carrier mobility Symbol, μ. In a semiconductor material, the average drift velocity of electrons and holes per unit electrostatic field.

carrier noise Modulation of a carrier when there is no input from the modulator itself; unwanted modulation.

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 radio-frequency 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 $P = I^2R$, where I is antenna current and R is antenna resistance at the point of current measurement. The indirect method involves determination of power according to the formula $P = EIF$, where E and I are antenna voltage and current, and F is a factor less than 1.0, whose value depends on the type of modulation used.

carrier power-output rating The power delivered by an unmodulated transmitter or generator to the normal load or its equivalent.

carrier shift In an amplitude-modulated transmitter or generator, the undesired change of average carrier voltage during modulation.

carrier-shift indicator An instrument for detecting carrier shift. It usually contains only a pickup coil, semiconductor diode, and dc milliammeter in series. Meter deflection is steady until carrier shift is detected; then, the needle fluctuates.

carrier signaling In wire telephony, the use of carrier-wave signals to operate such functions as dialing, ringing, busy signal, etc.

carrier storage In a semiconductor device, the tendency of mobile carriers to stay near a junction for a short time after the junction voltage has been removed or reversed in polarity.

carrier suppression The elimination of the carrier in an amplitude-modulated signal so that only the sideband energy remains.

carrier swing In frequency-modulated or phase-modulated transmission, the total deviation (lowest to highest instantaneous frequency) of the carrier wave.

carrier system The transmission of many signals over one circuit, accomplished by modulating various different carriers at different frequencies. Different signals can use different modulation methods.

carrier telegraphy **1.** Continuous-wave telegraphy by WIRED WIRELESS. **2.** Wired-wireless telegraphy in which a radio-frequency carrier is modulated by an audio-frequency keying wave.

carrier telephony Telephone communication by WIRED WIRELESS.

carrier terminal **1.** At each end of a carrier-current line or cable, the equipment for generating, modifying, or utilizing the carrier energy. **2.** In a balanced modulator, the point of carrier insertion.

carrier-to-noise ratio The ratio of carrier amplitude to noise-voltage amplitude.

carrier transmission Transport of information by a carrier, as by an amplitude-modulated radio wave that carries the low-frequency information as the AF modulation envelope and delivers it to the demodulator at the receiving station.

carrier-type dc amplifier A high-frequency ac amplifier, ahead of which is operated a generator and transducer. A dc voltage applied to the transducer modulates the carrier supplied by the generator; the amplifier boosts the modulated wave, and the resultant output is rectified at a level higher than that of the dc input signal.

carrier voltage The voltage component of a carrier wave; also, the amplitude of this component. Compare CARRIER CURRENT and CARRIER POWER.

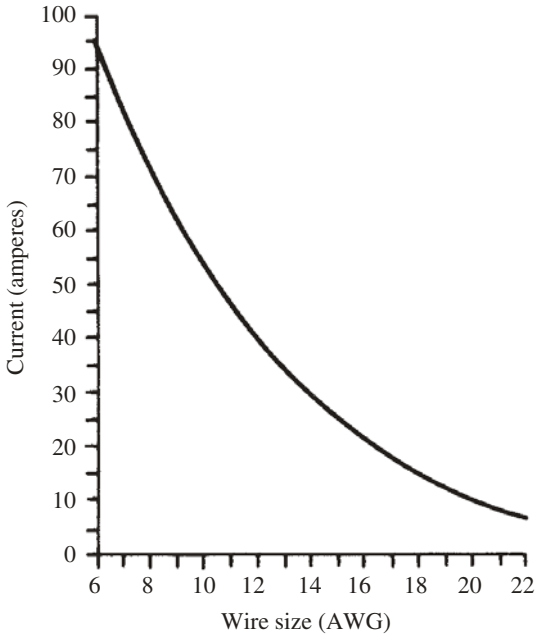
carrier wave A sine wave that is modulated to convey information in wireless and cable communications systems. The lowest frequency normally used for wireless signal transmission is 9 kHz, corresponding to a wavelength of approximately 33 km. The highest frequency is less well defined; some systems make use of visible light waves, whose wavelengths are as short as approximately 4×10^{-7} m. For modulation to work effectively, the carrier must have a frequency at least 10 times the highest frequency of the modulating signal.

carry **1.** In adding a column of figures, the digit added to the column at the left when the sum exceeds one less than the radix value. **2.** In digital computers and counters, a pulse that corresponds to the arithmetic operation in which a figure is carried to the next column in addition.

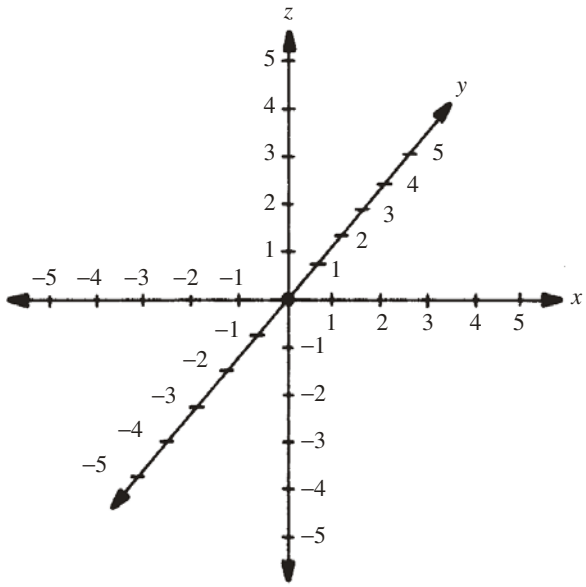
carrying capacity The ability of a conductor, such as copper wire, to carry current safely (expressed in maximum amperes).

carry-complete signal In an arithmetic computation by a computer, an adder-produced signal indicating that the pertinent carries have been generated.

carry system A communications system in which several carries occupy one circuit.



carrying capacity (of some AWG sizes of copper wire)



Cartesian three-space

carry time The time taken for a digital computer or counter to perform a carry operation (See CARRY, **2**).

Cartesian coordinate geometry Also called *rectangular coordinate geometry.* In robotic systems, a movement scheme in two or three dimensions. The position of the robot arm is determined by linear coordinates, relative to an origin point. These coordinates are specified along linear axes—each of which is perpendicular to the others at the origin. See CARTESIAN COORDINATES, CARTESIAN PLANE, and CARTESIAN THREE-SPACE.

Cartesian coordinates Also called *rectangular coordinates.* A mathematical system that uniquely defines the position of a point on a plane, in space, or in general, in an *n*-dimensional hyperspace when *n* is a whole number greater than 3. There are *n* axes for *n* dimensions, each axis intersects all the others at a single point, called the origin. The axes are mutually perpendicular at this origin. The axes are scaled in units with the origin having coordinate values that are all equal to zero (usually). Positive values go along the axes in one direction; negative numbers go in the opposite direction for each axis. Usually, the axes are graduated in equal-sized units. The system gets its name from the mathematician Rene Descartes.

Cartesian plane A linear, two-dimensional coordinate plane commonly used for graphing equations in one variable.

Cartesian three-space A linear, three-dimensional graph-coordinate system used for rendering equations in one or two variables.

Cartesian three-space graph A three-dimensional graph that shows an equation in one or two variables. Three-space graphs are often displayed more clearly by means of computer graphics, in which the entire display can be rotated to show the characteristics of the surface resulting from a given equation or function.

Cartesian n-space The coordinate space defined by a Cartesian system of *n* coordinates, where *n* is a whole number of 2 or greater.

cartridge **1.** The replaceable transducer assembly of a microphone. **2.** A magnetic-tape magazine. Also see TAPE CARTRIDGE. **3.** A removable computer mass-storage medium, containing a tape, magnetic diskette, or optical diskette. **4.** An insulating tube housing a fuse, semiconductor component, resistor, capacitor, or other part.

cartridge fuse A fuse consisting of a fusible wire enclosed in a cartridge, having a ferrule at each end for plug-in connection.

cascadable Capable of, or designed for, being connected in cascade with other similar or identical components.

cascade **1.** Components or stages connected and operated in sequence, as in a three-stage amplifier. The components or stages are often but not necessarily identical. **2.** To form a cascade.

cascade control **1.** In an automatic control system, a controller whose setting is varied by the output of another controller. **2.** An automatic control system in which the control units are connected in stages, so that one unit must operate before the next one can function.

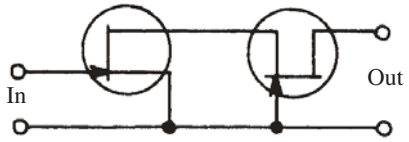
cascaded amplifier A multistage amplifier in which the stages are forward-coupled in succession.

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.

cascade thermoelectric device A thermoelectric component or circuit that consists of several cascaded sensors (see CASCADE, **1**).

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.

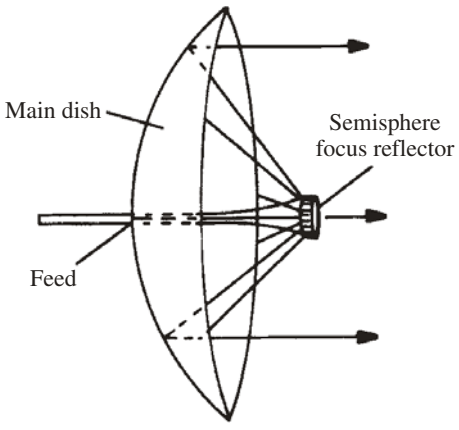
cascode A high-gain, low-noise, high-input-impedance amplifier circuit, consisting of a grounded-emitter or grounded-source input stage coupled directly to a grounded-base or grounded-gate output stage.



cascode (field-effect transistor arrangement)

case temperature The temperature at a designated point on the outside surface of a component's case or housing.

Cassegrain antenna A dish antenna that uses CASSEGRAIN FEED.



Cassegrain antenna

Cassegrain feed A dish-antenna feed system in which the feed point is located at the center of the dish itself. For transmission, the radio-frequency energy emerges from a waveguide and is directed to a small convex reflector at the focal point of the dish. The small reflector directs the signal back to the dish, spreading the energy out to cover the entire surface of the dish. The dish reflects the energy again and collimates it in the desired direction of propagation. For reception, the process is reversed; the dish focuses the energy on the small reflector, which propagates it back to the feed point.

cassette **1.** A holder (magazine) of reels of magnetic tape that is itself a mechanical subassembly, which can be easily inserted into and removed from a tape deck. **2.** A lightweight holder of photographic film or X-ray plates (before, during, and after exposure).

castor oil A viscous insulating oil extracted from castor beans. Highly refined castor oil is used as an impregnant in some oil-filled capacitors. Dielectric constant, 4.3 to 4.7. Dielectric strength, 380 V/mil.

CAT Abbreviation of COMPUTERIZED AXIAL TOMOGRAPHY.

catalysis The process whereby an agent, called a catalyst, enhances a chemical reaction without entering into the reaction. Catalysts are used in electronics, for example, to promote the setting of resins in potting and encapsulating operations.

catalytic agent A substance that accomplishes catalysis.

cataphoresis As caused by the influence of an electrostatic 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.*

catcher In a Klystron, the second reentrant cavity. (See KLYSTRON.)

catcher diode A 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).

catcher grids In 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.

catenation See CONCATENATION.

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. This is generally the positive electrode. **3.** In a vacuum tube, the electron-emitting electrode (filament or indirectly heated cathode sleeve).

cathode current Symbol I_K. The current flowing in the cathode circuit of a tube. Cathode current is the total of grid, plate, screen, and suppressor currents, and can have an ac and a 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, **2.**

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 incident light flux.

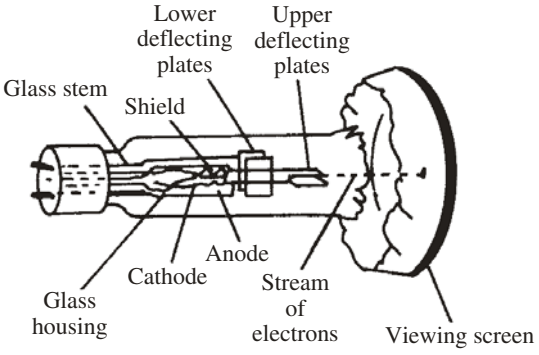
cathode-ray oscillograph An instrument that provides a permanent record, by photographic or other means, of the image on the screen of a cathode-ray tube.

cathode-ray oscilloscope See OSCILLOSCOPE.

cathode rays Invisible rays emanating from the cathode element of an evacuated tube operated with a high voltage between 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. **3.** A picture tube.



cathode-ray tube

cathode terminal **1.** In a diode (semiconductor or tube), the terminal to which a negative 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 acts 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.

cathode voltage Symbol, E_K. The voltage between ground (or B-minus) and the cathode of a tube; it can have both ac and dc components.

cathodic 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.

cathodofluorescence Fluorescence resulting from a material's exposure to cathode rays.

cathodoluminescence In a vacuum chamber in which a metal target is bombarded with high-velocity electrons (cathode rays), the emission of radiation of a wavelength characteristic of the metal.

cation A positive ion. Also see ION.

CAT scanner The X-ray apparatus for COMPUTERIZED AXIAL TOMOGRAPHY.

CATV Abbreviation of COMMUNITY-ANTENNA TELEVISION (usually cable television).

caustic soda electrolyte Symbol, NaOH. Sodium hydroxide solution, as used in some secondary cells and experimental devices.

cavitation The local formation of cavities in a fluid used in ultrasonic cleaning because of the reduction in pressure at those points.

cavitation noise In an ultrasonic cleaner, the noise resulting from the collapse of bubbles produced by cavitation.

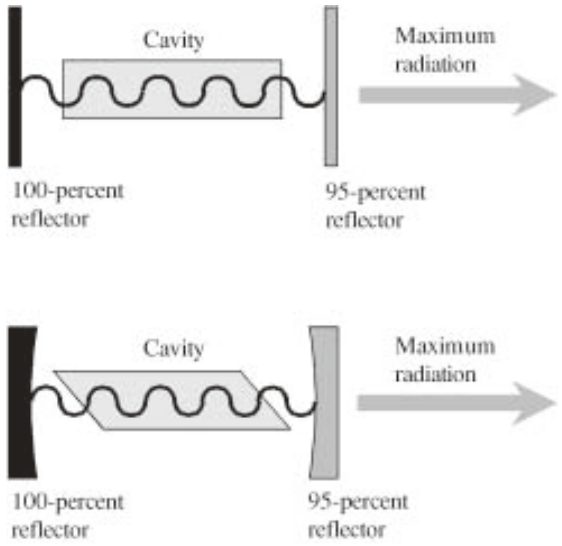
cavity A metallic chamber (can) in which energy is allowed to reflect, sometimes resulting in resonance.

cavity filter A microwave (usually band rejection) filter consisting of a resonant cavity and associated coupling devices.

cavity frequency meter See CAVITY WAVEMETER.

cavity impedance The impedance across a cavity at a particular frequency. At resonance, the cavity impedance is purely resistive.

cavity laser A laser that employs a resonant cavity filled with gas, such as helium/neon or argon, and a pair of reflectors. Resonance occurs between the reflectors, one of which is totally reflective and the other of which is approximately 95 percent reflective. Output is from the partially reflective end of the device.



cavity laser

cavity magnetron A magnetron 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 See RESONANT CAVITY.

cavity wavemeter An absorption wavemeter 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.

CB Abbreviation of CITIZENS BAND.

Cb Symbol for COLUMBIUM.

C_B Symbol for BASE CAPACITANCE of a transistor.

C band The band of radio frequencies between 3.9 and 6.2 GHz.

C_C Symbol for collector capacitance of a transistor.

cc **1.** Alternative abbreviation of *cubic centimeter*. The International Organization for Standardization recommends cm^3. **2.** Abbreviation of COTTON-COVERED.

CCA Abbreviation of CURRENT-CONTROLLED AMPLIFIER.

CCD Abbreviation of CHARGE-COUPLED DEVICE.

CCIS Abbreviation of COMMON-CHANNEL INTERFACE SIGNALING.

CCIR Abbreviation of *Comite Consultatif International des Radiocommunications (International Radio Consultative Committee).*

CCIT Abbreviation of *Comite Consultatif International Telegrafique (International Telegraph Consultative Committee).*

CCITT Abbreviation of *Comite Consultatif International Telegrafique et Telephonique (International Telegraph and Telephone Consultative Committee).*

CCS **1.** Abbreviation of CONTINUOUS COMMERCIAL SERVICE. **2.** Abbreviation of *common-channel signaling.*

CCTV Abbreviation of CLOSED-CIRCUIT TELEVISION.

CCTV monitor A video monitor that receives a signal from a CCTV transmitter.

CCTV signal The picture signal in a CCTV system. It can be either a modulated radio-frequency signal or a composite video signal.

ccw Abbreviation of COUNTERCLOCKWISE.

CD Abbreviation of COMPACT DISK.

Cd Symbol for CADMIUM.

cd Abbreviation of CANDELA.

CD-4 A method of obtaining quadraphonic reproduction on a phonograph disk using modulated carriers with frequencies above the human hearing range.

CDI Abbreviation of CAPACITOR-DISCHARGE IGNITION.

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.

cd/m^2 Candelas per square meter, the SI unit of luminance.

CD-ROM Abbreviation of COMPACT-DISK READ-ONLY MEMORY.

Ce Symbol for CERIUM.

C_e Symbol for EMITTER CAPACITANCE of a transistor.

ceiling **1.** The maximum possible power output from a transmitter. **2.** The maximum possible current or voltage that a circuit can deliver. **3.** In aviation, the level of the cloud base.

ceilometer An instrument for measuring ceiling (cloud height).

cel In animated graphics, an individual image or frame.

cell **1.** A single (basic) unit for producing dc electricity by electrochemical or photovoltaic action, as in a battery or a solar panel. Also see PRIMARY CELL, STANDARD CELL, STORAGE CELL. **2.** An addressable, one-word-capacity storage element in a computer memory. **3.** The geographic region covered by a specified repeater in a cellular communications network. See CELLULAR COMMUNICATIONS. **4.** An electrostatic charge dipole in the atmosphere, usually occurring in or near thunderstorms. **5.** A thunderstorm.

cell constant The surface area of the electrodes in a cell divided by the distance between them. The basic linear units must be the same: for example, square centimeters for surface area and centimeters for distance.

cell counter A bioelectronic instrument used to count blood cells and other minute particles.

cell reversal A condition that can occur in some rechargeable electrochemical cells and batteries, such as *nickel-cadmium batteries.* It most often results from neglecting to recharge the cell or battery when it has become 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 similar applications. 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 nitrate The nitric acid ester of cellulose, a plastic insulating material.

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.

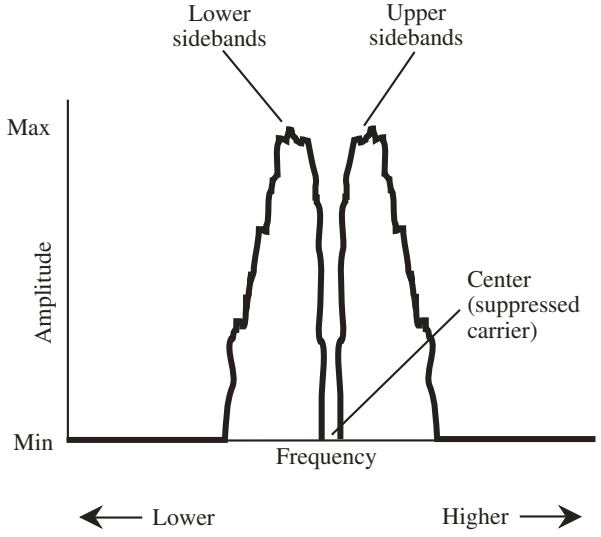
cent An audio-frequency interval of 0.01 (1/100) of a half step. A half step is the frequency difference between two immediately adjacent keys on a piano.

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 antenna An antenna 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 frequency, 3.

centering control In an oscilloscope circuit, a potentiometer used to position the image on the screen (particularly in the center). Separate controls are provided for horizontal and vertical centering.

center loading In an inductively loaded antenna, placement of the loading coil(s) at or near a point or points midway between the feed point and the end(s) of the radiating element.

center of beam **1.** In a directional antenna system, the direction, denoted by a straight ray, where the signal strength or response is the greatest. **2.** In a beam of visible light, the geometric center of the spot produced when the beam strikes a surface perpendicular to the beam. **3.** In a beam of visible light, the axis within the beam where the intensity is greatest.

center of channel The frequency that is midway between the lowest and highest frequency components of a communications channel.

center of radiation The point from which the energy radiated by an object appears to arrive.

