curve In navigation, the rate at which the course of a vehicle deviates with reference to the distance along the true course.
on-course signal A single-tone-modulated signal indicating to an aircraft pilot following a radio beam that the flight is substantially on course.
on current See ON STATE CURRENT.
on delay An interval during which a circuit remains off after an actuating signal has been supplied. Compare OFF DELAY.
on-demand system A system, especially in computer and data-processing operations, that delivers information or service immediately upon request.
onograph An electromechanical device that graphically draws alternating-current waveforms on paper.
on-scope A radio-frequency (RF) energy detector that consists of a neon bulb attached to the end of an insulating rod. When an intense RF field, the field energy ionizes the gas in the bulb, causing it to glow without direct connection to the RF circuit.
one-address code In computer programming, a code in which the addresses and an operation, the addresses referring to one memory location.
one condition See ONE STATE.
one-digit adder See HALF ADDER.
one-element rotary antenna A directional antenna consisting of a ram and a field coil in it.
one-level address See ABSOLUTE ADDRESS.
one-level subroutine In a computer program, a subroutine in which no reference is made to other subroutines.
one-lunger Colloquialism for a radio transmitter consisting entirely of a one-transistor oscillator.
one output See ONE STATE.
one output signal The signal that results from reading a computer memory unit that is in the logic 1 state.
one output terminal In a flip-flop, the output terminal that is energized when the circuit is in its logic 1 state.
one output pulse A method of computer programming in which instructions contain two addresses and an operation, the addresses referring to the location of the next instruction and the location of the data to be used.
one state One condition in a binary machine language instruction. Compare ZERO STATE. In binary notation, the one state is represented by the digit 1.
one-shot A single-tone-modulated signal.
one-shot circuit See MONOSTABLE MULTIVIBRATOR.
one-shot multivibrator See MONOSTABLE MULTIVIBRATOR.
one-silenced wave A waveform consisting of only negative or positive half-cycles. Example: a rectified alternating-current signal.
one state Also, logic 1 state. The high, or true logic state of a bistable device, such as a flip-flop.
non-binary code A four-impedance network containing a four-cell network consisting of a radiator only (no directors or multipliers) that intercepts or radiates equally well in any azimuth (horizontal) direction.
non-fused switch A single-tone-modulated signal.
onibearing selector A device that can be set manually to a selected omnibearing.
onmachine language instruction A machine language instruction in which the address in an instruction refers to the distance along the true course.
on demand system A system, especially in computer and data-processing operations, that delivers information or service immediately upon request.
onograph An electromechanical device that graphically draws alternating-current waveforms on paper.
on scope A radio-frequency (RF) energy detector that consists of a neon bulb attached to the end of an insulating rod. When an intense RF field, the field energy ionizes the gas in the bulb, causing it to glow without direct connection to the RF circuit.
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one state One state is represented by the digit 1.
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one shot circuit See MONOSTABLE MULTIVIBRATOR.
one shot multivibrator See MONOSTABLE MULTIVIBRATOR.
one silenced wave A waveform consisting of only negative or positive half-cycles. Example: a rectified alternating-current signal.
one state Also, logic 1 state. The high, or true logic state of a bistable device, such as a flip-flop. Compare ZERO STATE. In binary notation, the one state is represented by the digit 1.
one third octave band A frequency band that is 1/6 octave wide: that is, the difference between the upper-frequency limit (1/f) and the lower-frequency limit (1/f) is one-third of an octave. Also see OCTAVE BAND.
one to one assembler An assembler computer program that produces a machine language instruction as a result of translating a source-language statement.
two-to-one correspondence A mapping between two sets A and B so that every element in set A has exactly one correspondent in set B.
O network A four-impedance network containing two series (upper and lower) arms and two shunt (input and output) arms.
onway radio See ONE WAY COMMUNICATION.
on way repeater In wire telephony, a device that amplifies and retransmits a signal in the direction the signal was traveling when it arrived at the repeater. Compare TWO WAY REPEATER.
on way valve A node or rectifier (British varia-
on-state resistance  The resistance of a voltage-dependent resistor that is conducting current.

on-state voltage  The voltage drop across a semiconductor device (such as a diode, rectifier, or thyristor) when the device is conducting current. Also see OPERATIONAL CURRENT.

on the air  1. The state of a radio station that is broadcasting. In broadcasting, the condition in which the transmitter is operational and the sound and/or video from the studio is being disseminated.

on time  The length of time a switch or switching device (such as a flip-flop) remains on.

on voltage  See ON-STATE VOLTAGE.

OOP  Abbreviation of OBJECT-ORIENTED PROGRAMMING.


opamp  See OPERATIONAL AMPLIFIER.

op code  Abbreviation of OPERATION CODE.

open-axis line  See OPEN-WIRE LINE.

open-back cabinet  A loudspeaker enclosure in which one space behind the speaker is open to the room.

open capacitance  The value of a variable capacitor whose rotor plates have been rotated completely out of mesh with the stator plates. Compare CLOSED CAPACITANCE.

open-center display  A radar display in which a ring around the center indicates zero range.

open-chassis construction  A method of assembling electronic equipment by mounting components and mounting them on an unenclosed chassis, often without a front panel. Similar to breadboard construction.

open circuit  A discontinuous circuit (i.e., one that is broken at one or more points and, consequently, cannot complete a circuit or present a voltage at its terminals). Compare CLOSED CIRCUIT.

open-circuit line  See OPEN-CIRCUITED TRANSMISSION LINE.

open-circuited transmission line  Abbreviation, OCTL. An unterminated transmission line in which the conductors at the far end are not connected together.

open-circuit impedance  For a transmission line or a four-terminal network, the input or driving-point impedance when the output end of the line is open-circuited.

open-circuit jack  A telephone jack that introduces a break in a circuit until a plug connected to a closed external circuit is inserted.

open-circuit plug  See OPEN PLUG.

open-circuit resistance  For a four-terminal network, the input or driving-point resistance when the output end of the network is unterminated.

open-circuit signaling  A system of signaling in which no current flows until the signal circuit is in active operation. In a simple telegraph circuit, for example, current flows only when the key is pressed [i.e., form a dot or dash].

open-circuit alarm system  A security system in which all the actuating sensors are normally open and connected in parallel. When one of the sensors is actuated, it closes, causing a short circuit that triggers the alarm.

open-circuit voltage  See NO-LOAD VOLTAGE.

open collector configuration  In an integrated circuit, an output scheme utilizing no internal pull-up resistor. While OR outputs can thus have opposite states without risk of damage to the device.

open component  An open-circuit component (e.g., an open diode, coil, resistor, etc.).

open core  A magnetic core having a cylindrical shape. A disadvantage of this core configuration, in some applications, is that much of the magnetic flux extends outside the core. Compare CLOSED CORE.

open-core choke  A choke coil wound on an open core. Also called OPEN-CORE INDUCTOR. Compare CLOSED-CORE CHORE.

open-core transformer  A transformer wound on an open core. Compare CLOSED-CORE TRANSFORMER.

open-delta connection  See VEE-CONNECTION OF TRANSFORMERS.

open-ended  Pertaining to a circuit or device that can be built upon without modifying its original configuration.

open-end stub  A stub that is neither short-circuited nor terminated at its far end.

open-end stub tuning  Adjustment of an OPEN-END STUB, by pruning its length, for optimum operation at a given frequency.

open-entry contact  A contactor, an unprotected, opening contact of the female type.

open feed  See OPEN-WIRE LINE.

open-frame machine  See GENERATOR and MOTOR.

open-loop 1. In a control system, a feedthrough path having no feedback and that is not self-regulating. 2. In an operational amplifier, the configuration in which there is no feedback, and in which the device operates at maximum gain. 3. A loop within a program from which the computer automatically exits after a specific number of iterations.

open-loop bandwidth  The bandwidth of an open-loop device, such as an amplifier, without feedback. Also see OPEN LOOP.

open-loop control system  A control system having no feedback and that is not self-regulating. An example is a fluid-level gauge that indicates the height of fluid in a tank, but that cannot correct the level automatically. Compare CLOSED-LOOP CONTROL SYSTEM.

open-loop differential voltage gain  For a differential amplifier, the overall voltage gain (when either input is used) when the amplifier has no feedback.

open-loop gain  The overall gain ratio of output to input of an open-loop device, such as an amplifier without feedback. Also see OPEN LOOP.

open-loop input impedance  The input impedance of an open-loop device, such as an amplifier without feedback. Also see OPEN LOOP.

open-loop output impedance  The output impedance of an open-loop device, such as an amplifier without feedback. Also see OPEN LOOP and OPEN LOOP IMPEDANCE.

open-loop system  1. A circuit in which the input and output currents are independent. 2. A robot that does not use a servo system. It depends entirely on alignment and precision for positioning accuracy. 3. An electromechanical device that does not use corrective feedback.

open-loop voltage gain  The overall voltage gain of an open-loop amplifier (i.e., one having no feedback). Also see OPEN LOOP.

open magnetic circuit  A magnetic circuit in which a complete path is not provided for magnetic flux. See, for example, CLOSED MAGNETIC CIRCUIT. Compare CLOSED MAGNETIC CIRCUIT.

open motor  An induction motor (i.e., one that has openings in its housing for air circulation).

open-phase relay  In a polyphase system, a protective relay that opens when one or more phases are open-circuited. Also see OPEN-PHASE PROTECTION.

open plug  A phone plug to which no external connections are made; it is used to hold the blades of a jack as if they were plugged in.

open-relay  A tape-recording system in which the tape, during record or playback condition, is wound into a take-up reel that is physically separate from the tape reel. Also called reel-to-reel arrangement.

open relay  A relay in its open-contact state. 2. A relay having an open-circuited coil. 3. An unenergized relay.

open routine  In computer operations, a routine that can be inserted directly into a larger routine and requires no link to the main program.

open subroutine  In computer operations, a subroutine that can be inserted into a larger instructional sequence and must be recopied whenever it is required. Also called direct-insert subroutine.

open systems interconnection reference model  Abbreviation, OSI-RM. A standard set of protocols for computer network communication. It consists of seven levels, also called layers: physical layer, data link layer, network layer, transport layer, session layer, presentation layer, and application layer.

open-system pickup temperature  A temperature transducer that must be placed directly in contact with the object whose temperature is being measured.

open volume  Pertaining to the maximum gain operation of a sound-reproducing system (i.e., operation at full volume). Compare CLOSED VOLUME.

open wire  1. An unterminated wire. 2. A wire supported above the surface of the ground and often ungrounded. See OPEN-WIRE LINE.

open-wire feed  See OPEN-WIRE LINE.

open-wire line  A transmission line in which a tap, or another device, usually consisting of two straight, parallel wires held apart by bars of low-loss insulating material at regular intervals along the line.

open-wire loop  A branch line connected to a main feed line.
open-wire wavemeter See LECHER WIRES.

operate In computer operations, a quantity that enters into results from an operation.

operate 1. To manipulate according to an established procedure (e.g., to operate an instrument). 2. To perform specifications, in the sense that an electronic circuit functions.

operate current A signal current or trigger current required to activate a device. Compare OPERATE VOLTAGE.

operate delay See OPERATE TIME, 1.

operate interval See OPERATE TIME, 2.

operate time 1. The interval starting after the application of an operate current or voltage to a device, and ending when the device operates. 2. The period during which an electronic equipment is in operation. Also see OPERATING TIME, 1.

operate voltage The signal voltage or trigger voltage required to activate a device. Compare OPERATE CURRENT.

operating ambient temperature Abbreviation, OAT. The maximum or recommended temperature in the space immediately surrounding an equipment in operation.

operating angle In an amplifier circuit, the excitation signal cycle, in degrees, during which drain, collector, or plate current flows. Class-A amplifiers operate for 360 degrees of the input signal cycle; class-B amplifiers operate for more than 180 degrees, but less than 360 degrees of the input signal cycle; class-C amplifiers operate for 180 degrees of the input signal cycle; class-D amplifiers operate for less than 180 degrees of the input signal cycle.

operating bias In a circuit containing transistors, diodes, etc., the value(s) of direct-current bias required for normal operation.

operating code The code used by the operator in a computer or data processing system.

operating conditions The environment in which a circuit or system functions in normal use.

operating current The current required by a device during its operation. Compare IDLING CURRENT.

operating cycle The sequence of events in the operation of a device. For example, the repetitive operation of a neon bulb relaxation oscillator is a sequence of three events: (1) slow charge of capacitor, (2) firing of bulb, and (3) abrupt discharge of capacitor.

operating frequency 1. The fundamental frequency at which a circuit or device is operated. 2. The frequency of the current, voltage, or power delivered to a circuit.

operating frequency range 1. The range of operating frequencies, expressed as a minimum and maximum for a communications receiver, transmitter, or transceiver. 2. For an integrated-circuit oscillator, its design, maximum frequency, and all frequencies in between, at which the device is guaranteed to operate.

operating line The line that intersects each curve at a single point and graphically displays the performance of the device for a given condition. Thus, an operating line on a family of output curves for a transistor might depict operation with a given load resistor.

operating overload The extent and/or duration of overload to which an equipment can be exposed during customary operation, and still continue to properly function.

operating point On the response curve for a device, the point indicating the quiescent level of operation (such as determined by a fixed bias voltage or current). An alternating-current point applied at this point oscillates above and below the point as a mean.

operating-point shift A movement of an operating point due to faulty operation of a circuit or device, or to a value change in some critical component.

operating position 1. The control point in a system, i.e., the place where an operator [see OPERATOR, 1] normally functions. 2. The actual or recommended physical orientation of a device during its operation (e.g., a vertical operating position for a power vacuum tube).

operating power 1. The power actually used by a device during its operation. 2. The antenna power of a radio station.

operating ratio For a given period, the ratio \( r / t \), where \( r \) is the time during which an equipment is operating correctly, and \( t \) is the duration of the period.

operating time 1. The interval during which an equipment is in operation. 2. The period corresponding to OPERATING ANGLE.

operating-time characteristic For a coil-type relay, the relationship between operating time and operating power.

operating voltage The voltage required by a device, or measured at the device, during its operation. Compare IDLING VOLTAGE.

operation 1. The working of a circuit or device (i.e., its performance). 2. A process usually involving a sequence of steps (e.g., a mathematical operation). operational amplifier Also called an op amp. A specialized linear integrated circuit (IC) that consists of several transistors, resistors, diodes, and capacitors, interconnected to produce gain over a wide range of frequencies. A single amplifier can comprise an entire IC, or an IC can contain several amplifiers. The dual op amp and the quad op amp are common variants. Some ICs contain one or more amplifiers in addition to other circuits. The devices can be used with resistance-capacitance (RC) networks or combinations to build active filters for use at audio frequencies.

operational differential amplifier An OPERATIONAL AMPLIFIER preceded by a DIFFERENTIAL AMPLIFIER.

operational readiness In statistical analysis, the probability that a system will, at a certain time, be correctly operating or ready to operate.

operational reliability Reliability determination empirically from a study of the actual operation of a device or system under controlled conditions. Also called ACHIEVED RELIABILITY.

operational transconductance amplifier Abbreviation, OTA. A high-gain, low-output-impedance amplifier that works differently from the conventional operational amplifier in that its output current is proportional to its input-signal voltage.

operation code In computer operations, the part of an instruction that specifies an operation.

operation decoder In a digital computer, the circuit that reads an OPERATION CODE and directs other circuits in the execution of the code.

operation envelope See WORK ENVELOPE.

operation number In computer programming, a number that indicates the position in the program of a particular operation or subroutine.

open-wire wavemeter • operating ratio 497

operating station In a computer installation, one or more consoles for the control of a data-processing system.

operating system Abbreviation, OS. In a computer, a set of programs that oversee the functioning of the system and application software. It works with the basic input/output system (BIOS).

operating temperature range For a given device, the spread between maximum and minimum values of operating temperature.

operating time 1. The interval during which an equipment is in operation. 2. The period corresponding to OPERATING ANGLE.

operationalism A branch of computer engineering devoted to the solution and/or optimization of functions of many variables.

operation time The interval between the instant of application of all voltages to a circuit, and the instant when the current reaches a specified percentage of its final steady value.

operator 1. A person who performs an operation (see OPERATE, 1). 2. In mathematics, a symbol indicating an operation (e.g., \( +, -, \times, \div \), etc.).

opt. Abbreviation of OPTICAL.

optacon An electronic aid for the blind. It has a camera that scans printed matter and a device that forms corresponding raised letters that can be read, as would Braille, with the fingertips. The name is a contraction of optical to tactile converter.

optical 1. Generating or sensing visible light. 2. Visible: light visible to the eye, the range of approximately 390 to 750 nanometers wavelength.

optical ammeter A type of OPTICAL PYROMETER that measures the current flowing through the filament of an incandescent filament.

optical antenna A photosensitive device intended for the reception of modulated-light or modulated-infrared signals. Usually consists of a convex lens or a concave reflector and a semiconductor photodetector.

optical axis The z-axis of a quartz crystal (see Z-AXIS, 4).

optical character reader A device that uses OPTICAL CHARACTER RECOGNITION to discern printed characters.
optical character recognition

Abbreviation, OCR. In computer and data-processing operations, the reading of, or transferring of, optical, numerical, and other characters from hard copy (usually printed matter) by photoelectric methods. It converts the characters into digital data that can be stored in computer memory, on disks and tapes, and transmitted via digital communication networks. It can also allow a computer or robot to read signs, maps, etc.

optical communications

One-way or two-way communications via modulated visible light. It can be conducted through optical fibers, the atmosphere, water, or any other transparent medium.

optical coupler

A coupling device consisting essentially of a light source (actuated by an input signal) mounted in an opaque housing with a light-sensitive device that delivers the output signal. In its simplest form, the arrangement consists of a light-emitting diode (LED) and a photodiode.

optical mode

The vibration mode that produces an oscillating dipole in a crystal lattice.

optical pattern

A Christmas-tree-like pattern produced by parallel rays of light striking a photographic plate. Also see DIFFRACTION.

optical playback

See OPTICAL SOUND REPRODUCER.

optical pyrometer

A pyrometer for measuring the temperature of a hot body in terms of the intensity and color of light it emits.

optical scanner

An electronic device that converts hard-copy text and graphics into digital form suitable for processing and storage in a computer. There are several types; the most common resembles a small photocopy machine and is known as a flatbed scanner. See OPTICAL SCANNING.

optical sound reproduction

A photoelectric machine for recording sound on photographic film. Also see OPTICAL SOUND RECORDING.

optical sound recording

A system for recording sound on photographic film. The sound is picked up by a microphone and amplified to vary the intensity of a light source. The film passing this modulated beam becomes exposed to a variable-width or variable-density track corresponding to the modulation (see VARIABLE-DENSITY SOUND RECORD and VARIABLE-WIDTH SOUND RECORD). When developed, it is played back, its sound track modulates a light beam in the reproducer by actuating a photoemissive cell or phototube to produce the audio signal, which is then amplified.

optical sound reproducer

A photoelectric machine for reproducing sound on film. A light beam produced by the device in the device is modulated by the passing sound wave, and in turn, modulates a phototube or photoemissive cell mounted in the device, which is amplified to drive a loudspeaker. Also see OPTICAL SOUND RECORDING.

optical system

Collectively, the functional arrangement of lenses, mirrors, prisms, and related devices in optoelectronic apparatus.

optical tachometer

An electronic instrument for measuring (by means of reflected-light variations) the speed of a body, such as a rotating shaft, without electrical or mechanical attachments to the latter.

optical thermometer

See OPTICAL PYROMETER.

optical twinning

A kind of defect in which two types of quartz occur in the same crystal. Compare ELECTRICAL TWINS.

optical wand

A pencil-like optical probe, used to read bar codes from a printed page and translate the codes into information that is then loaded into a computer or calculator.

optical axis

See OPTICAL AXIS.

optical flow

See EPIPOlar NAVIGATION.

optics

1. The science of light, its measurement, application, and control. 2. A science of lenses, prisms, filters, or mirrors used in electronic devices to control, direct, or otherwise modify light rays.

optoelectronic coupler

The adjustment or manipulation of the elements of a process or system for the best operation or end result.

optoelectronic device

A device for amplifying the effect of a small rotation. The rotating member carries a small light source that reflects a light beam over a curved scale, the distance through which the light spot travels on the scale being proportional to the distance between the scale and the rotating mirror. In this way, the deflection on the scale is several times the length of the arc described by the mirror, the rotation being thus amplified.

optical link

See OPTICAL COUPLER.

optical mark recognition

A method of data transfer that involves the use of optical techniques.

optical maser

See LASER.
The periodic change of a body or quantity caused by signals from the high-frequency recording and low-frequency recording are compensated to provide reproduction that more closely resembles the actual sound. 2. A curve by the form of a sine wave, as defined in 1.

orthogonal axes Perpendicular axes (e.g., those in a Cartesian (rectangular) coordinate system).

ORTHICON A television camera tube somewhat similar to the iconoscope, but which provides internal amplification of the electron image (e.g., that of a photomultiplier tube).
From the oscillation of energy back and forth between the inductor and capacitor.

- Oscillatory discharge: An electrical discharge, such as that of a capacitor, that sets up an OSCILLATORY CURRENT.

- Oscillatory surge: A current or voltage surge that includes both positive and negative excursions.

- Oscillatory transient: See OSCILLATORY TRIGGER.

- Oscillator: A device consisting essentially of a bar of semiconductor material positioned in a magnetic field; it will produce oscillations under certain conditions.

- Oscillograph 1: The instrument that makes a permanent record (photograph or pen recording) of a rapidly varying electrical quantity. Also called recorder (see RECORDER, 2). Compare OSCILLOSCOPE. Oscillograph recorder A direct-writing recorder (see RECORDER, 2).

- Oscilloscope: The graphic display of a rapidly varying electrical quantity. Also called oscillograph. Oscilloscope camera A special high-speed, short-focus camera for use with oscilloscopes. Oscilloscope camera A special high-speed, short-focus camera with features for attachment to an oscilloscope to record images from the screen. Standard and instant-film types are available.

- Oscilloscope differential amplifier: An amplifier that processes the difference between two signals, for the purpose of displaying on an oscilloscope or oscillograph.


- Oscillator: A device designed specifically to function as a local oscillator and mixer. Oscillator tuning: The separate, often ganged, tuning of the oscillator stage in a circuit.

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- Oscillator power supply 1: The direct-current or alternating-current power supply for an oscillator. See OSCILLATOR-TYPE POWER SUPPLY.

- Oscillator radiation: The emission of radio-frequency energy by the oscillator stage of a superheterodyne receiver. Also see OSCILLATOR INTERFACE.

- Oscillator radiation voltage: The radio-frequency voltage at the antenna terminals of a superheterodyne receiver that results from signal emission by the oscillator stage.

- Oscillator stabilization 1: The automatic compensation of an oscillator circuit for the frequency drift resulting from changes in temperature, current, voltage, or component parameters. 2. The automatic stabilization of the operating point of an oscillator circuit against variations resulting from changes in temperature, supply current or voltage, or component parameters.

- Oscillatory current 1: A current that alternates periodically, particularly the current in an inductance-capacitance (LC) tank circuit that results from the oscillation of energy back and forth between the inductor and capacitor.

- Oscillator current 2: An alternating-current generator.

- Oscillator current 2: A voltage that constitutes one of the waveforms output by an AUTOMATIC-SWITCHING OSCILLATOR.

- Oscillator current 3: A voltage that constitutes one of the waveforms output by an AUTOMATIC-SWITCHING OSCILLATOR.

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- Oscillator: A device consisting essentially of a bar of semiconductor material positioned in a magnetic field; it will produce oscillations under certain conditions.
output current 1. Symbol, \( I \). The current delivered by a source, such as a battery, generator, or amplifier. Compare INPUT CURRENT. 2. Symbol, \( I \). Current flowing in the output leg or electrode of a circuit or device. Compare INPUT CURRENT. 3. Symbol, \( I \). The direct-current power input, and \( P \) is the alternating-current (signal) power output.

output equipment See OUTPUT DEVICE, 3.

output filter The direct-current filter of a power supply operating from alternating current. Also see CAPACITOR-INPUT FILTER and CHOKE-INPUT FILTER.

output gap A device via which current or power is intercepted from an electron beam in a beam-power tube.

output impedance Symbol, \( Z \). The impedance "looking" into the output terminals of an amplifier, generator, or network. Compare INPUT IMPEDANCE.

output indicator A device, such as an analog meter, digital meter, or bar-graph meter, that provides a visual indication of the output-signal amplitude of an equipment.

output leakage current In an open-collector integrated circuit, the current from collector to emitter with the output in the "off" condition and a specified set of conditions at the input and output terminals. Compare INPUT TRANSFORMER.

output limiting A process for automatically maintaining the amplitude of the signal delivered by a generator or amplifier. See, for example, AUTOMATIC GAIN CONTROL, AUTOMATIC MODULATION CONTROL, VOLUME EXPANSION, and VOLUME LIMITER.

output load See OUTPUT DEVICE, 1.

output load current 1. The current through the output load of an amplifier. Generally, this current is expressed in root-mean-square (rms) form. 2. The highest rms current that an amplifier can deliver to a load of a specified impedance.

output meter A meter that gives a quantitative or qualitative indication of the output of an amplifier or generator. See, for example, OUTPUT-POWER METER.

output offset In an integrated circuit, the voltage at the output when the inputs are grounded.

output power Symbol, \( P \). The power deliverable by an amplifier, generator, or circuit. Also called output power. Compare OUTPUT CURRENT.

output-power meter A type of direct-reading wattmeter for measuring the power output of an amplifier or generator.

output regulator A circuit or device that automatically maintains the output of a power supply or signal source at a constant amplitude.

output resistance Symbol, \( R \). The internal resistance of a circuit or device, as "seen" at the output terminals. Compare INPUT RESISTANCE.

output routine In computer operations, a routine (program segment) that performs the work involved in moving data to an output device, often including intermediate transfers and modifying the data as necessary.

output section See OUTPUT AREA.

output sink current In an integrated circuit, for a specified set of conditions at the input and output terminals, current into the output as measured in milliamperes or microamperes.

output source current In an integrated circuit, for a specified set of conditions at the input and output terminals, the current out of the output, as measured in milliamperes or microamperes.

output stage The last stage of an amplifier. Delivers the signal to the load.

output terminals Terminals (usually a pair) associated with the output of a circuit or device (see OUTPUT, 1, 2). Compare INPUT TERMINALS.

output tank In a transmitter or power generator, a parallel-tuned combination of inductance and capacitance in the collector, drain, or plate circuit, that is generally tuned to resonance at the operating frequency. It optimizes efficiency and couples the signal to the load. Compare INPUT TRANSFORMER.

output transformer The output-coupling transformer that delivers signal voltage or power from an amplifier, generator, or network to a load or to another circuit. Compare INPUT TRANSFORMER.

on the oscillator frequency or signal amplitude. 2. An amplifier, usually with a voltage gain of 6 dB, that follows a video amplifier. The amplifier drives a coaxial transmission line.

output bus driver In a computer, a device that amplifies output signals sufficiently to provide signals to other devices without undue loading of the supply line (bus).

output capability The maximum power or voltage output that a circuit can deliver without distortion or other improper operating conditions.

output capacitance Symbol, \( C \). The internal capacitance of a circuit or device, as seen at the output terminals. Compare INPUT CAPACITANCE.

output capacitive loading For an operational amplifier at unity gain, the maximum capacitance that can be connected to the output of the amplifier before phase shift increases to the point of oscillation.

output capacitor 1. In a capacitance-coupled circuit, the output coupling capacitor. Compare INPUT CAPACITOR. 2. The last capacitor in a power-supply filter circuit.

output capacity The maximum output capability of a device or system expressed in appropriate units, such as current, voltage, power, torque, energy, etc.

output choke The last choke (inductor) in a power-supply filter circuit.

output circuit The circuit or subcircuit that contributes the output portion of a network or device. Also see OUTPUT and OUTPUT TERMINALS. Compare INPUT ABSENCE.

output-circuit distortion Distortion in the output portion of a circuit or device (such as a transistor or transformer), usually caused by an overload or nonlinear response.

output conductance Symbol, \( g \). The internal conductance of a circuit or device, as "seen" at the output terminals. It is the reciprocal of OUTPUT RESISTANCE. Compare INPUT CONDUCTANCE.

output control 1. The gain control of an amplifier. 2. The level control of a variable-power supply.

output coupling transformer See OUTPUT CAPACITOR.

output current 1. Symbol, \( I \). The current delivered by a source, such as a battery, generator, or amplifier. Compare INPUT CURRENT. 2. Symbol, \( I \). Current flowing in the output leg or electrode of a circuit or device. Compare INPUT CURRENT. 3. Symbol, \( I \). The direct-current power input, and \( P \) is the alternating-current (signal) power output.
overdrive • overload recovery time 507

overdrive In an analog amplifier, an undesirable operating condition occurs with the applica-
tion of excessive input signal voltage or signal levels. This results in increased distortion, nonlinearity, excessive harmonic generation, and excessive output signal bandwidth. In the high-field-gain portion of the system, such a condition grossly degrades the quality of the output sound. This condition is called transis-
tor or vacuum tube, whose bias current or voltage is higher than the correct value for a given mode of operation. Compare UNDERBIASED UNIT.

overdriving A characteristic of electronic amplifiers, in which the output of a device is higher than the correct value for a given mode of operation. Compare UNDERBIASED UNIT.

overall loudness The apparent intensity of an acoustic stimulus, generally measured with the threshold of hearing, and expressed in decibels, relative to the threshold level.

overall voltage compliance In an integrated circuit, the voltage range over which the output can be made to swing, while keeping the operation of the circuit within a certain maximum allowable nonlinearity limit. It is measured in volts or milli-
vols. It can also be measured as the root-
mean-square (rms) value.

overall voltage swing In an integrated circuit with a specified maximum output, the output voltage change me-
sured as a difference between maximum and minimum in volts or millivolts.

output channel A terminal or a pair of terminals, on an integrated-circuit dual stage that are not assigned in any way to a specific function. These terminals are used to communicate directly with an external signal source.

output circuit breaker A circuit breaker that opens when current exceeds a predetermined value. Compare UNDERCURRENT RELAY.

output circuit 1. The circuit that is driven by an amplifier or generator, usually it is a power tube. 2. See OUTPUT DEVICE.

output device A transistor in the final stage of an amplifier or generator; usually, it is a power tube.

output tube A vacuum tube in the final stage of an amplifier or generator; usually, it is a power tube.

output voltage 1. Symbol, E or V. The voltage de-
divered by a source, such as a battery, generator, or amplifier. Compare INPUT VOLTAGE. 2. Symbol, E or V. The voltage across the output leg or electrode of a circuit or device. Compare IN-
PUT VOLTAGE.

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vols. It can also be measured as the root-
mean-square (rms) value.

output voltage noise In an integrated circuit, the noise voltage over a given range of frequencies, as measured in peak-to-peak millivolts or micro-
vols. It can also be measured as the root-
mean-square (rms) value.

output winding The secondary coil of an output transformer.

outside antenna See OUTDOOR ANTENNA.

outside booster See OUTDOOBOOSTER.

outside diameter Abbreviation, OD. The outer-
most diameter of a body or figure having two con-
centric diameters (e.g., tubing or conduit). Compare INSIDE DIAMETER.

outside lead See FINISH LEAD.

oven 1. Also called crystal oven. A chamber provid-
ing a closely controlled operating temperature for an electronic device, such as a quartz crys-
tal. 2. An enclosure in which electronic equip-
ment can be tested at selected, precise high temperatures. Compare COLD CHAMBER.

overall feedback Positive or negative feedback throughout the system, as opposed to feedback confined to one stage or a few stages within the system.

overall gain The total gain of an entire system (such as a multistage amplifier), as opposed to the gain of output control transformer.

overcompounded generator A dummy-type gen-
erator having a compound field winding in which the series-field winding increases the field inten-
sity beyond the point needed to maintain the out-
put voltage. Compare UNDERCOMPOUNDED GENERATOR.

overcoupled transformer A transformer having greater than critical coupling between its primary and secondary winding in which the mutual inductance is the same as intermediate-frequency (IF) transformers, this produces a double-peak response.

overcoupling Extremely close coupling (see CLOSE COUPLING).

overcurrent A current greater than the specified, nominal, or desired level. Compare UNDERCUR-
RENT.

overcurrent circuit breaker A circuit breaker that opens when current exceeds a predetermined value. Compare UNDERCURRENT RELAY.

overcurrent protection The use of a circuit breaker, relay, or other device to protect a circuit or system from damage resulting from an exces-
sive flow of current.

overcurrent relay A protective relay that opens a circuit when current exceeds a predetermined value. Compare UNDERCURRENT RELAY.

overcutting In a calcu-
lator or computer, the condition in which an arithmetic operation yields a result exceeding the capacity of the loca-
tion or display for a result. The carry digit that results from the condition described in (1).

overflow indicator 1. In a digital calculator, a dis-
paly that indicates that a numerical value is too large or too small to be shown with the available number of decimal places. 2. In data processing, a display that indicates the presence of too many bits or characters for the available storage space, allowing a small amount of the data to be retained. A display that indicates the presence of too many bits or characters for the available storage space, allowing a small amount of the data to be retained. A display that indicates the presence of too many bits or characters for the available storage space, allowing a small amount of the data to be retained.

overflow position In a digital computer, an auxili-
ary register position for developing the overflow digit (see OVERFLOW, 1). In a digital computer, an auxiliary register position for developing the overflow digit (see OVERFLOW).

overflow record A sheet of transparent or translucent material laid over a schematic diagram for the purpose of tracing connections that have been made in wiring an equipment from the diagram.

overdrive Amplifier See OVERDRIVEN UNIT.

overdriven amplifier An oscillator, amplifier, or trans-
ducer whose driving signal (current, voltage, power, or other quantity) is higher than that which the device can properly or efficiently han-
dle for correct or intended operational perfor-
mance.

overdub In audio recording, a method of combin-
ing two or more signals onto a single tape track. For example, a live voice can be recorded on a tape containing pre-recorded music.

overexcited Receiving higher than normal excita-
tion, as in radio-frequency amplifiers or alternat-
ing-current generators.

overcharging A current greater than the specified, nominal, or desired level. Compare UNDERCUR-
RENT.

overcurrent The time during which two successive 
overdubbing приемов звукоснимания.
overload relay  A relay actuated when circuit current exceeds a predetermined value. Compare UNDERLOAD RELAY.

overload time  The maximum length of time that an equipment can safely be subjected to an overloads level of current.

overmodulation  Modulation in excess of a specified level—especially amplitude modulation greater than 100%. Compare COMPLETE MODULATION and UNDERMODULATION.

overmodulation alarm  See OVERMODULATION INDICATOR.

overmodulation indicator  A device, such as a neon bulb, incandescent lamp, light-emitting diode, analog meter, or digital meter, adapted to give an alarm when the modulation percentage of a signal exceeds a predetermined value.

overpotential  See OVERVOLTAGE.

overpower relay  A relay actuated by a rise in power above a predetermined level. Compare UNDERPOWER RELAY.

overpressure  For a pressure transducer, pressure in excess of the maximum rating of the device.

override  1. To intentionally circumvent an automatic control system. 2. To bridge a functional stage of a system.

overscanning  The deflection of the beam of a cathode-ray tube beyond the edges of the screen.

overshoot  1. The momentary increase of a quantity beyond its normal maximum value (e.g., the spike sometimes seen on a square wave because of the overshoot of a rising voltage). 2. Momentary overtravel of the pointer of an analog meter.

overshoot relay  See OVERSHOOT RELAY.

overshoot time  The use of an automatic device, such as a thermal relay or thermostat, to disconnect a device from the power supply when the device’s temperature becomes excessive.

overthrow  See OVERSHOOT.

overtone  See HARMONIC.
To assemble and house an electronic device, a wide range of housings, from the simple encapsulation of miniature transistors to forced-air-cooled enclosures for heavy power units. This includes a wide range of housings, from the simple encapsulation of miniature transistors to forced-air-cooled enclosures for heavy power units.

The enclosure for an electronic device crowd.

Pacific Standard Time

See CARDIAC STIMULATOR.

packet communications

A method via which data is exchanged through a network according to the most efficient possible path at the time of its transit. At the destination, the packets are reassembled into the original signal. This scheme makes more efficient use of network resources than continuous-connection or single-path methods. However, when network usage is heavy, there can be a delay in the arrival of a sufficient number of packets to produce an intelligible received signal.

packet radio

The transmission and reception of PACKET COMMUNICATIONS data via radio.

packet switching

In telephony, a method of connection in which data is exchanged between subscribers by splitting the data into units (packets). Each packet is sent out over the optimum path at the time of transmission. The signal path can, and usually does, vary from packet to packet. At the destination, the packets are reassembled into the original signal. The connection is in effect nonexistent during periods of silence (no data transmitted by either subscriber). Compare CIRCUIT SWITCHING.

packing

In the button of a carbon microphone, bunching and cohesion between the carbon granules.

packing density

The number of discrete package circuits within a given surface area or volume.

packing factor

1. See VOLUMETRIC EFFICIENCY.

2. In computer operations, the number of bits that can be recorded in a given length of magnetic memory surface. Also called PACKING DENSITY.

pack transmitter

A portable transmitter that can be strapped to the operator's back.

pack unit

A portable transceiver that can be strapped to the operator's back or carried on an animal's back.

PACM

Abbreviation of pulse-amplitude code modulation.

paid

1. An attenuator network (usually a combination of resistors) that reduces the amplitude of a signal by a desired amount while maintaining constant input and output impedances. 2. In computer operations, to make a record a fixed size by adding blanks or dummy characters to it. 3. To lower the frequency of an inductance-capacitance (LC) circuit by adding capacitance to an already capacitively tuned network.

padder

See OSCILLATOR PADDLER.

padding capacitor

A capacitor to be strapped to the operator's back or carried on an animal's back.

paddle-handle switch

A portable switch that prints a message in lines on a page, according to an established format, rather than in a single line.

page

1. A public-address system used for summoning purposes. 2. See H E E P E R.

page turning

The successive display of pages (see PAGE).

pair

1. Two wires, especially two insulated conductors in a cable. 2. A set of two particles or charge carriers (e.g., electron-hole pair). 3. A set of two transistors or vacuum tubes, operating together in push-pull or parallel in a power amplifier.

paired cable

A cable consisting of separate twisted pairs of conducting wires.

palmetto

In industrial robots, the automatic placing of objects in a tray according to a computer program.

Palm

See HANDHELD COMPUTER.

PalmPilot

In radar, a method of simultaneously scanning the azimuth and the elevation.

palmprint computer

See HANDHELD COMPUTER.

Paleomagnetism

The study of certain rocks and minerals to determine the nature of the earth's magnetic field at the time the rocks were formed. When the age of the rock is determined by means of radiometric dating, and numerous rock samples are found covering many different eras, the nature of the earth's magnetic field can be graphed over time.

palladium


palatinate

A computer program of general use for magnetic tape operations.

Palmer scan

A panoramic sweep made as from an antenna, or to sweep a wide band of frequencies with a suitable tuning circuit.

PANDA

1. A method via which data is exchanged through packets. Each packet is routed individually through the network according to the most efficient possible path at the time of its transit. At the destination, the packets are reassembled into the original signal. This scheme makes more efficient use of network resources than continuous-connection or single-path methods. However, when network usage is heavy, there can be a delay in the arrival of a sufficient number of packets to produce an intelligible received signal.

packet communications

A method via which data is exchanged through a network according to the most efficient possible path at the time of its transit. At the destination, the packets are reassembled into the original signal. This scheme makes more efficient use of network resources than continuous-connection or single-path methods. However, when network usage is heavy, there can be a delay in the arrival of a sufficient number of packets to produce an intelligible received signal.

packet radio

The transmission and reception of PACKET COMMUNICATIONS data via radio.

packet switching

A portable switch that prints a message in lines on a page, according to an established format, rather than in a single line.

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The successive display of pages (see PAGE).

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A cable consisting of separate twisted pairs of conducting wires.
panic button A security system, a button or switch that immediately triggers an alarm when it is closed.

panoramic adapter An external device that can be connected to a receiver to sweep a frequency band and indicate carriers on the air as pips on a screen at the corresponding frequency points.

panoramic display 1. A wide-angle display. 2. A spectrum-analyzer display that shows a wide range of frequencies. From zero to well above the maximum frequency in the monitored system.

panoramic receiver A receiver that displays pips on a screen to show carriers on the air in a given frequency band. All frequencies in the band are presented along the horizontal axis of the screen.

panpot A potentiometer with which panning can be achieved (see PAN, SLI).

pan-range A form of radar display in which target motion can be ascertained.

pantograph The transmission of radar information to a distant location for observation or recording.

Papa Phonetic alphabet code word for the letter P.

paper advance mechanism In a data-processing system, the part of a printer that moves (some- times by computer control) the paper through the printer.

paper capacitor A component that is made by placing paper, soaked with mineral oil, between two strips of foil. The assembly is rolled up, and wire leads are attached to the two pieces of foil. Finally, the rolled-up foil and paper are enclosed in a cylindrical case. These components are sometimes found in radio-frequency (RF) electronic equipment. They have values ranging from about 0.001 microfarads (µF) to 0.1 µF, and can handle low to moderate voltages, usually up to about 1000 volts. Compare CERAMIC CAPACITOR, ELECTROLYTIC CAPACITOR, MICA CAPACITOR, PLASTIC-FILM CAPACITOR, TANTALUM CAPACITOR.

PAR Abbreviation of PRECISION APPROACH RADAR.

par Abbreviation of PARALLEL.

parabola A plane curve that is the locus of points that are equidistant from a fixed point (the focus) and a fixed straight line (the directrix). In the Cartesian xy-plane, the general equation is \( y = ax^2 + bx + c \) where a, b, and c are constants. A parabola is a conic section, that is, a figure generated by the intersection of a right circular cone and a plane parallel to an element of the cone.

parabola control See VERTICAL-AMPLITUDE CONTROL, 2.

parabola generator A circuit for generating a parabolic-waveform signal.

parabolic microphone A directional microphone mounted at the principal focus of a parabolic sound reflector; the front of the microphone faces the inside of the parabola. It is useful for detecting sounds from great distances.

parabolic reflector Also called paraboloidal reflector. A reflector having the shape of a paraboloid. It is particularly useful for focusing or directing radiation. For example, if a radiator, such as an antenna rod, is placed at the focus of the paraboloid, a beam of parallel rays will be emitted by the reflector.

paraboloid The surface generated by a PARABOLA rotated about its axis of symmetry.

paraffin A relatively inexpensive, easily available, solid, white petroleum wax. At one time, it was used to impregnate capacitors and coils and to waterproof paper used for insulating purposes.

parallax The apparent shift in the position of a relatively nearby object when the observer moves or alternately blinks either eye. Thus, a pointer type meter will seem to give different readings when viewed from different angles. Some meters have mirrored scales to eliminate this effect.

parallel 1. Pertaining to the type of operation in a computer where all elements in an information item (e.g., bits in a word) are acted upon simultaneously, rather than serially (one at a time).

parallel-access A storage to a device.

parallel access In which transistors are connected in parallel with each other for increased power output. Also see PARALLEL CIRCUIT.

parallel-component amplifier An amplifier stage in which the active devices (transistors or vacuum tubes) are connected in parallel with each other for increased power output. Also see PARALLEL CIRCUIT.

parallel-component oscillator An oscillator stage in which transistors are connected in parallel with each other for increased power output. Also see PARALLEL CIRCUIT.

parallel computer A computer equipped to handle more than one program at a time, but not through the use of multiple programming or time-sharing.

parallel cut crystal See Y-CUT CRYSTAL.

parallel-diode half-wave rectifier See PARALLEL LIMITER.

parallel-fed amplifier An amplifier circuit in which the direct-current operating voltage is applied in parallel with the alternating-current output voltage. Also see PARALLEL FEED.

parallel-fed oscillator An oscillator circuit in which the direct-current operating voltage is applied in parallel with the alternating-current output voltage. Also see PARALLEL FEED.

parallel-free A receiver that displays pips on a screen to show carriers on the air in a given frequency band. All frequencies in the band are presented along the horizontal axis of the screen. Compare CERAMIC CAPACITOR, ELECTROLYTIC CAPACITOR, MICA CAPACITOR, PLASTIC-FILM CAPACITOR, TANTALUM CAPACITOR.

parallel-gap welding A welding technique using a welding torch and an auxiliary time-sharing welding electrode to join two pieces of metal. Compare TOUGHENING.

parallel hardware A computer that performs many instructions simultaneously.

parallel inductance The inductance between the turns of a coil.

parallel inductors Parallel inductors are connected in parallel (shunt) with each other for increased power output. Also see PARALLELL CIRCUIT.

parallel inverse feedback A feedback in which the two vectors are adjacent sides. The sum of the vectors is represented by the diagonal of the parallelogram.

parallel operation In computer operations, the simultaneous transmission of all bits in a multitube word over individual lines, as compared with the serial transmission of a word bit by bit.

parallel circuit A circuit in which the components are connected across each other (i.e., so that the current circuit could be drawn showing the component leads bridging common conductors as rungs would across a ladder). Compare SERIES CIRCUIT.

parallel component amplifier An amplifier stage in which the active devices (transistors or vacuum tubes) are connected in parallel with each other for increased power output. Also see PARALLEL CIRCUIT.

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parallel output
A digital output consisting of two or more lines, all of which carry data at the same time.

parallel processing
In computer operations, the simultaneous processing of different programs through separate channels. Compare SERIAL PROCESSING.

parallel-Q Symbol, \( Q \). The figure of merit of a parallel circuit of inductance, capacitance, and resistance.

parallel resistance
1. A resistance connected in parallel (shunt) with some other component.
2. The resistance between the plates of a capacitor.
3. The resistance across a coil.

parallel resistors Resistors connected in parallel. If the individual resistances are represented by \( R_1, R_2, R_3, \ldots, R_n \), then total resistance \( R \) is equal to \( 1/R = 1/R_1 + 1/R_2 + \ldots + 1/R_n \). Also see PARALLEL CIRCUIT.

parallel resonant circuit
Resonance in a circuit consisting of a capacitor, inductor, and alternating-current source connected in parallel. At the resonant frequency, the inductive reactance is equal in magnitude, but opposite in effect, to the capacitive reactance. The capacitor current and inductor current are maximum, the line current is minimum, and the circuit impedance is maximum. Compare RESONATE.

parallel-rod circuit
A resonant circuit in which the capacitor, inductor, and alternating-current source are connected in parallel. Compare SERIES-RESONANT CIRCUIT.

parallel-rod resonant trap
A wavetrap consisting of a parallel-rod inductance-capacitance (LC) circuit. Compare SERIES-RESONANT TRAP.

parallel-series Also called series-parallel. Pertaining to an arrangement of components, usually similar (e.g., resistances), consisting of parallel circuits connected in series with each other, or of series circuits connected in parallel with each other. Usually, the component values or ratings are all identical, so currents and/or voltages are equally shared among them. Also see PARALLEL CIRCUIT and SERIES CIRCUIT.

parallel-series capacitors Capacitors connected in PARALLEL-SERIES, usually to obtain higher voltage and/or current ratings than an individual capacitor can provide.

parallel-series inductors Inductors connected in PARALLEL-SERIES and separated or oriented to minimize the effects of mutual inductance. Compare SERIES-RESONANT TRAP.

parallel-series resistors Resistors connected in PARALLEL-SERIES, usually to obtain a higher power rating than an individual resistor can provide.

parallel storage
In a computer, storage in which all information items can be made available in the same amount of time.

parallel-tube amplifier A bandpass amplifier having a parallel-tube network in its negative-feedback path. The null frequency of the network determines the pass frequency of the amplifier.

parallel-tube measuring circuit A parallel-tube network used for measuring circuit constants. Also called TWIN-TUBE MEASURING CIRCUIT.

parallel-tube network A resistance-capacitance (RC) network containing two tee sections (with R and C elements opposite in the tee) connected in parallel. The network produces a null at one frequency. Also called TWIN-T NETWORK.

parallel-tube oscillator A resistance-capacitance tuned oscillator having a parallel-tube network in its negative-feedback path. The null frequency of the network determines the oscillator frequency.

parallel transfer A form of digital information transfer, consisting of two or more lines that carry data at the same time.

parallel-wire line A transmission line consisting of two parallel wires whose separation is kept constant by dielectric rods (open-wire line) or a solid dielectric web (ribbon line).

paramagneto A paramagnetic substance (see PARAMAGNETISM). Compare DIAMAGNET.

paramagnetic Possessing PARAMAGNETISM.

paramagnetism The state of having a magnetic permeability slightly greater than \( 1 \). Compare DIAMAGNETISM.

parameter 1. An operating value, constant, or coefficient that can be either a dependent or an independent variable (e.g., a transistor-electrode current or voltage). 2. The ratio of one coefficient to another, where both are either fixed or variable (e.g., transconductance of a vacuum tube).

parameter word In a computer memory, a place having a capacity of \( \times \) bits) in which is stored a parameter for a program.

parametric amplifier A radio-frequency power amplifier based on the action of a voltage-variable capacitor in a tuned circuit.

parametric amplifier diode See VARACTOR.

parametric converter A frequency converter in which a parametric device, such as a varactor, is used to change a signal of one frequency to a signal of another frequency. Also see PARAMETRIC DOWN-CONVERTER and PARAMETRIC UP-CONVERTER.

parametric diode A variable-capacitance diode (see VOLTAGE-VARIABLE CAPACITOR).

parametric down-converter A parametric converter in which the output signal is of a lower frequency than the input signal. Compare PARAMETRIC UP-CONVERTER.

parametric modulator Modulation in which either the inductance or capacitance of a tank circuit or coupling device is varied at the modulation frequency.

parametric oscillator An oscillator that generates visible light energy by means of a parametric amplifier and a tunable cavity.

parametric up-converter A parametric converter in which the input signal is of a higher frequency than the input signal. Compare PARAMETRIC DOWN-CONVERTER.

parametric oscillator See PHASE-LOCKED OSCILLATOR.

parametric processing A device consisting of several digital circuit elements that use parametric oscillators.

paramp Abbreviation of PARAMETRIC AMPLIFIER.

paraphase inverter A single-transistor phase inverter in which the two out-of-phase output signals are obtained by taking one output from the collector or drain, and the other output from the emitter or source. Thus, the 180-degree phase difference between collector/drain and emitter/source is exploited.
parasitic choke A small radio-frequency choke coil (with or without a shunting resistor) that suppresses or eliminates parasitic oscillation to a power amplifier.

parasitic director In a multielement directional antenna, an element acting as a director; usually, it is a few percent shorter than the driven element.

parasitic element An electrical conductor that comprises an important part of an antenna system, but that is not directly connected to the feed line. Such elements are used for the purpose of obtaining directivity and power gain. They operate via electromagnetic coupling to the driven element(s). The principle of operation was first discovered by the Japanese engineers Yagi and Uda, who observed that antenna elements parallel to a driven element but not connected to anything, at a specific distance from the driven element, and having a certain length, cause the radiation pattern to show gain in one direction and loss in the opposite direction. See DRIVEN ELEMENT, PARASITIC ARRAY, PARASITIC DIRECTOR, PARASITIC REFLECTOR.

parasitic-element director antenna See PARASITIC ARRAY.

parasitic eliminator See PARASITIC SUPPRESSOR.

parasitic excitation Excitation of a beam-antenna element without a direct connection to the transistor. Thus, a director or reflector element can be excited by the field of the radiator element.

parasitic inductance Stray inductance (e.g., the internal inductance of a wire-wound resistor).

parasitic oscillation Extrinsic, useless oscillation present as a fault in an electronic circuit, particularly a radio-frequency power amplifier.

parasitic reflector In a multielement beam antenna, a parasitic element acting as a reflector; usually, it is a few percent longer than the driven element.

parasitic resistance Stray resistance (e.g., the inherent, internal resistance of a multilayer coil)

parasitic suppressor A small resistor, coil, or parallel combination of the two, connected in series with the plate of a vacuum tube or transistor to eliminate parasitic oscillations in a radio-frequency power amplifier.

PARD Abbreviation of PERIODIC AND RANDOM DEVIATION.

parity 1. a pair (with respect to the even-or-odd state of the characters in a group). 2. Having the quality that the number of bits (or the number of similar bits) is an integer.

parity bit 1. In computer operations, a logic 1 added to a group of bits so that the number of Is in the group is, according to specification, even or odd. 2. In computer operations, a check bit that can be a logic 0 or 1, depending on the parity (see PARITY). 1 of the total of Is in the bit group being checked.

parity check A check of the integrity of data being transferred by adding the bits in, for example, a word, and then determining the parity bit needed and comparing that with the transmitted parity bit.

parity error An error disclosed by a parity check.

parity tree A digital device used to check parity.

pass Abbreviation, pc. The distance at which the mean radius of the earth’s orbit around the sun subtends an angle of 1 second of arc; 1 pc = 3.0857 × 10^{16} kilometers or 3.26216 light years.

pass See CIRCUIT COMPONENT, 1.

pass failure The usually destructive breakdown of a circuit component.

partial One of the frequencies in a complex musical tone. It might be a harmonic of the fundamental frequency, although this is not always the case.

partial carry The temporary storage of some or all of the carry information in a digital calculation.

particle 1. A tiny, discrete bit of matter. 2. A unit of matter smaller and lighter than an atom. See, for example, ANTIPARTICLE, ELECTRON, NEUTON, NEUTRETTO, NEUTRINO, NUCLEON, POSITRON, and PROTON.

particle accelerator See ACCELERATOR. 1.

particle theory of radiation In physics, a model that explains the structure of electromagnetic radiation (radio waves, infrared, visible light, ultraviolet, X rays, and gamma rays) in terms of discrete particles. Each particle, called a PHOTON, carries a certain amount of energy that depends on the wavelength of the radiation.

particle velocity c (The speed and direction of the particles from a source of atomic radiation.

passband The continuous spectrum of frequencies transmitted by a filter, amplifier, or similar device.

passband ripple Multiple low-amplitude attenuation variations within the passband of a filter or tuner, resulting in a ripple pattern on the nose of the response curve.

PASSCHEN’S LAW For a two-element, parallel-plate, gas-discharge tube, the plate-to-plate sparking pressure is proportional to P^2, where P is the gas pressure, and d is the distance between plates.

pass amplifier A tuned amplifier having the response of a bandpass filter. Like the filter, the amplifier passes one frequency (or a narrow band of frequencies) readily while rejecting or attenuating others. Compare REJECT AMPLIFIER.

passive absorber A substance that reflects minimum sound energy. Examples include acoustical ceiling tile and thick carpeting.

passive circuit A circuit consisting entirely of non-amplifying components, such as capacitors, resistors, inductors, and diodes.

passive communications satellite A communications satellite that reflects electromagnetic waves, but does not contain a transponder; that is, it does not receive and retransmit the signals. Also called passive satelit. Compare ACTIVE COMMUNICATIONS SATTELITE.

passive component A device that is basically static in operation (i.e., it is ordinarily incapable of amplification or oscillation and usually requires no power for its characteristic operation). Examples: conventional resistor, capacitor, inductor, diode, rectifier, and fuse. Compare ACTIVE COMPONENT. 1.

passive coax See PASSIVE COMMUNICATIONS SATTELITE.

passive decoder A decoder that responds to only one signal code, rejecting all others.

passive detection In reconnaissance, detecting a target without betraying the location of the detector.

passive electric network See PASSIVE NETWORK.

passive frequency multiplier A frequency multiplier that does not require a power supply, but operates only from the input signal energy. Usually consists of one or more semiconductor diodes, sometimes in conjunction with inductors and/or capacitors. The output signals appear at integral multiples of the input frequency.

passive infrared sensor A device that detects infrared directly, such as that given off by humans because of their body heat. It does not generate energy of any kind. It is used in some intrusion detection systems.

passive mixer A signal mixer using only passive components (diodes, nonlinear resistors, and nonlinear reactances) (i.e., one without active components, such as transistors). Passive mixers introduce some loss. Compare ACTIVE MIXER.

passive modulator A modulator using only passive components (diodes, nonlinear resistors, and nonlinear reactances) (i.e., one without active components, such as transistors). Passive modulators introduce some loss. Compare ACTIVE MODULATOR.

passive network A network composed entirely of passive components (i.e., one containing no generators and providing no amplification).

passive reflector A small surface used to reflect electromagnetic energy at ultra-high and microwave frequencies.
passive transponder A device that allows a ma-
chine, such as a computer or robot, to identify an
object. A bar-code reader is a common example.
Magnetic labels, such as those on credit cards and
bank cash cards, are another example. It is
so named because it does not transmit data; it re-
quires a sensor for data detection.
password As a security device in computer opera-
tions, a group of characters upon whose presen-
tation to the system via a terminal the user is
allowed access to memory or control of informa-
tion with a Jack or connector at each end, used to in-
terconnect [patch] circuit points exposed for the
purpose on a panel or board.
Patchcord A flexible line of one or more conduc-
tors carrying a word or field.
Patchtone control A dual tone-control circuit
using a variable series resistance-capacitance
(RC) filter for treble boost, and a variable shunt
RC filter for bass boost. The input signal is ap-
plicated in parallel to both filters. The outputs are
combined in an audio mixer.
patching The interconnection of two or more signal
paths. The寮 panel A panel on which the terminals of a
system are accessible for interconnection, tests, etc. It is
used especially in high-fidelity audio
recording systems. It was once commonly used in
manual telephone-switching applications.
patch up 1. To replace faulty or damaged parts in
an electronic system with roughly appropriate
surrogates to restore operation quickly (usually
under emergency conditions). Also see DOCTOR.
2. To wire a circuit quickly using patch cords for
preliminary test and evaluation.
pattern 1. A document awarded by a government
body, giving to an inventor the exclusive right to
exploit an invention for a specified number of
years. Formally called letter patent. 2. The monopoly
granted by a document, as defined in 1.
pool 1. The route over which current flows. 2. In
radio and navigation, the imaginary line extend-
ing directly between transmitter and receiver (or
target). 3. In a computer program, the logical or-
der of instructions.
pathfinder A form of lie detector that indicates
changes in the electrical resistance of the human
body.
pattern recognition In machine-vision systems, a
method of identifying an object or decoding data
according to geometric shape. Optical character
recognition (OCR) is an example. The machine
recognizes combinations of shapes, and deduces
a glutinous electrolyte.
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manual telephone-switching applications.
power during a single RF cycle at the highest peak of the modulation envelope.

peaked sawtooth

peak envelope power • peak-to-peak voltage

peak point The highest current point in the current-voltage response curve of a tunnel diode. Immediately beyond this point, the current decreases as the applied voltage is increased, indicating a negative-resistance region. Compare VALLEY POINT.

peak power 1. Symbol, Pp. Unit, watt. Alternating-current power that is the product of the peak voltage (Epk) and the peak current (Ip). For PEs in volts and Ip in amperes, the peak power in watts is given by Pp = Epk Ip. 2. The highest output power that an amplifier or device can produce without excessive distortion. 3. The maximum instantaneous power that a speaker can handle without risk of damage.

peak recurrent forward current For a semiconductor diode, the maximum repetitive instantaneous forward current as measured under specified conditions of operation.

peak probe A voltmeter test probe containing a diode circuit whose direct-current output voltage is close to the peak value of the applied alternating-current test voltage.

peak recurrent forward voltage For a semiconductor diode, the maximum repetitive instantaneous forward voltage as measured under specified conditions of operation.

peak voltage Abbreviation, PVP. Often used interchangeably with the term PEAK REVERSE VOLTAGE. 1. The peak value of the voltage applied to a rectifier diode in the reverse direction. 2. The maximum value of reverse voltage that a rectifier diode will tolerate according to its specifications.

peak level In audio recording and reproduction, a bulb or light-emitting diode (LED) that illuminates when sound peaks exceed a predetermined amplitude.

peak limiting 1. A method of limiting the maximum amplitude of a signal. When the instantaneous peak amplitude, either positive or negative, exceeds a certain value, the output is clipped at that value. 2. In pulse-code modulation, the effect arising from the application of an input signal in excess of the virtual decision value.

peak modulated power In an amplitude-modulated wave, the maximum instantaneous signal power including the carrier and sidebands. In a frequency-sinmodulation, the peak modulated power is four times the unmodulated carrier power.

peak point The highest point on the peak power (including the carrier and sidebands) versus time graph. For a pulsating-sine-wave, the peak point is the highest point on the waveform. For a square wave, the peak point is the highest peak voltage, Epeak, that an amplifier or device can produce without excessive distortion. 3. The maximum instantaneous power that a speaker can handle without risk of damage.

peak probe A voltmeter test probe containing a diode circuit whose direct-current output voltage is close to the peak value of the alternating-current test voltage.

peak recurrent forward current For a semiconductor diode, the maximum repetitive instantaneous forward current as measured under specified conditions of operation.

peak recurrent forward voltage For a semiconductor diode, the maximum repetitive instantaneous forward voltage as measured under specified conditions of operation.

peak voltage Abbreviation, PVP. Often used interchangeably with the term PEAK REVERSE VOLTAGE. 1. The peak value of the voltage applied to a rectifier diode in the reverse direction. 2. The maximum value of reverse voltage that a rectifier diode will tolerate according to its specifications.

peak-level meter A voltmeter test probe containing a diode circuit whose direct-current output voltage is close to the peak value of the applied alternating-current test voltage.

peak voltage Abbreviation, Epeak. The highest value reached by an alternating-current voltage half cycle, or by a voltage pulse. Also called MAXIMUM VOLTAGE.

peak voltmeter 1. An alternating-current (ac) voltmeter that responds to the peak value of the applied voltage. 2. An ac voltmeter that responds to the average value of the applied voltage—even through its scale reads in peak volts.

peak lamp A miniature incandescent bulb, sometimes used as a control panel or meter light.

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perceived level  The level of a disturbance, particularly sound, as sensed by a person. It is generally expressed in decibels, with respect to a certain threshold value. The threshold is assigned an intensity of 0 dB.

percentage  An expression of a fraction, in terms of hundredths. A quantity of x percent indicates a fraction of x/100. Percent is usually abbreviated by the symbol %.

percentage error  The amount by which a measured value differs from the true value, expressed as a percentage (the number of parts per 100 that the measurement is in error).

percentage-modulation meter  An instrument that provides direct readings of the modulation percentage of an amplitude-modulated signal. The meter scale or dial is graduated in increments from 0 to somewhat more than 100 percent.

percentage uncertainty  The maximum possible error in a measurement, expressed as a percentage of the measured value. Also see UNCERTAINTY IN MEASUREMENT.

percent distortion  Symbol, %d. In the determination of harmonic distortion, the total harmonic voltage expressed as a percentage of the fundamental voltage, plus total harmonic voltage: %d = 100Eh/E, where Eh is the total voltage of the harmonic components, and E is the total signal voltage (fundamental plus harmonics).

percentile curve  A curve depicting the behavior of a system that occurs once for every complete orbit. At this point, the satellite travels faster than at any other point in the orbit.

permanent magnet  A magnetic field that persists when a magnet is removed. The magnetic field is caused by the alignment of the magnetic moments of the atoms in the material. The atoms are arranged in a regular pattern with no faults.

permanent-magnet loudspeaker  A loudspeaker in which the core is a strong permanent magnet (as opposed to a direct-current electromagnet). Also see MAGNETIC SPEAKER.

permanent-magnet generator  A generator in which the field is either stationary or rotating, and the core is a permanent magnet. Compare TEMPO-MA.NET GENERATOR.

percent modulation  See PERCENTAGE-MODULATION METER.

permanent ripple  The amount of ripple voltage in the direct current output of a rectifier, the combined PERIODIC DEVIATION, including ripple, noise, hum, and transient spikes.

period  Symbol, T. Unit, second. The duration of a complete alternating-current cycle or of any cyclic event; T = 1/f, where f is the frequency in Hertz. Also see CYCLE, FREQUENCY, and HERTZ.

permeability curve  An expression of a function that is represented by a periodic curve (e.g., the sine function y = sin x).

perspective  The point at which a solar-orbiting satellite attains its lowest altitude. It occurs once for every complete orbit. At this point, the satellite travels faster than at any other point in the orbit.

perspective interface  Abbreviation, PIA. An integrated circuit that consists of an input/output port to interface a microprocessor with peripheral devices.

peripheral transfer  In a computer system, the transfer of a unit of data between peripherals, or between a peripheral and the central processing unit.

Permalloy  A high-permeability alloy of iron and nickel.

permeability  A high-permeability alloy of iron and nickel.

permeability tuning  A method of modulation accomplished by varying the sequence of digital bits.

permeance  Unit, H/m. In a magnetic circuit, the permeance is the total signal voltage (fundamental plus harmonics) represented by a periodic curve (e.g., the sine function y = sin x).

permeability tuning  A method of modulation accomplished by varying the sequence of digital bits.

permeation  A selection of several factors or objects from a group, in a specific ordered sequence. For example, one of the permutations of the elements of the set (1, 2, 3, 4, and 5) is the ordered sequence 4, 1, 3, 5, 2.

permeability tuning  A method of modulation accomplished by varying the sequence of digital bits.

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personal communications service **Abbreviation, PCS.** Also called digital cellular. An enhanced wireless network using digital modulation, celluar repeaters, and facilitating telephone and Internet connections. Emphasis is on maximizing user mobility and portability, and minimizing blind zones. Compare CELLULAR COMMUNICATIONS.

personal computer A small computer equipped with a keyboard, display, hard disk, diskette drives(s), a modem or fax/modem, one or more serial data ports, and one or more parallel data ports. They are used extensively by individuals and businesses for record keeping, data processing, communications, word processing, graphics, etc.; they are also used in schools as an educational aid.

personal digital assistant Abbreviation, PDA. See HANDHELD COMPUTER.

personal equation The value of systematic error for a person observing specific phenomena or making measurements.

personality Characteristics that make an intelligent computer or robot human-like. In general, the more powerful the computer, the more personality it can have, depending on the installed software. In some cases, certain malfunctions in a computer can produce personality quirks.

personal robot A usually autonomous robot intended for use by individuals. The most common examples are programmable robots, such as a PERSONAL COMPUTER, intended for the education and entertainment of children. More sophisticated devices can perform domestic tasks, such as cleaning floors and mowing lawns.

calculator Abbreviation, Pm. A large unit of astronomical distance, equal to 10^15 meters or 10^13 kilometers.

pf Abbreviation of PICOFAHAD. pf Symbol for POWER FACTOR. pFET Abbreviation of P-CHANNEL JUNCTION FIELD-EFFECT TRANSISTOR. PFET Abbreviation of PULSE-FREQUENCY MODULATION. PG Abbreviation of POWER GAIN. pH Abbreviation of PHETRAM. pH 1. Symbol for hydrogen-ion concentration. Numerically, pH is the negative logarithm of the effective hydrogen-ion concentration in gram equivalents per liter. The scale runs from zero to 14, with 7.0 being neutrality relative to acidity vs. alkalinity; values between zero and 7 denote acidity, and values between 7 and 14 denote alkalinity. 2. Abbreviation of PICOHER. phantom Radio interference in the form of a heat cataclysm, resulting from interference between two strong carriers, often from local radio stations. When the phantom frequency lies within the tuning range of a receiver, the phantom can be tuned in as a separate signal. But when the phantom corresponds to the intermediate frequency (IF) of the receiver, it will ride into the IF amplifier and be present as an unattractive hearable signal.

phantom channel In a properly phased high-fidelity stereo sound system, the apparent sound source centered between the left- and right-channel loudspeakers.

phantom circuit In a wire telephone, a third circuit that has no wires, it results from a method (using repeating coils) of making two other circuits do the work of (this third) one.

phantom signal Also called hystere. In a radar system, a signal that does not correspond to an actual target. The origin of the phantom signal or echo cannot be readily determined.

phantom target See ECHO BOX.

phase angle Unit, degree or radian. In an alternating-current (ac) circuit, the lag or lead between the instant that one alternating quantity reaches its maximum value and the instant that another alternating quantity reaches its maximum value. It is usually given in degrees (a complete cycle being 360 degrees) along the horizontal axis of the time-versus-magnitude graph of the ac quantity.

phase-angle voltmeter An instrument that indicates both the magnitude and phase of a voltage.

phase coincidence For signals having the same frequency or coinciding in terms of instantaneous amplitudes, so positive peaks of the first signal correspond to negative peaks of the second signal.

phase constant For periodic waves that do not have a certain relative phase, and spaced at a certain distance, resulting in a directivity pattern that exhibits gain in some directions and little or no radiation/response in other directions. Such an array can have two elements, producing a unidirectional cardioid or bidirectional figure-eight pattern. More complex arrays have several elements, usually vertical antennas, strategically positioned and fed with signals of specified phase to produce a highly tailored pattern. The most sophisticated systems have rotatable or steerable radiation/response patterns.

phase-delay equalizer See DELAY EQUALIZER.

phase detector See PHASE-SENSITIVE DETECTOR.

phase diagram A graphical representation of waves having equal frequency, but differing in phase. The phase difference for two identical waves having equal frequency, the condition of their being inverted relative to each other, is usually given in degrees (a complete cycle being 360 degrees), but less than 360 degrees.

phase difference 1. The difference (in time, angle, or fractional cycle) between the instants at which two alternating quantities reach a given value. For a deelectric, the complement of PHASE ANGLE, that is, 90 degrees minus the phase angle in degrees, is often used. 2. The phase difference between various components of a signal passed by a circuit or device.

phase discriminator See DISCRIMINATOR, POS- TER-SEELEY DISCRIMINATOR, RATIO DETECTOR, and TRAVIS DISCRIMINATOR.

phase distortion Distortion characterized by inequality between various components of a signal passed by a circuit or device.

phase inverter A resistance-capacitance-coupled amplifier with a single-ended input and a push-pull output. This circuit enables a push-pull amplifier to be driven without an input transformer.

phase opposition For signals having the same frequency, the condition of their being inverted relative to each other in terms of instantaneous amplitudes, so that the first signal corresponds to negative peaks of the second signal, and negative peaks of the first signal correspond to positive peaks of the second signal. This is not the same thing as being shifted by an odd number of half cycles.

phase modulation Abbreviation, FM. A method of modulation in which the phase of the carrier current is varied in accordance with the instantaneous amplitude of the modulating signal. Compare FREQUENCY MODULATION.

phase-locked oscillator An oscillator in which the inductance or the capacitance is varied periodically at half the driving frequency. The oscillator can be tuned in as a separate signal. But the output from the divider is exactly at the reference-oscillator frequency, the two signals are in phase, and the output of the phase comparator is zero volts dc. If the VCO frequency changes, the phase also changes, and the phase comparator produces a dc error voltage. The error voltage is applied to the VCO, causing the VCO frequency to correct itself. This maintains the VCO frequency at precisely n times the reference-oscillator frequency.

phase-locked loop A circuit that can be tuned in as a separate signal. But the output from the divider is exactly at the reference-oscillator frequency, the two signals are in phase, and the output of the phase comparator is zero volts dc. If the VCO frequency changes, the phase also changes, and the phase comparator produces a dc error voltage. The error voltage is applied to the VCO, causing the VCO frequency to correct itself. This maintains the VCO frequency at precisely n times the reference-oscillator frequency.

phase multiplication Similar to FREQUENCY MODULATION. Multiplication in which the phase of the carrier current is varied in accordance with the instantaneous amplitude of the modulating signal. Compare FREQUENCY MODULATION.
integral multiple of 180 degrees in phase, although in practice, with sine waves and square waves, the effect is the same. Compare PHASE COINCIDENCE.

**phase opposition** See VELOCITY RESONANCE, phase opposition. 1. The inversion of an alternating-current (ac) signal. The instantaneous amplitude (current or voltage) is multiplied by a negative constant. Thus, the positive half-cycles become negative, and the negative half-cycles become positive. 2. A phase shift of ±180 degrees (½ cycle) in an ac signal.

**phase-reversal** See PHASE-SEQUENCE RELAY.

**phase-rotation relay** See PHASE-SEQUENCE RELAY.

**phase-rotation system** A system for producing single-sideband signals without using selective filters. In one such system, two balanced modulators are used. One of these receives carrier and modulating voltages that are 90 degrees out of phase with voltages that are fed to the other balanced modulator.

**phase-sensitive detector** Abbreviation, PSD. A detector for frequency modulation (FM) and phase modulation (PM). It delivers a direct-current output voltage whose value is proportional to the difference in phase between a reference signal and the signal from a local oscillator.

**phase-shift bridge** A four-arm bridge circuit for shifting the phase of an alternating-current signal. Such a circuit is often used (with one arm variable) to shift the phase of the firing voltage for a thyatron.

**phase-shift discriminator** See FOSTER-SEELEY DISCRIMINATOR.

**phase shifter** A circuit, such as an inductance-capacitance (LC) or resistance-capacitance (RC) network, or a device, such as a Helmholtz coil or phase-shifting capacitor, that introduces a phase shift between input and output signals.

**phase-shifting capacitor** A special four-stator, one-rotor variable capacitor that, with a transformer-coupled resistance-capacitance (RC) circuit, provides 360 degrees of continuously variable phase shift for one rotation of the rotor. The rotor plate turns like a cam under the stators because of the off-center insertion of the rotor shaft.

**phase-shift oscillator** A single-stage oscillator in which the required 180-degree phase shift in the signal (fed back from output to input) is obtained by passing the output through a phase-shifting network.

**phase-shift-type distortion meter** A distortion meter in which the output signal of a device under test is compared with a distortion-free input test signal. The output signal phase is shifted 180 degrees, with respect to the input, and the two amplitudes are made equal. If there is no distortion, the signals cancel each other, and the result is zero. Any remaining signal is proportional to the total harmonic distortion (THD).

**phase-splitting circuit** A circuit that produces, from a single input signal, two output signals differing in phase.

**phase-splitting driver** A PHASE INVERTER used as the driver of a push-pull amplifier.

**phase velocity** The velocity of a wave, provided by the product of the frequency and the wavelength.

**phasings** In an alternating-current generator, windings that deliver voltages that differ in phase.

**phasings** In a crystal filter, a small variable capacitor that constitutes one arm of a four-arm bridge in which the crystal is another arm. Adjustment of this capacitor balances the bridge, thus preventing the undesirable passage of a signal through the capacitance of the crystal holder.

**phenolic** A family of plastic insulating materials made with phenolic resin, and occasionally used as dielectrics and air-core coil forms. Some of the trade names for these materials include Bakelite, Cutolin, Durax, Durite, Formicor, and Micarta.

**phenolic insulators** See PHENOL-FORMALDEHYDE PLASTICS.

**phenolic resin** A synthetic resin made by condensing phenol (carbolic acid) with formaldehyde.

**phenomenon** An event or circumstance that can be verified by the senses, as opposed to one subject to theory or speculation (e.g., the phenomenon of magnetic attraction).

**Phillips gate** A device that allows measurement of the gas pressure in a confined chamber. A current is passed through the gas. The magnitude of the current, for a given gas, is a function of the gas pressure and temperature.

**Phillips screw** A screw with a pair of slots in its head. The slots are arranged like an X. Phillips screws are available in many different sizes, as are ordinary screws. The X-shaped pair of slots reduces the tendency for the screwdriver to slip out of the screw head as the screw is rotated.

**Phi phenomenon** The illusion of motion resulting from the rapid presentation to the eye of pictures showing objects in a succession of different positions. Observation and motion pictures exploit this illusion. Also see PERSISTENCE.

**pH meter** An instrument used to measure the acidity or alkalinity of solutions. Also see PH.

**phenol formaldehyde plastics** A four-arm bridge circuit for establishing the phase opposition between radio and wire-telephone facilities. Also see PATCH.

**phenol** A unit of apparent change in loudness discerned by a listener. Unlike the decibel, the phon includes compensation for the ear's nonlinear response to attendant frequency changes. At a frequency of 1 kHz, a change in loudness of 1 phon is the equivalent of 1 decibel.

**phenon** An individual sound or syllable in the human voice, with a characteristic amplitude-frequency spectrum. It is important in speech recognition and speech synthesis. Computers can be programmed to identify and transcribe these sounds; computers can also be programmed to generate the sounds from text data.

**phenome** An individual sound or syllable in the human voice, with a characteristic amplitude-frequency spectrum. It is important in speech recognition and speech synthesis. Computers can be programmed to identify and transcribe these sounds; computers can also be programmed to generate the sounds from text data.

**phenonic alphabet** Words whose initial letters are used to identify the letters of the alphabet for
photonic alphabet • phosphor copper
tlies certain substances undergo chemical change when light strikes it. Different substances exhibit different degrees of this effect.

See PHOTODECOMPOSITION.

A counting device (electro-mechanical or fully electronic) that counts observations or events with an analog or digital display. It can function by producing a voltage (see PHOTODIC COUNTER). See also PHOTOMETER.

cell The property of some materials that ordinarily fluoresce to continue to glow after the source of light or electron beam has been removed. Compare FLUORESCENCE.

The phenomenon whereby the electrical resistance of a substance to change when light strikes it. Different substances exhibit different degrees of this effect.

A device that converts infrared, visible light, or ultraviolet radiation strikes it. Different substances exhibit different degrees of this effect.

A device that converts infrared, visible light, or ultraviolet radiation strikes it. Different substances exhibit different degrees of this effect.

A viewing screen coated with a phosphor (e.g., oscilloscope screen). The stimulus (light or an electron beam) has been removed. Compare FLUORESCENCE.

A special type of stethoscope, A phonograph cartridge. It consists of a turntable, an arm, a stylus (needle), and a phonograph record. The record is made of a vinyl or similar plastic, on which audio information is written.

An instrument that makes a graphic record of heart sounds. The record made by a PHONOCARDIOGRAM.

A device that converts infrared, visible light, or ultraviolet radiation strikes it. Different substances exhibit different degrees of this effect.

A jack similar to a phone jack, designed especially for the quick connection and disconnection of coaxial cables with audio and low-frequency devices. Is lowered upon exposure to infrared rays, visible light, or ultraviolet radiation. Some of these substances undergo chemical change when infrared radiation, visible light, or ultraviolet radiation strikes it. Different substances exhibit different degrees of this effect.

Also called RCA plug. A plug similar to a phone plug, designed especially for the quick connection and disconnection of coaxial cables with audio and low-frequency devices.

The property of some materials that ordinarily fluoresce to continue to glow after the source of light or electron beam has been removed. Compare FLUORESCENCE.

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A special type of stethoscope, A phonograph cartridge. It consists of a turntable, an arm, a stylus (needle), and a phonograph record. The record is made of a vinyl or similar plastic, on which audio information is written.
photomask 1. A positive or negative photographic mask used in offset and lithographic printing and in the manufacture of integrated circuits by photolithographic processes. 2. In a cathode-ray tube, a mask of fluorescent dots covering the phosphor screen. 3. A mask used for creating a mask pattern on a silicon wafer, usually at a size reduced from the original pattern. 4. A mask used in photoreduction from an original to make a reduced copy of a map, chart, or other illustration.

photometry The science of visible-light measurement. The response of the human eye is used as the basis for preferred sensors (those used with photometric instruments, which have spectral sensitivity curves resembling those of the eye). Compare Radiometry.

photometric measurement of power See ELECTRIC WATTMETER.

photomultiplier tube A phototube consisting of a series of phototubes placed one behind another. The output current is amplified for each tube, and this output is passed on to the next tube, which is sensitive to light of a different wavelength. The output of the last tube is proportional to the intensity of the incident light. A photocathode, on which the image is projected by the lens system and scanning electron beam, is used to detect the light. The signal is then amplified and passed to the photomultiplier tube.

photoprocessing 1. A method of producing integrated circuits and printed circuits by photographing (often at considerable reduction) an enlarged pattern of the circuit on a suitable light-sensitive surface of metal or semiconductor, and chemically etching away unwanted portions of the surface. 2. A method of preparing a photographic plate or film by exposing the light-sensitive material to the image of a scene and then developing, fixing, and drying the material.

photorecognition 1. The use of FACSIMILE to scan and send photographs in analog form via wire or radio. 2. The use of a computer, equipped with a modem and graphics software, to display and/or store photographs transmitted in digital form via wire or radio.

photorecording 1. A method of producing and reproducing images on photo-sensitive material, usually by exposure to light or other electromagnetic radiation. 2. A method of producing and reproducing images on photo-sensitive material, usually by exposure to light or other electromagnetic radiation.

photorefractive material A material that is transparent to light and whose optical properties can be altered by exposure to light. Photorefractive materials are used in holography, optical data storage, and optical computing.

photometry A method of measuring light, color, and other optical properties of objects.

photometric power measurement See ELECTRIC WATTMETER.

photomultiplier tube A type of phototube that delivers high output current for a given light intensity by utilizing the secondary emission of electrons. The initial light-sensitive cathode emits electrons, which strike a specially placed metal plate with a force that dislodges more electrons. These electrons, together with the initial emission, are reflected to a second plate, where they dis-
\textbf{photoneutron} A neutron released by PHOTONIC INTEGRATION.

\textbf{photophone} 1. A telephone-type communication system using a modulated light beam transmitted between stations. 2. A process for recording sound on motion-picture film (see OPTICAL SOUND RECORDING).

\textbf{photorelay} See PHOTOELECTRIC RELAY.

\textbf{photoresistive cell} See PHOTOCONDUCTIVE CELL.

\textbf{photoresistive material} See PHOTOCONDUCTIVE MATERIAL.

\textbf{photoreversivity} See PHOTOCONDUCTIVITY.

\textbf{photoreceptor} See PHOTOCONDUCTOR, 1, 2.

\textbf{photosensitive cell} A light-sensitive electronic device. See, for example, PHOTOCONDUCTIVE CELL, PHOTODIODE, PHOTOFET, PHOTOSENSITIVE TIPPLER TUBE, PHOTOTRANSISTOR, PHOTOTUBE, and PHOTOVOLTAIC CELL.

\textbf{photosphere} The luminous layer at the surface of a star.

\textbf{photoswitch} A light-activated switch. Some photoswitches contain an electromechanical relay, others, such as the light-activated silicon-controlled switch, have no moving parts.

\textbf{phototimer} An electronic timer for timing photographic processes.

\textbf{phototransistor} A transistor in which current carriers emitted as a result of illumination constitute an input-signal current. This current is amplified by the transistor. The output signal delivered by the transistor, accordingly, is larger than the output of an equivalent photodiode.

\textbf{phototube} An electron tube that converts light energy into electrical energy by acting as a light-sensitive resistor. Characteristically, the tube contains an illuminated cathode coated with a photomissive material, and an anode wire situated nearby. Light energy causes electrons to be emitted from the cathode in amounts proportional to light intensity; the electrons are attracted by the anode, which is connected externally to a positive direct-current voltage.

\textbf{photovoltaic cell} Also called solar cell. A semiconductor diode, usually made from silicon, that converts visible light, infrared, and/or ultraviolet directly into electrical current. The device consists of a flat P-N junction; the assembly is transparent so that radiant energy can fall directly on the P-type silicon. Metal ribbing, forming the positive electrode, is interconnected with tiny wires. The negative electrode is a metal backing, placed in contact with the N-type material. The component produces about 0.5 to 0.6 volts in direct sunlight under no-load conditions.

\textbf{photovoltaic material} A substance that generates a voltage when exposed to light. The principal substances exhibiting this effect are silicon, selenium, and germanium. Also see ACTINOELECTRIC EFFECT.

\textbf{phototran} A light-sensitive, four-layer semiconductor device, used for switching purposes.

\textbf{physical properties} The distinguishing characteristics of matter, apart from its chemical properties. Included are boiling point, density, ductility, elasticity, electrical conductivity, hardness, heat conductivity, index of refraction, malleability, melting point, specific heat, and state (solid, liquid, gaseous, or plasma).

\textbf{physical quantity} A quantity expressing the actual number of physical units under consideration, as compared with a dimensionless number. Examples: 50 volts, 39 kilometers, and 3 pico- farads. Compare DIMENSIONLESS QUANTITY.

\textbf{physics} The science of energy and matter and their interactions. Physics is subdivided into several fields, including mechanics, thermodynamics, acoustics, optics, and electricity/magnetism. Many subdivisions are within the traditional fields.

\textbf{P} Symbol for INPUT POWER.

\textbf{pickup} 1. A device that serves as a sensor of a signal or quantity. This covers a wide variety of items, including temperature sensors, vibration detectors, microphones, photograpic pickups, etc. 2. Collectively, energy or information that is received (e.g., sound pickup).

\textbf{pickup arm} The pivoted arm that holds the cartridge and stylus of a phonograph.

\textbf{pickup cartridge} See PHONO CARTRIDGE.

\textbf{pickup current} 1. The current required to close a relay. 2. Current flowing through, or generated by, a pickup.

\textbf{pickup pattern} The directional pattern of a microphone or other transducer that converts acoustic energy into electrical signals.

\textbf{pickup voltage} 1. The voltage required to close a relay or circuit breaker. 2. The voltage delivered by a pickup.

\textbf{pico-} Abbreviation, p. A prefix meaning $10^{-12}$. 2. A prefix meaning extremely small.

\textbf{picocomparator} A usually direct-reading instrument used to measure current in the picoampere range. Also see CURRENT METER.

\textbf{picoampere} Abbreviation, pA. A small unit of current equal to $10^{-12}$ ampere.

\textbf{picocoulomb} Abbreviation, pc. A small unit of electrical quantity equal to $10^{-12}$ coulomb.

\textbf{picocoulomb} Abbreviation, pC. A small unit of radionuclide activity equal to $10^{-12}$ curie.

\textbf{picofarad} Abbreviation, pF. A small unit of capacitance equal to $10^{-12}$ farad.

\textbf{picohenry} Abbreviation, pH. A small unit of inductance equal to $10^{-12}$ henry.

\textbf{picosecond} Abbreviation, ps or ps. A small unit of time equal to $10^{-12}$ second.

\textbf{picotuner} See COLLINS COUPLER.

\textbf{picovolt} Abbreviation, pv. A small unit of voltage equal to $10^{-12}$ volt.

\textbf{picovoltmeter} A usually direct-reading electronic instrument used to measure electromotive force in the picovolt range.

\textbf{picowatt} Abbreviation, pW. A small unit of power equal to $10^{-12}$ watt.

\textbf{pictorial} See FICTITORIAL WIRING DIAGRAM.

\textbf{pictorial diagram} See FICTITORIAL WIRING DIAGRAM.

\textbf{pictorial wiring diagram} A wiring diagram in the form of a drawing or photograph of the component, as opposed to one of circuit symbols. The components are shown in their positions in the finished component, and the wiring as lines running between them.

\textbf{picture element} See PIXEL.

\textbf{picture information} In a television signal, the variable-amplitude component (i.e., the one carrying energy corresponding to the picture elements) that fills the space between blanking pulses.

\textbf{picture-in-picture} Abbreviation, PIP. In some television receivers, a feature that allows simultaneous viewing of two programs. One program occupies the full screen, and another program appears in a small portion of the screen.

\textbf{picture reception} 1. See PHOTOGRAPH RECEIPTION, 2. The reception of television signals.

\textbf{picture transmission} 1. See PHOTOGRAPH TRANSMISSION, 2. The transmission of broadcasting television signals.

\textbf{picture tube} The cathode-ray tube used in a television receiver to display the image. Also called KINESCOPE.

\textbf{pie chart} See CIRCLE GRAPH.

\textbf{piecorder} A simple crystal oscillator in which the crystal is connected directly between the input and output terminals of the active device (usually a bipolar or field-effect transistor). A tuned inductance-capacitance (LC) circuit might be included, but is not required.

\textbf{photoneutron} • pickoff
pie winding  A method of coil winding in which two or more separate, multiwound coils are connected in series and placed along a common axis. It is sometimes used in radio-frequency choke to minimize capacitance among the windings.

piezo-  A prefix meaning pressure (see PRESSURE).

piezoelectric A substance that, when stretched or compressed, exhibits a change in dielectric constant.

piezoelectric accelerometer  An accelerometer using a piezoelectric crystal, whose voltage output is proportional to acceleration.

piezoelectric ceramic  A ceramic material that delivers a voltage when deformed, or that changes its shape when a voltage is applied to it.

piezoelectric crystal  A crystal (such as quartz, Rochelle salt, tourmaline, or various synthetics) that delivers a voltage when mechanical force is applied between its faces, or that changes its shape when a voltage is applied between its faces.

piezoelectric earphone  See CRYSTAL EARPHONE.

piezoelectric filter  See CRYSTAL FILTER and CRYSTAL RESONATOR.

piezoelectricity  Electricity produced by deforming (squeezing, stretching, bending, or twisting) certain crystals, such as those of quartz, Rochelle salt, or tourmaline.

piezoelectric loudspeaker  See CRYSTAL LOUDSPEAKER.

piezoelectric microphone  See CERAMIC MICROPHONE.

piezoelectric oscillator  See CRYSTAL OSCILLATOR.

piezoelectric pickup  See CRYSTAL PICKUP.

piezoelectric resonator  See CRYSTAL FILTER and CRYSTAL RESONATOR.

piezoelectric transducer  See CRYSTAL TRANSDUCER.

piezoelectric transducer See CRYSTAL TRANSDUCER.

piezoid  A complete piezoelectric crystal device.

piezo resistance  In certain substances, the tendency of the resistance to change with stretching or compression.

piezo tweeter  A tweeter of the piezoelectric type (see CRYSTAL LOUDSPEAKER).

pin filter  A fixed filter having one series arm and two shunt arms; its schematic representation has the general shape of the upper Greek letter pi.

piggyback component  See OUTBOARD COMPO.

piggyback control  See CASCADE CONTROL.

piggyback tuner  A separate ultra-high-frequency (UHF) lamp operated in conjunction with the very-high-frequency (VHF) tuner of the television receiver.

pigtail 1. A usually long and sometimes flexible lead, such as the pigtail of a fixed capacitor.

2. Descriptive of a device containing a long lead or leads, and usually mounted by such leads.

3. See VOLTAIC PILE. 2. See NUCLEAR REACTOR. 3. A battery of electrochemical cells. 4. Any packed group of particles or granules.

pinch speaker  A small, flat loudspeaker intended for use under a pillow.

PILOT  Acronym for programmed inquiry reading or teaching. A straightforward high-level computer programming language, used in computer-assisted instruction (CAI).

pilot lamp  See PILOT LIGHT.

pilot light  A usually small, incandescent or neon lamp. When glowing, it serves as a signal that a piece of equipment is in operation.

pilot model  A preliminary model of a circuit or device constructed primarily to test the efficacy of a production procedure. The pilot model usually follows the PROTOTYPE.

pilot production  The often small-scale production of a device in a special assembly line apart from the main line in a factory.

pilot regulator  A variable-gain circuit that maintains a constant output—even if the input amplitude changes.

pilot Abbreviation of PULSE-INTERVAL MODULATION.

mode  In a vane-anode magnetron, the mode of operation in which adjacent vanes have radio-frequency voltages of opposite polarity.

pin 1. A semiconductor junction consisting of a layer of intrinsic semiconductor material situated between n and p layers. 2. A slender, straight, stiff probe used as a terminal or locking device (see, for example, BASE PIN and BAYONET BASE).

pinchoff  A junction field-effect transistor, the condition in which the gate voltage causes the channel to be effectively cut off.

pinchoff voltage  In a junction field-effect transistor, the lowest gate voltage that will produce pinchoff.

pinch roller  In a tape recorder, a rubber-tired, rotating cylinder that helps to pull the tape past the recording and/or playback heads.

pinchoff voltage  A voltage at which a depletion region starts to form. As the depletion region extends, the potential barrier builds up and the channel is effectively cut off.

pinchoff voltage  In a crystal detector, the potential difference at which the diode becomes non-conducting.

pinchoff voltage  A voltage at which the gate voltage causes the channel to be effectively cut off.

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pinchoff voltage  In a field-effect transistor, the lowest gate voltage that will produce pinchoff.
pitch of winding • In a coil, the distance from the center of one turn to the center of the adjacent turn in a single layer of winding. PIV Abbreviation of PEAK INVERSE VOLTAGE.
pivot • The sometimes jeweled, stationary member of the bearing in an analog meter movement.
pi-wound choke • A choke coil consisting of several series-connected sections, mounted on a single core and separated to reduce internal capacitance.
pix • Abbreviation of PICTURE.
pixel • Contraction of picture element. The smallest bit of data in a video image. Also called pel. The smaller the size of the pixels in an image, the greater the resolution for a given image area.
pixel aspect ratio • In a video image, the ratio of PIXEL height to pixel width.
pl tube • See PICTURE TUBE.
PL • Abbreviation for PRIVATE LINE.
plaat • Effect apparent in the perceived pitch of a sound, caused by variations in the way the waves interact inside the human ear.
planar diffusion • In the production of a semiconductor device, the diffusion of all the elements into one face of a wafer. Consequently, connections to the elements all lie in one plane. Also see EPITAXIAL PLANAR TRANSISTOR and PLANNER TRANSISTOR.
planar diode • A semiconductor diode, having a pn junction that lies entirely within a single plane.
planar epitaxial passivated diode • A junction diode that, like the planar epitaxial transistor, has been manufactured by planar diffusion, then passivated to protect the junction. Also see EPITAXIAL GROWTH, EPITAXY, PASSIVATION, and PLANAR DIODE.
PL/1 • A computer programming language that is a hybrid of scientific and commercial types (like ALGOL and COBOL). The combined features bring powerful problem-solving and mass-data-handling capabilities.
planar epitaxial passivated transistor • A planar epitaxial transistor that has been passivated to protect the exposed junctions. Also see EPITAXIAL PLANAR TRANSISTOR, PLANAR TRANSISTOR, PASSIVATION, and PLANNER TRANSISTOR.
planar transistor • A transistor in which the emitter, base, and collector elements terminate on the same face (plane) of the silicon wafer. A thin film of silicon dioxide is grown on top of the wafer to insulate the exposed junctions after the leads have been attached (i.e., the transistor is passivated).
Planck constant • Symbol, h. Unit, joule-second. The constant of proportionality in the fundamental law of electronic thermal energy, stating that radiant energy is composed of quanta proportional to the frequency of the radiation; $h = qf = 6.62608 \times 10^{-34}$ J·s, where $q$ is the value of the quantum and $f$ is the frequency in Hz.
plane of polarization • The plane containing the direction of propagation and the electric field vector of a plane-polarized wave (see POLARIZATION, 3 and POLARIZED LIGHT).
planar polarization • See POLARIZATION, 3 and POLARIZED LIGHT.
planar-reflector antenna • A directive antenna in which the reflector is a sheet of metal or a metal screen. In a corner-reflector antenna, the reflector is a folded sheet, or two sheets joined along one edge.
planetary electron • See ORBITAL ELECTRON.
planimeter • A mechanical instrument for measuring the area of a closed figure. The outline of the figure is traced with the pointer of the device, and the area is read from a pair of dials. In this application, the planimeter does the work of integral calculus.
PLA • A high-level computer programming language sometimes used in artificial intelligence. It is a “goal-oriented” language in that it seeks a solution to a problem using various schemes, as necessary.
plan position indicator • Abbreviation, PPI. A radar display on whose screen small spots of light reconstruct the scanned vicinity, revealing objects, such as buildings, boats, aircraft, etc. The distance from the center of the screen to a spot designates the range of an object, and the radial angle reveals its bearing.
plant • In computer operations, to put the result of an operation specified by a routine in a storage location from which it will be taken for implemen- tation of an instruction further on in the program.
plaque resistor • A flat, noninductive, power resistor, often used as a dummy load during high-frequency power measurements.
plasma • A usually gaseous state of matter that is composed of ions, negative ions, and uncharged particles. Also see PHYSICAL PROPERTIES.
plasma diode • A diode in which a plasma substance produces conduction in one direction, but not in the other.
plasma length • See DEBYE LENGTH.
plasma oscillation • In a plasma, a form of electric-field oscillation of the rapidly moving electrons.
plasma torch • A torch, used for such high-heat applications as melting metal, in which a gas is heated by electricity to the high temperature at which it becomes a plasma.
plasmastory • A form of electron tube sometimes used at ultra-high and microwave frequencies. It is similar to a thyratron. An inert gas is excited until it becomes a plasma, producing amplification under certain operating conditions.
plastacette • See CELLULOSE ACETATE.
plastic • A synthetic material usually made from various organic compounds through polymerization (see POLYMERIZE). Plastics can be molded into solid shapes and are available as films. Examples: celluloid, cellulose acetate, cellulose nitrate, polyethylene, and polysulfone. Also see THERMOPLASTIC MATERIAL and THERMOSET MATERIAL.
plastic-film capacitor • A capacitor made using polyester, polyethylene, or polystyrene. The method of manufacture is similar to that for paper capacitors when the plastic is flexible. Stacking methods can be used if the plastic is more rigid. The geometries can vary, and these capacitances are therefore found in several different shapes. Capacitance values for plastic-film units range from about 50 pF to several tens of microfarads. Most often they are in the range of 0.001 µF to 10 µF. Plastic-film capacitors are employed in audio equipment, and also in wireless transmitters and receivers. The efficiency is good, although not as high as that for mica-dielectric units. Also see CERAMIC CAPACITOR, ELECTROLYTIC CAPACITOR, MICA CAPACITOR, PAPER CAPACITOR, TANTALUM CAPACITOR.
plasticized • A substance added to a plastic to make it softer or more flexible.
plastic-loaded chip carrier • Abbreviated PLCC. A surface-mounted package for an integrated circuit. It is small in size and has high electrical and mechanical reliability.
plate • 1. The anode of an electron tube. 2. One of the electrodes of a primary or secondary battery cell. 3. One of the electrodes of a capacitor.
plateau • In a response curve, a region in which an increase in the independent variable produces no further change in the dependent variable. Example: the saturation region in a common-base transistor collector-current curve.
plate Blocking capacitor • A capacitor connected in parallel across the plate of an electron tube. It is small in size and has high electrical and mechanical reliability.
plate circuit • The external circuit associated with the plate of an electron tube.
plate-circuit relay • A direct-current relay operated in series with the plate of an electron tube.
plate conductance • Symbol, $g_P$. Unit, siemens. Conductance of the internal plate circuit of an electron tube. The value of static $g_P$ is equal to the plate-circuit voltage divided by the plate voltage $V_b/E_b$. The value of dynamic $g_P$ is equal to the derivative of the static $g_P$. $dP/V_b$. Plate conductance is the reciprocal of PLATE RESISTANCE.
plate current • Symbol, $I_P$. Direct current flowing in the plate circuit of an electron tube.
plate-current shift • A change in a plate current of a radio-frequency power amplifier during amplitude modulation. The action discloses faulty operation because the average plate current should remain constant during modulation.
plate dissipation • Abbreviation: PD. Unit, watt. Power expended in the plate of an electron tube. For an unloaded tube, $PD = E_b I_b$, where $I_b$ is the direct-current [dc] plate current in volts, and $E_b$ is the dc plate current in amperes. For a loaded tube, $PD = P_i - P_o$, where $P_i$ is the alternating-current [ac] load power output of an amplifier or oscillator in which the tube operates, and $P_o$ is the plate dissipations. Plate dissipation is the sum of plate power supply and the capacitor freely alternates alternating-current signal energy to the tank.
plate capacitance • See PLATE-CATHODE CAPACITANCE.
plate-cathode capacitance • Symbol, $C_{P-C}$. Unit, pF. The internal capacitance between the plate and cathode of an electron tube. Also called OUTPUT CAPACITANCE.
plate characteristic • For an electron tube, the family of plate current vs plate voltage curves for various grid bias voltages.
plate circuit • The external circuit associated with the plate of an electron tube.
plate-circuit relay • A direct-current relay operated in series with the plate of an electron tube.
plate conductance • Symbol, $g_P$. Unit, siemens. Conductance of the internal plate circuit of an electron tube. The value of static $g_P$ is equal to the plate-circuit voltage divided by the plate voltage $V_b/E_b$. The value of dynamic $g_P$ is equal to the derivative of the static $g_P$. $dP/V_b$. Plate conductance is the reciprocal of PLATE RESISTANCE.
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plate magnetic wire • A wire with a ferromagnetic outer coating on a core that is not magnetic.
plate voltage

Symbol, \( V_p \). The direct-current voltage applied to the plate of an electron tube.

plate-wire memory

See WIRE MEMORY.

plate-grid capacitance

Symbol, \( C_{pg} \) or \( C_{pg'} \). Unit, pF. The internal capacitance between the plate and control grid of an electron tube. Also called INTERELECTRODE CAPACITANCE and FEED-DOWN CAPACITANCE.

plate load

The power-consuming load into which the plate circuit of an electron tube operates. In an intermediate stage of a multistage amplifier, this load is the grid circuit of the following tube.

plate load impedance

Symbol, \( Z_p \). Unit, ohm. In a tube circuit, the (output) impedance that is ac-connected between the plate and ground, or dc-connected between the plate electrode and dc plate power supply.

plate meter

A direct-current ammeter or milliammeter that indicates the plate current of an electron tube.

plate modulation

A method of AMPLITUDE MODULATION in which a modulating voltage is superimposed on the direct-current plate and screen voltages of a higher-frequency amplifier or oscillator.

plate series compensation

In an audio amplifier, the use of a plate decoupling circuit to obtain a dc-balanced amount of bias in a grid circuit of an electron tube operates. In an intermediate stage of a multistage amplifier, this load is the grid circuit of the following tube.

plate shunt compensation

The addition of a network to the plate-output circuit of a tube to boost the base response of an amplifier.

plate spacing

1. The distance between plates in a fixed capacitor. This dimension is usually the same as dielectric thickness. 2. The distance between plates in a variable capacitor. Also called capacitor air gap.

plate spacing, 1

Plate

Dilectric

Plate spacing

plate supply voltage

Symbol, \( E_p \). The output voltage of a plate power supply.

plate tank

A resonant inter-electrode capacitance (LC) circuit operated from the plate of an electron tube.

plate tank capacitance

The capacitance required to tune a PLATE TANK to resonance.

plate tank inductance

The inductance of the coil in a PLATE TANK.

plate tank voltage

The audio-frequency or radio-frequency voltage developed across the plate tank of an electron-tube circuit.

plate-tank computer system

A personal computer and associated peripherals, equipped for reproducing multimedia that has been recorded on CD-ROM.

plug

A usually male quick-connect device that can be inserted into a JACK to make a circuit connection, or be pulled out of the jack to break the connection. See, for example, MALE PLUG, PHONE PLUG, POWER PLUG, and POLARIZED POWER PLUG.

plug-in device

A fuse provided with an Edison base for screwing into a socket.

plug-in fuse

A cartridge fuse having a metal ferrule on each end for insertion into a matching clip for easy installation and removal.

plug-in disk

One of the individual disks in a computer HARD DISK drive.

plug-in component

A component or module, such as a transistor, capacitor, coil, lamp, etc., provided with pins, clips, or contacts for easy insertion into, or removal from, a socket.

plug-in coil

A coil wound on a form having pins that can be quickly inserted into, or removed from, a socket.

plug-in coil form

An insulating form with base pins that mate with socket terminals so that a coil wound on the form can be quickly inserted, or removed from, a circuit.

plug-in component

A component or module, such as a transistor, capacitor, coil, lamp, etc., provided with pins, clips, or contacts for easy insertion into, or removal from, a circuit. See, for example, PLUG-IN CAPACITOR, PLUG-IN COIL, PLUG-IN FUSE, PLUG-IN UNIT.

plug-in fuse

A cartridge fuse having a metal ferrule on each end for insertion into a matching clip for easy installation and removal.

plug-in meter

A meter with base pins or banana plugs for quick insertion into, or removal from, a circuit.
plug in resistor • point defect

A resistor with pins or ferrules for quick insertion into, or removal from, a socket. A small transformer with pins for quick insertion into, or removal from, a socket.

plug in unit
A unit, such as a tuned circuit, amplifier, or meter, that has pins or contacts for easy insertion into, or removal from, a larger piece of equipment.

plumber's delight
An antenna whose construction, including that of the mast, is entirely of metal rods or tubing, with no insulating parts. Short circuits and grounds are prevented by making all attachments and joints at points that are at zero voltage, with respect to the standing-wave pattern.

Plumbicon
A television camera tube, similar to the Vidicon, with a lead-oxide target. It is noted for high sensitivity. The image lag time is shorter than in the conventional vidicon.

plumbing
Collectively, the waveguides, tees, elbows, and similar pipeline devices and fixtures used in microphone setups.

plunger-type meter
A meter in which an iron or steel plunger is pulled into a coil by the magnetic field produced by current flowing in the coil. The plunger is attached to a pointer that moves over the scale.

plutonium
Symbol, Pu. A radioactive metallic element that is artificially produced. Atomic number, 94. Atomic weight, approximately 244.

PM
Abbreviation of PERMANENT MAGNET.

PM
Abbreviation of PULSE-MODULATED.

PM
Abbreviation of PHASE MODULATION.

Pm
Abbreviation of PROMETHIUM.

Pm
Abbreviation of PERIODIC MODULATION.

PM
Abbreviation of PERMANENT-MAGNET GENERATOR.

PMM
Abbreviation of PERMANENT-MAGNET TRANSFORMER.

PMOS
Abbreviation of P-CHANNEL METAL-OXIDE SEMICONDUCTOR.

PMU
Abbreviation of a portable memory unit.

PN
Abbreviation of POLY-N-PAL.

PN
Abbreviation of POSITIVE-NEGATIVE notation.

PN junction
See PN JUNCTION.

Pn
Abbreviation of POL-LIKE SEMICONDUCTOR.

Pn
Abbreviation of POSITIVE-NEGATIVE.

Pnc
Abbreviation of POLY-NEGATIVE.

pi-boundary
See PI-Boundary.

pip transistor
A junction transistor having an intrinsic layer between a n-type semiconductor base and a p-type semiconductor layers.

pneumatic computer
A computer that uses fluid logic (i.e., one in which information is stored and transferred by the flow of a fluid (gas or liquid) and pressure variations therein).

pnp junction diode
A diode consisting of the junction between p-type and n-type regions in the same wafer of semiconductor material. Compare NPN TRANSISTOR.

Pn device
See PN DEVICE.

pnp transistor
A bipolar junction transistor in which the emitter and collector layers are p-type semiconductor material, and the base layer is n-type semiconductor material. Compare NPN TRANSISTOR.

Pv
Symbol for POLARIZATION.

Pv
Symbol for OUTPUT POWER or POWER OUTPUT.

POGO
Abbreviation of polar orbiting geophysical observatory.

point
A dot indicating the place of separation between the integral and fractional parts of a number (e.g., decimal point). Also calledradix point. 2. A precisely defined location in three-dimensional space that has theoretically zero length, zero width, and zero depth (e.g., focal point). 3. The place on a graph in any number of dimensions, at which two or more curves or coordinates intersect. 4. A set of operating conditions for a component, device, or system (e.g., cutoff point, operating point). 5. A defined condition at which some specific physical phenomenon occurs (e.g., melting point).

point charge
An electric charge imagined to occupy a single point in space; thus, it has neither area nor volume.

point contact
The point at which the sharply pointed tip of a wire or rod conductor touches a second conductor (e.g., the contact between a "cat whisker" and a semiconductor wafer).

point-contact diode
A semiconductor diode having a fine wire (“cat whisker”) that serves in permanent contact with the surface of a wafer of semiconductor material, such as germanium or silicon.

point-contact junction
The pn junction electroformed under the "cat whisker" touches the semiconductor wafer in a point contact diode or transistor.

point-contact transistor
A transistor having two fine wires ("cat whiskers") that serve as the emitter and collector electrodes. The pointed tips of the wires are nearly in contact with a few mils apart from the surface of a wafer of semiconductor material, such as germanium. The semiconductor serves as the base electrode. This device was a predecessor of the JUNCTION TRANSISTOR.

point counter
A Galvani counter tube in which the central electrode is a pointed, fine wire. Also see point detector.

point defect
1. In a semiconductor substance or piezoelectric crystal, the absence of an atom from its place in the lattice structure. 2. The presence of an extra atom in the lattice structure.

pointed tip
A sharp-ended thin taper that leaves a kerf or electrical discharge to occur more readily at a sharp point than at a blunt surface (as of an electrode).

pointed blade
A pointed blade, stiff wire, or insulated line on a transparent blade; it moves over a scale to indicate a setting or the value of a quantity. Also called NEEDLE.

pointer-type meter
An analog meter in which a pointer moves over a calibrated scale.

point impedance
1. The impedance observed at a given point in a circuit. 2. In a transmission line, the intensity of the electric field divided by the intensity of the magnetic field at the given point.

point of saturation
For a magnetic core, saturation as evidenced by a leveling-off of the positive and negative halves of the magnetization curve.

point source
A source from which electromagnetic radiation emanates, and that appears as a geometric point from a great distance.

point mode
Descriptive of cathode-ray-tube display operation (in a computer system), in which data is portrayed as dotted dots.

point-to-point communication
Communication between two stations whose location can be precisely specified.

point-to-point connection
A method of robot arm movement in which the device can attain only certain positions. The coordinates of each stop position structure are stored in the controller (computer) memory.

point-to-point station
A radio station that provides point-to-point communication.

point-to-point wiring
A method of wiring an electronic circuit in which wires are run directly between the terminals or components, usually by the shortest practicable route. It is used mainly in high-voltage circuits, such as power amplifiers. Compare CABLED WIRING.

pointing accuracy
An indication of absolute accuracy; 1 poise is the absolute viscosity of a fluid that requires a shear force of 1 dyne to move a 1-sq-cm area of one of two parallel layers of fluid (1 cm apart) with a velocity of 1 cm per second, with respect to the other layer. The comparable SI unit is the newton-second per meter squared (N-s/m²); 1 poise = 0.1 N-s/m².

polar axis
1. The axis of rotation of a crystal, perpendicular to a reflection plane. 2. The straight line connecting epicenters of electric, magnetic, or gravitational poles in a system.

polar coordinate conversion
See POLAR COORDINATE TRANFORMATION.

polar-coordinate geometry
A two-dimensional system for movement of industrial-robot arms. It is based on the system of POLAR COORDINATES, in which a radius and a direction are assigned to each point in the working plane.

polar coordinates
The magnitude and direction of a vector in a defined plane, listed as a radius (magnitude) in combination with an angle (direction) between the vector and the polar axis.

polarimeter
An instrument used for measuring the amount of polarized light in a ray that is only partially polarized.

polarized
A source from which electromagnetic radiation emanates, and that appears as a geometric point from a great distance.

polarity
Invertible. In some instruments, especially those having automatic polarity, the automatic blanking of the polarity sign.

polarity-sensitive relay
A current-relay actuated only when coil current flows in one direction. One of the simplest versions is a relay having a semiconductor diode connected in series with its coil.

potential meter
A potentiometer connected to two direct-current sources so that a pair of output terminals has plus and minus polarities at one extreme of potentiometer adjustment, and minus and plus at the other extreme. At the center of the range, the output voltage is zero.

polarity switch
A double-pole, double-throw switch connected between a pair of direct-current input terminals so that the polarity of a pair of output terminals can be interchanged.

polarization
1. In a radio wave, the orientation of the electric lines of flux, with respect to the surrounding environment (e.g., horizontal polarization and vertical polarization). 2. The disabling of a battery cell by the formation of insulating gas on one of the plates. 3. The condition in which transverse waves of light are confined to a specific (e.g., horizontal or vertical plane).
polarization diversity • A form of reception in which two separate receivers, tuned to the same signal, are connected to independent antennas. One antenna is vertically polarized and the other is horizontally polarized. The result is a reduction in fading caused by ionospheric effects on the polarization of the incoming signal.

polarization error • In the operation of a loop antenna (e.g., that of a direction finder), null error caused by waves arriving with polarization opposite that of the loop thus, vertically polarized waves arriving at a horizontal-plane loop, and vice versa. See POLARIZATION FADING. In radio reception, a form of fading that results from changes in the polarization of the arriving signal with respect to the receiving antenna. When the polarization of the arriving signal coincides with that of the receiving antenna, the received signal strength is maximum. When the received-signal polarization is at right angles to the receiving antenna, the signal strength is minimum.

polarization modulation • A method of impressing information on a signal by changing the polarization of the radiated electromagnetic field.

polarization selectivity • For a photoemissive surface, the condition in which the ratio of photocurrents for two different angles of plane polarization of the light incident to the surface differs from the ratio of the corresponding amounts of light absorbed by the surface. Also see PHOTOEMISSION. PHOTOEMISSIVE MATERIAL, and POLARIZATION.

polarized capacitor • A conventional electrolytic capacitor, so called because one particular terminal must be connected to the more positive of the two connection points. Compare NONPOLARIZED ELECTROLYTIC CAPACITOR.

polarized light • Visible light waves whose electric lines of flux are confined more or less to a single plane. This effect can be obtained via filtering; it also occurs naturally under certain conditions. Scattered sunlight is polarized to some extent by the atmosphere. Light is polarized to some extent when it reflects from a plane surface. Also see POLARIZING FILTER.

polarized plug • A plug that can be inserted into a socket or receptacle in only one way to ensure safe and foolproof operation.

polarized power plug • A polarized plug for connection of equipment to an alternating-current utility power source.

polarized reactor • A saturable reactor in which the lines of flux produced in the three-leg core by the coils on the two outer legs are added in the center leg. Consequently, the flux can reorient or oppose the controlling current in the coil on the center leg, depending on the direction of the current. Compare NONPOLARIZED Reactor.

polarized receptacle • A receptacle constructed so that it can receive a plug in only one way, thus preventing incorrect connections.

polarizing filter • A form of optical filter that allows passage of light whose electric vector lies in a specified plane. In photography, the polarizing filter is used to reduce or eliminate light reflected from surfaces. In radio communication, the polarizing filter is used to reduce interference caused by unwanted signal reflections. Also see POLARIZATION MODULATION.

polar orbiting satellite • Any satellite in a POLAR ORBIT.

polar planimeter • See PLANIMETER.

polar relay • See POLARIZED RELAY.

polar response • The horizontal-plane directional response of an antenna or other transducer.

polar orbit • An orbit that carries a satellite over the geographic polar regions of the earth. This type of orbit is oriented at, or nearly at, 90 degrees with respect to the equator, and can have a period ranging from about 90 minutes to several weeks or even months. Low-earth-orbit (LEO) satellites generally have such orbits.

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polarization modulation • A method of impressing information on a signal by changing the polarization of the radiated electromagnetic field.

polarization selectivity • For a photoemissive surface, the condition in which the ratio of photocurrents for two different angles of plane polarization of the light incident to the surface differs from the ratio of the corresponding amounts of light absorbed by the surface. Also see PHOTOEMISSION. PHOTOEMISSIVE MATERIAL, and POLARIZATION.

polarized capacitor • A conventional electrolytic capacitor, so called because one particular terminal must be connected to the more positive of the two connection points. Compare NONPOLARIZED ELECTROLYTIC CAPACITOR.

polarized light • Visible light waves whose electric lines of flux are confined more or less to a single plane. This effect can be obtained via filtering; it also occurs naturally under certain conditions. Scattered sunlight is polarized to some extent by the atmosphere. Light is polarized to some extent when it reflects from a plane surface. Also see POLARIZING FILTER.

polarized plug • A plug that can be inserted into a socket or receptacle in only one way to ensure safe and foolproof operation.

polarized power plug • A polarized plug for connection of equipment to an alternating-current utility power source.

polarized reactor • A saturable reactor in which the lines of flux produced in the three-leg core by the coils on the two outer legs are added in the center leg. Consequently, the flux can reorient or oppose the controlling current in the coil on the center leg, depending on the direction of the current. Compare NONPOLARIZED Reactor.

polarized receptacle • A receptacle constructed so that it can receive a plug in only one way, thus preventing incorrect connections.

polarizing filter • A form of optical filter that allows passage of light whose electric vector lies in a specified plane. In photography, the polarizing filter is used to reduce or eliminate light reflected from surfaces. In radio communication, the polarizing filter is used to reduce interference caused by unwanted signal reflections. Also see POLARIZATION MODULATION.

polar orbit • An orbit that carries a satellite over the geographic polar regions of the earth. This type of orbit is oriented at, or nearly at, 90 degrees with respect to the equator, and can have a period ranging from about 90 minutes to several weeks or even months. Low-earth-orbit (LEO) satellites generally have such orbits.

polar-orbiting satellite • Any satellite in a POLAR ORBIT.

polar planimeter • See PLANIMETER.

polar relay • See POLARIZED RELAY.

polar response • The horizontal-plane directional response of an antenna or other transducer.

polar orbit • An extremity or terminus that possesses POLARITY. Examples: magnetic pole and electric pole. 2. The movable member of a switch. 3. One of the frequencies at which a transfer function becomes infinite.

pole face • The smooth end surface of a pole piece.

pole piece • 1. A section of specially shaped iron or steel that is attached to a magnetic core. 2. Half of a two-piece magnetic core that terminates in a pole.
polymer A compound that is the product of polymerization, resulting from the chemical union of one or more molecules. Also see POLYMERIZE.

polymerize To unite monomers or polymers of the same kind to form a molecule having a higher molecular weight.

polyphase In alternating-current circuits, pertaining to the existence or generation of two or more specific electrical phases. Compare SINGLE PHASE.

polyphase antenna An antenna consisting of two dipole radiators mounted perpendicular to each other at their midpoint and excited 90 degrees out of phase. The radiation pattern is approximately circular in the plane of the elements. Also called TURNSTILE ANTENNA.

polyphase generator 1. A dynamo-type generator of polyphase power (two-phase, three-phase, etc.). See POLYPHASE OSCILLATOR.

polyphase oscillator An oscillator circuit that generates polyphase alternating current. The circuit contains separate oscillators for each phase. A three-phase circuit, for example, has three symmetrical oscillators with matched inductance and capacitance.

polyphase power 1. The total dissipated power in a polyphase alternating-current circuit. 2. Polyphase alternating current provided for utility purposes.

polyphase rectifier A rectifier of polyphase alternating current generally obtained from a three-phase power source through a transformer. The several common circuits usually contain a diode for each phase. Such rectifiers offer the advantage of higher ripple frequency than is obtainable by single-phase operation. For a three-phase rectifier, for example, the ripple frequency is three times the line frequency; for a six-phase rectifier, it is six times the line frequency.

polyphase system An alternating-current circuit in which voltages or currents are normally out of phase with each other by some fixed amount. Familiar types are two-phase and three-phase.

polyphase transformer An alternating-current transformer specifically designed for use in circuits that have two or more simultaneous current phases.

polypropylene A plastic material commonly used as an electrical insulator. Dielectric constant, 2.5. Dielectric strength, 4.000 V/mil.

polyrad antenna A tapered dielectric antenna, usually made of polyurethane, for directional microwave transmission.

polyvinyl A clear, colorless thermosetting-type plastic. It is widely used as an insulating material in radio-frequency circuits and, to some extent, as a dielectric film in fixed capacitors. Dielectric constant, 2.4 to 2.9. Dielectric strength, 20 to 28 kV/mm.

polyethylene capacitor A high-Q capacitor in which the dielectric film is polyethylene.

polyvinyl chloride Abbreviation, PVC. A plastic insulating material. Dielectric constant, 3.5 to 4.0. Dielectric strength, 800 V/mil.

polyvinyl chloride polymer A hard, white, usually glazed ceramic dielectric and insulant. Dielectric constant, 6 to 7.5. Dielectric strength, 40 to 100 V/mil. Also called china.

polyurethane An amorphous, flexible, polyether polymer.

porcelain A ceramic-dielectric capacitor made from porcelain.

porcelain insulator An electric insulator fabricated from porcelain.

porch See BACK PORCH and FRONT PORCH.

port 1. In a circuit, device, or system, a point at which energy or signals can be introduced or extracted in a particular manner (e.g., two-port circuit and l/d/0 port). 2. An aperture in a loudspeaker enclosure.

portable-mobile station See MOBILE STATION.

portable station A communications station that can be carried from one location to another. A portable station differs from a mobile station in that a mobile station does not usually operate while in motion, whereas a mobile station does.

ported reflex enclosure A loudspeaker cabinet that is resonant at a specified bass (low-frequency) sound reproduction.

positive 1. Abbreviation of POSITIVE. 2. Abbreviation POS. 3. Positive voltages, currents, or powers are considered to be positive.

positive angle In rectangular coordinates, an angle measured in the first or second quadrant.

positive charge A positive voltage or current applied to the positive terminal of a battery.

positive feedback Feedback that is in phase with the input signal.

positive feedback Feedback that is in phase with the input signal. Also called REGENERATIVE FEEDBACK. Compare NEGATIVE FEEDBACK.

positive function A function having the positive sign with open terminals. See polarized system, the trigonometric sine function is positive in the first and second quadrants, the cosine in the first and third, and the tangent in the first and third. Compare NEGATIVE FUNCTION.

positive ghost In a television picture, a ghost with positive shading (see POSITIVE, 3). Also see GHOST.
positive-going • positive resistor

positive-going Pertaining to a signal whose value is changing in a positive direction. This is not restricted to signals of actual positive polarity; a decreasing negative voltage, for example, is positive-going as it falls in the direction of zero— even if the zero line is negative.

positive grid In an electron tube, a control grid whose effective signal voltage is positive, with respect to the cathode.

positive-grid oscillator A microwave oscillator circuit in which the control grid of a triode tube is operated at a positive direct-current potential, and the plate at a negative potential. Electrons move back and forth between cathode and plate, through the grid, and thus give rise to an oscillating current.

positive ground A direct-current electrical system in which the positive power-supply terminal is connected to the common ground. It is not generally used in North America.

positive half-alternation See POSITIVE HALF-CYCLE.

positive half-cycle That half of an alternating current cycle in which the current or voltage increases from zero to maximum positive and returns to zero.

positive image 1. A picture in which the blacks, whites, and grays correspond to those in the actual scene (see POSITIVE, 3). 2. A normal television picture (i.e., one that has the shading described in 1).

positive ion An atom that has a deficiency of electrons and, consequently, exhibits a net positive change. Also called CATION.

positive lead See POSITIVE CONDUCTOR.

positive light modulation In television transmission, the condition in which transmitted power increases as the light intensity increases. Compare NEGATIVE LIGHT MODULATION.

positive logic 1. Binary logic in which a low positive state represents logic 0, and a high negative state represents logic 1. Compare NEGATIVE LOGIC.

positive resistors A form of MAGNETOSTRICTION in which the physical size of a substance is directly proportional to the intensity of the surrounding magnetic field.

positive measurement error See POSITIVE ERROR OF MEASUREMENT.

positive modulation In amplitude-modulated television transmission, the increase in transmitted power when the brightness of the scene increases. Compare NEGATIVE MODULATION.

positive modulation factor For an amplitude-modulated wave having unequal positive and negative peaks, a ratio expressing the maximum positive deviation (increase) from the average value of the envelope. Compare NEGATIVE MODULATION FACTOR.

positive number A real number, whose value is greater than zero. Compare NEGATIVE NUMBER.

positive peak The maximum amplitude of a positive half-cycle or positive pulse.

positive-peak clipper A peak clipper that leaves off the positive half-cycle of an alternating-current wave to a predetermined level.

positive-peak modulation Amplitude modulation of the positive peaks of a carrier wave.

positive-peak voltmeter An electronic voltmeter for measuring the amplitude of the positive peak of an alternating-current (ac) wave. In its simplest form, it consists essentially of a direct-current (dc) microammeter with a diode oriented to pass the positive half-cycle. A series capacitor in the circuit is charged to approximately the peak value of the applied ac voltage. Compare NEGATIVE-PEAK VOLTMETER.

positive phase-sequence relay A phase-sequence relay that responds to the positive phase-sequence in a polyphase circuit. Compare NEGATIVE PHASE-SEQUENCE RELAY.

positive picture modulation See POSITIVE MODULATION.

positive picture phase In a television signal, the swinging of the picture-signal voltage from zero to positive, in response to an increase in brightness in the scene. Compare NEGATIVE PICTURE PHASE.

positive plate 1. The positive member of an electron- or electrochemical cell or battery. Electrons flow from this plate to the negative plate, through the external circuit. 2. A vacuum-tube plate that is biased positively, as in a conventional tube circuit.

positive pole See POSITIVE ELECTRODE.

positive power See POSITIVE EXCITATION.

positive pressure Osmotic pressure (see OSMIC RESPONSE). Compare NEGATIVE RESISTANCE. positive resistor A resistor whose value does not change with current or voltage changes. Compare NEGATIVE RESISTOR.

positive temperature coefficient Abbreviation, PTC. A number expressing the amount by which a quantity (such as the value of a component) increases when temperature is increased. The coefficient is stated as a percentage of the rated value per degree or in parts per million per degree. Compare NEGATIVE TEMPERATURE COEFFICIENT and ZERO TEMPERATURE COEFFICIENT.

positive transmission In facsimile or television, a form of amplitude modulation in which the picture brightness is directly proportional to the signal strength at any given instant of time.

positive voltage The voltage of a positive ion.

positive-ion A positively charged particle having the same mass as that of the electron, and the same magnitude of electric charge, but positive (instead of negative). Sometimes called positive electron.

post See BINDING POST.

post-prefix meaning "following," "subsequent to," or "behind.

post-accelerating electrode In a cathode-ray tube, the high-voltage electrode that produces POST-DETECTION ACCELERATION of the electron beam. Also called INTENSIFIER ELECTRODE.

post-acceleration See POST-DETECTION ACCELERATION.

post-alloyed diffusion Abbreviation, PADD. A transistor in which electrodes are diffused into the semiconductor wafer after other electrodes have been allowed.

post-conversion bandwidth The bandwidth of a signal after it has been converted from one frequency to another.

post-decimation In a polyphase circuit, the condition in which the control grid of a triode tube is operated at a positive direct-current potential, and the plate at a negative potential. Electrons move back and forth between cathode and plate, through the grid, and thus give rise to an oscillating current.

post-decimation CRT An oscilloscope tube provided with a high-voltage intensifier electrode in the form of a ring encircling the inside flare of the tube, between the deflecting plates and the screen. The deflected electron beam is accelerated in the post-decimation CRT arrangement allows the beam to be deflected at low velocity and high sensitivity, then to be accelerated for a brighter image.

post edit The editing of data in a computer output.

post-emphasis See DEEMPHASIS.

post-equalization 1. In sound recording and reproduction, equalization during playback. Compare PREEQUALIZATION. 2. See DEEMPHASIS.

post-mortem An investigation into the cause of failure of a circuit, device, or system.

post-mortem dump At the end of a computer program run, a dump to supply information for debugging purposes.

post office box A type of wheatside bridge that contains resistance coils in a special box. The coils are connected so that they can be replaced by shorting connectors.

post 1. See POTENTIOMETER. 2. See DASHPOINT. 3. Abbreviation of POTENTIAL. 4. To encapsulate a circuit in a potting compound, such as epoxy resin. potassium Symbol, K. A metallic element of the alkaline-earth metal group. Atomic number, 19. Atomic weight, 39.10. A salt that is an electrolyte in some forms of electroplating.

potassium cyanide Formula, KCN. A highly toxic salt that is an electrolyte in some forms of electrotinning.

potassium dihydrogen phosphate Abbreviation, KDP. An inorganic ferroelectric material.

pot core A magnetic core for a coil, made of ferrite or of powdered iron, consisting of a central rod, a surrounding polelike enclosure, and a lid. The rod passes through the center of the coil, and the pot and lid completely enclose the coil. This arrangement provides a completely closed magnetic circuit and coil shield.

potential See ELECTROMOTIVE FORCE.

potential barrier See VOLTAGE DIVIDER.

potential drop 1. A voltage difference between two points in a circuit. 2. The voltage across a resistor in a direct-current circuit.

potential energy Energy resulting from the position of a body or particle (e.g., the energy stored...
in something lifted against gravity and held in its new position) or from the position of charges (e.g., the potential energy of a charged capacitor). Compare KINETIC ENERGY.

potential energy • power amplifier

potential gradient See VOLTAGE GRADIENT.

potentiality audio output display of the VOLTAGE GRADIENT across a body (e.g., a resistor). potential transformer A small step-up transformer for increasing the range of an alternating-current voltmeter.

potentiometer 1. A variable resistor used as a voltage divider. The input voltage is applied across the entire resistance element and the output voltage is taken from the wiper, relative to one end of the element. One end is usually grounded (zero potential). 2. A null device whose operation is based on a variable resistor, and is used for precise voltage measurements. The unknown voltage is applied to the input of a variable resistor whose settings are known with great accuracy; the resistance is adjusted for an output voltage that exactly equals the voltage of a standard cell (as indicated by a null between the two voltages). The unknown voltage is then determined from the resistance and the standard-cell voltage.

potentiometer noise In a current-carrying potentiometer, noise generated when the wiper blade rubs against the resistance element, or by contact between the blade and element.

potentiometer recorder A type of graphic recorder. It consists essentially of a resistance-calibrated potentiometer, a standard cell, and a galvanometer. When an unknown voltage (E) is applied to the input terminals of the potentiometer and the output terminal is at zero null, E = E(1/R2), where E is the voltage of the standard cell, R1 is the input resistance of the potentiometer, and R2 is the output resistance of the potentiometer.

Potentiometer layout An illustration of the phase relationship between current and voltage in an alternating-current circuit that contains reactance.

POTS Acronym for plain old telephone service, meaning basic service without optional features (touch-tone dialing, conference calling, call forwarding, etc.).

potted circuit A circuit embedded in plastic or wax to protect it against the environment, and/or to minimize the effects of physical vibration (see POTTING).

potted component An electronic part embedded in a suitable plastic or wax to protect it against the environment and/or to minimize the effects of physical vibration (see POTTING). Potting.

potted material A substance, such as a resin or wax, used for potting electronic gear. Also called potting compound.

pound 1. Abbreviations, lb, Ip. A unit of weight equal to 16 avoirdupois ounces. 2. Abbreviation, lb. A unit of force approximately equal to 4.448 newtons. 3. Abbreviation, lbm. A unit of mass approximately equal to 0.4536 kilogram.

poundal A unit of force equal to approximately 1382.55 dynes or 0.015255 newton. One poundal is the force that, when acting for one second, will impart a speed of one foot per second to a one-pound mass.

pound-foot Abbreviation, lb-ft. A unit of torque equal to the product of a force of one pound and a moment arm of one foot. Compare OUNCE-INCH.

pounds per square inch absolute Abbreviation, psia. Absolute pressure (i.e., the sum of atmospheric pressure and the pressure indicated by a gauge). Compare POUNDS PER SQUARE INCH GAUGE.

pounds per square inch gauge Abbreviation, PSIG. The value of pressure indicated by a gauge, without correction for atmospheric pressure. Compare POUNDS PER SQUARE INCH ABSOLUTE.

powdered-iron core A magnetic core consisting of minute particles of iron, each coated with a film to insulate it from others, molded into a solid mass. Because of its low eddy-current loss, this type of core is usable in radio-frequency transformers and coils, where it increases the inductance of the winding.

power 1. Symbol, P, Unit, watt. The rate of doing work, or producing or transmitting energy. For an alternating-current circuit, in the direct-current circuits, and in alternating-current circuits containing no reactive power, power is the product of the root-mean-square current and voltage. For, example, AC POWER, APPARENT POWER, DC POWER, POWER FACTOR, REACTIVE KILOVOLT-Ampere, REACTIVE Volt-Ampere, Watt, and WattLESS POWER. 2. The product obtained by multiplying a quantity x by itself n times, written xn. For example, 22 = 2 × 2 = 4, 82 = 8 × 8 = 64. It is the fourth power of 2. Compare ROOT, 1, 3. The exponent in an expression, as defined earlier. In the expression 2x, x is the power.

power amplification 1. The amplification of a signal in a power circuit to produce a signal having greater power. 2. The signal power increase, expressed as a ratio or as a figure in decibels, resulting from the process defined in 1. Also called POWER GAIN.

power amplification ratio See POWER AMPLIFIER RATIO.

power amplifier An amplifier that delivers useful amounts of power to a load, such as one or more speakers. Compare CURRENT AMPLIFIER and VOLTAGE AMPLIFIER.

power-amplifier device A high-current tube or transistor designed especially for high power output. Such a device does not always provide significant voltage amplification, but always provides power amplification. Compare VOLTAGE-AMPLIFIER DEVICE.

power-up peak torque Symbol, Pp. For a torque motor, the input power in watts needed for peak torque at stall at a winding temperature of 25°C. Compare THERMAL CAPACITY.

power attenuation 1. A reduction of power level. 2. See POWER LOSS.

power bandwidth For a high-fidelity audio amplifier, the difference between the maximum and minimum frequencies at which the amplifier can produce at least 50 percent of its maximum power output, with less than a certain amount of total harmonic distortion (usually 10 percent).

power blackout A situation in which all electric power is lost to utility subscribers in a defined region.

power consumption 1. The rate of energy consumption in a given circuit, the root-mean-square voltage multiplied by the root-mean-square current. Compare POWER FACTOR, REACTIVE KILOVOLT-Ampere, REACTIVE Volt-Ampere, Watt, and WattLESS POWER. 2. The product obtained by multiplying a quantity x by itself n times, written xn. For example, 22 = 2 × 2 = 4, 82 = 8 × 8 = 64. It is the fourth power of 2. Compare ROOT, 1, 3. The exponent in an expression, as defined earlier. In the expression 2x, x is the power.

power cutoff frequency Symbol, ′′. The frequency at which the power gain of a transistor drops 3 dB below its peak value.

power derating For a temperature higher than the specified ambient temperature, a deliberate reduction of the power dissipated by a component or device. This is done to prevent failure of the component or device. Also see DERATING, DERATING CURVE, and DERATING FACTOR.

power difference An expression of the power lost in a circuit when power is absorbed by a dielectric material.

power diode A heavy-duty diode that is usually used in power-supply service. Also called rectifier diode.

power grid An aggregate of power-generating stations, transmission lines, and associated equipment.
equipment, usually extending over hundreds of miles and embracing several communities, so op-
erated that it can add or deliver power to the system or draw power from it, according to local demand.

power ground The power-supply ground for a cir-
cuit or system.

power-handling capacity 1. The amount of power that a device can dissipate, either continuously or intermittently, without suffering damage. 2. The maximum input power that can be tolerated by an amplifier transistor or tube without overheating.

power-hyphreba For a semiconductor device or vacuum tube, a curve plotted from the device’s current and voltage values, which provide the power value when multiplied (e.g., a 2-watt curve for the direct-current collector input of a power transistor).

power input See INPUT POWER.

power-input control The adjustment of the output of a power supply by varying the alternatingcurrent input to the power transformer. Usually, a variable autotransformer is operated ahead of the power transformer. See, for example, VARIABLE TRANSFORMER and VARIAC.

power inverter See CHOPPER POWER SUPPLY.

power-level indicator 1. See DB METER. 2. See OUTPUT POWER METER.

power line The line through which electrical en-
ergy is received by a subscriber.

power-line Abbreviation, PLC. Carrier-current telephony or telegraphy over power lines that are common to transmitting and receiving stations. Also see WIRELESS TELEGRAPHY.

power-line filter 1. A heavy-duty radio-frequency (RF) power line filter close to a de-
vice that generates RF energy, such as a radio transmitter. It prevents transmission of RF en-
ergy via the power line. 2. An RF filter inserted in the power line, where it enters the power supply of a piece of equipment, such as a com-
puter or high-fidelity audio amplifier. It prevents RF energy on the power line from entering the de-
vice via the power supply.

power-line frequency The frequency of the alter-
nating current available over com-
mercial power lines. In the United States, it is 60 Hz; in some countries, it is 50 Hz.

power-line monitor An expanded-scale alternatingcurrent voltmeter for the continuous moni-
tor of power-line voltage.

power-line pickup The interception of radio-
frequency energy by utility power lines acting as receiving antennas. This can enter a sensitive electronic device, such as a computer or a high-
fidelity audio amplifier, via the power supply.

power loss Symbol, PL. In interstage cou-
ing, the ratio of available power (with the cou-
pling network in place) to the available power when the network is disconnected.

power meter See WATTMETER.

power modulation factor In amplitude modulation, the ratio of the peak power to the average power.

power oscillator A heavy-duty oscillator delivering useful power output.

power output See OUTPUT POWER.

power output meter See OUTPUT POWER METER.

power pack An external power-line-operated unit supplying alternating or direct current for the op-
eration of electronic equipment.

power pentode A heavy-duty pentode vacuum tube designed to deliver relatively high output power.

power plug A plug for insertion into a power-line outlet.

power programmer A device that adjusts radar output power, in accordance with the target di-
rection and target range.

power rating 1. The specified power required by an equipment for normal operation. 2. The specified power output of a generator or amplifier.

power reactive See REACTIVE VOLT-AMPERE.

power rectifier A heavy-duty semiconductor diode used to rectify alternating current for power-
supply purposes.

power relay A heavy-duty relay designed to switch significant amounts of power. The heavy contacts and armature require high actuating current; this necessitates a larger coil than is used in lighter-duty relays.

power resistor A heavy-duty resistor (i.e., one de-
dsigned to carry large currents without overheating). A heavy-duty resistor designed to deliver relatively high output power.

power supply 1. A device, such as a generator or a transformer, delivering current to a circuit. 2. The supply of alternating or direct current for the op-
eration of electronic equipment.

power supply filter An external power-line-operated unit designed to suppress power-supply noise.

power-supply rejection ratio The ratio of the output-
put voltage change for an amplifier, oscillator, or other circuit, to the change in power-supply volt-
age. It is determined on an instantaneous basis.

power-supply sensitivity In an operational ampli-
ifier, the sensitivity of the output to variations in the power-supply voltage.

power surge 1. A momentary increase in the volt-
age that a utility line can suffer. This may be abnormally high voltage that sometimes exists for the first several milliseconds after utility power is restored following a 2.

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age that a utility line can suffer. This may be abnormally high voltage that sometimes exists for the first several milliseconds after utility power is restored following a 2.
preamplifier

approximately 15 MHz, where most of the noise comes from the receiver, rather than from outside sources. 2. A low-noise amplifier used for boosting weak signals for television reception. 3. A low-noise, low-level amplifier used for boosting signal levels from transducers, such as microphones or photocells.

preamplified relay A relay through which is maintained a steady current that is just lower than that needed to close the relay. The actuating signal, then, need only be a small amount of additional current.

precondition current 1. The cutoff current in a transistor. 2. In a thyatron, the small (anode) current which keeps the plate held negative and prevents the current flowing before the tube is instantaneously pressurized. Any other elements can then be referenced.

determined counter A counter programmed to count to a desired number and stop.

preamplifier See MULTIPLEXER.

preamplifier 1. To record a tape with DOLBY compression, the recording that has been recorded with Dolby compression.

preamplification In frequency modulation, the introduction of a rising-response characteristic (response rises as modulation frequency increases). Compare DEEMPHASIS.

preamplifier circuit 1. In sound recording and reproduction, equalization during recording. 2. See PREAMPLIFIER.

preferred values of components A number system used by the Electronics Industries Association (EIA) for establishing the values of composition resistors and small fixed capacitors.

prefix multiplier See MULTIPLIER PREFIX.

prefix notation As used with complex expressions involving many operators and operands, a type of notation in which the expressions, rather than containing brackets, are given a value, according to the relative positions of operators and operands.

prefix 1. A small wafer, usually dry-pressed from powdered plastic, from which the body of a component, such as a capacitor or resistor, is heat-molded. Also called a pill or biscuit. 2. The preformed slab used in molding a phonograph disc. 3. To shape a moldable circuit before fixing the final configuration or package.

preliminary information For manufactured electronic components, data that is released prior to the actual availability of the device. Subject to change when units are produced.

premold A molding compound of reinforced plastic.

premolded record A phonograph disc on which a recording has been made (i.e., a recorded disc).

premolded tape Magnetic tape on which a program or data has been recorded. Also called RECORDABLE TAPE.

primary coil A relay through which is main💪活力，and to which other elements can then be referred.

preset element In automation and control, an element that can be preset to a given level or value, and to which other elements can then be referenced.

preset switch In the circuit of a PRESET COUNTER, a multiposition rotation switch that can be set to determine the number of input pulses that must be received for the circuit to deliver one or more output pulses.

preset A downward-moving transient pip that sometimes precedes the rise of a pulse.

preshoot amplitude The peak voltage of a PRE- SHOOT measured from the zero line to the valley of the preshoot.

preshoot time The width of a PRESHOOT, measured along the horizontal base line (time axis).

pressing 1. A process by which photophanic discs are fabricated from plastic. 2. A disc pressed from plastic.

press-to-talk microphone A microphone that uses a PRESS-TO-TALK SWITCH for actuation.

press-to-talk switch A switch in a microphone or on the end of a control cord. It is used to activate a transmitter, telephone, or recorder when the operator wishes to speak.

pressure Abbreviation, P or p. 1. Force per unit area. It can be expressed in any appropriate units of force and area (e.g., newtons per square meter, pounds per square inch, grams per square centimeter, etc.). 2. The application of force over part of a surface. 3. Compression. 4. See TEN- SION, 1.

pressure amplitude The pressure caused by an acoustic disturbance. It is usually measured in dynes per square centimeter.

pressure capacitor An enclosed fixed or variable capacitor, whose breakdown voltage increases when the air pressure rises inside the container.

pressure contact 1. A mechanical switch used to stop or start an electronic circuit by means of opening or closing a contact when air pressure is applied or released.

pressure gradient microphone See PRESSURE GRADIENT MICROPHONE.

pressure microphone A microphone that receives sound waves at only one side of its diaphragm.

This one-sided exposure results in the displacement of the diaphragm by an amount proportional to the instantaneous pressure of the sound waves.

pressure pad In a tape recorder, a small pad that holds the tape against one of the heads.

pressure pickup See PRESSURE TRANSDUCER.

pressure roller In a tape recorder, a rubber-tired output roller that presses the tape against the capstan.

pressure sensor A device that detects the presence of, and/or measures, physical force within a specific area. One simple device uses two metal plates separated by electrically resistive foam. Pressure compresses the foam and reduces the resistance between the plates. This resistance change can be detected and measured.

pressure switch A switch that is opened or closed by a change in pressure within a system.

pressure transducer A sensor for converting pressure into proportionate current or voltage. Some use strain gauges; others use piezoelectric crystals, potentiometers, and other variable elements.

pressure zone A region of high air pressure that is immediately adjacent to a surface reflecting an acoustic (sound) wave.

preoperative microphone A microphone equipped with a deflector that helps guide acoustic energy toward the diaphragm.

pressure To place data in memory before it is intended for use.

preoperative stage A stage, such as one in an intermediate step, that is not designed to produce final results or operating systems, but acts as a precursor to the final step. Such a stage might include a head designer or operator, who is responsible for a particular area.

primary 1. See PRIMARY COLORS. 2. See PRIMARY STANDARD.

primary battery A battery composed of primary cells.

primary block A fundamental group of channels in pulse-code modulation, combined by means of time-division multiplexing.

primary capacitance 1. The distributed capacitance of the primary winding of a transformer whose secondary winding is unloaded. Compare SECONDARY CAPACITANCE, 1, 2. A series or shunt capacitance used to tune the primary coil of a radio-frequency transformer. Compare SECONDARY CAPACITANCE, 2.

primary cell An electrochemical cell that does not require charging in order to function. Once it has been discharged, the cell must usually be thrown away. Compare STORAGE CELL. Also see CELL, DRY CELL, and STANDARD CELL.

primary circuit 1. The circuit associated with the primary winding of a transformer, the circuit associated with the input to a device or system.

primary coil See PRIMARY WINDING.
primary colors  See COLOR PRIMARY.
primary current  The current flowing in the primary circuit of a transformer. Also called TRANSFORMER INPUT CURR...nts. Compare SECONDARY CURRENT.
primary electron  A fast-moving electron possessing the greater energy after a collision between two elec- trons. Compare SECONDARY ELECTRON.
primary emission  Emission arising directly from a source, such as the cathode of an electron tube. Compare SECONDARY EMISSION.
primary frequency standard  A device that gener- ates unmodulated signals at precise frequencies. It generally uses a highly stable crystal oscillator that can be referred to a time standard and peri- odically corrected. A string of multivibrators, to- gether with harmonic amplifiers and buffers, divide, and multiply the fundamental crystal fre- quency. The resulting signals provide markers for calibrating receivers and test equipment. Com- pare SECONDARY FREQUENCY STANDARD. Also see PRIMARY STANDARD.
primary impedance  1. The impedance of the primary winding of a transformer whose secondary winding is unloaded. Compare SECONDARY IMPEDANCE.  2. An external impedance pre- sented to the primary winding of a transformer. Compare PRIMARY IMPEDANCE. 2. A device that performs the initial conversion in a measurement or control system. Such an el- ement converts a natural force or material into a signal that can be transmitted to appropriate instruments for translation and evaluation.
primary power  Power in the primary circuit of a transformer. Also see PRIMARY KVA and PRI-mary VA. Compare SECONDARY POWER.
primary measuring element  A detector, sensor, or transducer that performs the initial conversion in a measurement or control system. Such an el- ement converts a natural force or material into a signal that can be transmitted to appropriate instruments for translation and evaluation.
primary radiator  1. The driven element of a direc- tive antenna system that incorporates parasitic elements. 2. The driven element of a directive an- tenna that uses a reflector, such as a screen or dish.
primary resistance  The direct-current resistance of the primary winding of a transformer. Compare SECONDARY RESISTANCE.
primary standard  A usually stationary source of a quantity (e.g., capacitance, frequency, time, in-ductance, resistance, etc.). This source is so pre- cise, and is maintained with such care, that it can be used as a universal reference. Compare SECONDARY STANDARD.
primary turns  Symbol, Tp. The number of turns in the primary winding of a transformer. Compare SECONDARY TURNS.
primary utilization factor  Abbreviation, UP. For a transformer in a rectifier circuit, the ratio of direct-current power output to primary volt- amperes. Numerically, the primary utilization factor is higher than the secondary utilization factor, but is less than 1. Also see SECONDARY UTILIZATION FACTOR and UTILITY FACTOR.
primary VA  The volt-amperes in the input wind- ing of a transformer. Compare SECONDARY VA.
primary voltage  The voltage across the primary winding of a transformer. Also called transformer input voltage. Compare SECONDARY VOLTAGE.
primary winding  The normal or usual input wind- ing of a transformer. Also called primary coil. Compare SECONDARY WINDING.
prime meridian  See ZERO MERIDIAN.
prime mover  A machine, such as a gas engine, steam engine, or water turbine, that converts a natural force or material into mechanical power.
primitive oscillation period  In a complex oscilla- tion waveform, the shortest period for which a definite repetition occurs; the highest fundamen- tal frequency.
principal axis  The line passing through the center of the spherical part of a lens, mirror, or dish re- flector.
principal focus  The focal point of rays arriving parallel to the principal axis of a lens, mirror, or dish reflector.
principal mode  See DOMINANT MODE.
principal ray  The path described by an electron en- tering an electron lens parallel to the lens’s axis, or by an electron leaving this lens parallel to the axis.
print  1. The material transferred from a typewriter onto paper. 2. The command, in a computer sys- tem, that causes data to be placed on paper or onto the output screen. 3. The alphanumeric output of a computer or data terminal.
printed capacitor  A two-plate capacitor formed on a printed circuit.
printed circuit  A pattern of conductors (corre- sponding to the wiring of an electronic circuit) formed on a board of insulating material, such as a phenolic, by photo-etching, silk-screening of metallic paint, or by the use of pressure-sensitive preforms. The leads or pins of discrete compo- nents are soldered to the printed metal lines at the proper places in the circuit, or the compo- nents can be formed along with the conductors. Also see ETCHED CIRCUIT.
printed-circuit board  A usually copper-clad plas- tic board used to make a printed circuit.
printed-circuit lamp  A baseless lamp having flex- ible leads for easy soldering or welding to a printed circuit.
printed-circuit relay  A usually small relay pro- vided with pins or lugs for easy solder connection to a printed circuit.
printed-circuit switch  A rotary switch whose con- tacts and contact leads are printed on a substrate. Compare PRIMARY RESISTANCE.
printed-circuit template  Also called etching pat- tern. A drawing for the purpose of making printed-circuit boards by photographic means.
printed coil  A flat, spiral coil formed on a printed circuit.
printed circuit  A usually copper-clad plastic board used to make a printed circuit.
primary circuit  The driven element of a direc- tive antenna system that incorporates parasitic ele-ments. 2. The driven element of a directive an- tenna that uses a reflector, such as a screen or dish.
primary resistance  The direct-current resistance of the primary winding of a transformer. Compare SECONDARY RESISTANCE.
primary standard  A usually stationary source of a quantity (e.g., capacitance, frequency, time, in- ductance, resistance, etc.). This source is so pre- cise, and is maintained with such care, that it can be used as a universal reference. Compare SECONDARY STANDARD.
primary turns  Symbol, Tp. The number of turns in the primary winding of a transformer. Compare SECONDARY TURNS.

There are several types, including the dot-matrix printer, the daisy-wheel printer, the lift-off printer, and the laser printers, such as the dot-matrix printer, which can render only text data; others, such as the laser type, can print high- resolution graphic images, sometimes in color.

printing calculator  1. An electronic calculator that supplies a printed record of the results of a calculation. 2. For a programmable calculator, the results, a record of program steps, and plots of curves.

printing digital voltmeter  Abbreviation, PDM. A digital voltmeter that delivers a printed record of a voltage reading, in addition to the usual digital readout of the voltage.

printing telegraph  1. A telegraph that prints the received message on a tape or page. 2. See TELE- TYPEWRITER.

printing wheel  See PRINT WHEEL.

print format  The form of data transmitted by a computer program to a printer (e.g., plain text, graphics, color graphics, etc.).

printout  See DATA PRINTOUT. 1. 2. See print-through. In prerecorded magnetic tape on a reel or cassette, the transfer of magnetism be- between layers of the rolled-up tape.

print wheel  In a daisy-wheel printer, the rotate- table wheel on whose rim the letters, numbers, and other symbols are inscribed in relief.

priority indicator  In data transmission, a code that specifies the order of importance of a mes- sage in a group of messages to be sent.

priority processing  In multiple programming op- erations, a system for assigning the order of processing for different programs.

privacy code  1. A subaudible tone used in cord- less telephone systems to reduce the chances of interference between phones operating on the same channel in close proximity. 2. A subaudible tone used in radio transmissions, especially in conjunction with repeaters, to allow only those stations with the proper code to be received. A tone-burst sequence at the beginning of a trans- mission that actuates a receiver, allowing only those stations with the proper code to be re-ceived.

privacy equipment  Devices, such as speech scramblers and digital encryption programs, that provide some measure of secrecy in communica- tions.

privacy switch  In a telephone amplifier, a switch (usually a pushbutton) for muting outgoing mes- sages.

private automatic exchange  Abbreviation, PAX. A dial telephone system for use within an organiza- tion and having no connection to the central off- ce. Compare PRIVATE BRANCH EXCHANGE.

private branch exchange  Abbreviation, PBX. A telephone system, complete with a private manu- ally operated switchboard and individual tele- phone sets, installed and operated on private
promises but having trunk-line connection to the central office. Compare PRIVATE AUTOMATIC EXCHANGE. See also EXCHANGE.

deined, electronic means, to certain subcircuits or a complete telephone system used to restrict access to a communications system. The tone is used to perform. For access to the system, a transmitted signal must contain the tone of the appropriate subaudible frequency, in addition to the voice or other information.

probability 1. The branch of mathematics concerned with the likelihood of an event's occurrence. It has many applications in quality control and physics. 2. The mathematical likelihood that an event will occur.

program error Abbreviation, PE. The value of error above and below which all other error values are equally likely to occur.

probe 1. A usually slender pencil-like implement with a pointed metal tip and a flexible, insulated lead. It is used to contact live points in a circuit under test (e.g., voltmeter probe and oscilloscope probe). 2. A device used to sample a radio frequency or current at a desired point (e.g., WAVEGUIDE PROBE). 3. A pickup device shaped like a probe for insertion into close quarters (e.g., PROBE THERMISTOR) or tight spaces.

probe meter See PROBE-TYPE VOLTMETER.

probe thermistor A thermistor of slender con-

compliance for insertion into an area in which the tem- temperature is to be monitored or controlled.

probe thermocouple A thermocouple in the form of a slender probe for insertion into close quarters for temperature sensing or temperature control.

probe tip of a probe A flexible reference system for soft- circuit.

probe-type voltmeter A voltmeter installed in a long probe or wand. Kilovoltmeters are some- times constructed in this fashion, with a long multiplier resistor housed in the probe.

promoting or determining the existence of, external artificial interference (e.g., power-line noise) in a radio communications cir- cuit.

problem-oriented language Any high-level com- puter language that allows the user to write programs as statements in terms appli- cable to the field of interest (e.g., COBOL's state- ments in English for problems relating to business).

problem rejection In artificial intelligence, a pro- cess in which problems are made easier by break- ing them down into smaller logical parts.

process control The control of a process, such as one of manufacturing, by means of computers.

processor 1. A circuit or device used to modify an input in response to certain requirements (e.g., clipper and crimeshaper). 2. See DATA- PROCESSING EQUIPMENT. 3. See MICROPROCESSOR. 4. See MICROPROCESSOR.

prod The metal tip of a probe (see PROBE, 4).

product 1. The result of mixing or heterodyning of two or more signals. 2. The result of modulating one signal with another. 3. The result of combining or processing a signal or signals in a specified manner. 4. The salable end result of a manufacturing process. 5. The result obtained when two or more quantities are multiplied by each other.

product detector A detector circuit whose output is the product of two signals applied simultane- ously to the circuit. In a single-sideband receiver, for example, one of the signals is the incoming signal; the other, the signal from the local beat-frequency oscillator.

product detector

production lot A manufactured set of compo- nents, circuits, or systems, intended for sale. All of the units in the lot are identical. The finished product is suitable (presumably) for consumer use.

production unit One unit in a production lot; a finished unit, ready for use by a consumer.

product modulator A modulator whose output is equal or proportional to the product of carrier voltage and modulating voltage.

product of sine waves The result of multiplying one sine wave by another with attention being paid to the power factor. In the case of a resistive circuit, where the power factor is equal to 1, all voltage-current (I^2) products are positive, and are equal to the true power. A product wave has neg- ative half-cycles when the circuit contains reactance.

professional engineer A person licensed by a state board of examiners to work independently as an engineering. Also see PE and REGISTERED PRO- FESSIOANAL ENGINEER.

program 1. In computer operations, a detailed se- quence of instructions representing an algorithm (the necessary steps in solving a problem) that can be implemented by a computer. 2. The con- tent of which is broadcast or recorded on a tape for a specified period of time. 3. In audio recording, the composite output from the mixer, used to make the master tape or disc.

program address counter See INSTRUCTION ADDRESS COUNTER.

program amplifier A broadcast preamplifier used at the studio or a remote location.

programmatics The study of computer programming.

program circuit In wire telephony, a circuit capa- ble of handling music and other audio data that covers a wide band of frequencies.

program compatibility The condition in which a program written for one computer can be uti- lized with another computer having a different architec- ture.

program controller In a central processor, a unit that controls the sequence and execution of pro- gram instructions.

program counter See CONTROL REGISTER.

program file A flexible reference system for soft- ware library maintenance.

program flowchart A representation of a computer program in the form of a flowchart. Each function and transition point is indicated by a box in the chart. A user can follow the flowchart and de- termine the outcome of the program for any given set of input parameters.

program memory A collection of computer or pro- grammable-calculator programs. Usually, it means the collection of programs used in a given computer system, often a software package sup- plied by the hardware vendor. It might also be a catalogue of computer programs, or a collection of programs with functions for their use.

programmable calculator A calculator that can be programmed to perform a chain of operations in a given order repetitively.

programmable read-only memory In a computer, a read-only memory (ROM) that can store a pro- gram.

program maintenance The ongoing correcting, updating, and modification of computer pro- grams belonging to a system.

programmable dummy A program that occurs during a program run, according to a program instruction.

programmed halt During a computer program run, a temporary cessation resulting from an in- terrupt or halt instruction.

programmed instruction See MACRO INSTRUC- TION.

program timer See CYCLE TIMER.

programmer 1. The person who writes computer pro- grams. 2. A timing unit that controls the duration of a program.

program segment A unit within a computer pro- gram that is stored with others in memory at the time of the program's execution, or sometimes, as overlays loaded individually when the entire pro- gram is run.

program specification A description of the steps involved in the solution of a problem, from which a programmer devises a computer program.

program step An instruction in a computer pro- gram.

program tape In computer operations, a magnetic or paper tape that contains programs for a sys- tem or application.

program timer 1. A programmed timer (see CY- CLE TIMER). 2. A timing unit that controls the duration of a program.

progressive scanning Non-interlaced television raster scanning, in which the lines are traced from top to bottom in succession. Conventional television broadcasting uses INTERLACED SCANNING.

progressive wave A wave disturbance that travels through a theoretically perfect homogeneous medium. This can be a compression (longitudi- nal) wave, a transverse wave, or an electromag- netic wave.

project Abbreviation, PE. For an amplifier circuit, the oper- ating point at which crossover distortion van- ishes. The direct-current bias voltage (grid or plate) required for projected cutoff is somewhat lower than the value corresponding to conven- tional cutoff of plate or drain current.

project engineer A field of engineering dealing with the coordination of a complete project.

projection television A television system for viewing by a relatively large group, usually ac- complished via a projection tube and optical sys- tem.

projection tube A cathode-ray tube, especially a television picture tube, consisting of a bright light image that can be projected onto a large screen by means of a lens system.

projector 1. A device that transmits a visible image onto a surface for reproduction. 2. In general, any device that transmits an image or information.

PROLOG Acronym for programming in logic. A high-level computer programming language, sim- ilar to LISP, used in artificial intelligence. The op- erator inputs facts and rules; the computer, in effect, derives theorems from the facts by follow- ing the logical rules.

 PROM Abbreviation of PROGRAMMABLE READ- ONLY MEMORY.

promethium Symbol, Pm. A metallic element of the rare-earth group, produced artificially. Atomic number, 61; atomic weight, approxi- mately 145. Formerly called ililium.

promethium cell A cathode-ray tube using a battery cell using an isotope of promethium. Radioactive particles from this substance strike a phosphor, causing it...
to glow. Self-generating photocells then convert this light into electricity.

from a computer program in a PROGRAMMABLE READ-ONLY MEMORY (PROM). It uses a built-in keyboard.

In computer operations, a message received by an operating system or an individual program. For example, in disk operating system (DOS), it could be the statement ‘Bad command or file name.’

In computer or programmed-calculator operations, the entry of a special, required variable when the machine halts and awaits such entry.

See PIN.

An arrangement for measuring the mechanical power output of a rotating machine. It is a special form of friction brake consisting of a band passed around a pulley on the rotating shaft of the machine under test and held at each end by a spring balance.

The extension of energy into and through space. Thus, radiant energy is propagated from and by its source. 2. A phenomenon resulting from the extension of energy into and through space. Thus, radio waves can be spoken of as a propagated wave.

For waves transmitted along a line, a number showing the effect the line has on a particular figure [e.g. one containing a real-number component (the attenuation constant) and an imaginary-number component (the phase constant)].

Symbol, $t_{na}$. In an integrated circuit logic gate, the time taken for a logic signal to be propagated across the gate. 2. In digital-circuit operation, the time required for a logic-level change to be transmitted through one or more elements.

See DELAY-Power Product.

The ratio $R/\sqrt{E}$, where $E$ is the complex electric-field strength at a point to which a wave has been propagated, and $E'$ is the complex electric-field strength at the point of origin. Also called propagation ratio.

The path loss of an electromagnetic disturbance between the transmitting and receiving antennas.

See WAVEGUIDE MODE.

See PROPAGATION FACTOR.

In digital-circuit operation, the time required for a bit to be transferred from one point to another in the system.

See VELOCITY OF PROPAGATION.

An action, such as amplification or conversion, that produces an output signal proportional to the input signal.

An amplifier in which the instantaneous output amplitude is proportional to the instantaneous input amplitude.

A voltage-regulation system in which the feedback correction voltage is proportional to the output-voltage error.

A Geiger tube having a pointed-wire for the ionized-anode node. The voltage developed across the load resistor is proportional to the number of ions created by the radioactive particles entering the tube.

A set of transducers and associated circuitry that allows a computerized robot to constantly sense the positions of its end effectors, and use this data in carrying out programmed tasks.