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 coil See CENTER-TAPPED WINDING.

center-tapped filament A tube or lamp filament that has a tap at its center.

center-tapped inductor An inductor that has a tap at half the total number of turns (the physical center of the winding).

center-tapped potentiometer A potentiometer that has a tap at half the total resistance of the resistance element.

center-tapped resistor A fixed resistor that has a tap at half the total resistance.

center-tapped transformer A transformer that has one or more center-tapped windings.

center-tapped winding A winding that has a tap at half the total number of turns (the physical center of the winding).

center-tapped winding

center tracking frequency In three-frequency alignment (tracking) of a circuit, the frequency between the upper and lower frequency limits (alignment or tracking points of the circuit).

center-zero meter A meter that has its zero point at the center of the scale (e.g., a dc galvanometer).

centi- Abbreviation, c. Prefix meaning hundredth(s) (10^{-2}).

centigrade scale See CELSIUS SCALE.

centimeter Abbreviation, cm. A unit of length equal to 10^{-2} meter, or 0.3937 inch.

centimeter-gram-second system Abbreviation, cgs. A system of units, now seldom used, in which the centimeter is the fundamental unit of length, the gram is the fundamental unit of mass, and the mean solar second is the fundamental unit of time. Electrical units in the cgs system fall into two categories: *electrostatic* and *electromagnetic.* The names of cgs electrostatic units have the prefix *stat-* (e.g., STATAMPERE, STATVOLT, etc.). Cgs electromagnetic units have the prefix *ab-* (e.g., ABAMPERE, ABVOLT, etc.).

centimetric waves See MICROWAVES.

centipoise A cgs measure of the dynamic viscosity of liquids. Equal to 10^{-2} poise.

central office In telephone systems, a switching network at which numerous circuits or subscriber lines converge.

central processing unit Abbreviation, CPU. In a digital computer, the section containing the arithmetic and logic unit (ALU), control circuits, and internal memory circuits. Also called *central processor.*

Central Radio Propagation Laboratory A government laboratory that studies radio propagation and collects, correlates, and analyzes data for predicting propagation conditions. The organization also studies methods of measuring propagation.

centrifugation potential An electric potential that occurs in a colloidal solution when the solution is centrifuged.

centrifugal switch A switch actuated by rotational motion (e.g., the automatic disconnection switch in a capacitor motor).

centripetal force The force that draws the mass of a rotating body toward the axis of rotation.

ceramal See CERMET.

ceramet seal See CERAMIC-TO-METAL SEAL.

ceramic-based microcircuit A tiny circuit printed or deposited on a ceramic substrate.

ceramic capacitor A component made with sheets of metal stacked alternately with wafers of ceramic. This material, like mica, has low loss, and therefore allows for high efficiency. For low values of capacitance, only one layer of ceramic is needed, and two metal plates can be glued to a disk of porcelain, one on each side. Alternatively, a tube or cylinder of ceramic can be employed, and metal ink applied to the inside and outside of the tube. These capacitors have values ranging from a few picofarads to about 0.5 μF. Their voltage ratings are comparable to those of paper capacitors. Compare ELECTROLYTIC CAPACITOR, MICA CAPACITOR, PAPER CAPACITOR, PLASTIC-FILM CAPACITOR, TANTALUM CAPACITOR.

ceramic dielectric **1.** A ceramic used as a dielectric in capacitors. Examples: barium titanate, barium strontium titanate, and titanium dioxide. Ceramic dielectrics provide high dielectric constant. **2.** A ceramic used as an insulator. Examples: isolantite, porcelain, and steatite.

ceramic filter A resonant filter similar to a crystal filter, but using a piezoelectric ceramic material.

ceramic magnet A permanent magnet made of a magnetic ceramic material, such as mixtures of barium oxide and iron oxide.

ceramic microphone A microphone that uses a CERAMIC PIEZOELEMENT to convert sound waves into electrical impulses.

ceramic piezoelement A component that uses a piezoelectric ceramic material. Examples: ceramic filter, ceramic microphone, ceramic phono pickup, ceramic transducer, and electrostrictive transducer. Also called PIEZOELECTRIC CERAMIC.

ceramic resistor A carborundum resistor whose value is voltage-dependent. It usually displays a negative temperature coefficient of resistance (but a positive coefficient is available) and a negative voltage coefficient of resistance.

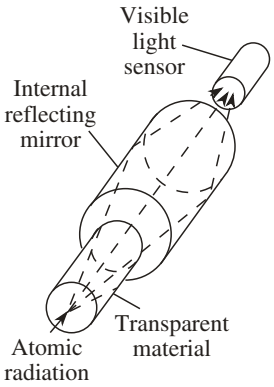
ceramics **1.** Clay-based materials used as dielectrics and insulators in electronics. Examples: barium titanate, titanium dioxide, porcelain, isolantite, and steatite. **2.** The science and art of using and developing ceramics.

ceramic-to-metal seal A bond in which ceramic and metal bodies are joined, for example, the bonding of a metal lead to a ceramic disk, through which it passes to provide a leak-proof seal. Also called *ceramet seal.*

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 frequencies.

Cerenkov radiation Light emanating from a transparent material that is traversed by charged particles, whose speed is higher than the speed of light through the material.



Cerenkov radiation

Cerenkov rebatron device An apparatus for generating radio-frequency energy by passing an electron beam through a piece of dielectric having a small aperture.

ceresin wax A yellow or white wax obtained by refining *ozocerite.* Used as an insulant and sealant against moisture. Dielectric constant, 2.5 to 2.6.

cerium Symbol, Ce. A metallic element of the rare-earth group. Atomic number, 58. Atomic weight, 140.13.

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.*

certified 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 CALIFORNIUM.

cgs Abbreviation of CENTIMETER-GRAM-SECOND.

chad The punched-out particle(s) constituting refuse from paper-tape punching.

chadded tape Punched paper tape in which the chad is left partially attached to the tape's punched holes.

chadless tape Punched paper tape without CHAD.

chafe **1.** An area that has been abraded by rubbing or scraping. **2.** To produce a chafe.

chaff 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.

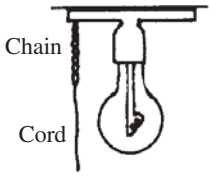
chain calculation As performed by a calculator, a calculation that can be entered as it would normally be written (i.e., without the need for regrouping operands).

chain printer In the readout channel of a digital computer, a high-speed printer carrying printer's type on a revolving chain.

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.



chain switch

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.

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 the disks.

change record A computer record that changes information in a related master record. Also called *transaction record.*

change tape See TRANSACTION TAPE.

channel **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-amplifier channel of an oscilloscope, or the modulator channel of a radio transmitter]. **4.** The end-to-end 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 designator A name, number, or abbreviation given to a channel in a communications system.

channel effect 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.

channelizing 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.

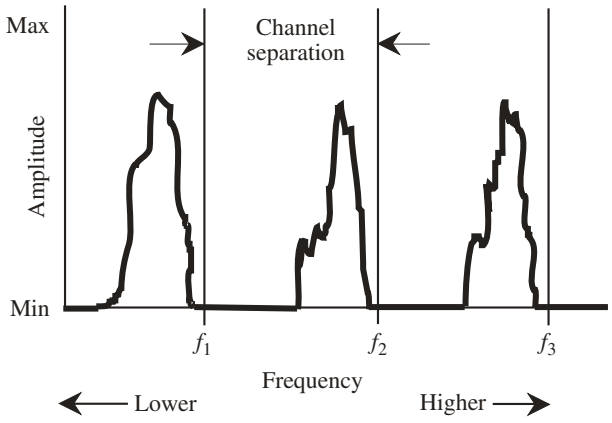
channel reversal In stereo reproduction, interchanging the left and right channels.

channel-reversing switch In a stereo system, a switch that allows channel reversal without the need for reorienting 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 of a series of channels into functional status in a system.

channel separation **1.** The spacing between communications channels, expressed in kilohertz. **2.** In stereo reproduction, the degree to which the information on one channel is separate from the other; usually expressed in decibels.



channel separation, 1.

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 data speed of the slower channel.

channel-utilization index An indication 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 In a frequency channel, the difference $f_2 - f_1$, where f_1 is the lower-frequency limit and f_2 is the upper-frequency limit of the channel.

chapter A self-contained computer program section.

character **1.** One of the symbols in a code. **2.** In computer operations, a digit, letter, or symbol used alone or in some combination to express information, data, or instructions.

character code In a communications or computer system, the combination of elements (e.g., bits) representing characters.

character crowding A reduction of the time interval between successive characters—especially those read from tape.

character density The number of characters that can be stored in a given length or surface area of

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.

character emitter A coded-pulse generator in a digital computer.

character generator A device that converts coded information into readable alphanumeric characters.

characteristic **1.** A quantity that characterizes (typifies) 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_0. **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. This value is determined 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 terminated with a load 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 Z_0 between 50 and 100 ohms. Twinlead is available with 75-ohm and 300-ohm Z_0 values. Open-wire line has Z_0 between 300 and 600 ohms, depending on the spacing between the conductors, and also on the type of dielectric (insulating material) employed to keep the spacing constant between the conductors. **3.** Experimentally, the value of impedance that, 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 overflow In floating-point arithmetic, the condition that occurs when a characteristic exceeds the upper limit specified by a program or computer.

characteristic spread The range of values over which a characteristic extends. For example, if an amplifier's output ranges 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 exceeds the lower limit specified by a program or computer.

character modifier In address modification, a constant (compare VARIABLE) that refers to a specific character's location in memory.

character-oriented A computer 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 printing and script 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 galvanically, 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 *paris* plus the subsequent space, multiplied by six (five letters and one 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.

Charactron A cathode-ray readout tube that displays letters, numbers, and symbols on its screen. More commonly called a *monitor.*

charcoal tube In a system for producing a high vacuum, a trap containing activated charcoal, which is heated to dull red, then cooled by liquid air to absorb gases.

charge **1.** A quantity of electricity associated with a space, particle, or body. **2.** To electrify a space, particle, or body (i.e., to give an electric charge). **3.** To store electricity, as in a storage battery or capacitor. Compare DISCHARGE.

charge carrier **1.** An ELECTRON whose movement constitutes a flow of electric current. **2.** An elec-

tron deficiency (HOLE) whose movement constitutes a flow of electric current. **3.** Any particle, such as a charged atom (ION), PROTON, ALPHA PARTICLE, or BETA PARTICLE, whose movement constitutes a flow of electric current.

charge-coupled device Abbreviation, CCD. A form of analog-to-digital converter that generates a digital signal output representing an analog image input. The transfer of stored charges provides the method of operation. Used in machine vision systems and in numerous scientific applications.

charge density The degree of charge or current-carrier concentration in a region.

charged particle **1.** See CHARGE CARRIER. **2.** See ION.

charged voltage **1.** The voltage across a fully charged capacitor. **2.** The terminal voltage of a fully charged storage cell.

charge holding See CHARGE RETENTION.

charge of electron The negative electric charge carried by a single electron. Approximately equal to 1.602×10^{-19} coulombs.

charger **1.** See BATTERY CHARGER. **2.** Any device or circuit that charges a capacitor.

charge retention **1.** The holding of an electric charge by a cell or battery when no current is being drawn from it. **2.** A measure of the ability of a cell or battery to maintain an electric charge when no current is drawn from it. Often specified in terms of *shelf life.* **3.** The holding of a charge by a capacitor.

charge-storage tube A cathode-ray tube that holds a display of information on its screen until the operator removes it by pressing an erase button.

charge-to-mass The ratio of the electric charge to the mass of a subatomic particle.

charge-to-mass ratio of electron The ratio of the charge (e) of the electron to the mass (m_e) of the electron, in coulombs per kilogram (C/kg). For an electron at rest, e/m_e is approximately equal to 1.602×10^{-19} C divided by 9.11×10^{-31} kg = 1.76×10^{11} C/kg.

charge transfer **1.** The switching of an electric charge from one capacitor to another. **2.** The capture of an electron by a positive ion from a neutral atom of the same kind, resulting in the ion becoming a neutral atom, and the previously neutral atom becoming a positive ion.

charge transfer device A semiconductor in which an electric charge is moved from location to location. Applications include delay lines, video signal processing, and signal storage.

charging **1.** The process of storing electrical energy in a capacitor. **2.** The process of storing electrochemical energy in a storage cell or battery.

charging current **1.** The current flowing into a capacitor. **2.** The current flowing into a previously discharged storage cell.

charging rate **1.** The rate at which charging current flows into a storage cell or battery, expressed in amperes or milliamperes. For most cells and batteries, the rate is greatest initially, when the cell or battery is depleted or nearly depleted; the rate decreases as the cell or battery becomes charged. **2.** The instantaneous rate at which charging current flows into a capacitor or capacitance-resistance circuit, expressed in amperes, milliamperes, or microamperes.

charged voltage **1.** The voltage across a fully charged capacitor. **2.** The terminal voltage of a fully charged storage cell.

Charlie Phonetic alphabet code word for the letter C.

chassis A (usually metal) foundation on which components are mounted and wired.

chassis ground A ground connection made to the metal chassis on which the components of a circuit are mounted. When several ground connections are made to a single point on the chassis, a COMMON GROUND results.

chatter **1.** A rapidly repetitive signal, caused by interruption or variation of a current (usually interference). **2.** Extraneous vibration, as of the armature in a relay.

chatter time The interval between the instant that contacts close (for example, in a relay) and the instant at which chatter ends.

cheater cord An extension cord used to conduct power to a piece of equipment (especially a television receiver) by temporarily bypassing the safety switch or interlock. Use of such a cord presents a potentially fatal shock hazard to personnel using, or working on, the equipment.

Chebyshev filter Also spelled *Tschebyscheff* or *Tschebysheff.* A form of inductance-capacitance (LC) lowpass, highpass, bandpass, or band-rejection filter, characterized by an attenuation-versus-frequency curve with ripple in the passband.

check **1.** A test generally made to verify condition, performance, state, or calculations; specifically, in computer operations, it applies to operands or results. **2.** The usually abrupt halting of an action.

check bit A binary CHECK DIGIT.

check character In a group of characters, one whose value depends on the other characters, which it checks when the group is stored or transferred.

check digit Also called *check number.* In computer operations, a number added to a group of digits, forming a code that identifies entities in the system (including personnel) and can be used for verification. The check digit is the remainder when the number code (for example, 459) is divided by a fixed number (for example, 5); in this case, the check digit (the remainder of 459/5) is 4, and the amended code number is 4594.

check indicator An indication, made via a video display, that something has been shown to be invalid according to a check.

checking program Also called *checking routine.* For debugging purposes, a diagnostic computer

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 allow 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 reconstruction 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 added to, 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: electroplater, electrolytic cell for the production of hydrogen gas, and storage battery.

chemically deposited printed circuit A printed circuit in which the pattern of metal lines and areas are 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 reducting 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.

CHIL Abbreviation for *current-hogging injection logic.* A form of bipolar digital logic technology.

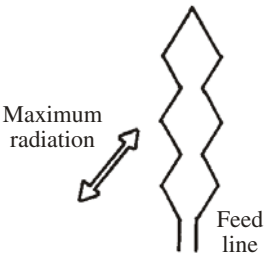
chip **1.** An INTEGRATED CIRCUIT. **2.** A small slab, wafer, or die of dielectric or semiconductor material, on which a subminiature component or circuit is formed or deposited.

chip capacitor A subminiature capacitor formed on a chip.

chip resistor A subminiature resistor formed on a chip.

chip tray A chad 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 broadside to the plane of the driven element.



Chireix-Mesny antenna

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 oscillator as it is keyed. 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.

chlorine Symbol, Cl. A gaseous element of the halogen family. Atomic number, 17. Atomic weight, 35.453.

choke **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 CHOKE COIL.

choke 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.

choke coil **1.** A large-value inductor that provides a high impedance to alternating current (ac), while offering virtually no opposition to direct current (dc). **2.** In radio-frequency (RF) applications, an inductor that provides a high impedance to RF signals while showing low impedance for audio-frequency (AF) signals and direct currents (dc).

choke-coupled modulation An amplitude-modulation (AM) scheme, in which the modulator is coupled to the radio-frequency (RF) amplifier through a shared iron-core choke coil.

choke flange At the end of a waveguide, a flange in which a groove forms a CHOKE JOINT.

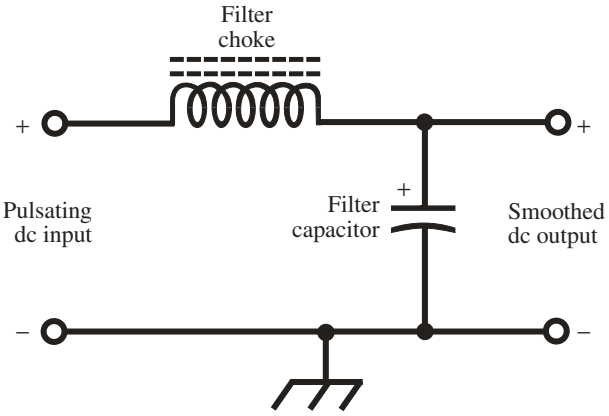
choke-input filter A filter whose input component is an inductor (choke). The choke-input power-supply filter is distinguished by its superior voltage regulation, compared with the CAPACITOR-INPUT FILTER.

choke joint A joint connecting two waveguide sections and permitting efficient energy transfer without requiring electrical contact with the inside wall of the waveguide.

chopped dc See INTERRUPTED DC.

chopped mode In a single-gun cathode-ray-tube (CRT) oscilloscope, a technique for sequentially displaying several signals that are not referenced to the oscilloscope sweep.

chopped signal An ac or dc signal that is periodically interrupted, as by means of a CHOPPER.



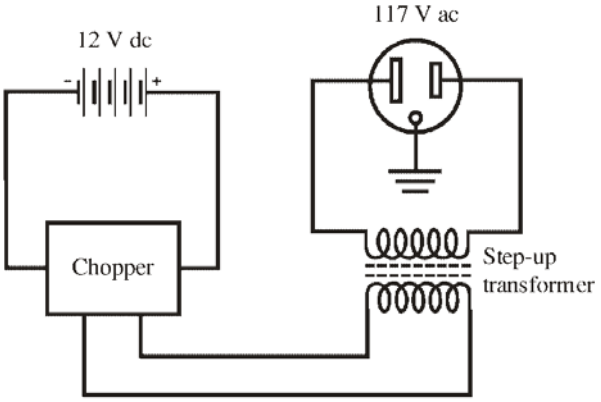
choke-input filter

chopper A device or circuit that interrupts a direct current (dc) at some predetermined rate. Ideally, such a device is characterized by distinct on and off operation.

chopper 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.



chopper power supply

chopper stabilization **1.** Stabilization of direct-current (dc) amplification by using a CHOPPER CONVERTER ahead of a stable ac amplifier, and rectifying the amplifier output. **2.** In a regulated power supply, use of a CHOPPER AMPLIFIER at the control-circuit input to improve regulation.

chopper-stabilized amplifier See CHOPPER AMPLIFIER and CHOPPER STABILIZATION, **1.**

chopper transistor A transistor that provides rapid and repeated on/off switching of direct current (dc), in the manner of an electromechanical interrupter. See CHOPPER.

chopping frequency The frequency at which a chopper interrupts a signal.

chord **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 airfoil.

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 graphics.

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 has 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.*

chroma circuit In color television, one of several circuits whose ultimate purpose is to produce a color component on the screen.

chroma-clear raster In color television reception, the clear raster resulting from a white video signal, or from operation of the chroma circuits of the receiver (as if they were receiving a white transmission). Also called *white raster.*

chroma control In a color television receiver, a rheostat or potentiometer that permits adjustment of color saturation through variation of the chrominance-signal amplitude before demodulation.

chromatic fidelity See COLOR FIDELITY.

chromaticity **1.** The state of being chromatic (see CHROMA). **2.** A quantitative assessment of a color in terms of dominant or complementary wavelength and purity.

chromaticity coordinate 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 a three-color system 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.

chromel-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 The process of coating a metal with chromium. Generally protects against corrosion.

chrome recording tape Also called *chrome tape* or *chromium tape.* Tape that is manufactured from the compound chromium dioxide. Noted for its ability to faithfully record and reproduce music.

chrominance In color television, the difference between a reproduced 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.

chrominance-carrier reference In color television, a continuous signal at the frequency of the chrominance subcarrier; it is in fixed phase with the color burst and provides modulation or demodulation phase reference for carrier-chrominance signals.

chrominance channel In color television, a circuit devoted exclusively to the color function, as opposed to audio and general control channels.

chrominance component In the NTSC color television systems, either of the components (I-signal or Q-signal) of the complete chrominance signal.

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 rheostat or potentiometer in the red, green, and blue matrix channels of a color television receiver, used to adjust the primary-signal amplitudes.

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 One of the transmission primaries (red, green, and blue) upon which the chrominance of a color depends.

chrominance signal The signal component in color television that represents the hues and saturation levels of the colors in the picture.

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.

chromium Symbol, Cr. A metallic element. Atomic number, 24. Atomic weight, 51.996. Commonly used as a plating for metals to improve resistance to corrosion.

chronistor An elapsed-time indicator in which current, flowing during a given time interval, electroplates an electrode. The duration of the interval is determined from the amount of deposit.

chronograph **1.** An instrument that provides an accurate time base along the horizontal axis of its permanent 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.

chronoscope An instrument for precisely measuring small time intervals.

CHU Call letters of the Canadian time-signal station whose primary frequency is 7.335 MHz.

Ci Symbol for INPUT CAPACITANCE.

CIE Abbreviation for *International Commission on Illumination.*

cinching In a reel of magnetic tape, the slipping of tape as force is applied.

cinematograph See KINEMATOGRAPH.

cipher A code used for the purpose of preventing interception of a message by third parties.

circ **1.** Abbreviation of *circuit.* **2.** Abbreviation of *circular.*

circle graph Also called a *pie graph.* A representational device consisting of a disk subdivided into various triangular areas (radiating from the center of the circle), which are proportional to represented quantities.

circle of confusion A circular image of a point source of light, resulting from an aberration in an optical system.

circle of declination The graduated circular scale of a *declinometer.*

circlotron amplifier A high-powered microwave amplifier of the one-port, cross-field, nonlinear type using a magnetron.

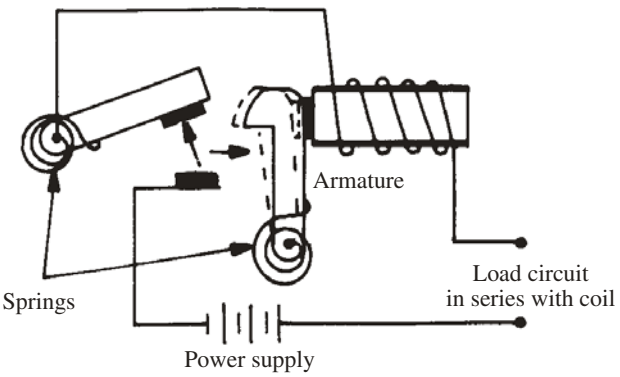
circuit **1.** A closed path through which current flows from a generator, through various components, and back to the generator. (An electronic circuit is often a combination of interconnected subcircuits.) **2.** The wiring diagram of an electronic device or system.

circuit analysis The careful determination of the nature and behavior of a circuit and its various parts. It can be theoretical, practical, or both. Compare CIRCUIT SYNTHESIS.

circuit analyzer See CIRCUIT TESTER.

circuit board A panel, plate, or card on which electronic components are mounted and interconnected to provide a functional unit.

circuit breaker A resettable fuse-like device that is designed to protect a circuit against overloading. In a typical circuit breaker, the winding of an electromagnet is connected in series with the load circuit and with the switch contact points. Excessive current through the magnet winding causes the switch to be opened.



circuit breaker

circuit capacitance The total capacitance (lumped, distributed, and stray) present in a circuit.

circuit capacity **1.** The ability of a circuit to handle a quantity (such as current, voltage, frequency, power, etc.) safely and efficiently. **2.** The maximum value of some parameter at which a circuit can function safely and efficiently (e.g., a circuit capacity of 50 A). **3.** The number of channels that can be accommodated simultaneously by a circuit.

circuit component **1.** 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.

circuit diagram A drawing in which symbols and lines represent the components and wiring of an electronic circuit. Also called CIRCUIT

SCHEMATIC, SCHEMATIC DIAGRAM, and WIRING DIAGRAM.

circuit dropout 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 fault **1.** Malfunction of a circuit. **2.** An error in circuit wiring.