Variations in voice tone and emphasis that lend meaning and implication to spoken statements. It is important in advanced computer speech recognition and speech synthesis systems. Two sentences with identical wording can have greatly different meanings, depending on these factors (for example, "You are!" versus "You are?").

An electromagnetic artificial human limb or body part. Examples: artificial legs, artificial hands, and artificial respirators. Some such devices are computer-controlled; others can be manipulated by nerve impulses.


A slow-acting power-disconnect device on the distribution of current flowing in an adjacent conductor. 2. In an audio system, the result of placing a microphone too close to a person’s mouth. Under these conditions, some spoken consonants (e.g., B, F, and T) produce clapping or booming sounds.

An electronic device situated in the mouth. Under these conditions, some spoken consonants (e.g., B, F, and T) produce clapping or booming sounds.

A device that indicates the presence of a nearby body. Such a device uses some form of circuit, such as that of a CAPACITANCE RELAY, that changes its operating characteristics when an object enters its field.

A component that breaks a circuit, such as a safety ground or ground-fault interrupter, that protects an operator from electric shock. 2. A series resistor that limits the current going through a device.

The preliminary design or model of a device or system. It is often modified numerous times before the final design is attained. Compare PILOT MODEL.

Crystalline silver arsenide trisulfide. Artificial crystals of this compound are used in tunable infrared ray instruments.

A capacitance relay used to actuate an alerting-signal device when an area is intruded upon or a person is too close to a protected object. Also called INTRUSION ALARM.

The influence of high-frequency current flowing in one conductor on the distribution of current flowing in an adjacent conductor. 2. In an audio system, the result of placing a microphone too close to a person’s mouth. Under these conditions, some spoken consonants (e.g., B, F, and T) produce clapping or booming sounds.

An electronic device situated in the nose area of a missile. When the missile is near the target, the fuse transmits a signal that is reflected back from the target; this reflected signal detaches the fuse from the nose of the missile. This is an aid in rocket navigation because it prevents collisions. Some devices can measure the distance from a robot, or from a robotic end effector to a nearby object.

A device that indicates the presence of a nearby body. Such a device uses some form of circuit, such as that of a CAPACITANCE RELAY, that changes its operating characteristics when an object enters its field.

A voltage-regulation system in which the feedback correction voltage is proportional to the output-voltage error.

An amplifier in which the power output is proportional to the output voltage. 2. In digital-circuit operation, the time required for a logic-level change to be transmitted through one or more elements.

A synchrotron that uses a magnetic field to deflect charged particles. It is used for research in high-energy physics.

A voltage-regulation system in which the feedback correction voltage is proportional to the output-voltage error.

A device that allows a computerized robot to constantly sense the positions of its end effectors, and use this data to carry out programmed tasks.

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A voltage-regulation system in which the feedback correction voltage is proportional to the output-voltage error.

A series resistor that limits the current going through a device.

A fast-acting power-disconnect device on the distribution of current flowing in an adjacent conductor. 2. In an audio system, the result of placing a microphone too close to a person’s mouth. Under these conditions, some spoken consonants (e.g., B, F, and T) produce clapping or booming sounds.

A spark-gap-type lightning arrester disposed in parallel with a component, or between a line and ground as protection against high-voltage transients and surges.

A phenomenon in which the feedback correction voltage is proportional to the output-voltage error.

A device that allows a computerized robot to constantly sense the positions of its end effectors, and use this data to carry out programmed tasks.

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A device that indicates the presence of a nearby body. Such a device uses some form of circuit, such as that of a CAPACITANCE RELAY, that changes its operating characteristics when an object enters its field.

A series resistor that limits the current going through a device.
Abbreviation of pulse droop. Lowering of a pulse bandwidth. The greater the pulse frequency, the greater the bandwidth occupied. The faster the rise and/or decay times of a pulse, the greater the pulse droop.

Pseudo-stereophonic effect A somewhat heightened binaural effect obtained when two loudspeakers are situated, relative to the listener, so that a transmittime difference of 1 to 30 milliseconds results.

Pseudo-stereophonic effect

psf Abbreviation of pounds per square foot. (Also, lb per sq ft, lb/ft²).

psig Abbreviation of POUNDS PER SQUARE INCH ABSOLUTE.

psia Abbreviation of POUNDS PER SQUARE INCH GAUGE.

psl particle A massive elementary particle that represents a resonance in an electron-positron interaction.

PSK Abbreviation of PHASE-SHIFT KEYING.

PSM Abbreviation of pulse-spacing modulation; more commonly called PULSE-INTERVAL MODULATION.

psvm Abbreviation of phase-sensitive voltmeter.

P 561

puck drive In a tape recorder, a speed-reduction system for driving the flywheel from the shaft of the (high-speed) motor to the oscilloscope. A rubber tire mounted on the flywheel is driven, through friction, by the motor shaft. In others, an intermediate rubber-tired wheel is placed between the motor shaft and the rim of the flywheel.

pulldown Descriptive of a circuit, device, or individual component used to lower the value (e.g., impedance) of a circuit to which it is connected.

pull-in current The current required to close a relay.

pulling 1. The abnormal tendency of one circuit to cause another to slip into tune with it. This often results (from coupling intended or accidental) that is too tight. Thus, when two oscillators feed a common circuit, such as in a mixer, one might pull the other into tune with itself. 2. Lowering of a crystal frequency by an external reactance.

pull-in voltage The voltage required to close a relay. A mechanical switch actuated by a pulling action.

pullup Descriptive of a circuit or component used to raise the value (e.g., impedance) of a circuit to which it is connected.

pull-up voltage A circuit or device that receives a current of a certain number of pulses (or pulses per second) and delivers an output that is a function of that quantity. See, for example, DIVIDE-BY-SEVEN CIRCUIT and DIVIDE-BY-TWO CIRCUIT.

pulse counter A circuit or device that indicates the number of pulses presented to it in a given time interval.

pulse counting Counting pulses in a sequence. At low speed (pulse repetition rate), this can be done with an electromechanical dual-type counter. At high speed, a fully electronic circuit is required.

pulse delay circuit A monostable multivibrator adapted to deliver its single output pulse a predetermined time after the input pulse has been applied.

pulse dialing A form of telephone dialing in which each digit is formed by a series of pulses, usually at 10 to 20 Hz. The pulses are the equivalent of disconnecting the line for a few milliseconds. Each digit has the corresponding number of pulses, except digit 0, which is formed by 10 pulses.

pulse droop Distortion observable as a downward-sloping top on the time pattern of a pulse. It can be quantified in volts, millivolts, microvolts, amperes, milliamperes, or microamperes.

pulse-driving voltage A method of conveying information in wireless communications. A train of pulses is transmitted. The intelligence-carrying signal is sampled periodically and the amplitude is converted into binary code. The code might allow for eight levels (000 to 111), 16 levels (0000 to 1111), 32 levels (00000 to 11111), or 64 levels (000000 to 111111) binary code-modulation binary code A code used in communications not in the form of line transmission. Individual values are denoted by binary numbers.

pulse-code modulation multiplex equipment A multiplexer/demultiplexer for signal conversion between a single signal and multiple-channel signals. It uses both pulse-code modulation and time-division multiplexing.

pulse-count divider A circuit or device that receives an input of a certain number of pulses (or pulses per second) and delivers an output that is a function of that quantity. See, for example, DIVIDE-BY-SEVEN CIRCUIT and DIVIDE-BY-TWO CIRCUIT.

pulse counter A circuit or device that indicates the number of pulses presented to it in a given time interval.

pulse counting Counting pulses in a sequence. At low speed (pulse repetition rate), this can be done with an electromechanical dual-type counter. At high speed, a fully electronic circuit is required.

pulse delay circuit A monostable multivibrator adapted to deliver its single output pulse a predetermined time after the input pulse has been applied.

pulse dialing A form of telephone dialing in which each digit is formed by a series of pulses, usually at 10 to 20 Hz. The pulses are the equivalent of disconnecting the line for a few milliseconds. Each digit has the corresponding number of pulses, except digit 0, which is formed by 10 pulses.
pulsed laser A laser in which flashes (pulses) of high-intensity light excite the lasing medium.

pulsed duration The time period during which a pulse exists (i.e., its width on an oscilloscope display).

pulsed modulation Abbreviation, PDM. See PULSE WIDTH MODULATION.

pulsed frequency Abbreviation, PFM. See PULSE FREQUENCY MODULATION.

pulsed generator A signal generator that produces pulses. A general-purpose generator of this sort will produce pulses of adjustable amplitude, duration, shape, and repetition rate.

pulsed height discriminator A circuit or device that passes only pulses whose amplitudes exceed a predetermined value.

pulsed interval The interval between successive pulses.

pulsed-length modulation Abbreviation, PPM. Also called pulse-frequency modulation (PFM) or pulse-numbers modulation (PNM). A method of conveying information in wireless communications. A train of pulses is transmitted. Every pulse is of the same shape and duration, but their rate fluctuates with the modulating waveform. When there is no modulation, the pulses are evenly spaced with respect to time. An increase in the instantaneous data amplitude might cause the pulses to be sent more often (positive modulation) or less often (negative modulation).

pulsed inverter A single-stage, wideband, low-distortion power amplifier, or common-source amplifier. The output pulse waveforms are then inverted, with respect to the input pulse waveforms.

pulsed jitter In a pulse train, a disturbance characterized by random changes in the spacing between pulses.

pulsed-load modulation See PULSE-DURATION MODULATION.

pulsed load The load impedance for a pulse generator. A high signal strength.

pulsed-monostable See PULSE-REPETITION RATE.

pulsed mode See PULSE MODULATION.

pulsed modulation See PULSE AMPLITUDE MODULATION, PULSE-CODE MODULATION, PULSE-INTERVAL MODULATION, PULSE-POSITION MODULATION, PULSE-DURATION MODULATION.

pulsed modulator 1. A modulator that delivers power or voltage pulses for modulating a carrier. 2. A device that modulates pulses (see PULSE MODULATION).

pulsed-modulated pump A device or circuit that reduces the duration (width) of a pulse.

pulsed-numbers modulation Abbreviation, PNM. See PULSE FREQUENCY MODULATION.

pulsed operation Intermittent operation of a circuit, in the form of discrete pulses.

pulsed oscillator Any oscillator with an output that consists of a series of pulses.

pulsed-position modulation Abbreviation, PPM. A method of conveying information in wireless communications. A train of pulses is transmitted. The timing of each individual pulse varies according to the modulating waveform. The pulses occur earlier or later than the nominal (zero-modulation) time, depending on the instantaneous amplitude of the modulating signal.

pulsed ratio The ratio of pulse height (amplitude) to pulse width (duration).

pulsed regeneration Restoration of the original waveform and frequency to a pulse. It eliminates distortion caused by circuits or propagation conditions.

pulsed repetition frequency Abbreviation, PRF. See PULSE-REPETITION RATE.

pulsed-repetition rate Abbreviation, PPR. The number of pulses per unit time; usually pulses per second (pps).

pulsed rise time The time required for the leading edge of a pulse to rise from 10 to 90 percent of its maximum amplitude. Compare PULSE FALL TIME.

pulsed scalar A circuit actuated by the reception of a definite, predetermined number of input pulses.

pulsed-shaping circuit 1. A circuit for producing a pulse from a wave of some other shape (e.g., sine wave). 2. A circuit for tailoring a pulse to a desired shape, amplitude, and duration.

pulsed spacing The interval between successive pulses.

pulsed-spacing modulation Abbreviation, PSM. See PULSE-INTERVAL MODULATION.

pulsed-steering diode In a flip-flop circuit, a diode through which the trigger pulse must pass to switch the circuit. Because of the unidirectional conductivity of a diode, pulses of only one polarity are passed.

pulsed-stretcher 1. A shaping circuit that widens a pulse (i.e., increases its duration). 2. A circuit, such as a special monostable multivibrator, that generates a pulse that is wider than the trigger pulse.

pulsed-stuffing See JUSTIFICATION.

pulsed tilt The sloping of the normally flat top of a pulse either up or down. Also see PULSE DROOP.

pulsed time 2. See PULSE DURATION.

pulsed-time modulation See PULSE-POSITION MODULATION.

pulsed train A series of successive pulses of usually one kind.

pulsed transformer A transformer designed to accommodate the fast rise and fall times of pulses and similar nonsinusoidal waveforms. Such transformers often use special core materials and are made using special winding techniques.

pulsed transmitter 1. A device that transmits a series of pulses. 2. A pulse-modulated transmitter. 3. See PULSE MODULATOR.

pulsed waveform The general shape of a pulse as it appears on an oscilloscope display. The various forms range from positive or negative half-sinusoids, through rectangles, to thin-line spikes.

pulse width The dimension of a pulse (i.e., its duration).

pulse-width modulation Abbreviation, PWM. Also called pulse-duration modulation (PDM). A method of conveying information in wireless communications. A train of pulses is transmitted. The width (duration) of each individual pulse varies according to the modulating waveform. Normally, the pulse width increases as the instantaneous modulating-signal level increases (positive modulation). However, this can be reversed so that higher audio levels cause the pulse width to decrease (negative modulation).

pulse-width modulation waveform Modulating waveform Pulse amplitude

pulse train A series of successive pulses of usually one kind.

pump frequency The frequency of a PUMP voltage.

pumping A method of laser actuation. A series of pulses, at the resonant frequency of the lasing material, is injected to cause laser output.

pump oscillator An oscillator for producing a PUMP voltage.

pump voltage The voltage of a pumping signal. Also see PARAMETRIC AMPLIFIER and PUMP 1, 2.

punch 1. A tool for cutting holes in metal chassises, panels, and boxes for electronic equipment. 2. High signal strength.

punch-in editing In audio recording, a feature that allows convenient insertion of new material on a tape. The tape recorder can be switched instantly from Play to Record, and back again, whenever the operator wants to add material.

punchthrough In a bipolar transistor, the potentially damaging condition resulting when the reverse bias of the collector is increased to a voltage high enough to spread the depletion layer entirely through the base. This tends to effectively connect the emitter to the collector.

punchthrough region The conduction region associated with higher-than-punchthrough voltage, in which bipolar-transistor current is excessive. Also see PUNCHTHROUGH.

punchthrough voltage The voltage that causes PUNCHTHROUGH in a given bipolar transistor.

punchthrough voltage (PTV) Abbreviation, PTV. See BREAKDOWN VOLTAGE.

Pupin coil One of several loading coils that can be inserted at intervals in series with a telephone line to cancel line-capacitance effects and, thus, improve the clarity of speech.

pure tone An audio-frequency (AF) tone having essentially no harmonic content; a sine-wave AF tone.

pure wave A wave containing no distortion products.

purity The removal of an undesired gas or other substance from a system by introducing a material to displace it.

purity detector A power-line operated alternating-current electromagnet that can be manually rotated in front of a color-television picture tube to demagnetize the tube. Also called a DEGAUSSER.

purity 1. In color television, complete saturation of a hue. 2. In a waveform, complete freedom from distortion. 3. The extent to which spurious signals are attenuated in the output of a radio or television transmitter. Also called spectral purity.

purity adjustment In a color-television picture tube, adjustment of each purity control for pure color.

purity coil A variable-current coil around the neck of a color-television picture tube that is used to adjust color purity. Also see PURITY CONTROL.
purity magnet

A ring-magnet collar around the neck of a color-television picture tube to adjust, by rotation, color purity.

purple plague

Corrosion that occurs when aluminum and gold are placed in contact.

pushbutton tuning

The tuning of a circuit to various frequencies in single steps by means of pushbutton switches.

pushdown stack

Also called first-in/last-out. A digital read-write memory in which data bits emerge in reverse sequence from the order they go in. If data bit x enters the pushdown stack before data bit y, then x will come out after y. Compare FIRST-IN/FIRST-OUT.

push-in terminal

A circuit contact or tie point, usually of thin, springy material, that can be inserted into a hole in a perforated board.

push-pull

Pertaining to a circuit in which two active devices are used, with the inputs and outputs both placed in phase opposition. In the output circuit, even harmonics are canceled, and odd harmonics are reinforced.

push-pull amplifier

An amplifier stage in which, for increased power output, two active devices are operated 180 degrees out of phase with each other in opposite halves of a symmetrical circuit. Also see PUSH-PULL CIRCUIT.

push-pull circuit

A symmetrical circuit in which two active devices operate on separate halves of the input-signal cycle and deliver a combined output signal.

push-pull deflection

In an oscilloscope, the application of deflection voltage to a pair of deflecting plates 180 degrees out of phase with each other. For this purpose, the output amplifier in the horizontal or vertical deflection channel is a push-pull stage.

push-pull doubler

See PUSH-PULL MULTIPLIER.

push-pull doubler

Also called PUSHDOWN LIST.

push-pull microphone

A set of two microphones, in which the audio-frequency outputs are in phase opposition.

push-pull multiplier

A push-pull amplifier with its output circuit tuned to an odd-numbered multiple of the input frequency. This circuit is unsuitable for even-harmonic operation, but has some merit as an odd-harmonic multiplier (e.g., a tripler or quintupler). Also see PUSH-PULL MULTIPLIER.

push-pull oscillator

An oscillator stage in which, for increased power output, two active devices are operated 180 degrees out of phase with each other in opposite halves of a symmetrical circuit. Also see PUSHDOWN LIST.

push-pull/parallel amplifier

An amplifier stage in which tubes or transistors are connected in push-pull/parallel for increased power output. Also see PARALLEL-COMPONENT AMPLIFIER, PUSH-PULL AMPLIFIER, and PUSH-PULL/PARALLEL CIRCUIT.

push-pull/parallel circuit

A push-pull circuit in which two or more active devices are connected in parallel on each side of the circuit. This arrangement gives increased power output over that of the conventional push-pull circuit. See, for example, PUSH-PULL/PARALLEL AMPLIFIER and PUSH-PULL/PARALLEL OSCILLATOR.

push-pull/parallel oscillator

An oscillator stage in which active devices are connected in push-pull/parallel for increased power output. Also see PARALLEL-COMPONENT OSCILLATOR, PUSH-PULL OSCILLATOR, and PUSH-PULL/ PARALLEL CIRCUIT.

push-pull recording

A type of film sound track consisting of two side-by-side images 180 degrees out of phase with each other.

push-pull transformer

A transformer having a center-tapped winding for operation in a push-pull circuit.

push-push

Pertaining to a circuit in which two active devices are used, with the inputs connected in phase opposition, and the outputs connected in parallel. The result is reinforcement of the even harmonics and cancellation of the fundamental frequency and all odd harmonics.

push-pull circuit

See PUSH-PUSH MULTIPLIER.

push-pull multiplier

An amplifier circuit containing two active devices with their inputs connected in phase opposition and their outputs connected in parallel. This circuit is unsuitable for fundamental-frequency and odd-harmonic operation, but has some merit as an even-harmonic multiplier (e.g., a doubler or quadrupler). Also see PUSH-PULL MULTIPLIER.

push-to-talk

switch See PRESS-TO-TALK SWITCH.

pushup list

In data processing, a method of amending a list, whereby new items are added at the end of the list; all other items retain their original positions. Compare PUSHDOWN LIST.

Pyralin

See CELLULOSE NITRATE.

pyramidal horn antenna

A rectangular horn antenna that is flared in two dimensions. The horn width and height both increase linearly with increasing distance (in the direction of maximum radiation/response) from the feed point.

pyramidal wave

See BACK-TO-BACK SAWTOOTH.

pyrex

A heat-resistant glass having numerous applications in electronics and chemistry.

pyroelectric lamp

See NERNST LAMP.

pyroelectric material

A crystalline material that generates an output voltage when it is heated.

pyrolysis

The process whereby heat changes a substance into one of several different substances by rearranging its atoms.

pyromagnetic effect

In a material or circuit, the combined effect of heat and magnetism.

pyrometer

An instrument, other than a thermometer, used for the measurement of temperature. See, for example, OPTICAL PYROMETER.

Pythagorean scale

A sound scale defining a specific type of relationship among audio tones. If x and y are related by the Pythagorean scale and are adjacent in frequency, then a specific frequency (f) exists, so $x = f^2$ and $y = f^3$.

Pythagorean theorem

A theorem of plane geometry. For a right triangle, with sides of lengths a, b, and c, where c is the side opposite the right angle, it is always true that $a^2 + b^2 = c^2$. 

p-zone

See P LAYER.

pwc

Abbreviation of PLATED-WIRE MEMORY.

pwrt

Abbreviation of POWER.
The figure of merit of a capacitor, inductor, or inductance-capacitance (LC) circuit, equal to the reactance divided by the resistance. 2. Symbol for electrical charge. 3. Occasional symbol for SELECTIVITY. 4. See Q BAND. 5. See Q OUTPUT.

1. Symbol for quantity of electricity (in coulombs). 2. Symbol for the charge carried by an electron (the charge carried by a hole is represented by \(-q\)). 3. Symbol for the value of a quantum.

Abbreviation of QUALITY ASSURANCE.

The separate null adjustment for the \(Q\) value of a component being tested in an impedance bridge having separate resistive and reactive balances.

An antenna in which the transmission line (feeder) is matched in impedance to the center of the radiator by means of a \(Q\)-matching section.

Abbreviation of QUIET AUTOMATIC VOLUME CONTROL.

The radio-frequency band 36 to 46 GHz. It is subdivided as follows: \(Q\) band, 36 to 38 GHz; \(Q_b\), 38 to 40 GHz; \(Q_a\), 40 to 42 GHz; \(Q_c\), 42 to 44 GHz; and \(Q_d\), 44 to 46 GHz.

One of the parallel metal tubes in a \(Q\)-matching section. Also see \(Q\) ANTENNA.

A filtering device or circuit used for \(Q\) SPOLING in a laser.

The technique of inhibiting laser action during an interval when an ion population excess is pumped up. When the laser is subsequently triggered by \(Q\) switching, a more powerful pulse of light results than would be otherwise obtained.

A usually direct-reading instrument for measuring the \(Q\) of a capacitor, inductor, or inductance-capacitance (LC) circuit. Most \(Q\) meters are operated at radio frequencies, but audio-frequency instruments are available.

Amplitude modulation obtained by varying the effective \(Q\) of a radio-frequency tank circuit in step with a modulating component. See ABSORPTION MODULATION.

Abbreviation of quick make/quick break.

A positive-feedback (regenerative) amplifier that increases the effective \(Q\) of a tuned circuit, and thereby sharpens its response, when its input is connected across the tuned circuit.

The reference output of a flip-flop.

A set of three-letter groups, each beginning with the letter \(Q\), used for simplified telegraph and radiotelegraph communication, and sometimes rapid voice communication (in radiotelephony). Each signal represents a commonly used phrase or message.

A card verifying communication with, or the reception of signals from, the station sending the card. Such verification is common in the amateur radio service and with some shortwave broadcast and CB stations.

Abbreviation of QUADRUARY RESIDUE DIFFUSION.

See \(Q\)-MATCHING SECTION.

In color television, the quadrature component of the chrominance signal, equal to \(+0.48(R-Y)\) and to \(+0.41(B-Y)\), where \(B\) is the blue camera signal, \(R\) is the red camera signal, and \(Y\) is the luminance signal.

A laser-switching action obtainable from a device characteristic (such as the collector curve of a transistor or plate curve of a tube) and that identifies the quiescent operating point.

A device or circuit that produces \(Q\) switching in a laser.

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Abbreviation of QUALITY CONTROL.

Abbreviation of QUALITY CONTROL ENGINEER or QUALITY CONTROL ENGINEER.

In American (NTSC) color television, the 508-kHz-wide, green-magenta color information transmission band.

Abbreviation of QUALITY CONTROL TECHNI-CIAN.

In the local oscillator and associated circuitry of a color television receiver, a 3.85-MHz CW signal of \(Q\) PHASE.

In a color television receiver, the component of the chrominance signal that is 90 degrees out of phase with the in-phase component.

A color television receiver, the demodulator that combines the chrominance signal and the color-hurst oscillator signal to recover the \(Q\) signal (see \(Q\) SIGNAL, 2). 2. Abbreviation of QUANTUM ELECTRODYNAMICS. 2. Abbreviation of quod erat demonstrandum. Latin for "which was to be demonstrated." Also, Q.E.D. Often written at the conclusions of valid logical proofs and derivations.

See \(Q\).

Abbreviation of QUADRATURE MODULATION.

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A linear radio-frequency impedance-matching transformer consisting of two straight, rigid, parallel metal conductors that are used to match a feeder to an antenna. The section is \(\frac{1}{4}\) wavelength long at the operating frequency. The diameters and center-to-center spacing of the conductors are such that the characteristic impedance of the matching section is equal to the geometric mean of the feeder characteristic impedance and the radiation resistance of the radiator. Also see \(Q\) ANTENNA and \(Q\)UR-TER-WAVELENGTH MATCHING STUB.

A usually direct-reading instrument for determining the \(Q\) of a capacitor, inductor, or inductance-capacitance (LC) circuit. Most \(Q\) meters are operated at radio frequencies, but audio-frequency instruments are available.

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MODULATION. CODE MODULATION and PULSE-NUMBERS

A platinized quartz fiber between the quadrants. The vertical axes in the complex plane are used in control, feedback, and reference devices. The number of quadrants is used in some synchrotrons and linear accelerators.

A specific 90-degree arc of a circle. In acoustics, a sound-reflection grating that scatters sound waves almost uniformly in all directions. A set of four interconnected flip-flops forming a 90-degree arc of a circle. A specific 90-degree arc of a circle.

A combination of two dipoles, proportional in the vertical component of the dipole's field. A rectifier circuit that delivers a direct current for each half cycle of the input alternating current. A four-pole magnet with a pair of holes for passage of quanta.

A specific 90-degree arc of a circle. A set of four interconnected flip-flops forming a 90-degree arc of a circle. A specific 90-degree arc of a circle.

A directional antenna similar to the QUAD ANTENNA. It can have a driven element and a director. A three-element system has one driven element, one director, and one reflector. The director has a driven element and a director. A two-element array has two driven elements.

A rectifier circuit that delivers a direct current for each half cycle of the input alternating current. A four-pole magnet with a pair of holes for passage of quanta.
quantizer A circuit or device that selects the digital subdivision into which an analog quantity is placed, an analog-to-digital converter.
quantizing See QUANTIZATION.
quantometer An instrument for measuring magnetic susceptibility.
quantum 1. Abbreviation, Q. Plural, quanta. In physics, a definite amount of energy equivalent to a unit or particle of electromagnetic energy. The energy contained in one such particle is directly proportional to the frequency, and inversely proportional to the wavelength. 2. See PHOTON. 3. Any discrete unit derived by QUANTIZATION.
quantum chromodynamics A term coined by Professor Murray Gell-Mann for the theory of quarks and gluons.
quantum counter A radiation-counter tube with a window for the admission of light to the cathode.
quantum efficiency See QUANTUM YIELD.
quantum electrodynamics A branch of quantum mechanics that deals with the motion of electrons, photons, and quasiparticles caused by electromagnetic action. Quantum electrodynamics takes relativistic effects into account.
quantum electronics The branch of electronics concerned with energy states in matter.
quantum-equivalence The principle that each electron emitted by a radioactive source is a quantum of energy, and that the phenomenon of a unit of energy has the same relations to other units as the phenomenon of a unit of energy to other units. In the quantum theory, the energy content of a quantum is related to its frequency, and the relation is given by the Planck equation.
quantum level The orbit or ring occupied by an electron in an atom.
quantum mechanics A branch of physical science concerned with the relationship of observable data to the behavior of matter and energy, on the basis of observable data. Quantum mechanics is the branch of physics concerned with the distribution of elementary particles through various quantized states.
quantum noise The theory that the emission or absorption of energy by atoms or molecules occurs in discrete packets or units, rather than continuously. Each unit is the emission or absorption of an energy packet called a QUANTUM. Thus, radiant energy is thought to be divided into quanta.
quantum number A number that describes the energy and angular momentum of a quantum object, such as a quark or photon. It gives the quantum number of the energy level, for a particle.
quantum statistics A branch of QUANTUM MECHANICS concerned with the distribution of elementary particles through various quantized energy levels.
quantum theory The theory that the emission or absorption of energy by atoms or molecules occurs in discrete packets or units, rather than continuously. Each unit is the emission or absorption of an energy packet called a QUANTUM. Thus, radiant energy is thought to be divided into quanta.
quantum transition The movement of an electron from one energy level to another within an atom.
quantum yield The photostability of a given medium, so that the reflection from one structure is canceled by that from the other. Quantum yield is a measure of the efficiency with which light is absorbed by a medium.
quantum wave A hypothetical particle having a fractional electrical charge; quarks are thought to be constituents of other subatomic particles.
quarter-deflection method A method of measuring high-frequency resistance, involving the use of a sine wave signal source, a standard noninductive variable resistor, and a square-law radio-frequency ammeter.
quarter-phase See TWO-PHASE.
quarter wave 1. The length of time corresponding to 90 electrical degrees in a wave disturbance. 2. The distance in space, or along a wire or feed line that corresponds to 90 electrical degrees in a wave disturbance.
quarter-wave antenna An antenna in which the radiator is an electrical quarter-wavelength long at the operating frequency. Where Lq represents the length of the radiator and f represents the frequency in megahertz, then the formula is Lq = 246/f and \( L_q = \frac{750}{f} \). Compare FULL WAVELENGTH, HALF WAVELENGTH.
quarter-wavelength line A transmission line or feeder that is a quarter-wavelength long at the operating frequency. Also called quarter-wave line.
quarter-wavelength matching stub An arrangement consisting of a quarter-wavelength-long parallel-wire section of transmission line, used for matching the impedance of a nonresonant feeder to that of an antenna. It is similar to a Q-MATCHING SECTION, except that flexible transmission line (e.g., ladder line) is used, rather than rigid metal rods or tubing.
quarter-wave monopole A nondirectional UHF vertical antenna requiring no ground. The radiator is \( \frac{1}{4} \) wavelength long, and is an enlarged-diameter outer sleeve connected to the outer conductor of the coaxial feeder. The two sections simulate a half-wave antenna.
quarter-wave plate A plate of double-refracting crystalline material whose thickness allows the introduction of a quarter-cycle phase difference between the ordinary and extraordinary components of light transmitted by it.
quarter-wave radiator An antenna consisting of a single, usually straight, active element that measures an electrical quarter wavelength from end to end. When operated against electrical ground, the element exhibits resonance. A simple quarter-wave radiator can be used for many applications, such as in radio receivers, transmitters, transceivers, high-fidelity turntables, etc.
quarter-wave transformer A quarter-wave resonant line short-circuited at one end by an adjustable slider. This arrangement is useful for radio-frequency impedance matching.
quarter-wave transmission line See QUARTER-WAVE LINE.
quantum 1. The branch of physics concerned with energy states in matter. 2. An energy state in matter. 3. A branch of QUANTUM MECHANICS concerned with the distribution of elementary particles through various quantized energy levels. 4. A branch of quantum mechanics that involves the motion of electrons, photons, and quasiparticles caused by electromagnetic action. Quantum electrodynamics takes relativistic effects into account.
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quartz resonator  See CRYSTAL RESONATOR.
quartz timepiece  A watch or clock having as its control element a time-determining quartz crystal.
quasi-  A prefix meaning “to some extent” or “similar to,” as in quasi-optical radio some la radio wave that behaves like a light ray.quasi-static  Pertaining to a voltage that is negative, with respect to some other voltage, but whose absolute polarity is positive. For example, -0.5 volt is quasi-negative, with respect to +5.0 volts.
quasi-optical  Behaving like light. The term is used to describe certain extremely short radio waves or other radiations that, like light rays, follow line-of-sight paths and can be directed, reflected, refracted, or diffused.
quasi-path  A line-of-sight path followed by very short signals, such as microwaves.
quasi-positive  Pertaining to a voltage that is positive, with respect to some other voltage, but whose absolute polarity is negative. For example, -0.5 volt is quasi-positive, with respect to +5.0 volts.
quasi-random  A set of numbers considered to be random, but chosen according to an algorithm.
quasielectrical waveform  A waveform whose shape approaches that of a rectangular wave, but that possesses a small amount of tilt and/or curvature.
quasi-scientific  A term that is sometimes applied to the design of electronic systems or to the appraisal of circuit behavior, using an intuitive, rather than analytical approach.
quasi-sine waveform  A waveform that is not a perfect sine curve, but is close enough to be considered sinusoidal, for all practical purposes.
quasi-single sidedband  A modulated waveform that somewhat resembles single-sidedband, in which parts of both sidesbands are present.
quasi-square wave  A waveform that is not a perfect square, but is close enough to be considered square for all practical purposes. It is sometimes applied to a rectangular wave where a square wave is desired.
quasi-technical  A term sometimes applied to qualitative tests, as opposed to quantitative tests.
quaternary  Pertaining to a base-4 number system. 2. Of an atom, joined to carbon atoms for four bonds. 3. The fourth member of a 4-unit set.
quêbéc  Phonetic alphabet code word for the letter Q.
quench  1. To suddenly bring to an end (e.g., to quench an oscillation). 2. To cool quickly, as in the quenching of a heated metal object. 3. To extinguish the discharge in a gas tube.
quench capacitor  A capacitor that prevents a spark from arcing across an inductor when current flow abruptly stops.
quench frequency  The frequency at which re- generation in a superregenerative circuit is increased and decreased.
quench oscillator  In some superregenerative circuits, the separate ultrasonic oscillator that produces the required quenching action.
quench resistor  A resistor in a quenching network that prevents a spark from occurring across an inductor when current flow stops.
quenched list  A list of data, steps in a process, or commands awaiting execution in a specific order.
quenches theory  A branch of mathematical electronics, dealing with the optimum order in which steps should be executed to obtain a particular end result.
quinary  In computer operations, a binary-coded decimal system in which each decimal digit is represented by seven bits occupying 8 places, whose values are 8, 6, 4, 2, 1, 0, and 1.
quinary operation  A circuit that enables its mating halves to be separated even if its handle or lever is moved slowly by the operator. This action minimizes arcing and prevents chatter. Compare QUICK-MAKE SWITCH.
quinary code  A computer programming language based on FORTRAN and offering facilities, through the use of remote terminals, for running, testing, debugging, and compiling programs.
quinary counter  A decade counter consisting of a ring-of-5, followed by a single binary stage.
quint  Quick operation of a superregenerative circuit that prevents a spark from occurring across an inductor when current flow abruptly stops. It is sometimes applied to a rectangular wave where a square wave is desired.
quint  A rectifier circuit that delivers a direct-current output voltage equal to about five times the peak value of the alternating-current input voltage. 2. A circuit that delivers an output signal at the fifth harmonic of the input signal.
quintessential  A prefix meaning “to some extent” or “similar to,” as in quasi-optical radio some la radio wave that behaves like a light ray.
quintessential  The point on the characteristic curve of a transistor, diode, or similar device, describing the zero-signal operating conditions.
quintessential push-pull  Denoting a push-pull stage, especially an audio power-output amplifier, in which the direct-current signal is essentially zero.
quintessential state  The inactive, or resting, state of an active component, such as a transistor or vacuum tube.
quintessential state  The inactivity, or resting, state of an active component, such as a transistor or vacuum tube.
quintessential state  The term used in describing a component’s ability to respond to a zero-signal input voltage.
quintessential state  A term that is sometimes applied to a digital component’s ability to respond to a zero-signal input voltage.
quintessential state  The term used in describing a component’s ability to respond to a zero-signal input voltage.
quintessential state  A term that is sometimes applied to a digital component’s ability to respond to a zero-signal input voltage.
quintessential state  A term that is sometimes applied to a digital component’s ability to respond to a zero-signal input voltage.
radial

A method of missile homing in which radar is used to track a target.

detection and ranging

radar 1. The theory and application of radio detection and ranging systems as defined in 1.

radar altitude 1. The distance of an aircraft above the surface of the earth, as determined by radar.

radar antenna 1. Any antenna used for transmitting and/or receiving radar signals.

radar astronomy

The use of radar equipment to observe and map planets, moons, and asteroids, and to measure their distance from the earth or from a spacecraft.

radar beacon

A radar transceiver that, on receipt of radar signals, transmits encoded signals from which the operator can take a bearing.

radar beam

The cone-shaped main lobe of energy emitted by a radar antenna. The narrower the beam, the greater the resolution of the radar system.

radar clutter

Visual interference on a radar screen caused by reflections from ground or sea.

radar countermeasures

Abbreviations, RCM and rad CM. In wartime, any method of interfering with enemy radar, such as jamming or use of decoys.

radar detector 1. A device used in automobiles and trucks to detect the proximity of police or highway-patrol radar.

raceway

See WIRE DUCT and WIREWAYS.

rack

An upright frame for holding equipment of RACK-AND-PANEL CONSTRUCTION.

rack and pinion

A method of building electronic equipment on a chassis attached horizontally or vertically to a vertical panel. After completion of a unit, the panel is fastened in place on a RACK. Several such panels fill the rack.

rack and pinion construction

A device used for mechanical adjustment of a control, such as the tuning control in a radio receiver. A gear engages a serrated rod. As the gear is turned, the rod moves lengthwise.

rack up

In computer operations, a way of displaying data, in which a new line added to the already completely occupied screen bumps up what has been forgiven, thus eliminating the top line.

rack and pinion

A device used in military vehicles to spot speeding vehicles.

raccoon

An indoor antenna, sometimes used with a television receiver, consisting of two vertical whips (usually telescoping), the angle between which is adjustable.

rabbit ears

An upright frame for holding equipment of RACK-AND-PANEL CONSTRUCTION.

radical

Abbreviation of RADICAL.

radial

Radial 1. A microwave system for detecting objects and determining their distance, direction, heading, speed, and other characteristics. Signals from the transmitter are reflected back to the transceiver via the object, and the reflection (sometimes along with the transmission) is displayed on a cathode-ray screen. The name is an acronym for RADIO DETECTION AND RANGING.

radial 2. The application and theory of radio detection and ranging systems as defined in 1.

radar altitude

The distance of an aircraft above the surface of the earth, as determined by radar. This value varies with the terrain over which the aircraft passes.

radar antenna

Any antenna used for transmitting and/or receiving radar signals.

radar astronomy

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radar detector

1. A device used in automobiles and trucks to detect the proximity of police or highway-patrol radar.

2. A device used in military applications, especially aviation, to indicate the presence of radar.

radar display

The scheme via which a radar set portrays the relative positions of the objects that produce echoes. The most common is the azimuth/range display, showing compass bearings (usually in degrees clockwise from geographic north) and radius from the transmitter (usually in miles or kilometers). Altitude above mean sea level can be displayed for individual echoes.

radar homing

A method of missile homing in which radar is used to track a target.

radar speed trap

A radar system used by traffic police to spot speeding vehicles.

radar telescope

The transmission and reception unit used in radar astronomy. Compare RADIO TELESCOPE.

RadCM

Abbreviation of RADAR COUNTERMEASURES.

radial

1. One of several conductors used to enhance the performance of an unbalanced, vertical antenna. These can be constructed from wire or metal tubing, and generally measure one-quarter wavelength or more. When a vertical antenna is mounted at the earth’s surface, the ground conductivity is improved by these conductors, which run outward from the base of the radiator, and are connected to the shield of a coaxial feed line. The greater the number of radials of a given length, the more the ground loss is reduced. Also, the longer the radials for a given number, the better. If a vertical radiator is mounted with its base more than one-quarter wavelength above the earth’s surface, there need only be three or four conductors measuring exactly one-quarter wavelength. See GROUND-MOUNTED VERTICAL ANTENNA, GROUND-PLANE ANTENNA.

2. Pertaining to the distance from the center of a circle to its periphery.

3. Pertaining to the distance from the center of a sphere to its surface.

4. Extending or emanating from a defined point.

radial

Abbreviation of RADIAL.

radial

1. A device used in military vehicles to spot speeding vehicles.

2. A microwave system for detecting objects and determining their distance, direction, heading, speed, and other characteristics. Signals from the transmitter are reflected back to the transceiver via the object, and the reflection (sometimes along with the transmission) is displayed on a cathode-ray screen. The name is an acronym for RADIO DETECTION AND RANGING.

radial

3. The application and theory of radio detection and ranging systems as defined in 1.

radar altitude

The distance of an aircraft above the surface of the earth, as determined by radar. This value varies with the terrain over which the aircraft passes.

radar antenna

Any antenna used for transmitting and/or receiving radar signals.

radar astronomy

The use of radar equipment to observe and map planets, moons, and asteroids, and to measure their distance from the earth or from a spacecraft.

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2. Pertaining to the distance from the center of a circle to its periphery.

3. Pertaining to the distance from the center of a sphere to its surface.

4. Extending or emanating from a defined point.
radial ground An earth connection composed of radials buried in the ground.

radial lead A lead (typically) attached perpendicular to the axis of a component, such as a resistor or capacitor.

radian Abbreviation, rad. The angle at the center of a circle subtended by an arc whose length is equal to the radius. Equal to approximately 57.2958 degrees.

radiance The radiant flux emitted by an object. Radiance is measured in terms of the amount of energy contained in a unit solid angle (steradian) with the source at the apex.

radians-to-degrees conversion The conversion of radian angular measure into degrees. To change radians to degrees, multiply the number of degrees by 57.2958. Thus, 0.7854 radian = 45 degrees. Compare DEGREES-TO-RADIANS CONVERSION.

radiant efficiency The ratio of the radiant energy emitted by a source to the energy consumed by the source. The radiant energy is generally specified within a certain range of wavelengths. An example is the incandescent light bulb, which has relatively low radiant efficiency in the visible spectrum between about 760 and 390 nanometers.

radiant energy 1. Any form of energy emitted by a source and propagated through space as an electromagnetic disturbance. Included are radio waves, infrared, visible light, ultraviolet, X rays, and gamma rays. 2. Electromagnetic disturbances at infrared and shorter wavelengths.

radiant flux The rate at which radiant energy is emitted.

radiation 1. The emission of energy or particles (e.g., waves from an antenna, X rays from an X-ray tube, energy from a radioactive material, heat from a body, etc.). 2. Radio waves, infrared, visible light, ultraviolet, X rays, or gamma rays. 3. Ionizing emissions from radioactive substances (e.g., alpha particles, beta particles, neutrons, gamma rays, etc.).

radiation angle The horizontal or vertical angle at which electromagnetic waves are radiated from an antenna. Measured between the central axis of the main lobe and the horizon, or between the central axis of the main lobe and geographic north.

radiation belts See VAN ALLEN RADIATION BELTS.

radiation counter An instrument used for determining the intensity of atomic-particle radiation, X rays, or gamma rays. Operates by means of ionization of a gas in a sealed tube.

radiation field The portion of the electromagnetic field that is perturbed by a radiator, as opposed to the induction field.

radiation intensity For a directional radio transmitting antenna, the radiated power per steradian in a given direction.

radial ground • radioactive

radiation angle

Average terrain (horizontal)

Antenna

Maximum radiation

Angle

radiation angle

radiation loss Loss of energy through radiation from a conductor. Also see LOSS.

radiation pattern A graphical representation of the intensity of the electromagnetic field in various directions from a radiator, such as a transmitting antenna. It is usually shown in either the horizontal plane or a specific vertical plane containing the antenna. Also see LOBE.

radiation physics The study of radiation and its effects on matter. Radiation physics is especially concerned with ionizing radiation, but it can involve any kind of particle or electromagnetic energy.

radiation pressure Pressure exerted on a surface by impinging electromagnetic radiation.

radiation resistance The inherent resistance at the feed point of a resonant radio antenna.

radiation sickness General physiological symptoms resulting from a short-term overdose of X rays, gamma rays, or atomic-particle radiation.

radiator 1. The element of an antenna from which radio energy is directly radiated, as opposed to the transmission line, lead in, reflector, or director. 2. See LIGHTSPEAKER.

radio 1. Wireless electrical communication, i.e., by means of electromagnetic waves. 2. See RADIO RECEIVERS. 3. See RADIO TRANSMITTER. 4. Used to communicate by radio.

radioactive element A chemical element that is RADIOACTIVE (e.g., uranium). Also called radioactive.

radioactive isotope See RADIOISOTOPE.

radioactive tracer A quantity of radioactive material put into a system so that its path can be monitored by means of a radiation detector. An example is the introduction of radioactive barium into the large intestine. The flow and concentration of the barium gives an indication of the functioning of the lower intestine.

radioactive transducer A pickup device for detecting and measuring radioactivity (e.g., Geiger-Muller tube).

radioactivity counter See GEIGER COUNTER and SCINTILLATION COUNTER.

radio altimeter See RADAR ALTITUDE.

radio amateur An electronics hobbyist licensed to operate two-way wireless communications stations in various assigned frequency bands, without receiving payment for services rendered.

Radio Amateur Civil Emergency System Abbreviation, RACES. A civil defense organization of licensed amateur radio stations. Also see RADIO AMATEUR.

radio astronomy The observation, study, and analysis of radio-frequency electromagnetic emissions from bodies or points in space, and the study of these bodies through their radiations.

radioautograph See AUTORADIOGRAPH.

radio buoy A radio transmitter of direction-finding or guidance signals. 2. Also called radio beacon. The signals transmitted by a radio beacon, as defined in 1.

radio beam 1. Antenna radiation focused in one direction. 2. See RADIO BEACON.

radiochemistry A field of biology concerned with the influence of radiant energy or radioactivity on living organisms.

radio channel A radio transmission directed to numerous nonselective receivers—especially by a station in the broadcast service. Also called RADIOPHONIC. Also see BROADCAST SERVICE.

radio card An automobile equipped with a two-way radio.

radio-carbon Radiocarbon (i.e., carbon 14).

radioeconomic • radio-frequency choke

radio control See REMOTE CONTROL.

radio direction finder See DIRECTION FINDER.

radio dial A gauge showing the frequency of a radio signal emitted by a source having radial motion, with respect to the receiver. 2. An electronic device used to display the radial angle by means of the Dogleg effect at radio frequencies.

radio-engineering The branch of electronics specifically involved with wireless communications.

radioelement See RADIOACTIVE ELEMENT.

radio engineer A trained professional skilled in the physics and mathematics of radio communications, and in the theory and application of basic electronics engineering and related subjects. Also see RADIO ENGINEERING.

radio engineering The branch of electronics engineering devoted to the theory and operations of radio communication.

radio field strength The intensity of radio waves at a given point. Also see FIELD INTENSITY. 2 and RADIO MAP.

radio frequency Abbreviation, RF. 1. Consisting of, or pertaining to, alternating currents at frequencies above about 9 kHz (the lowest allocated radio frequencies). 2. Consisting of, or pertaining to, electromagnetic fields whose wavelengths are longer than those of infrared, but shorter than about 33 kilometers (corresponding to a frequency of 9 KHz). Also see RADIO SPECTRUM.

radio-frequency amplifier 1. In a superheterodyne circuit, the channel in which the incoming signal is amplified. Compare INTERMEDIATE-FREQUENCY AMPLIFIER. 2. Broadly, an amplifier of radio-frequency signals.

radio-frequency choke A device used for filtering. RF. A low-inductance coil used to block radio-frequency waves. Also called inductor.

radio-frequency choke • radioactive element

radio-frequency circuit A circuit used for radio-frequency purposes; e.g., a radio-frequency choke.

radio frequency The branch of electronics dealing with frequencies above 9 kHz (the lowest allocated radio frequencies). Radio-frequency circuits and equipment are used to handle audio frequencies, television frequencies, and frequencies used in radio communication.

radio frequency • radio frequency amplifier

radio frequency amplifier A device used to amplify radio-frequency waves.

radio frequency oscillator A device used to produce radio-frequency waves.

radio frequency oscilloscope A device used to monitor radio-frequency waves.

radio frequency • radio frequency amplifier

radio frequency circuit A circuit used for radio-frequency purposes; e.g., a radio-frequency choke.

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radio frequency • radio frequency amplifier

radio frequency amplifier A device used to amplify radio-frequency waves.

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radio frequency oscilloscope A device used to monitor radio-frequency waves.
The science and art of measuring radio-frequency (RF) signals, usually in conjunction with computers, by personnel aboard moving vessels, for the purpose of plotting, correcting, and maintaining a course. The intersecting line method of fixing position where three land-based transmitters are needed. Their locations must be accurately known. A direction-finding device on the vessel is used to determine the bearings of each of the transmitters. Aircraft radio-navigation can be performed with the aid of radar. The most sophisticated radio-navigation techniques employ the Global Positioning System (GPS). Computers are used to project the course of a craft based on its current position, its speed, and the direction of its movement. Course corrections are made by choosing the desired course and having the computer calculate speed and/or direction changes. Compare RADIOLOCATION.

radio locator A tool for detecting and measuring the strength of radiant energy. One form consists of a set of vanes blackened on one side and mounted on pivots in a partially evacuated glass bulb. Visible light or infrared causes the vane assembly to rotate, the speed being proportional to the intensity of the light.

radio temperature A measure of the current power at radio frequencies. Also see FACSIMILE.

radio technologist A specialist skilled in RADIOLOGY.

radiotherapy The science embracing the theory and use of X rays and radioactive substances in the diagnosis and treatment of diseases and ailments.

radioactivity 1. The property of a material that allows ionizing radiation to pass through it with little or no absorption. 2. The extent to which a material transmits ionizing radiation.

radioisotopes Visible light emitted from a radioactive material. A good example is radium; it was once used on wristwatch dials so that they could be seen in the dark.

radiochemicals Chemical decomposition brought about by radiation.

radio map A map of a geographic area, on which lines are drawn connecting measured points of equal field strength for signals from a radio station at the approximate center of the area.

radioelectrograph See RADIOSONDE.

radio receiver A device for detecting and measuring the strength of radiant energy. One form consists of a set of vanes blackened on one side and mounted on pivots in a partially evacuated glass bulb. Visible light or infrared causes the vane assembly to rotate, the speed being proportional to the intensity of the light.

radio frequency (RF) channel, such as the RF amplifier and first detector of a superheterodyne circuit.

radio frequency meter An instrument for measuring signals of RADIO FREQUENCY (9 kHz and above).

radio frequency oscillator Abbreviation, RFO. An oscillator (self-excited or crystal-controlled) for operation at radio frequencies. In such an oscillator, stray components, efficiency, and general losses are of primary concern. Also see RADIO FREQUENCY.

radio frequency power Symbol, $P_{RF}$. Alternating current power at radio frequencies.

radio frequency interference Abbreviation, RFI. 1. Anomalous electrical noise in radio-frequency (RF) amplifiers, detectors, and instruments. 2. Undesired RF signals that compete with desired ones in amplifiers, receivers, and instruments. 3. The unwanted interception and demodulation of a strong RF signal by an audio-frequency (AF) device, such as a telephone set or high-fidelity stereo amplifier.

radio frequency sensitivity The selectivity of a radio-frequency (RF) channel, such as the RF amplifier and first detector of a superheterodyne circuit.

radio frequency selectivity The selectivity of a radio-frequency (RF) channel, such as the RF amplifier and first detector of a superheterodyne circuit.

radio frequency transmitter Abbreviation, RF transmitter. A device used for the purpose of impedance matching, antenna tuning, or interstage coupling at frequencies above the range of human hearing (approximately 20 kHz and up). The device might consist of solenoidal windings with an air core, solenoidal windings with a powdered-iron or ferrite core, or toroidal windings with a powdered-iron or ferrite core. The windings are designed to minimize distributed capacitance and direct-current resistance. When no reactance is present, the impedance-transfer ratio is equal to the square of the turns ratio. Compare AUDIO-FREQUENCY TRANSFER RATIO.

radio frequency receiver 1. A transistor capable of providing significant amplification at radio frequencies. 2. A transistor operable at frequencies above 100 kHz.

radio frequency power See RADIO FREQUENCY.

radio frequency current See RADIO FREQUENCY.

radio location The science and art of measuring radiation in the infrared, visible, and ultraviolet regions of the electromagnetic frequency spectrum. Compare PHOTOMETRY.
graph, obtained by scanning the radio spectrum and plotting signal intensity as a function of frequency. The radio spectrum The continuum of frequencies useful for radio communication and control. Classified in the following manner: Very low frequency (VLF), 9 to 30 kHz; low frequency (LF), 30 to 300 kHz; medium frequency (MF), 300 to 3000 kHz; high frequency (HF), 3 to 30 MHz; very high frequency (VHF), 30 to 300 MHz; ultrahigh frequency (UHF), 300 to 3000 MHz; super high frequency (SHF), 3 to 30 GHz; extremely high frequency (EHF), 30 to 300 GHz. Radio isometry See CRYSTAL FILTER.

**Radio station** The location at which a radio transmitter and/or receiver is housed for use in two-way communication. 1. The complete set of equipment for a radio receiving and/or transmitting installation, including the studio, linking apparatus, and antennas. 2. A standard broadcast station.

**Radio technician** A professional skilled in the construction, testing, repair, and maintenance of radio equipment, and sometimes in its design, and who usually works under the supervision of a radio engineer. Also see RADIO SERVICE TECHNICIAN.

**Radio telegraph** See Keying, keying. 1. Pertaining to the theory and application of, and the equipment for, Morse code transmission and/or reception via radio. 2. An installation for Morse code transmission and/or reception via radio. 3. The transmission and/or reception of Morse code signals via radio. 4. See CONTINUOUS CODE. 5. See S.O.S.

**Radio telegraph distress signal** See S.O.S.

**Radio telegraph monitor** See Keying, keying. 1. The transmission and/or reception of telegraphic communications, usually Morse code, by means of radio. 2. A test-pattern generator that produces sawtooth-wave signals. Also see RAMP.

**Radio telegraphy** The transmission and/or reception of radio signals, especially aboard an aircraft. Also see RAINBOW PATTERN.

**Radio watch** See TELEVISION.

**Radio waves** Electromagnetic waves in the RADIO SPECTRUM.

**Radio window** That portion of the radio-frequency electromagnetic spectrum that passes through the atmosphere, rather than being refracted or absorbed. The wavelength range is about 20 meters to 5 millimeters, or 15 MHz to 60 GHz. The lower limit of this range is affected by ionospheric conditions. The upper frequency limit depends on various factors, including relative humidity and dust content of the air.


**Radiotherapy** See DIATHERMY.

**Radon** Symbol, Rn. A gaseous radioactive element that results from the disintegration of radium. Atomic number, 86. Atomic weight, 222.

**Rad/s** Abbreviation of radians per second, the SI unit of angular velocity.

**Rad** Abbreviation of radian, radians per squared second, the SI unit of angular acceleration.

**Radix** A continuous-wave, low-frequency radionavigation system. Position is determined by comparing the phase of two signals sent from different locations.

**RAID** Acronym for REDUNDANT ARRAY OF INDEPENDENT DISKS.

**Rainbow generator** A test-signal generator that produces a full color spectrum, a pattern resem-bling the successive coloration of a rainbow, on the screen of a color-television receiver. Also see RAINBOW PATTERN.

**Rainbow pattern** A test pattern for servicing a color-television receiver. It consists of a full color spectrum, thus taking its name from its resemblance to a rainbow. Also see RAINBOW GENERATOR.

**Ramp** A sawtooth wave with a linear rise and a practically instantaneous decay; its name was derived from its resemblance to an incline.

**Ramp generator** A test-signal generator that produces sawtooth-wave signals. Also see RAMP.

**Random** Abbreviation of RANDOM-ACCESS MEMORY.

**Random-access memory** A memory providing access to the data stored on it, or memory in which data can be recovered in any order of access. (Also, R.A.M.)

**Random access memory** A continuous-wave, low-frequency radionavigation system. Position is determined by comparing the phase of two signals sent from different locations.

**Random number** A number that is uniformly chosen from a specified interval. (Also, R.N.)
random noise  Electrical noise in which the pulses or fluctuations have no discernible pattern of occurrence (i.e., they are haphazard in frequency and amplitude).

random number  A number derived by chance. It is used in statistical analysis for various purposes.

random number generator  Hardware or software that provides a sequence of numbers or digits that are random for the purpose of a given statistical application.

random occurrence  See CHANCE OCCURRENCE.

random variable  In statistics, a variable that can have a number of values, each of the same probability.

random winding  A coil winding in which the turns are wound haphazardly to reduce distributed capacitance.

range  1. The limits within which a circuit or device operates (i.e., the territory defined by such limits). Examples: current range, frequency range, and voltage range. 2. The difference between the upper and lower limits of deflection of a meter.

range capacitor  See TRIMMER CAPACITOR.

range-height indicator  Abbreviation, RHI. A radar display in which the horizontal axis shows distance to the target, and the vertical axis shows elevation of the target.

range mark  See DISTANCE MARK.

range plotting  The creation of a graph of the distance (range) to objects, as a function of direction or orientation in two or three dimensions. Commonly used in robot guidance systems.

range resistor  See TRIMMER RESISTOR.

range sensing  The measurement of distances to objects via electronic methods such as radar, sonar, vision systems, etc. Commonly used in robot guidance systems.

ranging 1. Any means of determining the distance from a stationary object or objects. 2. Any of several methods for a vehicle, vessel, aircraft, spacecraft, or robot to navigate in its environment by measuring and keeping track of changes in the distance between itself and one or more objects or objects.

rank  1. To arrange in a specific sequence according to significance. 2. A place in such a sequence.

Rankine scale  A temperature scale on which the freezing point of water is assigned a value of 32 °R (36 °F), and the boiling point 212 °R (212 °F). Absolute zero is represented by 0 °R (−273.16 °C). For conversion to °F, multiply by 1.8 and add 32.

rapidity  A fast change of a quantity or setting (usually in one direction) with time.

rapid printer  See QUICK PRINTER.

Raser  A device that produces coherent electromagnetic waves at radio frequencies, the radio-frequency equivalent of a LASER.

raster  The rectangle of light (composed of unmodulated lines) seen on the screen of a television picture tube when no signal is present.

ratchet  See COMPARATOR, 2 and ELECTRONIC RATCHET.

rate  See DERIVATIVE ACTION.

rate effect  In a four-layer semiconductor device, the tendency for the switch to conduct undesirably as a result of a transient spike.

rate-grown transistor  See GRADIENT-JUNCTION TRANSISTOR.

rate gyro  A special gyroscopic for measuring angular rates.

rate of change  1. The extent to which the value of a dependent variable changes in accordance with a specified change in an independent variable (usually time). 2. A quantitative expression of the speed with which a dependent variable changes, with respect to an independent variable (usually time).

rate signal  A signal whose amplitude is proportional to the derivative of a variable, with respect to time.

rate time  In automatic-control operations, the time over which the addition of DERIVATIVE ACTION advances PROPORTIONAL ACTION.

ratio-arm bridge  A simple four-arm bridge in which the balancing potentiometer supplies the two arms, one on each side of the slider at all settings.

ratio detector  A frequency-modulation (FM) secondary detector resembling the FOSTER-SEELEY DISCRIMINATOR, except that one of the two diodes is reversed and the junction point of the load resistors is grounded. In an FM circuit using a ratio detector, no limiter is required. The ratio of the direct-current outputs is proportional to the ratio of the instantaneous signal voltages applied to the two diodes.

ratio meter  An instrument that compares two different signals (and indirectly their sources) and delivers a reading of their ratio.

rational number  A number that can be expressed in the form $\frac{a}{b}$, where $a$ and $b$ are integers and $b$ is not equal to zero.

rational operation  Any of the conventional arithmetic operations: multiplication, division, addition, or subtraction.

ratio of geometric progression  In a geometric progression, the ratio of one value to the next.

ratio of similarity  The ratio of the lengths of corresponding sides in similar geometric figures.

rat race  See HYBRID RING.

raven red  A variety of red oxide of iron, a commercial red paint used as the magnetic coating of early recording tapes.

raw ac  Unrectified alternating current (ac) or voltage.

raw data  Data that has not been processed in any way.

rawinosonde  A RADIOSONDE tracked by a radio direction finder to determine wind velocity. The name is an acronym from radar u ted radi osonde.

raw tape  The tape of a BLANK TAPE.

Rayleigh distribution  A probability-density function, used to describe the behavior of sky-wave electromagnetic signals.

Rayleigh’s law  The hysteresis loss in a magnetic material varies in proportion to the cube of the magnetic induction.

RB  Symbol for RUBIDIUM.

RC  1. Abbreviation of RESISTANCE-CAPACITANCE. 2. Abbreviation of RADIO CONTROLLED. 3. Abbreviation of REMOTE CONTROL.

RC 1. Symbol for COLLECTOR RESISTANCE. (Also, $r_c$.) 2. Symbol for COLD RESISTANCE.

RCA jack  See PHONO JACK.

RCA plug  See PHONO PLUG.

RC circuit  See RESISTANCE-CAPACITANCE CIRCUIT.

RC-coupled amplifier  See RESISTANCE-CAPACITANCE-COUPLED AMPLIFIER.

RC coupling  See RESISTANCE-CAPACITANCE COUPLING.

RC filter  See RESISTANCE-CAPACITANCE FILTER.

RC 1. Abbreviation of RECALL. 2. Abbreviation of RESISTANCE-CAPACITANCE-INDUCTANCE.

RCM  Abbreviation of RADIO COUNTERMEASURES. (Also, radCM.)

RC phase shifter  See RESISTANCE-CAPACITANCE PHASE SHIFTER.

RC time constant  See RESISTANCE-CAPACITANCE TIME CONSTANT.

RCTL  Abbreviation of RESISTOR-CAPACITOR-TRANSISTOR LOGIC.

RC tuning  See RESISTANCE-CAPACITANCE TUNING.

RCV  Abbreviation for receiving. (Also, rev.)

RCVR  Abbreviation for RECEIVER. (Also, revr, rx.)

rd  Abbreviation for rutherford.

R & D  See R AND D.

RF  Symbol for RADIO RESISTANCE.

Rf  Symbol for DIODE RESISTANCE. (Also, $r_f$.)

f  Symbol for DISTRIBUTED RESISTANCE.

R-DAT  Abbreviation of ROTARY DIGITAL AUDIO TAPE.

Rc  Symbol for DC RESISTANCE. (Also, $r_c$.)

 RDF  Abbreviation of RADIO DIRECTION FINDER.

r  Symbol for RESISTOR.

Re  Symbol for RESISTOR-CAPACITOR-TRANSISTOR LOGIC.

ReA  Abbreviation of Remote Electrovision Administration.

reac  Abbreviation for REAC.

reac region  See PUNCHTHROUGH.

reac voltage  See PUNCHTHROUGH.

reactance  Symbol, X, unit, ohm. The opposition offered to the flow of alternating current by pure capacitance, pure inductance, or a combination of the two. Reactance introduces phase shift. Also see CAPACITIVE REACTANCE and INDUCTIVE REACTANCE. Compare RESISTANCE.
reactance chart A nomograph for capacitance, inductance, and frequency.

reactance factor The ratio of the alternating-current resistance of a conductor to the direct-current resistance. The reactance factor generally increases as the frequency increases because of skin effect and because the length of the conductor might be a sizable part of the wavelength of the transmitted energy.

reactance modulator A frequency modulator using a variable reactance, usually a varactor diode in the oscillator.

reactance transistor A transistor used as a REACTANCE MODULATOR.

reactance-time meter See NEOMATOGRAPH and NEOMATOMETER.

reactive absorber In acoustics, a device that dissipates impinging sound waves by means of reflection, resonance, and other effects, besides dissipation in the form of heat.

reactive attenuator An attenuator that functions by means of reactance, rather than by means of resistance.

reactive current The component of alternating current that is not in phase with the voltage. Compare RESISTIVE CURRENT.

reactive kilovolt-ampere Abbreviation, kW. A unit of high apparent power; it is the product of kilovolts and amperes in a reactive component of a circuit. Also see APPARENT POWER, KILO-VOLT-AMPERE, REACTIVE VOLT-AMPERE, and VOLT-AMPERE.

reactive load 1. A load device that is capacitive or inductive, rather than resistive. 2. A load device that contains reactance as well as resistance.

reactive power See REACTIVE KILOVOLTAMPERE and REACTIVE VOLT-AMPERE.

reactive volt-ampere Abbreviation, VAR. A unit of apparent power; it is the product of volts and amperes in a reactive component of a circuit. Also see APPARENT POWER, KILO-VOLT-AMPERE, REACTIVE KILOVOLT-AMPERE, and VOLT-AMPERE.

reactor 1. An inductor, especially one having very low internal resistance, used principally for its inductive reactance. 2. A chamber in which the nuclei of atoms are split to provide atomic energy. Also see NUCLEAR REACTOR. 3. In industrial chemistry, a vat in which reaction between a central processing unit and a specific peripheral occurs.

read 1. In computer operations, to extract data from memory or a storage medium (e.g., magnetic, transistor, etc.) and transfer it to another area of memory or other medium. Compare WRITE. 2. In digital communications, to transcribe data into printed form. 3. In radiotelegraphy, to listen to Morse-code signals and comprehend the text without necessarily writing it down. 4. To observe and note the indication of an instrument, such as a meter.

readability In electronic communications, the degree to which a desired signal can be recognized and interpreted in a given context.

readback In a multiplexer, a feature that facilitates inspection of the contents of the control latch.

reader A device that transcribes digital signals or markings into meaningful data. Examples: Morse-code reader and bar code reader.

read head In a magnetic memory or in a tape recorder or wire recorder used for data recording, the head that picks up the magnetic pulses from the drum, tape, disk, or wire. Compare WRITE HEAD.

reading rate The number of input characters per second that a computer or other data-processing device handles.

read-only memory Abbreviation, ROM. In a computer or calculator, a memory unit in which instructions or data are permanently stored for use by the machine or for reference by the user. The stored information is read out without modification.

readout lamp An electron tube containing several cathodes, filled with a gas (such as neon), and used as a numeric or alphanumeric display device. Each cathode is connected to a separate pin on the base. A single anode is connected to all cathodes. The cathode(s) to which a voltage is applied glows(s), showing the shape of a numeral, letter of the alphabet, or other symbol. In recent years, this type of display has been replaced by light-emitting diodes (LEDs) and liquid-crystal displays (LCDs).

readout pulse In a random-access memory (RAM), a pulse applied to the word line, facilitating readout of the information in a certain storage slot.

read pulse In computer operations, a pulse that activates the read function (see READ). Compare WRITE PULSE.

read rear front end The number of data units an input read device can transcribe per unit of time (e.g., bits processed, bytes or words per minute [bps]).

readthrough 1. The repetition of certain transmitted pulses at the same frequency. 2. The continuous monitoring of a signal being jammed. Any change in the frequency, modulation, or other characteristics of the signal can then be detected, and the jamming signal adjusted accordingly.

real 1. The period during which data is being transferred from a computer storage unit.

real-write channel In computer operations, a channel in which activity between a central processing unit and a specific peripheral occurs.

real-write head An external storage medium used for both reading and writing data. See READ and WRITE.

real-write memory 1. A small data storage bank for short-term use. The contents of the memory are easily changed. 2. See RANDOM ACCESS MEMORY.

real address See ABSOLUTE ADDRESS.

real axis The axis of the real-number component of a COMPLEX NUMBER (i.e., the horizontal axis in an ARGAND DIAGRAM).

real component The real-number part of a COMPLEX NUMBER.

real power The apparent power multiplied by the power factor in an alternating-current circuit containing reactance. Real power is the difference between the apparent power and the reactive power. Actual radiated or dissipated power can be measured directly.

real time Pertaining to the operation of a computer, communications, or data processing system in which events are represented or acted on as they occur. Data is processed as it becomes available, used, or transmitted through use of direct-access storage devices, and remote terminals.

real-time clock A device that produces periodic signals that reflect the interval between events. It is sometimes used to indicate time of day.

rear end The low-frequency portion of a superheterodyne receiver i.e., the intermediate-frequency amplifier, second detector, and audio-frequency amplifier. Compare FRONT END.

rear projection A method of big-screen television picture reproduction. The image is focused onto a translucent, flat surface. The viewer is positioned on the side of the screen opposite to the projector beam.
Low-noise, high-gain amplifiers are the rule. Field-effect transistors are commonly used.

**receiver IPF** In wireless communications or broadcast receiver, the series of radio-frequency (RF) amplifier stages in which most of the gain takes place and where the best possible RF selectivity is obtained. The intermediate RF amplifiers in which the amplifiers works is a constant frequency. This simplifies the design of the amplifiers to produce optimum gain and selectivity. Crystal lattice filters or mechanical filters are commonly used in these stages to obtain the desired bandwidth and response.

**receiver mixer** In a superheterodyne wireless communications or broadcast receiver, a stage that converts the variable input signal frequency to a constant intermediate frequency (IF), or a stage that converts the first IF to a second IF usually having a lower frequency. This type of circuit is nonlinear, and combines the signal with a carrier from a local oscillator (LO). The output is either the sum or the difference of the signal frequency and the LO frequency.

**receiver sensitivity** A quantitative measure of the ability of a wireless receiver to recover weak signals while rejecting unwanted noise. This can be quantified. In general, the lower the noise figure, the better the sensitivity. Gallium-arsenide field-effect transistors (GaAsFETs) are well known for the low levels of noise they generate, even at quite high frequencies. Other types of FETs can be used at lower frequencies. Bipolar transistors tend to be noisy. See also NOISE FACTOR, NOISE FIGURE.

**recording** A half of a transistor stage from the write to the read mode. It is measured as the length of time from switching out of the write mode until meaningful signals occur at the output. In a receiver, the time required from the completion of a transmitted signal until the receiver is activated.

**recorder** A measuring instrument. Also called RECORDED TAPE. Compare BLANK TAPE.

**recording** 1. A machine for preserving sound, video, or data signals in the sequence in which they occur (e.g., DISC RECORDEE, TAPE RECORDER, and WIRE RECORDER). 2. A machine for making a permanent visual record (photographically or by stylus) of an electrical phenomenon. Examples: DRUM RECORDER and OSCILLOGRAPH.

**recording density** The number of information units (bits, bytes, etc.) represented by magnetic areas, per unit area or length.

**recording disc** A phonograph record on which material has not been recorded, or from which recorded material has been removed. Compare RECORDED DISC.

**rectangular coordinates** A set of coordinates that are suitable for describing a specific rectangular region. Used in television.

**rectangular wave** An alternating or pulsating current or voltage whose rise and decay times are essentially zero, and whose maxima and minima are essentially flat, but not necessarily of equal duration. The SQUARE WAVE is a special type of rectangular wave.

**rectifier** A device that can accept a restoration of chemical energy following use, and thus can be completely charged and discharged numerous times. Examples: nickel-metal-hydride (NiMH) battery and lead-acid battery.

**rectification efficiency** The ratio (expressed in a signal) of the direct-current output voltage to the peak alternating-current input voltage of a rectifier.

**rectification** The conversion of alternating current into pulsating direct current by any means other than the use of a motor-generator. Also see RECORDER.

**rectification efficiency** The ratio (expressed in a signal) of the direct-current output voltage to the peak alternating-current input voltage of a rectifier.

**rectifier** A device that can accept a restoration of chemical energy following use, and thus can be completely charged and discharged numerous times. Examples: nickel-metal-hydride (NiMH) battery and lead-acid battery.
rectifier  Abbreviation, rect. An electronic or electromechanical device that converts alternating current into pulsating direct current.

rectifier diode  A heavy-duty tube or semiconductor diode designed primarily to change alternating current to pulsating direct current in power supplies.

rectifier filter  A circuit containing parallel capacitance, sometimes in combination with series inductance, intended for smoothing out the ripple in the output of a power-supply rectifier.

rectifier filter system  The rectifier plus power-supply filter combination for converting alternating current into direct current.

rectifier photocell  A photovoltaic cell consisting of two layers of material with a semiconductor junction between them. The device produces direct current when exposed to visible light, infrared, or ultraviolet radiation.

rectifier probe  A diode-type probe used with a direct-current (dc) voltmeter to measure radio-frequency (rf) voltage. The diode rectifies the rf signal and presents to the meter a dc voltage proportional to the peak rf voltage.

rectifier tube  A two-element electron tube, once commonly used for converting alternating current into pulsating direct current in high-voltage, high-current power supplies.

rectifier-type meter  See DIODE-TYPE METER.

rectilinear chart  A graphic-recorder chart in which the crossing coordinates are arcs, rather than straight lines, to correspond to the swing of the pen. Also see STRIP CHART.

rectilinear scan  See RECTANGULAR SCAN.

recurrent  A circuit in which several sections of identical configuration (e.g., l sections) are cascaded.

recurrent phenomenon  A phenomenon that repeats itself periodically.

reference  In an oscilloscope, a repetitive horizontal sweep of the beam occurring at a frequency determined by the settings of the sweep controls. Also called REPETITIVE SWEEP. Compare NONREPETITIVE SWEEP.

recursion 1. Generating a complete sequence of functions or numbers by applying an algorithm to initial values in the sequence. 2. In computer programming and artificial intelligence, a logical process containing loops in calculation or reasoning.

recursive  Relating to a procedure or set of steps that repeat endlessly.

Red Book  The first format developed for compact-disc data storage media, developed by Sony and Philips. It is commonly used in digital audio systems. See also CD-ROM, GREEN BOOK, ORANGE BOOK, and YELLOW BOOK.

red-green-blue  Abbreviation, RGB. In video applications, the three primary colors from which all other colors are derived. Also see COLOR TELEVISION.

reed  In a three-gun color-television picture tube, the electron gun whose (correctly adjusted) beam strikes only the red phosphor dots on the picture tube. Also called RED GUN.

red oxide of iron  An iron oxide of the general formula Fe₂O₃ used as the magnetic coating of recording tape. Also see IRON OXIDE.

red oxide of zinc  See ZINCITE.

red tape operation  An operation or function needed for organizational purposes, but that does not directly contribute to the completion of the task at hand.

reduced instruction set computer  Abbreviation, RISC. A computer architecture in which program instructions are simplified to obtain enhanced processing speed. It is useful especially in complex graphics, animation, multimedia, and scientific work requiring many calculations.

reduction ad absurdum  A method of obtaining a conclusion by proving that its negation results in a contradiction. It is sometimes used in computer programming involving mathematical proofs.

reduction in a two-dimensional display of information or data. Also see REDUCTIONISM.

reductionism  The theory that all human thought processes, including emotion and intuition, can be reduced to digital logic, and thus can be duplicated by a sufficiently powerful computer. It is of interest to researchers in artificial intelligence.

reductionist  A person who subscribes to the theory of REDUCTIONISM.

ref 1. The repetition of components in a circuit (e.g., series or parallel connection of them) so that one will be available for circuit operation if the other fails. 2. Having available more than one method for performing a function. 3. Having on hand several copies of data as a safeguard against data loss.

redundancy check  A check for the integrity of digitized data to which extra bits have been added for the purpose (e.g., parity check).

redundant 1. Pertaining to any two units of data that resemble each other in such a manner that if one unit is removed, no information is lost from the system. 2. A unit of data that contains information already present in the system.

reflection 1. The transfer of electrons to the active chemical. 2. A repetitive phenomenon that repeats itself periodically. 3. A usually thin metal blade, leaf, or strip used in radars to bounce electromagnetic energy back to the system. Also see HUMMER.

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loss caused by the mismatch because the reflected field is usually all returned again when it arrives back at the transmitter.

**reflected-power meter** A radio-frequency instrument, connected between a source and a load, that can measure INCIDENT POWER and REFLECTED POWER.

**reflected ray** The ray that is reflected by the surface of a body or region it strikes. Compare INCIDENT RAY and REFRACTED RAY.

**reflected resistance** 1. In a transformer, the effective resistance across the primary winding when a resistive load is connected to the secondary. 2. In a transmission line, the resistance at the input end when a load is connected to the output end.

**reflected wave** 1. An electromagnetic wave reflected by the ionosphere or by the surface of the earth. Compare INCIDENT WAVE and REFRACTED WAVE. Also see IONOSPHERE and IONOSPHERIC PROPAGATION. 2. A wave that is bounced off an obstruction, such as a building or mountain.

**reflecting galvanometer** A galvanometer having a light-beam pointer.

**reflecting shell** See IONOSPHERE.

**reflection** 1. The turning back of a ray by a surface or object. Examples of reflecting media are the surface of the earth, the polished surface of a material, and a layer of the ionosphere. Compare REFRACTION. 2. The return of energy to the source by the mismatched end of a transmission line or by the end of a radiator.

**reflection error** In a radar, radionavigation, or radio-location system, an error in the reading caused by reflections of the signal from objects other than the intended signal source or object.

**reflection factor** See MISMATCH FACTOR.

**reflection law** When a ray strikes a smooth reflecting surface, the angle of incidence is equal to the angle of reflection.

**reflection loss** 1. Loss caused by the reflection of an electromagnetic field at a discontinuity in a transmission line. 2. Loss that occurs when an electromagnetic wave is reflected from a surface or object.

**reflection phase grating** A device that diffuses sound waves by diffraction effects. The acoustic equivalent of an electromagnetic-wave DIFFRACTION GRATING.

**reflective code** See GRAY CODE.

**reflectivity** 1. See MISMATCH FACTOR. 2. The degree to which a point, plane, or surface reflects the radiation (light, for example) that strikes it.

**reflometer** 1. See REFLECTED-POWER METER. 2. A type of photometer used to measure reflection.

**reflector** 1. A smooth, metal surface or wire screen for reflecting radio waves. See, for example, PARABOLIC REFLECTOR. 2. A length of wire, rod, or tubing used in a parasitic antenna to reflect radio waves. Compare DIRECTOR and RADIATOR. 3. A polished surface for reflecting visible light or infrared rays (i.e., a mirror). See REFLECTOR.

**reflector element** See IONOSPHERE.

**reflector satellite** A satellite whose skin reflects radio waves.

**reflector voltage** In a reflex Klystron, the reflector-to-cathode voltage.

**reflex baffle** A loudspeaker BAFFLE constructed so that some of the sound radiated to the rear of the diaphragm is transmitted forward (after phase shift) to boost acoustic radiation at some frequencies.

**reflex bunching** In a Klystron, electron bunching following direct-current-field-induced reversal of the velocity-modulated electrons. Also see REFLEX KLYSTRON.

**reflex circuit** A radio receiver circuit in which a single transistor is used successively for different functions. For example, one active device can act as a mixer and as a radio-frequency amplifier.

**reflex Klystron** A Klystron having only one cavity. This cavity serves first as the buncher and then, as the electrons are turned around and caused to pass through again, as the catcher.

**refracted ray** The ray that is refracted by a body or region through which it passes. Compare INCIDENT RAY and REFLECTED RAY.

**refracted wave** An electromagnetic wave that is refracted by the ionosphere. Compare INCIDENT WAVE and REFRACTED WAVE. Also see IONOSPHERE and IONOSPHERIC PROPAGATION.

**refraction** The bending of an energy ray as it passes through media that cause a change in the speed of propagation. It can occur with radio waves, infrared, visible light, ultraviolet, X rays, gamma rays, and sound waves.

**refractive index** See INDEX OF REFRACTION.

**refractivity** The extent of the ability to refract, given the quantity \(\phi / \phi_0 - 1\), where \(\phi_0\) is the phase velocity in free space, and \(\phi\) is the phase velocity in the medium through which a wave passes.

**refractory** A heat-resistant, nonmetallic ceramic material.

**refrigerator** A chamber used to maintain a circuit or component at a constant temperature that is lower than the ambient temperature. This device is analogous to the oven, which maintains a higher temperature than the surrounding medium. A refrigerator can be used to maintain precise frequency for a reference oscillator.

**regeneration period** The period during which the electron beam scans a cathode-ray tube screen to restore changes to the screen surface.

**regenerative amplifier** An amplifier that uses regeneration to increase its gain and/or selectivity.

**regenerative detector** A detector provided with regenerative feedback. Although such a detector is sensitive, it can be unstable. Compare NONREGENERATIVE DETECTOR.

**regenerative feedback** Feedback producing regeneration (i.e., positive feedback). Compare DEGENERATIVE FEEDBACK.

**regenerative IF amplifier** An intermediate-frequency amplifier in which regeneration is introduced to boost sensitivity and, sometimes, selectivity.

**regenerative reading** A method of reading data recorded on a recording medium so that it has its original characteristics. Compare NONREGERATIVE READING.

**regenerative reading** A method of reading data recorded on a recording medium so that it has its original characteristics. Compare NONREGERATIVE READING.