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 impedance. **2.** In circuit synthesis, the arrangement of a circuit so as to provide desired performance with the fewest components and least-complex wiring.

circuit switching In telephony, a method of connection in which a single 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). Compare PACKET SWITCHING.

circuit synthesis The development of a circuit under the guidance of theoretical or practical knowledge of basic electronics principles and component parameters. Compare CIRCUIT ANALYSIS.

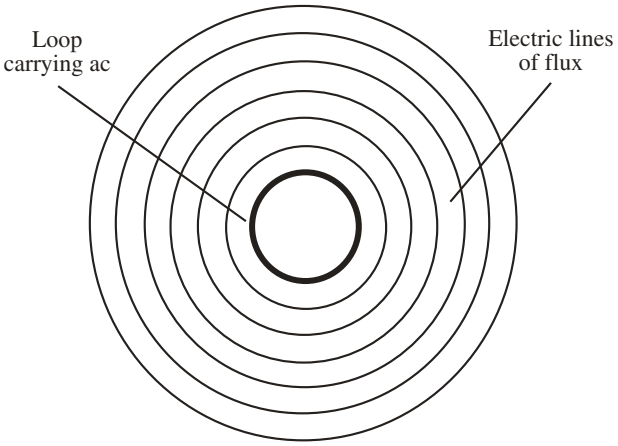
circuit tester An instrument for checking the performance of electronic circuits. Often consists of a specialized continuity tester, but occasionally it includes a dynamic performance tester.

circuit tracking The alignment and/or pretuning of circuits for identical or optimum response. It applies especially 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.

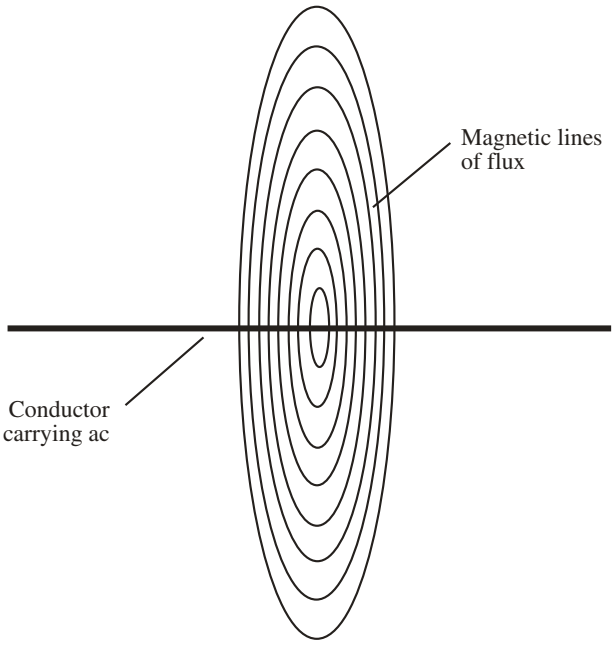


circular electric wave

circular functions Trigonometric functions of the angle described by a vector rotating counterclockwise around a circle. Also see COSINE, 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 mil A unit of cross-sectional area equivalent to 0.785 millionths of a square inch, or the area of a circle having a diameter of 0.001 inch. Generally, the circular mil is used to specify the cross-sectional area of a conductor, such as wire.

circular mil foot A unit of volume in which the length is 1 foot and the cross-sectional area is 1 circular mil.

circular polarization 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 sinusoidal 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.

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 from one terminal to the next.

circumvention In a security or alarm system, the evasion of detection. 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 *cislunar 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/kg Abbreviation of *coulombs per kilogram,* the unit for electron charge-to-mass ratio.

C/kmol Abbreviation of *coulombs per kilomole,* the unit for the Faraday constant.

ckt Abbreviation of CIRCUIT.

Cl Symbol for CHLORINE.

cl Abbreviation of CENTILITER.

cladding 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.

clamper A device that restricts a wave to a predetermined dc 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 each scanning line.

clamping circuit See CLAMPER.

clamping diode A diode used to fix the voltage level of a signal at a particular reference point.

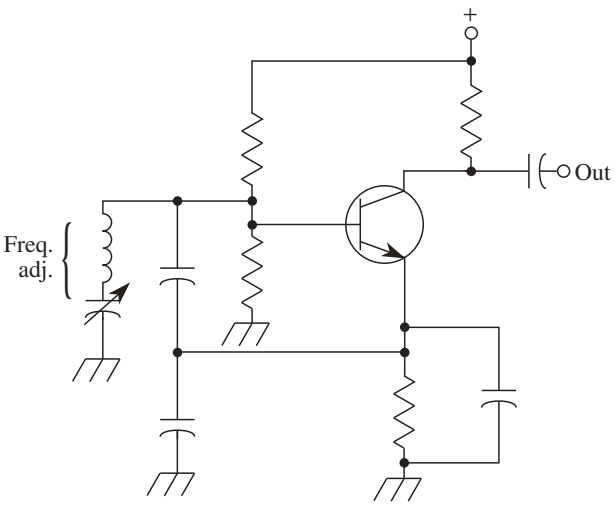
clapper In a bell, the ball or hammer that strikes the bell; in an electric bell, it is affixed to the vibrating armature.

Clapp-Gouriet oscillator A *Colpitts oscillator* in which a capacitor is connected in series with the inductor. The circuit offers high frequency stability in the presence of input and output capacitance variations.

Clapp oscillator A series-tuned hybrid *Colpitts oscillator,* having a tuning capacitor in series with the inductor, rather than in parallel with the inductor. The circuit allows the use of a smaller tuning capacitor, resulting in improved stability.

Clark cell See ZINC STANDARD CELL.

class-A amplifier An amplifier whose bias is set at approximately the midpoint of the characteristic curve. Output electrode current flows during the



Clapp oscillator

complete ac driving-voltage cycle. The input signal never drives the device into the nonlinear portion of the characteristic curve.

class-AB amplifier Either a CLASS-AB_1 AMPLIFIER or a CLASS-AB_2 AMPLIFIER.

class-AB_1 amplifier An amplifier whose bias is adjusted to a level between that of a class-A amplifier and that of a class-AB_2 amplifier. Output electrode current flows during the entire ac driving-voltage cycle. The input signal drives the device into the nonlinear portion of the characteristic curve during part of the cycle.

class-AB_2 amplifier An amplifier whose bias is adjusted to a level between that of a class-AB_1 amplifier and that of a class-B 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_1 or class-AB_2 amplifier.

class-A modulator A circuit for obtaining amplitude-modulated signals; essentially a class-A amplifier with two inputs, one for the carrier and the other for the modulating signal.

class-A 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-B 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.

class-C amplifier An amplifier whose input-electrode bias is adjusted for operation at a point considerably beyond cutoff. Output current flows during less than half of the input signal cycle. Such an amplifier requires comparatively high driving power, but is capable of excellent efficiency. Commonly used in continuous-wave (CW), amplitude-modulated (AM), and frequency-modulated (FM) radio transmitters.

class-C operation The operation of a transistor, field-effect transistor, or vacuum tube, in which the collector, drain, or plate current flows for significantly less than half the signal cycle.

class-D telephone A telephone restricted to use by emergency services, such as fire departments and guard alarm installations.

classical electron radius Abbreviated r_e. The quantity expressed as $e^2/(m_e c^2)$, where e is the electron's charge in electrostatic units, m_e is its rest mass, and c is the speed of light. The value r_e is equal to approximately 2.82×10^{-13} cm or 2.82×10^{-15} m.

clean room A room for the assembly or testing of critical electronic equipment. The term is derived from the extraordinary steps taken to remove dust and other contaminating agents. The personnel wear carefully cleaned garments (or disposable clothing), gloves, caps, and masks; in some situations, they are required to walk between ceiling and floor ducts of a vacuum system upon entering the room.

cleanup process In the process of electron tube evacuation, a technique used to remove residual and occluded gases from the vacuum apparatus and from the device being evacuated.

clear **1.** In computer operations, to restore a switching element (e.g., a flip-flop) or a memory element to its standard (e.g., zero) state. **2.** In computer practice, an asynchronous input.

clearance The distance between two live terminals, or between one live terminal and ground.

clear band In optical character recognition, the part of a document that must remain unprinted.

clear channel **1.** A channel in the standard amplitude-modulation (AM) broadcast band that is designated to only one station within the area covered by the signal from that station. **2.** In television broadcasting, a channel for which there are no restrictions on the nature of the programming.

clear memory A function in a calculator or small computer that erases the contents of the memory.

clear raster The raster on the screen of a television picture tube in the absence of a signal, noise, or faulty beam deflection.

cleavage In a crystalline substance, the quality of splitting along definite planes. Also, a fragment resulting from such a cleft.

click filter See KEY-CLICK FILTER.

click method An emergency technique for rendering an electric current audibly detectable, by

making and breaking the circuit carrying the current to a headset or earphone. A single click results from each make and each break. Also see TIKKER.

click suppressor See KEY-CLICK FILTER.

climate chamber A test chamber that provides accurately controlled temperature, humidity, and/or barometric pressure, for evaluating the performance of electronic components and circuits. Also called ENVIRONMENTAL TEST CHAMBER.

climatometer An instrument incorporating a hygrometer and bimetallic thermometer, whose dial pointers intersect to indicate comfort zones (best temperature-to-humidity ratio).

clinometer An electromechanical device that measures the steepness of a slope. When the device is level (horizontal), the output voltage is zero. If the device is tipped in one direction, a negative voltage is produced; if it is tipped in the other direction, a positive voltage is produced. 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

clipped-noise modulation Modulation of a jamming signal through clipping action to increase the sideband energy and resulting interference.

clipper A circuit whose output voltage is fixed at a 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 voltage.

clipper amplifier An amplifier operated so that the positive, negative, or both positive and negative peaks are clipped in the output signal. The clipping action results from feeding a regular symmetric waveform into an amplifier so that on negative excursion extremes, the stage is cut off; on positive excursion extremes, the amplifier is driven into saturation.

clipper limiter A device that delivers an output signal whose amplitude range corresponds to input-signal voltages between two predetermined limits. It can be used as a *noise limiter* with an element or elements that clip all pulses whose amplitudes are greater than the signal being processed.

clipping **1.** Leveling off (flat-topping) a signal peak at a predetermined level. Also see CLIPPER. **2.** In audio practice, the loss of syllables or words because of cutoff periods in the operation of the circuit (usually caused by overdriving a stage).

clock In a digital computer or controller, the device or circuit that supplies timing pulses to pace the operation of the system.

clocked flip-flops A master-slave arrangement of direct-coupled flip-flops. Information entered into the master unit when the input-trigger pulse amplitude is high is transferred to the slave unit when the amplitude is low.

clock frequency In a digital computer or control, the reciprocal of the period of a single cycle, expressed in terms of the number of cycles occurring in one second of time (hertz, kilohertz, or megahertz).

clock generator 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-hand 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.

clone A machine manufactured by a relatively unknown company that performs all the same functions, in basically the same way, as another machine manufactured by a well-known, major corporation. The term is used especially in reference to computers and computer peripherals. If a device is compatible with a certain computer, then clones of that device are generally compatible with that computer. Also, the device is likely to be compatible with all clones of the computer.

close coupling Also called *tight coupling.* In a transformer, the placement of the primary and secondary coils as close together as possible for maximum energy transfer. Compare LOOSE COUPLING.

closed capacitance The value of a variable capacitor whose rotor plates are completely meshed with the stator plates. Compare OPEN CAPACITANCE.

closed circuit A continuous unbroken circuit (i.e., one in which current can flow without interruption). Compare OPEN CIRCUIT.

closed-circuit cell A primary cell, such as the early gravity cell, designed for heavy and polarization-free service.

closed-circuit communication Communication between units only within a defined, hard-wired system, not extending to other units or systems.

closed-circuit security system An electronic security or alarm system, consisting of subsystems

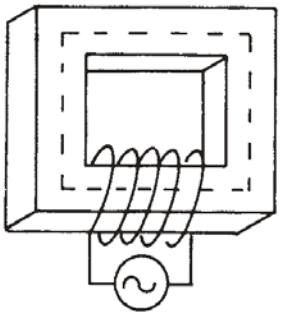
interconnected so that a disturbance anywhere in the circuit will result in an alarm signal pinpointing the location of the disturbance.

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.

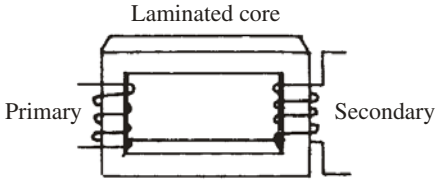
closed core A magnetic core generally constructed in an "O" or "D" configuration to confine the magnetic path to the core material. Compare OPEN CORE.

closed-core choke A choke coil wound on a CLOSED CORE. Also called CLOSED-CORE INDUCTOR.



closed-core choke

closed-core transformer A transformer wound on a CLOSED CORE.



closed-core transformer

closed loop **1.** The feedback path in a self-regulating control system. An oscillator, for example, is a closed-loop amplifier. **2.** A loop within a program that would continue indefinitely, except for an external exit command.

closed-loop bandwidth The frequency at which the gain of a closed-loop circuit (see CLOSED LOOP, **1**) drops 3 decibels from the direct-current or midband value.

closed-loop control system A control system in which self regulation is obtained by means of a feedback path (see CLOSED LOOP). An example is a voltage regulator, in which a rise in output voltage is fed back to the input. This changes the input voltage and reduces the output voltage to its correct value. Compare OPEN-LOOP CONTROL SYSTEM.

closed-loop input impedance The input impedance of an amplifier that has feedback.

closed-loop output impedance The output impedance of an amplifier that has feedback.

closed-loop voltage gain The voltage gain of an amplifier that has feedback.

closed magnetic circuit A magnetic circuit in which the flux is uninterrupted, as in a ferromagnetic core, which has no air gap. Also see CLOSED CORE.

closed subroutine In a digital computer program, a subroutine that can be accessed and left by branch instructions, such as GOSUB and RETURN in the high-level language BASIC.

close-spaced array A beam antenna in which the elements (radiator, director, and reflector) are spaced less than a quarter-wavelength apart.

close-talk microphone A microphone that must be placed close to the mouth. Such a microphone is less susceptible to background noises than an ordinary microphone, and is useful in environments where the ambient noise level is high.

closing rating A specification for closure conditions in a relay, including duty cycle and contact life (total guaranteed closures before contact failure).

closure **1.** The act of closing or being closed (e.g., *switch closure* or *relay closure*). **2.** Circuit completion (i.e., the elimination of all discontinuities).

cloud The mass of electrons constituting the space charge in a vacuum tube.

cloverleaf antenna An omnidirectional transmitting antenna in which numerous horizontal, four-element radiators (stacked vertically, a quarter-wavelength apart) are arranged in the shape of a four-leaf clover.

C/L ratio See LC RATIO.

clutter Extraneous echoes that interfere with the image on a radar display.

clutter gating In radar operations, a switching process that causes the normal video to be displayed in regions free of clutter, and the video indicating target movement to be displayed only in cluttered areas.

Cm Symbol for CURIUM.

cm Abbreviation of CENTIMETER.

c.m. Abbreviation of CIRCULAR MIL.

cm^2 Abbreviation of *square centimeter.*

cm^3 Abbreviation of *cubic centimeter.*

C_{max} Abbreviation of *maximum capacitance.*

C meter See CAPACITANCE METER.

C_{min} Abbreviation of *minimum capacitance.*

CML Abbreviation of CURRENT-MODE LOGIC.

CMOS Abbreviation of COMPLEMENTARY METAL-OXIDE SEMICONDUCTOR.

CMR See COMMON-MODE REJECTION.

CMRR See COMMON-MODE REJECTION RATIO.

CMV See COMMON-MODE VOLTAGE.

C network A circuit with three impedances connected in series, the free leads being connected to a pair of terminals and the two internal junctions, to another pair of terminals.

Co Symbol for COBALT.

C_o Symbol for OUTPUT CAPACITANCE.

coalesce In computer operations, to create one file from several.

coarse adjustment Adjustment of a quantity in large increments. Compare FINE ADJUSTMENT.

coarse-chrominance primary See Q SIGNAL.

coastal bending A change in the horizontal direction of a line-of-sight radio wave when it crosses a coastline.

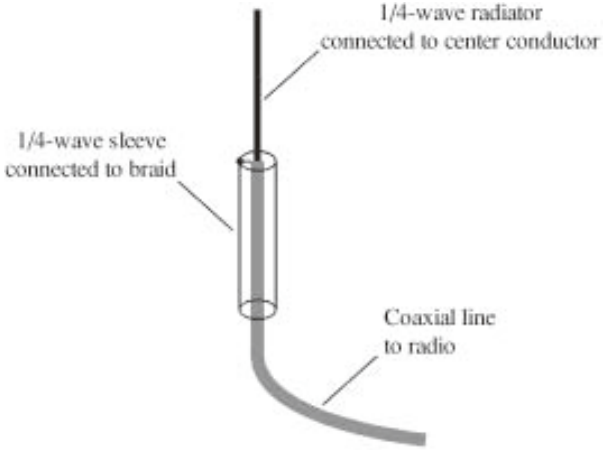
coast station In the Maritime Mobile Radio Service, a land station that communicates with shipboard stations.

coating **1.** The application of a substance to another substance by means of electroplating, electrophoresis, or similar process, for the purpose of protecting the material, isolating it from the environment, or improving the conductivity of an electrical connection to some other object. **2.** The magnetic material on a recording tape. **3.** In a computer system, the magnetic material on a magnetic diskette or hard disk.

coating thickness On magnetic tape or magnetic disks, the depth of the magnetic coating applied to the base.

coax Abbreviation of COAXIAL CABLE or COAXIAL LINE.

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 this tubing through a shorting disk at the top. The inner conductor of the cable is connected to a 1/4-wave vertical radiator that is insulated from, and that extends upward from the top of, the lower section.



coaxial antenna

coaxial cable 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.

coaxial cable
(From left to right: insulating jacket, woven outer conductor, low-loss insulating sleeve, inner conductor.)

Characteristics of prefabricated coaxial transmission lines.

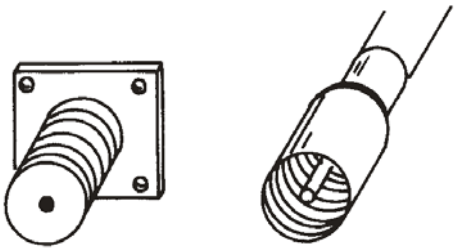
Type	*Characteristic impedance, (ohms)*	*Velocity factor*	*Outside dia. (in.)*	*Picofarads per foot*
RG-8/U	52	0.66	0.41	29.5
RG-9/U	51	0.66	0.42	30.0
RG-11/U	75	0.66	0.41	20.6
RG-17/U	52	0.66	0.87	29.5
RG-58/U	54	0.66	0.20	28.5
RG-59/U	73	0.66	0.24	21.0
RG-174/U	50	0.66	0.10	30.8
hard line	50	0.81	0.50	25.0
($\frac{1}{2}$-inch)	75	0.81	0.50	16.7
hard line	50	0.81	0.75	25.0
($\frac{3}{4}$-inch)	75	0.81	0.75	16.7

coaxial capacitor **1.** 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

picofarads up to about 100 pF. **2.** A short length of coaxial cable that is used as a capacitor rather than a transmission line because of the inherent capacitance between its center conductor and braid. See COAXIAL CABLE.

coaxial cavity A cavity consisting of a cylindrical metal chamber housing a central rod. The cavity can be tuned to resonance by means of a piston.

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 connector

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.

coaxial driver See COAXIAL SPEAKER.

coaxial filter **1.** A filter that uses a coaxial cable as a tuned circuit. **2.** A filter designed to be used in a coaxial transmission line.

coaxial jack A female receptacle or connector, whose concentric terminals have the same spacing as a male coaxial-cable connector designed to fit it.

coaxial line A signal transmission line consisting of COAXIAL CABLE.

coaxial-line frequency meter A microwave absorption wavemeter (see WAVEMETER) with input and output receptacles for insertion into a coaxial line.

coaxial-line oscillator See CONCENTRIC-LINE OSCILLATOR.

coaxial loudspeaker See COAXIAL SPEAKER.

coaxial plug A male connector whose concentric terminals have the same spacing as a female coaxial cable connector designed to fit it.

coaxial receptacle A coaxial connector, such as a coaxial jack or plug. Receptacles are installed in equipment, whereas plugs are usually attached to the end of coaxial cables.

coaxial relay A relay designed to connect and disconnect, or to interchange, coaxial cables in a transmission line without disturbing the characteristic impedance of the line.

coaxial speaker Also called *coaxial driver* and *coaxial loudspeaker.* A large low-frequency speaker and a small high-frequency speaker mounted concentrically, the smaller within the larger. When used with a crossover network, this arrangement provides fairly good wide-range audio-frequency response, and saves physical space, compared with the use of separate speakers.

coaxial stub **1.** A length of coaxial cable acting as a branch to another coaxial cable. Commonly used for impedance matching. **2.** A length of coaxial cable, usually cut to 1/4 or 1/2 wavelength, and connected across a coaxial transmission line to act as a WAVETRAP. Commonly used to reject strong interfering signals.

coaxial switch A switch designed to connect and disconnect, or to interchange, coaxial cables in a transmission line without disturbing the characteristic impedance of the line.

coaxial tank A tank circuit consisting of a rod within a cylinder. The tank is usually tuned by a small variable capacitor connected between the rod and cylinder at one end of the combination. Generally used at ultra-high frequencies (UHF).

coaxial-tank oscillator A stable, self-excited oscillator that uses a COAXIAL TANK. Also see CONCENTRIC-LINE OSCILLATOR.

coaxial transistor A transistor in which a semiconductor wafer is mounted centrally in a metal cylinder (the base connection) and is contacted on opposite faces by the emitter and collector whiskers, which are axially mounted.

coaxial transmission line A transmission line that is a COAXIAL CABLE.

coaxial wavemeter A type of absorption wavemeter in which the tunable element is a section of coaxial line (i.e., a metal cylinder surrounding a metal rod). An internal short-circuiting disk is moved along the cylinder to connect its inner wall to selected points along the rod's length, thereby varying the resonant frequency. The instrument is useful at microwave frequencies.

cobalt Symbol, Co. A metallic element. Atomic number, 27. Atomic weight, 58.94.

cochannel interference Interference between similar signals transmitted on the same channel.

Cockcroft-Walton accelerator A proton accelerator in which nuclei of hydrogen atoms are given high velocity through a straight tube by a high dc voltage.

codan Any of several muting (SQUELCH) systems. In particular, a squelch circuit that suppresses noise in a sensitive receiver equipped with automatic gain control (AGC). The receiver is quiet until a carrier of predetermined strength is received. The name is an acronym for *carrier-operated device antinoise.*

codan lamp A lamp that alerts a radio operator that a signal of satisfactory strength is being received. Also see CODAN.

code **1.** 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.** ENCODE.

codec 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).

code character **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.

coded decimal 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 message to indicate how and where it is going.

coded program See PROGRAM.

coded signal **1.** A wire- or radiotelegraph signal in which secrecy is achieved by using letters in cipher groups, instead of straight language. **2.** SCRAMBLED SIGNAL.

coded stop See PROGRAMMED HALT.

code elements The smallest identifiable parts that compose a digital code. For example, in computer code, the elements are ones and zeroes (*high* and *low* logic states); in Morse code, they are *dots* and *dashes.*

code holes In a punched card or tape, holes representing data.

code line A written computer program instruction.

code machine Any one of several devices for recording or reproducing code signals.

code position The part of a data medium (e.g., card row) reserved for data.

code-practice oscillator A simple keyed audio oscillator intended for practicing Morse code.

coder **1.** In computer operations, a person who prepares instructions from flow charts and procedures devised by a programmer. **2.** A device that delivers coded signals.

code receiver A radiotelegraph receiver.

code ringing A method of ringing a telephone subscriber in a predetermined manner to convey a certain message.

code segment The instruction part of computer storage associated with a process. Compare DATA SEGMENT and DUMP SEGMENT.

code set The collection of codes representing all of the characters in a language.

code speed See KEYING SPEED.

code transmitter **1.** A radiotelegraph transmitter. **2.** A tape-operated keyer for wire telegraphy or radiotelegraphy.

code word See PHONETIC ALPHABET CODE WORD.

coding **1.** Performing the service of a CODER. **2.** Writing instructions for a digital computer; a part of programming.

coding check A pencil-and-paper verification of a routine's validity.

coding sheet A form on which program instructions are written prior to input.

codiphase radar A radar system that uses beam forming, signal processing, and a phased-array antenna.

codistor A voltage-regulating semiconductor device.

coefficient **1.** A factor in an indicated product. Thus, in $4y$, 4 is the coefficient of y. **2.** A parameter that indicates a specific characteristic of some component or device (e.g., COEFFICIENT OF COUPLING or COEFFICIENT OF REFLECTION).

coefficient of coupling Symbol k. The ratio of MUTUAL INDUCTANCE between two inductors to the maximum possible (theoretical) value of mutual inductance. This ratio is always greater than or equal to 0 (no coupling between inductors), and less than or equal to 1 (perfect coupling between inductors).

coefficient of current detection See CURRENT-DETECTION COEFFICIENT.

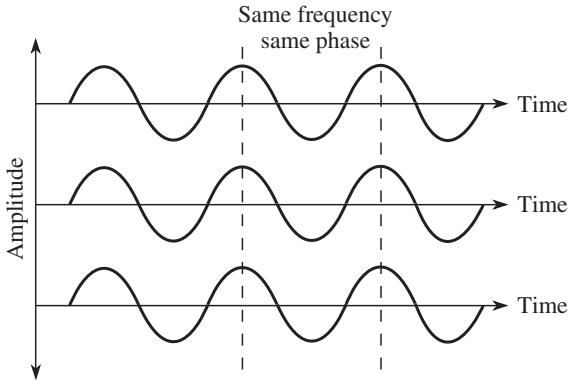
coefficient of reflection A measure of the amount of electromagnetic field reflected in a transmission line from the load feed point. The coefficient of reflection is equal to the square root of the reflected power divided by the forward power.

coercive force The demagnetizing force required to remove residual magnetism from a material.

coercivity See COERCIVE FORCE.

cogging Nonuniform rotation of a motor armature. The velocity increases as an armature coil enters the magnetic field and decreases as it leaves the field.

coherence In electromagnetic radiation, a condition in which all the wavefronts are in phase. This results in high energy concentration, and makes possible the long-distance transmission of infrared, visible light, and ultraviolet, because the rays are almost perfectly parallel. It also makes possible the extreme radiation intensity characteristic of some LASER devices.



coherence

coherent bundle A bundle of optical fibers, such that the individual fibers are in the same relative positions at either end of the bundle.

coherent carrier A carrier that agrees in frequency and phase with a reference signal.

coherent electroluminescent device See LASER DIODE.

coherent light Visible light in which the phase relationship between successive waves is such that the beam consists of parallel rays that provide a high concentration of energy. Also see LASER.

coherent-light radar See COLIDAR.

coherent oscillator In a radar system, an oscillator that provides a COHERENT REFERENCE.

coherent-pulse operation Pulse operation characterized by a fixed phase relationship between pulses.

coherent radiation Radiation characterized by COHERENCE.

coherent reference A stable reference frequency with which other signals are phase locked for coherence.

coherent transponder A transponder in which the frequency and phase of the input and output signals have a fixed relationship.

coil A long conductor or group of conductors wound into a tight helical package, often in several layers on a cylindrical form. This takes advantage of the resulting concentration of magnetic flux, maximizing the inductance that can be obtained in a component of limited physical size. Further increases in inductance can be realized by the use of ferromagnetic core materials. See also INDUCTOR.

coil antenna See LOOP ANTENNA.

coil checker An alternating-current (ac) meter or simple bridge for checking inductors. Such instruments usually only indicate inductance values, but some list readings of resistance or approximate inductor *Q* factor.

coil dissipation The power wasted in a coil as heat. Generally, this dissipation or loss is proportional to the resistance of the coil, and to the square of the current passing through the coil.

coil form The insulating support around which an air-core coil is wound.

coil loading The insertion of one or more inductors into a transmission line or antenna element, for the purpose of impedance matching, alteration of the resonant frequency, or both.

coil magnification factor The *Q* factor of an inductor. Generally given by the ratio X_L/R_L, where X_L is the inductive reactance of the coil in ohms, and R_L is the resistance of the coil in ohms.

coil neutralization See INDUCTIVE NEUTRALIZATION.

coil resistance The resistance of a coil (inductor), as distinct from its reactance. It is almost entirely the result of ohmic loss in the wire from which the coil is manufactured.

coilshield A metal can designed to provide efficient electrostatic and electromagnetic shielding of a coil, preventing unwanted inductive coupling to other components.

coincidence The simultaneous occurrence of two or more signals. Compare ANTICOINCIDENCE.

coincidence amplifier An amplifier that delivers an output signal only when two or more input signals occur simultaneously.

coincidence circuit See AND CIRCUIT.

coincidence counter A circuit or device, such as a gate, that delivers an output pulse only when two or more input pulses occur simultaneously; the output pulses go to a device that counts them.

coincidence detector See AND CIRCUIT.

coincidence gate See AND GATE.

coincident-current selection Selection of a magnetic core (in a core memory or similar device) by applying two or more currents simultaneously.

coin shooting Searching for coins and similar small, buried metallic objects using a METAL LOCATOR.

coke A porous material obtained from the destructive distillation of coal. It is valued for the production of carbon components for electronics, such as dry-cell electrodes and motor brushes.

cold **1.** Pertaining to an electrical circuit, component, or terminal that is at ground potential. **2.** A term denoting a bad solder joint. **3.** Pertaining to an unheated electrode or element. See COLD CATHODE.

cold alignment The alignment of a tracking system (especially of its tuned circuits) when the system is not in operation, as when transistor power is off. Also called QUIET ALIGNMENT.

cold cathode **1.** In an electron tube, a cathode that emits electrons without being heated. **2.** A cathode electrode operated at a temperature below ambient temperature.

cold chamber An enclosure in which electronic equipment can be tested at selected, precise low temperatures. Compare OVEN.

cold flow The (usually gradual) change in the dimensions of a material, such as plastic in a molded part.

cold junction In a thermocouple system, an auxiliary thermocouple connected in series with the hot thermocouple, and immersed in ice or operated at ambient temperature.

cold light Light produced without significant heat, as from the ionization of a gas by a high voltage (as in neon bulbs and fluorescent lamps), or by electroluminescence, bioluminescence, cathodoluminescence, or a similar phenomenon.

cold pressure welding Welding sometimes used in the fabrication of electronic equipment, in which the metal parts to be joined are pressed together tightly to the point of deformation, whereupon they become welded.

cold resistance The resistance of an unheated electronic component. Compare HOT RESISTANCE.

cold rolling A method of manufacturing an inductor core so that the magnetic grains are all arranged lengthwise.

cold solder joint A solder joint in which insufficient heat has been applied, resulting in a bad connection.

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.

colidar An optical radar system using unmodulated, 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 electrode toward which emitted current carriers travel. **2.** In a Klystron, the final electrode toward which electrons migrate after passing through the buncher and catcher. **3.** In an iconoscope, a cylindrical electrode around the circumference of the tube, which gathers and conducts away the electrons released by the mosaic. **4.** The final (target) electrode in a backward-wave or traveling-wave tube. **5.** A computer program segment that collates compiled segments so that they can be loaded into the computer.

collector capacitance **1.** Symbol, C_C. The capacitance of the collector junction in a bipolar transistor. **2.** The capacitance of the collector electrode in a Klystron, iconoscope, backward-wave tube, or traveling-wave tube.

collector current **1.** Symbol, I_C. The current flowing in the collector circuit of a bipolar transistor. Also see AC COLLECTOR CURRENT and DC COLLECTOR CURRENT. **2.** Current flowing in the collector circuit of a Klystron, iconoscope, backward-wave tube, or traveling-wave tube.

collector-current cutoff See COLLECTOR CUTOFF.

collector cutoff In a bipolar transistor, the condition in which the collector current is cut off (i.e., reduced to the residual value). Also see CUTOFF CURRENT.

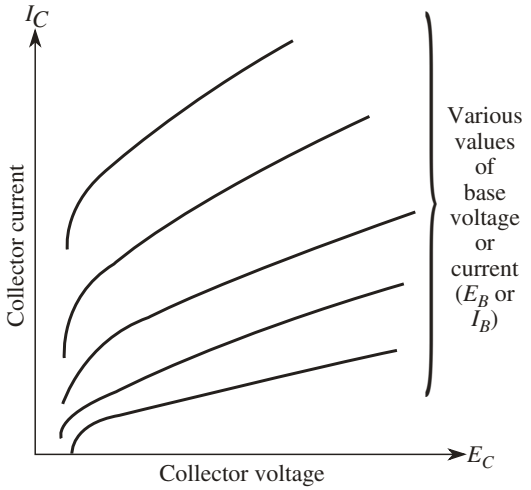
collector cutoff current See CUTOFF CURRENT.

collector-diffusion isolation A method of making integrated circuits that contain bipolar transistors. Provides electrical separation of the transistors in a semiconductor integrated circuit.

collector dissipation Symbol, P_C. In a bipolar transistor, the power dissipation of the collector electrode. The collector dc power dissipation is the product of collector current and collector voltage: $P_C = V_C I_C$.

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 base current (common-emitter circuit) or emitter current (common-base circuit).



collector family

collector junction In a bipolar transistor, the junction 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 collector electrode, caused by a momentary alteration of the charge density of the collector junction by injected carriers reaching the junction.

collector resistance In a bipolar transistor, the internal resistance of the collector junction. See 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, serves as a connection to a rotating element, as in a signal-gathering system. **3.** The collector electrode in an iconoscope.

collector transition capacitance The capacitance between the collector and base of a bipolar transistor under normal operating conditions. This capacitance has a limiting effect on the operating frequency of a bipolar device.

collector voltage Symbol, V_C. In a bipolar transistor, the voltage on the collector electrode. See AC

COLLECTOR VOLTAGE and DC COLLECTOR VOLTAGE.

collimated rays Electromagnetic waves made parallel or nearly parallel. This can be done by means of a reflector, a lens, or a laser.

collimation **1.** The process of rendering electromagnetic rays parallel. **2.** Adjustment of the line of sight of an instrument, such as a level or transit.

collimation equipment Optical-alignment equipment.

collimator A device for producing parallel rays of light or other radiation. In electronics, the most common example is a *dish antenna.*

collinear antenna A broadside directional antenna consisting of two or more half-wave radiators; the current is kept in phase in each section by quarter-wave stubs between each radiating section. The radiators are stacked end to end horizontally or vertically. Also called FRANKLIN ANTENNA.

Collins coupler A single-section, pi-filter circuit, used to match a radio transmitter to a wide range of antenna impedances. Also called *pi coupler* and *Collins network.*

collodion A viscous solution of pyroxylin and a solvent (such as acetone, alcohol, or ether) sometimes used as a binding agent for coils and other components.

cologarithm Abbreviation, colog. The logarithm of the reciprocal of a number; colog x = log $(1/x)$ = log x^{-1} = –log x.

color A perceived characteristic, and a direct function, of visible-light wavelength. Seen by the human eye as a spectrum of hues, ranging from red at the longest visible wavelengths, through orange, yellow, green, blue, indigo, and finally violet at the shortest visible wavelengths. See HUE.

coloration In audio applications, a blending of sounds as a result of mixing among components at different frequencies. Sometimes this is done deliberately; in other instances, it is undesirable.

color balance In a color television receiver, adjustment of the beam intensities of the individual guns of a three-gun picture tube. Compensates for the difference in light emissivity of the red, green, and blue phosphors on the tube screen.

color bar-dot generator A radio-frequency (RF) signal generator that produces a bar or dot pattern on the screen of a color television picture tube. Used for testing and alignment.

color-bar pattern A color television test pattern of vertical bars—each of a different color.

color breakup A transient separation of 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.).

color burst As a phase reference for the 3.579545-MHz oscillator in a color television receiver, approximately nine cycles of the chrominance subcarrier added to the back porch of the horizontal blanking pedestal in the composite color signal.

color carrier See CHROMINANCE SUBCARRIER.

colorcast A color television broadcast.

color code **1.** A system that uses colored stripes or dots to mark the nominal values and other characteristics on capacitors, resistors, and other components. **2.** A code that represents the various frequencies being used by radio-control modelers in competition, and used on flags attached to transmitters, for example, as a safeguard against jamming.

color coder See COLOR ENCODER.

color contamination In a color television system, faulty color reproduction resulting from incomplete separation of the red, green, and blue channels.

color-coordinate transformation In a color television system, the computation (performed electrically in the system) of the tristimulus (primary) values with reference to one set of primaries, from the same colors derived from another set of primaries.

color depth An expression for the extent to which an image can accurately render color. Generally expressed in bits or in number of colors. Some systems can reproduce millions of different colors.

color-difference signal Designated B-Y, G-Y, and R-Y. The signal resulting from reducing the amplitude of a color signal by an amount equal to the luminance-signal amplitude. Also see B-Y SIGNAL, G-Y SIGNAL, and R-Y SIGNAL.

color dot **1.** A phosphor spot on the screen of a color television picture tube. **2.** One of the spots stamped on a capacitor, indicating the capacitance, voltage, and tolerance (see COLOR CODE, **1**). **3.** A spot stamped on a resistor, indicating the number of zeros to be added to the value indicated by the color bands.

color edging In a color television picture, an aberration consisting of false color at the boundaries between areas of different color.

color encoder In a color television transmitter, the circuit or channel in which the camera signals and the chrominance subcarrier are combined into the color-picture signal.

color equation A mathematical means of determining the resultant color obtained by adding primary colors in various proportions.

color fidelity The faithfulness with which a color television system, lens, or film reproduces the colors of a scene.

color filter A transparent plate or film that transmits light of a desired color, and eliminates or attenuates all other colors.

color flicker In a color television system, image instability that occurs when the luminance and chromaticity both fluctuate.

color fringing In a color television picture, false color around objects, sometimes causing them to appear separated into different colors.

color generator A special radio-frequency (RF) signal generator to adjust or troubleshoot a color television receiver. The color signals it delivers are identical to those produced by a broadcast station.

color graphics Computer graphics displayed in color on a cathode-ray tube (CRT) or liquid-crystal display (LCD).

colorimeter A device used to quantitatively measure the color intensity of a sample relative to a standard.

colorimetric A characteristic of visible light, representing the wavelength concentration. Refers to the perceived color of a light beam.

colorimetry The science and art of color measurement.

color killer In a color television receiver, a circuit that, in the absence of a color signal, delivers a negative bias to cut off the bandpass amplifier.

color match In photometry, the condition in which color agreement exists between the halves of an area. Also see COLOR MATCHING.

color matching The art of selecting colors that are identical in hue, saturation, and brilliance. This can be done with the unaided eye or with the help of an instrument.

color media Substances that transmit essentially one color of visible light while blocking other colors.

color meter A photoelectric instrument for measuring color values, and comparing and matching colors.

color mixture An additive combination of two or more colors. Thus, red + yellow = orange, blue + red = violet, red + blue + green = white, etc.

color oscillator The oscillator in a color television receiver that coordinates the color response. This oscillator is operated at 3.579545 MHz, to within plus or minus 10 Hz.

color palette In a color video image, the total number of possible colors that can be displayed.

color phase In color television, the phase difference between an I or Q chrominance primary signal and the chrominance carrier reference.

color-phase diagram In color television, a quadrant diagram showing (for each of the three primary and complementary colors) the difference in phase between the color-burst signal and the chrominance signal, as well as the peak amplitude of the chrominance signal. Also shown are the peak amplitude and polarity of both in-phase and quadrature components required for the chrominance signals. For color TV receiver adjustment, the color-phase diagram is displayed, in effect, by a VECTORSCOPE when a suitable signal from a color generator is applied to the receiver.

color picture signal **1.** In color television and/or computer graphics, an electrical signal containing components corresponding to the hue, saturation, and brilliance of a fixed or changing visual image. **2.** In color television, the combination of chrominance and luminance signals minus blanking and sync signals.

color picture tube A specialized type of cathode-ray tube (CRT), used in color television receivers and computer displays. Three different images are produced: one in red, one in blue, and one in green. The three monochrome images are combined to form a complete color image.

color primaries **1.** Also called *additive primaries* or *primary colors.* In color television, the hues red (R), green (G), and blue (B). When these colors are mixed in various ratios, any visual color can result. **2.** Also called *subtractive primaries* or *primary pigments.* In color printing, the hues magenta (M), cyan (C), and yellow (Y). These roughly correspond to red (R), blue (B) and yellow (Y). Sometimes black (K) is also included. When these pigments are mixed in various ratios, any visual pigment can result.

color purity The ratio of wanted to unwanted components in a color. In a pure color, there are no components other than those required to produce the color. Color, in this context, includes white, black, and all shades of gray.

color-purity magnet A permanent magnet on the neck of a color television picture tube, used to help ensure color purity by maintaining proper displacement of the electron beam.

color registration In color television reception, the precise superimposition of red, green, and blue so that the composite is free from COLOR EDGING.

color rendering index A mathematical expression defining the effect of the color of a light source on an object. For example, in red light, a blue object appears nearly black.

color sampling rate The number of times per second that each primary color is sampled in a color television receiver.

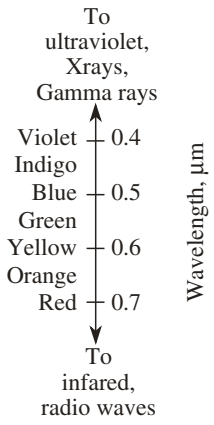
color saturation A measure of the purity of a hue. The extent to which a hue is without a white component; 100% saturation indicates a complete absence of white.

color sensing In machine vision systems, the ability to distinguish between light of different wavelengths. Usually done with red, green and blue color filters and three separate cameras.

color sensitivity **1.** The degree of which a photosensitive device, such as a photocell or camera tube, responds to various colors of light. **2.** The degree to which photographic film responds to various colors of light.

color signal See COLOR PICTURE SIGNAL.

color spectrum The band of electromagnetic energy containing visible light; it extends from red (at the longest wavelengths) to violet (at the shortest). Commonly measured in *nanometers (nm)*, where 1 nm = 10^{-9} m. Also expressed in *Angstroms*, where 1 Angstrom = 10^{-10} m = 0.1 nm. In order of decreasing wavelength, the colors are red at 750 to 700 nm (7500 to 7000



color spectrum

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 PRIMARIES. Each color primary is represented by an axis. Any COMPOSITE COLOR can be represented by a unique vector. The relative amount of each color primary is given by the length of the composite-color vector components along each axis.

color television Television in which the picture approximates natural color. It operates on the basis of mixing three primary colors (red, blue, and green) of phosphors on the picture tube screen.

color television receiver A television receiver designed 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.

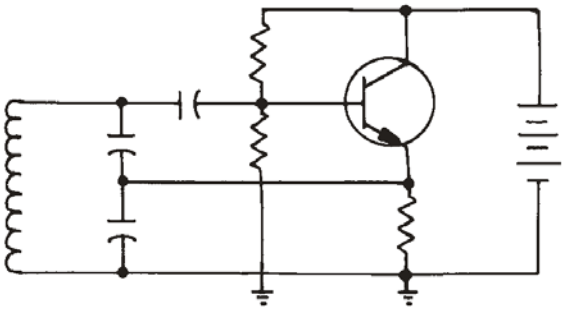
color triad On the screen of a color picture tube, one of the color cells, each of which contains one of the three phosphor dots: red, green, and blue.

color triangle A triangle that can be inscribed on a chromaticity diagram to reveal the chromaticity range resulting from adding the three color primaries.

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 rendition of weather patterns, usually showing various intensities of precipitation as different colors. Commonly, areas of precipitation show up as violet, blue, green, yellow, orange, and red, in order of increasing intensity.