**regenerative signal** A signal that can be handled by a register.

**registered professional engineer** A title granted by a state board of examiners to a person licensed to work as an engineer.

**registrar** The number of characters or bits that can be held in a register, according to its capacity.

**registration** The accurate alignment of terminals or other points on different components or on opposite sides of a board so that when the surfaces containing these points are overlaid, all points mate precisely.

**regulated power supply** A power supply whose output is held automatically to a constant level or within a narrow range, regardless of loading variations.

**regulating transformer** See VOLTAGE-REGULATING TRANSFORMER.

**regulation** 1. In general, the adjustment or control of a component, device, or system. 2. Automatic control. See, for example, SELF-REGULATION.
rejection notch  A sharp dip in the transmission characteristic of a crystal filter. It provides rejec-
tion of a specified frequency. Also see CRYSTAL RESONATOR and REJECTION FILTER.

rejection  The degree to which a selective circuit rejects unwanted signals. Compare REJECTIVITY.

rejection notch  See REACTIVATION.

rel Symbol, R. The cgs unit of reluctance, equiva-

relaxation  A delayed change in circuit conditions, as a result of change in the input.

relaxation  A change in circu,
resistance 1. A natural or synthetic organic substance that is polymeric in structure and largely amorphous. Various plastics are made from synthetic resins.

resistance-capacitance circuit A circuit containing only resistors and capacitors. There are no inductors.

resistance-capacitance-coupled amplifier A multistage amplifier circuit in which RESIST-ANCE-CAPACITANCE COUPLING is used between stages and at the input and output points of the circuit.

resistance-capacitance coupling Coupling, especially between stages in a circuit, using blocking capacitors and supply-path resistors.

resistance-capacitance filter A power-supply filter or wave filter containing only resistors and capacitors. The resistors are in the positions occupied by inductors in inductance-capacitance filters.

resistance-capacitance-inductance Abbreviation, RC. Pertaining to a combination of resistance, capacitance, and inductance.

resistance-capacitance phase shifter A phase shifter containing only resistors and capacitors to obtain the desired shift.

resistance-capacitive The property of circuits, devices, or substances that causes impinging energy to be dissipated by conversion to heat. Compare REACTANCE.

resistance-capacitive coupling Abbreviation, RES-CAP. A coupling, especially between stages in a circuit, using blocking capacitors and supply-path resistors.

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resistance-inductance phase shifter A phase shifter containing only resistors and inductors to obtain the desired phase shift.

resistance lamp An incandescent bulb inserted in series with a circuit to provide a dropping resistance. Such a lamp is capable of dissipating a large amount of power, shows very little resistance at low frequencies, and is inexpensive.

resistance magnetometer A magnetometer whose operation is based upon the change of electrical resistance of a material such as bismuth wire placed in the magnetic field under test.

resistance material A substance, such as carbon or Germanium, whose resistivity is high enough to enable its use as a lumped resistor. See, for example, RESISTANCE ALLOYS and RESISTANCE METAL.

resistance metal A metal, such as iron, whose resistivity is high enough to enable its use as a lumped resistor. Also see RESISTANCE ALLOYS.

resistance pad An attenuator composed of nominally identical resistors.

resistance standard A highly accurate and stable resistor used in precision measurements of resistance. Also see PRIMARY STANDARD and SECONDARY STANDARD.

resistance strain gauge An electrical strain gauge in which the stressed element is a thin resistance wire.

resistance strip A strip of metallic or nonmetallic resistance material also see RESISTANCE ALLOYS and RESISTANCE METAL.

resistance temperature detector A transducer consisting of a specially made resistor whose resistance varies linearly with temperature.

resistance thermometer An electronic thermometer whose operation is based on the change of resistance of a wire as it is heated or cooled.

resistance transducer See RESISTIVE TRANS- DUCER.

resistance tuning See VARIABLE-RESISTANCE TUNING.

resistance welding An electrical or electronic welding process in which the workpieces are heated by current flowing through the inherent resistance of their junction.

resistance wire Wire made of a metal or alloy that exhibits significant resistivity. See, for example, RESISTANCE ALLOYS and RESISTANCE METAL.

resistance-wire sensor A specific length of resistance wire, properly mounted, whose resistance is proportional to a sensed phenomenon such as strain, temperature, presence of gas, pressure, etc. See, for example, ELECTRICAL STRAIN GAUGE, GAS DETECTOR, and PRESSURE TRANSDUCER.

resistive current The component of alternating current that is in phase with voltage. Also called WATT CURRENT. Compare REACTIVE CURRENT.

resistive cutoff frequency Symbol, \( f_{oc} \). The frequency beyond which a tunnel diode ceases to exhibit negative resistance.

resistive load A load device that is essentially a pure resistance.

resistive losses Losses resulting from the resistance of a circuit or device, and usually appearing as heat.

resistive transducer A transducer in which the sensed phenomenon causes a change in resistance, which in turn produces a corresponding change in output current or voltage. Compare CAPACITIVE TRANSCLUDER, CRYSTAL TRANS- DUCER, INDUCTIVE TRANSCLUDER, MAGNETIC TRANSCLUDER, and PHOTOELECTRIC TRANSCLUDER.

resistive trimmer See TRIMMER RESISTOR.

resistive voltage The voltage across the resistance component of an alternating current circuit, the resistive voltage is in phase with the current.

resistivity Symbol, \( \rho \). Resistance per unit volume or per unit area. It can be expressed in terms of ohms per cubic meter or ohms per square meter. Also see MICROHM-CENTIMETER and OHM-CENTIMETER.

resistor A device having resistance concentrated in lumped form. Also see RESISTANCE and RESIS-

TIVITY.

resistor-capacitor-transistor logic Abbreviation, RTL. A form of RESISTOR-TRANSISTOR LOGIC in which capacitors are used to enhance switching speed.

resistor color code See COLOR CODE.

resistor core A form around which a resistance wire can be wound for the purpose of construct- ing a high power resistor.

resistor decade See DECADE RESISTOR.

resistor diode A usually forward-biased semiconductor diode that acts as a VOLTAGE-DEPEN- DENT RESISTOR.

resistor FET See ELECTRONIC RESISTOR.

resistor fuse See FUSIBLE RESISTOR.

resistors in parallel See PARALLEL RESISTORS.

resistors in parallel-series See PARALLEL-

SERIES RESISTORS.

resistors in series See SERIES RESISTORS.

resistors in series-parallel See SERIES-

PARALLEL RESISTORS.

resistor substitution box A self-contained assortment of common-value resistors arranged to be switched one at a time to a pair of terminals. In troubleshooting and circuit development, any of several useful fixed resistance values can thus be obtained.

resistor transistor See ELECTRONIC RESISTOR.

resistor-transistor logic Abbreviation, RTL. A cir- cuit in which the logic function is performed by resistors, and an inverted output is provided by transistors.

resonat A form of vacuum tube that is used as an oscillator and amplifier at ultra-high and microwave frequencies. It is essentially a cavity resonator.

resonant 1. The degree to which closely adjacent parts of an image can be differentiated. 2. The re- solution of a problem by means of logical analysis. 3. The ability of a vision or ranging system to dis- tinguish between objects that are close together in terms of radial distance, direction, or absolute separation.

resolution ratio In a television image, the ratio of horizontal resolution to vertical resolution.

resonance 1. The state in which the natural re- sponse frequency of a circuit coincides with the frequency of an applied signal, or vice versa, yielding intensified response. 2. The state in which the natural vibration frequency of a body coincides with an applied vibration force, or vice versa, yielding reinforced vibration of the body.

resonance bridge An alternating-current bridge (see BRIDGE, 2) in which one or two arms are series-resonant or parallel-resonant. The other arms being resistances. Also see SERIES-TYPE RESONANCE BRIDGE and SHUNT-TYPE RESO- NANCE BRIDGE.

resonance curve A graph of the insertion gain or loss of a component, device, circuit, or system to variations in the frequency of an applied sound or signal. Such curves are almost always plotted in rectangular coordinates with frequency as the in- dependent variable on the horizontal axis. The de- pendent variable, plotted on the vertical axis, can be any characteristic that displays a peak or dip at the resonant frequency or frequencies. In radio- frequency circuits, such parameters include current, voltage, attenuation, gain, and impedance.

resonance theory of hearing The theory that sound waves pass down the auditory canal and cause the eardrum to vibrate. Behind the eardrum is a system of three bones leading to the cochlea. The cochlea consists of fibers that res- onate: therefore, they vary in length and tension. Various groups of fibers are activated by different sounds, and the vibrations are transmitted to nerves leading to the brain.

resonance radiation Electromagnetic radiation from an energized substance, resulting from movement of electrons from a higher to lower energy level. When an electron moves from a higher to a lower orbit, a photon, having a definite wave- length, is emitted.

resonant cavity A chamber whose size resonates energy injected into it at a natural frequency, which is determined by the chamber’s dimen- sions. Such cavities can be used with acoustic or electromagnetic waves.

resonant circuit A circuit whose components are chosen for maximum circuit response at a given frequency. Examples: parallel-resonant circuit and series-resonant circuit. Also see RESONANCE and RESONANT FREQUENCY.

resonant current Current flowing in a tuned cir- cuit.

resonant feeder An antenna feeder that is reso- nant at the operating frequency.

resonant filter A filter containing at least one se- ries- or parallel-resonant arm for sharp response. Thus, a power-supply filter of this kind might have a parallel-resonant arm acting as a wave- trap at the ripple frequency.

resonant frequency Symbol, \( f_r \) or \( f_o \). The natural frequency at which a circuit oscillates or a device vibrates. In an inductance-capacitance circuit (series-resonant or parallel-resonant), the reac- tances cancel at the resonant frequency, leaving only resistance.

resonant-gate transistor A transistor embodying a tiny tuning fork for resonance at low frequen- cies, thus eliminating bulky coils and capacitors.

resonant line A transmission line that is resonant at the operating frequency.

resonant-line amplifier See LINE-TYPE AMPLI- FIER.

resonant-line circuit A circuit using resonant lines as a tank. See, for example, LINE-TYPE AMPLIFIER and LINE-TYPE OSCILLATOR.

resonant-line oscillator See LINE-TYPE OSCILLA- TOR.
resonant-line wavemeter See LECHER WIRES.
resonant rise See VOLTAGE RISE.
resonant-slope amplifier See DIELECTRIC AMPLIFIER.
resonant-slope detector See SLOPE DETECTOR.
resonant voltage rise See VOLTAGE RISE.
resonant voltage stepup See VOLTAGE RISE.
resonance 1. To exhibit RESONANCE—either electrically or acoustically. 2. To adjust a variable-frequency electrical or acoustical device so that it exhibits RESONANCE at a specific frequency.
resonator A device that produces or undergoes resonance. See, for example, HELMHOLTZ RESONATOR and RESONANT CAVITY.
resource A part of a computer system that can be used for a specific application as a unit (e.g., printer, PCMcia standard adapter card, tape drive, etc.).
responder The transmitting section of a transponder.
response The behavior of a circuit or device (especially in terms of its dependent variables), in accordance with an applied signal (e.g., frequency response and current vs. voltage response).
response curve A graph depicting the performance of a circuit or device. Examples: attenuation vs. frequency curve and current vs. voltage curve.
response time The interval between the instant a signal is applied to or removed from a circuit or device and the instant that the circuit acts accordingly.
restart Following a malfunction or error occurring during a computer process, to go back to an earlier point in the program.
resting state The QUIESCENT STATE.
restore See RESET.
resultant 1. The vector that results from the addition of two or more vectors. 2. A quantity that results from mathematical operations performed on other quantities.
retarding magnet See DRAG MAGNET.
retentivity 1. The property whereby a material retains magnetism imparted to it. 2. A quantitative measure of the extent to which a material retains magnetism when subjected to it.
retention period In computer operations, the time during which the data on a magnetic medium (disk or tape) must be kept intact.
retread 1. In a cathode-ray tube, the return of the scanning beam to its starting point. 2. In a cathode-ray tube, a line traced on the screen by the scanning beam as it returns to its starting point, if \( \text{RETREAD} \) is not used.
retread blanking Obliteration of the RETREAD of the electron beam in a cathode-ray tube. It removes the retread line invisible on the screen so that it will not interfere with the display.
retread line See RETREAD, 2.
retread ratio For the swept beam in a cathode-ray tube, the ratio of the scanning velocity in the trace direction to the scanning velocity in the RE-TRACE direction.
retread time In a cathode-ray tube, the amount of time required for the scanning beam to move from the end of one trace or line to the beginning of the next.
retool To supply something with specially designed or adapted parts that were not available when it was made.
retransmit for Orbit For an artificial earth satellite, an orbit whose direction is east-to-west, relative to the earth’s surface.
return 1. See RETRACE, 2. See RETURN CIRCUIT. 3. See RETURN POINT. 4. In an electronic circuit, the electrical ground and ground current path.
return circuit The circuit through which current returns to a generator.
return instruction In a computer program, an instruction in a subroutine directing operation back to a specific point in the main program.
return interval See RETRACE TIME.
return line See RETRACE, 2.
return point 1. The point to which circuits are returned (e.g., a common ground point). 2. The terminal point of a return circuit.
return ratio See FEEDBACK FACTOR.
return time See RETRACE TIME.
return to zero 1. Abbreviation RZ or RTZ. In the magnetic recording of data, a method in which the write current returns to zero following the write pulse. Compare NOISE-RETURN-TO-ZERO. 2. A logic system in which the zero and one states are represented by zero voltage and a discrete voltage.
return trace See RETRACE, 1, 2.
REV 1. Abbreviation of REENTRY VEHICLE. 2. Abbreviation of REVERSE.
rev 1. Abbreviation of REVOLUTION. 2. To quickly and substantially increase the angular velocity of a motor.
reverberation 1. Multiple reflections of sound waves from the inside surfaces of an enclosed chamber. 2. The dying-out of sound waves in an enclosed chamber as the waves reflect repeatedly from the inside surface. In sound recording and/or reproduction, an electronically produced echo. It is used for special effects—especially in electronic music systems. 4. See RESONANCE, 2.
reverberation chamber A room in which the walls, floor and ceiling absorb very little sound, resulting in echoes. To avoid standing waves, the room is designed so that no two surfaces are exactly parallel.
reverberation system A system of devices operated with an electronic organ to simulate the effect of reverberation in a large room, such as a church auditorium.
reverberation time In an enclosed chamber, the time required for a sound to die down to a specified level (usually -60 dB) after the disturbance has stopped.
reverberation unit A device for producing artificial echoes—especially in the operation of electronic music systems.
reverse 1. To alter the direction of a current or process of an object so that the new direction is exactly opposite the previous direction. 2. In a directional wattmeter, the reflected-power indication or switch position.
reverse AGC Automatic gain control in which a signal-dependent voltage is fed back to an earlier stage to adjust its gain automatically. Compare FORWARD AGC.
reverse bias Reverse voltage or current in a transistor or a semiconductor diode. Compare FORWARD BIAS.
reverse breakdown See AVALANCHE.
reverse breakdown voltage See AVALANCHE VOLTAGE.
reverse characteristic The current vs. voltage response of a semiconductor junction that is biased in the reverse (low-conduction) direction. Compare FORWARD CHARACTERISTIC.
reverse conduction The very small current conduction through a pn junction when it is reverse-biased. Also called back current. Compare FORWARD CURRENT.
reverse current Symbol, \( I \). The current that flows through a pn junction when it is reverse-biased. Also called back current. Compare FORWARD CURRENT.
reverse engineering A design process in which a specific device or system is copied functionally, but not literally.
reverse Polish notation Abbreviation, RPN. A system of notation for expressing mathematical operations in which the operators follow the operands being manipulated. It is a mode of entry for some calculators (e.g., the operation \( 7 \times 2 \) might be entered by pressing keys in this order: \( 7, \text{ENTER, 2,} \).\( \)).
reverse recovery time See RECOVERY TIME, 1.
reverse resistance Symbol, \( R \). The resistance of a reverse-biased pn junction. Also called BACK RESISTANCE. Compare FORWARD RESISTANCE.
reverse voltage Symbol, \( E \) or \( V \). Direct-current voltage applied to a pn junction so that the p-type material is electrically more negative than the n-type material. Also called BACK VOLTAGE. Compare VOLTAGE.
reverse-voltage capacitance The internal capacitance of a reverse-biased semiconductor pn junction.
reverse voltage drop The voltage drop across a semiconductor pn junction that is biased in the reverse (low-conduction) direction.
reversible counter A counter that, by a control signal, can have the value it is holding either increased or decreased.
reversible permeability The permeability of a ferromagnetic substance when the magnitude of the alternating-current field is arbitrarily small.
reversing switch 1. A switch that reverses the polarity of a direct current voltage. 2. A switch that reverses the direction of motor rotation.
revolving field  See ROTATING FIELD.
rewind  To run a magnetic tape on a transport at a high speed in the direction opposite to that associated with the play mode.
rewrite  In computer operations, to return information read from a storage location to that location by recording.
RF  Symbol/Abbreviation of RADIO-FREQUENCY.
RF amplifier  See RADIO-FREQUENCY AMPLIFIER.
RF choke  See RADIO-FREQUENCY CHOKING.
RF coupling  See RADIO-FREQUENCY INTERFERENCE.
RF inverse feedback  A negative-feedback system for radiofrequency transmitters, in which a portion of the modulated radiofrequency (RF) signal is re-injected, and the resulting direct-current voltage is filtered and applied as bias to one of the audio stages in the proper polarity for degeneration.
RF lamp  A lighting lamp, used with radiofrequency (RF) alternating current, rather than the conventional 60-Hz current. This results in better efficiency, and allows much more light to be generated with a given filament lamp, as compared with 60-Hz current.
RF motion detector  In security systems, an intrusion detection and alarm system that senses Doppler-effect-induced changes in the frequency or phase of a radio-frequency (RF) electromagnetic field. The Doppler effect results from motion of objects in the secured area.
RF power supply  See OSCILLATOR-TYPE POWER SUPPLY. A common power source for radio-frequency oscillators.
RF preamplifier  A sensitive, radio-frequency amplifier circuit intended for improving the signal-to-noise (S/N) ratio in a wireless receiver. Generally placed between the receiver and the antenna or feed, such devices are tunable, others are broadband. See also PREAMPLIFIER.
RF probe  See RECTIFIER PROBE.
RF resistance  See RADIO-FREQUENCY RESISTANCE.
RF selectivity  See RADIO-FREQUENCY SELECTIVITY.
RF transformer  See RADIO-FREQUENCY TRANSFORMER.
RF transistor  See RADIO-FREQUENCY TRANSISTOR.
Rf  Symbol for GRID RESISTANCE.
Rg  Symbol for GRID RESISTANCE.
Rho  Symbol for RESISTANCE. (Also, Rg.)
RGT  Abbreviation of RESISTANT-GATE TRANSISTOR.
Rh  Symbol for RHODIUM.
Rheo  Symbol for high-frequency resistance (see RADIO-FREQUENCY RESISTANCE).
RHI  Abbreviation of RANGE-HEIGHT INDICATOR.
rheometer  A metallic element. Atomic number, 75. Atomic weight, 186.207. It is used in some thermocouples.
rheostat  A wirewound variable dropping resistor of the rotary type or slider type.
ribbon microphone  See VELOCITY MICROPHONE.
ribbon microphone ride gain  In broadcasting, the operations of constantly adjusting the audio modulation of the transmitter for optimum operation.
rhombus  A four-sided geometric plane figure, in which all four sides have equal length, and opposite angles have equal measure.
rhombic antenna  See DIAMOND ANTENNA.
rhomboid  A five-sided geometric plane figure, in which all five sides have equal length, and opposite angles are equal.
rhombus  A four-sided geometric plane figure, in which all four sides have equal length, and opposite angles have equal measure.
rhombic antenna  See DIAMOND ANTENNA.
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ripple amplitude The peak or peak-to-peak value of ripple in a power supply (see RIPPLE, 1).

ripple converter A binary counter consisting of flip-flops cascaded in series. A pulse must pass se-quentially from the input, through each stage, to the output of the chain.

ripple current Current flowing in a circuit as the result of ripple voltage (see RIPPLE AMPLITUDE).

ripple factor The ratio of the Ripple AMPLITUDE to the direct-current voltage output of a power supply.

ripple frequency The frequency of the ripple component (see RIPPLE, 1). In power supplies using half-wave rectification, this frequency is normally 60 Hz (the line frequency); in full-wave supplies, it is normally 120 Hz (twice the line frequency).

ripple percentage See PERCENT RIPPLE.

ripple torque Symbol, 1. In a torque motor, the amount of fluctuation in torque resulting from com-mutator switching action.

ripple voltage See RIPPLE AMPLITUDE.

RISC Abbreviation of REDUCED INSTRUCTION SET COMPUTER.

rise See VOLTAGE RISE. See RISE TIME.

rise time 1. An increase in the amplitude of a pulse or wave.

rise cable 1. A vertical feeder cable. 2. A vertical section of a feeder cable.

rise time 1. The time required for a pulse to rise from 10 percent to 90 percent of its peak amplitude. Compare FALL TIME.

RJ45 Abbreviation of REMOTE-JOB ENTRY.

RSM Symbol for cathode resistance.

RL 1. Abbreviation of RESISTANCE-INDUCTANCE-CAPACITANCE (R-L-C) network.

RL 2. Symbol for OUTPUT RESISTANCE. (Also, Rm.)

RL circuit See RESISTANCE-INDUCTANCE-CAPACITANCE CIRCUIT.

RL bridge See RESISTANCE-INDUCTANCE BRIDGE.

RL circuit See RESISTANCE-INDUCTANCE-CAPACITANCE CIRCUIT.

room temperature Abbreviation of REMOTE-JOB ENTRY.

room temperature The temperature of an indoor environment, approximately 21 degrees Celsius (70 degrees Fahrenheit).

ROM Abbreviation of READ-ONLY MEMORY.

Room noise Ambient acoustic noise in a room.

room resonance Acoustic resonance caused by the geometry and contents of a room.

room temperature Abbreviation of RT. 1. The tempera-ture of the chamber in which a test or fabrica-tion is carried out. It is commonly used to distinguish between operations that can be performed at the ambient temperature and those that require an elevated tempera-ture typical of an indoor environment, ap-proximately 21 degrees Celsius (70 degrees Fahrenheit).

room tone A qualitative expression for the suit-ability of an audio system for a given acoustic application. It is affected by factors (such as resonances or lack thereof, echoes or lack thereof, overall room size and proportions, and background noise).

room square meter Abbreviation, sq. m. The square root of the arithmetic mean (average) of the squares of a set of values.

root-mean-square converter A device that con-verts an input signal of any waveform into a direct-current signal of the same value as the EFFECTIVE VALUE of the input signal.

root-mean-square current See EFFECTIVE CURR-ENT.

root-mean-square voltage See EFFECTIVE VOLT-AGE.

ROPC Abbreviation of record of production.

root mean square The peak or peak-to-peak value of a signal.

root mean square value The peak or peak-to-peak value of a signal.

root-mean-square current See EFFECTIVE CURRENT.

root-mean-square voltage See EFFECTIVE VOLTAGE.

rooter switch A toggle switch whose lever is a spe-cially shaped bar. The bar is rocked back and forth to operate the switch. Compare BAT- HANDLE SWITCH, PADDLE SWITCH, and SLIDE SWITCH.

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rotary amplifier See AMPLIDYNE.

rotary antenna See VERTICAL ANTENNA.

rotary beam A beam antenna, such as a Yagi, that can be rotated in a (usually horizontal) plane to allow the whole assembly to be rotated; a wheel contact provides a movable tap. Such an indicator is con-tinuously variable and is often used in such de-vices as antenna-tuning networks.

rolling In television, the apparent continuous up-ward or downward movement of the picture, resulting from lack of vertical synchronization between the transmitted and received signals.

rolloff 1. The rate at which a dependent variable (e.g., output amplitude) diminishes above or be-low a certain critical value of the independent variable (e.g., frequency). It pertains especially to frequency response in audio devices and sys-tems. 2. Attenuation of the bass and/or treble re-sponse or output in an audio system.

romex cable A wire of form a covering with a coating that is highly resistant to the environment.

Romex cable A wire of form a covering with a coating that is highly resistant to the environment.

rooms An area within a building that is used for a par-ticular purpose or activity.

room tone A qualitative expression for the suit-ability of an audio system for a given acoustic application. It is affected by factors (such as resonances or lack thereof, echoes or lack thereof, overall room size and proportions, and background noise).

room volume The rate at which a dependent variable (e.g., output amplitude) diminishes above or be-low a certain critical value of the independent variable (e.g., frequency). It pertains especially to frequency response in audio devices and sys-tems. 2. Attenuation of the bass and/or treble re-sponse or output in an audio system.

ROM Abbreviation of READ-ONLY MEMORY.

Romeo Phonetic alphabet code word for the letter R.

romex cable A wire of form a covering with a coating that is highly resistant to the environment.

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romex cable A wire of form a covering with a coating that is highly resistant to the environment.
allow transmission and/or reception in various directions. Also see ROTATABLE ANTENNA.

rotary beam antenna See ROTARY BEAM.

rotary converter A dynamo (electric machine) having a direct-current armature connected to a commutator on one end of the shaft and to slip-rings on the other end. When the machine is operated as a direct-current motor, it delivers an alternating-current output, and vice versa. Also called DOUBLE-CURRENT GENERATOR.

rotary dialing An older style of telephone dialing in which a rotary pulse generator is used to dial the digits.

rotary digital audio tape Digital audio tape used with a recording/playback system that uses a rotating head or heads.

rotary encoder An optical analog-to-digital (A/D) converter that operates by passing a light beam through a rotating disk. The amplitude of the analog input signal at any moment causes a certain angular rotation of the disk, cutting off the light beam, according to the nature of the pattern on the disk. The resulting modulated light beam has digital characteristics and can be detected using photocells.

rotary inverter A motor-generator used to change a direct-current input voltage into an alternating-current output.

rotary-motion sensor A transducer that delivers an output voltage proportional to the arc over which its shaft has been turned.

rotary power amplifier See DC GENERATOR AMPLIFIER.

rotary relay An electromechanical relay in which a pivoted armature rotates to open or close the contacts. The rotary relay is an example.

rotary selector switch See ROTARY SWITCH.

rotary stepping relay See STEPPING SWITCH.

rotary stepping switch See STEPPING SWITCH.

rotary switch A switch in which a blade moves in a rotating fashion.

rotary transformer A motor-generator used to change an input voltage into a lower or higher output voltage.

rotatable antenna An antenna that can be turned to change the orientation of its main lobe (direction of greatest forward gain) in a specific plane (usually horizontal).

rotating amplifier See DC GENERATOR AMPLIFIER.

rotating antenna An antenna that constantly turns to scan a given area (e.g., a RADAR ANTENNA).

rotating-capacitor modulator A frequency modulator consisting of a motor-driven variable capacitor. Also see WOBBULATOR.

rotating field An alternating-current electric or magnetic field, such as that generated by the stators of some motors, that revolves between poles.

rotating interrupter A commutator (see COMMUTATOR, 1).

rotatable antenna rotating machines Electromechanical devices (such as motors, generators, amplifiers, rotary converters, etc.) that utilize magnetic flux to convert angular motion or displacement into electrical energy, or vice-versa.

rotating memory See DISK MEMORY and DRUM MEMORY.

rotating voltmeter See GENERATING VOLT-METER.

rotator A motor-driven, remotely controlled mechanism for turning a directional antenna in a specific plane.

rotor 1. A rotatable coil—especially in a motor or generator. Compare STATOR. 2. The rotating member of a motor or generator. Compare STATOR. 3. The rotating-plate assembly of a variable capacitor. Compare STATOR. 4. The pin that rotates the blade of a rheostat or potentiometer.

rotor blade The wiper arm of a rheostat or potentiometer.

rotor coil See ROTOR. 1.

rotor plate The rotating plate(s) of a variable capacitor. Compare STATOR PLATE.

roullette pattern A circular pattern for frequency identification with an oscilloscope, consisting of loops around the screen’s circumference. Compare GEAR-WHEEL PATTERN, LINKSAUS FIGURE, and SPOT-WHEEL PATTERN.

rounding 1. A method of approximating a quantity by reducing the number of significant digits. For example, rounding 3.44 to two significant digits yields 3.4; rounding 3.46 to two significant digits yields 3.5. Compare TRUNCATION. 2. The approximation of a value to a specified number of decimal places or significant digits. 3. Smoothing of the corners of a square wave or sawtooth wave, resulting in lengthening of the transition time from one state to another.

rounding error The error resulting from the rounding of a number (see Rounding, 2). round off To shorten an otherwise lengthy number by replacing numerical digits with zeros and increasing the final nonreplaced digit by 1 if the leftmost replaced digit is 5 or greater. Thus, 3.14192653 can be rounded off to 3.14 or 3.14.

round-up A form of numerical approximation, in which a number with a value of n.5 or greater is assigned the value n + 1. This is a feature of many calculators using scientific rotation or a fixed number of decimal places.

Rsub Symbol for OUTPUT RESISTANCE. (Also, Rs.)

result 1. To physically position wires or conducting circuit paths by planning and deliberation. 2. The path over which conductors are positioned. 3. A path over which signals or information can be carried.

routine 1. In computer operations, the complete sequence of instructions for performing an operation (i.e., a program or program segment). 2. A test or measurement procedure. 3. An assembly or manufacturing procedure. 4. A standard troubleshooting procedure.

row In a matrix, a horizontal arrangement or set of values.

Rt Symbol for THERMAL RESISTANCE. (Also, R.)

rule 1. A physically tangible object used in troubleshooting procedure.

rubber A natural insulating material: an elastomer exhibiting rapid elastic recovery. Dielectric constant, 2 to 3.5. Dielectric strength, 16 to 50 kV/mm. Also called India rubber. Compare HARD RUBBER.

rubber-covered wire Wire insulated with a jacket of rubber.


ruby laser A laser using a ruby rod as the resonant element.
Below about 50 Hz. Vibrations that can occur in a poorly designed or malfunctioning phonograph turntable.

**rumble filter** An audio high-pass filter having a sharp cutoff below 50 Hz, for eliminating rumble arising from irregularities in the rotation of a phonograph turntable. Also see RUMBLE, RASH, RASH.

**run** 1. The execution of a computer routine or program. 2. To execute a routine or program. 3. To cause a routine or program to be executed. 4. A command that causes a routine or program to be executed.

**runaway** In a current-carrying circuit or device, especially a semiconductor, a rapid increase in current that causes the temperature to rise, in turn resulting in a further increase in current. Unless preventive measures are taken, this will ultimately damage or destroy the component.

**run chart** In computer operations, a flowchart showing the organization and order of pertinent programs to be run.

**running accumulator** A computer storage unit having registers linked so that data is transferred unidirectionally from one to the other, and in which only one register is accessible from the outside.

**running open** 1. The condition of a mechanical teleprinter running continuously in the absence of a signal. The teleprinter operates, but nothing is printed; this keeps the machine in synchronization. 2. Operation of a transmitter at the maximum rated level of input or output power.

**running-time meter** See ELAPSED-TIME METER.

**run time** 1. The period of time during which a computer program is executed. 2. The length of time required for a computer program to be executed.

**rupture** 1. The usually rapid and violent tearing apart, or breaking through, of an insulating material subjected to excessive voltage. 2. The clean opening of relay, circuit-breaker, or switch contacts to interrupt a current-carrying circuit.

**rush** Broadband audio background noise, such as that arising from superheterodyne receivers and high gain amplifiers. Its name is derived from resemblance to the gentle rushing of wind. Compare HISS. 1. 2.


**sabot** Abbreviation for RETARD.

**sablon** A form of inductive semiconductor switch, operated at cold temperatures to maximize conductivity.

**SAB** Abbreviation for SHELL of a tube or semiconductor device.

**sablon** A section of the S band, extending from 3100 to 3400 MHz.

**sabin** A unit of sound absorption; 1 sabin represents a surface that can absorb sound at the same rate as 1 square foot of a perfectly absorptive surface.

**SADT** Abbreviation of SURFACE ALLOY DIFFUSED-BASE TRANSISTOR.

**SAE** 1. Abbreviation of SHAFT-ANGLE ENCODER. 2. Abbreviation of Society of Automotive Engineers.

**safe noise level** A level of acoustic intensity equal to 85 dB above the threshold of hearing. At sound levels higher than this, eardrum damage is possible.

**safety factor** A figure denoting the extent of overload that a device can withstand before breaking down.

**safety ground** A connection made between equipment (usually the metal chassis, panel, case, or frame circuit) and the earth as a protective measure against fire and electric shock.

**safety switch** See ELECTRICAL INTERLOCK.
electrolyte, insulant, corrosion, rust, etc.) taken from a larger group or body.

sample and hold A method of storing a variable signal for detailed examination.

sampled data system A system that can be either digital or analog, that works from samples of the input signals.

sampling systems, a device that digitizes and stores sound for a brief interval of time.

sample size In statistics, the number of items in the sample space chosen for analysis.

sampling, the set of events, numbers, or other items chosen for analysis.

sampling 1. Observation of a signal at various points in a circuit, without affecting the operation of the circuit. 2. The conversion of analog signals to binary signals—especially for use in digital communications systems and in computers. 3. In statistics and probability, a set of function values corresponding to specifically chosen points in the domain.

sampling rate The frequency with which samples are taken (e.g., 1/40 to one sample per hour) or 10/min (10 samples per minute).

sampling window See WINDOW.

sand load A microwave power dissipator in which the absorptive material is a mixture of sand and carbon.

sapphire needle See SAPPHIRE STYLUS.

sapphire stylus A jewel-tipped stylus for disc recording and playback. It is noted for durability.

sat. 1. Abbreviation of saturate. 2. Abbreviation of SATURATION. 3. Abbreviation of SATELLITE.

satd. Abbreviation of saturated.

satellite An artificial object sent into orbit around the earth or another planet. See, for example, ACTIV COMMUNICATIONS SATELLITE and PAS-SIVE COMMUNICATIONS SATELLITE.

satellite communication Communication via one or more satellite transponders. Usually both stations are on the ground, although sometimes one or both stations are airborne or in space.

satellite processor 1. In a computer, a microprocessor that is subsidiary to the central processing unit (CPU). 2. In a data-processing system, a CPU used to control sequences of programs of secondary importance to the system's main application.

satellite television The broadcasting and reception of television (TV) signals via earth-orbiting satellite. Usually, the satellite is in a geostationary orbit. The receiving station employs a dish antenna, a tuner, a digital-to-analog (D/A) converter (if the device has a TV receiver). To make a statement of inequality or an assertion of SCALE.

sc 1. See SCANNER.

scale 1. An ordered series of quantities, such as tones, frequencies, voltages, etc. (e.g., musical scale). 2. A radio-frequency band extending from 1550 to 5200 MHz. For subdivisions of this band, see S1, BAND, S2, BAND, S3, BAND, S4, BAND, S5, BAND, S6, BAND, S7, BAND, and S8, BAND.

scale down A method of storing a variable signal for detailed examination.

scale up A method of storing a variable signal for detailed examination.

scale-down recorder A method of storing a variable signal for detailed examination.

scale-down, alcohol A digital-to-analog converter (DAC) operated at a sampling rate lower than the input rate. A scale-down, the abbreviation for SCALE.

scale facetor A method of storing a variable signal for detailed examination.

scale factor A method of storing a variable signal for detailed examination.

scale limit A method of storing a variable signal for detailed examination.

scale of measurement A method of storing a variable signal for detailed examination.

scale of representation A method of storing a variable signal for detailed examination.

scale space A method of storing a variable signal for detailed examination.

scale size A method of storing a variable signal for detailed examination.

scale-up recorder A method of storing a variable signal for detailed examination.

scale-up, alcohol A digital-to-analog converter (DAC) operated at a sampling rate higher than the input rate. A scale-up, the abbreviation for SCALE.

scale-up, alcohol A digital-to-analog converter (DAC) operated at a sampling rate higher than the input rate. A scale-up, the abbreviation for SCALE.
scale expansion  Spreading out the divisions in part of a scale (see SCALE, 1).

scale factor  A multiplier, the readings from which a particular scale must be multiplied or divided to give the true values measured. Quantities. 2. A figure that converts or converts to another system of rotation, or to another system. 3. In scales that show or show in a digital manner, the factor by which a group of quantities is adjusted. 4. The ratio of output frequency to input voltage for a voltage-to-frequency converter.

class-factor adjustment  In some meters, an adjustment that allows full-scale deflection to be set at any desired value (within certain limits) of applied-signal amplitude.

class-factor error  The absolute value of the difference between the actual scale factor and the ideal scale factor for a multiplier circuit.

class-factor tolerance  The extent to which a measured value for the scale factor differs from the computed value. It is generally given as a percentage.

class length  The end-to-end dimension of a scale (see SCALE, 1), in inches, centimeters, geometric degree, or number of divisions.

class multiplier  See SCALE FACTOR, 1.

class-of-two counter  A circuit that delivers one output pulse for two successive input pulses.

class-of-ten counter  A circuit that delivers one output pulse for 10 successive input pulses.

class-of-scale 10 COUNTER.

classer  A circuit or device for extending the frequency range of another device (e.g., a circuit that extends the range of a 1-MHz counter to 100 MHz).

class range  The difference between the lowest and highest values on a scale.

class span  See SCALE RANGE.

classing  1. The act of converting operational amplifiers to weight and sum multiple voltages. 2. The rate at which a controlled quantity is checked periodically by a control computer. See SCANNING FREQUENCY.

class tuning  Repetitive, automatic sweeping of a frequency band by a tuned circuit containing a varactor, whose capacitance is periodically varied by a sawtooth voltage.

class AB  A method of waveforms analysis involving the evaluation of instantaneous amplitudes at numerous points in time. The values are obtained at specific intervals from the image of a complete wave cycle, as displayed on an oscilloscope or plotted on a graph.

class AB  The expression of very large and very small numbers as a fixed-point part (mantissa) and a power of the radix (usually 10)

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class-of-ten counter  A circuit that delivers one output pulse for 10 successive input pulses.

class-of-scale 10 COUNTER.

classer  A circuit or device for extending the frequency range of another device (e.g., a circuit that extends the range of a 1-MHz counter to 100 MHz).

class range  The difference between the lowest and highest values on a scale.

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Generally, the mantissa is greater than or equal to 1, but less than 10; the power of 10 is adjusted accordingly. Thus, for example, 0.003700 = 3.700 × 10^-3. See also SIGNIFICANT FIGURES.

scratch filter A crystal, such as one of sodium iodide, that sparkles or flashes when exposed to radioactive particles or rays.

scintillation 1. In radar operations, the apparent rapid displacement of a target from its mean position. 2. A momentary flash of light produced in a phosphor or scintillating crystal when a high-velocity particle strikes it. 3. A small fluctuation in radio field intensity at a receiving point.

scintillation counter A radiation counter consisting essentially of a scintillating crystal in combination with a photomultiplier tube. Flashes from the excited crystal cause the tube to deliver output pulses that are totaled and indicated.

scintillator material A substance, such as crystalline sodium iodide, that scintillates under certain stimuli.

scissoring A method of interrupting the electron beam in a cathode-ray tube when the beam would not land on the phosphor screen.

scip Abbreviation of SPHERICAL CANDLEPOWER.

scop Abbreviation of SILICON-CONTROLLED RECTIFIER.

scrambled signal Any signal in which (for secrecy or convenience) the characters are disarranged according to an encryption algorithm. Thus, intelligible reception is possible only if the signal is processed via a suitable decryption algorithm. Example: SCRAMbled SPEECH.

scrambled signal A transmission in which the frequencies have been inverted to prevent eavesdropping. It is automatically unscrambled (by reinversion) at the receiver to restore intelligibility.

scrambler circuit A circuit containing filters and frequency inverters for scrambling speech.

scratch filter An audio-frequency low-pass filter that suppresses high-frequency noise caused by friction between a phonograph disc and the needle.

scratchpad memory In computers, a low-capacity memory that stores an intermediate result of a computational calculation.

scratch tape Magnetic data tape that can be overwritten for any purpose.

sec 1. Second, abbreviated by S. 2. A variable-frequency oscillator used to locate and identify signals by the heterodyne method. 3. The reciprocal of the cosine; sec x = 1/cos x. The secant of a right triangle to the adjacent side (see). 4. The mean second of time; 1 sec = 1/3600 hour. 5. Symbol for SELENIUM.

secant Abbreviation of SECONdary ELECTRICAL standard.

secondary 1. A color prepared by mixing two primary colors. In television operation, any displayed color composed of two or more color primaries. 2. Current The current flowing in the secondary of a transformer. Also called SECONDary ELECTRICAL standard.

secondary cell See STORAge BATTERY.

secondary circuit The circuit associated with the secondary winding of a transformer. 2. See OUTPUT circuit.

secondary color 1. A color that can be mixed by two primary colors. In television operations, any displayed color composed of two or more color primaries.

secondary current The current flowing in the secondary winding of a transformer. Also called SECONDary CURRENT.

secondary electron 1. The electron possessing the lesser energy after a collision between two electrons. Compare PRIMARY ELECTRON. 2. An electron ejected by secondary emission.

secondary emission The action whereby electrons in the atoms at the surface of a target are ejected as a result of bombardment by a beam of many electrons. Thus, in an electron tube, electrons from the cathode strike the plate with a force that drives secondary electrons out of the plate, into the surrounding space.

secondary emitter A source of secondary electrons (e.g., the plate of an electron tube or a dynode in a photomultiplier tube).

scroll See WINDING.

seal 1. The point at which a lead or electrode enters or leaves and is secured to an envelope, case, or housing. Such a point is often tightly closed against passage of air in or out of the envelope. 2. To close off a circuit or component from the air (see). A sealed dry battery A set of electrochemical dry cells that can be installed without concern for orientation or position. Example: 9-volt “transistor battery.

sealer 1. A meter that is tightly closed against the entry of moisture and foreign materials. 2. A meter that is locked or otherwise protected against tampering.

sealing compound A substance (such as wax, pitch, or plastic) used to enclose and protect electronic devices.

search 1. To scan or sweep through a range of quantities or through a region of interest. 2. To examine (usually in some prescribed order) items of information in a computer memory to find those satisfying a given criterion.

search coil An inductive probe (exploring coil) used to sample magnetic fields.

search oscillator A variable-frequency oscillator used to locate and identify signals by the heterodyne method.

search probe 1. See SEARCH coil. 2. A capacitive grid used to sample electric fields.

search radar A radar that displays a target almost immediately after that target enters a scanned area.

search time The time needed to test items during a search. 2. See SEARCH coil.

sea return See SEA CLUTTER.

sea clutter Collectively, the radar echoes that the sea reflects.

sea level The point at which a lead or electrode enters or leaves and is secured to an envelope, case, or housing. Such a point is often tightly closed against passage of air in or out of the envelope.

sea return See SEa CLUTTER.

seasonal effects In ionospheric propagation, the changes produced as a result of the revolution of the earth around the sun. The path of the sun across the sky, and the length of the day, are primarily responsible for such effects.

seasonal static Atmospheric electrical interference, most prevalent during the summer. The path of the sun across the sky, and the length of the day, are primarily responsible for such effects.

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not possess the very high stability and extreme accuracy of a primary frequency standard. The secondary standard is periodically checked against a PRIMARY FREQUENCY STANDARD and appropriately corrected.

secondary The impedance of the secondary winding of a transformer whose primary winding is unloaded. Compare PRIMARY IMPEDANCE. 1. An external impedance presented to the secondary winding of a transformer. Compare PRIMARY IMPEDANCE. 2. secondary inductance The inductance of the secondary winding of a transformer whose primary winding is unloaded. Compare PRIMARY INDUCTANCE.

secondary KVA The kilovolt-amperes in the secondary circuit of an operating transformer. Compare PRIMARY KVA.

secondary power The power in the secondary circuit of a transformer. Also see SECONDARY KVA and SECONDARY VA. Compare PRIMARY POWER.

secondary radiation 1. The (sometimes random) renatement of electromagnetic waves, as from a receiving antenna. 2. Rays emitted by atoms or molecules when the latter are struck by other radiation.

secondary rays Rays emitted by atoms or molecules that have been bombarded by other rays of the same general nature. Examples: secondary X-rays and secondary beta rays.

secondary resistance The direct-current resistance of the secondary winding of a transformer. Compare PRIMARY RESISTANCE.

secondary standard An accurate source of a quantity (capacityance, frequency, inductance, resist-ance, etc.), that is referred periodically to a primary standard for correction.

secondary storage In computer and data-processing systems, storage that is auxiliary to the main storage. Also called backing storage.

secondary turns The number of turns in the secondary winding of a transformer. Compare PRIMARY TURNS.

secondary utilization factor For a transformer in a rectifier circuit, the utility factor of the secondary winding ratio of direct-current power output to secondary volt-amperes.

secondary VA The volt-amperes in the secondary circuit of a transformer. Compare PRIMARY VA.

secondary voltage The voltage across the secondary winding of a transformer. Also called TRANSFORMER OUTPUT VOLTAGE. Compare PRIMARY VOLTAGE.

secondary winding The normal output winding of a transformer. Also called SECONDARY COIL. Compare PRIMARY WINDING.

segment 1 A record produced by a SEISMOGRAPH. It is a tape or a magnetic spherical object that contains the history of an earthquake.

segment 2 A set of collinear radiating elements, placed end-to-end with reactances between them, for the purpose of modifying the radiation pattern.

segmental horn antenna A set of collinear radiating elements, placed end-to-end with reactances between them, for the purpose of modifying the radiation pattern.

segmentalized antenna An (usually sheetmetal) antenna with the shape of a horn of rectangular cross section. It is flared in one dimension only.

second-channel attenuation See SELECTANCE, 2. second-channel interference In a given channel, interference arising from authorized signals two channels removed.

second detector In a superheterodyne receiver, the intermediate-frequency detector. Compare FIRST DETECTOR.

section 1. A subcircuit or stage of a larger circuit (e.g., the oscillator section of a receiver). 2. The smaller unit described in 1, when self-contained and operated independently (e.g., filter section).

sectionalized antenna A set of collinear radiating elements, placed end-to-end with reactances between them, for the purpose of modifying the radiation pattern.

sector On a magnetic disk, a specific portion of a track.

sectoral horn antenna An (usually sheetmetal) antenna with the shape of a horn of rectangular cross section. It is flared in one dimension only.

sector display In a radar, a display that allows the continuous observation of a portion of the tracked area.

sectoral horn antenna The state in which a radioactive substance changing into another substance is decaying as fast as the second substance is being formed.

secular change A slow change in the intensity of the terrestrial magnetic field.

secure mode In a security system, the condition of being activated.

securent In radiotelephony, a spoken word (pro- nounced say-kyoor-ee-tay) identifying a transmission concerning safety. Equivalent to TT in radiotelegraphy.

security code 1. A set of alphanumeric characters (letters and/or numbers) or switch settings that activates or deactivates a security system. 2. See PASSWORD.

security robot In a smart home, a robot that assists in protection of a home or business, and its occupants, from intrusion, burglary, or attack. If an intruder enters the property, the security robot might drive the offender away or detain the offender until police arrive. The robot might employ iris print detection or facial feature detection to identify an intruder from a distance. The robot would be linked to the home computer via a broadband, high-speed wireless system. Compare SENTRY ROBOT. Also see SMART HOME OR BUSINESS.

security system A set of electronic (and sometimes also electromechanical) devices designed to do one or more of the following: restrict access to a premises or computer system, detect abnormal conditions, detect unauthorized entry, alert human operators of abnormal conditions, alert owners and/or authorities of unauthorized entry to a premises, and (in some cases) provide physical protection of property.

seebeck effect The development of an electromotive force in a junction of two dissimilar metals (a thermocouple) when the temperature of the junction is different from that of the rest of the material.

seebeck emf The electromotive force resulting from the Seebeck effect.

seed crystal A small single crystal from which a larger single crystal (e.g., germanium or silicon) is grown. Also see CZOCHRALSKI METHOD.

sectoring robot A robot that serves in the capacity of a seeing-eye dog, to help visually impaired people in their daily activities.

seek 1. To search. 2. To search for a specific piece of data by moving the read/write head over the disk surface.

seek area An area of direct-access storage to which access may be attempted and from which the records can be accessed quickly.

segment 1. The portion of a line or curve lying between two points. 2. See PROGRAM SEGMENT.

segmental meter An expanded-scale meter (see SCALE EXPANSION).

segmented encoding law An approximation of a smooth encoding law, done by means of linear partitions or segments. The greater the number of segments, the more accurate the approximation.

segmenting See PARTITIONING.
to arrive in various phase relationships, with resulting distortion in the received signal.

**selective fading** Interference confined to a narrow band of frequencies.

**selective polarization** See POLARIZATION SELECTIVITY.

**selective reflection** In the reflection of electrons directed into a crystal by means of an electron gun, the tendency of the electrons to be reflected more readily when they strike the crystal at certain angles.

**selective relay** A relay or relay circuit tuned to open or close at one signal frequency. 2. A relay or relay circuit adjusted to open or close at one value of current or voltage.

**selective trace** In computer operations, a diagnostic program used to analyze certain areas of memory or specific kinds of program instructions, for debugging purposes.

**selectivity** 1. The ability of a circuit or device to pass signals of one frequency and reject signals at other frequencies. 2. The degree to which a circuit or device passes signals of one frequency and rejects signals at other frequencies.

**selectivity control** In some equipment (such as receivers, crystal filters, wave analyzers, and vibration meters) an adjustment that permits variation of selectivity.

**Selectoject** A fully electronic, continuously tunable, notch-peaker that is resistance-capacitance tuned up. Its name is an acronym for select or reject.

**selector** 1. A channel switch in a radio or television receiver. 2. See SELECTOR SWITCH.

**selector channel** In data-processing and computer components, the transmission channel controlling the information flow between peripherals and a central processing unit.

**selector pulse** In digital communications, an identifying pulse that represents a certain group of bits.

**selector relay** A device, such as a stepping switch, that actuates one of a number of available circuits on receipt of a predetermined number of pulses.

**self-charging switch** A (usually rotary) multiposition switch that allows an operator to select from among several options (such as frequency channels, frequency bands, or selective filters).

**selenium** A nonmetallic element. Atomic number, 34. Atomic weight, 78.96. It is used in the manufacture of some diodes, rectifiers, and photocells.

**selenium diode** A junction diode in which the semiconducting material is specially processed selenium. Also see JUNCTION DIODE.

**selenium photocell** See SULLENUM CELL.

**selenium rectifier** A disk- or plate-type power rectifier utilizing the junction between selenium and another semiconductor and iron.

**self-bias** For a transistor or vacuum tube, input-electrode bias voltage resulting from the flow of output-electrode current through a resistor common to both circuits. Also called AUTOMATIC BIAS.

**self-capacitance** The inherent internal capacitance of a device other than a capacitor.

**self-checking number** A number whose digits have a value that determines the check digit attached to it; thus, it can be verified following its transfer between storage locations or peripherals.

**self-cleaning contacts** Switch or relay contacts that clean themselves automatically by means of damping action.

**self-contained device** A device containing all parts and sections (e.g., main circuit, power supply, meter, loudspeaker, etc.) needed for full operation (i.e., no auxiliary equipment is needed).

**self-controlled oscillator** See SELF-EXCITED OSCILLATOR.

**self-discharge** The tendency of an electrochemical cell or battery to gradually lose stored energy when not in use.

**self-discharge rate** A quantitative expression of the speed with which SELF DISCHARGE occurs in an electrochemical cell or battery when it is stored without being used.

**self-energy** Symbol, E. The energy mc^2, in joules, of a particle traveling at the speed of light c \((2.9979 \times 10^8 \text{ m/s})\) and whose mass is m kilograms.

**self-erasing** In a magnetic tape, the unwanted erasing of data near a highly magnetized region.

**self-excited** A circuit or device that the passage of an applied current produces breakdown.

**self-excited oscillator** A television picture tube in which the electron gun has an automatic, electro-static focusing arrangement.

**self-generating photocell** See PHOTOVOLTAIC CELL.

**self-generating transducer** A voltage-producing transducer, such as a piezoelectric pickup or dynamic microphone.

**self-healing capacitor** A capacitor, such as a wet electrolytic unit, in which the dielectric is restored to its normal condition after a high-voltage breakdown.

**self-heated thermocouple** Thermocouple in which the passage of an applied current produces the heat necessary for the activation of the thermocouple.

**self-heating thermostat** A thermostat heated to above ambient temperature by the current passing through it. Also called DIRECTLY HEATED THERMOSTAT. Compare INDIRECTLY HEATED THERMOSTAT.

**self-impedance** The effective or measured impedance of a circuit point.

**self-inductance 1.** The inductance of an inductor.

2. The inherent internal inductance of a device other than a transformer.

**self-induction** Inductance that occurs in a single circuit. An instance is the generation of an opposing voltage across a coil by an alternating current flowing through it. Also see INDUCTANCE.

**self-oscillating relay** A relay that remains in the state that it has been switched (i.e., locked open or closed) until a subsequent signal is received.

**self-powered device** A device that requires no external power source (i.e., it is equipped with a self-contained battery or a generator).

**self-pulsing blocking oscillator** A blocking oscillator that produces a train of radio-frequency pulses. Compare SINGLE-SWING BLOCKING OSCILLATOR.

**self-quenching detector** A super-regenerative detector (see SUPER-REGENERATIVE CIRCUIT) in which the low-frequency quenching voltage is supplied by the regenerative detector itself. Also see QUENCHING ACTION and QUENCH OSCILLATOR. Compare SEPARATELY QUENCHED DETECTOR.

**self-quenching oscillator** A circuit, such as a blocking oscillator, in which oscillation is periodically switched off automatically, resulting in a self-interrupted wave train.

**self-rectifying vibrator** A vibrator-type power supply in which one vibrator reed chops the direct-current input to the primary winding of the transformer, and a second vibrator reed rectifies the alternating-current output delivered by the secondary winding. Also see VIBRATOR RECTIFIER.

**self-rectifying X-ray tube** An X-ray tube operated with alternating-current anode voltage.

**self-regulation** The ability of a circuit or device to control its output automatically, according to some predetermined plan, by using output error to correct operation or to vary the input.

**self reset** 1. The action of a circuit breaker to reapply power after a certain amount of time, without any action of any device, returning a circuit or system to normal automatically.

**self-resetting loop** In a computer program, a loop in which instructions cause locations used in the loop to assume their condition prior to the loop’s execution.

**self-resistance** The inherent internal resistance of a device other than a resistor.

**self-resonant frequency** The frequency at which a device will resonate (i.e., it has a resonant point). Pertaining to a computer or system, a data transmission channel consisting of several options (such as frequency channels, frequency bands, or selective filters).

**self-sustained oscillations** Oscillations maintained by means of positive feedback (inductive or capacitive) from the output to the input of a circuit. See, for example, SELF-EXCITED OSCILLATOR.
semi-transparent line

self-test Any arrangement whereby a device or system determines, without the aid of an external operator or reader, that it is operating correctly.

self-ventilated motor See OPEN MOTOR.

self-wiping contacts See SELF-CLEANING CONTACT.

self-excitation See AUTOSONY and SYNCHRO.

SEM See ELECTRONIC MICROSCOPE.

semiconductor A material whose natural resistivity lies between that of conductors and insulators (e.g., GERMANIUM, SILICON, SELENIUM, and Gallium arsenide).

semiconductor capacitor A miniaturized component that takes advantage of reverse biasing in a semiconductor P-N junction. When a voltage source is connected across a diode so that it does not conduct, the diode acts as a capacitor. The capacitance varies depending on how much reverse voltage is applied to the diode. The greater the reverse voltage, the smaller the capacitance. Some diodes are especially manufactured to serve this function. This phenomenon can be useful in the fabrication of integrated circuits (ICs). See also INTEGRATED CIRCUIT.

semiconductor counter A device for measuring the intensity of ionizing radiation (such as alpha particles, beta particles, or gamma rays) using a photodiode and sensing circuit.

semiconductor device A component (such as a diode, photocell, rectifier, or transistor) that exhibits the properties of a semiconductor.

semiconductor diode A solid-state device, as opposed to a vacuum-tube diode or gas-tube diode. Examples: germanium diode, silicon diode, and silicon diode.

semiconductor laser See LASER DIODE.

semiconductor material See SEMICONDUCTOR.

semiconductor-metal junction The area of physical contact between a metal and a semiconductor.

semiconductor photosensor A semiconductor photodiode or phototransistor, as opposed to a photosensitive resistor.

semiconductor rectifier A heavy-duty semiconductor diode or assembly of such diodes designated primarily to change alternating current to direct current in power-supply units. Rectifiers commonly are made from copper oxide, germanium, magnesium-copper sulfide, selenium, or silicon. Also see JUNCTION DIODE and METAL RECTIFIER.

semiconductor resistor A tiny resistor manufactured from semiconductor material, especially one that is etched onto the chip of an integrated circuit (IC). The thickness, and the types and concentrations of impurities added, determine the resistance of the component. Such resistors can handle only a tiny amount of power because of their small size. But because IC circuits are designed to consume minimal power, this is not a problem. The small signals produced by ICs can be amplified, using circuits made from discrete components, if it is necessary to obtain higher signal power. See also INTEGRATED CIRCUIT.

semidiode Pertain to a transistor that exhibits different directional characteristics at different frequencies.

semilogarithmic graph Also called semilog graph. A graph in which one axis is logarithmic and the other axis is linear.

semilogarithmic scale A scale in which the logarithm of the unit is plotted against the linear units of the other variable.

semilogarithmic graph A chart or graph that produces a straight line when the logarithm of one variable is plotted against the linear units of the other variable.

semitone A musical interval that is one of the 12 equal divisions of the octave. Also called SEMITONE.

sequence timer A circuit that samples a quantity in a predetermined sequence.

sequence relay A relay whose contacts close in a predetermined order.

self-test • semiresonant line
sequentially equivalent of parallel circuit

(capacitors to allow alignment of sensitive apparatus)

series resistance 1. Resistance acting in series with another resistance or with another quantity (e.g., capacitance and inductance) or with the plates of a capacitor. The inductance resistance that acts effectively in series with the plates of a capacitor. The resistance of the wire in a coil, acting effectively in series with the inductance.

series resistors Resistors connected in series with each other. If the individual resistors have values \( R_1, R_2, \ldots, R_n \), then the total resistance \( R_{\text{total}} = R_1 + R_2 + \ldots + R_n \). Also see SERIES CIRCUIT.

series resonance Resonance in a circuit consisting of a capacitor, inductor, and alternating-current generator in series. At the resonant frequency, the inductive reactance and the capacitive reactance cancel, so the net reactance is zero. The inductance, capacitance, and inductance current are maximum and equal, and the circuit impedance is minimum. Compare PARALLEL RESONANCE.

series-resonant circuit A resonant circuit in which the capacitor, inductor, and generator are connected in series. Also see SERIES RESONANCE.

series-resonant trap A waveshape consisting of a series-resonant inductance-capacitance (LC) circuit. Compare PARALLEL-RESONANT TRAP.

series-fed amplifier An amplifier circuit in which the operating voltages are applied in series with the alternating-current (ac) and direct-current (dc) voltages in series to a device. Example: the presentation of the dc operating voltages for an amplifier in series with the ac signal voltages (see SERIES-FEED AMPLIFIER).

series feedback A feedback system in which the feedback signal is presented to the input point in series with the input signal. Compare SHUNT FEEDBACK.

series field A magnetic field produced by a series winding in a motor or generator.

series generator An electric generator in which the armature and field windings are connected in series. Compare SHUNT GENERATOR.

series inductance 1. Inductance acting, effectively, in series with some other quantity (e.g., the inherent inductance of a wire-wound resistor). 2. An inductance connected in series with other inductances, or with some other quantity (e.g., capacitance and resistance).

series inductors Inductors connected in series, and separated or oriented in a way that minimizes the effects of mutual inductance. Assuming zero mutual inductance, if the individual inductors have values \( L_1, L_2, \ldots, L_n \), then the total inductance \( L_{\text{total}} = L_1 + L_2 + \ldots + L_n \). Also see SERIES CIRCUIT.

series limiter A limiter (clipper) circuit in which the diode is essentially in series with the signal. Compare PARALLEL LIMITER.

series loading The series insertion of reactances in a circuit for the purpose of impedance matching.

series magnetic circuits A combination of several magnetic paths in line so that flux extends through each path in sequence; this is analogous to the flow of an electric current successively through series-connected resistors.

series motor An electric motor whose armature and field windings are connected in series. Compare SHUNT MOTOR.

series operation The operation of units in succession, necessitating sequential current flow through each. Also see SERIES CIRCUIT.

series opposition Series opposition is a property wherein the operating voltages are applied in series with the operating voltages for an amplifier in series with the ac signal voltages (see SERIES-FEED AMPLIFIER).

series parallel-inductors See PARALLEL-SERIES-INDUCTORS.

series-parallel resistors See PARALLEL-SERIES RESISTORS.

series-fed amplifier • serrated rotor plate 621

series regulator A voltage regulator circuit in which the controlled device is in series with the controlled load. Compare SHUNT REGULATOR.
A shading coil encircles the tip of the core of a coil that carries alternating current (ac), such as the field shading coil 1.

An analog or digital output signal proportional to the arc of rotation of a shaft.

A section of the S BAND extending from 1650 to 1850 MHz.

A tuning meter in which the one-input terminal.

Electrical noise arising inside a radio or television receiver, as opposed to that picked up from the outside.

Electrical noise arising inside a radio or television receiver, as opposed to that picked up from the outside.

A signal generator designed expressly for use in a SERVOMECHANISM.

A signal generator designed expressly for use in a SERVOMECHANISM.

An energy (“power”) meter. Also see KILOWATT-HOUR METER.

A signal generator designed expressly for use in a SERVOMECHANISM.

A signal generator designed expressly for use in a SERVOMECHANISM.

A (usually industrial) robot whose motion sequence is programmed into a computer.

In wireless broadcast or communications reception, random electromagnetic noise generated by the earth’s atmosphere. Some of this noise is thermal in origin; some originates in thunderstorms. Sometimes this noise is called static.

The amount charged by a technician for a cell or battery, the relative amount of energy capacity (percentage of full-charge capacity) available at a given time, or after a certain length of time in normal use.

The amount charged by a technician for a cell or battery, the relative amount of energy capacity (percentage of full-charge capacity) available at a given time, or after a certain length of time in normal use.

A signal generator designed expressly for use in a SERVOMECHANISM.

A signal generator designed expressly for use in a SERVOMECHANISM.

An energy (“power”) meter. Also see KILOWATT-HOUR METER.
shaker  See VIBRATOR, 2.
shake table  A platform, actuated by a vibrator, on which components can be mounted for a vibration test.
shallow-diffused junction  A pn junction made by diffusing the impurity material for a short distance into the semiconductor wafer. Compare DEEP-DIFFUSED JUNCTION.
shape factor  1. For a tuned circuit, the ratio of the 60-dB bandwidth to the 6-dB bandwidth. 2. For a filter, the ratio of bandwidth at high attenuation to that at low attenuation.
shaping network  A combination of components for changing the natural response of a circuit to a desired response (i.e., a curve-changing circuit).
shared file  A data file that is available for use by more than one system simultaneously.
shared files system  A data processing system having one direct-access storage device from which information can be accessed by more than one computer.
sharpen  1. A circuit or device for increasing the selectivity of another circuit or device. 2. A circuit or device for decreasing the rise or fall time of a pulse or square wave. 3. A circuit or device for steepening the response of a filter.
sharpness  See SELECTIVITY.
sharp pulse  A pulse having extremely fast rise and fall times and narrow width (i.e., a spike).
shaving  The physical modification of a phonograph or other permanent recording surface, in preparation for rerecording.
shell  A. Section of the S BAND extending from 570 to 2,300 MHz. B. See POSITIVE-ION SHEATH. C. Control of in-storage, deterioration of the negative electrode because of local action in the zinc.
shell core  A core which completely surrounds the coils.
shell life  1. The longest period of time that electronic equipment can be continuously kept in storage before deterioration of materials or degradation of performance occurs. 2. The longest period of time that a battery can be stored without use before it must be discarded or recharged.
shell-type choke  See SHELL-TYPE INDUCTOR. 3. A core that completely surrounds the coils of a choke or transformer.
shell-type diode  A diode with the core completely surrounded by the coils.
shell-type inductor  An inductor in which the core completely surrounds the coils.
shell-type transformer  A transformer in which the core completely surrounds the coils.
shield  A metallic partition or box for confining an electric or magnetic field.
shield baffle  A sheet-type shield. Also see BAFFLE, 2 and SHEILD PARTITION.
shield box  A shield having a general box shape, and which is usually enclosed on all sides.
shield braided wire  Tubing woven from wire, through which an insulated wire is passed and thus shielded.
shield can  A cylindrical shield, usually enclosed on all sides.
shield disk  A flat shield having a disk shape. Also see BAFFLE, 2; SHEILD BAFFLE; and SHEILD PARTITION.
shielded cable  Cable completely enclosed within a metal sheath that is either flexible or rigid.
shielded wire  A single strand of insulated wire completely enclosed in a flexible or rigid shield.
shield partition  A wall-type shield usually consisting of a single, flat sheet of metal, sometimes bent into an angle. Also called BAFFLE SHIELD (see BAFFLE, 2).
shield plate  See BAFFLE, 2; SHEILD BAFFLE; SHEILD DISK; and SHEILD PARTITION.
shield room  See CAGE.
shield wire  A (usually grounded) wire, near and parallel to another wire that it shields.
shift  1. To move from one operating point to another in a characteristic curve, or in the operation of an equipment. 2. To transfer data from one point to another in a system, or move it left or right in a register.
shift flip-flop circuit  A flip-flop designed especially as a stage in a shift register.
shift pulse  1. In a shift register, a drive pulse that initiates the shifting of characters.
shift register  In computers, calculators, and storage systems, a circuit (usually composed of flip-flops in cascade) in which pulses can be shifted from stage to stage and finally out of the circuit.
shingle-type photocell  A device in which several separate photocells are series connected by slightly overlapping the ends of adjacent cells.
ship station  A radio or radar station installed aboard a ship that is not in port.
ship-to-shore communication  Radio communication between a ship at sea and a land-based station.
ship-to-shore communication  Radio communication between a ship at sea and a land-based station.
shock  1. Any situation that presents the danger of electric shock to attendant personnel. 2. The existence of a potential difference that will cause a current of at least 5 mA to flow through a resistance of 500 ohms or more, for a prolonged period of time.
shock absorber  A device that damps or eliminates the effect of a sudden shock.
shock absorber  A device that damps or eliminates the effect of a sudden shock.
shock-excited oscillator  A type of self-excited oscillator in which the transistor is suddenly cut off by applying a cutoff voltage to the gate or base electrode. This abrupt interruption of steady drain or collector current shocks the tank into damped oscillations.
shock hazard  1. Any situation that presents the danger of electric shock to attendant personnel. 2. The existence of a potential difference that will cause a current of at least 5 mA to flow through a resistance of 500 ohms or more, for a prolonged period of time.
shockley diode  See FOUR-LAYER DIODE.
shock mount  A structure that secures a microwave oven so that the microwave output is not affected by vibration.
short  1. A circuit or device for connecting two binding posts. 2. An often unintended low-resistance path through which current bypasses a component or circuit.
short circuit  A circuit or device for increasing the current, or for decreasing the rise or fall time of a pulse or square wave.
short-circuit current  In a power supply, the current that flows when the output is directly shorted. Many power supplies have shutdown devices that cause the current to stop flowing when the output terminals are short-circuited; other supplies effectively insert resistance in series with the load, if necessary, to limit the current.
short-circuiting switch  A rotary selector switch in which unused contacts are automatically shorted by momentary applying a pulse.
short-circuit parameter  A parameter for which zero resistance is assumed in the part of the circuit under consideration. The current amplification factor (alpha) of a common-base-connected transistor is such a parameter because its collector load resistance is assumed to be zero.
shorted-stub tuning  Tuning a stub to match a feeder to an antenna by sliding a short-circuiting bar along the two wires of the feeder.
shorting bar  A thick, metal strap for short-circuiting two binding posts.
shorting link  A short metal strip for connecting together two binding posts.
shorting loop  In a telephone system, a device that short-circuits two specified points for the purpose of testing or line fault detection.
shorting stick  A metal rod with an insulating handle, used to short-circuit a charged capacitor to ground, or to short-circuit the drain or collector current of a transistor.
short-circuiting switch  A device that damps or eliminates the effect of a sudden shock.
short-line tuning  See SHORT-CIRCUITING SWITCH.
short-line tuning  Use of a parallel capacitance to change the characteristic of a circuit, as in the case of a tuning a stub.
short-line tuning  Use of a parallel capacitance to change the characteristic of a circuit, as in the case of a tuning a stub.
short-line tuning  Use of a parallel capacitance to change the characteristic of a circuit, as in the case of a tuning a stub.
shore effect  A phenomenon caused by the existence of a potential difference that will cause a current of at least 5 mA to flow through a resistance of 500 ohms or more, for a prolonged period of time.
shore effect  A phenomenon caused by the existence of a potential difference that will cause a current of at least 5 mA to flow through a resistance of 500 ohms or more, for a prolonged period of time.
shore effect  A phenomenon caused by the existence of a potential difference that will cause a current of at least 5 mA to flow through a resistance of 500 ohms or more, for a prolonged period of time.
short-skip communication  Radio communica-
tion via the ionosphere over relatively short dis-
tances (up to about 300 miles). See, for example,
SPORADIC-E SKY.

short-term drift  The gradual change in the value of
a quantity, such as frequency or voltage, ob-
served over a comparatively brief interval, as op-
posed to a change occurring over a long period.
Compare LONG-TERM DRIFT.

short-term effect  The variation of any electrical
parameter over a relatively brief time interval. Ex-
ample: frequency drift over a short time period.
Also called short-time effect.

short-term stability  Stability reckoned over a
comparatively brief time interval, as opposed to
stability for a long period. Compare LONG-TERM
STABILITY.

short-time effect  See SHORT-TERM EFFECT.

shortwave  1. Pertaining to wavelengths
shorter than 200 meters (i.e., frequencies higher than
1.50 MHz). 2. Pertaining to the frequencies above
the standard amplitude-modulation broadcast
band (above 1.605 MHz), but below 30 MHz.

shortwave converter  A superheterodyne con-
verter for adapting a longwave receiver (such as a
broadcast receiver) for shortwave reception.

shortwave listener  Abbreviation, SWL. A radio
receiver that receives, but does not transmit,
shortwave signals.

shortwave receiver  Any radio receiver capable of
intercepting and demodulating signals in the
range 1.705 MHz to 30 MHz.

shortwave transmitter  Any radio transmitter ca-
ble of producing energy in the range 1.705 MHz
to 30 MHz.

shot-effect noise  Electrical noise caused by ran-
dom fluctuations in a current, as in a diode or tran-
sistor. Also see EQUIVALENT NOISE RESIS-
tANCE, COMPARE THERMAL NOISE.

shotgun microphone  A highly directional micro-
phone sensitive only to sounds coming from a
specific direction; the response pattern has a
narrow main lobe. Its name results from its long,
cylindrical configuration.

shot noise  Electrical noise arising from intermit-
tent impacts of such as those produced by spark
discharges, make-and-break contacts, etc. Its
name results from its resemblance to pistol shots.

shrink  The amount by which a material being mea-
sured with an electronic instrument decreases in
its reference dimension. Compare STRETCH.

shrink tubing  Plastic sleeving placed over a con-
ductor or at a conductor/connector joint, and
made to shrink down with the application of heat.

shunt  Synonym, parallel. 1. Pertaining to the
connection of one component across (in parallel)
with another (e.g., shunt resistor). 2. Pertaining to
circuits or conductors in such a manner that they
each (or all) are subjected to identical voltages.

shunt circuit  Between two specific points in a device or system.
4. To deliberately bypass some part of a system
by means of a short circuit.

shunt circuit  See PARALLEL CIRCUIT.

shunt-diode rectifier  A rectifier circuit in which
the rectifying diode is connected in parallel with the source
and load. Compare SERIES-DIODE RECTIFIER.

shunt-fed  1. Pertaining to a circuit or device in
which the direct-current operating voltage and
alternating-current signal voltage are applied in
parallel to an electrode. 2. Pertaining to a base-
grounded vertical antenna excited at some point
above ground.

shunt feed  See PARALLEL FEED.

shunt feedback  A feedback system in which the
fed-back signal is presented to the input of the
network in parallel with the input signal.

shunt generator  An electric generator in which the
armature and field windings are connected in
parallel. Compare SERIES FEEDBACK.

shunt cutting  A means of producing energy in the
range 1.705 MHz to 30 MHz.

shunt leads  Interconnecting wires used for the
purpose of attaching a shunting component to a
test instrument.

shunt limiter  See PARALLEL LIMITER.

shunt loading  The parallel insertion of a reactance
in a circuit, for the purpose of impedance match-
ing.

shunt motor  An electric motor whose armature
and field windings are connected in parallel.
Compare SERIES MOTOR.

shunt regulator  A voltage-regulator circuit in
which the controlled transistor or vacuum tube is
in parallel with the output (load) terminals.

shunt resistor  1. A device that can be connected in
parallel with a load to increase its current range.
2. A resistor connected in parallel with a
circuit to reduce its current. Compare MULTIPLIER RESISTOR.

shunt-series circuit  See PARALLEL-SERIES CIRCUIT.

shunt tee junction  A waveguide H-PLANE TEE
JUNCTION.

sidetone  S/I • sidetone 627

sidelobe suppression  Elimination of the side-
lobe(s) from the radiation pattern of an antenna.

sidetones  In telephony, the reproduction by a
receiver of sounds picked up by the transmis-
sor of the same telephone.

sideband  1. With respect to a carrier, one of the
additional frequencies generated by the modula-
tion process. In simple amplitude modulation,
the two sidebands are $f_c + f_m$ and $f_c - f_m,$ where
$f_c$ is the carrier frequency, and $f_m$ is the modula-
tion frequency. 2. Pertaining to sidebands as de-
ned in 1.

sideband attenuation  See SIDEBAND CUTTING.

sideband attenuation  Sideband elimination or attenuation of the
sidebands of a modulated signal by a circuit hav-
ing insufficient bandwidth.

sideband frequency  The frequency of the modula-
tion-generated signal accompanying a carrier.
One sideband frequency is that of the carrier ma-
nus that of the modulating signal; another is the
sum of the carrier and the modulation frequency.

sideband interference  1. Interference arising from
one or both of the normal sidebands of a modu-
lated signal. 2. Interference caused by spurious
sidebands, resulting from overmodulation.

sideband power  The power contained in the side-
band(s) of a signal.

sideband suppression  Elimination of the side-
lobe(s) from the radiation pattern of an antenna.

sidetone  See SIDEBAND CUTOFF.

sidetone suppression  Sideband attenuation or atten-
uation of the sidebands of a modulated signal.

sidetone technique  A method of using, for com-
 munications or other purposes, one or both of
the sidebands of a modulated signal without the
carrier.

sidechain amplifier  An auxiliary amplifier that is
external to a main amplifier. Such an amplifier
might be used, for example, in a feedback chan-
nel or in a volume-compression or volume-
expansion channel.

side frequency  See SIDEBAND.

sidereal time  In certain directional antenna systems, a
minor lobe in the horizontal-plane directivity pat-
tern that appears at right angles, or nearly at
right angles, to the main lobe. Such a lobe repre-
sents reduced sensitivity and/or power gain rela-
tive to the main lobe. Also see MAIN LOBE, MINOR LOBE.
sidetone telephone A telephone set with no provision for canceling the sidetone.
siemen's unit of conductance. The conductance of a component or medium in siemens is equal to the reciprocal of the resistance in ohms.

Siemen’s electrolydynamometer A spring-tension meter for measuring torque, with zero current through the device representing zero torque. It can be used for measurements of current, voltage, or power.