Colpitts oscillator A radio-frequency (RF) oscillator that uses a single, untapped inductor. A combination of two fixed capacitors in series is connected in parallel with the inductor. The feedback is controlled by the ratio of capacitances. A permeability-tuned coil or a roller inductor can be used to obtain variable-frequency operation. Stability is enhanced when the output of the oscillator is taken from the emitter or source portion of the circuit. To prevent the output signal from being short-circuited to ground, an RF choke is connected in series with the emitter or source. Compare HARTLEY OSCILLATOR.



Colpitts oscillator

columbium Symbol, Cb. The former name of the metallic element *niobium.* Atomic number, 41. Atomic weight, 92.9064.

column See CARD COLUMN.

columnar graph A graphical presentation of data, in which the ordinates are represented by vertical columns whose height depends on the value. Commonly used in *presentation graphics*, but less common in *analytical graphics.*

column binary Binary number representation on punched cards, wherein consecutive digits correspond to consecutive column punching positions.

column speaker An acoustic speaker with a long cabinet, so that a large column of air is used for resonating or reinforcing purposes. This type of speaker radiates over a wide azimuth angle, while providing a narrow beam in the elevation plane.

column split On a punched card machine, the device for reading, as two separate characters or codes, two parts of a single column.

COM **1.** Abbreviation for *communications port.* **2.** Abbreviation for *computer output on microfilm.*

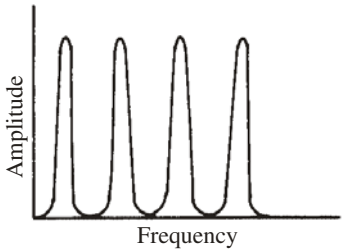
coma An aberration that causes the beam spot on the screen of a cathode-ray tube to resemble a comet.

coma lobes An aberration in the radiation or response pattern of a dish antenna that occurs when the radiating element is not exactly at the focal point of the reflector. When the directional

pattern is altered by moving the driven element, rather than turning the entire antenna, these lobes appear.

comb amplifier An arrangement of several sharply tuned bandpass amplifiers whose inputs are connected in parallel and whose outputs are separate; the amplifiers separate various frequencies from a multifrequency input signal. The name is derived from the comb-like appearance of the response pattern of various output peaks displayed along 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 observed on a spectrum analyzer. Also see COMB AMPLIFIER.



comb filter response

comb generator **1.** A signal generator that provides outputs at evenly spaced frequencies. So called because, on a spectrum analyzer, its output looks like the teeth of a comb. **2.** A transmitter with many spurious signals at its output.

combination **1.** A functional, usually stationary, installation consisting of two or more pieces of equipment. Examples: transmitter/receiver combination, motor/generator combination, and tuner/amplifier combination. **2.** In mathematics, a selection of several factors from a group, without regard to order. Thus, from the group ABC, the three possible combinations are AB, AC, and BC. Compare PERMUTATION.

combinational circuit Two or more basic logic circuits, combined in such a way that the output state depends entirely on the input states.

combination bridge A bridge that affords two or more classes of measurement, usually selectable by means of a function switch. Examples: capacitance-inductance bridge, and capacitance-resistance bridge.

combination cable A cable that has conductors grouped in pairs, threes, quads, or similar arrangements.

combination feedback See CURRENT-VOLTAGE FEEDBACK.

combination microphone Two or more microphones combined into one unit.

combination speaker Two or more loudspeakers combined into one (e.g., a COAXIAL SPEAKER).

combination tone An acoustic tone resulting from the combination 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.

combinatorial logic A form of digital logic, in which the output states depend on the input states, but on no other factor.

combined head See READ-WRITE HEAD.

combined reactance The net reactance (X) in a circuit, obtained by vectorially adding the inductive reactance (X_L) and the capacitive reactance (X_C).

combiner A circuit or device for mixing various signals to form a new signal. Also see MIXER.

combiner circuit In a color television camera, the circuit that combines the chroma and luminance with the sync.

comeback A spurious response in a bandpass or band-rejection filter, at a frequency well above or below the passband or stopband.

command **1.** In computer operations, the group of selected pulses or other signals that cause the computer to execute a step in its program. **2.** Instruction.

command chain Part of a computer operation carried out independently as a series of input/output instructions.

command control In automation, electronic control, 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 guidance system A system in which a guided missile and its target are both tracked by radar.

command language A computer language made up of command operators.

command link In a command guidance system, the section that transmits missile-steering commands.

command network A radio communications network in which the chain of command is rigorously 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 implementation (e.g., to describe the purpose of a step or subroutine).

comment field A record or file in which instructions or explanations are given.

commercial data processing A commercial (rather than industrial, scientific, or personal) application of data processing.

commercial-level security See LEVEL-2 SECURITY.

commercial killer A usually remote-controlled, electronic relay for disabling a radio or television receiver during advertisements.

commercial language A computer programming language for commercial applications (payroll, for example).

common **1.** Grounded. **2.** Pertaining to a connection shared by several different points in a circuit or system. **3.** See COMMON GROUND.

common area A computer storage area usable by several programs or segments within a program.

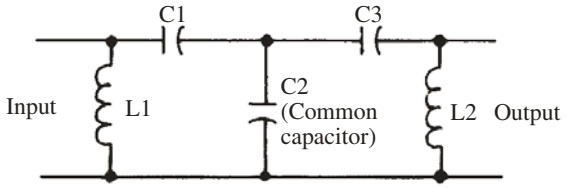
common-base circuit A bipolar transistor circuit in which the transistor base is the common (or grounded) electrode. Also called *grounded-base circuit.*

common battery **1.** A battery shared by two or more different circuits or pieces of equipment. **2.** In wire telephony, a central office battery that supplies the entire system.

common-battery office In wire telephony, a central office that provides a common battery.

common business-oriented language See COBOL.

common-capacitor coupling The process of coupling one tuned circuit to another by means of a capacitor that is common to both circuits.



common-capacitor coupling

common-carrier fixed station A fixed radio station that provides public service.

common-cathode circuit A tube circuit in which the cathode is the common (or grounded) electrode. Also called *grounded-cathode circuit.*

common-channel interference Radio interference resulting from two stations transmitting on the same channel. It is characterized principally by beat-note (heterodyne whistle) generation, and suppression or capture of the weaker signal by the stronger one.

common-collector circuit A bipolar-transistor circuit in which the collector is the common (or grounded) electrode. Also called *grounded-collector circuit* and EMITTER FOLLOWER.

common communications carrier A communications company authorized by the licensing agency to furnish public communications.

common-component coupling See COMMON-CAPACITOR COUPLING, COMMON-INDUCTOR COUPLING, and COMMON-RESISTOR COUPLING.

common-drain circuit A field-effect transistor circuit in which the drain terminal is the common (or grounded) electrode. Also called *grounded-drain circuit* and SOURCE FOLLOWER.

common-emitter circuit A bipolar transistor circuit in which the emitter is the common (or grounded) electrode. Also called *grounded-emitter circuit.*

common-gate circuit A field-effect transistor circuit in which the gate is the common (or grounded) electrode. Also called *grounded-gate circuit.*

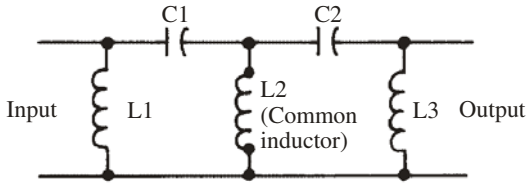
common-grid circuit A tube circuit in which the control grid is the common (or grounded) electrode. Also called *grounded-grid circuit.*

common ground A single ground-point connection shared by several portions of a circuit.

common impedance A single impedance shared by parts of a circuit. Because currents from the various parts flow through this impedance simultaneously, coupling (desired or undesired) can occur between them.

common-impedance coupling See COMMON-CAPACITOR COUPLING, COMMON-INDUCTOR COUPLING, and COMMON-RESISTOR COUPLING.

common-inductor coupling The process of coupling one tuned circuit to another by means of an inductor that is common to both circuits.



common-inductor coupling

common language A language recognized by all the equipment in a data processing system.

common logarithm Abbreviation, $\log_{10}$. Also called *base-10 logarithm.* A logarithm in which the base number is 10. Also see LOGARITHM.

common mode Pertaining to signals or signal components that are identical in amplitude and duration.

common-mode characteristics In an operational amplifier, characteristics denoting amplifier performance when a common signal is applied to inverting and noninverting inputs.

common-mode gain The voltage gain of a differential amplifier with a common-mode input.

common-mode impedance input The impedance between ground and one of the inputs of a differential amplifier. Compare COMMON-MODE INPUT IMPEDANCE.

common-mode input capacitance In a differential amplifier, the internal capacitance of the common-mode input circuit.

common-mode input circuit In a differential amplifier, the input circuit between ground and the inputs connected together.

common-mode input impedance In a differential amplifier, the open-loop impedance between ground and the inputs connected together. Compare COMMON-MODE IMPEDANCE INPUT.

common-mode input signal A signal applied to the common-mode input circuit of a differential amplifier (i.e., to both inputs connected together). Compare COMMON-MODE SIGNAL.

common-mode input voltage In a differential amplifier, the maximum voltage that can be applied safely between ground and the inputs connected together.

common-mode interference 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 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.

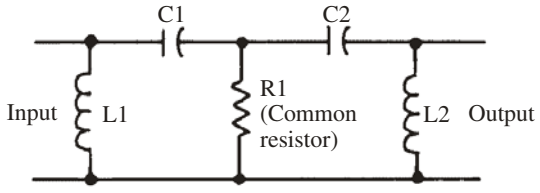
common-mode voltage The part of the input that is common to both inputs of a differential amplifier circuit. It is quantitatively defined as the arithmetic mean of the voltages at the inputs.

common-mode voltage gain See COMMON-MODE GAIN.

common-mode voltage range The range limited by the maximum nonsaturating input voltage that can be applied to both inputs of an operational amplifier.

common pool An assigned memory store, utilized by two or more circuits or systems.

common-resistor coupling The process of coupling one circuit to another by means of a resistor that is common to both circuits.



common-resistor coupling

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-user channels Communication channels open to all licensees in a particular service.

communication band A band of frequencies whose use is authorized expressly for communications, rather than for other services (such as broadcasting, education, remote control, etc.).

communication channel **1.** In radio or wire service, a (usually auxiliary) channel for direct exchange of information between units of the service (e.g., a "talking circuit" between a broadcast studio and the transmitter house). **2.** A data transmission channel between two points (e.g., a remote terminal and a central computer system).

communication link **1.** Collectively, the equipment providing a communication channel between two transmitters. **2.** Data terminal equipment.

communication protocol The specifications of a digital signal, including the speed in bits per second (bps) or bauds, the code type, the bit duration, the mark-to-space ratio, etc.

communications The science and art of using and developing electronic equipment and processes for the transmission and reception of information.

communications common carrier An organization licensed to provide public communication services.

communications network An organization of transmitting and receiving stations for the reliable exchange of intelligence. Also called *net.*

communications receiver A general-coverage or multiband radio receiver, designed primarily for listening to amateur, weather, or other nonbroadcast stations. Compare BROADCAST RECEIVER.

communications satellites Satellites in earth orbit that provide propagation paths (e.g., by reflection or retransmission) for radio waves between terrestrial transmitters and receivers. Also see ACTIVE COMMUNICATIONS SATELLITE and PASSIVE COMMUNICATIONS SATELLITE.

community-antenna television Abbreviation, CATV. A system in which an advantageously located receiving station receives television signals, amplifies them if necessary, and distributes them in the community served by the system. Commonly called *cable TV.*

commutating capacitor **1.** In a flip-flop circuit, a capacitor connected in parallel with the cross-coupling resistor to accelerate the transition from one stable state to the other. Also called *speedup capacitor.* **2.** A capacitor connected in parallel between silicon-controlled rectifier (SCR) stages to momentarily reverse the current going through the SCR, thereby causing the SCR to go into the cutoff condition.

commutation **1.** In a direct-current (dc) generator, periodic reversal of the current in the armature coils as the coils alternately 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 electrical polarity at the commutator brushes remains constant. **2.** In a thyratron or silicon-controlled rectifier (SCR) circuit, momentarily reversing the polarity to cut the device off.

commutator **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.

commutator ripple The pulsating voltage superimposed on the direct-current (dc) voltage delivered by an unfiltered dc generator.

compact disc Abbreviation, CD. A digital, high-density optical disc, used in high-fidelity stereo sound systems. Also used to store computer data. The information is encoded as tiny pits on the surface of the disc, and is recovered by a laser, a sensor and a digital-to-analog (D/A) converter. These disks have largely superseded magnetic tapes, and have rendered long-playing vinyl disks and turntables obsolete. See also COMPACT-DISK READ-ONLY MEMORY.

compact-disk read-only memory Abbreviation, CD-ROM. A digital COMPACT DISC used for the long-term storage of computer data and/or software programs. Usually the same size as a high-fidelity stereo disk, it can hold over 600 megabytes of data. Although data can be read from the disk, it cannot be overwritten.

compander Term for *compressor/expander*. In the transmission and reception of audio-frequency (AF) intelligence, a system that uses an amplitude compressor at the transmitter and an amplitude expander at the receiver. The compressor reduces the dynamic range before transmission, and the expander restores it after reception. Provides improved signal-to-noise ratio under marginal communications conditions. Also increases the ratio of average power to peak power. See COMPANDING.

companding A process in which a signal is compressed at the transmitting end of a circuit and expanded at the receiving end, yielding a signal like the original at the receiver output. Signals are more efficiently transmitted when they are compressed because the average power increases, relative to the peak power. This improves the average signal-to-noise ratio for weak signals. See COMPANDER.

companding law The mathematical function used for companding. It is an output-amplitude versus input-amplitude function for the compression at the transmitter, and the inverse of this function for the expansion at the receiver.

companion keyboard An auxiliary keyboard connected to a regular keyboard and operated remotely.

companionship machine A computer or robot with sufficient machine intelligence to provide entertainment and mental stimulation for humans.

comparator **1.** An integrated circuit (IC) with two inputs, called A and B. The device compares the voltages that appear at these inputs. If the input voltage at A is significantly greater than the input voltage at B, the output is about +5 V. If the input voltage at A is not greater than the input voltage at B, the output voltage is about +2 V. These ICs are used to actuate, or trigger, other devices such as relays and electronic switching circuits. **2.** In general, any circuit that compares some characteristic of two input signals and produces an output that depends on the relationship between the inputs. **3.** An instrument for checking the condition of a component by comparing it directly with an identical component of known quality has a scale reading in percentage deviation, or simply "GO/NO-GO." Examples: capacitor comparator, resistor comparator, coil comparator.

compare In computer operations, a relational test performed on two quantities to determine their relative magnitude, including an indication of the test result and, sometimes, the taking of action. Example: the process and acton resulting from execution of the statement "IF A > B THEN GO TO LINE 250."

comparison **1.** An expression of the relationship between two voltages, currents, phase angles, component values, or other quantities in an electrical or electronic circuit or system. **2.** An examination of different data bits or items, which results in a conclusion about some aspect of their relationship.

comparison bridge A bridge designed especially for the quick comparison of components (e.g., the comparison of resistors with a standard resistor, inductors with a standard inductor, and capacitors with a standard capacitor).

comparison measurement A measurement in which a quantity or component is compared with a known, similar quantity or component value, rather than having the measurement displayed directly by a meter. Examples: bridge measurements, potentiometric measurements, and frequency matching.

compass **1.** Any of several instruments for determining direction on the earth's surface [e.g., magnetic (mariner's) compass and gyrocompass]. **2.** A radio direction finder. **3.** An instrument for drawing circles.

compatibility **1.** A desirable condition in which devices or systems can function efficiently together, without any modification of equipment. **2.** In computer operations, a desirable condition in which different computers can run the same software, without any modification of hardware or software.

compatible color television A color-television system whose transmissions can be received in black and white by any ordinary monochromatic receiver.

compatible integrated circuit A hybrid integrated circuit (IC) that has an active element inside the integrated structure and a passive element deposited on its insulated outer surface.

compensated amplifier A wideband amplifier whose frequency range is extended by special components and circuit modifications. Also see COMPENSATING CAPACITOR and COMPENSATING COIL.

compensated diode detector 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 A resistor consisting of a diffused semiconductor material to which are added controlled amounts of n- or p-type dopants (impurities).

compensated-loop direction finder A direction finder whose loop antenna is complemented by another antenna for polarization-error compensation.

compensated semiconductor A doped semiconductor material in which the acceptor impurity cancels the effects of the donor impurity.

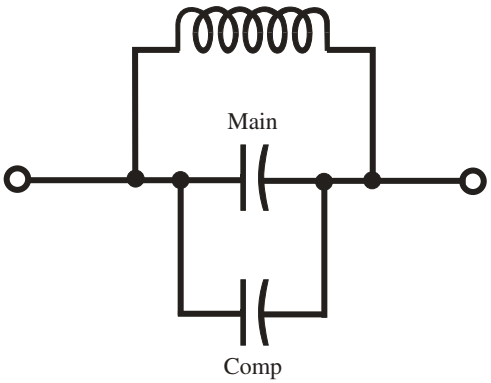
compensated volume control A combination volume-tone control that provides bass boost at low volume levels to compensate for the ear's deficiency at low frequencies.

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 in a tank or other circuit. 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/temperature drift of the latter to zero or to some desired positive or negative value.

compensating diode A junction diode used to temperature-stabilize a transistor circuit. It is usually forward-biased in the base-bias network of the transistor.

compensating filter **1.** A selective filter used for the purpose of eliminating some irregularity in the frequency distribution of received energy. **2.** A filter used to change the wavelength distribution of electromagnetic energy.

compensating resistor **1.** A low-value resistor of known temperature coefficient, connected in series with a main resistor to reduce the resistance/temperature drift to zero, or to some desired positive or negative value. **2.** See TRIMMER RESISTOR.



compensating capacitor, 1.

compensating resistor, 1.

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, **1**.

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, **2**.

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

zero internal impedance, and whose generated voltage equals the instantaneous potential difference produced across *Z* by the current flowing through it. Compare MAXIMUM POWER TRANSFER THEOREM, NORTON'S THEOREM, RECIPROCITY THEOREM, SUPERPOSITION THEOREM, and THEVENIN'S THEOREM.

compensator A device or circuit that facilitates the adjustment of a quantity, manually or automatically, to obtain precise values, or to counteract undesired variations.

compilation time The period during which a program is compiled, as distinct from RUN TIME.

compile **1.** To unify computer subroutines into an all-encompassing program. **2.** To gather information or data together into a single file or file set.

compiler 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.

compiler language Any computer language that serves as an interface between the operator and the computer.

compiler program A program that converts compiler language into machine language.

compiling routine In digital computer operation, a routine permitting the computer itself to construct a program to solve a problem.

complement **1.** 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 111 – 101 – 010); the complement of 1001 is equal to 0110 (because 1111 – 1001 = 0110).

complementary A Boolean operation whose result is the same as that of another operation, but with the opposite sign; thus, OR and NOR operations are complementary.

complementary colors **1.** In the additive color system, two colors that produce light gray or white when combined. **2.** In the subtractive color system, two pigments that produce dark gray or black when combined. **3.** Colors or pigments that are opposite each other on the color wheel.

complementary constant-current logic A form of bipolar logic with high operating speed and high component density.

complementary metal-oxide semiconductor Also sometimes called *complementary metal-oxide silicon.* Acronym, CMOS (pronounced "seamoss"). A digital integrated-circuit (IC) technology, in which logic gates are formed by n-channel/p-channel pairs of metal-oxide-semiconductor field-effect transistors (MOSFETs) fabricated on a substrate. Noted for high speed and low current drain.

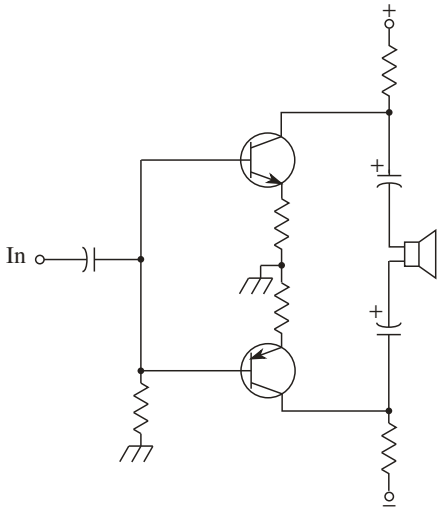
complementary operator The logical negation (NOT) operation.

complementary pushpull circuit See COMPLEMENTARY-SYMMETRY CIRCUIT.

complementary rectifier In the output circuit of a magnetic amplifier, nonsaturating half-wave rectifier elements.

complementary silicon-controlled rectifier A silicon-controlled rectifier that has polarity opposite from the usual silicon-controlled rectifier.

complementary-symmetry circuit A bipolar-transistor circuit that uses an npn and pnp transistor. The transistors conduct during opposite half-cycles of the input signal, the result being that push-pull output is provided with a single-ended input; no phase-splitting input circuit is required. The complementary-symmetry circuit offers very low output impedance, permitting a loudspeaker voice coil (or other low-impedance load) to be operated directly without a coupling transformer.



complementary-symmetry circuit

complementary tracking A control system in which several secondary (slave) devices are controlled by a primary (master) device.

complementary transistors A transistor pair of opposite polarity operated in a complementary-symmetry circuit or its equivalent.

complementary wave An electromagnetic wave in a transmission line that occurs as a result of reflection. Any impedance discontinuity will result in complementary waves.

complementer A logic circuit that provides an output pulse when there is no input pulse, and vice versa. Also called INVERTER and NOT CIRCUIT.

complement number In a base-n number system, for a given positive integer p less than n, the positive integer m such that $m + p = n$. For example, in the decimal (base-10) system, the complement of 4 is 6, the complement of 7 is 3, and the complement of 9 is 1. In the hexadecimal (base-16) number system, the complement of 4 is 12, the complement of 7 is 9, and the complement of 9 is 7.

complement-number handling A computer system in which the operations are carried out via the complements of the input numbers.

complement-setting technique A process of determining the number of pulses required to complete the switching of a counter circuit when it is started at some state higher than full zero. The number of pulses required for completion is equal to the number that represents the starting state's complement.

complete carry In digital computer operation, a system permitting all carries to generate carries.

complete circuit See CONTINUOUS CIRCUIT.

complete modulation Modulation to the maximum extent possible while maintaining acceptable circuit or system operation.

complete operation In computer operations, the condition in which the machine rigorously follows program instructions.

complete routine A vendor-supplied computer program that is usable without modification.

complex function **1.** A mathematical function of a complex-number variable. **2.** An integrated circuit (IC) containing two or more subcircuits that perform an operation more complicated that of any one of the circuits alone.

complex notation Notation taking into consideration both the real-number and imaginary-number components of a quantity. Thus, impedance (Z) is a complex quantity that includes a resistive (real) component (R) and a reactive (imaginary) component (jX). See COMPLEX NUMBER and COMPLEX OPERATOR.

complex number A number expressed in complex notation (e.g., $a + jb$, where a and b are real numbers and j is the COMPLEX OPERATOR). Can also be expressed as a point or a vector in an ARGAND DIAGRAM.

complex operator The unit imaginary number, represented as j by engineers and as i by mathematicians. This number is defined mathematically as the positive square root of –1.

complex parallel permeability An expression of 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.

complex periodic wave A periodic wave composed of a sine-wave fundamental and certain harmonics in specific proportions.

complex permeability An expression of inductor-core permeability, obtained from the mathematical ratio of the magnitudes of the vectors representing the induction and electromagnetic field strength within the core.

complex plane A Cartesian coordinate system with real numbers on the horizontal axis and imaginary numbers on the vertical axis. Used for vectorial representation of complex numbers. See ARGAND DIAGRAM.

complex quantity A quantity containing both real and imaginary components. Example: Impedance (Z) is a complex combination of resistance R (a real component) and reactance jX (an imaginary component): $Z = R + jX$.

complex radar target 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.

complex series permeability An expression of complex permeability of an inductor core under actual operating conditions, assuming zero loss in the conductors of the coil winding. A series combination of reactance and resistance.

complex steady-state vibration Periodic vibration with more than one sine-wave component.

complex tone An audio tone made up of more than one sine-wave component.

complex variable A variable having real and imaginary parts.

complex waveform The shape of a COMPLEX PERIODIC WAVE. It is the resultant of the individual sine-wave components (i.e., of the fundamental and the harmonics).

complex-wave generator A signal generator whose output signal is any of several selectable waveforms and frequencies (or repetition rates). Also see FUNCTION GENERATOR.

compliance **1.** 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. **2.** A measure of the output impedance of a switched-current signal source. Generally given as maximum current for a certain change in the voltage.

compliance range The voltage range required to maintain a constant current throughout a load-resistance range.

compliance voltage 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.

compliance-voltage range The output voltage range of a constant-current power supply.

component **1.** A device or part used in a circuit to obtain some desired electrical action [e.g., a resistor (passive component) or an integrated circuit

(active component)]. Also see ACTIVE COMPONENT and PASSIVE COMPONENT. **2.** An attribute inherent in a device, circuit, or performance (e.g., the REACTIVE COMPONENT of an inductor). **3.** A specified quantity or term (e.g., the WATTLESS COMPONENT of ac power). **4.** A piece of equipment in a high-fidelity sound system.

component density The number of components (see COMPONENT, **1**) in an electronic assembly of a given physical volume.

component failure rate **1.** The percentage of components, out of a specified group, that can be expected to fail within a specified length of time. **2.** The frequency with which a given component, in a certain application, can be expected to fail.

component layout The mechanical arrangement of components (see COMPONENT, **1**) in an electronic assembly.

component stress The electrical or mechanical strain to which a component is subjected. In general, the greater the stress, the higher the component failure rate.

composite cable A cable containing other cables of different types.

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; an alternating current 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; an ac voltage 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.

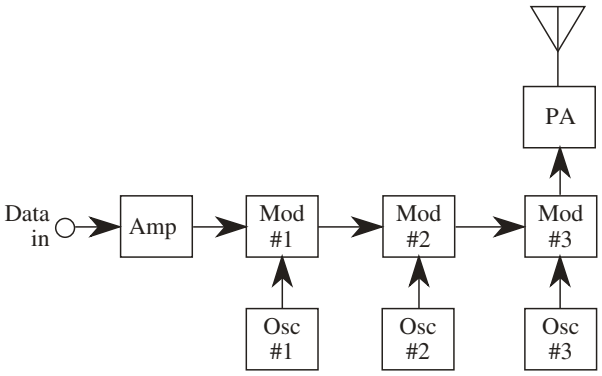
compound A substance in which the atoms of two or more elements have united chemically to form a molecule. For example, an atom of cadmium (Cd) and one of sulfur (S) combine to form a molecule of cadmium sulfide (CdS).

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-wound 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 modulation

compound motor An electric motor having both series and shunt fields. Also called *compound-wound motor.*

compound transistor Two or more transistors directly coupled in the same envelope for increased amplification. Also see COMPOUND CONNECTION.

compound-wound generator See COMPOUND GENERATOR.

compound-wound motor See COMPOUND MOTOR.

compress **1.** In communications, to reduce or minimize the bandwidth of a signal. **2.** In communications, the processing of a signal to increase low-level components and thereby raise the average power level relative to the peak power level. **3.** In computer operations, to reduce or minimize the number of bits in a digital signal or file, while

still retaining all the essential information. Compare EXPAND.

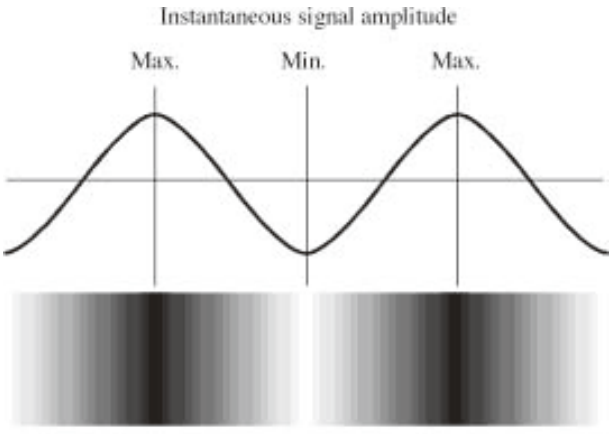
compressed-air capacitor A high voltage air-dielectric capacitor enclosed in a case in which the air pressure is held at several atmospheres. The device exploits the dielectric strength of compressed air, which is higher than that of air at normal pressure.

compressed-air speaker A speaker that uses an airtight chamber to enhance the acoustic reproduction at certain frequencies.

compression **1.** In communications, the reduction or minimization of signal bandwidth. **2.** In communications, the processing of a signal to increase low-level components and thereby raise the average power level relative to the peak power level. Usually, a logarithmic function. **3.** In computer operations, the reduction or minimization of the number of bits in a digital signal or file, while still retaining all the essential information. Compare EXPANSION.

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 wave

compressor A circuit or device that limits the amplitude of its output signal to a predetermined value, despite wide variations in input signal amplitude.

compressor driver unit A loudspeaker that works into an air space connected by a throat to a horn, rather than by driving a diaphragm.

Compton diffusion An effect that occurs when a photon and electron collide. Some of the energy from the photon is transferred to the electron. On a large scale, such collisions result in diffusion of electromagnetic waves.

Compton effect The increase in wavelength (decrease in frequency) of X-rays scattered by the electrons of lighter atoms bombarded with the X-rays.

Compton shift See COMPTON EFFECT.

compute To perform a mathematical operation by means of a relatively simple process. Thus, a digital computer solves intricate problems using simple arithmetic steps. Compare CALCULATE.

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 antibody Also called *vaccine.* A small subprogram designed to eliminate viruses from computer systems.

computer-assisted instruction Abbreviation, CAI. 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 suiting 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 game See VIDEO GAME.

computer graphics **1.** The use of computers to assist in drawing and drafting, and in the processing of video images such as photographs. **2.** Broadly, any computer-generated or computer-processed image.

computer instruction See INSTRUCTION.

computer interfacing apparatus The equipment used to connect a computer to other systems, and to peripherals.

computerized axial tomography Abbreviation, CAT. A multiple X-ray system that enables the observer to obtain cross-sectional images of the internal organs of the body.

computer map A blueprint, used in conjunction with machine vision, sonar, radar or beacons, that a mobile robot can use as a navigational aid. One or more such blueprints are stored in the robot controller's main memory.

computer music **1.** Music that is composed by a computer. **2.** See MUSICAL INSTRUMENT DIGITAL INTERFACE.

computer program See PROGRAM.

computer programmer A person skilled in devising and/or writing the routines that a digital computer uses to solve problems or process data.

computer storage tube A cathode-ray tube in which the electron beam scans and stores information in thousands of memory cells on a target. A cell "remembers" by acquiring and holding an electrostatic charge when it is struck by the beam from the writing gun. Information taken is read out of a cell by a second beam from the reading gun.

computer system A central processor and its associated online and offline peripherals, such as a monitor, modem, printer, optical scanner, magnetic disk drives, CD-ROM drive, and tape backup.

computer technician A professional skilled in building, repairing, and maintaining computers, and who, occasionally, designs them. Usually works under the supervision of a computer engineer.

computer terminal **1.** A teleprinter or video display unit and keyboard, used by human operator(s) of a computer. **2.** An interface between a computer and its human operator(s).

computer/TV interface A device or circuit for delivering the output of a digital computer to a standard television receiver so that the latter can serve as a GRAPHIC TERMINAL.

computer virus A deliberately created and disseminated subprogram or piece of programming code, that electronically spreads through computer systems and hinders operation. Usually diverts the computer(s) from intended functions; sometimes causes a catastrophic malfunction. Often exists undetected, being transferred from one computer to another by means of diskettes or software.

computer word See WORD.

computing amplifier See OPERATIONAL AMPLIFIER.

computing machine See COMPUTER.

concatenation **1.** A method of speed control for a 3-phase motor in which two induction motors are operated with their shafts coupled together. The stator of the first motor is connected to the 3-phase supply, and the slip rings of this motor are connected to the field of the second motor. The slip rings of the second motor are connected to the three ganged sections of a Y-rheostat used for adjusting the speed. **2.** Arrangement of a set into a series.

concentrated-arc lamp A brilliant low-voltage lamp, containing nonvaporizing electrodes in an inert-gas atmosphere. An arc across the electrodes creates the light source.

concentrated winding A coil winding that has a large number of turns in a small space.

concentration cell An electrolytic cell in which two electrodes are immersed in solutions of the same compound but having different combinations. The voltage is usually very small, 0.1 volt or less.

concentration gradient Between points in a semiconductor, the difference in electron or hole concentration.

concentric cable See COAXIAL CABLE.

concentric capacitor A fixed or variable capacitor whose plates are concentric cylinders. Also called *concentric-plate capacitor.*

concentric jack See COAXIAL JACK.

concentric line See COAXIAL LINE.

concentric-line oscillator A stable, self-excited oscillator whose frequency-determining tank consists principally of a section of concentric (coaxial) line. Used primarily at ultra-high frequencies (UHF).

concentric plug See COAXIAL PLUG.

concentric receptacle See COAXIAL RECEPTACLE.

concentric tank See COAXIAL TANK.

concentric-wound coil A combination of two or more coils wound on top of, and insulated from, each other.

conceptual modeling A technique for solving problems by devising a mathematical model based on the results of an experiment; experiments performed on the model are used to verify its validity.

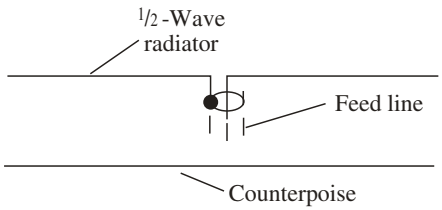
concurrent conversion In computer operations, running conversion and conventional programs together. Also see CONVERSION PROGRAM.

concurrent processing See MULTIPROGRAMMING.

condenser **1.** An obsolete term for CAPACITOR. **2.** A mirror or lens for concentrating light (on an object, for example). **3.** Something that condenses a gas or vapor. **4.** See CONDENSER MICROPHONE.

condenser antenna A two-wire horizontal antenna system in which the radiator is a wire situated above a counterpoise.

condenser microphone Also called *capacitor microphone.* A microphone in which a tightly stretched metal diaphragm forms one plate of an



condenser antenna

air capacitor, and a closely situated metal plug forms the other plate. A dc bias voltage is applied to the arrangement. Impinging sound waves cause the diaphragm to vibrate, varying the capacitance and causing the output current to fluctuate accordingly.

condensing routine In computer operations, a program that compresses data. See COMPRESSION, **3**.

condensite A plastic insulating material whose base is phenol formaldehyde resin.

conditional Pertaining to a quantity or phenomenon that depends on some external factor, and is therefore subject to change.

conditional branch A point in a computer program where a relational test is performed, and the statement line in which the test is made is left so that an out-of-sequence instruction can be implemented. Such a branch might be made, for example, following a statement, such as "IF Z = Y THEN GO TO LINE 380."

conditional branch instruction The instruction in a computer program that causes a CONDITIONAL BRANCH.

conditional implication operation A Boolean operation in which the result of operand values X and Y are such that the output is high only if input X is high and input Y is low. Also called *inclusion* or *if-then operation.*

conditional jump See CONDITIONAL BRANCH.

conditional stop instruction In a computer program, an instruction that can cause a halt in the run, as dictated by some specified condition.

conditional transfer See CONDITIONAL BRANCH.

condition code A set of constraints for a computer program; sets limits on what can be done with the computer under certain circumstances.

conditioning **1.** The process of making equipment compatible for use with other equipment. Generally involves some design or installation changes. **2.** Interfacing.

Condor A continuous-wave navigational system that produces a cathode-ray-tube display for automatically determining the bearing and distance from a ground station.

conductance Symbol, *G*. Unit, siemens. The ability of a circuit, conductor, or device to conduct electricity. Conductance in siemens is the reciprocal of resistance: $G = 1/R$, where R is the resistance in ohms.

conducted heat Heat transferred by conduction through a material substance, as opposed to *convection* and *radiation.* A heatsink conducts dissipated energy away from a transistor, whereupon convection and radiation allow heat to escape from the sink.

conduction **1.** The propagation of energy through a medium, depending on the medium for its travel. **2.** The transfer of electrons through a wire. **3.** The transfer of holes through a P-type semiconductor material. **4.** Heat transfer through a material object (see CONDUCTED HEAT).

conduction angle See ANGLE OF CONDUCTION.

conduction band In the arrangement of energy levels within an atom, the band in which a free electron can exist; it is above the *valence band* in which electrons are bound to the atom. In a metallic atom, conduction and valence bands overlap; but in semiconductors and insulators, they are separated by an energy gap.

conduction current **1.** The electromagnetic-field flow that occurs in the direction of propagation. A measure of the ease with which the field is propagated. **2.** Current in a wire or other conductor.

conduction-current modulation In a microwave tube, cyclic variations in the conduction current; also, the method of producing such modulation.

conduction electron See FREE ELECTRON.

conduction error In a temperature-acutated transducer, error caused by conduction of heat between the sensor and the mounting.

conduction field An energy field that exists in the vicinity of an electric current.

conductive coating A conducting layer applied to the glass envelope of a cathode-ray tube, such as an oscilloscope tube or picture tube.

conductive coupling See DIRECT COUPLING.

conductive material See CONDUCTOR.

conductive pattern The pattern of conductive lines and areas in a printed circuit.

conductivity Unit, S/m (siemens per meter). An expression of conductance per unit length of a material; the reciprocal of *resistivity.*

conductivity meter A device for measuring electrical conductivity. Generally, such a device is calibrated in siemens.

conductivity modulation In a semiconductor, the variation in conductivity that results from a variation of charge-carrier density.

conductivity-modulation transistor A transistor in which the bulk resistivity of the semiconductor material is modulated by minority carriers.

conductor **1.** A material that allows charge carriers (usually electrons) to move with ease among atoms. Examples are metals, electrolytes, and ionized gases. Substances vary widely in their suitability as conductors; the conductivity of commercial copper, for example, is almost twice that of aluminum. Compare INSULATOR. **2.** An individual conducting wire in a cable, insulated or uninsulated.

conduit A hollow tube, made of plastic or metal, through which wires, cables, and other transmission media are fed.

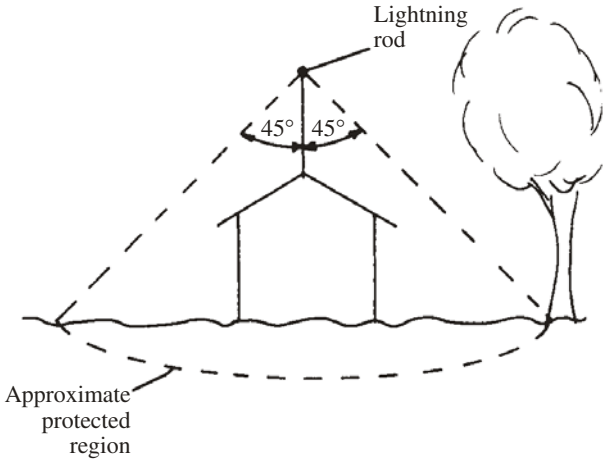
cone The conical diaphragm of a (usually dynamic) loudspeaker.

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 lightning 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).



cone of protection

cone of silence A small zero-signal zone directly over a low-frequency radio-range beacon. The zone is the product of the combined directive properties of the beacon transmitting antenna and the antenna on an aircraft.

cone speaker A loudspeaker having a sound-producing cone (diaphragm) made of specially treated paper or other material, as opposed to a loudspeaker having a flat diaphragm.

confetti On a color TV screen, color spots caused by chrominance-amplifier noise.

confidence The probability that a predicted result will occur.

confidence factor Confidence, expressed either as a fraction (between 0 and 1) or as a percentage.

confidence interval The range over which a parameter can vary so that a given confidence factor is maintained.

confidence level See CONFIDENCE FACTOR.

confidence limitations The maximum and minimum points of a confidence interval. Outside the confidence-limitation points, the confidence factor drops below the required minimum.

configuration **1.** The characteristic arrangement of components in an electronic assembly, or of the equipment symbols in the corresponding circuit diagram. **2.** Computer system.

configuration state In a computer system, an expression of the availability status of a device for a given application. A *configured-in* device is available; a *configured-out* device is available, but is restricted to certain users; a *configured-off* device is unavailable.

configuration table Within a computer's operating system, a table that provides the configuration state for various system units.

configured-in See CONFIGURATION STATE.

configured-off See CONFIGURATION STATE.

configured-out See CONFIGURATION STATE.

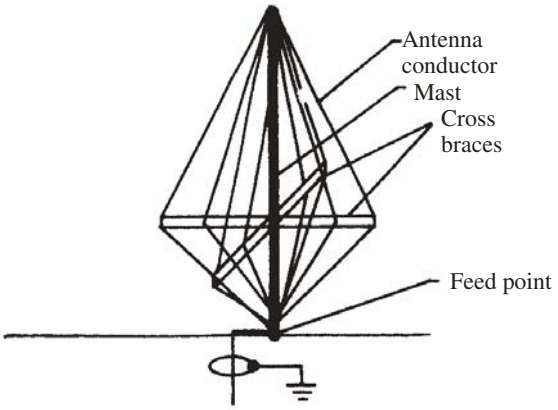
conformance The degree to which a quantity or variable corresponds to a standard or to expectations.

conformance error The extent (usually expressed as a percentage) to which conformance is lacking.

conical antenna See CONE ANTENNA.

conical horn A horn (antenna, loudspeaker, or sound pickup) having the general shape of a cone: the cross-sectional area varies directly as the square of the horn's axial length.

conical monopole antenna An unbalanced broadband antenna that derives its name from its shape. It is usually constructed from wire and must be operated against a good radio-frequency (RF) ground.



conical monopole antenna

conical scanning In radar transmission, a method of scanning in which the beam describes a cone, at the apex of which is the antenna.

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 branches In a network, two branches of such a nature that a signal in one has no effect on the other.

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).

conjunction The logical AND operation.

connect To provide an electrical path between two points.

connection The point at which two conductors are physically joined.

connective An operation symbol written between operands.

connector **1.** A device that provides electrical connection. **2.** A fixture (either male or female) attached to a cable or chassis for quickly making and breaking one or more circuits. **3.** A symbol that connects points on a flowchart.

conoscope A device that uses focused polarized light to examine crystals (as in checking the optical axis of a quartz crystal).

consequent poles The poles of an equivalent single magnet that is formed when two magnets are aligned with their two identical poles together. Thus, when the two north poles are placed together, the consequent poles are a south pole at each end and a north pole at the center.

conservation of energy **1.** The preservation of the potential for work by a given quantity of energy—even when it undergoes a change in form within a system. **2.** The *law of conservation of energy*, which states that energy can be neither created nor destroyed, but only changed in form.

console **1.** The main station or position for the control of electronic and/or computer equipment. **2.** The equipment at a fixed location. **3.** An equipment-containing cabinet that stands on the floor. **4.** Equipment permitting communication with a computer. Also called *dumb terminal.*

consonance **1.** Harmony between audio tones. **2.** Acoustical or electrical resonance between bodies or circuits that are not physically connected.

constant **1.** A quantity whose value remains fixed, such as the speed of light in a vacuum. Compare VARIABLE. **2.** The value of a component specified for use in a particular electronic circuit. **3.** An electronic component, particularly a capacitance or inductance. **4.** In a computer program, data items that remain unchanged for each run.

constant-amplitude recording In sound recording, the technique of holding the maximum amplitude of the signal steady as the frequency changes.

constantan An alloy of copper and nickel used in some thermocouples and standard resistors.

constantan-platinum thermocouple A thermocouple that uses the junction between constantan and platinum wires, which is contained in thermocouple-type meters.

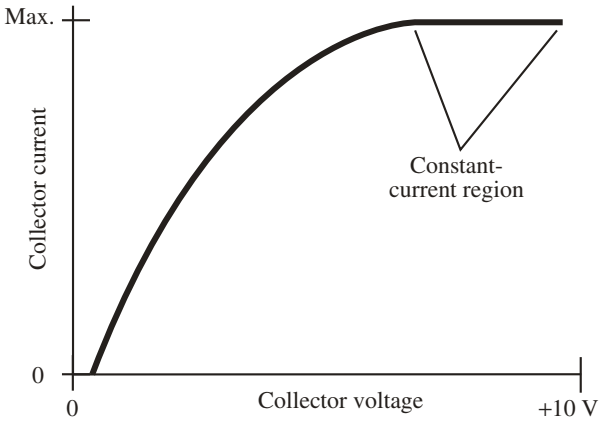
constant area As allocated by a computer program, an area of memory that holds constants.

constant bandwidth In a broadband tuned circuit, bandwidth that does not change with frequency.

constant current A current that undergoes no change in value as it flows through a changing resistance. Compare CONSTANT VOLTAGE.