Sierra Phonetic alphabet code word for the letter S.
sign 1. Any indicator denoting whether a value is positive or negative. 2. A graphic device indicating an operation. Examples: + (addition), − (subtraction), × (multiplication). 3. Any symbol. An ampersand, for example, is an “and” sign. 4. A characteristic symptom of malfunction or improper operation (e.g., a high standing-wave ratio in an antenna system is a sign of an impedance mismatch).
signal 1. An electrical quantity, such as a current or voltage, that can be used to convey information for communication, control, calculation, etc.
signal-actuated voice recorder Abbreviation, SA-VOR. A recorder that goes into operation automatically when the speaker starts talking and stops whistling.
signal amplitude The intensity of a signal quantity (see SIGNAL).
signal-boosted digit See PREAMPLIFIER.
signal channel In a system, a channel through which only signals, signal, control and modifying impulses, or a combination of both, are passed through the system in the order designated.
signal circuit A circuit handling signal currents and voltages. It is the exclusion of control and operating currents and voltages.
signal conditioner Any accessory device (such as a peak probe, demodulator probe, current shunt, etc.) used to modify or change the function of a basic element (such as an electronic voltmeter).
signal converter See CONVERTER, 1.
signal current The current component of a signal, as opposed to operating current in a system.
signal diode A diode designed primarily for light-duty applications (e.g., signal amplification, detection, demodulation, modulation, curve changing), as opposed to the heavy-duty applications of power diodes and rectifiers.
signal distance In two words (bit groups) of the same length, the number of corresponding bit positions whose states differ. For example, the signal distance between 01001 and 10011 is 3.
signal flow A general method of analyzing circuits, particularly those using feedback, through the use of diagrams in which straight arrows represent feedback paths, dots represent nodes, and curved arrows represent feedback paths.
signal-flow diagram The transmission-path diagram used in SIGNAL-FLOW ANALYSIS.
signal gain The gain of an amplifier circuit—especially if used in small-signal applications. See SIGNAL-TO-NOISE RATIO and GAIN.
signal generator An instrument that produces signals of precise frequency and amplitude, usually with a wide range of values.
signal ground 1. Any circuit point that remains at zero signal potential throughout the operation of a circuit, or component is located.
signal input signal rectification

signal mixer A simple (usually single-frequency) signal generator used in troubleshooting to introduce a test signal at selected points in a circuit, to locate malfunctioning stages or components.
signal noise amplitude to the amplitude of the noise. Also see SIGNAL-TO-NOISE RATIO.
signal noise level 1. Signal strength, usually in terms of voltage or current. It is usually specified in applications.
signal noise strength 1. In a receiver, the ratio of the desired signal to the level of distortion other than the specified signal. Usually expressed in decibels.
signal noise-to-distortion ratio 1. In a receiver, the ratio of the desired signal to the level of distortion other than the specified signal. Usually expressed in decibels.
signal-to-noise ratio Abbreviation, SINAD. In a receiver, the ratio of the desired signal to the level of noise and distortion, other than the specified signal. It is usually expressed in decibels (dB).
signal-to-noise ratio 1. Signal strength, usually in terms of voltage or current. It is usually specified in applications.
signal noiselinker A special signal generator delivering signals whose frequency, amplitude, and waveshape can be adjusted at will.
signal output signal rectifier

signal peak 1. Any device, (e.g., preamplifier, expander, amplitude limiter, delay network) inserted into or added onto a system to modify an existing signal. 2. Signal rectification The conversion of an alternating current signal into a proportionate direct current signal, usually by means of a diode circuit.
signal rectification 1. A device used for quickly changing the frequency of a transmitted signal. 2. A device that automatically causes a transmitted signal to be sent on a frequency that differs from the receiver frequency by a known and predetermined amount. See MIXER, 1. 4. See CONVERTER, 2.
signal rectifier See SIGNAL DIODE.
signal reshaping 1. The processing of a signal so that it acquires its original waveform. Also called signal regeneration. 2. Passing a digital signal of any type through a circuit that delivers a uniform output pulse on a real-time one-to-one basis.
signal shaper 1. The processing of a signal so that it acquires its original waveform. Also called signal regeneration. 2. Passing a digital signal of any type through a circuit that delivers a uniform output pulse on a real-time one-to-one basis.
signal strength 1. The strength of a signal, with respect to a reference strength. 2. Signal strength The strength of a signal, usually expressed in watts, milliwatts, or microwatts, as opposed to the operating voltage of the circuit.
signal current 1. The current component of a signal, as opposed to operating current in a system. 2. Signal current 1. The current component of a signal, as opposed to operating current in a system. 3. See MIXER, 1. 4. See CONVERTER, 2.
signal squitter See SIGNAL INJECTOR.
signal squitter A special signal generator delivering signals whose frequency, amplitude, and waveshape can be adjusted at will.
signal-to-noise-plus-noise ratio Abbreviation, SNR. In a receiver, the ratio of signal amplitude to noise amplitude. It is usually expressed in decibels.
silicon carbide  Formula, SiC. A compound of silicon and carbon valued as a semiconductor, an abrasive material, and a refractory substance. The commercial product is made by heating carbon and sand to a high temperature in an electric arc furnace. Also see CARBORUNDUM.

silicon cell  A type of photovoltaic cell using specially processed silicon as the light-sensitive material. This cell has a comparatively high voltage output.

silicon-controlled rectifier  Abbreviation, SCR. A four-terminal semiconductor device commonly used in power control applications (e.g., light dimmers and motor-speed controls). The electrodes are called the anode, the cathode, and the gate. The control signal is applied to the gate.

silicon-controlled switch  Abbreviation, SCS. A four-terminal semiconductor switching device similar to the SILICON-CONTROLLED RECTIFIER. It is used for high-duty switching.

silicon crystal detector  See SILICON JUNCTION DIODE.

silicon dioxide  Formula, SiO₂. A compound of silicon and oxygen. In the passivation of transistors and integrated circuits, a thin layer of silicon dioxide is grown on the surface of the wafer to protect the otherwise exposed junctions.

silicone  A polymeric material characterized by a recurring chemical group containing oxygen and silicon atoms in the main chain as links. Various silicone compounds have numerous uses in electronics.

silicon dioxide  Formula, SiO₂. A compound of silicon and oxygen. In the passivation of transistors and integrated circuits, a thin layer of silicon dioxide is grown on the surface of the wafer to protect the otherwise exposed junctions.

silicon A semiconductor material characterized by high power-dissipation tolerance.

silicon diode  A semiconductor diode in which the semiconductor material is specially processed silicon. Also see SILICON JUNCTION DIODE.

silicon dioxide  Formula, SiO₂. A compound of silicon and oxygen. In the passivation of transistors and integrated circuits, a thin layer of silicon dioxide is grown on the surface of the wafer to protect the otherwise exposed junctions.

silicone A polymeric material characterized by a recurring chemical group containing oxygen and silicon atoms in the main chain as links. Various silicone compounds have numerous uses in electronics.

silicon junction diode  A semiconductor diode using a pn junction in a silicon wafer. Compare SILICON POINT-CONTACT DIODE.

silicon on sapphire  Abbreviation, SOS. Pertaining to integrated-circuit fabrication in which a silicopitaxial layer is grown on a sapphire substrate. Abbreviation, SBC. A computer program whose implementation allows programs written for one computer to be compatible with another computer.

silver  Symbol, Ag. A precious metallic element.

silver oxide cell  See PROSITITE.

silver-dollar construction  Printed-circuit assembly on a disk-shaped board, about the size of a U.S. silver dollar.

silver-mica capacitor  A fixed capacitor made by painting or depositing a silver layer (capacitor plate) on both faces of a thin mica film (dielectric separator).

silverware  The undesirable tendency of silver to be removed from one location and deposited in another under adverse environmental conditions.

silicon-oxide battery  A set of two or more silicon-oxide cells stacked one atop the other, electrically connected in series. The resulting battery has a cylindrical shape. A set of four cells provides approximately 6 volts under no-load conditions; a battery of six cells provides 9 volts; a battery of eight cells provides 12 volts. See also SILICON-OXIDE CELL.

silver-oxide cell  An electrochemical cell having a button-like shape, small enough to fit inside a wristwatch. There are several available sizes and thicknesses, all with similar appearance. The generated potential difference under no-load conditions is 1.5 volts, with a high ratio of stored energy over mass. The cell has a flat discharge voltage curve; the voltage remains essentially constant until the charge is almost depleted, and then the voltage drops rapidly.

silver solder  A solder consisting of an alloy of silver, copper, and zinc. It has a comparatively high melting temperature. Also see HARD SOLDER.

silverstat  A multiconductor device used to adjust the balance of a resistance or reactance bridge.

sin  Abbreviation, sin. The trigonometric function y/x; the ratio of the opposite side of a right triangle to the hypotenuse.

sine wave  A periodic wave that can be represented by a sine curve (i.e., its amplitude is directly proportional to the sine of the angle of deflection through which the shaft has rotated).
single-crystal Pertaining to the internal structure of a crystalline material, in which the characteristic lattice is continuous throughout any size of the material. Also called MONOCRYS-TALLINE.

single-crystal material A substance, such as a semiconductor, of which a sample, regardless of size, consists of a single crystal (i.e., there are no grain boundaries). Also see SINGLE-CRYSTAL.

single-crystal pulling See CZOCHRAWSKI METHOD.

single-dial control Adjustment of a multistage system via one rotatable, calibrated control attached to a ganged arrangement that tunes all stages simultaneously.

single-diffused transistor A transistor in which only one diffusion of an impurity substance is made. Thus, in a diffused-base transistor, a single diffusion provides the base region and at the same time creates the emitter-base and collector-base junctions. Compare DOUBLE-DIFFUSED TRANSITOR.

single-electron memory Abbreviation, SEM. A computer memory in which the movement of one electron can change a logic bit from 1 (high) to 0 (low) or vice versa.

single-element rotary antenna See ONE-ELEMENT ROTARY ANTENNA.

single-ended circuit A circuit that has one end grounded, as opposed to a double-ended circuit and push-pull circuit.

single-ended deflection In an oscilloscope or similar device, horizontal or vertical deflection provided by a single-ended deflection channel.

single-ended input An input circuit with one terminal grounded (or the equivalent ungrounded input circuit). Also called unbalanced input. Compare BALANCED INPUT.

single-ended multiplexer A group of analog switches that selects from several analog signals.

single-ended output An output circuit with one terminal grounded (or the equivalent ungrounded output circuit). Compare BALANCED OUTPUT.

single-ended push-pull circuit An arrangement, such as a complementary symmetry circuit, that provides push-pull output with single-ended input, but does not require transformers.

single-frequency Also called fixed-frequency. Pertaining to circuits or devices that normally operate at a frequency only (e.g., single-frequency oscillator).

single-frequency amplifier An amplifier that normally operates at only one frequency (or within a very narrow band of frequencies) (e.g., an intermodulation-frequency amplifier, or a selective audio-frequency amplifier used for harmonic analysis or bridge balancing).

single-image response In an oscilloscope presentation, a single pattern, as opposed to a double-trace pattern.

single-inline package Abbreviation, SIP. A flat, nonencapsulated package having terminal pins along one edge. All the pins lie along a common line. See SINGLE-LAYER COIL.

single-line tap In a telephone system, a connection that provides or designates a separate line (e.g., to serve a single household).

single-loop feedback Feedback through only one path.

single phase Pertaining to the presence or generation of one alternating current phase only. Compare POLYPHASE.

single-phase full-wave Pertaining to a rectifier operated from a single-phase alternating-current (ac) power line, and rectifying both half-cycles of ac voltage. Compare SINGLE-PHASE/HALF-WAVE BRIDGE.

single-phase/full-wave bridge A bridge rectifier operated from a single-phase alternating-current supply, usually from the untapped secondary winding of a transformer. Compare SINGLE-PHASE/FULL-WAVE BRIDGE and SINGLE-PHASE/HALF-WAVE CIRCUIT.

single-phase/full-wave circuit A rectifier circuit in which each half-cycle of single-phase alternating current is rectified by a separate diode supplied from the ends of a center-tapped winding of a transformer. Compare SINGLE-PHASE/FULL-WAVE BRIDGE and SINGLE-PHASE/HALF-WAVE CIRCUIT.

single-phase/half-wave Pertaining to a rectifier operated from a single-phase alternating-current (ac) power line, and rectifying only one half-cycle of ac voltage.

single-phase/half-wave circuit A rectifier circuit in which a diode, output load, and single-phase alternating-current supply are connected in series, only one half-cycle of the cycle being passed by the diode. Compare SINGLE-PHASE/FULL-WAVE BRIDGE and SINGLE-PHASE/HALF-WAVE CIRCUIT.

single-phase rectifier See SINGLE-PHASE/FULL-WAVE BRIDGE, SINGLE-PHASE/FULL-WAVE CIRCUIT, and SINGLE-PHASE/HALF-WAVE CIRCUIT.

single-point ground One ground connection to what may be two or more poles. Such a common connection eliminates or greatly minimizes the common coupling often encountered when separate ground connections are used.

single-pole double-throw Abbreviation, SPDT. A switch that can be connected to either of two adjacent poles, but not to both.

single-pole single-throw Abbreviation, SPST. Descriptive of an electrical, electronic, or mechanical switch with a pole that can be connected to an adjacent pole (or disconnected from it) at will. It is used to provide the make and break function in a circuit.

single rail A one-conductor communications medium with a return. A one-conductor data line, with a ground return.

single-shot Also called one shot. Pertaining to circuit operation in which a single input pulse applied to a switching device (such as a multivibrator) causes it to deliver a single output pulse, rather than switch to a stable “on” state. A MONOSTABLE MULTIVIBRATOR operates in this mode.

single-shot multivibrator See MONOSTABLE MULTIVIBRATOR.

single sideband Abbreviation, SSB. Pertaining to a system of modulation in which one of the sidebands from an amplitude-modulated signal is attenuated or canceled out, leaving only one sideband. The carrier is generally suppressed also.

single-sideband suppressed-carrier Abbreviation, SSBC or SBSSC. Pertaining to a system of modulation in which the carrier and one sideband from an amplitude-modulated signal are suppressed; only the remaining sideband is transmitted. Sometimes this mode is simply called SSB or SSBCC.

single signal Pertaining to a mode of reception in which signals appear on only one side of zero beat, enhancing selectivity and reducing interference among received signals. Most superhet erodyne receivers have this feature; most direct-conversion receivers do not.

single-signal receiver A superheterodyne receiver that achieves high selectivity via a selective filter in the intermediate-frequency amplifier chain. Signals appear on only one side of zero beat, in a band whose width can be adjusted or selected for various values from about 200 Hz to 3 kH.

single-skip propagation See SINGLE-HOP PROPAGATION.

single-step operation See STEP-THROUGH OPERATION.

single-sweep In an oscilloscope, a single time-axis deflection of the electron beam. Also see SWEEEP, 1, 2, Compare RECURRENT SWEEEP.

single-sweep blocking oscillator A blocking oscillator that cuts off after generating a single cycle or pulse.

single-shot switch A single-action switch with one closed and one open position only.

single-tone keying Modulated continuous-wave keying. A single audio-frequency tone is used to modulate a carrier, and a change from it to the off state causes the carrier to be turned off.

single-track recorder A recorder, such as a magnetic-tape recorder or a graphic recorder, that permits recording along only one track.
A six-phase rectifier circuit is tuned by varying only one of its components (e.g., an intermediate-frequency transformer in which only the secondary coil is tuned, but both primary and secondary are tuned). A cell consisting of a single turn of wire, tubing, or strip. See RING INDUCTOR.

A potentiometer that can be adjusted through its entire resistance range by no more than one full rotation of the shaft. Usually, the turning range is somewhat less than a full circle (e.g., 360 degrees).

A single-wire-fed antenna consists of one wire only, for example, WINDOM ANTENNA.

A single-wire transmission line or feeder consisting of one wire only (see, for example, WINDOM ANTENNA). A device or circuit into which current drains. See HEAT SINK.

The circuit associated with a load or other sink. Compare SOURCE CIRCUIT.

A special form of cathode-ray tube, with the fluorescent coating replaced by a screen of halide crystals that darken, instead of glow, when exposed to the electron stream.

A polyphase rectifier circuit used as an aid for relaxation or sleeping. It consists of a wideband audio-frequency noise generator that produces low-level sounds similar to the noise of waves on a beach or a light wind through trees.

A gradual increase in transistor leakage current. A wire or strip of magnetic core.

A magnetic core.

A gradual increase in transistor leakage current. A bridge consisting of an adjustable arm (potentiometer) and a pair of binding posts for each of the other three arms. Suitable resistors, capacitors, or inductors are connected to the binding posts to set up the bridge circuit desired.

A vertical antenna in which the beam is adjusted to the point at which the returned skywave strikes the earth.

A radio wave propagated by ionospheric reflections and/or refractions. Compare GROUND WAVE.

A polyphase rectifier circuit

A polyphase rectifier circuit

A photoflash operated by the light flash which the output can be driven between its limits.

An electronic device sometimes used as an aid for relaxation or sleeping. It consists of a wideband audio-frequency noise generator that produces low-level sounds similar to the noise of waves on a beach or a light wind through trees.

A single-wire transmission line or feeder consisting of one wire only (see, for example, WINDOM ANTENNA).

A generalized computer routine needing only certain parameters to be usable for a specific application.

A single wire used for communications or control purposes. The earth furnishes the return path.

An antenna transmission line or feeder consisting of one wire only (see, for example, WINDOM ANTENNA).

A device or circuit into which current drains. See HEAT SINK.

A magnetic core.

A polyphase rectifier circuit

A photoflash operated by the light flash which the output can be driven between its limits.
**slide-rule dial** A dial mechanism having a straight scale that resembles a slide rule.

**slide switch** A switch operated by sliding a block-shaped button. Compare BAT-HANDLE SWITCH, PADDLE SWITCH, and ROCKER SWITCH.

**slide wire** A simple potentiometer consisting of a single, straight piece of resistance wire with a sliding contact. Also see SLIDE-WIRE RESISTOR, slide-wire bridge. A slide-wire arm bridge in which the adjustable element is a single, straight resistance wire along which a clip or slider is moved, and that supplies two arms of the bridge (one on each side of the slider).

**slide-wire resistor** A variable resistor consisting of a single wire or a section of foil along whose length a slider is moved to vary the resistance. The contact that mates with another contact, or moves along a contacted surface, with a sliding motion. Also called SELF-CLEANING CONTACT and WIPING CONTACT.

**slip** 1. In an eddy-current brake, coupling, or drive, the difference in speed between the field magnets and the iron eddy-current ring. 2. In a synchronous motor, the difference between rotor speed and stator speed.

**slip clutch** In a gear or rack-and-pinion drive system, a device that transmits the load if the torque becomes excessive. The gears then slip instead of being damaged.

**slip ring** See COLLECTOR RING.

**slip speed** See SLIP.

**slope** 1. The slant of a line in rectangular coordinates, depicted as the ratio of the change in the dependent variable $y$ to the change in the independent variable $x$. If $(x_1,y_1)$ and $(x_2,y_2)$ are two points on the line, then slope $m$ is determined by $m = (y_2 - y_1)/(x_2 - x_1)$. 2. The slant of a line in rectangular coordinates as defined in 1, when the line is tangent to a curve (graph) at a specified point. See SLOPE, SLOPE OF A CURVE, SLOPE OF A LINE.

**slope detector** An amplitude-modulation (AM) receiving circuit detuned to one side of resonance (i.e., to a point along the side of the selectivity curve) to detect a frequency-modulated (FM) signal. The FM swing occurs along the slope of the selectivity curve. Slope detection is used in narrowband FM when conventional FM circuitry is not available.

**slope resistance** The ratio of a small change in voltage to a small change in current at an electrode or in a component.

**slip-jar capacitor** See WATER CAPACITOR.

**slip-jar rectifier** See ELECTROLYTIC RECTIFIER.

**slot** 1. In the armature of a motor or generator, a groove in which the windings are laid. 2. The notch in the response curve of a crystal filter.

**slot antenna** A microwave antenna that radiates energy along a slot cut in a surface, such as the metal skin of an aircraft.

**slot coupling** Coupling microwave energy between a waveguide and a coaxial cable by means of two slots, one in the waveguide and the other in the outer conductor of the cable.

**slot-discharge resistance** See CORONA RESISTANCE.

**slot insulation** 1. Insulation of wires in the slots of the armature of a motor or generator (see SLOT). 2. A material in the form of tape or sheets, used for the purpose defined in 1.

**slot radiator** See SLOT ANTENNA.

**slotted line** A device consisting of a section of air-dielectric coaxial line arranged for microwave measurements. The outer conductor is a metal cylinder, and the inner conductor is a concentric metal rod. The cylinder is provided with a lengthwise slot through which a small pickup probe extends for sampling the electromagnetic field inside the device. The probe is attached to a carriage that slides along a graduated scale on the outside of the cylinder. Radiated energy is projected into one end of the line through a coaxial cable; as the probe moves along, responses are indicated by an external detector connected to the probe. The scale is read at these points to determine frequency, standing-wave ratio, impedance, and power. An alternate form of slotted line uses a section of slotted waveguide, instead of a section of coaxial line.

**slotted rotor** See SERRATED ROTOR PLATE.

**slotted section** See SLOTTED LINE.

**slotted waveguide** See SLOTTED LINE.

**slot width** 1. The width of a slot in the armature of a motor or generator (see SLOT). 2. The band-width of the notch in the response curve of a band-suppression filter of any kind. See, for example, NOTCH FILTER.

**slow-acting relay** Any relay designed to operate at some finite period following the application of the actuating voltage.

**slow-blow fuse** A fuse in which the melting wire breaks apart slowly. The time delay allows the fuse to withstand momentary current surges that do not damage the protected equipment, but that would cause a fast-blow fuse to break the circuit immediately.

**slower, fast-make relay** A relay that opens slowly and closes rapidly.

**slow-blow, slow-make relay** A relay that opens slowly and closes slowly.

**slow-drift** The amount of change in gain or attenuation.

**slow-flow storage** The skirt(s) of a selectivity curve, particularly in a communications receiver, where a small change in a quantity to the extent of change in some other quantity, when a causal relation exists between the magnitudes of the quantities. Example: See SLOW RESISTANCE.

**slower, slow-operate relay** A relay that closes slowly and opens rapidly.

**slower, fast-release relay** A relay that closes and opens rapidly.

**slow-charge** See SLOW CHARGE.

**slow-drift** The gradual change of a quantity or setting (usually in one direction). Compare FAST DRIFT.

**slow-drift speed** The speed at which a relay changes its position along the axis of the coil.

**slow-drift timer** Also called COMPARATOR TIMING RELAY, a device that operates after a predetermined length of time. It ensures that the rated amper-hour capacity will be restored to the battery.

**slow-motion** 1. The gradual deterioration of transistor performance. 2. The gradual deterioration in the performance of a component, circuit, device, or system.

**slow-drift** The gradual change of a quantity or setting (usually in one direction). Compare FAST DRIFT.

**slow-drift timer** Also called COMPARATOR TIMING RELAY, a device that operates after a predetermined length of time. It ensures that the rated amper-hour capacity will be restored to the battery.

**slowness** The slant of a line in rectangular coordinates, depicted as the ratio of the change in the dependent variable $y$ to the change in the independent variable $x$. If $(x_1,y_1)$ and $(x_2,y_2)$ are two points on the line, then slow $s$ is determined by $s = (y_2 - y_1)/(x_2 - x_1)$. 2. The slant of a line in rectangular coordinates as defined in 1, when the line is tangent to a curve (graph) at a specified point. See SLOPE, SLOPE OF A CURVE, SLOPE OF A LINE.

**slow release** A variable resistor consisting of a section of air-dielectric coaxial line arranged for microwave measurements. The outer conductor is a metal cylinder, and the inner conductor is a concentric metal rod. The cylinder is provided with a lengthwise slot through which a small pickup probe extends for sampling the electromagnetic field inside the device. The probe is attached to a carriage that slides along a graduated scale on the outside of the cylinder. Radiated energy is projected into one end of the line through a coaxial cable; as the probe moves along, responses are indicated by an external detector connected to the probe. The scale is read at these points to determine frequency, standing-wave ratio, impedance, and power. An alternate form of slotted line uses a section of slotted waveguide, instead of a section of coaxial line.

**slow-rotor** See SERRATED ROTOR PLATE.

**slow section** See SLOTTED LINE.

**slotted waveguide** See SLOTTED LINE.

**slot width** 1. The width of a slot in the armature of a motor or generator (see SLOT). 2. The band-width of the notch in the response curve of a band-suppression filter of any kind. See, for example, NOTCH FILTER.

**slow-acting relay** Any relay designed to operate at some finite period following the application of the actuating voltage.

**slow-blow fuse** A fuse in which the melting wire breaks apart slowly. The time delay allows the fuse to withstand momentary current surges that do not damage the protected equipment, but that would cause a fast-blow fuse to break the circuit immediately.

**slower, fast-make relay** A relay that opens slowly and closes rapidly.

**slow-blow, slow-make relay** A relay that opens slowly and closes slowly.

**slow-drift** The amount of change in gain or attenuation.

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small-signal analysis  Analysis of circuit or component operation in which it is assumed that the signals (and devices) fluctuate only slightly (i.e., within a steady bias level) or by a small amount.

small-signal bandwidth  The frequency at which the output signal of an analog circuit decreases to 3 dB, relative to the value for direct current. The output voltage is generally set at 0.1 volt peak-to-peak for testing this value so that the circuit is not overdriven.

small-signal component  A coefficient or parameter (such as amplification, transconductance, dynamic resistance, etc.) calculated or measured under conditions of small-signal operation. Also see SMALL SIGNAL and SMALL-SIGNAL EQUIVALENT CIRCUIT.

small-signal diode  See SIGNAL DIODE.

small-signal equivalent circuit  For a given transmission circuit, the equivalent circuit for low signal levels (i.e., at amplitudes lower than saturation and cutoff levels). Also see EQUIVALENT CIRCUIT.

small-signal operation  Operation at low signal amplitudes (i.e., at signal levels that do not extend into the saturation or cutoff levels of a transistor, diode, or other component).

small-signal transistor  A transistor designed for low-level applications, such as the amplification of small voltages and currents and low-voltage switching. Compare POWER TRANSISTOR.

SmallTalk  A high-level computer programming language that uses a graphical user interface (GUI). It is used in complex design and research, and in robotics.

smart house or business  An electronically controlled home or business, in which computers and robots take care of cooking, dish washing, floor scrubbing, waste removal, laundry, yard maintenance, snow removal, and other mundane chores. Exception detection and fire prevention are continuously maintained. In some cases, intruders can actually be identified or detained; fires can be extinguished by controlled sprinkler systems or remotely controlled robots. Some tasks can be monitored and controlled directly by the owner from remote locations, via telephone lines or wireless.

smartness  The ability of an electronic system, especially a computer or control system, to perform a complete series of operations, substituting alternative steps, where necessary—all with a minimum of instructions from, and supervision by, human operators.

smearing  In television or facsimile, a form of picture distortion caused by an excessively narrow receiving bandpass. The image appears fattened and horizontally blurred. Contrast might also be lost.

smoother crystal  A liquid crystal in which the molecules are arranged in parallel layers and cannot slide past each other.

S meter  In a radio communications receiver, a meter graduated in S units and/or decibels to indicate the strength of a received signal.

Smith chart  A curved line graph on which complex-number impedance values can be plotted. It is useful in evaluating the behavior of radio-frequency circuits, transmission lines, and antenna systems—especially with regard to impedance mismatches and standing-wave ratio.

Some types detect changes in the ionization potential of the air; others sense changes in the electric constant of the air. Also see PHOTOELECTRIC SMOKE DETECTOR.

smoke sensor  See SMOKE DETECTOR.

smoke  1. Relatively free from surface irregularity.
2. To reduce or eliminate irregularities in the voltage or current from a direct-current power source. 3. To reduce or eliminate irregularities in data or signal amplitude.

smoother choke  A power-supply filter choke having a core with an air gap that prevents saturation at maximum rated direct current. Compare SWINGING CHOKE.

smoothing factor  For a power-supply filter, a quantity approximately equal to 6.28 f/R, where f is the alternating-current frequency in Hertz, R is the filter resistance (in an RC filter) or the series reactance of the choke (in an LC filter) in ohms, and C is the filter capacitance in farads.

smoothing filter  1. A filter for smoothing the alternating-current ripple component of a direct-current power supply following rectification. It can consist of one or more parallel capacitors of large value, and one or more series choke of large inductance. 2. A low-pass filter used at the output of a digital-to-analog (D/A) converter for eliminating high-frequency components generated by sampling.

SMPE  Abbreviation of SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS.

SN  Symbol for TORUS.

SNR  Abbreviation of SIGNAL-TO-NOISE RATIO.

Snow  A type of television picture interference that typically occurs when the signal-to-noise ratio is low (the reception is marginal or poor). Characterized by countless tiny out-of-focus light spots, whose rapid, random motion mimics the appearance of falling snow.

SNOBOL  Acronym for string-oriented symbolic language, a computer-programming language for manipulating character strings.

snooperscope  A, an infrared-sensitive device that permits viewing objects and surroundings in total darkness. It presents the image on a fluorescent screen. B, a rifle-mounted starlight scope.

snowplow  A long, strong, flexible wire or strip used for arcing in relay-control instruments, thereby minimizing electromagnetic interference and prolonging contact life.

socket  A (usually female) fixture into which a plug, usually a female connector, can be inserted to pull other wires through electrical conduits.

socket punch  See PUNCH, 2.

socket punch  A long, strong, flexible wire or strip used for arcing in relay-control instruments, thereby minimizing electromagnetic interference and prolonging contact life.

Sneddon's law  A rule of physics that applies to visible light passing from air (or a vacuum) to some medium with an index of refraction c. If the light ray strikes the medium at an angle u, relative to a line normal (perpendicular) to the surface, and passes into the medium at angle ω relative to the normal, then sin u/sin ω = c.

smart meter  A low-cost, high-capacity meter.

smart software  1. Vendor-supplied or user-generated programs or groups of programs for a computer.
software+ soldering gun

or computer system. The detailed instructions for performing a particular operation with a cal-

software-defined radio Abbreviation, SDR. 1. Wireless communications in which the modula-
tion waveforms and protocols are generated and decoded by computer software. This allows a single microcomputer-controlled radio receiver, transmitter, or transceiver to operate in a variety of services that use different protocols. Changing the modulation waveform or protocol requires only a change in the program run by a micro-

computer that controls the radio. 2. A receiver, transmitter, or transceiver that employs the technology defined in [1]. 3. The use of wireless equipment that employs the technology defined in [1].
sol 1. Abbreviation of SOLUTION. 2. Abbreviation of SOLUHILE.
solar access For a specific property or location, the availability of direct exposure to the sun's rays as a source of energy.
solar absorption index A quantitative measure of the effect of the sun on the ionospheric absorp-
tion of radio waves.
solar activity See SOLAR RADIATION and SUNSPOT cycle.
solar battery A battery composed of solar cells connected in series and/or parallel for increased output.
solar cell A photovoltaic power transducer that converts visible light to electricity. It is called a cell because its output is a low direct-current voltage. Such cells can be connected in series and/or parallel to provide useful electric power output.
solar cycle See SUNSPOT CYCLE.
solar energy 1. The electromagnetic energy arriving from the sun, over a given period of time and within a spec-
ifie surface area, at a given location on the sur-
face of the earth. 2. Any energy derived entirely from the sun.
solar energy conversion Any process that changes solar radiant energy into another useful form.
solar flare A violent storm on the surface of the sun. These events tend to occur near the peak of the 11-year sunspot cycle. They cause an in-
crease in the level of radio noise that comes from the sun, and emit high-speed subatomic particles that reach earth a few hours after the first appearance of the flare. Because the parti-
cles are electrically charged, they are accelerated by the geomagnetic field. Sometimes a geomag-
cetic storm is produced, producing auroras near the poles and deterioration of ionospheric radio-
propagation.
solar flux An indicator of general solar activity. The solar noise level is measured at a particular fre-
quency, such as 2800 MHz. The solar flux tends to be highest during periods of the greatest sunspot activity and immediately following a solar flare.
solar laser See SUNLIGHT-POWERED LASER.
solar noise Broadband electromagnetic noise gener-
ted by the sun is a wave-like noise that occurs at radio frequencies and affects satellite, moon-

bounce, and space communications. This noise varies in intensity with the 11-year sunspot cycle, being generally higher at and near sunspot max-
ima. A solar flare can cause a sudden and dra-

motic increase in the noise at all wavelengths. See SOLAR FLARE.
solar panel An array consisting of a number of se-
ries-connected or series-parallel-connected solar cells mounted on a flat plate.
solar power Useful amounts of electricity obtained from suitable arrays of solar cells.
solar radiation Electromagnetic energy of various wavelengths originating in the sun. Such radia-
tion, after passing through the earth's atmos-
phere, consists of infrared rays and visible light. Some ultraviolet rays also reach the earth's surface.
solar relay See SUN SWITCH.
solar switch See SUN SWITCH.
solar wind Continuous emission of high-speed sub-
atomic particles by the sun. It causes distortion of the lines of flux in the earth's magnetic field. It be-
comes more intense following a solar flare.
solder 1. A metal alloy (usually of tin and lead) that is melted to electrically and mechanically join pieces of other metals. Also see HARD SOLDER and SOFT SOLDER. 2. To join metals with soldering.
soleno
d A device using tantale-metal bonding. A capacitor using tanta-

lum as a solid electrolyte.
solid 1. A solid substance affording ionic conduction. Also see SOLID ELECTROLYTE CAPACITOR.
solid capacitor See SOLID ELECTROLYTIC CAPACITOR.
solid capacitor See SOLID ELECTROLYTIC CAPACITOR.
solid-state chronometer Any semiconductor de-
vice to indicate or measure time.
solid-state circuit See MONOLITHIC INTE-
GRATED CIRCUIT.
solid-state lamp See LIGHT-EMITTING DIODE.
solid-state maser A device, such as the ruby maser, in which the stimulated medium is a solid.
solid-state photosensor A semiconductor photo-

diode or phototransistor, as opposed to a pho
tube.
solid-state physics The branch of physics con-
cerned with the nature and applications of such solids as electronic semiconductors.
solid-state relay 1. A sensitive relay consisting of a conventional electromagnetic relay preceded by a transistorized amplifier. 2. A completely elec-

tronic relay (i.e., one without moving parts) in which switching transistors provide the on and off states. 3. See THYRISTOR.
solid-state thermometer An electronic thermo-


ter utilizing one or more solid-state compo-

ts, such as transistors, integrated circuits, or thermistors.
solid-state thyristor See SILICON-CONTROL-LED DIODE and SILICON-CONTROLLED SWITCH.
solid-state tube A semiconductor device (diode, rectifier, transistor, SCR, etc.) in which energy is stored in a semiconductor component for later release with the application of an appropriate external voltage. The device is electrically and mechanically joint to metal with small quantities of radio waves, such as 2800 MHz. The solar flux tends to be highest during periods of the greatest sunspot activity and immediately following a solar flare.
soldering iron An electric or nonelectric tool hav-
ing a heated tip for melting solder.
solderless board A foundation [see BREED-
BOARD, 1] on which a circuit can be assembled by plugging components into tiny jacks without the necessity of soldering. Also see WIRE-WRAP CONNECTION.
solderless connection A connection between leads, or between leads and terminals, accom-
plished entirely through crimping, pinching, splicing, or wire wrapping. Solder is not used. Also see WIRE-WRAP CONNECTION.
solderless terminal A terminal to which a solder-

less connection can be made. Also see WIRE-WRAP CONNECTION.
a solid in a solid. A solution, typically, is molecular (i.e., there is no chemical reaction between its constituents). Also see SATURATED SOLUTION, SOLUTE, SOLVENT, and SUPERSATURATED SOLUTION. 2. The result of solving a problem or making a calculation. Also called an answer or result.

sound conductivity The electrical conductivity of a solution, such as an electrolyte. The conductivity (and conversely, the resistance) depends on the number and mobility of ions in the solution.

sound generator A device that produces an output in response to a control signal.

sound hazard integrator An instrument that is designed to measure cumulative noise exposure received by persons in noisy environments. One such instrument provides direct readings in percent of permissible exposure.

sound intermediate replica A reproduction of a sound intermediate, usually in the form of a negative or positive record.

sound marker A marker indicating the sound carrier point on a television alignment curve displayed on an oscilloscope screen.

sound-mixing amplifier A stage in a television receiver that is used to combine various sound signals, such as those from microphones, tape players, and so on.

sound-on-film recording Recording on a single track on magnetic tape of new material with previously recorded material. The old recording is not erased.

sound-operated relay 1. A relay operated indirectly from sound, through the medium of a pickup microphone and amplifier. 2. A relay having a delicately poised armature that operates directly from sound, through the medium of a pickup microphone and amplifier.

sound-on-sound recording Recording (on a single track on magnetic tape) of new material with previously recorded material. The old recording is not erased.

sound power The total sound energy per unit time produced by a sound source, as expressed in ergs per second or watts.

sound power level The extent, in decibels, by which SOUND POWER exceeds one picowatt (10^-11 watt).
sound pressure 1. The force exerted by sound waves on a surface area, expressed in dynes per square centimeter (as a rms value over 1 cycle). The sound pressure is proportional to the square root of sound-energy density. 2. The instantaneous change in the local air pressure and average pressure at a given point.

sound pressure level 1. The extent, in decibels, via which SOUND PRESSURE exceeds 20 micropascals (2.0 \times 10^{-5} \text{ pascals}).

sound probe A transducer used to receive acoustic vibrations for detection or measurement purposes.

sound recording The electrical recording of sound, using cylinder, disc, tape, wire, or other comparable storage medium.

sound-recording system A complete, integrated array of equipment for recording sound, including such components as microphones, amplifiers, pickups, filters and other shaping networks, attenuators, level indicators, and recording mechanisms. Compare SOUND-REPRODUCTION SYSTEM.

sound reinforcement Intensification of sound by horns, resonant chambers, or other acoustical devices.

sound relay See SOUND-OPERATED RELAY.

sound reproduction The electrical reproduction of sound from recordings on vinyl discs, magnetic tapes, magnetic disks, compact optical disks, etc.

sound-reproduction system A complete, integrated array of equipment for the playback of recorded sound, including such components as tape or record players, amplifiers, filters and other shaping networks, attenuators, level indicators, horns, and headphones. Compare SOUND-RECORDING SYSTEM.

sound spectrograph A device that produces a display of sound amplitude vs. frequency. Similar to a SPECTRUM ANALYZER, except that it operates at air, fluid, or solid frequencies (about 20 Hz to 20 kHz) and is actuated by acoustic disturbances, rather than by electromagnetic signals.

sound spectrum The continuous band of frequencies (about 20 Hz to 20 kHz) constituting audible sounds, and sometimes the immediately adjacent (subaudible and superaudible) frequencies.

sound stage The apparent dimensions of a sound source.

sound survey meter A portable instrument for measuring the intensity and other characteristics of sound.

sound sweating In audio recording or reproduction, the modification of the sound to achieve some desired effect.

sound system A sound-recording system, sound-reproduction system, or a combination of the two.

sound takeoff In a television receiver circuit, the point at which the frequency-modulated sound signal is extracted from the complex signal.

source track The variable-density or variable-width recording on one side of the film in sound-on-film recording and reproduction. Also see OPTICAL SOUND RECORDING.

sound transducer See ACOUSTIC TRANSUDER. sound transmission coefficient See ACOUSTICAL TRANSMITIVITY.

sound trap In a television receiver circuit, a wave trap that prevents the sound signal from entering the picture channels.

source unit See PHONE 2.

sound wave The vibratory phenomenon produced in a medium by acoustic energy. A sound wave in air consists of alternate compressions and rarefactions of the air. Also see ACOUSTIC WAVE.

source 1. The origin of a signal or electrical energy (e.g., a transmitting station). 2. In a field-effect transistor, the electrode that is equivalent to the emitter of a common-emitter-connected bipolar transistor, or the cathode of a vacuum tube. 3. That which is being transcribed to magnetic tape. 4. Manufacturer, wholesaler, or retailer.

source circuit 1. The circuit associated with the source electrode of a field-effect transistor. 2. A generator circuit. Compare SINK CIRCUIT.

source code See SOURCE LANGUAGE.

source computer A computer for compiling a source program.

source-coupled multivibrator A multivibrator circuit using field-effect transistors, in which feedback coupling is achieved with a common-source resistor for the two FETs. This circuit is equivalent to the emitter-coupled bipolar-transistor-type multivibrator.

source data automation A means of storing a master data file for easy duplication, whenever necessary.

source deck An audio or video tape player that reproduces original recordings in the editing process.

source follower A field-effect-transistor circuit in which the output voltage (about 20 volts to 20 kHz) is taken across a resistor between the source and ground. This circuit is equivalent to the emitter follower, and is a unity-gain device whose impedance-transformation characteristics make it ideal in signal conditioning, buffering, and impedance-matching applications.

source impedance 1. The impedance of a generator in a circuit. 2. The impedance of the source electrode of a field-effect transistor.

source language A computer programming language from which is derived (by a compiler) the machine language on which the computer operates.

source program A computer program written in a source language.

source-referenced pole The south pole of the equivalent bar magnet constituting earth's magnetic field (see EARTH'S MAGNETIC FIELD). The south magnetic pole lies close to the geographic south pole. Compare NORTH POLAR MAGNETIC POLE.

source-seeking pole Symbol, S. The so-called south pole of a magnet. When a bar magnet is suspended horizontally, this pole points to earth's south magnetic pole. Compare NORTH-SEEKING POLE.

sp Abbreviation of STACK POINTER.

space 1. Abbreviation of single pole. 2. Abbreviation of special.

space-charge field 1. The electric field existing within a group of charged particles. 2. The electric field existing in a plasma.

space diversity See DIVERSITY RECEPTION.

space diversity reception See DIVERSITY RECEPTION.

space division A method of data transfer in which different paths are used for the transmission of different characters.

space-distribution switch A switch having two or more ports and different paths connecting the ports.

space lattice The three-dimensional, redundant pattern formed by atoms and molecules in a crystal, and having a shape that is characteristic of a particular crystalline material.

spaceer An insulating rod or bar that serves to hold apart the conductors of a two-wire, four-wire, or coaxial air-dielectric transmission line.

space modulation One of the components of an electro-magnetic wave. The space wave, unlike the surface wave, is not earth-guided. It has two components: the direct wave and the ground-reflected wave.

spaghetti Slender, varnished-cambric tubing used as slipover insulation for wires and busbars.

span On an instrument scale, the difference between the highest value and the lowest value.

spare See ELECTRIC SPARK.

spark absorber 1. See SPARK SUPPRESSOR 2.

spark gap A device consisting essentially of two metal points, tips, or balls that are separated by a small air gap. A high voltage applied to the electrodes causes a spark to jump across the gap.

spark equation The maximum separation of the sparks gap at which a given voltage will produce a spark.

spark voltage The lowest voltage that will cause a spark to jump across a gap of a given width.

spark killer See SPARK SUPPRESSOR.

sparkover A discharge in air, a vacuum, or a dielectric. It is characterized by sparking between electrodes in the medium.

spark plate In some automobile radios, a noise-interference-eliminating bypass capacitor in which the chassis is one plate.

spark-plug suppressor A small resistive device connected in series with a spark plug to suppress electrical noise arising from the ignition in an internal combustion engine.

spark quencher See SPARK SUPPRESSOR.

spark suppressor A resistor, capacitor, and/or diode used to eliminate or minimize sparking between make-and-break contacts.

spatial distribution The three-dimensional directional pattern of a transducer (such as an antenna, microphone, or speaker).

spatial distribution The three-dimensional directional pattern of a transducer (such as an antenna, microphone, or speaker).

speaker 1. Abbreviation of silicon point contact. 2. Abbreviation of silicon point contact.

speaker damping See DAMPED LOUDSPEAKER.

speaker-level audio In a sound reproduction system, radio receiver, or other audio circuit, an audio-frequency signal sufficient to drive a speaker or speaker system directly, without the need for additional amplification.

sparking arc A method of modulated light transmission. An electric arc is modulated by audio-frequency signals.

special character A printed, displayed, or encoded character other than a numeral or letter, such as
an amperesand (#) or a pound sign (#). Also called SYMBOLO.

**special effects** Various techniques used in filmmaking, computer animation, and videotape recording for achieving certain visual scenes or images.

**special-purpose computer** A computer designed to handle problems or be suited for applications of a specific category; a dedicated computer.

**special-purpose calculator** An electronic calculator intended for essentially "nonmathematical" purposes, such as biorthym data, astrological information, metric conversions, musical composing, etc.

**specific address** See ABSOLUTE ADDRESS.

**specification** 1. For an electronic device, a statement of performance over specific parameters. Example: For a high-fidelity stereo amplifier, 50 watts per channel over a frequency range of 10 Hz to 30 kHz, with less than 1 percent total harmonic distortion. 2. A precise listing of requirements or expectations.

**specific conductivity** Conductance per unit volume. In SI units, this is expressed in siemens per cubic centimeter (S/cm²).

**specific dielectric strength** For an insulant, the dielectric strength per millimeter of thickness. gr. Abbreviation, sp gr. The ratio of the density of a material to the density of a substance accepted as a standard (usually water at 4 degrees Celsius or 39.2 degrees Fahrenheit).

**specific inductive capacity** See DIELECTRIC CONSTANT.

**specific resistance** See RESISTIVITY.

**specific sound-energy flux** See SOUND INTENSITY.

**spectral comparative pattern recognizer** Acronym, SCEPTRON. Equipment used to classify automatically complex signals obtained from information that has been converted into electrical signals.

**spectral density** For a complex signal, the amount of energy contained within a given band of frequencies.

**spectral energy distribution** The occurrence of different amounts of energy in different areas of a spectrum (as in a visible-light spectrum, sound spectrum, or radio-frequency spectrum).

**spectral response** The characteristic of a device, such as a photocell or the human eye, that describes the device's sensitivity to radiations of various frequencies in a given spectrum.

**spectral sensitivity** The color response of a light-sensitive device.

**spectrograph** A recording SPECTROMETER.

**spectrometer** 1. An instrument used to measure spectral wavelengths. 2. An instrument used to measure the index of refraction. 3. See MASS SPECTROMETER.

**spectrophotometer** A photometric instrument for chemical analysis. In the device, light passing through the material under analysis is broken up into a spectrum that is examined with a photoelectronic circuit, which, in turn, plots a spectrogram.

**spectroscope** An instrument that resolves a radiation into its various frequency components and permits measurement of each.

**spectrum** A band of frequencies or wavelengths (e.g., radio spectrum, visible-light spectrum, and sound spectrum).

**spectrum analyzer** 1. An automatic wave analyzer with a visual display (oscilloscope). 2. A scanning receiver with a screen that shows a plot of signals and their bandwidths over a specific frequency band.

**speech amplifier** A device designed especially for speech frequencies. It is generally used to amplify the signals from a microphone.

**speech clipper** See MASS SPECTROMETER.

**speech clipping** The use of a limiting circuit to maintain the output-signal amplitude of a speech amplifier against fluctuations in the intensity of speech input. The resulting signal requires filtering to remove harmonics generated by the process. Compare SPEECH COMPRESSION.

**speech compression** Automatic regulation of the gain of a speech amplifier to maintain its output-signal amplitude against speech-input fluctuations. Compare SPEECH CLIPPING.

**speech digit signaling** A method of digital signaling, where time slots generally used for encoded audio or video are used alternately for signaling.

**speech frequencies** See VOICE FREQUENCIES.

**speech intelligibility** The quality of reproduced speech that makes it easily understood by a reasonably proficient user of the language. For good speech intelligibility, a circuit should transmit frequencies between 300 Hz and 3000 Hz with minimal distortion. Increased bandwidth improves fidelity, but does not provide a significant increase in intelligibility for normal speech.

**speech inverter** See SCRAMBLER CIRCUIT.

**speech power** 1. The alternating-current power in an electric wave corresponding to speech, as opposed to that in a sine wave. 2. Sound power in decibels.

**speech recognition** The ability of a device to translate audible spoken words, phrases, or sentences into binary digital signals that can be used by machines, such as computers and robots.

**speech recognizer** An electronic device that translates audible spoken words, phrases, or sentences into binary digital signals that can be used by machines, such as computers and robots.

**speech scrambler** See SCRAMBLER CIRCUIT.

**speech synthesis** The ability of a device to translate binary digital signals from a machine, such as a computer or robot, into audible, coherent spoken words, phrases, or sentences.

**speech synthesizer** An electronic device that translates binary digital signals from a machine, such as a computer or robot, into audible, coherent spoken words, phrases, or sentences.

**speed key 1.** A semiautomated key for manual generation of Morse code characters. 2. A similar, fully automatic key used especially for high-speed telegraphy.

**speed of light** Symbol, c. The speed at which electromagnetic waves propagate in a vacuum; approximately 299,792 kilometers per second (186,282 miles per second).

**speed of sound** The speed at which acoustic waves propagate. It depends on the nature of the medium. In air, at ordinary temperatures, it is approximately 344 meters (1129 feet) per second. In fresh water, it is approximately 1443 meters (4800 feet) per second.

**speed of transmission** The amount of data sent in a given unit of time. It is generally measured in bits per second.

**speed of transmission** The amount of data sent in a given unit of time. It is generally measured in bits per second.

**speeding** The ability of a device to translate audible spoken words, phrases, or sentences into binary digital signals that can be used by machines, such as computers and robots.
speed of transmission • spiral distortion

bits per second (bps), characters per second (cps), characters per minute (cpm), or words per minute (wpm). It is used primarily for digital codes.

speedup capacitor See COMMUTATING CAPACITOR.

SPFW Abbreviation of SINGLE-PHASE FULL WAVE.

sp gr Abbreviation of SPECIFIC GRAVITY.

sphere 1. A closed surface in three-dimensional space, represented by the set of all points equidistant from a specified center point. 2. A solid in three-dimensional space, represented by the set of all points on or within a closed surface, as defined in 1.

sphere gap A spark gap in which the spark passes between two polished metal surfaces. When the air gap is adjustable, unknown high voltages can be measured in terms of the largest gap width at which sparking occurs. Compare NEEDLE GAP.

sphere-gap voltmeter See SPHERE VOLTMETER.

sphere volt meter A gap voltmeter using a SPHERE GAP.

spiral distortion A form of television camera-tube distortion caused by spiraling of the electron as they are emitted from the photocathode. The result is a twisted image.

spiral-rod antenna A set of dipole antennas for different frequencies, arranged in a common (usually horizontal) plane. The result is a broad-band antenna.

spiral-rod oscillator A parallel-line-type oscillator in which the lines are rods that are rolled up into spirals to conserve space. Also see LINE-TYPE OSCILLATOR.

spiral sweep 1. A means of sweeping the electron beam in a cathode-ray tube to produce an spiral trace on the screen. 2. The circuit for producing such a sweep.

spiral trace See SPIRAL SWEEP.

spiral winding See DISK WINDING.

spkr Abbreviation of speaker (see LOUDSPEAKER).

splitter See SPLITTER.

split-rotor plate A device specifically designed to facilitate easy splicing of audio, video, or digital magnetic tape.

splitting block A means of sweeping the electron beam to produce a spiral trace on the screen by the electron beam. The spiral distorts the image so that the lines are rods that are rolled up into spirals to conserve space. Also see LINE-TYPE OSCILLATOR.

split-loss phase inverter See PARAPHERAL INVERTER.

split-phase motor A fractional horsepower, alternating-current motor that starts like a two-phase motor and runs like a single-phase motor. After the machine approaches 75 per cent of full speed, a centrifugal switch cuts out the starting winding.

split-projector An acoustic transmission device with several independently operated transducers.

split-reed vibrator See SELF-RECTIFYING VIBRATOR.

split-rotor plate See SERRATED ROTOR PLATE.

split-stator capacitor A variable capacitor having two separate stator sections and a common rotor section.

split-sound receiver A television receiver circuit in which the sound signal is separated from the composite signal shortly after pickup by the antenna, and is amplified separately from the video signal. Compare INTERCARRIER RECORDER.

splitter A device used to couple two or more television receivers to a single antenna.

spool See REEL.

sporadic-E layer ionization Occasional, scattered ionization in the E-layer of the ionosphere.

sporadic-E propagation At certain radio frequencies, the long-distance propagation of electromagnetic (EM) waves via the E layer of the ionosphere. This layer exists at an altitude of approximately 90 miles. The ionosphere is sometimes affected by this propagation. The same is true of low-frequency broadcast channels, especially channels 2 and 3. See IONOSPHERE.

spot brightness Brilliance of the glowing dot or trace produced on the screen by the electron beam.

spot check 1. To take a random sample or to make a random test by selecting a single item from a run of similar items and subjecting it to analysis, examination, performance, or parameter evaluation, etc. 2. A random sample or test.

spot frequency 1. A single frequency or signal to which other frequencies can be referred. 2. A frequency or signal that acts as a limit marker (e.g., to define the edges of an allocated frequency band).

spot jamming Deliberate interference to a radio signal at some frequency and at some specific time.

spot modulation In a cathode-ray tube, modulation of the brightness of the spot (and, accordingly, of the image) produced on the screen by the

spot anode magneton A magnetron in which the plate (anode) consists of two semicylinders with the cathode at their axis.
electron beam. Also see INTENSITY MODULA-
tion.
spotted A method of electrical welding in
which the parts to be joined are held
against, overlapping between the points of two electrodes, and then passed turn by turn to heat
the parts at the point of contact.
spotted-wheel pattern A frequency-identifying wheel
pattern produced on an oscilloscope screen by in-
tensity modulating a circular trace. The circular
trace is produced by applying a standard
frequency signal to the horizontal and vertical input
terminals 90 degrees out of phase. A square-wave
signal of unknown frequency is applied to the in-
tensity-modulation (x-axis) input terminals. The
square wave chops the circle into a number of
bright sectors or spots. The unknown frequency
(A) equals N, where N is the number of spots in
the circle, and f is the standard frequency.
Compare GEAR-WHEEL PATTERN.
spray Acronym for small portable radar torch.
A portable radar unit that uses a Gunn diode to
generate microwave energy. The range is about
500 meters [500 m].
spray coating 1. Applying a protective coat of
insulating material to a conductor or component by
spraying it with a liquid substance and allowing it
to dry. Compare DIPPING COATING. 2. The coat ap-
plied, as defined in 1.
spreader 1. An insulator used to separate the wires of
a single-legged transmission line. 2. Any
of the rods composing the supporting structure in
cumulated quad antennas.
spredating current In a semiconductor, current
caused by the movement of charge carriers by cir-
cuit elements, such as spread out over zones that deviate sig-
ificantly from straight lines.
spredating loss Energy lost during the transmis-
sion of radiation.
spredating resistance In a semiconductor device,
the resistance that is a consequence of electrical
paths through material that is not along straight lines
between electrodes.
spread spectrum 1. A method of transmission in
which the occupied bandwidth of the signal is de-
liberately increased and spread out, over a much
wider range than it would normally occupy with
conventional modulation. 2. A signal transmit-
ted, as defined in 1.
spring coil See SOLENOID, 1.
spiring coil See FLEXIBLE CONTACT.
sprit In video and animated computer graphics,
a brief insert, such as a little insect that scurries
across the screen, or a face that pops in and
smiles. It is used primarily for effect.
SPR In the abreviation of SINGLE-POLE/SINGLE-
THROW (switch or relay).
spusious emission From a radio or television
transmitter and an unwanted output signal on a frequency other
than the fundamental signal frequency. It can be
generated by faulty modulation, amplification,
and/or oscillation.
spurious oscillation 1. Oscillation in a normally
nonoscillatory circuit. 2. In an oscillator, simulta-
nous oscillation at a frequency other than
the circuit fundamental.
spurious response In a communications receiver,
a signal that appears to be on a certain fre-
quency, when, in fact, the received signal is not on
that frequency. It often results from inad-
quate image rejection.
spurious-response ratio The ratio of the transmis-
sion (or gain) of a circuit of a desired signal to its
transmission (or gain) for a spurious signal at the
same setting of the circuit (e.g., signal-to-image
ratio).
spurious sidebands In an amplitude-modulated
(AM) or single-sideband (SSB) radio signal, side-
band energy at frequencies outside the nominal
signal band, usually resulting from improper
modulation, inadequate filtering, imprecise enve-
lope clipping, or nonlinear amplification.
spotnik The first orbiting artificial earth satellite.
It was launched by Russia (then known as the
Union of Soviet Socialist Republics) in 1957.
sputer 1. A layer of material obtained by sputter-
ing (see SPUTTERING). 2. To carry out the pro-
cess of sputtering (see SPUTTERING).
sputtering 1. A technique for electrically deposit-
ing a film of metal on a metallic or nonmetallic
surface. In a vacuum chamber, the piece of metal
to be deposited is made the cathode of a high-
voltage circuit, with respect to a nearby anode
plate. The high voltage causes atoms to be ejected
from the surface of the cathode and strike the
surface of an object placed in their path, becom-
ing deposited on it as a film of cathode metal.
Compare EVAPORATION. 1. 2. The disintegration
of a vacuum-tube cathode through ejection of
surface atoms from the cathode by impinging
positive ions.
sq Abbreviation of SQUARE.
S band A section of the S BAND, from 2400 to
2900 MHz.
SQC Abbreviation of STATISTICAL QUALITY
CONTROL.
SR 1. Abbreviation of SQUARE ROOTER. 2. In the
BASIC computer-programming language, a
function that computes the square root of a posi-
tive number.
SQU In the abbreviation of SIMPLE QUAD.
square-law demodulator See SQUARE-LAW DE-
TECTOR.
square-law detector A detector whose output is
proportional to the square of the quantity applied
to it. Also see CURRENT-SQUARED METER. 2. A
high-impedance electronic voltmeter, whose
deflection is proportional to the square of the ap-
plied voltage.
square-law meter 1. A device that circuit, or device that
accomplishes amplitude modulation of one signal
current by another, by simultaneously passing
the currents through a component, such as a
nonlinear resistor, having a square-law response.
squaring circuit 2. A circuit or component opera-
tion that results in an output signal, proportional
to the square of the input.
squaring amplifier An amplifier designed to
operate with square waves.
square-wave converter See SQUARING CIRCUIT.
square-wave generator A signal generator deliver-
ing an output signal that has a square waveform.
Compare SQUARING CIRCUIT. 1.
square-wave testing Testing the response of a cir-
cuit or device, such as an amplifier, by observing
the extent to which it distorts a square-wave signal
passing through it or measure of high-
frequency response.
squaring circuit 1. A device or circuit that can
convert sinusoidal waves into square waves.
squaring amplifier See SQUARING CIRCUIT.
squaring circuit 2. A circuit that results in an output signal, proportional
to the square of the input.
squaring amplifier 1. An amplifier whose output
is nearly, but not exactly, the same as that of a
square wave.
squaring amplifier 2. A signal generator deliver-
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S scale A scale of numbers used in radio communications, and especially in amateur radio, to report the approximate strength of signals: S1 faint signals; S2 very weak signals; S3 weak signals; S4 fair signals; S5 fairly good signals; S6 good signals; S7 moderately strong signals; S8 strong signals; S9 extremely strong signals. Also See S-METER.

see Abbreviation of single-silk-enameled (wire).

SSI Abbreviation of SMALL-SCALE INTEGRATION.

SSII Abbreviation of SOLID-STATE LAMP.

SSSC Abbreviation of SINGLE-SIDEBAND UN压制 PHASE CARRIERS. Also, SSISEC.

ST Abbreviation of SINGLE THROIN.

sta 1. Abbreviation of STATION. (Also stns.) 2. Abbreviation of STATION.

stab Abbreviated form of stabilizer (see STABILIZER, 4).

stability 1. The condition in which an equipment or device is able to maintain a particular mode of operation without deviation. 2. The condition in which the setting or adjustment of a device remains at a particular point without movement. 3. The condition in which a quantity remains constant, with respect to time, temperature, or another variable. 4. The ability of ions used in a vertical character recognition to retain their color after exposure to light.

stability factor Abbreviation. SF. For a bipolar transistor, the derivative $dI_v/dU_c$, where $I_v$ is the steady-state collector current and $U_c$ is the collector current cutoff.

stabilized platform See STABLE PLATFORM.

stand-by 1. See DAMPING DIODE. 2. See DAMPING RESISTOR.

sta 1. A device or circuit for the self-regulation of another variable. 2. A chemical used to control or arrest a reaction.

stabilizing windings Auxiliary field windings used to prevent speed runaway in brush motors.

Stabilize Tradename for a type of valve-regulated lead-acid battery.

stable A device whose characteristics and performance remain substantially unchanged with time or variations in temperature, applied power, or other quantities.

stable element 1. A component that maintains its value or ratings, despite wide variations in environmental conditions. 2. A navigational instrument that maintains its orientation in space at all times.

stable platform A gyro-type device used to stabilize instruments in space and to provide accurate information regarding attitude (pitch, roll, and yaw).

stable state A stable condition, such as the high and low states of a flip-flop. The flip-flop has two stable states and will remain in one unit it is switched to the other, and upon switching it will then remain in that latter state until switched back to the former. Compare UNSTABLE STATE.

stack 1. A piled assembly of capacitor plates and separating dielectric films. 2. An assembly of selenium rectifier plates (see POWER STACK).

3. To assemble a stacked array. 4. A temporary storage area consisting of a small group of registers in a computer memory.

stacked array An antenna system in which two or more identical antennas, such as dipoles, Yagis, or halos, are placed one above the other or side-by-side. It provides additional forward gain, and, in some cases, enhances the front-to-back ratio and/or front-to-side ratio.

stacked-dipole antenna A stacked array of half-wave dipole antennas.

stacking The combination of two or more identical antennas, such as dipoles, Yagis, or halos, in a STACKED ARRAY to provide enhanced forward gain. It can also enhance the front-to-back ratio and/or front-to-side ratio. Stacking can be done vertically or horizontally.

stack pointer Abbreviation. SP. A register indicating the last data item to be entered in a stack (see STACK). 4.

stage A complete functional unit of a system (e.g., amplifier stage, oscillator stage, modulator stage, etc.).

stage-by-stage elimination See SIGNAL INJECTION.

stage gain The amplification provided by a single stage in a system.

stage loss The loss introduced by a single stage in a system.

stagger 1. An error in facsimile reception, occurring as a constant discrepancy in the position of the received dot. 2. To deliberately tune a set of frequency bands allocated to conventional broadcast stations in the United States, the amplitude-modulation (AM) radio broadcast band extends from 535 to 1705 kHz, and the frequency-modulation (FM) radio broadcast band extends from 88 to 108 MHz. The television (TV) broadcast bands range from 54 MHz to 806 MHz in several sections, designated in channels from 2 through 69. Also see BROADCAST SERVICE.

standard cell A highly refined primary cell used to supply a precise direct-current voltage for electronic measurements. The Weston standard cell contains a mercury positive electrode, cadmium amalgam negative electrode, and cadmium sulfate electrolyte, and delivers 1.0183 volts at 20 degrees Celsius. Also see ZINC-STANDARD CELL.

standard deviation In statistical analysis, the square root of the mean of squares of deviation from the mean.

standard frequency A highly precise frequency to which other frequencies can be compared for identification or measurement.

standard-frequency oscillator A stable, precise oscillator that delivers a standard frequency. Also see PRIMARY FREQUENCY STANDARD and SECONDARY FREQUENCY STANDARD.

standard-frequency signal A calibration and reference signal that is broadcast on a standard frequency, such as those transmitted on 2.5, 5, 10, and 15 MHz by the National Bureau of Standards.

standard pitch The tone corresponding to the frequency 440 Hz (in music, the note A above middle C).

standard signal generator A (usually continuously variable) high-grade generator of modulated and unmodulated radio-frequency test signals. A general-purpose instrument of this type usually covers a wide range (e.g., 15 kHz to 100 MHz) in several tuning bands. For calibration, a standard signal generator is referred to a primary frequency standard or secondary frequency standard.
standard subroutine A usually vendor-supplied computer program segment applicable to more than one program and used as needed as a subroutine.

standard temperature and pressure The condition where temperature is zero degrees Celsius and the pressure is one atmosphere. Abbreviated STP.

standard time Official civil time in a particular region. See TIME ZONE.

standby 1. The state in which equipment is out of operation, but can be immediately activated. Also called DILING. 2. A state of readiness on the part of personnel, equipment, or systems.

standby battery An emergency power source for a battery-powered installation.

standby current The CURRENT DRAIN of a circuit, device, or system when in the standby condition.

standby equipment See EMERGENCY EQUIPMENT.

standby operation Keep-alive operation during a standby interval (see STANDBY).

standby power The power drawn by an equipment connected to the power supply, but out of operation.

standing power supply A circuit containing a battery, and sometimes a power inverter. When utility power fails, the switch actuates the supply, and the battery supplies power to essential devices or systems. Similar to an UNINTERCEPTIBLE POWER SUPPLY.

standing wave A stationary distribution of current or voltage along a line because of the interactions between a wave transmitted down the line and a wave reflected back; it is characterized by maximum-amplitude points (loops) and minimum-amplitude or zero points (nodes).

standing-wave distortion Distortion of current or voltage caused by standing waves on a transmission line terminated in an impedance that contains reactance, and/or that differs from the characteristic impedance of the line.

standing-wave indicator 1. A device, such as a lamp or meter, used to detect standing waves. 2. Standing-wave meter (see SWR BRIDGE).

static The condition or status of a component, device, circuit, or system.

static capacity The residual charge, measured in coulombs or ampere-hours, in a storage cell or battery at a given time. A measure of the available total energy in the cell or battery.

static farad The cgs electrostatic unit of capacitance; 1 statfarad = 1.11360 x 10^-12 farad.

static Hey The cgs electrostatic unit of inductance; 1 stathey = 8.98755 x 10^-9 henry.

static 1. Pertaining to that which is constant in quantity (e.g., static collector current of a transistor), 2. Pertaining to that which is at rest (e.g., static electricity), 3. The radio noise (sferics) produced by electric discharges in the atmosphere, usually lightning, 4. Pertaining to a test-and-measurement mode for a unit or device, without subjecting the unit or device to regular operation. Compare DYNAMIC.

static base current See DC BASE CURRENT.

static base voltage See DC BASE VOLTAGE.

static cathode voltage See DC CATHODE VOLTAGE.

static cathode resistance See DC CATHODE RESISTANCE.

static collector current See DC COLLECTOR CURRENT.

static collector voltage See DC COLLECTOR VOLTAGE.

static collector resistance See DC COLLECTOR RESISTANCE.

static collector voltage See DC COLLECTOR VOLTAGE.

static current The contents of a line in a source-language computer program.

static damping The amount of charge, measured in coulombs or ampere-hours, in a storage cell or battery at a given time. A measure of the available total energy in the cell or battery.

static drain current See DC DRAIN CURRENT.

static drain resistance See DC DRAIN RESISTANCE.

static drain voltage See DC DRAIN VOLTAGE.

static dump In computer operations, a dump occurring at a predetermined point in a program run or before the end of the run.

static electricity Energy in the form of a stationary electric charge, such as that stored in capacitors or produced by friction or induction.

static emitter current See DC Emitter CURRENT.

static emitter resistance See DC Emitter RESISTANCE.

static emitter voltage See DC Emitter VOLTAGE.

static flip-flop A flip-flop (see bistable multivibrator) using direct-current operating voltages. A single pulse switches the unit from on to off, and vice versa. Compare DYNAMIC-FLIP-FLOP.

static forward current transfer ratio Symbol, Hf. An expression of gain in a bipolar transistor. It can range from a factor of just a few times up to hundreds of times. Mathematically,

\[ H_f = \frac{I_c}{I_e} \]

where \( I_c \) is the collector current and \( I_e \) is the base current.

The \( H_f \) rating is important because it gives engineers an indication of the greatest current amplification that can be obtained with a particular transistor.

static frequency multiplier A magnetic-core device, similar to a magnetic amplifier or peaking transformer, that provides harmonics by distorting a sine-wave signal.

static gate current See DC GATE CURRENT.

static gate resistance See DC GATE RESISTANCE.

static gate voltage See DC GATE VOLTAGE.

static grid current See DC GRID CURRENT.

static grid voltage See DC GRID VOLTAGE.

static hysteresis The magnetization of a material (when it has the same intensity as the magnetizing force) is different when the force is increasing than when the force is decreasing, regardless of the time lag. Compare VISCIOUS HYSTERESIS.

static induction See ELECTROSTATIC INDUCTION.

static machine See ELECTROSTATIC GENERATOR.

static memory Also called nonvolatile memory. In a computer, a data memory medium (such as programmable read-only memory, or PROM) in which information is stored until it is altered or erased. It does not require a source of power to maintain the storage of the data. Compare VOLATILE MEMORY.

static mutual conductance See STATIC TRANSISTOR CONDUCTANCE.

static plate current See DC PLATE CURRENT.

static plate resistance See DC PLATE RESISTANCE.

static plate voltage See DC PLATE VOLTAGE.

statics The study of forces, bodies, poles, charges, or fields at rest or in equilibrium. Compare DYNAMICS.
static skew  In magnetic tape recording or playback, the amount of lead or lag time of one track, with respect to another. Ideally, the static skew should be zero or practically zero.

static source current  See DC SOURCE CURRENT.

static source resistance  See DC SOURCE RESISTANCE.

static storage  See DC SOURCE VOLTAGE.

static storage  Also called nonvolatile storage. In a computer, a data storage medium (such as magnetic or optical disk) in which information is stored until it is altered or erased. It does not require a source of power to maintain the integrity of the data. Virtually all data storage media are of this type, as contrasted with memory, which is often volatile (see STATIC MEMORY and VOLATILE MEMORY).

static stability  The ability of a robot to maintain its balance while standing still. A robot with two legs is generally poor in this respect. This is one of the reasons why humanoid robots (androids) are difficult to engineer. A minimum of three legs is necessary for good static stability.

static subroutine  In computer programming, a subroutine that always serves the same purpose (i.e., it does not need to be tailored to a particular set of parameters for a specific application).

station 1. An installation or stationing of a transmitter, receiver, or both. 2. A test-equipment installation or position. 3. A computer installation or fabricated modules.

stationary battery  A (usually wet storage) battery that is not moved when in use.

stationary state  A particular energy state for an atom represented by its electrons being in shells of input power.

stationary wave  See STANDING WAVE.

station authorization  The legal privilege assigned to a broadcast or communications station, allowing that station to be used for the purpose for which it was licensed.

station license  See STATION AUTHORIZATION.

statistical quality control  Quality control based upon the techniques of probability and statistics in analyzing findings, making predictions, and formulating procedures for sampling.

statmho  The cgs electrostatic unit of direct-current conductance: 1 statmho = 299.7925 volts.

statweber  The cgs electrostatic unit of magnetic flux: 1 statweber = 299.7925 webers (2.997925 × 10¹¹ maxwells).

statvolt  The cgs electrostatic unit of electromotive force: 1 statvolt = 299.7925 volts.

step 1. A single increment change in a value. 2. A single action in the operation, maintenance, or troubleshooting of equipment. 3. A specific increment in a quantity (such as frequency, voltage, current, etc.). 4. A sharp or rapid change in the value of a quantity.

step-by-step operation  See STEP THROUGH OPERATION.

step-down ratio  In a circuit or device, such as a step-down transformer or cathode follower, the ratio of the low output voltage to the high input voltage. Compare STEP-UP RATIO.

step-down transformer  A transformer delivering an output voltage lower than the input voltage. In such a transformer, the secondary (output) winding contains fewer turns than the primary (input) winding. Compare STEP-UP TRANSFORMER.

step function  See UNIT FUNCTION.

step generator 1. A circuit that produces a step function (see UNIT FUNCTION). 2. A circuit or device that generates a STEP-WAVE."
stopband  The continuous spectrum of frequencies rejected by a filter, selective amplifier, or other device.
stopband ripple  Single or multiple attenuation peaks within the stopband of an elliptic filter.
stop element  In digital transmission, a bit or set of bits indicating the end of a character, and serving to inform the receiving device of the end of the character.
stop filter  See BAND-SUPPRESSION FILTER.
stop filter  See PRIMARY FILTER.
stoppage  A fault that compresses or squeezes a body.
storage  The portion of earth’s upper atmosphere beginning at a height of approximately 10 miles and extending upward to the ionosphere.
storage capacitor  The retention of electric energy or charge, as in a capacitor or electrochemical cell.
storage cell  1. The amount of data that can be stored in a specific medium, such as a hard disk, diskette, or tape. Generally measured in bytes, kilobytes, megabytes, or terabytes. 2. The energy-delivering capability of a storage battery in terms of ampere-hours, milliampere-hours, or other current-time units for a specific rated voltage.
storage device  A medium into which data can be placed and kept for later use. Examples: magnetic disk, magnetic-optical disk, optical disk, and magnetic tape.
storage dump  See DUMP.
storage function  Abbreviation, STO. The so-called “memory” function of a microcomputer chip. It causes data to be inserted into memory or storage for later use. It is commonly used in programmable calculators, automatic-dialing telephones, and radio receivers. Also called memory function.
storage laser  A laser that stores intense energy by storing light.
storage life  See SHELF LIFE.
storage mesh  In the cathode-ray tube (CRT) of a storage oscilloscope, a fine metal mesh electrode that serves as the target on which the image is displayed. Also see STORAGE TUBE.
storage oscilloscope  An oscilloscope that retains a displayed image until the display is erased. Also see STORAGE TUBE.
storage register  In computers and calculators, a storage unit composed of flip-flops. In computers, it is independent of the central processing unit (CPU).
storage temperature  1. The recommended temperature for storing specified electronic components (such as an oscilloscope image or video display, for use at a later time. 2. The retention of electric energy or charge, as in a capacitor or electrochemical cell. 3. The retention of energy in the form of a magnetic field, as in an inductor.
storage allocation  The assignment of computer memory areas to certain kinds of information, as outlined in a source program and implemented by a compiler.
storage battery  A rechargeable battery; the technical term is secondary battery. Also see STORAGE CELL.
storage capacity  1. The amount of data that can be stored in a specific medium, such as a hard disk, diskette, or tape. Generally measured in bytes, kilobytes, megabytes, gigabytes, or terabytes. 2. The energy-delivering capability of a storage battery in terms of ampere-hours, milliampere-hours, or other current-time units for a specific rated voltage.
storage cell  1. An electrochemical cell whose potential can be restored by charging it with electricity. Compare PRIMARY CELL. Also see CELL. 2. The smallest of a computer storage medium. 3. In computer data storage, the part that can hold a data unit (e.g., a bit).
storage CRT  See STORAGE TUBE.
storage cycle  The period of time during which a location of a cyclic storage device cannot be accessed.
storage density  The number of data units (e.g., bytes, kilobytes, or megabytes) that can be stored in a specific medium, such as a hard disk, diskette, or tape.
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storage register  In computers and calculators, a storage unit composed of flip-flops. In computers, it is independent of the central processing unit (CPU).
stray inductance  Inherent inductance in a place where it can be detrimental (e.g., inductance in the coil of a wound resistor). Also see STRAY COMPONENT.

stray resistance  Inherent resistance in a place where it can be detrimental, such as leakage resistance in a dielectric, and wire resistance in an inductor.

streaking  In television or facsimile, a form of distortion in which the image appears enlarged in the horizontal, but not the vertical.

stress  1. See STRAIN. 2. See TENSION. 3. The force per unit area that produces STRAIN or TENSION on a body.

stretch  A length by which a material being measured with an electronic device increases in surface dimensions. Compare SHRINK.

stretched string  A long, thin wire or string that vibrates at a certain frequency, causing standing waves. It generally exhibits a specific fundamental frequency and integral harmonics of this frequency. As the wavelength is cut in half, the frequency doubles.

stroke  To initiate a discharge, as in striking a gas tube.

stitching voltage  See STARTING VOLTAGE.

string  1. In computer operations, a set of items in a sequence determined by the order of keys. 2. In a computer memory, a sequence of bits or characters. 3. Any group of series-connected components or circuits.

string electrometer  See BIPIAR ELECTROMETRE.

string variable  A string of characters, usually forming a word or phrase, represented by a variable name and character string symbol (BASIC's $, for example) in a computer program.

strip chart  A longitudinal, as opposed to circular, chart for graphic recording. In a rectilinear chart, both coordinates are straight; in a curvilinear chart, the crosswise coordinates are arcs.

strip core  A ferromagnetic core material made from a strip of the substance. The method of manufacturing superior ferromagnetic qualities, but also imparts a polarization to the material.

strip fuse  In which the fusible element is a flat strip of low-melting-metal strip. Compare WIRE FUSE.

stylus  1. See ELECTRONIC FLASH. 2. See STROBOSCOPE.

stylus light  1. See ELECTRONIC FLASH. 2. See STROBOSCOPE.

stylus pressure  See SUBSIDIARY COMMUNICATION AUTHORIZATION.

stylus pressure • subsidiary communication authorization See ELECTRONIC FLASH.

subcarrier oscillator  In a color-television receiver, the oscillator operating at the burst (chrominance-subcarrier) frequency of 3.579545 MHz.

subcarrier oscillator frequency  See SUBHARMONIC.

subcarrier oscillator • subsidiary communication authorization See ELECTRONIC FLASH.

subcarrier oscillator frequency See SUBHARMONIC.

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subcarrier oscillator frequency See SUBHARMONIC.

subcarrier oscillator frequency See SUBHARMONIC.

subcarrier oscillator frequency See SUBHARMONIC.
subsonic frequencies  Frequencies below the range of hearing, that is, less than about 20 Hz. Also called ULTRALOW FREQUENCIES and SUB-AUDIBLE FREQUENCIES.

substitution  An intermediate electricity-distributing location where electrical energy is transformed and transmitted to users within a given geographical area.

substitution capacitor  A capacitor used temporarily in place of another of usually the same value, as in troubleshooting. Also see CAPACITOR SUBSTITUTION BOX.

substitution inductor  An inductor used temporarily in place of another of usually the same value, as in troubleshooting. Also see INDUCTOR SUBSTITUTION BOX.

substitution method  1. A method of measuring a quantity (such as capacitance, inductance, or resistance) in which the value of the unknown quantity is determined in terms of the amount of a standard quantity that must be removed to restore the test circuit to its original state of balance. 2. A method of troubleshooting in which good components are substituted for bad ones in a circuit (see, for example, SUBSTITUTION CAPACITOR, SUBSTITUTION INDUCTOR, SUBSTITUTION RESISTOR, SUBSTITUTION SPEAKER, and SUBSTITUTION TRANSFORMER).

substitution speaker  A loudspeaker used temporarily in place of another of usually the same value, as in troubleshooting. Also see RESISTOR SUBSTITUTION BOX.

substitution transformer  A transformer used temporarily in place of another having the same characteristics, as in troubleshooting.

substrate  A plate, wafer, panel, or disk of suitable material (such as a semiconductor) on which the components of a unit, such as an integrated or printed circuit, are deposited or formed.

subterrestrial  Pertaining to components, systems, or devices installed underground. It is applicable especially to cables.

substrate removal  1. A process for removing the insulating material on (or in) which the components of a unit, such as an integrated or printed circuit, are deposited or formed.

subsonic acoustical communication  A method that uses low-frequency sound waves, such as SONAR, to communicate via conduction through earth or water.

subtractor  See ELECTRONIC SUBTRACTER.

subtractive color  A color formed by mixing subtractive primary pigments.

subtractive primaries  Broad-spectrum pigments used in printing to produce a wide variety of colors. These primaries are cyan (blue-green), magenta (pink-red), yellow, and sometimes black. They are used to print images that have been filtered through additive-primary lenses.

subtractive process  In the process of subtraction, the quantity that is subtracted from another (the minuend) to produce the remainder or difference.

subwoofer  A speaker designed to effectively reproduce extremely low audio frequencies, in some cases, subaudible below 20 Hz.

successive derivatives  Successive repetition of the operation of differentiating a function, which yields the first derivative, second derivative, and so on to the nth derivative.

successive integration  The operation of double or triple integration.

subharmonic  A reduction in hole life that occurs in a semiconductor material in the presence of a magnetic field.

suite  1. A group of computer programs run successively as a job. 2. A bundled, high-end software package used especially in business computing.

sulfate  In a lead-acid storage cell, the formation of disabling lead sulfate during discharge of the cell.


sun  A star that supplies energy to the earth through heat and light. Sunlight is the primary source of energy for all life on earth.

sunbed  An area on the sun's surface that is visible during a solar eclipse. Sunspots are areas of extremely high magnetic activity and are typically associated with solar flares.

sunbed cycle  The operation of double or triple integration.

suncheck  See SUMMATION CHECK.

sun frequency  1. In an amplitude-modulated carrier, the upper sideband frequency (i.e., the sideband equal to the carrier frequency plus the modulating frequency). Compare DIFFERENCE FREQUENCY. 2. In superheterodyne operation, an intermediate frequency equal to the signal frequency plus the local oscillator frequency.

summation  1. The sum of a finite number of terms. Thus, the total resistance of a circuit is the sum of the resistances of the individual components. 2. The sum of inputs to a unit, such as a comparator, that determines the state of the unit.

summation check  In computer operations, a check carried out on a group of digits. The result of adding the digits, and disregarding any overflow, is a check digit that can be compared with a standard value for the operation to verify the integrety of data.

summer  1. See ADDER. 2. See SUMMING AMPLIFIER.

summering amplifier  An operational amplifier whose output is the sum, or is proportional to the sum, of several inputs.

sun battery  A photovoltaic cells connected in series, parallel, or series-parallel to produce useful output voltages and currents.

sunbed cycle  The operation of double or triple integration.

sumcheck  See SUMMATION CHECK.

super  Prefix denoting over, above, greater than, or higher than, with respect to size, value, or rank. Compare SUB-

superconductor  A material or device that displays superconducting properties. Superconducting materials exhibit zero electrical resistance and zero magnetic permeability at temperatures below a critical temperature, typically around 100 kelvin for copper and lead. The critical temperature for superconducting materials is the point at which they lose their ability to carry electrical current. Superconductors are used in a variety of applications, including magnets, motors, generators, and quantum computing.

superconducting cable  A cable in which superconductivity is utilized by surrounding the cable with liquid helium to lower its temperature to near absolute zero.

superconductivity  The virtual disappearance of resistance in some metals cooled to temperatures in the vicinity of absolute zero. Also see CRYOGENICS, CRYOSTAT, and CRYOTRON.

superflatpack  An integrated-circuit package of the flatpack type having considerably more components and leads than those in the conventional flatpack.

superflatpak  Construction of superheterodyne.

superheterodyne circuit  A circuit in which the incoming signal in a first detector (or mixer) beats with the signal of a local oscillator, resulting in a second intermediate frequency, which is then amplifed by an intermediate-frequency (IF) amplifier. This IF signal is detected by a second detector whose output is amplified by an audio-frequency (AF) amplifier. Because the IF amplifier operates at a single (fixed) frequency, it can be adjusted for optimum selectivity and gain. Also called superhet circuit.

superheterodyne receiver  A radio or television receiver using a SUPERHETERODYNE CIRCUIT.

superhigh frequency  See RADIO SPECTRUM.

superheterodyne  An alloy having a maximum permeability of 10.

supermodulation  A type of modulation amplitude (AM) in which one radio-frequency (RF) power stage continuously generates the carrier, and a second (usually identical) RF power stage is gated into operation at the proper instant by the audio modulation to add additional RF power (corresponding to the audio output) to the output signal. At the same time, the carrier amplitude is decreased by the proper amount to fulfill the conditions of a
signal amplitude swing between zero and twice maximum for 100% modulation.

superposition wave, the manner in which the constituent waves combine. The instantaneous value of the complex wave is equal to the vector sum of the instantaneous values of all the constituent waves.

superposition of binary elements, if a voltage $E_1$ in branch A causes a current $I_1$ to flow through branch C, and if a voltage $E_2$ in branch B (which might be identical with branch A) causes a current $I_2$ to flow through branch C, then $E_1$ in branch A and $E_2$ in branch B applied simultaneously will cause a current equal to $I_1 + I_2$ to flow through branch C. Compare COMPENSATION THEOREM, MAXIMUM POWER TRANSFER THEOREM, NORTON'S THEOREM, RECIPROCITY THEOREM, and THIEVEN'S THEOREM.

superpower An arbitrary term denoting very high power. In the rating of standard broadcast stations, it has come to signify 1,000,000 watts (one megawatt) radio-frequency (RF) power output.

superradiance In a laser, a rapid increase in intensity of fluorescent-light emission with increasing excitation power.

superegenerative circuit A regenerative detector circuit in which regeneration is periodically increased almost to the point of oscillation, then decreased. This quenching action takes place at a frequency of about 50 or 100 kHz so that the quenching is inaudible. The result is that much more regeneration is afforded, without the detector going into oscillation, than is possible by simply increasing the regeneration manually. An extreme example is the result.

supersaturated solution A solution that contains more solute than it normally would hold. Super-saturated solutions are obtained through special techniques and are extremely unstable. Compare SATURATED SOLUTION. Also see SOLUTION, SOLUTION 1, and SOLUTION 2.

superscript A small number or letter written to the right and slightly above a line of text. It is used to refer to an exponent or to indicate a particular component in a chemical formula. Also see SUBSCRIPT.

supersensitive relay A relay that operates with a small current. A type of relay used to detect small currents or voltages such as those in a power line.

supersonic In a gas or liquid, movement of the medium at a speed greater than the speed of sound in that medium. Supersonic flow results in a greater force or drag because of shock waves that form in the medium.

supersonic frequency See ULTRASONIC FREQUENCY.

supersonic See ULTRASONIC.

supersloser A control system, a wire or foil strip that carries electrical current. If the current changes in such a line, an alarm is actuated.

supervisor 1. In a computer, a set of routines that oversees the operation of the system. The supervisor routes commands from the user to the device control unit, the device control unit to the device control unit processing unit. 2. The execution of such a set of routines.

supervisory circuit In a security system, a circuit between a sensor and the central computer or control device. This link can be via electronic current through a wire or cable, but other methods can be used, such as thermostats, line-of-sight optics, infrared, ultrasonic, or radio.

supply 1. See CURRENT SUPPLY. 2. See POWER SUPPLY. 3. See VOLTAGE SUPPLY.

supply current Alternatively direct current available for operating a circuit, device, or system.

supply frequency The frequency of an alternating-current power supply.

supply power The maximum power that can be reliably delivered by an alternating-current or direct-current power supply.

supply reel In a reel-to-reel tape recorder or player, the reel that is initially full and that gradually empty as the tape moves through the machine.

supply voltage The voltage of an alternating-current or direct-current power supply.

suppressed carrier A carrier that has been canceled or filtered out of a carrier-sideband combination.

suppressed-carrier double sideband See DOUBLE-SIDEBAND and SUPPRESSED CARRIER.

suppressed zero See SPURIOUS FREQUENCY.

suppressor circuit See VOLTAGE SUPPLY.

suppressor grid A gridlike element between the screen grid and the plate, used to suppress secondary emission. An electrostatic circuit in which regeneration is periodically increased almost to the point of oscillation, then decreased. This quenching action takes place at a frequency of about 50 or 100 kHz so that the quenching is inaudible. The result is that much more regeneration is afforded, without the detector going into oscillation, than is possible by simply increasing the regeneration manually. An extreme example is the result.