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, or approaches, a specific maximum. An example is the collector-current versus collector-voltage curve for a bipolar transistor.



constant-current curve

constant-current drive Driving power obtained from a constant-current source.

constant-current modulation See CHOKE-COUPLED MODULATION.

constant-current power supply See CONSTANT-CURRENT SOURCE.

constant-current sink See CURRENT SINK.

constant-current source A power supply whose current remains steady during variations in load resistance. Also called *constant-current supply* and *current-regulated supply.* Compare CONSTANT-VOLTAGE SOURCE.

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 in which Z_1Z_2 equals k^2 at all frequencies, where Z_1 is the impedance of the series element and Z_2 is the impedance of the shunt element.

constant-power dissipation line A line connecting points on a family of current-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 circuitry.

constant voltage A voltage that does not change as the load resistance varies. Compare CONSTANT CURRENT.

constant-voltage, constant-current supply A combination current-regulated and voltage-regulated power supply; 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 source 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 used to reduce variations in power-line 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.

construct 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 consumer item.

contact **1.** A conducting body (such as a button, disk, or blade) that serves to close an electric circuit when pressed against another conductor. Example: switch contact and spring contact. **2.** The state of being touched together, as when two conductors are brought into contact to close a circuit.

contact arc The arc that initially occurs when current-carrying contacts are separated.

contact area **1.** The face of an electrical contact. **2.** The common area shared by two conductors in mutual contact.

contact bounce The springing apart or vibration of contacts upon making or breaking.

contact chatter The abnormal vibration of mating contacts, caused by contact bounce or by an extraneous alternating current.

contact-closure input The input circuit of a device, such as a control-system amplifier, that is actuated by the closing of switching contacts. Compare CONTACT-OPEN INPUT.

contact combination The set of contacts on a switch or electronic relay.

contact detector A rectifier or demodulator, composed of two dissimilar materials in contact with each other. Semiconductor diodes are of this general type. Some contact-detector action can be obtained with two dissimilar fine wires (such as copper and iron) by touching their tips lightly together.

contact EMF Short for *contact electromotive force*; also called *contact potential.* A low direct-current (dc) voltage that is sometimes generated by the contact of two dissimilar materials.

contact follow The tendency of relay contacts to follow the actuating signals.

contact force **1.** The force with which relay contacts close with a given amount of coil current. **2.** The force with which a pair of relay contacts are held together when current flows through the coil. **3.** In a mercury-wetted relay, the force exerted by the mercury on the contacts as the relay closes.

contact gap The distance between contacts when they are open.

contact load **1.** The power dissipated by a load that is connected to a power supply through a closed set of contacts. **2.** The current passing through a set of closed contacts.

contact microphone A microphone placed in direct contact with a vibrating surface for pickup. Actuated by the vibration of a solid, rather than by the movement of air molecules.

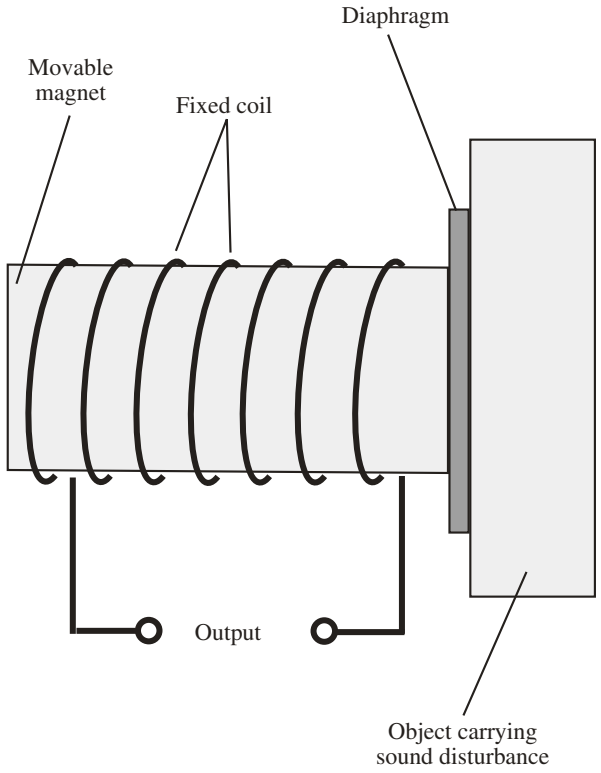
contact miss **1.** The improper alignment of contacts in a switch or relay. **2.** The condition of relay contacts not lining up properly.

contact modulator An electromechanical CHOPPER.

contact-open input The input circuit of a device, such as a control-system amplifier, that is actuated by the opening of switching contacts. Compare CONTACT-CLOSURE INPUT.

contactor A switch used for frequent opening or closing of a circuit. An example is a relay contactor used for keying a transmitter.

contactor noise **1.** Electrical noise that is the product of make-and-break contact action or fluctuations in conduction when the contacts are



contact microphone

closed. **2.** Sounds coming directly from contacts that are opening and closing.

contact potential The small direct-current (dc) voltage that results from the bombardment of an electrode by electrons, when the electrode has no external voltage applied to it.

contact 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.

contaminated material **1.** A semiconductor 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.

content-addressed storage In a computer, memory- or data-storage locations identified by content (see CONTENTS), instead of by address. Also called *associative storage.*

contention The result of interference among more than one transmitting station on the same communications channel.

contents **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. **2.** The environment in which a string of characters, composing a data unit or word, is used in a computer program.

Continental code A version of the Morse code used internationally in radiotelegraphy. Also called *International Morse code* and *general service code.* Compare AMERICAN MORSE CODE.

continuity A condition of being uninterrupted—especially pertaining to current flowing in an electrical or electronic circuit.

continuity test A test of the completeness of an electrical path. Ideally, the only concern is whether the circuit is open or closed, but sometimes circuit resistance is also of interest.

continuity tester A device (such as an ohmmeter, battery and buzzer, and battery and lamp) with which a continuity test can be made.

continuity writer The person who prepares copy for a radio or television broadcaster.

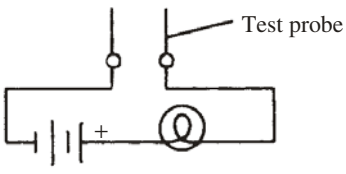
continuous carrier A medium (such as a radio-frequency wave) that will convey information (as when the carrier is modulated) with no disruption of the medium itself.

continuous circuit An uninterrupted circuit.

Continuous Commercial Service Abbreviation, CCS. A category in which safe operating parameters are listed for electronic components and communications equipment operated over long, uninterrupted periods. Compare INTERMITTENT COMMERCIAL AND AMATEUR SERVICE.

Character	*Symbol*
A	•–
B	–•••
C	–•–•
D	–••
E	•
F	••–•
G	––•
H	••••
I	••
J	•–––
K	–•–
L	•–••
M	––
N	–•
O	–––
P	•––•
Q	––•–
R	•–•
S	•••
T	–
U	••–
V	•••–
W	•––
X	–••–
Y	–•––
Z	––••
0	–––––
1	•––––
2	••–––
3	•••––
4	••••–
5	•••••
6	–••••
7	––•••
8	–––••
9	––––•
Period	•–•–•–
Comma	––••––
Query	••––••
Slash	–••–•
Dash	–••••–
Break (pause)	–•••–
Semicolon	–•–•–•
Colon	–––•••

Continental code



continuity tester

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 f_1 and a specified upper limit f_2. **2.** A range of electromagnetic frequencies that exhibits similar behavior between its lower and upper limits.

continuous stationery Also called *fanfold 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 specific range of values. An example is a frequency within the 75- to 80-meter 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, and 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.

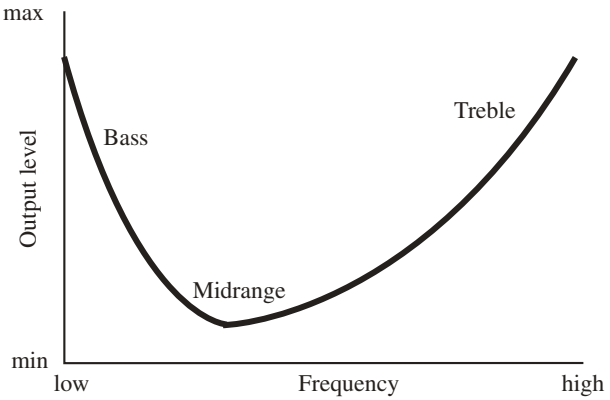
continuous-wave radar See CW RADAR.

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-kHz region, where the human ear is most sensitive.

contours of equal loudness See AUDIBILITY CURVES.

CONTRAN A computer language that requires no compiler, or translating, interface between the operator and the machine. The programming is 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; ex-



contour

cessive 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; in this way, the effect of the varnish would be ascertainable. **3.** As a computer function, understanding and implementing instructions or carrying out tasks, according to specific conditions.

control ampere-turns The ampere-turns of the control winding in a magnetic amplifier.

control block A storage block for control information in a computer.

control bus In a digital computer, the electrical conductors linking the central-processing-unit (CPU) control register to the memory circuits.

control card A card that provides control information for a computer.

control character A character (bit group) used to start the control of a peripheral.

control characteristic A representation (such as a collector-current versus collector-voltage curve) depicting the extent to which the value of one quantity affects or controls the value of another.

control circuit **1.** A circuit in which one signal or process is made to control another signal or process. **2.** 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 concerning 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 amplidyne, 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* or *system 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 QUIESCENT CARRIER OPERATION.

controlled-carrier transmission See QUIESCENT CARRIER OPERATION.

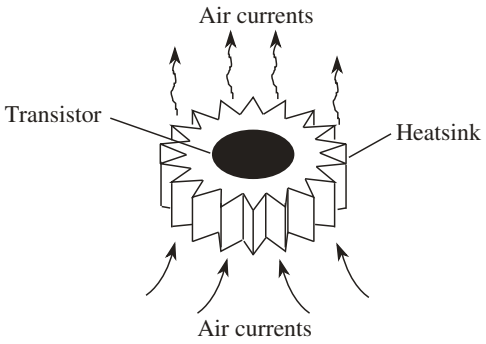
controlled rectifier A rectifier whose dc output can be varied by adjusting the voltage or phase of a signal applied to the control element. See SILICON-CONTROLLED RECTIFIER.

controller **1.** The control signal of an electronic control (or servo), 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 a servo system.

controlling file A computer storage area encompassing several complete magnetic disk cylinders; its size can be changed to accommodate a number of files.

control loop See CONTROL TAPE.
control mark See TAPE MARK.
control panel **1.** An accessible surface on which are mounted switches, buttons, potentiometers, meters, digital indicators, monitoring devices, and other apparatus essential to regulating and supervising an electronic system. **2.** The console that a computer operator or programmer uses to communicate with the central processing unit (CPU).
control plate The metallic plate or disk that serves as the antenna of a CAPACITANCE RELAY or TOUCHPLATE RELAY.
control program A program that arranges computer-operation programs in a certain order. Puts information in the computer memory for later use.
control rectifier A semiconductor diode device, used for the purpose of switching large currents. A small control signal can provide switching of high-power devices.
control register In a computer, the register that stores the address of the next instruction in the program being run.
control sequence The order in which instructions are executed in a digital computer.
control stack In a computer system, a unit of hardware having storage locations and used to perform arithmetic, assist in allocating memory to programs, and to control internal processes.
control statement In a programming language, an instruction that causes some action to be taken, as specified by a condition; it is also applicable to source program statements that affect the compiler's operation without modifying the machine code.
control tape Punched paper or plastic tape in the form of a closed loop and used to control printing devices. Also called *control loop.*
control total For a file or record group, a total derived during an operation; it is used to verify that all the records have been processed similarly.
control transfer The situation in which the control unit of a digital computer leaves the main sequence of instructions and takes its next instruction from an out-of-sequence address.
control transfer instruction See BRANCH INSTRUCTION.
control-voltage winding In a servomotor, the winding that receives a varying voltage of a phase different from that applied to the fixed-voltage windings.
control winding In a magnetic amplifier, the winding that conducts the control-signal current.
control word A word (a bit group) stored in a computer memory and used for a control function.
convection The flow of a gas or liquid that results in the transfer of heat from one location to another.
convection cooling The removal of excess heat from a component, such as a power vacuum tube or transistor, via upward movement of surrounding air that has been heated by the component.



convection cooling

convection current **1.** The motion of current carriers or a charge across the surface of a conductor or dielectric. **2.** Air currents rising above a heat source or heated body.
convective discharge The continuous high-voltage current discharge across a spark gap.
convectron A device that indicates the angle, with respect to the vertical, based on convection cooling of a straight wire. The temperature difference is greatest when the angle is 0 degrees (the wire is vertical); the temperature difference decreases as the angle increases, reaching a minimum at 90 degrees (when the wire is horizontal).
convenience outlet **1.** In North America, a wall outlet providing a nominal 117 volts alternating current (ac) at 60 Hz for common household appliances. **2.** An outlet in a laboratory that provides power for a certain application.
conventional current The notion that current flows from the positive pole to the negative pole in an electric circuit. This representation is used most often by physicists. Electron flow is opposite to conventional current flow; positively charged particles, such as holes, move in the same direction as the conventional current.
convergence **1.** The eventual meeting of values or bodies at some point (sometimes at infinity, as in certain mathematical series). **2.** The intersection point of the beams from separate electron guns in a cathode-ray tube (CRT).
convergence coil One of a pair of coils used in a color television receiver to produce dynamic beam convergence (see CONVERGENCE, **2**).
convergence control In a color television receiver, a potentiometer in the high-voltage circuit for convergence adjustment (see CONVERGENCE, **2**).
convergence electrode An electrode that provides an electrostatic field for converging electron beams. Compare CONVERGENCE MAGNET.
convergence frequency The frequency of the last member of a spectrum series.
convergence magnet An assembly that provides a magnetic field to converge electron beams. Compare CONVERGENCE ELECTRODE.

convergence phase control In a three-gun color picture tube, a variable resistor or variable inductor used to adjust the phase of the dynamic convergence voltage.

convergence plane **1.** In a color picture tube, the plane in which the red, green, and blue beams all focus. **2.** In a cathode-ray tube, the plane in which the electron beam reaches its sharpest focus.

convergent series A mathematical series that approaches a specific, finite numerical value as the number of terms increases. Thus, the series 0.3 + 0.03 + 0.003 + . . . approaches a limiting value of 1/3. Compare DIVERGENT SERIES and INFINITE SERIES.

converging lens A lens having a real focus for parallel rays; generally a *convex lens.*

conversational compiler 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.

conversational mode High-level computer operation or programming, in which the computer gives responses to the operator's input.

conversion **1.** The deliberate mixing of radio-frequency (RF) signals to produce signals at the sum and/or difference frequencies. **2.** The process of changing direct current (dc) to alternating current (ac). **3.** The process of changing low-voltage dc to high-voltage dc. **4.** The changing of a computer file to another format and, possibly, transferring it to a different storage medium (e.g., from tape to internal memory). **5.** The processing of a program or file written for one computer or application into a form suitable for another computer or application.

conversion efficiency In a converter (see CONVERTER, **1**), the ratio of output-signal amplitude to input-signal amplitude. For example, in a superheterodyne converter, a large intermediate-frequency (IF) output for a low radio-frequency (RF) input indicates high conversion efficiency.

conversion equipment In a computer system, an offline device for transferring data from one medium to another [e.g., a disk-to-tape converter (tape drive)]. Also called CONVERTER.

conversion exciter An exciter for transmitters, in which an output signal of a desired frequency is obtained by beating the output of a variable-frequency self-excited oscillator with the output of a fixed-frequency oscillator (such as a crystal oscillator).

conversion gain Amplification as a byproduct of conversion. See CONVERSION EFFICIENCY.

conversion loss Conversion gain of less than 1.

conversion program In computer operations, 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.

conversion time In digital computer operation, the time required for the machine to read out all the digits in a coded word.

conversion transconductance 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 higher-voltage dc. **4.** Conversion equipment. **5.** A circuit or device that changes analog data to digital data or vice versa.

converter amplifier See CHOPPER AMPLIFIER.

converter stage A circuit used principally to mix two signals (such as a received signal and local-oscillator signal in a superheterodyne receiver), and deliver the resultant signal.

convexo-concave Pertaining to a lens having a convex face of greater curvature than its concave face.

coolant A liquid (often water or oil) used to remove heat from an electronic component.

Coolidge X-ray tube An X-ray tube containing a heated filament (with focusing shield) and a slanting tungsten target embedded in a heavy copper anode.

cooling Maintenance of the operating temperature of an electronic component or system at a safe level. Common devices for cooling are heatsinks, circulating or forced air, and circulating liquid.

coordinate bond A covalent bond that consists of a pair of electrons supplied by only one of the atoms joined by the bond.

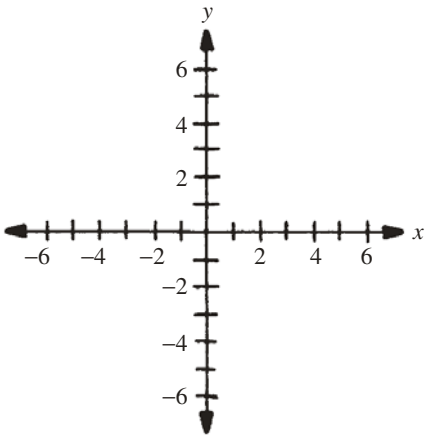
Coordinated Universal Time Abbreviation, UTC. Astronomical time at the Greenwich meridian (zero degrees longitude). The UTC day begins at 0000 hours and ends at 2400 hours. Based on the mean, or average, synodic (sun-based) rotational period of the earth. The earth is slightly behind UTC near June 1, and is slightly ahead near October 1.

coordinate digitizer A device or circuit that encodes a coordinate graph into digital signals for storage or transmission.

coordinate of chromaticity See CHROMATICITY COORDINATE.

coordinates A set of axes with points that can be uniquely defined or located on a line, in a plane, or in space. See CARTESIAN COORDINATES and POLAR COORDINATES.

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.



coordinate system (Cartesian)

coordination complex An ion or compound having a central (usually metallic) ion combined by coordinate bonds with a definite number of surrounding groups, ions, or molecules.

coplanar array A set of antennas that lie in the same plane, and are fed by a common transmission line.

copper Symbol, Cu. A metallic element. Atomic number, 29. Atomic weight, 63.546. An excellent conductor of electricity and heat, commonly used in the manufacture of wires and cables.

copper-clad wire Iron or steel wire plated with copper.

copper-constantan thermocouple A thermocouple consisting of a junction between wires or strips of copper and constantan. Typical output is 4.24 mV at 100°C.

copper loss Power (I^2R) loss in copper wires, cables, and/or coils.

copper-oxide diode A small diode in which the semiconductor material is copper oxide. Such diodes, widely used before the ready availability of selenium and silicon, are still occasionally found in meter-rectifier service.

copper-oxide modulator An amplitude modulator whose action is derived from the nonlinear conduction characteristic of copper-oxide diodes.

copper-oxide photocell A photoelectric cell in which the light-sensitive material is copper oxide.

copper-oxide rectifier A rectifier in which the semiconductor material is copper oxide. Rectifiers of this type are suitable for low-voltage service; they were widely used before the advent of germanium, silicon, and selenium rectifiers.

copper pyrites See CHALCOPYRITE.

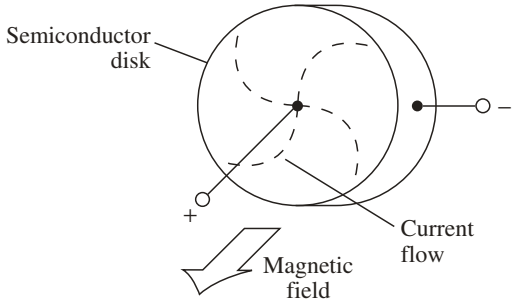
copper-sulfide rectifier A rectifier in which the unilateral junction is between copper-sulfide and magnesium elements. Like the copper-oxide rectifier, the copper-sulfide unit was once widely used in low-voltage applications.

copy **1.** Also called *hard copy.* Printed or written text. **2.** In communications, a qualitative expression of the extent to which received data is intelligible (e.g., a radio operator's signal report, "You are solid (perfect) copy."). **3.** To duplicate data in a storage system, the original being in another system, or in a different location in the same system. **4.** An exact duplicate of data in any form.

copying telegraph A descriptive term for a *facsimile* system.

Corbino disk A variable resistor consisting of a semiconductor disk capable of exhibiting the CORBINO EFFECT. The disk is inserted into an adjustable magnetic field, which serves as the control medium.

Corbino effect A phenomenon similar to the HALL EFFECT, in which a current flows around a disk carrying a radial current when the disk is inserted into a magnetic field whose lines of flux are perpendicular to the disk. Compare HALL EFFECT.