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surge A sudden rise or flow of current or voltage. See BURST, SURGE, and SURGE ABSORBER.

surge absorber See SURGE SUPPRESSOR.

surge arrestor See SURGE SUPPRESSOR.

surge current A large current that flows initially into a capacitor when a charging voltage is applied.

surge impedance The impedance seen in branch A causes a current to flow through branch B (which might be identical with branch A) causes a current to flow through branch C, then $E_1$ in branch A and $E_2$ in branch B applied simultaneously will cause a current equal to $I_1 + I_2$ to flow through branch C. Compare COMPENSATION THEOREM, MAXIMUM POWER TRANSFER THEOREM, NORTON'S THEOREM, RECIPROCITY THEOREM, and THIEVEN'S THEOREM.

surge protector Misnomer for SURGE SUPPRESSOR.

suppressor Modifying a semiconductor device consisting essentially of two narrowly separated plates (source electrode and receiver electrode) deposited on the film-insulated surface of a silicon chip, and a third, overlapping electrode (the transfer gate) deposited on, but insulated from, the other electrodes. An input signal stores a charge in the capacitor formed by the source electrode and chip. A subsequent trigger signal applied to the gate electrode triggers the charge to the receiver electrode, where it becomes an output signal (often amplified, with respect to the input signal).

surface carbon An effect (such as current, resistance, or resistivity) observed on the surface of a material. Compare BULK EFFECT. Also see CONDUCTIVITY.

surface charge-carrier transitor A semiconductor device consisting of two narrowly separated plates (source electrode and receiver electrode) deposited on the film-insulated surface of a silicon chip, and a third, overlapping electrode (the transfer gate) deposited on, but insulated from, the other electrodes. An input signal stores a charge in the capacitor formed by the source electrode and chip. A subsequent trigger signal applied to the gate electrode triggers the charge to the receiver electrode, where it becomes an output signal (often amplified, with respect to the input signal).

surface effect An effect (such as current, resistance, or resistivity) observed on the surface of a material. Compare BULK EFFECT. Also see CONDUCTIVITY.

surface insulation A coating applied to the surface of core laminations to prevent the passage of currents between laminations.

surface leakage Leakage of current over the surface of a dielectric material, as opposed to leakage through the interior of the material.

surface noise See SUBSTITUTE NOISE.

surface recombination rate For a semiconductor, the rate at which electrons and holes recombine at the surface. Compare VOLUME RECOMBINATION RATE.

surface resistivity The resistance of a unit area of surface of a dielectric material, as opposed to leakage throughout the material. Compare BULK RESISTIVITY. Also see RESISTIVITY.

surface tension The tendency of the surface of a liquid to ‘shrink.’ This property varies with different liquids and is caused by a net molecular force directed inward from the surface.

surface wave 1. The earth-guided component of a ground wave. (The other component is the SPACE WAVE.) For a longwave antenna traveling along the surface of a plate in a surface-wave amplifier or surface-wave filter.

surface-wave amplifier An amplitrating device consisting essentially of a surface-wave filter to which has been added a direct-current-biased type silicon transistor, which is separated from the crystal substrate of the filter by a very thin oxide layer. Amplification is produced by interaction between the electron current in the silicon and the piezoelectric field of the filter. Also see ACOUSTOELECTRONICS.

surface-wave filter An acoustoelectronic device consisting essentially of a crystal plate having electrodes at each end. An alternating-current (ac) input signal applied to one electrode sets up acoustic waves that travel along the surface of the plate to the other electrode, where they generate an ac output voltage by piezoelectric action. The resonant frequency of the device is governed by the dimensions of the crystal plate. Also see ACOUSTOELECTRONICS.

surge A sudden rise or flow of current or voltage.

surge absorber See SURGE SUPPRESSOR.

surge arrestor See SURGE SUPPRESSOR.

surge current A large current that flows initially into a capacitor when a charging voltage is applied.

surge impedance The impedance seen in branch A causes a current to flow through branch B (which might be identical with branch A) causes a current to flow through branch C, then $E_1$ in branch A and $E_2$ in branch B applied simultaneously will cause a current equal to $I_1 + I_2$ to flow through branch C. Compare COMPENSATION THEOREM, MAXIMUM POWER TRANSFER THEOREM, NORTON'S THEOREM, RECIPROCITY THEOREM, and THIEVEN'S THEOREM.

surge protector Misnomer for SURGE SUPPRESSOR.
susceptance Symbol, B. Unit, siemens. The reactive component of admittance, as distinguished from conductance.

susceptibility The capacity of a substance to become magnetized, expressed as the ratio of magnetomotive force to the magnetic flux density by which it is produced.

suspension 1. In a speaker, the flexible, circular or elliptical structure via which the cone is attached to the frame. 2. The wire or metallized fiber supporting the movable coil of a galvanometer.

3. Particles of a substance and the liquid in which it is mixed, but not dissolved. 4. The substance, as defined in 3.

suspension galvanometer A meter with a light-beam apparatus for lengthening the arc through which the pointer travels. When the beam of light is cast a long distance, a tiny movement of the image will cause considerable movement of the image.

sustained oscillations Oscillations that continue as long as power is supplied to the oscillation generator. Also see CONTINUOUS WAVE. Compare DAMPED OSCILLATIONS.

sustaining voltage The voltage at which second-crossover breakdown occurs in a transistor (see SECOND BREAKDOWN).

sweep video A horizontal scanning mechanism that separates brightness and color. It can enhance the video in some applications.

SW SW Abbreviation of SHORTWAVE.

sw Abbreviation of SWITCH. (Also, S or s.)

swamping resistor 1. A noninductive resistor connected in parallel with the input circuit of a class-B linear amplifier for automatic regulation of the excitation. 2. A resistor connected in series with the emitter of a bipolar transistor to minimize the effects of temperature-induced variations in junction resistance.

swarf The string of material that threads off a disc during recording.

S_30 band A section of the S BAND, extending from 3400 to 3700 MHz.

sweep 1. To deflect the electron beam in a cathode-ray tube, usually horizontally, to provide a time base for a circuit for achieving the particular deflection described in 1.

sweep circuit A circuit, such as a deflection generator (e.g., a sawtooth oscillator), for producing a sweeping signal. Also see SWEEP.

sweep delay In an oscilloscope or radar, the circuit for delaying the sweep until the start of the signal. Also see DELAYED SWEEP.

sweep generator A device that causes the electron beam in a cathode-ray tube to scan at a known speed. 2. An oscillator that generates a signal that rapidly varies in frequency. It is used for the testing and adjustment of bandpass filters and other selective circuits.

sweeping receiver See SCANNING RECEIVER.

sweep magnification In an oscilloscope, increasing or multiplying the sweep frequency, thus reducing the time per horizontal division. This increases the maximum frequency of waveforms that can be analyzed, and allows closer inspection of high-frequency signal components.

sweep oscillator See SWEEP GENERATOR.

sweep period The duration, in seconds, of one complete cycle of sweep signal in an oscilloscope. It is equal to the reciprocal of the sweep frequency.

sweep signal 1. The (usually linear, sawtooth) signal used to sweep the beam of an oscilloscope tube. Also see SWEEP.

2. A signal generator that supplies a signal whose frequency varies automatically and periodically throughout a given band.

sweep-signal generator A signal generator that supplies a signal whose frequency varies automatically and periodically throughout a given band.

sweep test A method of testing the attenuation-vs-frequency characteristics of a selective circuit, using a radio-frequency sweep generator.

sweep time The actual time required for a single sweep by a deflecting signal, t = t/ f, where t is scan time in seconds, and f is sweep frequency in hertz.

sweep voltage The peak voltage amplitude of the sweep signal.

SWG Abbreviation of standard wire gauge.

swf Abbreviation of symmetrical conductivity.

swing frequency The frequency at which the electron beam in a cathode-ray tube is deflected along the reference axis. 2. The frequency at which the carrier frequency is increased and decreased by a sweep-signal generator.

3. In an oscilloscope, the number of times that the trace moves across the screen in one second. It is equal to the reciprocal of the sweep period.

swg Abbreviation for SWEEP GENERATOR.

switch 1. A circuit or device (electronic, electromechanical, or mechanical) for producing a switching of a transistor, specified in milliamperes or microamperes.

switching characteristics Technical data describing the performance and capabilities of switching devices, e.g., stability, noise margins, frequency response, etc.

switching circuit An on-off type of circuit containing electronic or mechanical switches.

switching diode See COMPUTER DIODE.

switching frequency The frequency at which a repetitive switch operates. Also see SWITCHING RATE.

switching mode Operation in which a device, such as a transistor or diode functions as a binary digital device, rather than as an analog device. The current is generally either zero (cutoff or pinched-off) or some value that depends on the bias and the applied voltage.

switching rate The rate (e.g., closings per second) at which a repetitive switch operates. Also see SWITCHING FREQUENCY.

switching speed The time required for a switch to open or close for a switching device to change state from cutoff to saturation. Also see SWITCHING TIME.

swinging choke A filter choke that exhibits relatively high inductance when low current flows through it, and lower inductance when high current flows through it. This inductance, which swings under conditions of varying load current, permits the use of a high-resistance bleeder resistor. Compare SMOOTHING CHORE.

swinging receiver A method of packaging an electronic circuit, in which components are inserted into the assembly through holes drilled or punched in parallel, stacked printed-circuit boards.

switch 1. A circuit or device (electronic, electromechanical, or mechanical) for opening and closing a circuit or for connecting a line to one of several different lines (e.g., rotary selector switch). 2. To change the logic state of a circuit or device. 3. In a computer program, a branch instruction directing the program to a line number dependent on the value of a variable or result (e.g., BASIC’s GOTO). 4. To cause an electrical circuit to change state, as from low to high or vice versa.

SWR 1. The current flowing through a switch. 2. The current flowing through a switching diode or transistor. 3. The minimum current necessary to produce switching of a transistor, specified in milliamperes or microamperes.

SWR meter See SWR BRIDGE.

SWR band A section of the S BAND, extending from 2500 to 2700 MHz.

syntactic 1. Abbreviation of SYNTACTICAL. 2. Abbreviation of SYMBOL.

symbol 1. A letter or graphic device representing a quantity or term (e.g., f, CURRENT, f, FREQUENCY, etc.). 2. A conventional device denoting a mathematical operation; it is a circuit diagram symbol, a pictorial device representing a component.

symbolic address An address in a source language computer program (i.e., the arbitrary label used by the programmer).

symbolic language See SOURCE LANGUAGE.

symbolic logic A system for representing logical relationships, such as those acted upon by computer and switching circuits, by means of symbols that are nonnumerical. Also see BOOLEAN ALGEBRA.

symmetrical circuit A circuit having identical configurations on each side of the driving line, such as the ground bus. A push-pull circuit is an example.

symmetrical communications 1. Two-way communications in which the volume of transmitted data is the same for nearly the same, in both directions. 2. Two-way communications in which the speed of transmitted data is the same, or nearly the same, in both directions. Compare ASYMMETRICAL COMMUNICATIONS.

symmetrical conductivity 1. The maximum change exhibited by a varying quantity (e.g., amplitude swing and frequency swing).
symmetrical FET See SYMMETRICAL FIELD-EFFECT TRANSISTOR.

synchronous fields and transistor A field-effect transistor whose source and drain terminals can be interconnected without affecting circuit operation. Also called UNILATERAL FIELD-EFFECT TRANSISTOR.

symmetrical input See BALANCED INPUT.

symmetrical output See BALANCED OUTPUT.

synchronizing transistor See UNILATERAL FIELD-EFFECT TRANSISTOR.

symmetrical wave A wave whose positive and negative half-cycles are identical in shape and peak amplitude.

symmetry 1. The condition of having the same shape on each side of an axis. 2. The condition of conducting positive and negative currents equally well. 3. The condition in which a circuit is identical on both sides of a reference line, such as the ground line.

synchronic Resonant vibration of one body in response to the vibration of another body.

sync 1. Contraction of SYNCHRONIZATION. 2. Contraction of SYNCHRONISM.

synchronous circuit, the amplifier used to increase the amplitude of the sync pulses after they are separated from the composite video signal.

sync generator A circuit that produces the synchronize, their input in a television transmitter.

synchro A dynamo-electric-control device that, when connected to a similar device and the alternating-current power line, permits remote control. Thus, when the rotor of one synchro is turned to a certain position, the rotor of the other assumes the same position. Also see AUTOSYN and SELSYN.

synchrocyclotron A type of cyclotron in which the variation in mass because of increased velocity of the charged particles is compensated, resulting in higher energy for the particles.

synchro differential A synchro that receives two input signals and delivers a single output signal. The inputs can be two electrical signals, or one electrical signal and one mechanical signal.

synchrodyne receiver A direct-conversion receiver in which the local oscillator frequency becomes that of the standard signal.

synchronized clamping A type of clamping in which an output voltage is maintained at a predetermined fixed value until a synchronizing pulse is applied, whereupon the output follows the input.

synchronous multivibrator See DRIVEN MULTIVIBRATOR.

synchronizer A computer storage device used between two devices transmitting data at different speeds, to counteract this differential (as a buffer).

synchronizing signal A signal used to synchronize another signal, usually in frequency.

synchronous The condition of operating in step (phase) with some reference signal.

synchronous clock 1. An alternating-current clock driven by a synchronous motor. Although 60-Hz models are common, such clocks are not restricted to low-frequency ac operation; 1-kHz types, for example, are used in some primary frequency standards. 2. The timing source in a synchronous computer.

synchronous computer A computer whose operations are timed by single-frequency clock signals.

synchronous contacts The rectifying contacts of a synchronous vibrator (see VIBRATOR-TYPE RECTIFIER).

synchronous converter A synchronous machine that can run on alternating current and generate direct current, or vice versa. Also called ROTARY CONVERTER.

synchronous gate A gate whose output is synchronized, according to the input signal.

synchronous generator An alternator operating in synchronism with one or more other alternators. Also see SYNCHROSCOPE.

synchronous induction motor An alternating-current motor that is intermediate between the fractional-horsepower reluctance motor and the multiple-horsepower three-phase, synchronous motor. The synchronous induction machine starts like an induction motor and runs like a synchronous motor.

synchronous inputs In a computer flip-flop, inputs that accept pulses only at the command of the clock.

synchronous machine See SYNCHRONOUS INDUCTION MOTOR.

synchronous motor See SYNCHRONOUS INDUCTION MOTOR.

synchronous network A communications network in which all clocks are set so that they run at the same rate, their increments are identical in duration, and transitions occur simultaneously or with a specified phase difference. Such a system allows for greatly enhanced signal-to-noise ratio for a given amount of transmitter power, and also reduces the bandwidth necessary for a single signal so that many more signals can be placed in a given frequency band.

synchronous orbit See GEOSTATIONARY ORBIT.

synchronous satellite See GEOSTATIONARY SATELLITE.

synchronous speed For an alternating-current (ac) machine, the speed corresponding to the ac frequency.

synchronous transmission A method of signal transmission in which individual symbols are sent at a specified rate, according to a clock that also governs the receiver.

synchronous vibrator See VIBRATOR-TYPE RECTIFIER.

syncoscope 1. An oscilloscope having a high-speed sweep triggered by a synchronizing signal. Such an instrument is valuable for viewing high-speed pulses. 2. A pointer-type instrument used to indicate the synchronism between two parallel alternators. Also see SYNCHRO.

synchrotron A particle accelerator that uses a high-frequency electrostatic field and a low-frequency magnetic field to impart very high velocity to the particles.

sync pulse 1. A pulse used to control the frequency or repetition rate of an oscillator or other generator. 2. In a television system, a pulse transmitted as part of the composite video signal to control scanning. Also see HORIZONTAL SYNC PULSE and VERTICAL SYNC PULSE.

sync separator In a television receiver circuit, a stage used to separate and deliver the sync pulses from the composite video signal. See, for example, DIODE SYNC SEPARATOR.

sync signal See SYNCHRONIZING SIGNAL.

sync takeoff The point in the video amplifier circuit of a television receiver at which the composite video signal is sampled to extract the sync pulses.

syntax 1. The rules by which computer program statements are structured. 2. The way that a written or spoken sentence is constructed. It is important in speech recognition and speech synthesis.

synthesis The rigorous (usually mathematical) design of an electronic circuit or device and the accurate prediction of its performance. Compare ANALYSIS.

synthesizer 1. See SIGNAL SYNTHESIZER. 2. A circuit synthesizer (i.e., a device that allows a wide variety of circuits to be set up temporarily or simulated, for testing and evaluating). Sometimes, a specially programmed computer serves this purpose. 3. A keyboard on which music can be played, and whose output can be adjusted to simulate the sounds of various musical instruments. 4. See MOOG SYNTHESIZER.
system of units: A set of fundamental units for defining the magnitudes of all physical variables. The most common system of units is the standard international (SI) system.

**systems analysis**: In computer system operation, analyzing the way something is done and devising a better alternative by isolating the problem area, scrutinizing the system as it stands, studying what is thereby disclosed, devising the alternate application of software and/or hardware, disseminating the revised operational procedure, and overseeing the implementation of the new method.

**systems engineering**: The branch of engineering devoted to the design, development, and application of complete systems. The approach takes into consideration all elements in a system or process and their integration.

**systems flowchart**: A flowchart showing the interrelationship of activities in a system.

**S band**: A section of the S BAND, extending from 3900 to 4200 MHz.
talitl flare monitor: An electronic device for warning a motorist of talil flare.

tail pulse: A pulse with a fast rise time, but a slow decay time. See TAIL.

takedown: In computer operations, the process of clearing output peripherals for upcoming program runs.

take-down time: The duration of the TAKEDOWN process.

take-up reel: In a reel-to-reel tape recorder/reproducer, the reel on which the tape accumulates during recording or reproduction.

talk-back circuit: See INTERPHONE.

talk-listen switch: A transmit-receive switch in an intercommunication system (see INTERCOM).

talk power: See SPEECH POWER.

tally: 1. To obtain a sum or total. 2. The rows of operands, subtotals, and totals that add machine prints.

tally reader: A device that, via optical character recognition (OCR), can read the digits and symbols on a tally (see TALLY). 2.

tape loop: An endless device that closes a circuit or activates an alarm when a certain set of conditions is altered.

tan: Abbreviation of TANGENT.

tan-4: Arc tan (inverse tangent function).

2. A device that facilitates adjustment of the turns ratio of a transformer by changing the tap on the primary winding, the secondary winding, or both. It also facilitates the adjustment of the impedance-transfer ratio. It can be used for power supplies or audio- or radio-frequency transformers.

tape cartridge: A holder and the reel of blank or prerecorded magnetic (hi-fi audio or wider video) tape it contains, which can be inserted into a recorder/reproducer without having to thread or otherwise handle the tape for either playing or rewinding.

tape comparator: In a data-processing or computer system, a machine that compares tapes generated from the same input, for differences in the data thereon; it is a character-by-character process.

tape core: A ring-type magnetic core made by tightly winding metal tape in several layers for the desired thickness.

tape counter: See POSITION INDICATOR.

tape deck: In a tape recorder/reproducer, the complete tape-transport mechanism (drive, heads, equalization circuitry, and preamplifiers).

tape drive: See TAPE TRANSPORT. 2. A tape deck.

tape file: A data file recorded on magnetic tape.

tape group: An assembly of two or more tape decks.

tape head: On a reel or cassette of magnetic tape containing a data file, a record at the beginning or end that contains information about the file.

tape loop: An endless loop of magnetic tape.

tape magazine: See TAPE CARTRIDGE.

tape mark: 1. A character that subdivides the magnetic tape file on which it is recorded. Also called CONTROL MARK. 2. A character marking the end of a length of magnetic tape on a reel. Also called END-OF-TAPE MARK.

tape playing system: In computer operations, a system for operating a digital incremental plotter using the information on magnetic tape.

taper: A potentiometer or rheostat, the rate of change in resistance during uniform rotation of the knob. See, for example, LINEAR TAPER and LOG TAPER.

tape recorder: A machine for recording audio, video, or other data signals on magnetic tape; it can usually also play back the recorded material.

tapered potentiometer: A potentiometer having a tapered graduation winding (see TAPERED WINDING).

tapered winding: A resistance winding (in a rheostat or potentiometer) in which the resistance change per unit length of winding is nonuniform.

tape sort: The (computer) operation of sorting data in a magnetic tape file into a record-key-determined sequence.

tape splice: A mechanism that aligns and secures the overlapping ends of broken magnetic tape so that they can be cut (often with an integral cutter) to form butt ends, and taped into a splice.

tape station: See TAPE DECK.

tape-to-head contact: See HEAD-TO-TAPE CONTACT.

tape transmitter: A transmitter that receives its signal input from a recorded tape.

tape transport: In a tape deck or reproducer, the device that moves the tape past the heads.

tape unit: 1. See TAPE DECK. 2. See TAPE GROUP.

tape verify: In computer operations, a device that checks the integrity of data on paper tape through comparison with an original document.

tape width: Magnetic tape, the dimension perpendicular to tape travel; in general, the greater the tape width, the more tracks the tape can contain.

taped coil: An assembly of two or more intermediate connections (taps) are made at appropriate turns to provide intermediate values of inductance.

tapped component: A coil, transformer, choke, resistor, or other device, in which an intermediate connection is made. See, for example, TAPPED COIL.

taped induction: See TAPPED COIL.

taped resistor: A resistor in which one or more intermediate connections (taps) are made to appropriate parts of the resistance element to provide steps of resistance.

taped transformer: A transformer having one or more tapped windings.

tapped winding: A transformer or choke winding with one or more taps. Also see TAP and TAPPED COIL.

tap switch: A multiposition switch used to connect to various taps on a component. Also see SELECTOR SWITCH and TAP.

1. The bombarded electrode in an X-ray tube. 2. The scanned storage element in a television camera tube (electrons, the scanned object, 4. An object intended for nuclear particle bombardment. 5. A goal—especially in a production process (deadline, desired number of units, etc.).

target acquisition: 1. The moment at which a target comes within the range of a radar system. 2. The observation of a new target on a radar screen.
target discrimination  The extent to which a radar system can distinguish between two targets that are close together. Also called target resolution. It is specified in linear units (such as meters, kilometers, or miles).

target identification  Any method by which the identity of a radar target is determined.

target voltage  In a television camera tube, the backplate-to-cathode voltage.

task environment  The characteristics of the space in which an autonomous robot works. It depends on such factors as the intended application(s), the required speed at which the robots must work, and the human/robotic or computer/robotic interaction.

task-level programming  In robotics, the writing of programs to perform sequences of actions. A complex process, it is a primitive level of artificial intelligence (AI). An example is a program that directs a robot to prepare and serve a meal.

taut-band meter  A movable-coil in meter in which the conventional spiral springs of the coil are replaced by two tightly stretched, thin, straight metal ribbons, whose twist provides torque that returns the pointer to zero after a deflection.

Tb  Symbol for TERBIIUM.

Bi  Abbreviation of talk between ships.

Tc  Symbol for TECHNETIUM.

tee antenna  A three-resistor pad in which two series resistors and a shunt resistor are arranged to form a tee. See also R PARAMETERS.

tee circuit  In microwave systems, a tee-shaped junction of three waveguides with a ferrite post at the junction. See also microwave reflectometry.

tee-equivalent circuit  An equivalent circuit in which the components are arranged in the form of a tee. See, for example, TEE NETWORK and R PARAMETERS.

tee junction 1. A tee-shaped splice between two wires. 2. A tee-shaped fixture for splicing one coaxial line perpendicularly to another. 3. A tee-shaped section for joining one waveguide perpendicularly to another. Also called WAVE GUIDE TEE.

tee network  A three-terminal network resembling a tee.

tee pad  A three-resistor pad in which two series resistors and a shunt resistor are arranged to form a tee.

tee switch  A combination of three switches arranged to form a tee; two switches are in series with a shunt switch in between. If the series switches are open and the shunt switch is closed, isolation is greatly improved, compared to a single series switch.

telemeter 1. An indicating instrument that measures the value of a quantity generated at a distant point or measures and transmits the value. 2. The action afforded by the device in 1.

telemetering  See TELEMETRY.

telemeter receiver  See TELEMETRIC RECEIVER.

telemeter transmitter  See TELEMETRIC TRANSMITTER.

telemetric receiver  A system that selects, amplifies, and demodulates or rectifies a radio signal, and acts as indicating instruments, recorders, or data processors.

telemetric transmitter  A specialized transmitter that generates and transmits a radio signal, delivers it to signals delivered by data transducers, and delivers the modulated power to an antenna for transmission to a distant telemetric receiver.

telemetry  The transmission of data signals over a distance, either by radio waves or by wire. A special case is the transmission and reception of signals to indicating instruments, recorders, etc.

teleoperation  The remote control of autonomous robots. A human operator can control the speed, direction, and other movements of a robot from some distance away. See also TELEPRESENCE.

telephone Abbreviation, tel. A (usually printed-out) message transmitted and received via telegraph or teletypewriter. Compare CABLGRAM and RADIODEX.

telegraph Abbreviation, tel. An instrument for transmitting and receiving messages by means of telegraphy. In its simplest form, it consists of a key and a sounder powered by a battery. Also see PRINTING TELEGRAPH.

telegraph channel 1. The frequency band assigned to a particular telegraph station. 2. The frequency band occupied by a telegraph signal.

telegraph code  Broadly, Morse code. Wire telegraphy often uses a special version, such as the American Morse code.

telegraph key  See KEY, 1.

telegraph sounder See SOUNDER.

telegraph system  A complete, integrated, coordinated arrangement of equipment for communications by means of telegraphy. Included are telegraph keys or keyers, sounders or printers, relays, switchboards, wire lines and cables, and power supplies.

teleop  The branch of electrical communications that deals with the transmission and reception of messages by means of prearranged codes—especially over wires. Also see MORSE, 1, 2, 3; MORSE CODE; and WIRE TELEGRAPHY.

telemeter 1. An indicating instrument that measures the value of a quantity generated at a distant point or measures and transmits the value. 2. The action afforded by the device in 1.

telemetering  See TELEMETRY.

telemeter receiver  See TELEMETRIC RECEIVER.

telemeter transmitter  See TELEMETRIC TRANSMITTER.

telemetering  See TELEMETRY.

telecommunication  Communication, usually by wire, radio, or telecommunications relay, and the reception and application of the signals to indicating instruments, recorders, etc.

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temperature, telephone line, and others receive sound from the telephone receiver.

telephone answering machine See ANSWERING MACHINE.

telephone bypass capacitors A set of fixed capacitors connected in a telephone line and an electrical ground to bypass radio-frequency energy. It can reduce or prevent radio-frequency interference (RFI) to telephone sets and data terminals.

telephone data set A device that converts signals from a data terminal for passage over a telephone circuit to a data-processing center.

telephone dialer In a security system, a circuit that automatically dials one or more telephone numbers, alerting the recipient(s) that an emergency exists at a given location.

telephone induction coil A small telephone-to-line impedance-matching transformer used in telephone systems.

telephone patch See PHONE PATCH.

telephone pickup A device for receiving conversations from a telephone to which it isn’t directly connected.

telephone plug See PHONE PLUG.

telephone radio patch See PHONE PATCH.

telephone receiver The handheld part of a telephone set, containing the microphone and earphone, and, in some cases, the dialing keypad.

telephone repeater An amplifier and associated equipment used to boost the amplitude of a telephone signal at an appropriate point along the line.

A vertical antenna consisting of separate lengths of metal tubing of progressively smaller diameter so that one can slide into another. The antenna can be pulled out to full length or compressed to the length of the largest-diameter section.

telephoto lens A camera lens providing a telescopic effect.

A method of communication in which a video image is sent of a page of printed material.

telethermometer A device for measuring the temperature of distant objects.

teletracer See AUTOGRAPH and SYNCHRO.

teletype 1. The transmission and/or receipt of text messages in digital form, displayed or printed at a distant location. 2. See TELETYPEWRITER.

teletype grade A term descriptive of a circuit having the quality necessary for communication via teletype.

teletypewriter An electronic system for operating a distant Linotype.

telewriter A method of communication in which a video transmission and/or reception of photographs by means of FACSIMILE. 2. A photograph transmitted and/or received by means of FACSIMILE.

telephoto lens A camera lens providing a telescopic effect.

Abbreviation, TV. The transmission and/or reception, via electromagnetic fields, wire cables, light or fiberoptic cable, of images, usually with sound. 2. A system for receiving signals, as defined in 1. 3. Video programs or data, with or without sound. 4. A method of changing one electromagnetic field, wire cable, and/or fiberoptic cable.

A high-precision crystal oscillator.

A device for converting signals to an electrical signal that can be used to reconstruct the image on the screen of a picture tube.

A device that scans a scene and delivers a series of electrical signals that can be used to reconstruct the image on the screen of a picture tube.

A figure that states the temperature coefficient of a conventional component, such as a temperature-compensating component. Its sign is equal in magnitude and opposite in sign to that of a conventional component to which it is connected to cancel temperature-induced variation in the latter’s value.

The transmission and/or reception of telegraphy.

A device that converts signals to an electrical signal that can be used to reconstruct the image on the screen of a picture tube.

A vertical antenna consisting of separate lengths of metal tubing of progressively smaller diameter so that one can slide into another. The antenna can be pulled out to full length or compressed to the length of the largest-diameter section.

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A vertical antenna consisting of separate lengths of metal tubing of progressively smaller diameter so that one can slide into another. The antenna can be pulled out to full length or compressed to the length of the largest-diameter section.

A circuit used for sending and receiving short messages from a telephone to which it isn’t directly connected.

A person or entity responsible for the broadcast equipment used to boost the amplitude of a telecommunication signal. In conventional broadcasting, this band is usually 6 MHz wide. See, specifically, UHF TELEVISION CHANNELS and VHF TELEVISION CHANNELS.

A trained professional skilled in video electronics engineering, as well as in basic engineering and associated subjects.

The branch of electronics engineering devoted to the theory and application of television.

Abbreviation, TVI. Interference in the reception of television signals, usually occasioned by signals from radio services or commercial communications systems.

A. A television transmitter or receiver. B. A person or entity responsible for the broadcast of television programs or signals.

A TELEMETRY device for measuring voltages or currents at a remote point.

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**temperature gradient** A range of temperature variation, such as the rate of change of temperature, with respect to change of power dissipation, or the rate of change of temperature with spatial displacement.

**temperature inversion** See INVERSION, 1.

**temperature meter** An indicator (usually a direct-reading voltmeter or millivoltmeter) whose scale reads directly in degrees.

**temperature scale** See THERMOMETER SCALE.

**temperature-sensitive resistor** See THERMIS- TOT.

**temperature shock** See THERMAL SHOCK.

**temperature-to-voltage converter** A circuit or device, such as a thermometer, that delivers an output voltage proportional to an applied temperature.

**template** 1. A diagram, usually drawn on paper, to show the locations at which components should be placed or tasks should be performed. It is taped or cemented temporarily to the work, and the points are transferred to the latter by prick-punching. 2. A stencil-like plate with alphabetic and circuit symbols, used as a drafting aid. Sometimes called “drafting stencil.”

**temporary magnet** 1. A body that exhibits magnetism only briefly after it has been exposed to another magnet. Compare PERMANENT MAGNET, 2. See ELECTROMAGNET.

**temporary storage** 1. In computer and data-processing operations, the storage of data or instructions only until they are needed. Also called INTERIM STORAGE, 2. Locations in a computer memory set aside during a program run for holding intermediate results of operations.

**TEC** See TRANSVERSE ELECTROMAGNETIC WAVE.

**ten code** A set of abbreviations used by two-way radio operators. Each “ten signal” represents a specific statement or query.

**terminal 1** A force that tends to stretch, pull tight, or pull apart. Compare STRAIN, 2. A term referring to VOLTAGE—especially in a utility power transmission line.

**ten-turn potentiometer** A precision potentiometer whose shaft must be turned through 10 complete revolutions to cover the entire resistance range. Also see HELICAL POTENTIOMETER and MULTITURN POTENTIOMETER.

**T-equivalent circuit** See TEE-EQUIVALENT CIRCUIT.

**terrestrial magnetism** See EARTH’S MAGNETIC FIELD.

**tertiary coil** A third winding (see TERTIARY WINDING).

**tertiary winding** A winding on a transformer or magnetic amplifier.

**tesla** Symbol, T. A unit of magnetic flux density; 1 T = 1 weber per square meter = 10^4 gauss.

**Tesla coil** A special type of air-core step-up transformer for developing high voltage at audio frequencies. It consists essentially of a low-turn primary coil, through which low-frequency (RF) current flows, and a multturn secondary coil, across which the high voltage is developed.

**test** A procedure consisting of one or several steps, in which (1) the mode of operation of a circuit or device is established, (2) the value of a component is ascertained, or (3) the behavior of a circuit or device is observed.

**test bench** An equipment installation intended for the testing, repair, or debugging of electronic devices by a technician.

**test data** Data used to test a computer program, including samples within limits that might be encountered during the program’s implementation.

**test instrument** A device for checking the operation of a circuit or the value of a component. This class of instrument is usually less accurate than measurement instruments. Also see TEST SET.

**test lead** The flexible, insulated wire attached to a test prod.

**test pattern** A picture-and-line display on the screen of a television picture tube, used to check such features as aspect ratio, linearity, contrast, etc.

**test point** A terminal intended for connection of test equipment in the repair or debugging of a circuit. Often, test points are labeled by the letter TP followed by numerals (such as TP1, TP2, etc.).

**test probe** See PROBE, 1.

**test prod** A stick-type probe (see PROBE, 1) with a flexible, insulated lead terminating in a plug or lug for attachment to an instrument.

**text** In computer operations, a program devised to check the functioning of hardware. Also called utility and test routine.

**texturing** The ability of a robotic end effector to determine the relative smoothness or
roughness of a surface. One common scheme uses reflected light or infrared. Scattered reflections indicate a rough or matte surface.
tgt
Abbreviation of TARGET.
TH
Abbreviation of true heading.
Tt
Symbol for THEOREM.
TTh
Symbol for heater temperature.
thallium
thalohide cell
An exhausted photocell using thalium oxide/oxide as the light-sensitive material.
THD
Abbreviation of TOTAL HARMONIC DISTORTION.
theory
A reasonable proposition put forth to account for the behavior of, or the relationships between, bodies and forces, or to explain concepts and their relations. When a theory has stood up under exhaustive tests, it might reveal a scientific law.
therm
A gas heating unit. 1 therm = 100,000 British thermal units (10^8 Btu).
thermal-agitation
Random movement of particles (such as electrons) in a substance, because of heat.
thermal-agitation noise
See THERMAL NOISE.
thermal ammeter
See HOT-WIRE AMMETER.
thermal anemometer
See HOT-WIRE ANEMOMETER.
thermal conductivity
The heat-conducting ability of a material. Compare electrical conductivity (see CONDUCTIVITY).

<table>
<thead>
<tr>
<th>Thermal conductivity (W/mK°C)</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.0</td>
<td>Aluminum</td>
</tr>
<tr>
<td>2.4</td>
<td>Carbon</td>
</tr>
<tr>
<td>16.0</td>
<td>Chromium</td>
</tr>
<tr>
<td>39.0</td>
<td>Cooper</td>
</tr>
<tr>
<td>30.0</td>
<td>Gold</td>
</tr>
<tr>
<td>7.9</td>
<td>Iron</td>
</tr>
<tr>
<td>16.0</td>
<td>Magnesium</td>
</tr>
<tr>
<td>0.8</td>
<td>Mercury</td>
</tr>
<tr>
<td>8.5</td>
<td>Nickel</td>
</tr>
<tr>
<td>6.9</td>
<td>Platinum</td>
</tr>
<tr>
<td>8.4</td>
<td>Silica</td>
</tr>
<tr>
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<td>Silver</td>
</tr>
<tr>
<td>4.1</td>
<td>Thorium</td>
</tr>
<tr>
<td>6.4</td>
<td>Ti</td>
</tr>
<tr>
<td>20.0</td>
<td>Tungsten</td>
</tr>
<tr>
<td>11.0</td>
<td>Zinc</td>
</tr>
</tbody>
</table>

thermal-conductivity device
An instrument or control unit using a heated filament whose temperature, conductivity, or conductivity variation is varied by some sensed phenomenon. See, for example, GAS DETECTOR, HEATED-WIRE SENSOR, HOT-WIRE ANEMOMETER, HOT-WIRE FLOW METER, and HOT-WIRE MICROPHONE.

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<td>16.0</td>
<td>Chromium</td>
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thermal switch
A switch actuated by a temperature change. Types vary from the simple thermo-stat to complex servosystem switches with a temperature-transducer input.

thermal time-delay relay
A delay relay utilizing the slow heating and slow-cooling property of one of its components.

thermion
An ion or electron emitted by a hot body, such as the heated cathode of a vacuum tube.

thermionic Pertaining to thermions and their applications.

thermionic cathode
A heated cathode, in contrast to a cold cathode, used as an emitter of electrons or ions. Also see THERMION.

thermionic current
Current caused by thermionic emission—especially in an electron tube.

thermionic detector
A vacuum-tube detector. Also see THERMION and THERMIONIC EMISSION.

thermionic diode
A hot-cathode diode tube.

thermionic emission
The emission of electrons by a hot body, such as the filament or cathode of a vacuum tube. Also see THERMION and HOT CATHODE.

thermionics
The study of electron emission from objects or materials at high temperature.

thermionic tube
An electron tube (i.e., one in which electrons or ions are emitted by a heated cathode). Also see THERMION, THERMIONIC CURRENT, and THERMIONIC EMISSION.

thermionic work function
The energy required to force an electron from inside a heated cathode into the surrounding space (in thermionic emission). Also see WORK FUNCTION.

thermistor
A temperature-sensitive resistor, usually made from specially processed oxides of cobalt, magnesium, manganese, nickel, uranium, or mixtures of such substances. Thermistors are available with either a positive or negative temperature coefficient of resistance. The name is a contraction of thermally sensitive resistor.

thermistor bridge
A four-arm bridge (see BRIDGE) in which one arm is a thermistor and, therefore, is temperature sensitive.

thermistor power meter
A radio-frequency power-measuring instrument based on a thermistor bridge.

thermistor probe
A temperature probe containing a thermistor as the sensing element.

thermistor thermostat
An electronic thermistor in which the temperature-sensitive element is a thermistor.

thermocouple
A device consisting essentially of a bond between two wires or strips of dissimilar metals (such as antimony and bismuth). When the bond is heated, a direct-current voltage appears across it.

thermal eff
See SEEBECK EFFECT.

thermal emf
See THERMOCOUPLE-TYPE METER.

thermal conductivity gasmeter
See GAS DETECTOR.

thermal detector
1. See DOLOMETER. 2. In a se-curity or fire-prevention system, a device that closes a circuit or actuates an alarm if the temperature rises to a specified level.

thermal effect
See THERMOCOUPLE-TYPE METER.

thermal expansion
The effect of applying heat or cold to a device so rapidly that abnormal reactions occur, such as rapid (often catastrophic) expansions and contractions.

thermal expansion coefficient
The ratio of the change in length of a material to the initial length when the temperature changes by a specified amount.

thermal force
A force exerted by the heat of a reservoir on a body in thermal equilibrium with the reservoir.

thermal image
A display of a scene or object on which temperature distributions are indicated through the use of color or contrast variations.

thermal imaging
The science dealing with the radiation of thermal energy from objects or materials at high temperature. Also see THERMION and THERMIONIC EMISSION.

thermalimetery
The science dealing with the relationships between heat and mechanical energy and their interconversion. Also see NOTHERM THEOREM, FIRST LAW OF THERMODYNAMICS, SECOND LAW OF THERMODYNAMICS, and THIRD LAW OF THERMODYNAMICS.

thermal electrometer
A cooling device based on the Seebeck effect.

thermal electrometer
The production of thermoelectric voltage between certain materials.

thermoelectric effect
-Heat produced electricity, as in thermocouple operation.

thermoelectric junction
A junction between two conductors that exhibits variable characteristics under conditions of changing temperature.
ternating current. At least one diode is included in a rectifier for three-phase alternating current. Two diodes are provided for each phase. The ripple frequency is six times the line frequency. Also see BRIDGE RECTIFIER, POLYPHASE RECTIFIER, and THREE-PHASE CIRCUIT.

A half-wave rectifier operates on three-phase power. Above fractional-horsepower size, the three-phase motor is smoother running and more simply structured than the single-phase counterpart.

A (usually dynamo-type) two separate conductors are provided, in addition to the ground conductor. See FOUR-WIRE SYSTEM. See THREE-PHASE SYSTEM and, specifically, DELTA CONNECTION and WYE CONNECTION.

A temperature-sensitive switch. In one case a thermostat, in another a thermostat. Also see THERMOSTAT.

A member of a family of very thin film circuits that occupies (essentially) two dimensions; that is, a very thin film circuit which can be magnetized to represent digital data. See MAGNETIC THIN FILM.
for each phase. Also see POLYPHASE RECTIFIER, THREE-PHASE BRIDGE RECTIFIER, THREE-PHASE CHOP. 3, and THREE-PHASE WAVE-REVERSER.

three-phase system An alternating-current electric system with three current sources or voltages that exist simultaneously. They are of equal amplitude but 120° out of phase with each other.

three-phase, three-wire system An electrical system having three conductors, with an alternating-current phase difference of 120° between the conductor pairs.

three-phase-to-single-phase transformer An alternating-current transformer with three-phase input and two-phase output, the output currents are 180° out of phase with each other.

three-phase voltage Voltage in a three-phase alternating current circuit. The voltages across the three legs differ by 120°.

three-quarter bridge A bridge rectifier having diodes in three arms and a resistor in the fourth.

three-space A mathematical continuum in which each point is uniquely defined by three variables in an ordered triple, such as (x,y,z), and each ordered triple corresponds to exactly one point in the space. A common coordinate system is the Cartesian coordinate system having three axes, x, y, and z—each mutually perpendicular and intersecting at the origin (0,0,0).

three-space coordinates Any set of coordinates used for locating points or plotting graphs in three dimensions.

three-state logic See TRI-STATE LOGIC.

three-way speaker A set of three individual speakers contained in a single cabinet: a woofer (low-pass devices, such as the silicon-controlled rectifier.

Thyrite Ceramic silicon carbide, a nonlinear resistance material, or a resistor made of this material.

Threshold detector A device that prevents a signal from passing until its peak amplitude reaches a certain value.

threshold frequency 1. The cutoff frequency or frequencies in a band pass, band-rejection, low-pass, or high-pass filter. 2. The lowest frequency for a metal or semiconductor junction at which incident radiation gives rise to the photoelectric effect.

threshold of hearing The minimum intensity level at which sounds are audible in an environment containing essentially no background acoustic noise.

threshold of pain The intensity level at which hearing a sound causes physical discomfort. This is approximately 120 dB above the THRESHOLD OF HEARING for most people.

threshold signal The weakest signal that can be detected in a receiving system.

throat See HORN THROAT.

throat microphone A small microphone operated in contact with the user's throat.

throttle The feedback control device in a regenerative detector or amplifier.

throughput In computer operations, an overall quantitative indicator of processing power, expressed in terms of the amount of data processed in a given period of time.

three-out spiral On a phonograph disc, a lead-out groove.

titanium Symbol, Ti. A metallic element of the rare-earth group. Atomic number, 22. Atomic weight, 47.867.

thumbwheel potentiometer A potentiometer operated by means of a knurled knob (usually protruding perpendicularly through a panel) that is turned with the thumb or with a finger.

thumbwheel switch A switch operated by means of a knurled knob (usually protruding perpendicularly through a panel) that is turned with the thumb or with a finger.

thy • time-interval mode 685

tie cable A cable that connects two distributing points in a telephone system. Any cable that connects two or more points is called a tie point.

tie point A lug, screw, or other terminal to which wires are connected at a junction.

tie-point strip A copper strip with two or more lugs to which conductors can be soldered.

tight coupling See SEE INVERTER.
					
tilt switch A device, such as a mercury switch, that is actuated by tilting it to a certain angle.

timbre The quality that distinguishes the sound of one voice or instrument from that of another, largely because of harmonic content.

time Symbol, t. 1. The instant at which an event occurs. 2. The instant at which a time-base variable reaches a given value. 3. The interval between two instants, commonly called duration or length of time. Also see STANDARD TIME, TIME BASE, TIME ZONE, and ZERO TIME.

time base Time as the independent variable in a physical relation or function. It appears in expressions such as pulses per second, feet per minute, units per hour, etc.

time compressor In audio recording and reproduction, a device that speeds up or slows down the tempo without changing the audio frequencies. It is used for special effects.

time constant See ELECTRICAL TIME CONSTANT and MECHANICAL TIME CONSTANT.

time delay See DELAY, 1. 2. time delay relay See DELAY RELAY.

time-delay spectrometry In acoustics, a method of simulating an echo-free environment within an enclosure that is actually not echo-free.

time-division multiplexing Abbreviation, TDM. In digital data transmissions. Positive feedback obtained via inductive coupling between a small coil (ticker) in the output circuit of an amplifier, and a (usually larger) coil in the input circuit. Also see TICKLER.

time-division-multiplex switch A switch with multiple ports—each port corresponding to a certain time slot in a time-division-multiplex scheme. The input and output (send and receive) ports are connected together by selecting a certain time slot for each.

time-domain reflectometry Abbreviation, TDR. Measuring the reflective characteristics of a device or system by superimposing the direct and reflected components of a step-formed test signal on a time-calibrated oscilloscope screen.

time duration See TIME, 3.

time-duration modulation See PULSE-DURATION MODULATION.

time factor The ratio toa/tr, where ta is the analog time and tr is the relativistic duration of an event as simulated for a particle that could travel at the speed of light. Also called TIME SCALE.

time-interval mode A device that permits the measurement of time intervals. The operation that allows a number of events to be counted between two points on a waveform.
time modulation  Any form of modulation in which the instantaneous characteristics of a signal are varied.

timeout  The expiration of an allotted time period for a given operation.

timer 1. A device for automatically controlling the duration of an operation. See ELECTRONIC TIMER. 2. A device for measuring the duration of an operation.

time sharing  In computer operations, a method for interlaced (i.e., nearly simultaneous) use of a machine or facility by two or more persons or agencies. As the cost of computers diminishes, so does the need for time sharing. Also see TIME-DIVISION MULTIPLEXING.

time-sharing dynamic allocaton  In computer storage, a program that allocates memory areas and peripherals to programs being entered into a time-sharing system; it also controls program execution.

timeshift 1. To receive a message at a significantly later time than when it was sent. 2. To use a videocassette or videodisc recorder to view a television program at a later time than when it was transmitted.

time-shifting communications  Any form of communications in which the recipient reads or views the message(s) at a significantly later time than the message is sent from the source. A common example is electronic mail (e-mail) using online computer networks.

time signals  Special radio transmissions made under the auspices of the National Bureau of Standards, for indicating Coordinated Universal Time (UTC).

time slot  A specifically defined time interval in a data stream of importance primarily in digital communications, where a given time interval can be high or low or at some discrete value.

time-space-time switch  A large switch consisting of a space block between two time blocks.

time zone  One of the 24 zones into which the global map is divided for the purpose of standardizing time. Within these zones, mean solar time is determined in terms of distance east or west of the zero meridian at Greenwich (near London, England). Each zone is equal to 15 degrees of longitude, or 1 hour. Four zones fall within the continental United States: Eastern Standard Time (zone of the 75th meridian), Central Standard Time (zone of the 90th meridian), Mountain Standard Time (zone of the 105th meridian), and Pacific Standard Time (zone of the 120th meridian). Also see MERIDIAN, ZERO MERIDIAN, and ZONE TIME.

timing extraction  The retrieval of a timing signal from incoming data.

timing bus current  Measured in microamperes. The current that generates a timing waveform in an integrated-circuit voltage regulator.

timing signal  A repeating signal sent along with data to control the synchronization of transmitter and receiver.

to 1. Symbol, Sn. A metallic element. Atomic number, 50. Atomic weight, 118.71. Tin is widely used in electronics as a structural material, a constituent of solder, and (in foil form) as the plates of some fixed capacitors. 2. To prepare the tip of a soldering gun or iron, or the stripped end of a wire or cable, by applying a coat of solder.

tin-oxide resistor  See METAL-OXIDE RESISTOR.

tinsel  Metal film strips interwoven with fabric threads to provide a flexible cord, particularly for headsets.

tint control  In a color-television receiver, the control for changing color hue.

**tip**

**tip jack**  The mating connector for a tip plug.

**tip plug** 1. A prod terminating in a phone tip. 2. A plug type connector terminating in a phone tip.

titanium  Symbol, Ti. A metallic element. Atomic number, 22. Atomic weight, 47.88. Titanium enters into some dielectric compounds (e.g., titanium dioxide).

titanium dioxide  Formula, TiO₂. A ceramic dielectric material. Dielectric constant, 90 to 170. Dielectric strength, 100 to 210 V/mil.

tiny 1. A method of telephone dialing that is charged on a per-minute or per-second basis.

tone 1. The pitch (frequency) and timbre (relative harmonic content) of a sound other than noise. 2. A sound consisting of a periodic waveform having constant frequency; also called note.

tone arm  See PICKUP ARM.

tone burst  A test signal consisting of a single-frequency sine wave sustained for a brief period of time, usually having a rectangular envelope (rapid rise and decay).

tone-burst entry  In repeater systems, a technique whereby a short tone signal is used at the start of a transmission to trigger a particular repeater so that all repeaters in the system will not go into operation simultaneously.

tone-burst generator  An oscillator and associated circuitry for producing a tone burst.

tone control  An adjustable device or circuit for modifying the frequency response of an amplifier (i.e., for emphasizing bass, treble, or midrange pitches).

tone dialing  A method of telephone dialing that uses standard tone pairs actuated via a keypad with 12 keys representing digits 0 through 9 and symbols # and *. Some keypads have four additional keys: A, B, C, and D.

tone generator  An oscillator for producing simple audio-frequency signals for communications, control, or testing.

tone keying  In wire and radio telegraphy, the representation of code characters by audio-frequency tones. Also see MODULATED CONTINUOUS WAVE.

tone localizer  A localizer that provides lateral guidance for an aircraft by comparing the amplitudes of two modulating frequencies.

tone modulation 1. The transmission of Morse, Baudot, or ASCII signals by audio-frequency modulation of a radio-frequency carrier. 2. Any rapid variation of the amplitude or frequency of an audio tone.

top cap  A small metal cap on top of some electron tubes, serving as a direct, low-capacitance connection to one of the internal elements—usually the control grid, but sometimes the plate.

top loading  A method of feeding a vertical antenna at or near the top.

toroidal coil  A coil wound on a form that is shaped like a donut. The form is made of powdered-iron or ferrite. Toroidal coils have certain advantages over solenoidal coils: greater inductance for a given physical size, better isolation properties, and higher Q factor. A disadvantage is that an air core is not practical.

toroid  See TOROIDAL COIL.

toroidal coil  A coil wound on a form that is shaped like a donut. The form is made of powdered-iron or ferrite. Toroidal coils have certain advantages over solenoidal coils: greater inductance for a given physical size, better isolation properties, and higher Q factor. A disadvantage is that an air core is not practical.

toroid  A method of feeding a vertical antenna at or near the top.

torque 1. The force that tends to produce a rotating motion. 2. Rotation of the plane of polarization of light by some crystals.

torque amplifier  A device having rotating input and output shafts and that delivers greater torque at the output shaft than that required to turn the input shaft.
torque sensitivity Symbol, KT. For a torque ma-
or, torque output per amper of input current.
torque The moment of force equal to the pressure re-
quired to support a column of mercury 1 millime-
ter high at 0°C and standard gravity; 1 t = 1.33 = 224 Pa (133.32 millibars).
torsion The effect on an object by torque applied to
one end while the other is being held fast or
torqued in the opposite direction.
torsion delay line A delay line in which the delay
is manifested in a material that is torqued by me-
chanical vibrations.
torsion waves Waves that travel by means of
torque, instead of displacement or compression.
The velocity of propagation depends on the mod-
ulus of rigidity and the density of the propagating
medium.
tot 1. Abbreviation of total. 2. To derive a sum or
total.
total breakaway torque For a torque motor, the
sum of magnetic retarding torque and brush-
commutator friction.
total harmonic distortion Abbreviation, THD. The
distortion caused by the combined action of all
the harmonics present in a complex waveform.
An important specification in high-fidelity audio
amplifiers.
total distortion See TOTAL HARMONIC DISTOR-
tion.
total internal reflection 1. The reflection of visible
light from a boundary between two substances
having different indices of refraction. When the
angle of incidence, relative to the tangent to the
boundary, is smaller than a certain value, as light
travels through the more dense medium total re-
fection occurs at the boundary. 2. Reflection of
electromagnetic waves from an inlined layer in
the atmosphere. This occurs at angles smaller
than a certain angle, relative to the tangent of the
plane of the inlining layer. In some cases, total in-
ternal reflection does not occur. Actually, most
ionospheric reflection is really refraction; the
emitted waves are bent by the inlined layer rather
than reflected.
total reflection Full return of a ray by a reflector,
one of the energy being transmitted by or ab-
sorbed in the reflecting material.
touch plate relay A capacitance relay in which the
pickup element is a small, metal plate that actu-
ates the relay when charged by a source of current.
tough dog A malfunctioning circuit that seemingly
defies all attempts to diagnose and correct its
trouble. Also see DOG. In tracking transceivers, the usual
manner of operation in which the output of each
of the separate supplies automatically follows
that of the one being adjusted. Compare INDE-
PENDENT MODE.
touch screen A special cathode-ray tube (CRT) or
video display unit that allows input of data via
physical contact with the screen surface. Items
are selected by simply touching the appropriate
spot ("button" or icon) on the screen.
touch tone Abbreviation of TRANSMIT PROCES-
ing. TP 235. See TEE PAD.
tr Abbreviation of transmit receive.
tr 1. Symbol for RECOVERY TIME. 2. Symbol for
recovery time.
trace 1. A tiny or insignificant quantity. 2. The
movement of the electron beam across the face of
a cathode-ray tube. 3. A routine used for testing of,
or for locating a fault in, a circuit or computer
program. 4. The process of implementing such a
routine.
trace element See MICROELEMENT.
traceability An expression of the accuracy with
which a photograph styli follows the irregulari-
ties in a disc.
track A device for guiding the cursor or pointer
in a computer. It is often used in laptop (note-
book) computers. It resembles a ball bearing;
the operator moves the cursor or pointer by
positioning the bearing with a finger.
track-drive locomotion A method of robotic loco-
motion using two or more wheels that drive a belt
(track). It uses the same principle as a military
tracking Following in step, as when ganged cir-
cuits resonate at the same frequency (or some
frequency difference) at all settings, or when a
missile closely follows its guiding signal.
transfer See VERTICAL STYLUS FORCE.
track label On a magnetic storage medium, a
record that identifies a track.
track mode In tracking transceivers, the usual
manner of operation in which the output of each
of the separate supplies automatically follows
that of the one being adjusted. Compare INDE-
PENDENT MODE.
track supply Adjustable power supplies, packaged
two or more to the unit, in which the output of each
will automatically follow adjust-
ment made to one of them.
track pitch The distance between tracks (see
TRACK 2).
track record At the end of a magnetic-tape or
floppy-disc file, a record signaling the end of the
file and often giving such information as the
number of records in the file.
track record label At the end of a group of computer
records, a record containing information relevant
to the group’s processing.
tracking edge The falling edge of a pulse. Compare
LEADING EDGE.
trans Abbreviation of TRANSVERSE.
transact The exchange of activity that occurs
between a computer, via a terminal, and the user,
including any processing required (e.g., that in-
volving in adding records to, or deleting them
from, a file).
transaction file In data processing, a group of
records used to update a master file.
transaction processing In computer operations,
the use of a central processor for handling, mod-
ifying, or otherwise acting on information by
translating the input data into the output
transaction tape Magnetic tape on which a trans-
action file has been recorded.
transadmittance For an active device, the ratio
d/dE, where d is the alternating-current (ac)
component of a signal. Compare EG. In a
second electrode, as the signal.
transceiver 1. A combination transmitter and re-
ceiver housed in a single enclosure, with fre-
quency control and some ancillary stages
common to both units. This design is economical
because it eliminates redundancy. Such a system
is more easily tuned than a separate transmitter
and receiver if the operating frequency must be
changed. But it can be difficult to carry out split-
frequency or split-band communication on two
frequencies that differ greatly. Compare TRANS-
MITTER-RECEIVER. 2. In computer prac-
tice, a read/write data terminal capable of trans-
mitting and receiving information to and from a
channel.
transcendental functions Nonalgebraic func-
tions. These include logarithmic functions, expo-
ential functions, trigonometric functions, and
transcendental functions.
transconductance 1. Symbol, gm. Unit, mi-
croampere per volt. In an electrical circuit, the
transconductance is the ac component
of the current in a second electrode
exposed to a voltage change in the first electrode.
See DEMODULATING TRANSFORM.
transconductance amplifier An amplifier in
which the output current is a linear function of
the input voltage.
transcribe 1. To record material, such as a radio
program, for future transmission. 2. In computer
operations, the intermediary transfer of data, as
from tape to disk.
transcriber A device used for intermediata data
transfer (e.g., one that can move the data on mag-
netic tape to magnetic or optical disc).
transcription A recording of material, such as a
record or tape of a radio program, for later use in
a transmitter. See ELECTRICAL TRANSCHIP-
DER.
transcutaneous nerve stimulator Abbreviation,
TNS. An electronic device for the temporary relief
of pain. In its use, electrodes taped to the skin
over the painful area are connected to a portable
generator of suitable pulse energy.
transducer A device that converts one quantity
into another quantity, specifically when one of the
quantities is electrical. Thus, a transducer
converts electrical impulses into sound, a micro-
phone converts sound into electrical impulses, a
photocell converts light into electricity, a thermo-
couple converts heat into electricity, etc.
transducer amplifier An amplifier used expressly
to boost the output of a transducer.
transducer efficiency For a transducer, the ratio
of the output power to the input power.
transducer The device for the temporary relief
of pain. In its use, electrodes taped to the skin
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transducer efficiency For a transducer, the ratio
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transducer amplifier An amplifier used expressly
to boost the output of a transducer.
transient The speed at which data can be moved between a computer’s internal memory and a peripheral circuit from one plate of the capacitor to the other.

transformed charge In a circuit containing a capacitor, the net electric charge that moves around the external circuit from one plate of the capacitor to the other.

transformer 1. See LAPLACE TRANSFORM. 2. To change the voltage or nature of an electrical parameter (e.g., high to low voltage and alternating to direct current). 3. To change the form, but not the content, of data.

transformation constant See DISINTEGRATION CONSTANT.

transformer 1. A device using electromagnetic induction to transfer electrical energy from one circuit to another (i.e., without direct connection between them). In its simplest form, a transformer consists of separate primary and secondary coils wound on a common core of ferromagnetic material, such as iron. When an alternating current flows through the primary coil, the resulting magnetic flux in the core induces an alternating voltage across the secondary coil; the induced voltage can cause a current to flow in an external circuit. Also see AIR-CORE TRANSFORMER, INDUCTION, INDUCTIVE COUPLING, INDUCTION TRANSFORMER, and TRANSFORMER, 2. A section of radio-frequency (RF) transmission line used to match impedances. Also see LINEAR TRANSFORMER.

transient absorber See SURGE ARRESTER.
transient arrester See SURGE ARRESTER.
transient battery A 9-volt electrochemical battery consisting of six tiny nickel–carbon or alkaline cells in series. Each of the six cells supplies 1.5 volts. The ampere-hour capacity of the battery is the product of the number of cells (six) times the ampere-hour capacity of a single cell. The capacity of the battery is determined by the number of cells in series and the ampere-hour capacity of each cell.

transient absorber An instrument that indicates the voltage of momentary signals. Usually, a peak-reading meter in the instrument gives the highest positive or negative value the transient attains (sometimes holding the deflection for reading later) and can respond to pulses of 1 microsecond in duration.

transistor An active (commonly three-terminal) semiconductor device capable of amplification, oscillation, and switching action. The name is a contraction of transfer resistor. Also see ALLOY-DIFFUSED TRANSISTOR, ALLOY TRANSISTOR, BIPOLAR TRANSISTOR, DIFFUSED-BASE TRANSISTOR, DIFFUSED-EMITTER-AND-BASE TRANSISTOR, DIFFUSED-JUNCTION TRANSISTOR, DIFFUSED-MESA TRANSISTOR, DIFFUSED PLANAR TRANSISTOR, DIFFUSED TRANSISTOR, DIFFUSION TRANSISTOR, DOUBLE BASE JUNCTION TRANSISTOR, FIELD-EFFECT TRANSISTOR, FIELD-FIELD EFFECT TRANSISTOR, GERMANIUM TRANSISTOR, GROWN-DIFFUSED TRANSISTOR, GROWN-JUNCTION TRANSISTOR JUNCTION TRANSISTOR, MESAS TRANSISTOR, METAL-oxide-semiconductor FIELD EFFECT TRANSISTOR, MICROALLOY DIFFUSED TRANSISTOR, MICROALLOY TRANSISTOR, PHOTOTRANSISTOR, PLANAR EPITAXIAL PASSIVATED TRANSISTOR, PLANAR TRANSISTOR, POINT-CONTACT TRANSISTOR, POWER TRANSISTOR, SILICON TRANSISTOR, SURFACE BARRIER TRANSISTOR, SURFACE CHARGE TRANSISTOR, TANDEM TRANSISTOR, THIN-FILM TRANSISTOR, THREE-JUNCTION TRANSISTOR, and UNIJUNCTION TRANSISTOR.

transistor amplifier An amplifier containing only transistors as the active components. Also called transistorized amplifier.

transistor analyzer An instrument for measuring the electrical characteristics of transistors. Compare TRANSISTOR TESTER.

transistor battery A 9-volt electrochemical battery consisting of six tiny nickel–carbon or alkaline cells in series. Each of the six cells supplies 1.5 volts. The amper-hour capacity of the battery is the product of the number of cells (six) times the ampere-hour capacity of a single cell. The capacity of the battery is determined by the number of cells in series and the ampere-hour capacity of each cell.

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transit angle  For an electron, the angular frequency multiplied by the time required to travel from one point to another—especially from the cathode to the plate in a vacuum tube.

generally and amplifiers. The main asset of this scheme is the fact that it is possible to conduct split-frequency communication on bands whose wavelengths differ greatly. Another asset is the ability of the system, with proper design, to operate in full-duplex mode. The uplink signals are often used in satellite communications. Compare TRAVELING-WAVE TUBE.

transmitting antenna  An antenna designed expressly for the efficient radiation of electromagnetic energy into space.

transmitting station  A station that only transmits signals (i.e., it engages in no official form of reception). Compare RECEIVING STATION.

transmissivity  The degree to which a selective circuit transmits a desired signal. Compare SELECTIVITY.

transmitting transistor  A device that changes a signal from one multiplexed form to another while maintaining all of the information contained in the signal. For example, a transmultiplexer might convert time-division-multiplex data to frequency-division multiplex or vice versa.

transonic  Equal to, or approximating, the speed of sound in air (approximately 1100 feet per second).

transparency  The practically unimpeded transmission of radiation, such as light, through a material. Compare OPACITY and TRANSLUCENCE.

transponder  An acronym for transmitter and responder. 1. A combination transmitter-receiver that automatically transmits an identification signal whenever it receives an interrogating signal. 2. In a communications satellite, a broadband repeater that receives signals sent up from the earth, converts them to another frequency, and retransmits them back to the earth. Some satellites have units that employ multiplexing, data storage and retrieval systems, and other schemes to maximize the amount and variety of data they can handle.

transponder overload  A condition that occurs when a satellite transponder is heavily used or when an excessively strong uplink signal is received. During heavy usage, all downlink signals are consistently weaker than they are when the transponder is not mixing with many signals. If an overly powerful uplink signal is received, all downlink signals are attenuated intermittently. Often, the instantaneous power of the offending uplink signal, the greater the instantaneous attenuation of all the downlink signals. See TRANSMITTER, 2.

transport  See TAPE TRANSPORT.

transportable equipment  Portable electronic equipment. See, for example, PORTABLE TRANS- MITTER.

transuranium  An element whose atomic number is higher than that of uranium.

travelling wave  Am electromagnetic wave having electric-field vectors and magnetic-field vectors perpendicular to the direction of propagation.

travelling-wave tube  In a waveguide, the condition in which the microwave lines of flux are perpendicular to the direction of propagation. Compare TRAVELING-ELECTRIC Morse Code. Also see WAVEGUIDE MODE.

travelling-wave tube amplifier wave  An electromagnetic wave having electric-field vectors and magnetic-field vectors perpendicular to the direction of propagation.

travelling-wave mode  In a waveguide, the condition in which the electronic lines of flux are perpendicular to the direction of propagation. Compare TRAVELING-ELECTRIC MODE. Also see WAVEGUIDE MODE.

transmit-receive switch  A correctly dimensioned switch for transferring a single anode to another. Compare TRANSMITTER-RECEIVER.

travel time  The time taken by an electron to travel from one electrode to another—especially visible light. Compare TRAVEL TIME.

travel time  The time taken by an electron to travel from one electrode to another—especially visible light.
A television set using a single-gun color-television picture tube developed by Sony.

A single-gun color-television picture tube, which virtually all weather phenomena occur. It extends from the surface to an altitude of 8 to 12 miles above sea level.

The portion of the atmosphere in which virtually all weather phenomena occur. It extends from the surface to an altitude of 8 to 12 miles above sea level.
tunnel-diode amplifier A circuit that uses the negative-resistance properties of a tunnel diode to vary the frequency of an incoming signal.

tuned-collector oscillator A self-excited, common-emitter connected, bipolar-transistor oscillator in which the tuned tank is in the collector circuit.

tuned-collector oscillator + tunnel-diode amplifier

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tuned-collector oscillator

A circuit or device that can be set to select one signal from a number of signals in a frequency band.

tuned signal tracer A signal tracer that can be tuned sharply to the frequency of the test signal being traced.

tuned transformer An audio-frequency or radio-frequency transformer tuned via a capacitor in parallel with its primary winding and/or a capacitor in parallel with its secondary winding.

tuning A circuit or device that can be set to select one signal from a number of signals in a frequency band.

tuning meter A meter-type resonance indicator.

tuning core A powdered-iron core that slides or is fixed in a coil and is used to vary the frequency of an incoming signal.

tuning fork A metal device that vibrates at a precise audio frequency when struck physically. It usually has two prongs and looks something like a fork.

tuning oscillator A form of tropospheric propagation that provides a resistive load at a specific resonant frequency.

tuning receiver A receiver consisting only of a tuned-radio-frequency amplifier, detector, and audio amplifier. Compare SUPERHETRODYNE RECEIVER.

tuning signal A signal tracer that can be tuned sharply to the frequency of the test signal being traced.

tuning transformer An audio-frequency or radio-frequency transformer tuned via a capacitor in parallel with its primary winding and/or a capacitor in parallel with its secondary winding.

tuning core A variable capacitor used to tune an inductance-capacitance circuit (series-resonant or parallel-resonant).

tuning diode An inductance-capacitance circuit that can be adjusted independently of the transmitter or receiver with which it is used.

tuned dipole A half-wave, center-fed, resonant antenna.

tuned feeders A communications link between two high-gain antennas. Scatter is often observed in the elements of some electron tubes, and in inductive-lamp filaments.

tuned headphones Headphones used in radio-telegraphy that are flat-tuned to a single audio frequency (e.g., kHz) by means of a small parallel capacitor.

tuned coils Variable inductor used to tune an inductance-capacitance circuit (series-resonant or parallel-resonant).

tuned line An antenna wire or transmission line that provides a resistive load at a specific resonant frequency.

tuned pickup A pickup circuit or device (such as a radio-frequency amplifier for optimum frequency transformation. Compare TROPOSPHERIC BENDING.

tuned AF amplifier 1. A half-wave, center-fed, resonant antenna.

tuned headphones Headphones used in radio-telegraphy that are flat-tuned to a single audio frequency (e.g., kHz) by means of a small parallel capacitor.

tuned line An antenna wire or transmission line that provides a resistive load at a specific resonant frequency.

tuned pick-up A pickup circuit or device (such as a radio-frequency amplifier for optimum frequency transformation. Compare TROPOSPHERIC BENDING.

tuned radio-frequency receiver A receiver consisting only of a tuned-radio-frequency amplifier, detector, and audio amplifier. Compare SUPERHETRODYNE RECEIVER.

tuned resistors A temperature-compensated resistor used to vary the resistance of a circuit.

tuned relay An electronic or electromechanical relay that closes at one frequency. See, for example, REED SWITCH.

tuned transformer An audio-frequency or radio-frequency transformer tuned via a capacitor in parallel with its primary winding and/or a capacitor in parallel with its secondary winding.

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TST switch

See TIME-SHARING SYSTEM.

T switch

An electronic or electromechanical relay or switch used to vary the capacitance of a varactor and/or thickness have been adjusted so that it resonates at the transmitted-signal frequency.

tube A vibrating reed whose length, width, and/or thickness have been adjusted so that it resonates at the transmitted-signal frequency. See, for example, PARALLEL-TEE AMPLIFIER.

tube diode A two-element (cathode and anode) electron tube for current rectification. Also see DIODE.

tube diode An inductance-capacitance circuit for resonance on a desired frequency.
two-component device  A device having two stable states (e.g., a flip-flop).
two-state logic  Digital logic in which there are two possible conditions (called high and low, true and false, or 1 and 0).
two-tone keying  Abbreviation of FREQUENCY-SHIFT KEYING.
two-track recording  Recording on two adjacent tracks on magnetic tape. The separate recordings can be in the same direction (as in stereo) or in opposite directions.
two-way amplifier  An amplifier whose input and output terminals can be used interchangeably.
two-way communication  The exchange of messages between two or more stations that transmit as well as receive. Compare ONE-WAY COMMUNICATION.
two-way radio  1. Any form of TWO-WAY COMMUNICATION using electromagnetic waves. 2. A radio transceiver—especially one used for voice communication at very high or ultra-high frequencies.
two-way repeater  In telephony, a device that amplifies and retransmits a signal in either direction. Also see TWO-WAY AMPLIFIER.
two-way speaker  A woofer/midrange speaker and a tweeter occupying the same enclosure, and interconnected by a crossover network for wide-band frequency response.
two-way repeater  In telephony, a device that amplifies and retransmits a signal in either direction. Also see TWO-WAY AMPLIFIER.
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two-way repeater  In telephony, a device that amplifies and retransmits a signal in either direction. Also see TWO-WAY AMPLIFIER.
UHF generator 1. An oscillating device (such as a transmitter, tunnel diode, Rfistron, or magnetron) used to produce radio-frequency energy at ultra-high frequencies (UHF). 2. The equipment in which such a device is used. 3. An ultra-high-frequency test-signal generator.

UHF loop A (usually single-turn) loop antenna with a toroidal radiation pattern perpendicular to the loop; the antenna has a natural wavelength in the ultra-high-frequency (UHF) range.

UHF receiver A receiver tunable to frequencies in any band in the range 300 MHz to 3000 MHz.

UHF television channels Television channels 14 through 69, whose frequencies lie in the ultra-high range.

UHF transistor A transistor specially designed and fabricated for ultra-high-frequency (UHF) operation. It is characterized by extended beta cutoff frequency, low junction capacitance, and fast recovery time.

UHF translator A television broadcast translator station transmitting in an ultra-high-frequency (UHF) channel.

UHF tube A vacuum tube specially designed for operation at ultra-high frequencies. In such a transmitter, stray parameters are minimized and special tubes or transistors are required.

UHF capacitor A button-type capacitor. Because of its unique design, it is an efficient bypass capacitor at ultrahigh frequencies.

UHF converter 1. A circuit, usually consisting of a radio-frequency amplifier and mixer, for converting ultra-high-frequency (UHF) signals to a lower band of frequencies. 2. A circuit for converting UHF television signals to very-high-frequency (VHF) signals so that they can be accommodated by an older (VHF only) television receiver. See UHF TELEVISION CHANNELS and VHF TELEVISION CHANNELS.

UHF oscillator An oscillating device (such as a transmitter, tunnel diode, Rfistron, or magnetron) used to produce radio-frequency energy at ultra-high frequencies (UHF).
wave-lengths between 1000 kilometers and 100 kilometers. 2. Audio frequencies lower than those in the human hearing range.

ultramicrometer • an electronic instrument for extremely small linear measurements.

ultramicroscope • a microscope using re-fracted light to illuminate minute particles.

ultrametric • pertaining to wavelengths in the range 10⁻⁶ to 10⁻¹ meter (300 GHz to 300 THz).

ultraminiature • see MINIATURE.

ultraphotic rays • collectively, infrared and ultravi- olet rays.

ultrared • see INFRARED RAYS.

ultra-short waves • waves whose length correspond to ultra-high frequencies (i.e., wavelengths between 0.1 and 1 meter).

ultrasonic • of higher frequency than those that are audible (supersonic). See, for example, ULTRA- SONIC FREQUENCY.

ultrasonic bonding • a method of bonding metal by means of physical vibration at frequencies above the human hearing range.

ultrasonic braze- ing • forming a nonporous bond be-tween metal parts through the use of ultrasonic energy and a second, different metal (or alloy) having a lower melting point.

ultrasonic cleaning • a method of cleaning delicate or intricately structured items (such as dentures, contact lenses, or jewelry) in which the soiled items are immersed in a fluid that is agitated by ultrasonic vibrations; the soiled particles are shaken away.

ultrasonic cleaning tank • a thick-walled stainless-steel tank with ultrasonic transducers mounted within its walls and used for ultrasonic cleaning.

ultrasonic coagulation • the coagulation of a sub stance through ultrasonic agitation.

ultrasonic communication • under water tele graphic communication between ships and/or submarines by keying the echo-ranging sonar equipment.

ultrasonic delay line • a delay line, such as the mercury type, through which an ultrasonic signal is propagated. The delay results from the relative slow propagation of the ultrasonic wave through the material under test, or for the signal to penetrate the material and be reflected back to the trans- mitter.

ultrasonic densimeter • a density measuring ap paratus whose operation is based on the time re quired for an ultrasonic signal to penetrate the material under test, or for the signal to penetrate the material and be reflected back to the trans- mitter.

ultrasonic depth finder • see ACOUSTIC DEPTH FINDER.

ultrasonic detector • a device that responds to ultrasonic waves by indicating their presence, in tensity, etc.

ultrasonic diagnosis • the medical determination of the structure of tissues or structures within the body, in terms of reflection of ultrasonic waves by those tissues or structures. The technique is use ful in situations where other techniques, such as radiology or the use of catheter probes, are risky.

ultrasonic disintegrator • in biology and related fields, a device that uses ultrasonic energy to rupture cells, tissues, or foreign bodies, such as kidney stones.

ultrasonic drill • a drill running at speeds corre sponding to ultrasonic frequencies. The tool is valuable in drilling hard or brittle materials and in dentistry.

ultrasonic filter • a bandpass filter whose opera tion is based on the natural (ultrasonic) vibration frequency of small disks or rods of magnetostri ctive metal. See MAGNETOSTRICTION. Also called mechanical filter. 2. Generally, a filter operating at ultrasonic frequencies.

ultrasonic flow detector • a system analogous to radar, in which an ultrasonic wave is transmitted through a solid material and is reflected back to a detector and display device to reveal flaws, cracks, and strain in the material.

ultrasonic frequency • for an acoustic disturbance, any frequency above the limit of human hearing (higher than 20 kHz).

ultrasonic generator • 1. An oscillator that operates at frequencies above the range of human hearing, and the output of which is intended for coupling to an electronic transducer. 2. Any device that produces ultrasonic waves.

ultrasonic imaging constant • for a sound wave producing a diffraction spectrum, a figure indicating the distance between diffractions centers of a wave.

ultrasonic imaging • the production of an image in a specimen by means of ultrasonic energy directed into or through it.

ultrasonic image converter • a device that makes visible acoustic field patterns.

ultrasonic inspection • the use of ultrasonic waves to detect internal flaws in solid materials, such as metals. It is valued particularly because it is non destructive. Also see ULTRASONIC FLAW DETECTOR.

ultrasonic intrusion alarm • an electronic relay actuated by an ultrasonic wave.

ultrasonic intrusion alarm • 1. The use of high-frequency acoustic energy in industry, medicine, research, and the home. See ULTRASONIC FREQUENCY. 2. The use of high-frequency acoustic energy for medical diagnosis and treatment. 3. The branch of physics dealing with the effects and behavior of acoustic disturbances at frequencies above the range of human hearing.

ultrasonic material detector • see ULTRASONIC BRIE FENCY.

ultrasonic material detector • detecting the depth of a body of water in terms of the time taken for a transmitted ultrasonic signal to be reflected back to a transmitting point on the surface of the water.

ultrasonic material detector • a periodic variation in the intensity of reflection when acoustic waves are present in a light-transmitting medium. Also see ULTRASONIC LIGHT DIFFRACTION.

ultrasonic material detector • see ULTRASONIC DELAY LINE.

ultrasonic stroboscope • a stroboscope that uses an ultrasonically modulated beam of light.

ultrasonic switch • an electronic switch actuated by ultrasound.

ultrasonic therapy • the use of ultrasonic energy in medicine for treatment of certain disorders.

ultrasonic thickness gauge • an instrument that determines the thickness of a specimen in terms of the propagation time (or echo time) of ultra sonic waves through the specimen.

ultrasonic transducer • a transmitter that converts electrical energy into ultrasonic energy, or vice versa. Common types are the quartz crystal, cera mic crystal, and piezoelectric disk.

ultrasonic waves • acoustic waves whose length corresponds to ultrasonic frequencies (i.e., frequencies above 20 kHz).

ultrasonic welding • a below melting point tech nique of joining two metallic bodies by clamping them tightly together and applying ultrasonic en ergy, rather than heat, in the plane of the desired weld. Compare ULTRASONIC BRAZING.

ultrasonic whistle • a whistle whose pitch is be yond the range of human hearing. Although some are of the simple (blown) type, others are (usually miniature) electronic sound generators. These de vices can be used for the remote control of televi sion receivers, garage-door openers, and other equipment.

ultrasonography • a method of examining human tissues or organs by transmitting ultrasonic waves into the body and receiving the echoes.

ultrasound • 1. Acoustic disturbances at frequen cies above 20 kHz. 2. See ULTRASONIC FREQUENCY.

ultraviolet • electromagnetic radiation at wave lengths somewhat shorter than those of visible light. Longwave or near ultraviolet extends from approximately 360 nm down to 50 nm. Shortwave or far ultraviolet extends from 50 nm down to 4 nm. Pertaining to the behavior and effects of electromagnetic radiation in the range of approximately 390 nm to 4 nm.

ultraviolet • 1. A below-melting point tech nique of joining two metallic bodies by clamping them tightly together and applying ultrasonic energy, rather than heat, in the plane of the desired weld. Compare ULTRASONIC BRAZING.

ultraviolet • a device that modulates a light beam passing transversely through a fluid agitated by sound waves.

ultraviolet light modulator • see ULTRASONIC MODULATOR.

ultraviolet • a device analogous to an electronic relay actuated by an ultrasonic wave.

ultraviolet • 1. The use of high-frequency acoustic energy in industry, medicine, research, and the home. See ULTRASONIC FREQUENCY. 2. The use of high-frequency acoustic energy for medical diagnosis and treatment. 3. The branch of physics dealing with the effects and behavior of acoustic disturbances at frequencies above the range of human hearing.

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ultraviolet • an electronic relay actuated by an ultrasonic wave.

ultraviolet • see LASER.
ultraviolet lamp A lamp that delivers ultraviolet rays. Common types are arc lamps and mercury-vapor lamps.

ultraviolet light See Ultraviolet Rays.

ultraviolet power The power (in watts) of ultraviolet light.

ultraviolet rays Radiation at frequencies in the ultraviolet region of the electromagnetic spectrum, the highest visible-light frequencies and the lowest X-ray frequencies.

ultraviolet therapy The use of ultraviolet rays by physicians and other health personnel in the treatment of certain disorders.

ultraviolet wavelength The wavelength range of ultraviolet radiation (e.g., 390 nanometers (nm) to 4 nm).

ultraviolet waves See Ultraviolet Rays.

umbilical cord 1. A cord through which missiles and rockets are controlled and powered until they are launched. 2. A cord connecting an astronaut to his space vehicle during extravehicular activity (e.g., during a space walk).

umbilical tower The vertical tower supporting the umbilical cords extending to a rocket in the launch position.

umbra 1. The region of total (conical) shadow behind an object situated in the path of a radiation. 2. The comparatively dark central region in a Sunspot.

umbrella antenna An antenna consisting of a number of wires, extending from the top of a vertical or horizontal airplane or satellite, below, at the center of which the mast is mounted. The wires are usually fed in parallel from the top.

unclamped A process responsible for thermal resistance in nonconducting materials. It results from collision between phonons, or phonons and electrons.

UMW Abbreviation of ultramicrowave.

unabsorbed field strength The field strength with no absorption between transmitter and detector. The unabsorbed field strength is an ideal quantity; the actual field strength over a given distance is always less. It is expressed in volts per meter.

unamplified back bias A negative-feedback voltage developed across a fast-time-constant circuit and fed to the controlled point which the control-signal voltage is taken from a mon base.

unamplified house field An output (signal, power, etc.) that is delivered directly from the generating device without the benefit of an isolating stage, such as a buffer amplifier. Compare BUFFERED OUTPUT.

unamplified emitter resistor In a common-emitter transistor circuit, an emitter resistor without a bypass capacitor. The flow of output-signal current through the resistor produces negative feedback within a single stage.

unamplified feedback A positive or negative current or voltage taken from the output of a system and presented to the input without being boosted through auxiliary amplification.

unamplified feedback See Amplified Feedback.

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unconditional stability
Stability of a system at all frequencies and ages. Also called absolute stability.

unconditional transfer
See UNCONDITIONAL JUMP.

uncontrolled multivibrator
A multivibrator that is not synchronized with a signal source. Also called, from admixture: MULTIVIBRATOR and FREE-RUNNING MULTIVIBRATOR.

uncontrolled oscillator
See SELF-EXCITED OSCILLATOR.

uncorrected power
In an alternating-current circuit, a power value calculated without regard for power factor (i.e., the watt-ampere product).

uncorrected time
Local standard time that has not been corrected in terms of the distance of the locality from the nearest standard-time meridian.

uncorrected tube
A television picture tube operated without antipincushioning magnets.

uncoupled mode
A mode of vibration existing in a system concurrent with (but independent of) other modes.

undamped galvanometer
A galvanometer for which no provision has been made to limit overswing or prevent oscillation.

undamped meter
1. A meter for which no provision has been made to limit overswing or prevent oscillation.
2. A meter not actuated by a short circuit for limiting vibratory movement of the pointer during transport.

undamped natural frequency
In the absence of damping, the oscillation frequency of a system having one degree of freedom when a transient force displaces the system momentarily from its position of rest.

undamped oscillation
Continuous-wave oscillation. Also see CONTINUOUS WAVE.

undamped output circuit
An audio power-amplifier output circuit that has not been designed so that overswing of the loudspeaker cone is prevented.

undamped speaker enclosure
A loudspeaker cabinet for which provision has not been made to deaden resonances and other undesired vibration.

undamped wave
See CONTINUOUS WAVE.

undamped wave beam
A ray beam or a light beam in its normal position of rest (quiescence).

underbiased unit
A component, such as a transistor or vacuum tube, whose bias voltage or current is lower than the prescribed value. Compare OVERBIASED UNIT.

underbunching
Less-than-optimum bunching of electrons in a velocity-modulated tube because of lowered anode voltage.

undercompounded generator
A generator in which the output voltage varies inversely with load resistance.

undercoupling
Loose coupling, usually of an underdamped signal transfer.

undercurrent
A current of lower than specified strength. Compare OVERCURRENT.

undercurrent relay
A relay that is actuated when coil current falls below a predetermined level.

underrate
The removal of the metal under the edge of the resist in a printed circuit by the etchant; thus the cross section of the conductor is reduced.

underdamping
Insufficient damping of a system (i.e., not enough to prevent output oscillation following application of a transient force).

underdriven unit
An amplifier, oscillator, or transducer whose driving signal (current, voltage, power, or other quantity) is lower than the prescribed value. Compare OVERDRIVEN UNIT.

underexceed
Receiving lower-than-normal excitation, as in an underdriven final amplifier of a radio transmitter. Compare OVEREXCEEDED.

underflow
In computer operations, the condition in which a quantity entered into storage is shorter than the space provided for it (e.g., a 12-digit quantity in a 16-position register).

underground antenna
A transmitting or receiving antenna installed and operated below ground. Included are buried antennas and antennas on equipment operated in tunnels, cellars, and similar devices.

underground cable
A cable that is buried in the earth.

underground communication
Communication between a transmitter and receiver, both below the surface of the earth.

underground image
The below-ground mirror image of an antenna; it combines with the actual antenna to form the complete radiation pattern.

underground line
A power line laid below the surface of the earth.

underground receiver
1. A receiver situated completely below the surface of the earth. 2. A clandestine receiver.

underground transmitter
1. A transmitter situated completely below the surface of the earth. 2. A clandestine transmitter.

under insulation
The insulation (usually a strip of tape) laid under a wire brought up from the center of a core or a conductor.

underinsulation
Inadequate or insufficient insulation.

underlay
In a facsimile or television picture, a crowding of the scanned lines.

underload circuit breaker
See CURCUT BREAKER.

underloaded amplifier
An amplifier whose load resistance (impedance) is less than the prescribed value. 2. A power amplifier delivering less than its rated output power. Compare OVERLOADED AMPLIFIER.

undermodulation
Incomplete modulation of a carrier wave. Compare COMPLETE MODULATION and OVERMODULATION.

underpass
The crossing of two conductors on a semiconductive wafer, without an electrical connection.

underpower relay
A relay actuated when power drops below a predetermined level. Compare OVERPOWER RELAY.

underrate
To assign a rating (e.g., current or power) lower than the quantity of the rating an equipment can handle, or tolerate. For safety or reliability, apparatus sometimes is deliberately underrated—especially in power output and maximum current or voltage.

undershoot
On an oscilloscope screen or graph, a momentary swing of a current or voltage below the reference axis. Compare OVERSHOOT.

undershoot distortion
Distortion caused by reduction of the maximum amplitude of a signal waveform below the steady-state amplitude that would be reached by a prolonged signal wave.

undershoot relay
A relay actuated when circuit current drops below a predetermined value. Compare OVERSHOOT RELAY.

undershoot voltage
A relay actuated when voltage drops below a predetermined level. Compare OVERVOLTAGE RELAY.

undershoot voltage relay
A relay actuated when circuit current or voltage drops below a predetermined value. Compare OVERSHOOT RELAY.

undistorted output circuit
An audio power-amplifier output circuit, a power value calculated without regard for power factor (i.e., the volt-ampere product).

undisturbed-zero output
A meter that is unprotected by a transducer whose driving signal (current, voltage, power, or other quantity) is lower than the prescribed value. Compare OVERDRIVEN UNIT.

undisturbed-zero output signal
A galvanometer for which no provision has been made to limit overswing or prevent oscillation.

undisturbed response voltage
See UNDISTURBED RESPONSE SIGNAL.

undisturbed-zero output
In digital-memory operations, the output of a magnetic cell or other memory unit that has received a full, rather than partial, read pulse. Compare UNDISTURBED OUTPUT SIGNAL.

universal multivibrator
A circuit, a power value calculated without regard for power factor (i.e., the volt-ampere product).

universal oscillation circuit
A circuit, a power value calculated without regard for power factor (i.e., the volt-ampere product).

universal time
Local standard time that has not been corrected in terms of the distance of the locality from the nearest standard-time meridian.

unlimited bandwidth
Also called CONTINUOUS WAVE.

unlimited bandwidth
A sine wave that contains essentially no harmonic energy. 2. A nonsinusoidal wave whose shape corresponds exactly to the equation for the wave.

unlimited output signal
In digital-memory operations, the output of a magnetic cell or other memory unit that has received a full, rather than partial, read pulse. Compare UNDISTURBED OUTPUT SIGNAL.

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unmodified beam
A wavelike alternation.

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unexpected halt

During a computer program run, an undirected (unplanned) halt (e.g., one caused by a machine fault or program bug)unfiltered

Not having been subjected to filtering action. An example is the pulsating-direct-current output of an alternating-current-operated rectifier circuit.

unfocused light source

In a photovoltaic system, a light source that delivers diffused light.

uniform rectifier

A newly fabricated semiconductor rectifier (especially selenium) or an electrolytic rectifier before it has been electroformed or improved characteristics.

unfounded antenna

An antenna that can be unrolled to increase its length, thereby lowering its fundamental resonant frequency; it can also be unrolled to decrease its length and increase its fundamental resonant frequency.

ungrounded item

A component, circuit, or circuit point having no connection to ground, except an inadvertent one through common impedances or leakage paths.

ungrounded system

A system operated entirely above ground, any path to ground being accidental.

unguided

Without electronic guidance (pertaining to missiles, rockets, satellites, etc.).

uni-

A prefix (combining form) meaning one or single and appearing in a number of electronic terms. See the following several definitions for examples.

uniaxial

1. Having one axis. 2. Referred to one axis.

uniaxial crystal

A crystal having one optical axis.

univalent electrolyte

An electrolyte, such as sodium carbonate (Na₂CO₃), that dissociates into two univalent ions and one bivalent ion.

Unicode

Trade name for a 16- or 32-bit binary digital code that allows for the representation of characters and glyphs in all the written languages of the world. The 16-bit code contains 65,536 code points; the 32-bit version contains more than 1 million code points.

unidirectional length

Maximum in one direction only.

unidefined flying object

Abbreviation, UFO. An object claimed to have been seen in flight, but not identified by reliable authorities as any known type of vehicle.

unidirectional

1. Flowing or acting in one direction only. 2. Having a radiation or response sensitivity that is maximum in primarily one direction in space.

unidirectional antenna

See UNIDIRECTIONAL ARRAY.

unidirectional array

A beam antenna that radiates in one direction only, or principally in one direction, unless rotated.

unidirectional conductivity

Electrical conductivity in only one direction; it characterizes an ideal diode.

unidirectional coupler

A directional coupler sampling only one direction of transmission.

unidirectional current

A current that flows always in the same direction, although it might fluctuate in intensity.

unidirectional elements

Circuit elements, such as diodes or transistors, that transmit energy in one polarity, although it might fluctuate in value.

unidirectional field-effect transistor

See UNILATERAL FIELD-EFFECT TRANSISTOR.

unidirectional hydrophone

An underwater unidirectional microphone.

unidirectional loudspeaker

A loudspeaker that radiates sound substantially in one direction.

unidirectional microphone

A microphone that receives sound waves from one direction, usually from the front, minimum response usually being from the sides and back.

unidirectional network

A network that transmits signals in only one direction (i.e., the input and output terminals are not interchangeable).

unidirectional pattern

For a transducer (such as an antenna, speaker, or microphone), a radiation or response pattern that shows a pronounced maximum in one direction only.

unidirectional pulse

A single-polarity pulse.

unidirectional pulse train

A series of unidirectional pulses.

unidirectional response

For a receiving transducer, such as an antenna or microphone, a response pattern that shows a pronounced maximum in one direction only.

unipolar field-effect transistor

A semiconductor device consisting of a thin silicon bar on which a single pn junction acting as an emitter is formed near one end. Two bases are provided—each an ohmic connection made to one end of the bar. Also called double-base diode.

uniform magnetic field

A magnetic field in which all the lines of flux are straight and parallel, and in which the magnetic force has the same value at all points.

uniform plane wave

A free-space plane wave at an infinite distance from the generator, having constant-amplitude electric and magnetic field vectors over the equiphasic surfaces.

uniform precession

In regions of the uniform magnetic field of a sample of material, the state in which the magnetic moments of all atoms are parallel and precess in phase around the magnetic field.

uniform waveguide

A waveguide having constant electrical and physical characteristics along its axis.

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uniform waveguide

A waveguide having constant electrical and physical characteristics along its axis.
unilateralization A system of neutralization used in transistor amplifiers at very-high and ultra-high frequencies, in which the internal capacitive and resistive components are compensated by the neutralization feedback.

unilaterally neutralized A transistor amplifier in which both the internal resistive and capacitive components are compensated by the neutralizing circuit. Also see UNILATERALIZATION.

unilateral network See UNIDIRECTIONAL NETWORK.

unilateral transducer See UNIDIRECTIONAL TRANSDUCER.

uninterruptible power supply Abbreviation, UPS. A device that provides a continuous utility current to electronic devices in the event of a utility power dip or blackout. It contains a battery and a power inverter. These devices are used extensively in personal computing to prevent loss of data that could otherwise result from a utility power failure.

union 1. The logical inclusive-OR operation. 2. See BOND.

union catalog In computer operations, the compiled list of the contents of two or more tape or disk libraries.

unionic material A material having no ions (i.e., one in neutral.

uniform phase antenna See COLLINAR ANTENNA.

UNIPOL Acronym for universal problem-oriented language, a high-level computer-programming language.

unipolar 1. Having or using a single pole or polarized. 2. Operating with one class of current carrier.

unipolar armature An electric-motor armature that maintains its polarity throughout a complete revolution.

unipolar field-effect transistor See UNIPOLAR TRANSISTOR.

unipolar induction Induction by only one pole of a magnetic field.

unipolar input The input circuit of an instrument or device designed for input signals of one polarity only.

unipolar pulse A pulse in which the current flows in one direction only, whereas the voltage appears with only one polarity.

unipolar transistor A field-effect transistor (FET). It utilizes only one kind of carrier electrons in the n-channel FET, holes in the p-channel FET. Compare BIPOLAR TRANSISTOR.

unipolar winding The winding of a UNIPOLAR ARMATURE.

unipolar A, An all-pass filter having one pole and for which there is one zero. Also see ALL-PASS FILTER, POLES OF IMPEDANCE, and ZEROS OF IMPEDANCE. 2. A hypothetical, omnidirectional antenna.

unipotential cathode An indirectly heated tube cathode. Also called equipotential cathode. See INDIRECTLY HEATED CATHODE.

unit 1. A named, single magnitude adopted as a standard by physical measurement. Thus, the unit of current is the ampere, the unit of frequency is the hertz, the unit of capacitance is the farad, etc. Also see ABSOLUTE SYSTEM OF UNITS, INTERNATIONAL SYSTEM OF UNITS, and CENTIMETER-GRAM-SECOND. 2. A single piece or assembly of equipment, such as amplifiers, converter, power supply, etc. 3. A quantity of 1 implied when unit is the adjective describing a quantity (e.g., unit length means a distance of 1 meter, 1 foot, etc.).

unitary code In computer operations, a code based on one digit. The number of times the digit is repeated indicates a given number.

unit cell In crystals, the simplest polyhedron exhibiting all the structural features and which is repeated to form the crystal lattice.

unit charge See UNIT ELECTROSTATIC CHARGE.

unit electric charge See UNIT ELECTROSTATIC CHARGE.

unit electrostatic charge An electrostatic point charge that will attract or repel a point charge of equal strength 1 centimeter away in a vacuum with a force of 1 dyne (10^-6 newton).

unit function Symbol, H or h. 1. A time-dependent quantity that is zero before the start of a period (when time is zero), and 1 for all values of time greater than zero. It is approximated by a square wave, and is useful in solving problems involving time functions.

unit length 1. A fundamental unit of distance or time, used for reference in a measuring system. For example, in the mks (meter-kilogram-second) system, the unit of length is the meter, and the unit of time is the second. 2. The duration of a fundamental element, or bit, in a binary-code transmission system.

unitized construction The fabrication of an electronic equipment in subassemblies (such as modules) that can be tested separately, and that can be easily replaced (plugged in) in the event of individual failure.

unit line A line of electric or magnetic flux.

unit magnetic pole See UNIT POLE.

unit magnetic flux A magnetic field that is uniform with no magnetic terms (all are at unity, the other terms being zero).

unit thickness Pertaining to the use in electrical machinery of one slot per pole per phase.

unit See OR GATE.

unit pole The strength (magnetic flux) of a hypothetical magnetic pole that will attract or repel a point charge of equal strength 1 centimeter away in a vacuum, with a force of 1 dyne (10^-6 newton).

unity coupling Tight coupling between two coils, the turns ratio being 1 to 1 and the coils always being closely interwound.

unity gain The condition in which the output amplitude is the same as the input amplitude: that is, a gain factor of 1 or 0 dB.

unity-gain bandwidth 1. For an active filter, the bandwidth between the frequencies at which the gain is 0 dB. 2. For an operational amplifier having a rolloff of 6 dB per octave, the frequency at which the open-loop gain is 0 dB.

uni-univalent electrolyte An electrolyte that dissociates into two univalent ions [e.g., sodium chloride (NaCl)].

unity Abbreviation of universal.

unity 2. A field-effect transistor (FET).

unilateralization A system of neutralization used in transistor amplifiers at very-high and ultra-high frequencies, in which the internal capacitive and resistive components are compensated by the neutralization feedback.

uniplanar electrolyte An electrolyte, such as sodium phosphate (Na₃PO₄), that dissociates into three univalent ions and one trivalent ion.

unipolar amplifier A named, single magnitude adopted as a standard by physical measurement. Thus, the unit of current is the ampere, the unit of frequency is the hertz, the unit of capacitance is the farad, etc. Also see ABSOLUTE SYSTEM OF UNITS, INTERNATIONAL SYSTEM OF UNITS, and CENTIMETER-GRAM-SECOND. 2. A single piece or assembly of equipment, such as amplifiers, converter, power supply, etc. 3. A quantity of 1 implied when unit is the adjective describing a quantity (e.g., unit length means a distance of 1 meter, 1 foot, etc.).

unipolar function See UNIT FUNCTION.

unit network See UNIDIRECTIONAL NETWORK.

unit record • universal-wound coil

universal computer A universal Turing machine in computer theory, a TURING MACHINE capable of simulating other Turing machines.

universal coupler 1. An arrangement of one or more inductors and variable capacitors for matching a transmitter to virtually any antenna. One such device is the Collins coupler. 2. A device for matching numerous generator output impedances to numerous load impedances.

universal filter An active filter that is continuously tunable over a wide frequency range and that offers low-pass, high-pass, band-pass, and band-stop suppression functions.

universal frequency counter A digital frequency meter usable at radio and audio frequencies.

universal encoder A radio receiver that can be operated either from alternating current or direct current (i.e., from utility power or battery power).

universal shunt See AYRTON-MATHER SHUNT.

universal time See GREENWICH MEAN TIME.

universal transformer See UNIVERSAL OUTPUT TRANSFORMER.

universal transmitter A radio transmitter that can be operated either from alternating current or direct current (i.e., from utility power or battery power).

universal vendor marking See UNIVERSAL PRODUCT CODE.

universal winding A zigzag winding used to reduce the distributed capacitance of multilayer coils. Such windings common in intermediate-frequency (IF) transformers and in radio-frequency (RF) chokes.
univibrator  See MONOSTABLE MULTIVIBRATOR.  
unknown quantity  Any variable quantity sought in calculus problems; it is usually represented by lowercase italic letters from the second half of the alphabet (e.g., x, y, z).

unlike charge  Unequal similar electric charges (e.g., positive and negative).

unlike poles  North and south poles of a magnet.

unload 1. To remove data from a file. 2. To disconnect the load from a circuit.

unloaded amplifier  See UNTERMINATED AMPLIFIER.

unloaded antenna  An antenna operated without added inductance or capacitance.

unloaded applicator  Insulating. In dielectric-heating operations, the unloaded impedance of applicator electrodes placed in their normal working position without the dielectric material load in place.

unloaded battery  1. A battery in the standby condition. 2. A battery tested for open-circuit terminal voltage (i.e., with no load, except the voltmeter).

unloaded generator  See UNTERMINATED GENERATOR.

unloaded line  See UNTERMINATED LINE.

unloaded potentiometer  A potentiometer or voltage divider that delivers an unregulated output.

un Q  The Q factor (degree of selectivity) of a coil or tuned circuit that is activated by a signal, but that is not tuned to a load.

unmanned factory  A manufacturing plant run largely by robots and computers. There must generally be at least one human being, whose job is to oversee and maintain the operation of the machines.

unmatched elements  Components (such as resistors, capacitors, semiconductors, etc.) having different values. 2. Mating elements or devices not having the same impedance. Also called MISMATCH.

unmodulated carrier  A current whose characteristics (amplitude, phase, or frequency) are not varied by a signal or by noise.

unmodulated voltage  A voltage whose characteristics (amplitude, phase, or frequency) are not varied by a signal or by noise.

unmodulated wave  See CONTINUOUS WAVE.

unsaturated  Current  A current whose characteristics (amplitude, phase, or frequency) are not varied by a signal or by noise.

unsaturated standard cell  See STANDARD CELL.

unshaded cable  A cable, such as a twisted pair or a multewire twist, lacking a shielding jacket. Unless special precautions are taken, such as transposing conductors, such a cable is susceptible to stray pickup and is capable of radiation.

unshielded choke  An unshielded choke, i.e., one without a protective and shielding metal housing.

unshielded coil  An inductor without a field-confining enclosure.

unshielded probe  An instrument probe that has no shielding enclosure. Such a probe is desirable for some tests, but it is subject to antenna pickup effects, body capacitance, and stray-field pickup.

unshielded stage  In electronic equipment, a stage operating entirely in the open (i.e., without electrostatic or magnetic shielding enclosures). It is therefore, susceptible to stray pickup and is capable of radiation.

unshift  The mechanical action in a teletypewriter when the carriage moves from the figures position to the letters position.

unshunted current meter  A single-range D’Arsonval milliammeter or microammeter that has no shunt resistor. The resistance of the instrument is, therefore, equal to the resistance of the movable coil.

unsaturated logic  A digital logic scheme in which the switching devices operate between the saturated and cut-off conditions during either or both halves of the cycle and are not tuned to a load.

unsaturated operation  Operation of a device at a point below saturation (i.e., below the point at which an increase in coil current produces no further increase in magnetization of the core). Compare SATURATED OPERATION.

unsaturated standard cell  See STANDARD CELL.

ununoctium  Symbol, Uuo. Atomic number, 118.

ununoctium  Symbol, Uun. Atomic number, 110.

ununoctium  Symbol, Uuh. Atomic number, 116.

unmodulated wave  See CONTINUOUS WAVE.

unmodulated supply  A supply whose output current or voltage is not automatically held to a constant value. For example, an unregulated voltage is free to fluctuate in value.

unsaturated supply  A power supply whose output current or voltage is not automatically held to a constant value. Compare CONSTANT-VOLTAGE SOURCE.

unsaturated core  A magnetic core operated below the point of saturation (i.e., below the point at which an increase in coil current produces no further increase in magnetization of the core).

unsaturated logict  A digital logic scheme in which the switching devices operate between the saturated and cut-off conditions during either or both halves of the cycle and are not tuned to a load.

unsaturated operation  Operation of a device at a point below saturation (i.e., below the point at which an increase in coil current produces no further increase in magnetization of the core). Compare SATURATED OPERATION.

unmodulated receiver  A receiver that, at a particular instant, receives no actuating pulse, and that, therefore, does not change state.

unmodulated radio-frequency amplifier  An amplifier that is not tuned to a single frequency, but has useful gain across a range of frequencies. Examples are the distributed amplifier and the video amplifier.

unterminated filter  See ALL-PASS FILTER.

unmodulated line  A transmission line that is not terminated with an impedance (i.e., an open-ended line).

unmodulated carrier  A radio-frequency amplifier that is not tuned to a single frequency, but has useful gain across a range of frequencies. Examples are the distributed amplifier and the video amplifier.

unmodulated receiver  A receiver that, at a particular instant, receives no actuating pulse, and that, therefore, does not change state.

unmodulated radio-frequency amplifier  An amplifier that is not tuned to a single frequency, but has useful gain across a range of frequencies. Examples are the distributed amplifier and the video amplifier.

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uranium. In 1896, Antoine Henri Becquerel
observed that uranium salts emit rays (later identified as alpha, beta, and gamma) that can pass through bodies opaque to light and are capable of exposing a photographic plate. Also called Becquerel rays.

uraformaldehyde resin A termosetting, synthetic resin used in the manufacture of a number of plastic dielectric bodies and formed by the reaction of urea with formaldehyde.

ura plastic Any of several thermosetting plastics having a urea base and used as a dielectric and as a molding material in electronics (e.g., urea formaldehyde resin).

URSI Abbreviation of Union Radio Scientifique Internationale (International Radio Scientific Union).

burst A broadcast message giving information on sunspots, radio propagation, terrestrial magnetism, and related subjects. Also see URSI.

usable frequency Any frequency at which communications can be maintained between two points via ionospheric propagation. 2. Any frequency at which a communications system is operational.

usable sample 1. The portion of an oscilloscope or monitor display that is visible on the screen. 2. In statistics, a sample that is considered valid for calculation purposes.

USB Abbreviation of UPPER SIDEBAND.

user friendliness 1. For electronic equipment and systems, the quality of being easy for people to operate. 2. The relative ease with which a machine, especially a computer, can be operated by people.

useful life The elapsed time between the installation of an expendable component, circuit, or system, and the time it must be replaced.

useful line In television, the portion of a scanning line that can be used for picture signals. Also called AVAILABLE LINE.

user group A group of hobbyists or company representatives having in common the ownership and/or use of a specific brand of computer, and who meet or otherwise interact to share their expertise with, or programs, for, the machine. Also applicable to similar groups of programmable-calculator owners.

user's library A compilation of programs supplied to (by the vendor) or generated by a user group.

USM Abbreviation of underwriter-to-surface missile.

UTC Abbreviation of UNIVERSAL COORDINATED TIME.

utility 1. An organization providing a public service, such as electric power or electronic communications. 2. In computer operations, a program or set of programs intended for diagnosing and/or correcting hardware and software problems.

utility box A general-purpose aluminum or steel box, supplied in various convenient sizes (painted or unpainted), used as a housing or shield for electronic equipment.

utility factor For a transformer used in a direct-current (dc) power supply, the ratio of output to required kilovolt-ampere (kVA) capacity.

utilization factor See UTILITY FACTOR.

UV 1. Abbreviation of ULTRAVIOLET. 2. Abbreviation of UNDERVOLTAGE.

Uvicor A television camera tube in which a conventional vidicon scanning section is preceded by an ultraviolet-sensitive photocathode, an electron-accelerating section, and a special target.

Uviol lamp An ultraviolet lamp using uviol glass—a special glass that is transparent to ultraviolet rays.

UVM Abbreviation of UNIVERSAL VENDOR MARKING.
vacuum level 1. The pressure, in millimeters of mercury (mm/Hg). Normal atmospheric pressure is 760 mm/Hg. A perfect vacuum would be represented by 0 mm/Hg. 2. The proportion, or percentage, of normal atmospheric pressure in a given environment. vacuum phototube A phototube enclosed in an evacuated envelope, as opposed to one that is gas-filled. vacuum pump A pump for removing air and gases from electron tubes, X-ray tubes, lamp bulbs, etc. Such pumps include mechanical types, diffusion types, and combinations of these. Also see DIFFUSION PUMP. vacuum range The range of a communications system if propagation takes place through a perfect-vacuum (theoretical) medium. vacuum seal An airtight seal between adjoining parts in an evacuation system. vacuum switch A switch that is enclosed in a vacuum bulb or tube to reduce contact sparking.

vacuum thermocouple A thermocouple enclosed in a vacuum bulb with a small heater element. Radio-frequency current passed through the heater raises its temperature and causes the thermocouple to generate a proportional direct-current voltage. vacuum tube An electron tube from which virtually all air and gases are removed. Also see ELECTRON TUBE. vacuum-tube amplifier An amplifier using one or more vacuum tubes, rather than semiconductor devices. vacuum-tube bridge A special bridge for determining vacuum-tube characteristics by null method. vacuum-tube characteristics The operating parameters of a vacuum tube, such as plate current, grid voltage, input resistance, interelectrode capacitances, amplification factor, transconductance, etc., that describe the tube performance. vacuum-tube coefficients See VACUUM-TUBE CHARACTERISTICS.

vacuum-tube current meter An ammeter, milliammeter, microammeter, or nanoammeter embodying an amplifier that uses one or more vacuum tubes. Also see ELECTRONIC CURRENT METER.

vacuum-tube modulator A circuit using one or more vacuum tubes to impress a modulating signal on a carrier. vacuum-tube rectifier 1. An alternating-to-direct-current converter circuit using one or more vacuum tubes, rather than gas tubes or semiconductor devices. 2. A rectifier tube.

vacuum-tube sweep A sweep oscillator using a vacuum tube, rather than a gas tube. Also called HARD-TUBE SWEEP.

vacuum-tube voltmeter Abbreviation, vtm. A voltmeter using a tube-type amplifier. Also see ELECTRONIC VOLTMETER.

val Abbreviation of VALUE. valence A unit showing the degree to which elements or radicals (replaceable atoms or groups of atoms) will combine to form compounds. valence band In the energy diagram for a semiconductor, the band of lowest energy. This band lies below the forbidden band (energy gap), which is below the conduction band. Also see ENERGY BAND DIAGRAM.

valence bond In a semiconductor material, an intratetrapath over which shared electrons travel.

valence electrons Electrons in the outermost orbit of an atom. These electrons determine the chemical and physical properties of a material. Also see FREE ELECTRON.

valence shells See ELECTRON SHELLS.

validate To check data for correctness.

validity 1. Correctness or accuracy of data. 2. The logical truth of a derivation or statement, based on a given set of propositions.

valley A dip between adjacent peaks in a curve or wave.

valley current In a tunnel diode, the current at the valley point.

valley point The lowest point of finite current on the current-voltage response curve of a tunnel diode. Immediately before this point, current decreases with increasing applied voltage (an indication of negative resistance). Beyond this point, however, the current again increases with increasing voltage. Compare PEAK POINT.

valley voltage In a tunnel diode, the voltage at the valley point.

value 1. The level or magnitude of a quantity (e.g., voltage value). 2. The worth of a system, process, or event (the material, chemical and physical properties of a material).

valence The worth of a system, process, or event (the material, chemical and physical properties of a material). The range of a communications system if propagation takes place through a perfect-vacuum (theoretical) medium. vacuum vacuum A space from which all air and other gases have been removed to the greatest practicable extent. Some electronic parts, such as the elements of an electron tube, are housed in an evacuated space to protect them from the deterioration that would result from open-air operation.

vacuum capacitor A plate- or concentric-cylinder-type capacitor sealed in an evacuated glass tube or bulb. The vacuum acts as the dielectric and provides a dielectric constant of 1 and very high voltage breakdown.

vacuum deposition The electrical application of a layer of one material (such as a metal) to the surface of another (the substrate), carried out in a vacuum chamber (e.g., evaporation and sputtering). Also see DEPOSITION and EVAPORATION.

vacuum envelope The shell or tube of an electron tube, X-ray tube, or other electron device that requires a vacuum.

vacuum evaporation A method of manufacturing thin-film circuits by vaporizing a substance, and letting it accumulate or condense on a base.

vacuum gauge An instrument for measuring the vacuum in a device being evacuated. One of the several varieties of this gauge uses the elements of a triode, which are sealed in part of the vacuum system, some characteristic of the tube being continuously monitored as the vacuum pumping progresses. Another uses a thermistor sealed in part of the system; the resistance of the thermistor changes proportionately during the vacuum pumping.

vacuum impregnation The impregnation of a device (such as a capacitor, transformer, or choke coil) in a vacuum chamber. The process causes the pores in the device and its insulting materials to be completely filled with the impregnant.

vacuum A space from which all air and other gases have been removed to the greatest practicable extent. Some electronic parts, such as the elements of an electron tube, are housed in an evacuated space to protect them from the deterioration that would result from open-air operation.
vapor lamp A discharge lamp consisting essentially of a glass tube filled with a small amount of gas under low pressure and some element, such as mercury or sodium. A high voltage is applied between electrodes sealed into each end of the tube. The voltage causes the element to vaporize. This, in turn, ionizes the gas, causing it to glow.

vapor pressure In a confined medium, the pressure of a gas, measured in atmospheres, pounds per square inch, or millimeters of mercury.

VAR Abbreviation of VOLT-AMPERES Reactive.

var A semiconductor-type voltage-variable capacitor. Sometimes called a varactor diode.

varactor A dielectric amplifier using a varactor as the voltage-variable capacitor.

varactor amplifier A dielectric amplifier using a varactor as the voltage-variable capacitor.

varactor flip-flop A bistable multivibrator based on the nonlinear performance of one or two varactors.

varactor frequency multiplier A frequency multiplier (doubler, trippler, etc.) in which multiples of a fundamental frequency result from the nonlinear action of a varactor.

varactor frequency multiplier

varactor tuning A method of tuning a circuit or adjusting the frequency of an oscillator, using an inductor and a varactor to obtain the desired frequency. The varactor acts as a variable capacitor.

VAR-hour Abbreviation, VARh. Short for volt-ampere-hour, a unit of reactive energy. 1 VARh can be represented by 1 VAR for 1 hour, 2 VAR for 0.5 hour, 0.5 VAR for 2 hours, etc.

VAR-hour meter An instrument that measures reactive energy.

variable Abbreviation, var. A quantity whose value changes at some stated or calculable rate, and is given names in expressions or equations, such as x, y, or z. Compare CONSTANT. Also see DEPENDENT VARIABLE and INDEPENDENT VARIABLE.

variable-area sound track See VARIABLE-WIDTH SOUND RECORD.

variable block In computer operations, a unit of variable block space, whose group size is dependent on data requirements (i.e., it is not fixed).

variable-capacitance diode See VARACTOR.

variable-capacitance transducer See CAPACITIVE TRANSDUCER.

variable capacitor A capacitor that can be adjusted from a low value (practically zero) to some maximum value. A step-type unit contains a number of fixed inductors that can be switched in parallel with each other until, at the last step, all are in parallel and powered through and out of the coil. See VARCOUPLER and VAROMETER.

variable-glance indicator An audible signal used in lieu of, or in conjunction with, a meter to indicate voltage, current, logic state, etc. The higher the value of the measured quantity, the higher the pitch.

variable-inductance microphone A microphone in which the impinging sound waves cause corresponding variations in the resistance of an internal magnetic circuit.

variable-inductance pickup A phonograph pickup in which the stylus causes an armature to vibrate in a magnetic field, and consequently the resistance of the magnetic circuit varies in sympathy with the audio frequency.

variable-inefficiency modulation See EFFICIENCY MODULATION.

variable-erase recording In magnetic-tape operations, recording a signal by selectively erasing a previously recorded signal.

variable field 1. Any field with an intensity that changes with time. An electromagnetic field is a common example. 2. In a computer record, a field that is a variable block with a terminal symbol at the end.

variable-frequency oscillator Abbreviation, VFO. An oscillator (usually self-excited) whose frequency is continuously variable.

variable-inductance pickup A phonograph pickup in which the impinging sound waves cause the inductance of a small coil to vary in sympathy with the sound frequency.

variable-inductance transducer A transducer in which one winding is rotatable, for the purpose of adjusting the mutual inductance between the primary and secondary. It is used in certain antenna-coupling applications.

variable-motor A motor whose speed is adjustable. Example: a variable-selectivity intermediate-frequency (IF) amplifier.

variable-pitch indication An audible signal that is a voltage-variable capacitor of the semiconductor type, whose size is dependent on data requirements (i.e., it is not fixed).

variable-resistance pickup A phonograph pickup in which the vibration of the stylus causes the resistance of an internal resistive element to vary proportionately.

variable-resistance transducer A transducer in which the monitored quantity causes the resistance of an internal magnetic circuit to vary proportionately.

variable-resistance tuning Tuning of a selective resistance-capacitance (RC) circuit, such as a Wien bridge or parallel-tee network, by varying one or more of its resistance arms.

variable transformer A transformer whose output voltage is adjustable from zero (or some minimum value) to maximum. For this purpose, one winding (usually the secondary) in a two-winding transformer can have a number of taps. Smooth variation can be provided by moving a pointer across a series of taps or by moving a pointer over the turns of the winding.

variable-width sound record In photographic sound-on-film recording, a sound track made by varying, in sympathy with the sound frequency, the amount of light reaching the film. Compare VARIABLE WIDTH SOUND RECORD.

variable-width frequency multiplier A variable frequency multiplier whose frequency of operation is continuously variable.

variable-width sound record In photographic sound-on-film recording, a sound track made by varying the width of the track in sympathy with the sound frequency.

varicoupler A broadband variable capacitor having a roller contact to allow continuous adjustment. See ROLLER INDUCTOR. Another form of this type of variable inductor uses a roller switch that can be switched in parallel with each other until, at the last step, all are in parallel and powered through and out of the coil. See VARCOUPLER and VAROMETER.

variable voltage A voltage-variable capacitor of the semi-conductor-diode type. Also see VOLTAGE- VARIABLE CAPACITOR.

varicoupler An adjustable radio-frequency transformer consisting of a primary coil (usually the rotor) and a secondary coil (usually the stator), the former being rotatable to vary the coupling between the coils. The inductance of the stator is varied via a set of taps.

varistor A coil having a special core and whose inductance varies with the amount of direct current flowing through the winding. Also see SATURABLE REACTOR.

varicoupler A radio-frequency transformer in which one winding is rotatable, for the purpose of adjusting the mutual inductance between the primary and secondary. It is used in certain antenna-coupling applications.

variolosser A variable attenuator.

varimeter A continuously variable inductor consisting of two coils connected in series or parallel and mounted concentrically—one rotating inside the other. Inductance is maximum when the coils are perpendicular to each other, and minimum when they are parallel.

varilux A time-sharing method of transmitting and receiving wire telegraph signals. It allows the optimum usage of available lines.

varistor See VOLTAGE-DEPENDENT RESISTOR.

Varley-loop bridge A four-arm, direct-current bridge circuit in which one of the arms, a two-wire line, is accidently grounded at a distant point. By adjustment of the bridge, the resulting resistance indicates the distance to the fault.
The sum can be found geometrically by constructing a parallelogram from the vectors, corresponding to the two known sides, as a diagonal. The component produced by the vectors. The sum is the vector originating at the point where the two vectors originate, and extending the diagonal of the parallelogram.

vector addition

vector admittance The reciprocal of vector impedance.

vector cardiograph An electrocardiograph that indicates the magnitude and the direction of a heart signal.

vector components 1. The Cartesian coordinates of a vector, or its component angle and magnitude (polar coordinates). 2. Quantities that can be represented by means of vectors (e.g., impedance and velocity).

vector diagram A graphical representation of vector quantities.

vector function A function having both magnitude and direction. Also see VECTOR, VECTOR COMPONENTS, 2; and VECTOR QUANTITY.

vector generator A device that graphically illustrates a vector.

vectorial angle 1. The angle between a vector and the horizontal axis. 2. The angle between two vectors.

vector impedance Complex impedance (i.e., an impedance of the form \( R + jX \), where \( X \) is resistance, \( R \) is reactance, and \( j \) is an operator indicating that the reactance is 90 degrees out of phase, relative to the resistance).

vector-mode display On a cathode-ray-tube display, the data representation in which points on the screen are connected by straight lines.

vector power The vector quantity \( P \), where \( P_x \) is the active power and \( P_y \) is the reactive power.

vector power factor The ratio \( P/V \), where \( P_x \) is the active power and \( P_y \) is the reactive power. In sine-wave situations, this ratio of active power to vector power produces a figure identical to the conventional power factor.

vector quantity A quantity having both magnitude and direction, and that can, therefore, be represented by a vector.

velocity constancy A special cissoscope for visual adjustment of a color-television receiver by means of a velocity-phase diagram.

vector sum The resultant of two nonparallel vectors; therefore, the resultant of the forces or quantities represented by them. For example, reaction and resistance can be represented by two perpendicular vectors.

velocity voltmeter A voltmeter that indicates the phase as well as the amplitude of an alternating-current voltage.

velocity vector Symbol for a vector-voltage supply of a bipolar transistor.

vector antenna A center-fed antenna in which the two halves of the radiator form an angle considerably less than 180 degrees.

velocity connection of transformers See VEE CONNECTION OF TRANSFORMERS.

vector current Abbreviation of VOLTAGE CONTROLLED OSCILLATOR (Also, lowercase.).

vector diagram Representation of a quantity, as defined in "vector representation".

vectors Abbreviation of voltage-controlled shift register.

V-cut crystal See V-CUT CRYSTAL.

VCEO Abbreviation of VOLTAGE CONTROLLED OSCILLATOR (Also, lowercase).

VCR Abbreviation of VIDEODISC RECORDER.

VCSR Abbreviation of voltage-controlled shift register.

V-cut crystal See V-CUT CRYSTAL.

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VCR Abbreviation of VIDEODISC RECORDER.

VCSR Abbreviation of voltage-controlled shift register.
velocity vibration A state of resonance in which a 90-degree phase difference is between the fundamental frequency of oscillation of a system and the fundamental frequency of the applied signal.

velocity sorting Selecting and separating electrons, according to their velocity.

velocity spectograph A device that uses electric or magnetic deflection to separate charged particles into various streams, according to their velocity.

velocity variation See VELOCITY MODULATION.

velocity-variation amplifier See VELOCITY-MODULATED AMPLIFIER.

velocity-varation oscillator See VELOCITY-MODULATED OSCILLATOR.

velometer An instrument used to measure the velocity of air (e.g., to determine wind speed).

venetian blind effect A television display malfunction in which the picture seems to appear through horizontal slits.

Venn diagram A method of illustrating the relationship among various subsets within a specified universal set. The subsets are shown as geometric figures, usually circles.

vented-baffle loudspeaker See ACOUSTICAL PHASE INVERTER and BASS-REFLEX LOUDSPEAKER.

vent mount A metal bracket for fastening an antenna mast to a (plumbing) vent pipe on a roof.

ventricular fibrillation See FIBRILLATION.

verification 1. The process of ensuring that two sets of data are identical. 2. The process of validating (see VALIDATE).

vernier 1. An auxiliary scale along which a regular, linear scale (such as that of a tuning dial) slides. The vernier scale is graduated so that when the main scale is set to an unmarked point between two of its graduations, and the “0” point on the vernier scale is used as the index, “1” on the vernier scale will exactly coincide with “1” on the main scale. The corresponding number on the vernier scale indicates the exact number of subdivisions between two points on the main scale. Vernier arrangements are provided with the dials of some precision analog instruments. 2. See VERNIER CAPACITOR. 3. See VERNIER DIAL. 4. See VERNIER RESISTOR.

vernier capacitor A low-capacitance variable capacitor connected in parallel with a higher-capacitance fixed or variable capacitor for precise adjustment of the total capacitance.

vernier dial 1. A moving dial for fine tuning an adjustable device. The required reduction ratio is obtained with gears, friction wheels, or a belt-and-pulley combination. 2. A dial provided with an accessory vernier scale.

vernier resistor A low-resistance variable resistor connected in series with a higher-resistance fixed or variable resistor to precisely adjust the total resistance.

vernier rheostat See VERNIER RESISTOR.

vers Abbreviation of VERSED SINE.

versatile automatic test equipment Abbreviation, VATE. For troubleshooting the electronic systems of missiles, a computer-controlled tester that isolates faults through logical operations.

versed sine Abbreviation, vers. A trigonometric function equal to the difference between the cosine of an angle and one; vers x = 1 - cos x.

vertical 1. The terminal point at which two or more branches of a network meet. Also see NODE 1. 2. The point of intersection of two lines that form an angle.

vertical deflection plate In an oscilloscope (and in some early television picture tubes), a pair of plates that provides the electrostatic field for vertical deflection. Compare HORIZONTAL DEFLECTION PLATES.

vertical dipole An antenna consisting of a straight, center-fed, half-wave conductor oriented vertically.

vertical dipole • vertical dynamic convergence

vertical dynamic convergence During the scanning of points along a vertical line through the center of a color-television picture tube, the convergence of the electron beams at the aperture mask. Compare HORIZONTAL DYNAMIC CONVERGENCE.

vertical field strength The field strength of signals in a vertical plane passing through an antenna. Compare HORIZONTAL FIELD STRENGTH.

vertical-field-strength diagram A plot of vertical field strength.

vertical frequency response The gain-frequency characteristic of the vertical channel of an instrument, such as an oscilloscope. Compare HORIZONTAL FREQUENCY RESPONSE.
vertical gain

The overall amplification (gain) provided by the vertical channel of an instrument, such as an oscilloscope, graphical recorder, or television receiver. Compare HORIZONTAL GAIN.

vertical-gain control

A control, such as a potentiometer, for adjusting vertical amplification. Compare HORIZONTAL-GAIN CONTROL.

vertical-horizontal control

In a television receiver, the control for adjusting the frequency of the vertical oscillator so that the picture can be locked to prevent vertical roll. Compare HORIZONTAL-HOLD CONTROL.

vertical-incidence transmission

Transmission of a wave vertically to the ionosphere and the subsequent reflection of the wave to the earth.

vertical-lateral recording

In stereophonic disc recording, the recording of one signal vertically (see VERTICAL RECORDING) and the other laterally (see LATERAL RECORDING).

vertical linearity

Linearity of response (gain and deflection) of the vertical channel of an oscilloscope or television receiver. A linear picture is neither contracted nor expanded vertically in any part of the screen. Compare HORIZONTAL LINEARITY.

vertical-linarity control

In an oscilloscope or television receiver, the control whereby vertical linearity is adjustable. Compare HORIZONTAL-LINEARITY CONTROL.

vertical-polarized wave

An electromagnetic wave whose electric lines of flux are perpendicular to the plane of the horizon. Compare HORIZONTAL POLARIZED WAVE.

vertical-metal-oxide-semiconductor field-effect transistor

Abbreviation, VMOSFET. A metal-oxide-silicon field-effect transistor fabricated so that the current flow within the device is vertical, instead of the usual horizontal, affording several advantages over the conventional MOSFET.

vertical oscillator

In a television receiver, the oscillator that generates the vertical sweep signal. Compare HORIZONTAL OSCILLATOR.

vertical-output regulator

In a television receiver, a voltage-dependent resistor used to stabilize the sweep waveform across horizontal deflection coils—especially during warmup.

vertical output stage

In a television receiver, an output amplifier following the vertical oscillator. Compare HORIZONTAL OUTPUT STAGE.

vertical response

Pertaining to an electromagnetic wave whose electric lines of flux are perpendicular to the plane of the horizon. In general, when the element of an antenna is vertical, the electric lines of flux in the transmitted waves are vertical, and the antenna is most sensitive to incoming signals whose electric lines of flux are vertical. Compare HORIZONTAL POLARIZATION.

vertical positioning control

See CENTERING CONTROL.

vertical quantity

The quantity measured along the y-axis of a graph, or represented by the vertical deflection of an electron beam. Compare HORIZONTAL QUANTITY.

vertical radiator

See VERTICAL ANTENNA.

vertical recording

Disc recording in which the depth of the groove is varied in sympathy with the sound. Also called POLAR-LAND AND/or LATERAL RECORDING. Compare LATERAL RECORDING.

vertical redundancy

In computer operation, the error state when a character has an odd number of bits in an even-parity system, or vice versa.

vertical resolution

The number of horizontal wedge-lines that can be easily seen in a television test pattern before they blend. Compare HORIZONTAL RESOLUTION.

vertical retrace

In a cathode-ray device, such as an oscilloscope or television receiver, the rapid return of the beam to its starting point at the top of the screen after completely traversing the screen from top to bottom. Compare HORIZONTAL RETRACE.

vertical retrace blanking

In a television receiver, the automatic shutoff of the electron beam during a vertical retrace period, to prevent an extraneous line being traced on the screen during this period. Also see BLACKOUT, 2. BLANKING INTERVAL.

vertical sweep rate

See VERTICAL SWEEP FREQUENCY.

vertical synchronization

In a television receiver, synchronization of the vertical component of scanning that of the camera. Also see VERTICAL SYNC PULSE. Compare HORIZONTAL SYNCHRONIZATION.

vertical-vacuum voltmeter

In a video signal, the pulse that synchronizes the vertical component of scanning in a television receiver with that of the camera, and that triggers vertical retrace and blanking. Compare HORIZONTAL SYNCH PULSE.

vertical wave

See VERTICALLY POLARIZED WAVE.

vertical width control

See WIDTH CONTROL, 1, 2.

very high frequency

Abbreviation, VHF. Radio frequencies in the range 30 MHz to 300 MHz, corresponding to free-space wavelengths of 10 meters to 1 meter. It is sometimes divided into VHF low band (30 MHz to 50 MHz) and VHF high band (50 MHz to 300 MHz). Also see RADIO SPECTRUM, 1.

very high resistance

Abbreviation, VHR. Large values of resistance; usually expressed in meg-ohms, gigohms, or terahms.

very high-voltage voltmeter

Abbreviation, VHVVM. A voltmeter using a low-range microammeter or picoammeter and a very high value of multiplier resistance (see VOTMETER MULTIPLIER).

very high-speed integrated circuit

An integrated circuit whose switching speed is greater than that of the conventional circuit. This can extend several orders of magnitude beyond large-scale integration (LSI). Compare high-speed integrated circuit, 2.

very long range

Abbreviation, VLR. Pertaining to ground radar sets having a maximum slant range of over 250 miles. Compare VERY SHORT RANGE.

very low frequency

Abbreviation VLF. A radio frequency in the range 10 kHz to 30 kHz, corresponding to wavelengths between 30 kilometers and 10 kilometers. Also see RADIO SPECTRUM, 1.

very low resistance

Abbreviation, VLR. Values of resistance less than 1 ohm, usually expressed in milliohms or microhms.

very short range

Abbreviation, VSR. Pertaining to ground radar sets having a maximum slant range of less than 25 miles. Compare VERY LONG RANGE.

vestigial 1.

An effect that remains as a by-product, but that serves no directly applicable purpose. See, for example, VESTIGIAL SIDEBAND, 2.

vestigial 2.

A portion of one sideband in an amplitude-modulated signal, remaining after passage through a selective filter. 2. An ampli-
which the movable contact is carried by the end of a thin, metal strip (reed) of iron or magnetic alloy. The strip is supported within the magnetic field of a coil carrying an alternating current, so that when the frequency of this current corresponds to the natural (resonant) frequency of the reed, it vibrates vigorously enough to close the contacts. Such a relay, consequently, is frequency selective.

vibrating-wire oscillator An oscillator similar to the vibrating-reed oscillator, but using a wire, instead of a reed.

vibrating-wire transducer A transducer in which the fluctuating tension of a thin wire suspended in a magnetic field frequency-modulates the operating voltage.

vibration 1. The changing of the position or dimensions of a body back and forth, usually at a rapid rate, an action seen in the repetitive movement of a musical string, headphone diaphragm, loudspeaker cone, loose machine, etc. 2. See Oscillation.

vibration analyzer See VIBRATION METER.

vibration calibrator A device that generates a standard vibration, usually at a fixed frequency, for calibrating vibration meters, pickups, transducers, etc.

vibration galvanometer A type of alternating-current galvanometer. The natural frequency of the movable element of the instrument is made equal to that of the alternating current under test, to obtain a reading.

vibration isolator In an electronic-equipment assembly, a cushioning support that protects the equipment from vibration.

vibration machine See VIBRATOR.

vibration meter An instrument for measuring the amplitude and frequency of vibration (see VIBRATION, 1). It consists essentially of a vibration pickup followed by a selective amplifier and a recorder indicating voltmeter graduated in vibration units.

vibration pickup A transducer that senses mechanical vibration and converts it into a proportionate output voltage, or changes resistance in a circuit, in response to vibration.

vibrato In electronic musical instruments, a circuit or device that modulates a note by varying its frequency, amplitude, or both, at an extremely low frequency (a few hertz).

VI Abbreviation for VERY HIGH SPEED INTEGRATED CIRCUIT.

VI 1. Abbreviation of VOLUME INDEX. 2. Abbreviation of VISIBILITY INDEX.

VI= Symbol for INPUT VOLTAGE. (Also, V in.

vibrating bell A bell with a striking mechanism that oscillates, causing a continuous ringing sound.

vibrating-reed frequency meter See POWER-FREQUENCY METER.

vibrating-reed oscillator An audio-frequency oscillator in which an iron, steel, or alloy reed vibrating in a magnetic field acts like a tuning fork to control the oscillation frequency.

vibrating-reed relay An electromagnetic relay in which the movable contact is carried by the end of a thin, metal strip (reed) of iron or magnetic alloy. The strip is supported within the magnetic field of a coil carrying an alternating current, so that when the frequency of this current corresponds to the natural (resonant) frequency of the reed, it vibrates vigorously enough to close the contacts. Such a relay, consequently, is frequency selective.
video mapping A system of surveillance or mapping in which, for reference, the outlines of the area being surveyed are superimposed electromagnetically on the radar display of the area.

video masking A form of radar signal processing in which ground clutter and other unwanted echoes are removed, making the desired targets more readily visible.

video mixer A circuit or device for mixing the signals from two or more television cameras.

video modulation In television transmission, amplitude modulation of the carrier wave with pulses and waves corresponding to the picture elements.

video on demand Television service in which subscribers can choose the programs they want to watch, and also the specific times for viewing.

video random-access memory Abbreviation, VRAM. In computer systems, RANDOM-ACCESS MEMORY used primarily for enhancing the performance of the display.

video recording 1. Recording wideband material such as a video signal on a tape or disc. 2. The recording made of a telecast. Also see VIDEO TAPE RECORDER.

video signal 1. In television, the amplitude-modulated signal containing picture information and sounds. Also see VIDEO, 2 and VIDEO MODULATION. 2. Broadly, a telecast signal, including sound.

video stretching In some electronic navigation systems, increasing the duration of a video pulse.

video synthesis A computerized device that produces graphical renditions of objects or circuits in three dimensions.

videotape 1. A special magnetic tape for video recording (see VIDEO RECORDING, 2). 2. To make a video recording.

videotape recorder Abbreviation, VTR. A wide-band, magnetic-tape recorder for producing video recordings on a camera, or for making a record of television programs, for subsequent reproduction (playback).

videotape recording 1. Abbreviation, VTR. The technique of recording video signals on magnetic tape. Also see VIDEO RECORDING, 1, 2 and VIDEO TAPE. 2. A tape on which a video signal has been recorded.

videotext A system that allows television viewers to dial up special material, such as stock market quotations, weather data, sports scores, etc.

vidicon A television camera tube in which the electron beam scans a charged-density pattern that has been formed and stored on the surface of the photoconductor. It is commonly used in camcorders, closed-circuit television systems, and robot vision systems. Its assets include compactness and sensitivity.

viewfinder An accessory or integral device in which an image (formed optically or electronically) corresponds to the image viewed by the camera with which it is used.

viewing mesh In a cathode-ray storage tube, the mesh on which the image is presented for viewing by the operator. Also see CHARGE STORAGE TUBE.

viewing mirror In an oscilloscope-camera assembly, a flat, slant-mounted mirror that reflects the image on the oscilloscope screen to the viewer’s eye.

viewing screen In a cathode-ray device, such as an oscilloscope tube or television picture tube, the face on which the image appears.

viewing time In a storage type cathode-ray tube, the length of time for which the image persists.

viewing window See WINDOW, 2.

Villard circuit 1. A voltage-doubler circuit using one diode and two capacitors. The open-circuit direct-current output voltage is approximately twice the peak value of the alternating current input voltage. Also see VOLT-AGE DOUBLER. 2. See SELECTED INPUT.

villari effect In certain magnetostriictive materials, the change in magnetic induction that accompanies the application of a mechanical stress in a given direction. Also see MAGNETOSTRICTION.

vinyl A general name for vinyl copolymer resins.

vinylidene chloride A plastic insulant. Dielectric constant, 3 to 5. Dielectric strength, 20 kV/mm. Vinilite-A. A brand of the plastic, polyvinyl acetate.

vinylite-3 A brand of the plastic polyvinyl chloride.

vinyl resin A synthetic resin resulting from the polymerization of compounds that contain the group CH₂-C-.

viscous damping The use of a viscous fluid in the dashpot of a device (such as a relay, timer, or pickup arm) to provide damping. See, for example, DAMPEN RELAY.

viscous hysteresis A slow, slight increase in the magnetization of a material when the magnetizing field is constant. Compare STATIC HYSTERESIS.

visibility factor See DISPLAY LOSS.

visible radiation Electromagnetic radiation that is perceptible to the eye. Also see VISIBLE SPEC-TRUM.

visible spectrum The band of electromagnetic wavelengths that the human eye perceives as visible light. For most people, this band extends from approximately 380 nanometers (nm) to 700 nm, representing red light, down to 390 nm, representing violet light. The visibility curve peaks in the yellow-green region at about 560 nm: 1 nm = 0.000

viscometer See VISCOMETER.

viscosity The resistance offered by a fluid (liquid or gas) to objects moving through it. The viscosity of pure water is low; that of heavy oil is high. Expressed in newton-seconds per meter squared.

viscosity index Abbreviation, VI. A number indicating how well an oil retains its viscosity with temperature changes; larger indexes are assigned to oils that are little influenced by variations in temperature.

viscous-damped arm 1. A phonograph pickup arm with an oil dashpot to prevent arm resonance and to slow the descent of the arm to the disc.

viscous damping The use of a viscous fluid in the dashpot of a device (such as a relay, timer, or pickup arm) to provide damping. See, for example, DAMPEN RELAY.

viscous flow In a security system, a condition that results from a combination of factors: the flow of water, the flow of air, and the flow of objects. The flow of water is caused by the flow of air, which is caused by the flow of objects.

Viscous fluid A fluid that is not an ideal fluid, but rather a fluid that is affected by the presence of other fluids.

visible light A light that can be seen by the human eye. The visible light spectrum is divided into three regions: violet, blue-green, and red.

visible image The image formed when rays from a point are projected onto a screen. The visible image is the part of the scene that can be seen by the human eye.

visible light radiation The radiation that can be seen by the human eye. The visible light spectrum is divided into three regions: violet, blue-green, and red.

visible signal The signal that is visible to the human eye. The visible signal is the part of the scene that can be seen by the human eye.

visible spectrum The band of electromagnetic wavelengths that the human eye perceives as visible light. For most people, this band extends from approximately 380 nanometers (nm) to 700 nm, representing red light, down to 390 nm, representing violet light. The visibility curve peaks in the yellow-green region at about 560 nm: 1 nm = 0.000

viscosity index Abbreviation, VI. A number indicating how well an oil retains its viscosity with temperature changes; larger indexes are assigned to oils that are little influenced by variations in temperature.

vision A term used in television, film, and photography to describe the image that is formed on the film or television screen.

visionary A term used in television, film, and photography to describe the image that is formed on the film or television screen.

visionary effect The effect of the human eye in perceiving the image that is formed on the film or television screen.

visionary field The field that is perceived by the human eye in perceiving the image that is formed on the film or television screen.

visionary system The system that is used to perceive the image that is formed on the film or television screen.

visionary wave The wave that is perceived by the human eye in perceiving the image that is formed on the film or television screen.

visionary wave 2. The wave that is perceived by the human eye in perceiving the image that is formed on the film or television screen.

visionary wave 3. The wave that is perceived by the human eye in perceiving the image that is formed on the film or television screen.

visionary wave 4. The wave that is perceived by the human eye in perceiving the image that is formed on the film or television screen.
visible spectrum • voice frequencies

000 001 meter = 10^−3 m. Also see ELECTROMAGNETIC THEORY OF LIGHT.

voice carrier telegraphy • voltage-breakdown test 731

VMSOFET Abbreviation of VERTICAL-METAL-OXIDE SEMICONDUCTOR FIELD-EFFECT TRANSISTOR.\( V_{\text{g}} \) Symbol for OUTPUT VOLTAGE. Also, \( V_{\text{gs}} \).

VBA Abbreviation of VOLT-OHM-AMMETER.

vocabulary In computer-programming operations, a list of available operating codes and instructions for the computer. Also called INSTRUCTION SET.

vocoder A device for reducing speech to frequencies low enough for efficient transmission through a limited-bandwidth channel. The term is a contraction of voice coder.

Vola In a telephone system that utilizes a radio link (using the same frequency for transmission in both directions) and land-line links, an automatic, voice-operated switching system for enabling the transmitter and disabling the receiver, and vice versa. The name is an acronym for voice-operated device, anti-sing.

volumetric Contraction of voice data communications.

Voder An electronic device that synthesizes speech. The term is an acronym for voice operation demonstrator.

vogad A type of automatic gain control for audio amplifiers and modulators. In a radio transmitter, it maintains 100% modulation of the carrier—even when the speaker’s voice level varies widely. The name is an acronym for voice-operated gain adjustable device.

voice actuation See VOICE-OPERATED CONTROL.

voice amplifier A circuit that evaluates the characteristics of human voices, such as the amplitude-vs. frequency function or the amplitude-vs.-time function.

voice band See VOICE FREQUENCIES.

voice coil The moving coil of a dynamic microphone or dynamic speaker.

voice-controlled balanced A type of break-in operation for radiotelephony, in which the transmitter automatically switches on and off. When the operator starts talking, the transmitter switches off and the receiver switches on after the operator stops talking.

voice-controlled relay An electronic relay that is not actuated by the voice signal. It is used to transmit the picture portion of a television broadcast.

voice-actuated device An electronic device, such as a field-effect transistor, that amplifies a voltage signal or is controlled by a voltage, and draws virtually no signal current or control current. The opposite is a current-actuated device, such as a bipolar transistor.

voltaic 1. A telephone line and attendant equipment suitable for the transmission of speech and certain other information, such as control signals, digital data, etc. 2. A radiotelephone transmitter, a speech amplifier-modulator channel suitable only for voice frequencies.

volt-operated device, anti-sing See VODA.

voice-operated control A telephone line and attendant equipment suitable for the transmission of speech to frequen-
ties low enough for efficient transmission through the voice-operated device, anti-sing.

voice-operated gain-adjusting device See VOICE-OPERATED CONTROL.

voice-operated low loss and suppressor In wire telephony, a device that switches the loss from the transmitting line to the receiving line when the subscriber speaks, and vice versa.

voice grade 1. A graphic recording of the speech frequencies produced by an individual and used as a means of identifying that individual. 2. A circuit that evaluates the characteristics of human voices, such as the amplitude-vs. frequency function or the amplitude-vs.-time function.

voice-processing equipment A troubleshooting instrument for following a signal through a circuit by sensing at successive points in the circuit. The signal strength is indicated by a meter and a loudspeaker.

visual alignment Optimization of a circuit (such as a radio receiver) with the aid of meter deflec-
tions, rather than with audible indications. Also called silent alignment.

visual-audio radio range A radio aid to air naviga-
tion (characterized by an audible signal, meter deflec-
tion, or both) used by the pilot of an aircraft to determine if the course is being followed.

visual-audio range See VISUAL-AURAL RADIO RANGE.

visual-aural signal tracer A troubleshooting in-
strument for following a signal through a circuit by sensing at successive points in the circuit. The signal strength is indicated by a meter and a loudspeaker.

visual carrier frequency See VIDEO CARRIER and VIDEO FREQUENCY.

visual communication 1. Transmission and reception of light images, such as modulated beams of flashing lights. 2. Transmission and reception of messages by direct visual observation. It is resistant to interference.

visual display unit Abbreviation, VDU. 1. A computer peripheral consisting of a cathode-ray tube, a keyboard, and often a pointing device. 2. A dumb terminal for operation of a computer from a remote location.

visual horizon 1. The distance from a given point to the farthest visible point on the surface of the earth in a particular direction. 2. The enclosed geometric plane figure on the surface of the earth, representing the farthest visible points for a particular location.

visual telegraphy Telegraphy in which the re-
sults of visual signals are read from a visual device, such as a blinking light, meter, or swinging pen.

visual test The visual test of devices used to trans-
mits the picture portion of a television broadcast.

visual transmitter power The peak power output of a visual transmitter operating in normal operation.

vitreous Pertaining to a material or surface resem-
bling glass, such as the vitreous enamel on certain types of resistors.

VLF Abbreviation of VERY LOW FREQUENCY.

VLSI Abbreviation of VERY-LARGE-SCALE INTEGRATION.

V/m Abbreviation of VOLTS PER METER (a unit of electrical field strength).

VMO Abbreviation of vertical-metal-oxide semiconductor.

VOLT Abbreviation, V. The basic practical unit of electrical potential. 1 volt is the difference of potential produced across a resistance of 1 ohm by a current of 1 ampere. Also see KILOWOLT, MEGAVOLT, MICROVOLT, MILLIVOLT, NANOVOLT, and PICOVOLT.

Volta effect See VOLTA EFFECT.

voltmeter Symbols, \( V \), \( v \), or \( V/O \). Electromotive force, or emf. Also see MILLIVOLT.

voice frequency carrier telegraphy A type of carrier-current telegraphy (see WIRELESS TELEGRAPHY) in which the modulated carrier can be transmitted over a telephone line having a voice-frequency bandwidth.

voice-frequency dialing A system of telephone di-
ing allowing the conversion of direct-current pulses into voice-frequency alternating-current pulses.

voice-frequency telephony Wire telecommunication in which the frequencies of the elec-
tric waves are identical to the frequencies of the sound waves (or very nearly so).

voice grade Pertaining to a communications sys-
tem having a bandwidth capable of transmitting a human voice with reasonable intelligibility. See VOICE FREQUENCIES.

voice-grade channel 1. A telephone line and attendant equipment suitable for the transmission of speech and certain other information, such as control signals, digital data, etc. 2. In a radiotelephone transmitter, a speech amplifier-modulator channel suitable only for voice frequencies.

volatile memory See VOLTAGE MEMORY.

volatile store See VOLTAGE MEMORY.

Vodicon A form of semiconductor logic device used for analysis of analog signals. Trade name of Adage, Inc.

voluntarily Abbreviation, V. The basic practical unit of electrical potential. 1 volt is the difference of potential produced across a resistance of 1 ohm by a current of 1 ampere. Also see KILOWOLT, MEGAVOLT, MICROVOLT, MILLIVOLT, NANOVOLT, and PICOVOLT.

voltaic effect See VOLTA EFFECT.

voltmeter Symbols, \( V \), \( v \), or \( V/O \). Electromotive force, or difference of potential. \( E \), \( e \), or \( E/R \), where \( R \) is current output in ohms; \( V \) output in voltages.

voltage Symbols, \( V \), \( v \), or \( V/O \). Electromotive force, or difference of potential. \( E \), \( e \), or \( E/R \), where \( R \) is current output in ohms; \( V \) output in voltages.

voltage-amplification device A type of voltage-actuated device, such as a field-effect transistor, that amplifies a voltage signal or is controlled by a voltage, and draws virtually no signal current or control current. The opposite is a current-actuated device, such as a bipolar transistor.

voltage conditioning equipment A troubleshooting instrument for following a signal through a circuit by sensing at successive points in the circuit. The signal strength is indicated by a meter and a loudspeaker.

voice actuation A telephone line and attendant equipment suitable for the transmission of speech to frequen-
ties low enough for efficient transmission through the voice-operated device, anti-sing.

voice-operated gain-adjusting device See VOICE-OPERATED CONTROL.

voltage-operated loss control and suppressor In wire telephony, a device that switches the loss from the transmitting line to the receiving line when the subscriber speaks, and vice versa.

voltage: A graphical recording of the speech frequencies produced by an individual and used as a means of identifying that individual.

voice-operated gain-adjusting device See SPEECH RECOGNIZER.

voltage security A set of devices that allows a ma-
technician to perform diagnostic tests on the equipment without removing the cover or changing the operating settings.

voice-operated control A telephone line and attendant equipment suitable for the transmission of speech and certain other information, such as control signals, digital data, etc. 2. In a radiotelephone transmitter, a speech amplifier-modulator channel suitable only for voice frequencies.

voice-operated device, anti-sing See VODA.

voltage-actuated device An electronic device, such as a field-effect transistor, that amplifies a voltage signal or is controlled by a voltage, and draws virtually no signal current or control current.

voltage-amplification device A type of voltage-actuated device, such as a field-effect transistor, that amplifies a voltage signal or is controlled by a voltage, and draws virtually no signal current or control current.

voltage conversion A device that converts a source voltage to a different voltage.

voltage detector A troubleshooting instrument for following a signal through a circuit by sensing at successive points in the circuit. The signal strength is indicated by a meter and a loudspeaker.

voltage frequency carrier telegraphy • voltage-breakdown test 731

voltage amplifier A type of current-actuated device, such as a bipolar transistor, that amplifies a voltage signal or is controlled by a voltage signal.

voltage applied to an insulating material is continuously increased until the material breaks down.
breakdown point is reached. 2. A test in which the measured reverse voltage applied to a semi-conductor, such as a diode, is progressively increased until the reverse breakdown point is reached (see AVALANCHE BREAKDOWN). Voltage drop across a circuit. The voltage drop across a CURRENT SHUNT. Voltage converter A device used to calibrate, in terms of voltage, a meter scale, oscilloscope screen, graphic-recorder chart, etc.

Voltage-capacitance curve A plot depicting the variation of capacitance with applied voltage for a voltage-variable capacitor. For a varactor (variable-capacitance diode), capacitance varies inversely with reverse direct-current voltage.

Voltage coefficient A figure that shows the extent to which a quantity varies under the influence of voltage. It is generally expressed in percent per volt or in parts per million per volt (ppm/V).

Voltage coefficient of capacitance For a voltage-dependent capacitor, the capacitance change per unit change in applied voltage.

Voltage coil See POTENTIAL COIL.

Voltage comparator A device for comparing (usually only in terms of magnitude) the various types range from simple, manually balanced potentiometers to analog or digital devices that automatically compare magnitude and provide a direct readout of either their difference or the percent of imbalance.

Voltage control 1. A component or circuit that allows the adjustment of the output voltage of a power supply. 2. The adjustment of the output voltage of a power supply to optimize the performance of a circuit connected to the supply. Any circuit of control that is accomplished by the adjustment of the voltage supply.

Voltage-controlled amplifier Abbreviation, VCA. An amplifier in which gain is controlled by means of a voltage applied to a control terminal.

Voltage-controlled attenuator An attenuator circuit in which the control serves as a voltage-variable resistor. The output resistance of the transistor varies inversely with the direct-current input applied to the input electrode (base, emitter, or gate).

Voltage-controlled capacitor See VOLTAGE-DEPENDENT CAPACITOR.

Voltage-controlled crystal oscillator Abbreviation, VCO. A voltage-controlled oscillating circuit of the crystal-stabilized type.

Voltage-controlled generator Abbreviation, VCG. Any circuit the output frequency of which output frequency is varied by changing one of the direct-current inputs of the device.

Voltage-controlled oscillator Abbreviation, VCO. An oscillator of the inductance-capacitance (LC) type that employs a varactor diode in the capacitive portion of the tuned circuit. The varactor is placed in series or parallel with the tuning capacitor and is isolated for direct current by blocking capacitors. The frequency can be adjusted, within certain limits, by unmechanical means. The signal can also be frequency modulated by applying the modulating signal across a tube, a sidetone factor or increase in voltage drop across the tube.

Voltage doubler A power-supply circuit that supplies a direct-current output voltage of about twice the peak value of the alternating current input voltage.

Voltage drift See DRIFT VOLTAGE.

Voltage drop Abbreviation, VD. The voltage (R) set across a resistance (R) carrying a current (I): E = IR. For alternating current, reactance X and impedance Z can be substituted for resistance, where applicable.

Voltage-equalizing resistors In a power-supply filter, resistors connected across each capacitor in a string of electrolytic connected in series to withstand a high voltage. The resistors protect the capacitors by equalizing the voltage across them.

Voltage-fed antenna An antenna in which the feeder is attached to the radiator at a voltage loop (current node). Compare CURRENT-FEED ANTENNA.

Voltage generator See VOLTAGE SOURCE.

Voltage differential Symbol, δE or δV. An infinitesimal change in voltage. Compare VOLTAGE INCREMENT.

Voltage-directional relay 1. A relay that is activated when voltage exceeds a given direction. 2. A relay that closes only when the applied voltage is in a specific direction.

Voltage discriminator A circuit or device whose output voltage zero when the input voltage is of a prescribed value. When the input voltage is greater than this value, the output is positive; when it is less, the output is negative.

Voltage distribution 1. The delivery of operating voltage throughout a circuit (e.g., high and low direct-current voltages in the various stages of a transistor circuit). 2. Sometimes, the distribution of electrical energy ("power") distribution.

Voltage divider A resistive or capacitive potential meter or network used to divide an applied voltage by a desired amount.

Voltage doubler + voltage peak
voltage-power directional relay  A relay system in which two circuits are connected when their voltage difference exceeds a predetermined value in one direction, and are disconnected when the voltage in the opposite direction exceeds a predetermined level.

voltage quadrupler  A special rectifier circuit that supplies a direct-current output voltage of approximately four times the peak alternating-current input voltage.

voltage quinupler  See QUINTPLER.

voltage-range multiplier  1. A multiplier resistor (see VOLTMETER MULTIPLIER) connected in series with a voltmeter that has an internal multiplier, to increase the range of the instrument.

2. For an alternating-current voltmeter, an input amplifier used to increase the sensitivity of the instrument.

voltage rating  1. For a circuit or device, the recommended maximum voltage that can be applied, or the recommended working voltage, as specified.

2. For a generator, the specified output voltage.

voltage ratio  The quotient of the voltages, \( \frac{E_2}{E_1} \), at two specific points in a circuit, device, or system. Examples: ratio of input voltage to output voltage and ratio of primary voltage to secondary voltage.

voltage-ratio box  See VOLT BOX.

voltage reference  See STANDARD CELL and ZENER-DIODE VOLTAGE REFERENCE.

voltage-reference cell  See STANDARD CELL.

voltage-reference diode  A Zener diode biased into its Zener region. The voltage drop across the diode is comparatively constant. Under proper conditions, it can be used for reference purposes. Also see ZENER-DIODE VOLTAGE REGULATOR.

voltage reflection coefficient  In a reflected-wave situation, the ratio \( \frac{E_r}{E_i} \), where \( E_r \) is the field-strength voltage of the incident wave, and \( E_i \) is the field-strength voltage of the reflected wave.

voltage-regulated supply  See CONSTANT-VOLTAGE SOURCE.

voltage-regulating transformer  A special transformer in which a resonant circuit and core saturation (see SATURATED OPERATION, 1) are used to provide a constant output voltage.

voltage regulation  The stabilization of a voltage against fluctuations in source or load.

voltage-regulation constant  Symbol, \( K_v \). For a voltage-regulated power supply, the ratio \( \frac{\Delta V}{\Delta I} \), where \( \Delta I \) is a change in input voltage, and \( \Delta V \) is the corresponding change in load voltage.

voltage regulator  A circuit or device that holds an output voltage constant during variations in the input load or input voltage.

voltage-regulator diode  See ZENER-DIODE VOLTAGE REGULATOR.

voltage-regulator transformer  See VOLTAGE-REGULATING TRANSFORMER.

voltage relay  A relay or relay circuit that is actuated by a discrete voltage, rather than by current or power.

voltage-responsive device  See VOLTAGE-ACTUATED DEVICE.

voltage rise  The normal condition in a series-resonant circuit, in which the voltage across the coil or capacitor is higher than the voltage applied to the circuit.

voltage saturation  In a current-actuated device, such as a bipolar transistor, the situation in which an increase in current provides no increase in voltage drop beyond a certain point (the saturation point).

voltage-sensitive bridge  A bridge having a nonlinear element (such as a voltage-dependent resistor) as one of the arms. Because of this element, the bridge can be balanced (with a given set of other arms) at only one value of applied voltage. At lower voltages, the bridge becomes unbalanced in one direction; at higher voltage, in the opposite direction.

voltage tuning  A method of adjusting the frequency of an oscillator or resonant circuit by means of a variable, direct-current voltage.

voltage-type telemetry  Telemetry based upon the variation of a single voltage in sympathy with the changes in a sensed phenomenon.

voltage-variable capacitor  1. A capacitor having a specially processed nonlinear dielectric, such as barium strontium titanate, whose capacitance varies inversely with the applied direct-current bias voltage.

voltage-variable resistor  A small step-up transformer for increasing the sensitivity of an alternating-current voltmeter. Also called POTENTIAL TRANSFORMER.

voltage transformer  1. A device that delivers a voltage of approximately three times the peak value of the alternating-current input voltage.

2. In electronic equipment mounted on a metal panel, the voltage between the panel and a given point in the circuit.

voltage-turns ratio  The turns ratio of a transformer, indicated by the ratio of primary voltage to secondary voltage, or vice-versa.

voltage voltage-power directional relay • voltage-sensitive bridge

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voltage tuning  A method of adjusting the frequency of an oscillator or resonant circuit by means of a variable, direct-current voltage.

voltage-variable magnetron  A magnetron oscillator in which the output frequency is varied by adjusting the direct-current voltage on the tube.

voltage-variable oscillator  See VOLTAGE-CONTROLLED OSCILLATOR.

voltage turn ratio  The turns ratio of a transformer, indicated by the ratio of primary voltage to secondary voltage, or vice-versa.

voltage-type telemetry  Telemetry based upon the variation of a single voltage in sympathy with the changes in a sensed phenomenon.

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voltaic series
See ELECTROMOTIVE SERIES.

voltmeter
An electrolytic cell for determining the voltage of a battery, or of an unknown quantity of electricity, from the weight of metal deposited out of an electroyte onto the cathode by the action of the current flowing over an accurately timed interval.

combination meter
A combination meter for measuring electrical voltages and currents.

volt-amper Symbol. VA. Unit, watt. The simple product of voltage and current in volts and amperes, yielding the true power in a direct-current circuit and the apparent power in an alternating-current circuit. Also see APPARENT POWER and TRUE POWER.

volt-hour meter
See VAR-HOUR METER.

volt-ampere meter
See VAR METER.

volt-ampere reactive
Abbreviation, VAR. The product of volts and amperes for a purely reactive circuit. This product does not produce the true power because the power factor is neglected. It produces only the apparent power. A true reactance absorbs power during one half-cycle of alternating current, and returns it to the generator during the next half-cycle.

volta's law
See VOLTA'S PRINCIPLE.

volta's pile
See VOLTAIC PILE.

voltmeter
One of the oldest instruments, used in contact (even in air) will generate a difference of potential whose value is characteristic of the instruments. See ELECTROMOTIVE SERIES.

volt box
A precision, potentiometer-type voltage divider used in the calibration of meters and other instruments. The device is usually provided with a set of terminal posts for selecting various ratios of output voltage to input voltage.

volt-electron
See ELECTRONVOLT.

voltmeter
A usually direct-reading instrument used to measure voltage. Also see ELECTRON VOMETER, FET VOLTMETER, TRANSISTOR VOLTMETER, VACUUM TUBE VOLTMETER.

voltmeter-ammeter
See VOLT-AMMETER.

voltmeter amplifier
A wideband, flat-frequency response, low-distortion preamplifier used to boost the sensitivity of an alternating-current voltmeter.

voltmeter-millivoltmeter
A voltmeter that provides several low ranges, as well as several high ranges. A familiar example is an alternating-current voltmeter, which has various full-scale ranges from about 1 millivolt to about 1000 volts.

voltmeter multiplier
A resistor connected in series with a current meter (usually a milliammeter or a microammeter) to convert it into a voltmeter.

voltmeter sensitivity
Unit, ohm per volt. For a voltmeter, the total resistance of the instrument (multiplicand) or of the part through which the current flows (the resistance of the meter movement) divided by the full-scale deflection of the meter, usually in microamperes. Thus a 10-to-1 direct-current voltmeter with an input resistance of 100 kilohms has a sensitivity of 10,000 ohms per volt.

volt-milliammeter
A combination meter for measuring volts and milliamperes.

volt-ohm-milliammeter
A combination meter for measuring voltage, resistance, and current (in amperes).

volt-ohmmeter
A combination meter for measuring voltage and resistance.

volt-ohm-milliammeter
Abbreviation VOM. A multitester for measuring voltage, resistance, and current (in milliamperes and microamperes).

volsensor
See VOLTAGE DETECTOR.

volts per meter
Abbreviation, V/m or Vpm. The unit of electric field strength.

volume
1. Intensity of sound. Also called LOUDNESS.
2. A circumscribed portion of space, either imaginary or actually occupied, and described by three dimensions (e.g., sphere, ellipsoid, cube, pyramid, etc.).
3. In a computer system, a unit of magnetic storage medium (e.g., a diskette).

volume compression
The automatic reduction of the gain of an audio amplifier. The process differs from clipping (which "slices off" the tops of waves) in that compression (ideally) reduces the amplitude while preserving the waveform. Compare VOLUME EXPANSION.

volume compressor
A circuit or device (such as an automatic gain control amplifier) for achieving volume compression. Compare VOLUME EXPANDER.

volume conductance
The reciprocal of VOLUME RESISTIVITY.

volume control
A variable resistor (usually a potentiometer or a network of resistors, such as pad) for adjusting the gain, and, consequently, the output-signal loudness, of an amplifier.

volume equivalent
In wire telephony, speech loudness throughout the system, expressed in terms of the true loudness of a reference system and adjusted for equal loudness.

volume expander
A circuit or device for automatically boosting the volume of an audio-frequency signal. Also see EXPANDER. Compare VOLUME COMPRESSOR.

volume expansion
The technique of automatically increasing the gain, and consequently the output-signal volume, of an audio amplifier. Also see EXPANDER. Compare VOLUME COMPRESSOR.

volume indicator
A fast-acting alternating-current meter used to monitor the volume level in an audio channel in which the signal level is fluctuating. The scale is graduated in VOLUME UNITS. Also called VU-meter.

volume lifetime
In a homogeneous semiconductor, the interval between minority-carrier generation and recombination, or the interval in which the carrier density decreases from its initial value to one-half.

volume limiter
A circuit or device that automatically holds the volume level of an audio channel at a predetermined volume level (e.g., VOLUME COMPRESSOR and VOLUME EXPANSION).

volume-limited amplifier
An amplifier that functions as a volume limiter through the action of volume-limiting subcircuits.

vom
Abbreviation of VOLT-OHM-MILLIAMMETER.

von Hippel breakdown theory
The theory that, assuming no electron-energy distribution, breakdown occurs at field intensities for which the recombination rate of electrons and holes is lower than the rate of ionization by collision.

voltmeter-milliammeter
A device in which the bits are transmitted serially by one or more along a single line or bus.

VOR
Abbreviation of very-high-frequency omni-range (see VHF OMNIRANGE).

vote
See MAJORITY LOGIC.

voltage
Abbreviated form of VOICE-OPERATED CONTROL.

voltage
1. Symbol for GATE-SOURCE PINCHOFF VOLTAGE of a field-effect transistor. 2. Symbol for PLATE VOLTAGE.

voltage
Symbol for VOLTAGE AT PEAK TORQUE.

v particle
See VEE PARTICLE.

vpm
Abbreviation of VOLTS PER METER. (Also, V/m.)

VR
1. Abbreviation of VIRTUAL REALITY.
2. Abbreviation of VOLTAGE REGULATOR.

VR
Abbreviation of VIDEO RANDOM-ACCESS MEMORY.

Vref
Abbreviation of reference voltage.

Vref
Abbreviation of visual radio range.

Vref
Abbreviation of volt-seconds (watt-seconds).

Vref
Abbreviation of volt-seconds per ampere (watt-seconds per ampere).

VSA
Abbreviation of VOICE-STRESS ANALYZER.

VSB
Abbreviation of VESTIGIAL-SIDEBAND FILTER.

V signal
See VHF SIGNAL.

VSS
Abbreviation of VERY SHORT RANGE.

VSWR
Abbreviation of VOLTAGE STANDING-WAVE RATIO.

VT

VT fuse
See FROZEN FUSE.

VTL
Abbreviation of VARIABLE-THRESHOLD LEVEL.

VUM
Abbreviation of VOLUME-UNITS MAGNETRON.

VTR
Abbreviation of VOLUME-UNITS OSCILLATOR.

VTR
Abbreviation of VIDEOTAPE RECORDER or VIDEO TAPE RECORDING.

VTVM
Abbreviation of VACUUM-TUBE VOLTMETER.

VU meter
See VACUUM-TUBE VOLTMETER.

VU
Abbreviation of VOLUME UNIT.

VAC
Abbreviation of VOLUME UNIT.

vulcanized fiber
A tough insulating material derived from cellulose. Dielectric constant, 5 to 8.

VU meter
See VOLUME INDICATOR.

VVCXO
Abbreviation of variable-variability capacitor (see VOLTAGE VARIABLE CAPACITOR).

VV
Abbreviation of VOLTAGE.

VW
Abbreviation of volts working (see WORKING VOLTAGE).

vy
Abbreviation forertiary.
A portable, compact transceiver (or walkie-talkie transmitter for remote television pickup. At sports events and other gatherings, the unit is strapped to the shoulder of the camera operator. A portable combination camera and...
material, but not by absorption. Also see ADSORPTION.

wattmeter The useful, but not wholly accurate, teaching device of comparing an electric current with the flow of water. In such a comparison, voltage is shown equivalent to water pressure, and current to the quantity (e.g., gallons) of water flowing in unit time.

water primary battery or cell using water as the electrolyte.

water calomel A calomel meter used to measure power in terms of the increase in temperature of water heated by the electrical current.

water-capacitor An emergency capacitor made by setting one glass of water in another larger jar of water so that the two bodies of water are separated by the walls of the smaller jar. The bodies of water, in which an electrolyte has been dissolved, form the “plates” of the capacitor, and the wall of the smaller jar serves as the dielectric between them.

water glass Sodium silicate, a substance used as a fireproofing agent and protective coating.

watt-hour An instrument used to measure electrical power. The scale usually reads directly in watts, kilowatts, milliwatts, or microwatts. Also see ELECTRONIC WATTMETER.

watt-hour meter Abbreviation, WM. An instrument used to measure electrical power. The scale usually reads in watts. Also see ENERGY and WATT.

watt-second constant In an electric-energy meter, the number of watt-seconds in one revolution of the indicating disk.

wave 1. A single oscillation of some property of matter or space, such as density, displacement, or field strength. It moves outward from a point of disturbance and grows weaker as it travels farther. Wave motion is associated with mechanical vibration, sound, radio, heat, light, X rays, gamma rays, and cosmic rays. See SOUND and WAVELENGTH. 2. A single cycle of alternating or pulsating current or voltage. Also see AC VOLTAGE, ALTERNATING CURRENT, PULSATING DC VOLTAGE, and PULSATING DIRECT CURRENT.

wave absorption The removal of energy from electromagnetic waves as they pass through certain media, such as solid bodies, water, and the atmosphere. Compare POLARIZATION, WAVE REJECTION, and WAVE REFRACTION.

wave amplitude The peak value of a wave. Also see WAVE CRUISE and WAVE TRAVEL.

wave analyzer An instrument consisting essentially of a continuously tunable bandpass filter and an electronic alternating-current voltmeter. As the filter is tuned successively to the fundamental frequency of a complex wave and to its various harmonics, the voltmeter shows the amplitude of each of the components. Also see HELMERT WAVE ANALYZER.

wave angle The angle, measured with respect to the horizon, at which a radio wave is transmitted or received.

wave antenna See BEACON ANTENNA.

watt-hour capacity The number of watt-hours that a storage battery can deliver reliably and safely under specified operating conditions.

watt-hour demand meter A combination watt-hour meter and demand meter.

wave clutter Radar interference caused by waves on a body of water, particularly large swells on the ocean.

wave converter A guide wire, such as a baffle plate or grating, that changes a wave pattern from one type to another.

wave crest The maximum value of a wave envelope. Compare WAVE TRAVEL.

wave cycle A continuous alternation of a wave.

wave direction The direction in which an electromagnetic wave travels. It is perpendicular to the wave front and depends (whether it is forward or backward) upon the direction of the electric and
wave envelope

A flat, lip-shaped fitting at the end of a waveguide. It is a protective cover for the end of a waveguide. The seal introduces very little microwave attenuation, while preventing entry of moisture and debris.

waveguide flange

A quarter-wave dielectric rod or graphited sand button resistor inserted into a waveguide so that its amount of penetration and position can be adjusted for tuning purposes.

waveguide post

A transverse rod inside a waveguide that acts as a parallel susceptance.

waveguide probe

A pickup probe (tip or loop, as required) for sampling the field inside a waveguide, or a similar injection probe for introducing wave energy into a waveguide. Also see WAVEGUIDE SLOTTED LINE.

wave guide propagation

1. The transmission of microwave energy through a waveguide by successive reflections between the inner walls.
2. Propagation of very-high-frequency (VHF), ultra-high-frequency (UHF), or microwave electromagnetic fields through an atmospheric duct (see DUCT, 1), as if through a waveguide. Propagation of very-low-frequency (VLF) electromagnetic fields through a waveguide-like duct between the ionosphere and the earth’s surface.

waveguide resonator

A section of waveguide having a slot that accommodates a movable plate or coupling rod.

waveform

The shape of a wave as described in terms of its resemblance to some well-known figure or to its conformity to the curve of the applicable wave equation (e.g., sinusoidal, square, sawtooth, cosine, rectangular, and triangular).

waveform distortion

See AMPLITUDE DISTORTION.

waveform analyzer

See WAVE ANALYZER.

waveform converter

A circuit or device for changing a signal of one waveform (such as a sine wave) into one of another waveform (such as a pulse or square wave).

waveform distortion

The malfunction evidenced by a change of the waveform of a signal passing through a circuit.

waveform error

In a quantity displayed by an alternating current test instrument, an error caused by the waveform of the measured signal. Thus, a voltmeter calibrated with a sine wave voltage is subject to error when a measured signal is nonsinusoidal. Also called waveform effect.

waveform generator

See FUNCTION GENERATOR.

waveform influence

In a waveguide assembly, a tee connection to, or insertion into, a waveguide system. Such components include waveguide parts and accessories (e.g., splicing hardware, attenuators, etc.) for joining waveguide sections that provide the required phase shifts.

waveguide component

A device, such as an interference.-absorbing plate, for signal attenua-
tion in a waveguide.

waveguide cutoff

In a waveguide, the highest or lowest frequency that can be propagated with less than a specified amount of attenuation per unit length.

waveguide directional coupler

A directional coupler made of two parallel waveguides with a common wall. Two slots cut in the wall allow part of the microwave energy propagated in one direction in the main waveguide to be extracted, and energy traveling in the opposite direction to be rejected.

waveguide dummy load

A waveguide section that dissipates the microwave energy entering it.

waveguide elbow

1. A curved bend in a waveguide. 2. A waveguide connector with a bend.

waveguide flange

A flat, liplike fitting at the end of the pipe of a waveguide. It fastens waveguide sections together or attaches a waveguide component, equipped with an identical flange, to the end of a waveguide.

waveguide frequency meter

See WAVEGUIDE WAVELENGTH.

waveguide gasket

A gasket that provides electrical continuity between mating waveguide sections.

waveguide grating

A transmission line used at ultra-high and microwave radio frequencies. It is a hollow metal pipe with a rectangular or circular cross section. A rectangular waveguide must have sides measuring at least 0.5 wavelength and preferably more than 0.7 wavelength. A circular waveguide should be at least 0.6 wavelength in diameter, and preferably 0.7 wavelength or more. The characteristic impedance \( Z_0 \) varies with frequency. In this sense, it differs from coaxial or parallel wire lines, whose \( Z_0 \) values are independent of frequency.

waveguide apparatus

See WAVEGUIDE COMPONENTS.

waveguide attenuator

A device used for adaptation to, or insertion into, a waveguide system. Such components include waveguide parts and accessories (e.g., splicing hardware, attenuators, etc.) for joining waveguide sections.

waveguide connector

A fitting for joining waveguides for the efficient propagation of a signal.

waveguide coupling

A point function in a wave equation, specifying wave amplitude.

wave function

A transmission line used at ultra-high and microwave radio frequencies. It is a hollow metal pipe with a rectangular or circular cross section. A rectangular waveguide must have sides measuring at least 0.5 wavelength and preferably more than 0.7 wavelength. A circular waveguide should be at least 0.6 wavelength in diameter, and preferably 0.7 wavelength or more. The characteristic impedance \( Z_0 \) varies with frequency. In this sense, it differs from coaxial or parallel wire lines, whose \( Z_0 \) values are independent of frequency.

waveguide apparatus

See WAVEGUIDE COMPONENTS.

waveguide cutoff

A waveguide that acts as a parallel susceptance.

waveguide slotted line

A fitting that allows one waveguide section to be joined to a main waveguide at an angle and provided with a nondissipative termination. Also see WAVEGUIDE DUMMY LOAD.

waveguide probe

A pickup probe (tip or loop, as required) for sampling the field inside a waveguide, or a similar injection probe for introducing wave energy into a waveguide. Also see WAVEGUIDE SLOTTED LINE.

waveguide analyzer

An adjustable piston in a waveguide flange used to connect a section of waveguide in series or parallel with another section.

waveguide impedance

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See FUNCTION GENERATOR.

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waveguide transformer  A waveguide component that functions as an impedance transformer.

waveguide tuner  In a waveguide system, an adjustable tuner providing impedance transformation.

waveguide twist  A length of waveguide whose cross section is rotated around the longitudinal axis (e.g., from vertical to horizontal).

waveguide wavelength  In a uniform waveguide operating at a given frequency and in a particular mode, the distance between similar points for 360° phase shift.

waveguide wavemeter  A waveguide component that acts as an absorption wavemeter or trans-mission wavemeter for identifying microwave frequencies.

wavelength  Unit, meter. The displacement in one complete wave of an alternating or vibrating phenomenon, generally measured from crest to crest or from trough to trough of successive waves. For electromagnetic waves in free space, the wavelength in meters is equal to 3 × 10^8 divided by the frequency in Hertz. Also see WAVELENGTH-PERIOD-FREQUENCY RELATIONSHIPS.

waveguide wavemeter  A waveguide component used to remove (trap) a wave from a radio-frequency source of unknown frequency, used to determine the unknown frequency by absorption.

wavelength constant  The imaginary-number component of the propagation constant.

wavelength shifter  1. A frequency shifter whose performance is indicated in units of wavelength, rather than in units of frequency. 2. In certain photorefractive cells and tubes, a photorefractive substance that raises the efficiency of the device by absorbing photons and then releasing none of longer wavelength.

wave mechanics  A theory of matter that views subatomic particles as complex wave patterns, and attempts to account for all physical processes in terms of wave phenomena.

wavemeter  An instrument for measuring the wavelength or frequency of radio waves. One form consists of a series-resonant circuit containing an inductor, variable capacitor, and diode-type meter. The dial of the capacitor is calibrated to read in MHz. The inductor picks up energy from the radio-frequency source of unknown frequency, the capacitor is tuned for peak deflection of the meter, and the unknown frequency is read from the dial. This instrument is often called an absorption wavemeter because it absorbs a certain amount of power from the signal source under test. See also CAVITY WAVEMETER, COAXIAL WAVEMETER, LECHER WIRES, and SLOTTED LINE.

wave motion  Undulating motion (e.g., up and down, and side to side). An electromagnetic wave has undulating electric and magnetic components that are both in phase and perpendicular to each other and to the direction of propagation of the wave.

wave normal  1. The direction of propagation of an electromagnetic wave. 2. A unit vector directed at a right angle to both the electric and magnetic lines of flux in an electromagnetic wave.

wave number  The reciprocal of wavelength. This number denotes the number of waves per unit distance.

wave packet  A short pulse composed of waves.

wave packets  Radiant energy resulting from a number of wave trains of different wavelengths.

wave path  The line along which a WAVE TRAIN is propagated.

wave polarization  The direction (horizontal or vertical) of wave undulations (i.e., the plane of the undulations, with respect to the direction of propagation). In general, a vertical antenna radiates a vertically polarized wave, and a horizontal antenna radiates a horizontally polarized wave.

wave propagation  The movement of waves through space or through some medium. Electromagnetic waves travel through space at the speed of light (approximately 3 × 10^8 meters, or 186,000 miles, per second) and, like light, can be reflected and refracted.

wave reflection  The reflection of electromagnetic waves by an obstruction, such as a solid body or a layer of the ionosphere. Compare WAVE ABSORPTION, WAVE POLARIZATION, and WAVE REFRACTION.

wave refraction  Bending of the line of propagation of electromagnetic waves as they pass through various media, such as the troposphere or the ionosphere. Compare WAVE ABSORPTION, WAVE POLARIZATION, and WAVE REFLECTION.

waveshape  The overall contour of a wave—especially as revealed by a curve plotted for the particular wave equation. Also see WAVEFORM.

waveshaping circuit  A circuit that receives an input signal having a certain waveshape, and delivers an output signal having a different waveshape. For example, a squaring circuit converts a sine wave to a square wave at the same frequency.

wave surface  See WAVE FRONT.

wave tail  In a decaying pulse or signal envelope, the interval between the beginning of the decay and the point at which the amplitude reaches zero.

wave telegraph  See RADIO TELEGRAPHY.

wave telephony  See RADIO TELEPHONE.

wave theory of matter  A physical theory that the charge of an electron is distributed in space, rather than being focused at a point. Also see WAVE MECHANICS.

wave tilt  A slight forward tilt of the electric flux lines in a radio wave radiated at the surface of the earth by a vertical antenna.

wave train  A series of identical electromagnetic waves cycles propagated at equal intervals; an electromagnetic energy burst lasting at least several cycles.

wave trap  A resonant circuit consisting of an inductor and capacitor, either or both of which can be adjustable for tuning, used to remove (trap) signal at the resonant frequency from a signal mixture.

wave trough  The minimum value of a wave envelope. Compare WAVE Crest.

wave velocity  The distance a unit time traversed by a wave passing through a given medium.

wave winding  See DRUM WINDING.

waveguide transformer  1. A metal or insulating tube formed into a closed loop, usually with corrugations, around a conductor that carries electromagnetic waves. 2. See WAX MASTER.

waveguide window  A foot-operated device used with an electronic musical instrument to produce a "wah-wah" sound fluctuation.

waveguide wavemeter  A fixed capacitor that has been dipped in or impregnated with a wax, such as carnauba.

waveguide window  A fixed capacitor that has been dipped in or impregnated with a wax, such as carnauba.

waveguide window  A thin metal opening mounted transversely inside a waveguide for impedance-matching purposes. The edges of the slit in a capacitive window are perpendicular to the electric field; in an inductive window, they are parallel to the electric field.

waveguide window  A wavy-shaped junction for joining three waveguide sections.

wave heating  Heating a material by energy absorbed from traveling electromagnetic waves.

wave interference  Interaction between two or more waves, resulting in reinforcements and cancellations of energy.
weighted noise level

weathering Deterioration of electronic equipment as a result of exposure to outdoor heat, cold, moisture, wind, and similar conditions.
weather-protected machine A machine (usually a generator or motor) whose vent holes are designed to prevent entry of dust, water, and debris.
weather protection The coating, sealing, or treating of electronic equipment for protection against corrosion, humidity, and temperature changes in outdoor use.
weather satellite A satellite designed to photograph weather systems in infrared and/or visible light, and to relay the pictures to earth viafacsimile or television.
weather sound See RADIOSONDE.
weather transmission The radio transmission of meteorological reports. Sometimes the transmissions are combined with guidance transmissions, from which they can be separated by means of a filter in the receiver.
weather Abbreviation. Wb. The SI unit of magnetic flux and of the magnetic flux quantum. 1 Wb = 108 maxwells = 1.257 x 1014 unit pole.
Weber-Fechner law The law expressing the relationship between a stimulus and the physiological reaction it produces. The sensation is proportional to the logarithm of the stimulus.
weber per square meter Symbol, Wb/m². See TESLA.
weber turn A unit of magnetic flux linkage equal to one weber in a 1-turn coil.
wedge 1. In a waveguide, a termination consisting of a tapered block or plate of carbon (or other dissipative material). 2. In a television test pattern, convergent, equally spaced lines for checking resolution.
wedge bonding In integrated-circuit fabrication, a method of bonding in which a threecomponent system is used to fuse the device to the substrate. 3. The tendency for a potential difference to develop between opposite ends of a length of wire, when the wire is placed parallel to magnetic lines of flux and rotated.
weight 1. A battery that has been depleted to the point that its output (no-load or full load) is too low to be useful. 2. A battery specially designed for low-voltage output.
weak color Lack of color vividness or poor contrast between colors in a color-television picture. The condition is often caused by some malfunction in the chroma demodulator(s).
weak contrast In a television picture, poor differentiation of adjacent tonal areas.
weak coupling See LOOSE COUPLING.
weak battery 1. An extremely small electric current. The term is relative: generally, it refers to currents of a few microamperes or less.
weak magnet 1. A magnet whose power has deteriorated considerably below a prescribed level. 2. The body that normally is only slightly magnetic.
weak signal A signal whose amplitude is very low compared with that of signals considered satisfactory in a given application. Although the term is relative, it usually implies a signal that is non-competitive with other signals in a given environment.
weak-signal detector A detector in which, at low input-signal amplitude (weak-signal levels), the direct-current output is proportional to the square root of the input-signal voltage.
wearout The complete deterioration of a component system (i.e., beyond restoration to useful service).
wearout failure Failure because of wearout, which can be predicted on the basis of known lifetime and the deterioration characteristics of component materials (e.g., beyond restoration to useful service).
wearout point The instant of wearout, in terms of power output, watt-hour capacity, or some other characteristic.
weather antenna An antenna dimensioned for reception exclusively in the 162.4- to 162.55-MHz weather band. See WEATHER TRANSMISSION.
weathering Deterioration of electronic equipment as a result of exposure to outdoor heat, cold, moisture, wind, and similar conditions.
weather-protected machine A machine (usually a generator or motor) whose vent holes are designed to prevent entry of dust, water, and debris.
weather protection The coating, sealing, or treating of electronic equipment for protection against corrosion, humidity, and temperature changes in outdoor use.
weather satellite A satellite designed to photograph weather systems in infrared and/or visible light, and to relay the pictures to earth via facsimile or television.
weather sound See RADIOSONDE.
weather transmission The radio transmission of meteorological reports. Sometimes the transmissions are combined with guidance transmissions, from which they can be separated by means of a filter in the receiver.
weather Abbreviation. Wb. The SI unit of magnetic flux and of the magnetic flux quantum. 1 Wb = 108 maxwells = 1.257 x 1014 unit pole.
Weber-Fechner law The law expressing the relationship between a stimulus and the physiological reaction it produces. The sensation is proportional to the logarithm of the stimulus.
weber per square meter Symbol, Wb/m². See TESLA.
weber turn A unit of magnetic flux linkage equal to one weber in a 1-turn coil.
wedge 1. In a waveguide, a termination consisting of a tapered block or plate of carbon (or other dissipative material). 2. In a television test pattern, convergent, equally spaced lines for checking resolution.
wedge bonding In integrated-circuit fabrication, a method of bonding in which a three-component system is used to fuse the device to the substrate. 3. The tendency for a potential difference to develop between opposite ends of a length of wire, when the wire is placed parallel to magnetic lines of flux and rotated.
weight 1. A battery that has been depleted to the point that its output (no-load or full load) is too low to be useful. 2. A battery specially designed for low-voltage output.
weak color Lack of color vividness or poor contrast between colors in a color-television picture. The condition is often caused by some malfunction in the chroma demodulator(s).
weak contrast In a television picture, poor differentiation of adjacent tonal areas.
weak coupling See LOOSE COUPLING.
weak battery 1. An extremely small electric current. The term is relative: generally, it refers to currents of a few microamperes or less.
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whistle filter • Wide Area Telephone Service

whistle filter  1. An amplitude modulation, recording characterized by a correspondence of maximum received power to minimum recording medium density. 2. In frequency modulation, recording characterized by a correspondence of lowest received frequency to maximum recording medium density.

white area

white room See CLEAN ROOM.

white saturation See WHITE COMPRESSION.

white signal The facsimile signal (see FACSIMILE) corresponding to scanning the copy area having maximum density.

white-to-black amplitude range  1. At a point in a positive-amplitude-modulated (AM) facsimile system (see FACSIMILE), the ratio (in dB) of signal current or voltage corresponding to white in the picture to that for black in the picture. 2. At a point in a negative AM facsimile system, the ratio (in dB) of signal current or voltage corresponding to black in the picture to that for white in the picture.

white-to-black frequency swing At a point in a frequency-modulated facsimile system, the frequency difference \( f_u - f_b \), where \( f_b \) is the frequency corresponding to black in the picture, and \( f_u \) is the frequency corresponding to white.

white transmission A system of picture or facsimile transmission in which the maximum copy darkness corresponds to the smallest amplitude (in an amplitude-modulated transmitter) or the highest instantaneous frequency (in a frequency-modulated transmitter). The opposite of BLACK TRANSMISSION.

white X radiation X rays of the continuous, or general, type.

whizzer An attachment that can improve the high-frequency reproduction in some audio loudspeakers.

whole-number division Arithmetic division (as in the division of binary numbers) in which the quotient is a whole number (i.e., division in which the divisor is contained in the dividend an integral number of times).

whole-to-whole division See WHOLE-TO-WHOLE DIVISION.

WHP Abbreviation of water horsepower.

whisker section 1. The absorption of a liquid by, and its flow through, a cloth or thread, such as a lamp wick or lubricating wick. 2. The flow of molten solder along and under the insulation of a wire.

wicking See WICK ACTION.

wide-angle diffusion A form of diffusion characterized by the wide-angle scattering of light; causes the source to have the same brightness at all angles.

wide-area network A group of computers linked together, but separated by large geographic distances. Links can be made via telephone lines or radio.

wide-area service A teletype network that operates over long-distance wire lines.

Wide Area Telephone Service See WATS.
wideband 1. Having a bandwidth greater than the minimum necessary to transmit a signal with acceptable intelligibility. 2. For a voice signal, having a bandwidth greater than 6 kHz. 3. Having the capability to operate, without adjustment, over a broad range of frequencies or wavelengths. 4. In a digital network, a channel having a bandwidth of more than 6 kilobits but less than 2 Mbps.

wideband amplifier An amplifier that exhibits reasonably flat response to a broad band of frequencies. The term is relative, depending on the application.

wideband antenna An antenna that transmits or receives signals over a broad frequency range, usually without the need for tuning.

wideband axis In a color-television signal, the direction of the fine chrominance primary phasor.

wideband communications 1. Communications carried out over a broad range of frequencies without the minimum necessary for effective transfer of the information. 2. A method of transmitting and receiving signals by deliberately varying the channel frequency over a wide range. Also called spread-spectrum communications.

wideband generator A signal generator covering a wide frequency range. Typical coverage in a laboratory-type instrument is 10 kHz to 100 MHz.

wideband oscilloscope An oscilloscope whose horizontal, vertical, and sweep channels operate over a wide band of frequencies. Although the term wideband is relative, a wideband oscilloscope is usually assumed to be capable of displaying both normal sweeps and fast sweeps over a wide range of frequencies.

wideband ratio The ratio B1/B2, where B1 is frequency bandwidth and B2 is intelligence bandwidth.

wideband receiver A radio receiver that can tune in signals over a wide range of frequencies. An example is a communications receiver that can cover 10 kHz to 30 MHz continuously.

wideband repeater A repeater capable of operating over a wide range of input and output frequencies. Such repeaters are used in active communications satellites handling many different channels at the same time.

wideband signal generator See WIDEBAND GENERATOR.

wideband sweep 1. In the operation of an oscilloscope, a repetitive sweep of the electron beam, the frequency of which is adjustable to any desired point within a wide range. The basic sweep rate in simple oscilloscopes is restricted to the audio-frequency range (up to about 20 kHz), but a wideband sweep extends to much higher frequencies, typically several tens of MHz. 2. A sweep circuit that produces the wideband sweep action described in 1.

wideband test meter An alternating-current (ac) meter that can measure quantities over a wide frequency range in its basic form (i.e., without special external probes or converters). An example is an electronic ac voltmeter with a range extending from 10 Hz to 2.5 MHz.

wide-base diode A junction diode in which the p region is considerably wider than the n region.

wide-open 1. Pertaining to wideband, untuned response. 2. Pertaining to maximum-gain operation (e.g., a wide-open amplifier or receiver).

wide-range ammeter An ammeter that employs one or more shunt resistances to increase the full-scale deflection, usually by a power of 10 (10, 100, 1000, etc.). The resistor must be capable of carrying the current without burning out. Shunts are used when it is necessary to measure very large currents, such as hundreds of amperes. Shunts also allow a microammeter or milliammeter to be used as a multimeter with many current ranges.

wide-range reproduction High-fidelity audio-frequency reproduction.

width 1. The horizontal dimension of a pulse, usually corresponding to its effective duration; also called PULSE DURATION. 2. The horizontal dimension of an image, such as a television picture.

Wien bridge A bridge-type audio frequency meter used as a band-suppression filter (-notch circuit).

Wien bridge frequency meter A bridge-type audio frequency meter in which the continuously variable-frequency-selective circuit is a Wien bridge. Also see BRIDGE-TYPE AF METER.
Radioactive particles penetrating the chamber are made visible as droplets form trails when the winders condense on them.

**Wilson effect** Electric polarization of a dielectric material being moved in a magnetic field.

**Wilson electrometer** A device (see ELECTROSCOPE) using a single leaf hanging vertically.

**Wilson experiment** An experiment demonstrating the WILSON EFFECT. It consists of rotating about its axis a hollow dielectric cylinder (whose inner and outer surfaces are metallized) in a magnetic field parallel to the axis. The result: An alternating voltage appears between the metallized surfaces.

**Windstorm machine** A rotating machine used to produce high-voltage static electricity. The machine contains two glass disks, each having separate sectors of metal foil spaced around its face. The disks rotate in opposite directions, and the foil sectors passing each other form variable capacitors. Metal brushes pick up charges from the sectors passing under them, and deliver this energy to one or more Leyden jars for storage.

**wind charger** A wind-driven generator used specifically to supply direct current for charging storage batteries.

**wind-driven generator** A dynamo-type generator, either stationary or mobile, powered by a windmill-like device.

**windage** See ANEMOMETER.

**wind indicator** 1. A coil in an inductor or transformer (e.g., primary winding, secondary winding, output winding, etc.) 2. A coil in a motor or generator.

**windline** The winding length of a coil, expressed in degrees.

**winding cross section** The cross section of a multi-layer coil.

**winding depth** The depth of a multilayer coil, measured from the outermost layer to the innermost layer.

**winding factor** For a transformer or choke coil (or for a toroidal coil), the ratio of the total area of the windings to the area of a circle of the same diameter.

**winding area** See WINDOW.

**winding factor** See FACTOR.

**winding resistance** The total wind pressure on an antenna, the greater the wind loading for a given wind speed, the greater the wind loading for a given antenna. The greater the exposed surface of the antenna, the greater the wind loading. The greater the wind speed, the greater the wind loading for a given antenna system can safely withstand, assuming no accumulation of ice on the antenna structure.

**Windom antenna** 1. A multiband antenna in which a single-wire feeder is attached to a horizontal half-wave radiator wire somewhat off center, at a point about 3/8 wavelength from one end of the radiator. The antenna operates with reasonable efficiency at the first several harmonics of the frequency at which it measures 3/8 wavelength. 2. A similar antenna using a parallel-wire feeder.

**window** 1. Radar interference material (see CHAFF). 2. An interval during which a circuit is gated open to permit signal sampling. During this interval, a window is figuratively open to the signal. 3. The open spaces between the legs of an inductor for a transformer or choke coil. 4. An electromagnetic frequency band easily transmitted by earth's atmosphere. 5. The period during which conditions are ideal for a complex operation, such as a rocket or spacecraft launch. 6. An application space in a computer program that uses a graphical interface.

**window area** See WINDOW.

**window comparator** A comparator that detects voltage levels within a certain range of values, rather than simply indicating whether a voltage is more or less than a certain specified value.

**window corridor** An area where window (see WINDOW) has been dispersed.

**window jamming** The disturbance of electronic communications, especially radar, by dumping reflective material, such as metal foil, from an aircraft. Also see CHAFF, JAMMING; and WINDOW.

**Windows** Trade name (Microsoft) for a personal-computer interface scheme. The several versions all use selectable icons and menus. 1. Windows 1. The protective treatment and preparation of electronic equipment for wind storage or for operation in frigid regions.

**windscreen** The protective treatment and preparation of electronic equipment for wind storage or for operation in frigid regions.

**windrow** An area in which WIPEOUT occurs.

**wiper** 1. A thin metal blade or strip in sliding contact with a coil or other element over which it is turned to vary some quantity (such as resistance, inductance, voltage, current, etc.). 2. A brush in a motor or generator.

**wiper arm** See WIPER 1.

**wiper blade** See WIPER 1.

**wiping action** The movement of contacts against each other when they slide as they make or break a circuit.

**wiping contact** A contact that makes and breaks with a sliding motion.

**wire** 1. A metal or other thread serving as a conductor of electricity. 2. To connect wires between points in a circuit. 3. See TELEGRAM. 4. To send a TELEGRAM.

**wire bonding** 1. The interconnection of components within a discrete package, by means of fine wire welders or tooling welded to the individual components. 2. A method of temporarily splicing the outer conductors of two coaxial cables. 3. In general, any solderless method of splicing between two conductors.

**wire broadcasting** Broadcasting by means of carrier-current communication (see WIRED RADIO).

**wire cloth** A net of fine wire, used as an electrical shield when air circulation is necessary.

**wire drawing** See WIRE DRAWING.

**wire drawing** The movement of contacts against each other when they slide as they make or break a circuit.

**wire drawing** 1. The movement of contacts against each other when they slide as they make or break a circuit.

**wire feeding** The movement of contacts against each other when they slide as they make or break a circuit.

**wireless** A computer in which information is exchanged by means of wireless equipment (see WIRELESS).

**wireless** 1. A system for specifying the characteristics of wire. See AMERICAN WIRE GAUGE and BIRMINGHAM WIRE GAUGE. 2. A wire number governed by diameter (e.g., 18-gauge wire for 0.032 in. 3. A tool or instrument for measuring wire diameter or for determining wire number.
wire gauze • wire splice

wire gauze A fine screen of thin wires.
wire gauze cutting See WAVEGUIDE GRATING.
wire gauze weaving A machine, such as a robot, by means of signals sent by wire from the control panel.
wire leads Leads that are (usually thin, flexible) wires, rather than pins, bars, strips, etc. An example is the wire leads of some transistors (as opposed to terminal pins).
wireless 1. Pertaining to data communications and control systems that operate without wires (e.g., an infrared link between a notebook computer and a desktop computer). 2. An early name for radio; it is still used in some countries. Sometimes for specificity, radio is referred to as wirelessly or wireless telephony or wireless telephone. See RADOTELEPHONY.
wireless access protocol Acronym, WAP. A communications standard used on a worldwide basis with portable cellular telephone sets incorporating electronic mail, online service access, and/or Internet access.
wireless broadcaster See WIRELESS MICROPHONE.
wireless compass A radio compass (see DIRECTION FINDERS).
wireless device A device that operates over a distance, without the use of interconnecting wires.
wireless e-mail 1. The use of electronic mail (e-mail) in conjunction with a wireless Internet service. 2. A form of a specialized portable wireless communications device, resembling a stripped-down computer or an enhanced cell phone, to send and receive e-mail messages.
wireless interferam An intercom using wired radio for transmission over the power line from which it is operated. Also see WIRELESS RADIO.
wireless Internet 1. The use of a personal computer, usually a notebook or portable, in conjunction with a wireless modem connected to the Internet. Services of this type are provided with high-end cellular telephone subscriptions. As sets and limitations are similar to those associated with cell phone services. 2. The use of a specialized portable wireless communications device, resembling a stripped-down computer or an enhanced cell phone, for basic Internet access and information retrieval.
wireless microphone A device consisting of a small radio-frequency oscillator modulated by the microphone to which it is attached, and provided with tiny antenna. The modulated signal is picked up and reproduced by a radio receiver.
wiring 1. A system of wires or similar conductors connected between circuit components. 2. Connecting and dressing such wires, as in wiring a circuit. 3. Collectively, the connections (either actual wire or printed metal lines or processed semiconductor pads) between terminals and components in an electronic circuit. 4. The process of installing or making such connections.
wiring board The control panel of a computer (e.g., a plugboard).
wiring capacitance Unavoidable capacitance between wires in a circuit, or between the wires and nearby metal bodies.
wiring connector A small (usually metal) fitting used to tie wires together. See WIRING TOOLS.
wiring diagram See CIRCUIT DIAGRAM.
wiring impedance Unavoidable impedance in the wires in a circuit, and in associated terminals and hardware conducting alternating current. This impedance is the vector sum of WIRING REACTANCE and WIRING RESISTANCE.
wiring inductance Unavoidable inductance in the wires in a circuit, and in associated terminals and other hardware, through which alternating currents flow.
wiring reactance Unavoidable reactance in the wires in a circuit, and in associated terminals and other hardware, conducting alternating current. This reactance is caused by WIRING INDUCTANCE and/or WIRING RESISTANCE.
wiring resistance Unavoidable resistance in the wires in a circuit and in associated terminals and other hardware. See WIRING INDUCTANCE.
winka x-ray A voltage-triplet circuit using only two diodes and two capacitors. Its no-load direct-current output voltage is approximately three times the peak value of the alternating-current input voltage. Also see VOLTAGE TRIPLER.
wk Abbreviation of WORK. 2. Abbreviation of week.
WM Abbreviation of WATTMETER.
Watt A unit of measure equal to the product of one watt and one second. Also see WATT.
Wm Abbreviation of WAVELENGTH.
wobulator A device that sweeps the frequency of an oscillator. There are several types, from a motor-driven, rotating tank to sophisticated, fully electronic variable capacitors or variable inductors.
wool Yarn which is a natural product of domesticated sheep. See TUNSTOELEN.
Wolf’s equation A sinesp-300number equation used to forecast maximum sunspot number S = A1000 + B, where R is relative sunspot number, k is a constant for the telescope used, G is the
number of spot groups observed, and N is the total number of spot groups.

Wolf's equation • working voltage


workpiece The object heated by an induction or dielectric heater.

worm A cylindrical gear whose spiral "teeth" re- main in contact throughout a single turn. Another word for helix.

worm drive A mechanism for transferring motion from a turning knob shaft through a right angle to the shaft of an adjustable component, such as a potentiometer or variable capacitor. The knob turns a threaded shaft that mates with a gear wheel.

Written filter A light filter for separating colors. It is available in transparent sheets of various colors and is useful in photography and in several phases of electronics, including the operation of color meters and color matchers.

wrinkle finish A pattern of fine wrinkles created by special paint when it dries on a surface, such as that of a metal cabinet for a piece of electronic equipment.

wrist-force sensor In robotics, a set of strain gauges that detects the various forces in the joint connecting an end effector to an arm, and sends signals back to the robot controller. The controller can use the signals to direct the movements of the arm or end effector.

write 1. In computer operations, to transfer data from one form of memory or storage to another form. Example: To transfer data in a computer from random-access memory (RAM) to the hard disk. Compare READ. 2. To produce an image on the storage mesh in the cathode-ray tube of a storage oscilloscope.

write control See WRITE PERMIT RING.

write gun See WRITING GUN.

write head In a magnetic memory or in a tape recorder or wire recorder used for recording data, the head that magnetizes the drum, tape, disk, or other recording medium or surface.

write pulse In computer operation, the pulse that causes information to be recorded in a magnetic cell, or sets it to the one state. Compare READ PULSE.

write-time period The time taken to write data to a storage device.

writing gun In a storage oscilloscope, the electron gun that produces the image electronically on the storage mesh. It is mounted in the rear of the cathode-ray tube and is enclosed by FLOOD GUN.

writing head See WRITE HEAD.

writing rate In photography on a cathode-ray screen, the highest spot speed at which an acceptable picture can be made.

writing speed See WRITING RATE.

wire 1. A wire-wrap connection. 2. A piece of wire or wire conductor by wrapping insulating tape around it.

wire wrap The (usually successful) completion of a design, fabrication, test, or investigation.

woom A shortwave receiver used for signals back to the robot controller. The controller can use the signals to direct the movements of the arm or end effector.

Wolf's equation • working voltage


workpiece The object heated by an induction or dielectric heater.

worm A cylindrical gear whose spiral "teeth" remain in contact throughout a single turn. Another word for helix.

worm drive A mechanism for transferring motion from a turning knob shaft through a right angle to the shaft of an adjustable component, such as a potentiometer or variable capacitor. The knob turns a threaded shaft that mates with a gear wheel.

word processor 1. An electronic device, similar to a typewriter, used for writing. Words, phrases, sentences, or paragraphs can be changed, replaced, or deleted prior to the final printout. 2. A computer used for writing, as defined in 1. 3. Software that allows a computer to be used for writing, as defined in 1.

word rate In communications or computer systems, the number of words per unit time (e.g., WORDS PER MINUTE).

word size See WORKING DATA LENGTH.

words per minute In telegraphy, a measure of data speed. It is approximately equal to the number of characters (including spaces) per minute divided by 6.

word time In computer operations, the time required to process one word that is in storage.

work 1. Symbol, W. Units: joule, erg, foot-pound, kilogram meter. That which is accomplished by the transfer of energy from one body to another, as when an exerted force causes a displacement. The amount of work performed is equal to force times distance: $W = F \times d$. An amateur radio term meaning to engage in two-way communication with another station.

work area In computer operations, a temporary area of memory for data items being processed. Also called INTERMEDIATE STORAGe, WORKING MEMORY, and WORKING STORAGE.

work coil The alternating-current-carrying coil that induces energy in the workpiece in induction heating.

work envelope The range of motion over which a component, such as a coil or capacitor, for insulation or protection.

work function Unit, eV. The energy required to bring an internal particle to the surface of a material and out into space, as when an electron is emitted by the hot wire of an electron tube. The work function is the voltage required to extract 1 electrostatic unit of electricity from the material.

working data file A temporary accumulation of data sets that is erased or otherwise discarded after it is transferred to another storage device.

working life The expected or guaranteed lifetime of a material, device, or system in actual operation or use. Compare SHELF LIFE.

working memory See WORK AREA.

working point The operating point of an active device (i.e., the point along one of the characteristic curves around which operation is fixed).

working Q The Q of a loaded circuit or device (e.g., tank-circuit Q of a radio transmitter loaded with an antenna or dummy load).

working range 1. The usable maximum distance between a transmitter and receiver in a wireless communications circuit. 2. The allowed range over which specified parameters can vary in a particular system while facilitating normal operation, rate, or operation within rated specifications.

working storage See WORK AREA.

working voltage The (usually maximum) voltage at which a circuit or device can be operated continuously with safety and reliability.


workpiece The object heated by an induction or dielectric heater.

worm A cylindrical gear whose spiral "teeth" remain in contact throughout a full turn. Another word for helix.

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written filter A light filter for separating colors. It is available in transparent sheets of various colors and is useful in photography and in several phases of electronics, including the operation of color meters and color matchers.

wrinkle finish A pattern of fine wrinkles created by special paint when it dries on a surface, such as that of a metal cabinet for a piece of electronic equipment.

wrist-force sensor In robotics, a set of strain gauges that detects the various forces in the joint connecting an end effector to an arm, and sends signals back to the robot controller. The controller can use the signals to direct the movements of the arm or end effector.

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wye-wye circuit

W/(sr m²) Abbreviation of watts per steradian per square meter.

W 1. Abbreviation of wireless telegraphy. 2. Abbreviation of WATERTIGHT.

WT Abbreviation of WEIGHT.

WU Abbreviation of Western Union International.

Wulf electrometer See BIFILAR ELECTROMETER.

Wullenweber antenna An electronically steerable antenna composed of two concentric circular arrays of masts connected to the steering circuitry.

WUX Abbreviation of Western Union telegraph.

WVdc Abbreviation of direct-current working voltage: the maximum continuous direct-current voltage that can safely be placed across a component.

Ww Abbreviation of watt-hour.

W/Ar Abbreviation of watts per steradian (unit of radiant intensity).

WWV The call letters of a standard-frequency/standard-time broadcasting station operated by the National Bureau of Standards and located in the continental United States. Also see WWVH.

WWVH The call letters of a standard-frequency/standard-time broadcasting station operated by the National Bureau of Standards and located in Hawaii. Also see WWV.

WX Radiotelegraph abbreviation of weather.

WXD International Telecommunications Union symbol for meteorological radar station.

WXR International Telecommunications Union symbol for radiosonde station.

wye adapter A connector that provides two outputs for a single input, or vice versa. It is commonly used in audio applications.

wye box In a three-phase power-measuring setup, a special arrangement of two impedances, each of which is equal to the impedance of the potential element of the wattmeter used in the setup. The box permits a single wattmeter to be used, which indicates one-third the total power. Without the box, three wattmeters would be needed.

wye connection A method of connecting three windings in a three-phase system so that one terminal of each winding is connected to the neutral point. It is shaped like the letter Y. Also called star connection.

wye current Current through one of the branches of a three-phase star (wye) connection.

wye delta starter A starter circuit for a three-phase squirrel-cage induction motor. When the starter switch is thrown in one direction, the stator of the motor is wye-connected for starting; thrown in the opposite direction, the stator is delta-connected for continued operation.

wye equivalent circuit A wye-connected three-phase circuit equivalent to a delta-connected circuit when the impedance of any pair of corresponding lines for both wye and delta are the same; the third line is unconnected.

wye junction See WAVEGUIDE WYE.

wye-matched-impedance antenna An antenna in which the impedance of a nonresonant open-wire feed line is matched to that of the center of the radiator by spreading the end of the feeder wires out into a Y-shaped or delta-shaped matching section. Also called DELTA-MATCHED-IMPEDANCE ANTENNA.

wye point The star point in a three-phase system. Also see WYE CONNECTION.
image of the material to be copied. A latent image is formed on the surface and is developed (by dusting with black powder attracted to the charged image) to make the image visible.

Xerography Xerography is a method of copying in which a material is exposed to XRAY and is then developed as explained above.

X-ray X-rays are electromagnetic waves having wavelengths ranging from approximately 0.01 nanometer (10⁻¹¹ meter) to 0.15 nanometer (1.5 x 10⁻¹⁰ meter). These waves are shorter than ultraviolet, but longer than gamma rays. They can be produced by bombarding a target of heavy metal (such as tungsten) with a stream of high-speed electrons in a vacuum tube. X rays have high penetrating power, can expose photographic film, and cause some substances to fluoresce. Also see X-RAY DIAGNOSIS, X-RAY INSPECTION, and X-RAY THERAPY.

X-ray beam A beam of X-rays, such as that produced by a cathode-ray tube in a television receiver or by a x-ray therapy system.

X-ray diagnosis A test for discovering internal defects and other abnormalities in the human body by use of X-rays to produce an image of the material to be copied. A latent image is formed on the surface and is developed (by dusting with black powder attracted to the charged image) to make the image visible.

X-ray diffraction The diffraction of X rays by a crystal.

X-ray diffraction camera A camera that produces an image of a crystal by diffraction of X-rays by it.

X-ray diffraction pattern A pattern produced by X-ray diffraction.

X-ray emission X-rays emitted by an object.

X-ray therapy An application of X-rays to the body.

X-ray tube A device that generates X-rays for a specific purpose, such as medical diagnosis.

X-ray photograph A photograph made by exposure to X-rays, especially an X-ray fluoroscopic image, a picture made without a camera by interposing an object (such as a part of the human body) between an X-ray tube and photographic film.

X-ray radiation X-rays are electromagnetic waves having wavelengths ranging from approximately 0.01 nanometer (10⁻¹¹ meter) to 0.15 nanometer (1.5 x 10⁻¹⁰ meter). These waves are shorter than ultraviolet, but longer than gamma rays. They can be produced by bombarding a target of heavy metal (such as tungsten) with a stream of high-speed electrons in a vacuum tube. X rays have high penetrating power, can expose photographic film, and cause some substances to fluoresce. Also see X-RAY DIAGNOSIS, X-RAY INSPECTION, and X-RAY THERAPY.

X-ray therapy A procedure for the treatment of diseases by the use of X-rays.

X-ray therapy system An apparatus for the production and use of X-rays for medical purposes.

X-ray therapy A procedure for the treatment of diseases by the use of X-rays.

X-ray therapeutist A person who is qualified to administer X-ray therapy.

X-ray tube A device that generates X-rays for a specific purpose, such as medical diagnosis.

X-ray photograph A photograph made by exposure to X-rays, especially an X-ray fluoroscopic image, a picture made without a camera by interposing an object (such as a part of the human body) between an X-ray tube and photographic film.

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The vertical axis of a chart, graph, or system of coils used for magnetic deflection of the electron beam in cathode-ray tubes.

**Y axis ammeter** An instrument for measuring the angle of yaw of an aircraft.

**Yaw** Side-to-side movement in a vehicle or robotic end effector. Essentially horizontal displacement about the vertical axis.

**Yaw amplifier** In an aircraft servo system, the unit that amplifies the yaw signal (the signal proportional to the deviation of the aircraft from the line of flight).

**Yaw meter** An instrument for measuring the angle of yaw of an aircraft.

**Y-axis** 1. The vertical axis of a chart, graph, or system of coils used for magnetic deflection of the electron beam in cathode-ray tubes.

2. In a quartz crystal, the axis drawn perpendicular to the faces of the hexagon.

**y-axis amplifier** See Y AMPLIFIER.

**Yb** Symbol for YTETRIUM.

**Y box** See WYE BOX.

**y channel** See Y AMPLIFIER.

**Y-channel gain** See Y GAIN.

**Y-channel** An interconnection among three waveguides. When power is applied to the junction through one waveguide, the wave is transferred to the adjacent waveguide immediately to the right or left.

**Y connection** See WYE CONNECTION.

**Y coordinate** See ORIGINATE.

**Y current** See WYE CURRENT.

**Y-cut crystal** A piezoelectric plate cut from a quartz crystal in such a way that the plane of the plate is perpendicular to the Y-axis of the crystal. See CRYSTAL AXES and Y-AXIS.

**Yd** Abbreviation of YARD.

**Y deflection** Vertical deflection of the spot on the screen of a cathode-ray tube. Compare X DEFLECTION.

**Y diode** The decoding diode in each of the Y lines of a computer memory matrix. Compare X DIODE.

**Y direction** The vertical direction in deflections and in graphical presentations of data.

**Y drive** The driving source or energy for the Y lines of a computer memory matrix. Compare X DRIVE.

**Y year** Abbreviation of YEAR. Also, y or yr.

**Y parameters** A system of coils used for magnetic deflection of the electron beam in cathode-ray tubes.

**Yoked** The material from which the primordial fireball is thought to have been made, and from which the entire known universe is believed to have originated approximately 10 billion (10^10) years ago.

**Y line** A vertical line of a memory matrix. Compare X LINE.

**Yagi antenna** An antenna consisting of two or more parallel, straight elements, including at least one parasitic element and at least one driven element. The elements all lie in the same plane. Each driven element is connected to the feed line. Half-wave resonant, and center-fed. A two-element array can be formed by adding a director or a reflector alongside a single driven element. An array with one director and one reflector, along with the driven element, increases the gain and directivity compared with a two-element system. The gain and directivity increase further as elements are added. This is usually done by placing additional directors in front of a three-element array. Compare QUAD ANTENNA.

**Yagi-Uda array or beam** An antenna consisting of two or more parallel, straight elements, including at least one parasitic element and at least one driven element. The elements all lie in the same plane. Each driven element is connected to the feed line. Half-wave resonant, and center-fed. A two-element array can be formed by adding a director or a reflector alongside a single driven element. An array with one director and one reflector, along with the driven element, increases the gain and directivity compared with a two-element system. The gain and directivity increase further as elements are added. This is usually done by placing additional directors in front of a three-element array. Compare QUAD ANTENNA.

**Y adapter** See WYE ADAPTER.

**YAG** Abbreviation of yttrium-aluminum-garnet, the stimulated substance in some lasers.

**Yagi antenna** Also called Yagi-Uda array or beam. An antenna consisting of two or more parallel, straight elements, including at least one parasitic element and at least one driven element. The elements all lie in the same plane. Each driven element is connected to the feed line. Half-wave resonant, and center-fed. A two-element array can be formed by adding a director or a reflector alongside a single driven element. An array with one director and one reflector, along with the driven element, increases the gain and directivity compared with a two-element system. The gain and directivity increase further as elements are added. This is usually done by placing additional directors in front of a three-element array. Compare QUAD ANTENNA.

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**yield** The lowest stress for plastic deformation of a material, below which the material is elastic and above which it is viscous.

**yield value** The amount of physical stress that causes a substance to become stretched permanently out of shape.

**yield strength** The lowest stress for plastic deformation of a material, below which the material is elastic and above which it is viscous.

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**yield value** The amount of physical stress that causes a substance to become stretched permanently out of shape.

**yield value** The amount of physical stress that causes a substance to become stretched permanently out of shape.

**yield point** The lowest stress for plastic deformation of a material, below which the material is elastic and above which it is viscous.

**yield strength** The lowest stress for plastic deformation of a material, below which the material is elastic and above which it is viscous.

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Yttralox A transparent polycrystalline ceramic composed primarily of yttrium oxide, which has many applications in electro-optics.

yttria Formula, \( \text{Y}_2\text{O}_3 \). Yttrium oxide, a white powder used in Nernst lamps.


yttrium-iron-garnet See YIG.

Yttrium metal Any of the group of metals, including yttrium, erbium, holmium, lutetium, thulium, ytterbium, and sometimes dysprosium, gadolinium, and terbium.

Yukon Standard Time Standard time of the ninth time zone west of Greenwich, embracing the Yukon Territory and a portion of southern Alaska.

Y-winding See WYE CONNECTION.

Y-Y circuit See WYE-WYE CIRCUIT.

Z-axis of the crystal and parallel to the X-axis. See CRYSTAL AXES.


zag The short, straight deflection of a point or particle, or of waves along a jagged path in a direction opposite that of a ZIG; one of the components of ZIG-ZAG DEFLECTION.

Zamboni pile A high-voltage electrochemical cell consisting of an aluminum anode, a manganese-dioxide cathode, and an aluminum-chloride electrolyte.

Z amplifier The intensity-modulation amplifier in an oscilloscope. Compare X AMPLIFIER and Y AMPLIFIER.

Z-angle meter An instrument, commonly of the null-balance type, that indicates the impedance and phase angle of capacitors, inductors, and sometimes of inductance-capacitance-resistance (ICR) combinations.

z-axis 1. The intensity-modulation input of an oscilloscope, including the associated circuit. 2. The video-signal input of a television picture tube, including the associated circuit. 3. The third axis in a three-dimensional coordinate system. 4. The lengthwise axis of a quartz crystal.

z-axis amplifier See Z AMPLIFIER.

z-axis modulation See INTENSITY MODULATION.

z channel See Z AMPLIFIER.

z-cut crystal A plate cut from a quartz crystal so that the plane of the plate is perpendicular to the Z-axis of the crystal.
Zener-diode coupling element A Zener diode used as a direct coupling element between amplifier stages in an electronic system. When no signal is present, the resistance of the diode is extremely high because the direct-current voltage across the diode-coupled amplifier stages reverse-bias the diode to below the avalanche point, and no current flows from one stage to the next. The signal raises the voltage enough to cause avalanche breakdown; the signal is thus readily transmitted from one stage to the following one.

### Zener-diode voltage reference

A device that utilizes the constant voltage drop across a Zener diode operated in its breakdown region, to provide a standard voltage for reference purposes. It consists essentially of a direct-current (dc) voltage source, limiting resistor, and Zener diode. For an alternating-current (ac) reference voltage, an ac voltage source, limiting resistor, and two Zener diodes (connected in parallel, back to back) are required. Zener diodes can be connected in series to supply a higher reference voltage than can be delivered by a single diode.

**Zener-diode voltage regulator** A simple voltage regulator whose output is the constant voltage drop developed across a Zener diode conducting in the reverse breakdown region. The simple regulator circuit consists of a Zener diode and an appropriate limiting resistor connected in series across the output terminals of an unregulated direct-current power supply. For alternating-current voltage regulation, two Zener diodes can be connected in parallel, back to back. Zener diodes in series are connected to regulate a higher voltage than can be accommodated by a single diode.

**Zener effect** See AVALANCHE BREAKDOWN.

**Zener knee** In the response of a reverse-biased Zener diode, the point of abrupt transition from low current (high resistance) to high current (low resistance). For voltage regulation and voltage standardization, the knee should be as sharp as possible.

**Zener knee current** In a Zener diode, the current that flows when the reverse bias reaches the avalanche voltage.

**Zener protection MOSFET** See GATE-PROTECTED MOSFET.

**Zener voltage** The particular value of reverse voltage at which a Zener diode or other reverse-biased pn junction abruptly exhibits the avalanche effect. Depending on the Zener diode, this potential can be less than 10 volts, or as much as several hundred volts.

**zenith** In the sky, the point directly overhead, exactly 180 degrees opposite the direction of the earth's center.

**Zeolite process** A method using certain artificial Zeolites (hydrous silicates) to soften water used in some electronic manufacturing and testing operations.

**Zeppelin antenna** Also called zepps. 1. A half-wave-length radiator, fed at one end with a quarter-wavelength section of open-wire line. The feed line can come away from the radiator at any angle, usually 90 degrees or more. The antenna was originally used aboard zeppelins: the entire system was dangled in flight and the feed line was colinear with the radiating element. The impedance at the feed point is high; the impedance at the transmitter end of the feed line is low. The antenna will operate satisfactorily at all harmonics of the design frequency. 2. A radiator that is an integral multiple of a half wavelength, fed with open-wire line of any length. A transmatch is employed at the transmitter and of the feed line. This arrangement is popular among radio amateurs. The primary advantage of this arrangement is ease of installation; the main drawback is the fact that the feed line radiates to some extent because the system is not perfectly balanced.
zero capacitance  •  zero pole

the lowest capacitance point, to which all other capacitances are referred.

zero compensation  The elimination or minimizing of the zero-signal output of a transducer or similar device.

zero compression  See ZERO SUPPRESSION. 1. 2.

zero current  1. Absence of movement of electrical charge carriers. 2. In some circuits, the lowest current level, to which all other currents are referred.

cut crystal  A piezoelectric plate cut from a quartz crystal in such a way that the frequency-temperature coefficient is zero.

di reference level  An agreed-upon zero level for decibel ratings (which are by nature relative). Zero dBm, for example, corresponds to 1 milliwatt. Compare VOLUME UNIT.

derift  1. The (usually gradual) drift of a zero point, such as the zero setting of an electronic voltmeter. 2. The condition of no change in the value of a quantity.

zero elimination  See ZERO SUPPRESSION. 1.

zero energy  The condition in which energy is neither generated, consumed, nor dissipated.

zero error  1. In instruments and measurements, an error so small that it can be considered inconsequential. 2. In a radar system, the inherent delay in the transmitter and receiver circuits.

zero field emission  Thermionic emission from a cathode or hot conductor within a uniform electric field.

zero fill  See ZERO. 5.

zero gravity  The condition of weightlessness (i.e., the state in which gravitational pull by a celestial body is completely absent or has been nullified).

zero gravity switch  A switch activated automatically when the condition of zero gravity is reached.

zero impedance  1. Absence of impedance (a theoretically ideal condition). 2. In some circuits, the lowest impedance level, to which all other impedances are referred.

zero inductance  Absence of inductance (a theoretically ideal condition). 2. In some circuits, the lowest inductance level, to which all other inductances are referred.

zero input  1. Complete absence of input (signal or noise). 2. Absence of operating voltage or power to a system. 3. In a flip-flop, the input terminal that is not receiving a trigger signal.

zero input terminal  In a flip-flop, the input-signal terminal at which a trigger signal will switch the flip-flop output to zero. Also called zero terminal and RENST TERMINAL.

zero instant  See ZERO TIME.

zero level  The reference level for the comparison of quantities. For example, it might be a voltage or current level; in audio measurements, it is the zero-dB reference level.

zero-line stability  In an analog metering device, the ability of the instrument to maintain proper zero adjustment over a period of time.

zero magnet  A permanent magnet used to set the pointer of a meter to zero.

zero magnitude  1. For a quantity, the state of being valueless (i.e., a complete absence of the quantity). 2. In some tests, measurements, or calculations, the lowest value of a quantity, to which all other values are referred.

zero meridian  The meridian at Greenwich (near London), England, from which longitude and standard time are reckoned. Also see TIME ZONE and ZONE TIME.

zero method  A method of measurement entailing adjustment of a circuit or device (such as a bridge, tee network, or potentiometer) for zero response of the detector. Also called null method.

zero modulation  The momentary lack of modulation in a communications or broadcast system, as during a pause in speech.

zero-modulation noise  Noise produced by previously erased tape that is run under specified operational conditions.

zero output  1. Complete absence of output signal or output power. Sometimes disregarding noise output. 2. In a flip-flop, the normal condition of no signal pulse at a particular output terminal.

zero-output terminal  In a flip-flop, the output terminal that is not delivering an output pulse.

zero phase  In an alternating-current circuit, the condition in which the current and voltage are in phase. That is, the current peaks occur at exactly the same times as the voltage peaks; the phase difference between the current and voltage is zero.

zero potential  1. Complete absence of voltage. 2. In some circuits, the lowest voltage, to which all other voltages are referred. 3. The potential of the earth as a reference point.

zero power  1. Complete absence of dissipated power. In some circuits and systems, the lowest power level, to which all other power values are referred.

zero-power resistance  In a thermistor, the resistance at which power dissipation is zero.

zero-power resistance-temperature characteristic  For a thermistor, a figure that reveals the extent to which the temperature of the thermistor body causes the zero-power resistance to change (expressed in ohms per degree Celsius).

zero reactance  1. Absence of reactance (a theoretically ideal condition). 2. In some circuits, the lowest reactance, to which all other reactances are referred.

zero resistance  1. Absence of resistance (a theoretically ideal condition). 2. In some circuits, the lowest resistance, to which all other resistances are referred.

zero scale current  In a digital-to-analog (D/A) converter, the current into the output when all logic inputs are low (off) and the output is at a certain predetermined value, in microamperes or milliamperes.

zero screw  The mechanical zero adjuster of a meter.

zero set  1. A usually screwdriver-adjusted mechanism for setting the pointer of a meter to zero. 2. An electrical circuit consisting of a resistance bridge or adjustable bucking voltage for setting a meter to read zero under specific conditions.

zero shift  See ZERO DRIFT.

zero signal  1. The condition of complete absence of signal. 2. A finite signal level used as a reference point against which all other signal levels are measured.

zero time  Any instant of time, to which all other instants are referred. 2. See ZERO PHASE.

zero terminal  A temperature point relative to which all other temperatures are reckoned. Also see ZERO SET OF POINT.

zero termination  1. See ZERO TERMINAL. 2. In a radio or television system, the introduction of a voltage to cancel the steady-state component of the input signal.

zero temperature  The point from which temperatures are reckoned, the arbitrary freezing point of a thermometer scale. On the Celsius (centigrade) scale, zero degrees corresponds to the freezing point of pure water at standard atmospheric pressure. On the Fahrenheit scale, zero degrees is 32 degrees colder than the freezing point of pure water at atmospheric pressure. On the Kelvin or Rankine scales, zero degrees corresponds to the complete absence of thermal energy; it is the coldest possible temperature. 2. A temperature point relative to which all other temperatures are reckoned.

zero temperature coefficient  A temperature coefficient having the value zero (i.e., one that indicates there is no temperature-dependent drift of a given quantity).

zero terminal  See ZERO INPUT TERMINAL and ZERO OUTPUT TERMINAL.

zero time  1. In some measurements, the first instant of time, to which all other instants are referred. 2. See ZERO PHASE.

zero voltage  A voltage coefficient having the value zero (i.e., one that indicates there is no voltage-dependent drift of a given quantity).

zero-zero  The atmospheric condition in which the ceiling and visibility both are zero (i.e., extremely dense fog).
Z gain

The gain (or gain control) of the intensity channel of an oscilloscope. Compare X GAIN and Y GAIN.

zig

The short, straight deflection of a point or particle, of a wave along a jagged path in a direct-current (dc) circuit that of ZAG, a component of Zigzag DEFOC.inition.

zig-deflection

Deflection of a particle, point, or object in a path that contains side-to-side motion, as well as forward motion. Also see ZAG and ZIG.

zigzag rectifier

A special version of the three-phase star (three-phase, half-wave) rectifier circuit. Direct-current (dc) saturation of the transformer secondary is avoided by winding half the turns of each secondary on a separate core (i.e., each core carries half the windings). The opposing flux resulting from different phases in the half-windings causes cancellation of the dc component of flux in each core.

zigzag reflections

Multihop reflections of waves along a zigzag path, resulting from repeated reflections within the ionosphere.

zinc

Symbol, Zn. A metallic element. Atomic number, 30. Atomic weight, 65.39. It is used as the negative-electrode material in dry cells and as a protective coating for some metals used in electronics.

zinc aluminum phosphor

Either of two similar substances used as a phosphor coating for cathode-ray-tube screens. One form glows blue; the other form glows red.

zinc-carbon cell

A common non-rechargeable electrochemical cell. Produces approximately 1.5 volts under no-load conditions. Zinc forms the outer case or shell, and is the negative electrode. A carbon rod serves as the positive electrode. The electrolyte is a paste of manganese dioxide and carbon. The cell is inexpensive, and is commercially available in various sizes. The shelf life is fairly long. Cells of this type work well at moderate temperatures, and in applications where the current drain is moderate to high. They function poorly at low temperatures. Compare ALKALINE CELL.

zinc germanate phosphor

A substance used as a phosphor coating for cathode-ray-tube screens. It glows yellow-green.

zinc magnesium fluoride phosphor

A substance used as a phosphor coating for cathode-ray-tube screens. It glows yellow-green.

zinc oxide

A substance used as a phosphor coating for cathode-ray-tube screens. It glows blue-green. It is also used in the manufacture of certain electronic components, such as resistors.

zinc-oxide resistor

A common non-rechargeable zinc-oxide resistor having a reflector composed of confocal parabolas arranged in a circle. A rapid-scan radar antenna having a reflector composed of confocal parabolas arranged in a circle. A special version of the three-phase star (three-phase, half-wave) rectifier circuit. Direct-current (dc) saturation of the transformer secondary is avoided by winding half the turns of each secondary on a separate core (i.e., each core carries half the windings). The opposing flux resulting from different phases in the half-windings causes cancellation of the dc component of flux in each core.

zinc oxide

A device or network parameters expressed as impedances.

ZPI

Abbreviation of ZONE-POSITION INDICATOR.

zircon

Preparations of zirconium (especially ZrO2), valued for their high-temperature dielectric properties.

zirconium


zener

A vertically radiating marker beacon defining the zone above a radio-range station.

Z meter

A device for measuring impedances. Instruments of this kind take four principal forms: (1) a direct-reading meter resembling an ohmmeter; (2) an adjustable circuit may simulated somewhat like a bridge and that compares an unknown impedance with a standard resistance; (3) an impedance bridge for evaluating the reactive and resistive components of an unknown impedance; (4) a section of transmission line used with a signal source and voltmeter for measuring impedance in terms of a standard resistor and/or standing waves.

ZMODEM

In data communications, an error-correction mode similar to XMODEM, except that when an error is found during transmission of a block of data, the source retransmits only that portion of the block following the error. This improves data transmission speed because, when an error occurs, the number of bytes retransmitted is generally fewer than the 128K block size standard in XMODEM. Compare XMODEM and YMDEM.

Zn

1. Symbol for ZINC. 2. Symbol for AZIMUTH.

Z signal

A special version of the three-phase star (three-phase, half-wave) rectifier circuit. Direct-current (dc) saturation of the transformer secondary is avoided by winding half the turns of each secondary on a separate core (i.e., each core carries half the windings). The opposing flux resulting from different phases in the half-windings causes cancellation of the dc component of flux in each core.

zoom
tensations, the area of a storage medium containing digits.

zoom lens

A continuously adjustable lens system that allows zoom effects to be obtained with a television or motion-picture camera lens so that the object seems to advance toward or recede from the viewer, remaining in focus as it does so. 2. See ZOOM LENS. 3. To magnify the image in a computer graphical user interface. A user can enlarge a specific portion of the display, at the expense of other portions. It is generally measured in percent (e.g., 200% zoom represents a magnification factor of 2).

Zparameters

Device or network parameters expressed as impedances.

ZPI

Abbreviation of ZONE-POSITION INDICATOR.

zirconia

A common non-rechargeable zinc-oxide resistor having a reflector composed of confocal parabolas arranged in a circle. A rapid-scan radar antenna having a reflector composed of confocal parabolas arranged in a circle. A special version of the three-phase star (three-phase, half-wave) rectifier circuit. Direct-current (dc) saturation of the transformer secondary is avoided by winding half the turns of each secondary on a separate core (i.e., each core carries half the windings). The opposing flux resulting from different phases in the half-windings causes cancellation of the dc component of flux in each core.
Appendix A

Schematic symbols

Ammeter
Amplifier general
Amplifier, inverting
Amplifier, operational
AND gate
Antenna, balanced
Antenna, general
Antenna, loop
Antenna, loop, multiturn
Battery
Capacitor, feedthrough
Capacitor, fixed
Capacitor, variable
Capacitor, variable, split-rotor
Capacitor, variable, split-stator

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Appendix A

Cathode, electron-tube, cold

Cathode, electron-tube, directly heated

Cathode, electron-tube indirectly heated

Cavity resonator

Cell, electrochemical

Circuit breaker

Coaxial cable

Crystal, piezoelectric

Delay line

Diac

Diode, field-effect

Diode, general

Diode, Gunn

Diode, light-emitting

Diode, photosensitive

Diode, PIN

Diode, Schottky

Diode, tunnel

Diode, varactor

Diode, zener

Directional coupler

Directional wattmeter

Exclusive-OR gate

Female contact, general

Ferrite bead

Filament, electron-tube

Fuse

Galvanometer

Grid, electron-tube

Ground, chassis
Appendix A

Ground, earth

Headset

Handset, double

Headset, single

Headset, stereo

Inductor, air core

Inductor, air core, bifilar

Inductor, air core, tapped

Inductor, air core, variable

Inductor, iron core

Inductor, iron core, bifilar

Inductor, iron core, tapped

Inductor iron core, variable

Inductor, powdered-iron core

Inductor, powdered-iron core, tapped

Inductor, powdered-iron core, variable

Integrated circuit, general

Jack, coaxial or phono

Jack, phone, two-conductor

Jack, phone, three-conductor

Key, telegraph

Lamp, incandescent

Lamp, neon

Male contact, general

Meter, general

Microammeter

Microphone
Microphone, directional
Milliammeter
NAND gate
Negative voltage connection
NOR gate
NOT gate
Optoisolator
OR gate
Outlet, two-wire, nonpolarized
Outlet, two-wire, polarized
Outlet, three-wire
Outlet, 234-V
Plate, electron-tube
Plug, two-wire, nonpolarized
Plug, two-wire, polarized
Plug, three-wire
Plug, 234-V
Plug, coaxial or phono
Plug, phone, two-conductor
Plug, phone, three-conductor
Positive voltage connection
Potentiometer
Probe, radio-frequency
Rectifier, gas-filled
Rectifier, high-vacuum
Rectifier, semiconductor
Rectifier, silicon-controlled
Relay, double-pole, double-throw
Relay, double-pole, single-throw
Relay, single-pole, double-throw
Relay, single-pole, single-throw
Resistor, fixed
Resistor, preset
Resistor, tapped
Resonator
Rheostat
Saturable reactor
Signal generator
Solar battery

Solar cell
Source, constant-current
Source, constant-voltage
Speaker
Switch, double-pole, double-throw
Switch, double-pole, rotary
Switch, double-pole, single-throw
Switch, momentary-contact
Switch, silicon-controlled
Switch, single-pole, rotary
Switch, single-pole, double-throw
Switch, single-pole, single-throw
Terminals, general, balanced

Terminals, general, unbalanced

Test point

Thermocouple

Transformer, air core

Transformer, air core, step-down

Transformer, air core, step-up

Transformer, air core, tapped primary

Transformer, air core, tapped secondary

Transformer, iron core

Transformer, iron core, step-down

Transformer, iron core, step-up

Transformer, iron core, tapped primary

Transformer, iron core, tapped secondary

Transformer, powdered-iron core

Transformer, powdered-iron core, step-down

Transformer, powdered-iron core, step-up

Transformer, powdered-iron core, tapped primary

Transformer, powdered-iron core, tapped secondary

Transistor, bipolar, NPN

Transistor, bipolar, PNP

Transistor, field-effect, N-channel

Transistor, field-effect, P-channel

Transistor, MOS field-effect, N-channel

Transistor, MOS field-effect, P-channel

Transistor, photosensitive, NPN

Transistor, photosensitive, PNP
Appendix A

Transistor, photosensitive, field-effect, N-channel

Transistor, photosensitive, field-effect, P-channel

Transistor, unijunction

Triac

Tube, diode

Tube, heptode

Tube, hexode

Tube, pentode

Tube, photosensitive

Tube, tetrode

Tube, triode

Voltmeter

Wattmeter

Waveguide, circular

Waveguide, flexible

Waveguide, rectangular

Waveguide, twisted

Wires, crossing, connected

Wires, crossing, not connected
## Tables and data

### Conversion between Electrical Systems

<table>
<thead>
<tr>
<th>Property</th>
<th>mks</th>
<th>cgs electromagnetic</th>
<th>cgs electrostatic</th>
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<tr>
<td>Capacitance</td>
<td>1 farad</td>
<td>$10^{-12}$ abfarad</td>
<td>$9 \times 10^{14}$ statfarad</td>
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<tr>
<td></td>
<td>$10^9$ F</td>
<td>1 abF</td>
<td>$9 \times 10^{-20}$ statF</td>
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<tr>
<td></td>
<td>$10^{-11/3}$ F</td>
<td>$10^{-20/9}$ abF</td>
<td>$1$ statF</td>
</tr>
<tr>
<td>Charge</td>
<td>1 coulomb</td>
<td>$0.1$ abcoulomb</td>
<td>$3 \times 10^3$ statC</td>
</tr>
<tr>
<td></td>
<td>$10^9$ C</td>
<td>1 abC</td>
<td>$3 \times 10^{16}$ statC</td>
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<tr>
<td></td>
<td>$10^{-1/3}$ C</td>
<td>$10^{-20/9}$ abC</td>
<td>$1$ statC</td>
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<td>Charge density</td>
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<tr>
<td>Conductivity</td>
<td>1 siemens/m</td>
<td>$10^{-11}$ absiemens/cm</td>
<td>$9 \times 10^3$ statSiemens/cm</td>
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<tr>
<td></td>
<td>$10^9$ S/m</td>
<td>1 abS/cm</td>
<td>$3 \times 10^{16}$ statS/cm</td>
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<td>Current</td>
<td>1 ampere</td>
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<tr>
<td>Current density</td>
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<td>Electric field intensity</td>
<td>1 volt/m</td>
<td>$10^6$ abvolt/cm</td>
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<td>Electric potential</td>
<td>1 volt</td>
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<td>$10^{-15/3}$ statV</td>
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<tr>
<td>Electric dipole moment</td>
<td>1 coulomb</td>
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<td>$0.1$ C-m</td>
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<td>$10^{-20/9}$ abC-m</td>
<td>$1$ statC/cm</td>
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### GREEK ALPHABET

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<tr>
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</table>

### Mathematical Functions

**Signs and symbols**

- `•`: radix (base) point
- `*`: multiplication symbol; logic AND function
- `∞`: infinity
- `+`: plus; positive; logic OR function
- `−`: minus; negative
- `±`: plus or minus; positive or negative
- `×`: times
- `÷`: divided by
- `≡`: equal to
- `≈`: approximately equal to
- `≈`: approximately equal to

**Mathematical Functions**

- `@`: at the rate of; at cost of
- `∈`: natural number = 2.71828
- `π`: pi = 3.14159...
- `():` parentheses (use to enclose a group of terms)
- `{ }`: brackets (use to enclose a group of terms that includes one or more groups in parentheses)
- `| |`: divides (use to enclose a group of terms that includes one or more groups in brackets).
- `≤`: not greater than
- `≥`: equal to or greater than
- `≈`: not equal to
- `≠`: not equal to
- `≈`: similar to
- `≈`: equal to
- `≡`: identical to; is defined by

**Operations**

- `x + y`: x added to y; x OR y
- `x − y`: y subtracted from x
- `x · y`: x multiplied by y; x AND y
- `x ÷ y`: x divided by y
- `x^y`: x raised to the indicated power of n
- `x`: x is to; proportional to; varies directly as
- `∑`: summation
- `Δ`: change in x with respect to y
- `∂`: derivative of x with respect to y
- `∇`: derivative of x with respect to y
- `·`: product between limits (from a to b)
### Prefixes

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<tr>
<td>exa-</td>
<td>$10^{18}$</td>
<td>E</td>
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</table>

### RESISTOR COLOR CODE

The first three color bands supply the total resistance. The fourth color (if any) gives the tolerance. Example: A 5,600-ohm resistor would have green (first color, 5), blue (second color, 6) and red.
About the author

Stan Gibilisco has authored or coauthored dozens of nonfiction books about electronics and science. He first attracted attention with Understanding Einstein’s Theories of Relativity (TAB Books, 1983). His Encyclopedia of Electronics (TAB Professional and Reference Books, 1985) and Encyclopedia of Personal Computing (McGraw-Hill, 1996) were annotated by the American Library Association as among the best reference volumes published in those years. Stan’s work has gained reading audiences in the Far East, Europe, and South America.
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