Corbino effect

cord **1.** A length of flexible, insulated cable, usually having two or three conductors. **2.** Tough, insulating string (e.g., *dial cord* or *lacing cord*).

cordless **1.** Descriptive of a plug without a flexible cord. **2.** Pertaining to radio-frequency (RF) or infrared short-range links for communications and control (e.g., a *cordless telephone* set).

cordless keyboard A computer keyboard that employs an infrared (IR), very-high frequency (VHF), or ultra-high-frequency (UHF) transmitter and receiver. Commonly used with so-called Web TV systems and in presentations using a display projection system. Operates according to the same electronic scheme as a CORDLESS MOUSE.

cordless modem See WIRELESS MODEM, 3.

cordless mouse 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 link 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.

core loss Loss of energy in a magnetic core, caused by eddy currents and hysteresis in the core material.

core memory An older memory technology, consisting of a series of small ringshaped magnetic cores, into or out of which data can be written or read by changing the magnetization of the cores.

core plane A usually flat assembly of special magnetic cores, through which pass associated current-conducting wires to provide a CORE MEMORY.

core saturation The condition in which a core of magnetic material accommodates the maximum number of magnetic lines characteristic of that material. Increasing the magnetizing force produces no additional magnetization.

core shift register A shift register that uses special magnetic cores as bistable components. See CORE MEMORY.

core storage A high-speed magnetic core storage unit. Also see CORE MEMORY and CORE PLANE.

core transformer A transformer whose coils are wound around a ferromagnetic core.

core wrapping The placing of an insulating layer over an inductor or transformer core. This minimizes the chances of short-circuiting between the windings and the core material.

core-type induction heater An induction heater in which the body to be heated is magnetically linked, by a core, to the energizing coil. Compare CORELESS INDUCTION HEATER.

corner **1.** An abrupt turn in the axis of a waveguide. **2.** The line, and the region in the vicinity thereof, at which two intersecting plane surfaces meet (e.g., the reflector screen of a CORNER-REFLECTION ANTENNA). The plane surfaces are usually perpendicular to each other. **3.** The point, and the region in the vicinity thereof, at which three intersecting plane surfaces meet. Generally, the plane surfaces are mutually perpendicular. **4.** The passband frequency limit(s) of a bandpass, band-rejection, high-pass, or low-pass filter. **5.** A sharp bend in the attenuation-versus-frequency curve of a bandpass, band-rejection, high-pass, or low-pass filter, depicting the limit(s) of the passband.

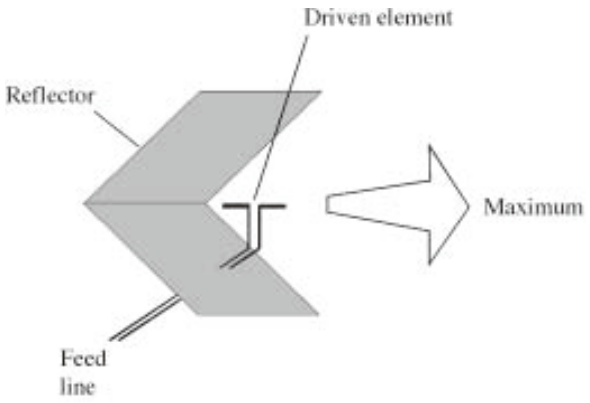
corner diffraction **1.** The bending of sound waves around a corner. **2.** The bending of radio-frequency (RF) energy around an object, when the wavelength is great, compared with the size of the object.

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, **4**.

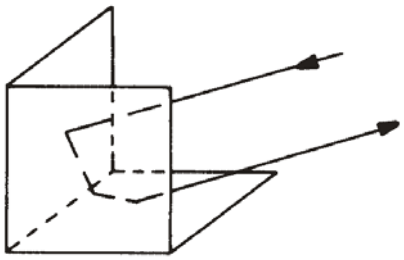
corner reflection The reflection of a beam of light (or of microwave energy or other short-wavelength energy) from a corner reflector, so the beam leaves the reflector in exactly the opposite direction from which it approaches. See CORNER REFLECTOR, **2**.

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, **1**.



corner-reflection antenna

corner reflector **1.** An antenna with a half-wave driven element and a reflector made of wire mesh, screen, or sheet metal that resembles an open folder. The flare angle of the reflecting element is about 90 degrees. The antenna is used at ultra-



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. **2.** Also called *tricorner 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, when the voltage gradient reaches a critical value.

corona failure A form of high-voltage failure, resulting from the erosion of an object (such as an electrical insulator) by corona.

corona loss Loss caused by energy dissipation through a corona. It occurs as a result of the emission of electrons from the surface 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 electric flux.

corona starting voltage The minimum voltage between two electrodes, or on a single electrode in free space, at which corona occurs.

corona voltmeter A voltmeter used to measure the peak value of a voltage 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.

corpuscle A tiny particle. It was the name given to the ELECTRON by some early experimenters and theorists.

correction **1.** The addition of a factor that provides greater accuracy in a measurement. **2.** A change in 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 (bring 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 resistive component of the antenna impedance to the characteristic impedance of a feed line, and also eliminates any reactance that might be present at the antenna feed point.

correed relay A sealed reed relay used as a high-speed switching device in communications equipment.

correlation A statistical expression or measure of the degree to which two sets of data are related. Can be given qualitatively (high-positive, low-positive, zero, low-negative, or high-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 positions.

correspondence The ability of a binocular machine vision system to tell when both of its optical sensors are processing an image from the same object; also, the ability of the system to keep both sensors tracking the same object.

corrosion-resistant Pertaining to materials that are 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.

corruption The altering of data or a code as a result of a program error or machine fault.

COS Abbreviation of COMPLEMENTARY-SYMMETRY CIRCUIT.

cosecant Abbreviation, csc. A trigonometric function; csc $q = c/a$, where c is the hypotenuse of a right triangle and a 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 COSECANT-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. Also abbreviated as csch.

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 yoke A magnetic-deflection yoke that has nonuniform windings for improved focus at the edges of a television picture. Also called *anastigmatic yoke* and *full-focus yoke.*

cosmic noise Radio noise produced by signals from extraterrestrial space.

cosmic rays Extremely penetrating rays consisting of streams of atomic nuclei entering the earth's atmosphere 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.

cost analysis In a commercial or industrial organization, ascertaining the expense associated with a service, process, or job.

cot Abbreviation of COTANGENT.

cotangent Abbreviation, cot. A trigonometric function; cot $q = b/a$, where a is the side adjacent to q and b is the side opposite q (in a right triangle). Cotangent is the reciprocal of tangent: cot $q = 1/\tan q$.

coth Abbreviation of HYPERBOLIC COTANGENT.

Cotton-Mouton effect See KERR MAGNETO-OPTICAL EFFECT.

Cottrell process Dust precipitated by high voltage. Dust in the air is made 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.

coul-cell A coulometer of the electrolytic-cell type.

coulomb (Charles Augustin Coulomb, 1736–1806). Abbreviation, C. The unit of electrical charge quantity, equal to the charge contained in 6.24×10^{18} electrons. A current of one ampere (1 A) represents 1 coulomb per second (C/s).

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.

coulometer An instrument 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 *coulombmeter.*

Coulter 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 **1.** A circuit, such as a cascade of flip-flops, that tracks the 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 impulses 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 Abbreviation, ccw. Pertaining to rotational motion in a sense opposite that of a typical analog clock. Movement is to the left at the top of the rotational circle, and to the right at the bottom of the circle. Compare CLOCKWISE.

counterclockwise-polarized wave An elliptically polarized electromagnetic wave whose electric-intensity vector rotates counterclockwise as observed from the point of propagation. Compare CLOCKWISE-POLARIZED WAVE.

counter efficiency The sensitivity of a radiation counter or scintillation counter to incident X-rays or gamma rays.

counterelectromotive cell A cell used to counteract a direct-current voltage.

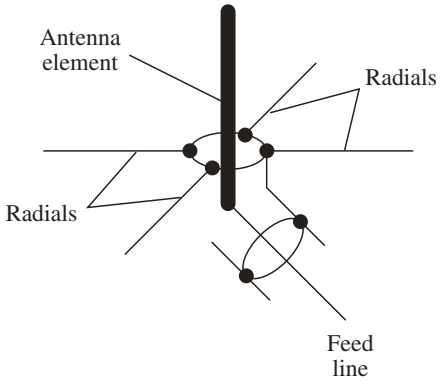
counter EMF See BACK VOLTAGE and KICK-BACK.

counter-meter A radioactivity instrument, such as a Geiger counter, that indicates the number of radioactive particles per unit time.

counterpoise A means of obtaining a radio-frequency (RF) ground by using a grid of wires or tubing in a plane parallel to the earth's surface or

to average terrain. The radius of the grid is usually at least 0.25 wavelength, but might be smaller if the feed-point impedance of the antenna is very high.

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.



counterpoise ground system

counter tube A tube, such as the Geiger-Meuller tube, in which a penetrating radioactive particle ionizes a gas and produces an output pulse.

counter voltage See BACK VOLTAGE and KICKBACK.

counting-type frequency meter A direct-reading analog or digital frequency meter that indicates the number of pulses (or cycles) per second applied to it.

count-remaining technique See COMPLEMENT-SETTING TECHNIQUE.

couple Two dissimilar metals in contact with each other or immersed in an electrolyte.

coupled circuits Circuits between which energy is transferred electrostatically, electromagnetically, by some combination of the two, or by direct connection.

coupled impedance The impedance that a circuit "sees" when it is coupled to another circuit. Thus, when the secondary of a transformer is terminated with an impedance, the primary "sees" a combination of that impedance and its own.

coupler A device for transferring energy between two circuits and using capacitive coupling, direct coupling, inductive coupling, or some combination of these.

coupling **1.** Also called *electrostatic coupling* or *capacitive coupling.* The linking of two circuits or devices by electric flux. **2.** Also called *magnetic coupling* or *inductive coupling.* The linking of two circuits or devices by magnetic flux. **3.** Also called *direct coupling.* The linking of two circuits or devices by direct connection. **4.** Also called *resistive coupling.* The linking of two circuits or devices through a resistance. **5.** Also called *optical coupling.* The linking of two circuits or devices through an optoisolator.

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 COEFFICIENT OF 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 electrostatically 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.

covalent binding forces In a crystal, the binding forces resulting from the sharing of valence electrons by neighboring atoms.

covalent bonding The binding together of the atoms 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.

coversed sine Abbreviation, covers. 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 (1)]. Thus, covers $q = 1 - \sin q$.

CP Abbreviation of *chemically pure.*

cp **1.** Abbreviation of CANDLE POWER. **2.** Abbreviation of *central processor.*

cps **1.** Abbreviation of CYCLES PER SECOND. Cycles per second, to denote ac frequency, has been supplanted by HERTZ. **2.** Abbreviation of *characters per second.*

CPU Abbreviation of CENTRAL PROCESSING UNIT.

CQ A general call signal used in radio communication, especially by amateur stations, to invite a response from any station that hears it.

Cr Symbol for CHROMIUM.

cracked-carbon resistor A high-stability resistor in which the resistance material is particulate carbon.

cracker A hacker with malicious intent (also see HACKER). Such a person attempts to gain access to computer systems or databases in order to steal something or inflict damage. Examples include theft, erasure, or mutilation of data; fraudulent debiting of bank accounts; alteration of credit information; and identity theft.

cradle guard See GUARD WIRE.

cradlephone A telephone set in which the microphone and earphone are mounted on opposite ends of a handle. This handle, called the *receiver*, rests on the crossmember of a stand connected to a base containing the dial and ringing circuits. Also called *French phone, French telephone*, and *handset.*

crash **1.** A condition in which a computer or network server becomes inoperative because of a software or memory-management problem. **2.** In a computer hard disk or diskette drive, contact of the read/write head with the surface of a disk or platter. Usually, it is the result of excessive physical vibration or shock.

crate A foundation unit into which modules are plugged to establish a circuit.

crawl **1.** See CREEPING COMPONENT. **2.** The credits (names of staff and their contribution to content) superimposed and moving on a television picture at the end of a program.

crazing The formation of tiny cracks in materials, particularly in such dielectrics as plastic and ceramic.

creep See COLD FLOW.

creepage Current leakage across the surface of a dielectric.

creeping component A quantity, such as current, voltage, or frequency, that slowly changes in value with time.

crest factor See AMPLITUDE FACTOR.

crest value The maximum amplitude of a composite current or voltage.

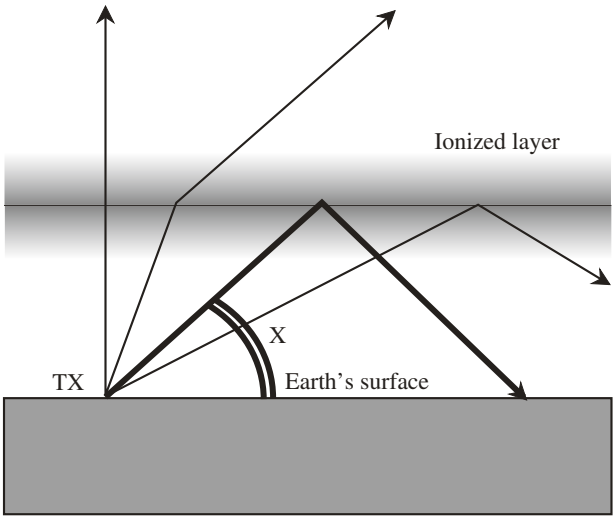
crest voltmeter A peak-reading (or sometimes peak-responsive) voltmeter.

crippled mode The mode of operation for a computer or other hardware in which some of the components are inoperable. Compare GRACEFUL DEGRADATION.

crisscross neutralization See CROSS-CONNECTED NEUTRALIZATION.

crisscross rectifier circuit A conventional bridge rectifier circuit configured in such a way that two of the diodes are connected in crisscross fashion between the input and output terminals.

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 reliably return the signal to the earth, and above which the ionosphere will not reliably return the signal. This 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 angle, 1

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 For a particular layer of the ionosphere, the high frequency at which a vertically propagated wave is no longer reflected back to the earth.

critical inductance In a choke-input power-supply filter, the minimum inductance that will maintain a steady value of average load current.

critical potential The potential difference required for an electron to excite or ionize an atom with which it collides.

critical voltage The voltage at which a gas ionizes.

critical wavelength The wavelength that corresponds to CRITICAL FREQUENCY.

CRO Abbreviation of *cathode-ray oscilloscope.*

Crookes dark space In a glow-discharge tube, the narrow dark space next to the cathode. Also see CROOKES TUBE.

Crookes tube A glow-discharge tube containing an anode, cathode, and a small amount of gas under low pressure.

cross antenna An antenna in which two (usually equal-length) horizontal radiators cross each other at right angles and are connected together to a feeder at their point of intersection. It takes its name from its horizontal-cross shape.

cross assembler A program used with one computer to translate instructions for another computer.

crossband operation **1.** Communications in which two frequency bands are used. Station X, for example, might transmit on frequency f_A in band A and receive on frequency f_B in band B; station Y would then transmit on f_B and receive on f_A. **2.** In satellite communications, the use of two frequency bands to facilitate full-duplex operation and to allow the satellite transponder to effectively function. The transponder receives signals from the earth within a specific frequency band, and converts this entire band of signals to a set of signals that occupies an equal amount of spectrum space on another frequency band. The converted signals are then retransmitted back to earth.

crossbar switch A three-dimensional array of switch contacts in which a magnetic selector chooses individual contacts, according to their coordinates in the matrix.

cross bearings A method of radionavigation, in which directional readings are taken from a receiving station (such as a ship or aircraft) for two fixed transmitting stations whose locations are known. Lines are drawn on a map from the transmitting stations, in directions 180 degrees opposite the bearings obtained from the receiving station. The intersection point of these lines is the location of the receiving station.

cross beat A spurious frequency arising from CROSS MODULATION.

cross-check To compare the result of a calculation or computer routine with the result obtained by a different method.

cross color In the chrominance channel of a color television receiver, crosstalk interference caused by monochrome signals.

cross-connected neutralization Neutralization of a push-pull amplifier by feedback through two capacitors—each connected from the output circuit of one transistor to the input circuit of the other.

cross-coupled multivibrator A multivibrator circuit in which feedback is provided by a coupling capacitor between the output of the second stage and the input of the first stage; the stages are forward-coupled by a capacitor of the same value.

cross coupling **1.** The state of being cross-coupled (see, for example, CROSS-COUPLED MULTIVIBRATOR). **2.** Undesired coupling between two circuits.

cross current A current that flows in the opposite direction from some other current.

crossed-pointer indicator **1.** Also called *crossed-needle meter.* A combination of two analog metering instruments in one case. Each needle has its own independently calibrated scale. A third scale corresponds to the intersection point of the needles. Commonly used in directional wattmeters that simultaneously show forward power, reflected power, and standing-wave ratio (SWR). **2.** A two-pointer meter used in aircraft to show the position of the aircraft, relative to the glide path.

crossed-wire thermoelement Two wires or strips of dissimilar metals joined or twisted at a point that constitutes a thermoelectric junction. In usual operation, a high-frequency current is passed through one wire, and a proportional direct-current (dc) voltage, generated by thermoelectric action, appears at the other wire.

cross flux The magnetic flux component that is perpendicular to the flux produced by field magnets.

cross-hair pattern A television test pattern consisting of a single vertical line and a single horizontal line, which form a simple cross. The pattern resembles the cross hairs of an optical instrument.

crosshatch generator A modulated radio-frequency (RF) signal generator that produces a crosshatch pattern on a picture-tube screen.

crosshatch pattern A grid of horizontal and vertical lines produced on a picture-tube screen by a cross-hatch generator. It is used in checking horizontal and vertical linearity.

cross modulation **1.** A type of radio-frequency interference (RFI) between two strong stations that are close in frequency. The desired carrier is modulated by the interfering signal. **2.** The production of signals by rectifier junctions in pipes and wiring near a radio receiver. These objects pick up waves and deliver energy at a different frequency, which finds its way into the receiver. Also called *external cross modulation.* **3.** The interaction between signals of different frequency when

they magnetize a core of nonlinear magnetic material. Also see CROSSTALK.

cross-modulation factor An expression of the amount of cross modulation (or crosstalk) present in a particular instance. It is equal to M_1/M_2, where M_1 is the modulation percentage that a modulated wave produces in a superimposed unmodulated wave, and M_2 is the modulation percentage of the modulated wave.

cross-neutralized circuit See CROSS-CONNECTED NEUTRALIZATION.

crossover **1.** In a circuit diagram, a point at which lines representing wires intersect, but are not connected. **2.** In a characteristic curve, point at which the plot crosses an axis or operating point. **3.** See CROSSOVER NETWORK.

crossover distortion Distortion of a characteristic at a crossover point (see CROSSOVER, **2**); for example, a bend in the curve where the plot of a waveform passes through zero.

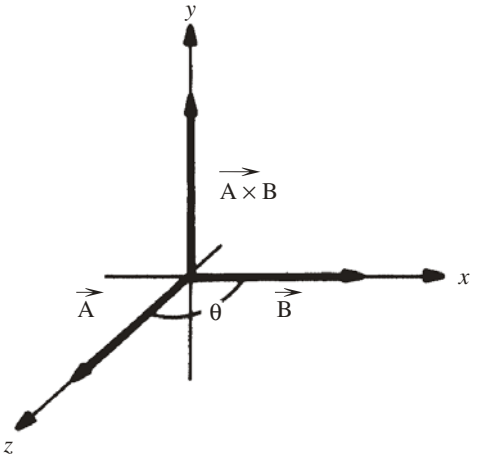
crossover frequency The frequency at which a crossover network delivers equal power to the two circuits it supplies.

crossover network Following final amplification in a sound-reproduction system, an outboard filter circuit that facilitates delivery of the low and high audio frequency (AF) components to the correct speakers.

crossover point See CROSSOVER, **2**.

crossover S-curve The S-shaped image obtained on an oscilloscope screen during sweep-generator alignment of a frequency-modulation (FM) detector. In correct alignment, the exact center of the S-curve (the crossover point) coincides with the zero point on the screen.

cross product Also called *vector product.* For vectors **A** and **B** having lengths A and B, respectively, and subtending an angle θ relative to each other, the cross product $\mathbf{A} \times \mathbf{B}$ points in a direction perpendicular to the plane containing both **A** and **B**. The length of $\mathbf{A} \times \mathbf{B}$ is equal to AB sin θ.



cross product

cross-sectional area **1.** The surface area of a face of a conductor after cutting through it at a right angle. Specified in square inches, square millimeters, or circular mils. **2.** The total of the cross-sectional areas of all the wires in a stranded conductor.

cross-sectional testing In quality assurance and quality control (QA/QC), a 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 solid plastics of solidified encapsulating compounds, so called from its resemblance to a bird's footprint. **2.** In a gravity battery cell, the zinc electrode, so called from its resemblance to a bird's foot.

CRT Abbreviation of CATHODE-RAY TUBE.

crud **1.** Broadband electrical noise, originating inside and/or outside a system. **2.** Undesired signals that interfere with a desired signal.

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.

cryoelectronics The study of the behavior of electronic devices, circuits, and systems 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.

cryosar A semiconductor switch utilizing low-temperature avalanche breakdown.

cryoscope 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

superconductive at a temperature of approximately 4.4 degrees K.

cryotronics Low-temperature electronics, concerned with such phenomena as superconductivity. The term is an acronym from cryogenics and electronics. Also see CRYOGENICS.

cryptanalysis The breaking of ciphers.

crypto- A prefix added to words, that implies encoding for the purpose of changing or hiding the meaning of a message or signal.

cryptography The creating and writing of ciphers.

cryptology The art and science of creating, writing, unscrambling, and breaking ciphers.

crystal **1.** A material distinguished by the arrangement of its atoms into a redundant pattern called a *lattice* that presents, in fragments of various sizes, a characteristic polyhedral shape. Common shapes include cubes, parallelepipeds, and hexagonal prisms. **2.** A fragment of material as defined in (1). **3.** A plate or bar cut from a piece of piezoelectric material.

crystal amplifier **1.** A semiconductor diode circuit using carrier storage. Transistor action and, accordingly, pulse amplification is obtained by alternately making one electrode of the diode an emitter or collector. **2.** Archaic term for TRANSISTOR.

crystal audio receiver An audio radar receiver, consisting of a crystal detector and audio-amplifier stages.

crystal axes The imaginary lines traversing a piezoelectric crystal, along which (or perpendicular to which) plates are cut for oscillators, resonators, or transducers.

crystal calibrator A crystal oscillator used to generate harmonic checkpoints for frequency calibration. Common fundamental calibrator frequencies are 100 kHz and 1 MHz.

crystal capacitor See VARACTOR.

crystal control The control of the operating frequency of a circuit by means of a piezoelectric crystal.

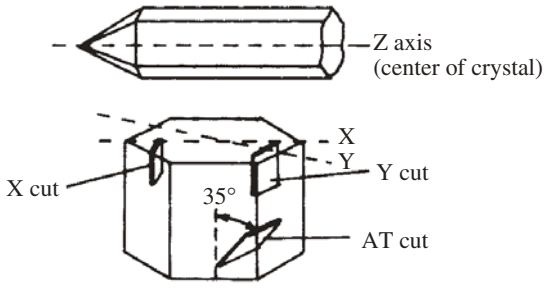
crystal-controlled receiver A superheterodyne radio receiver whose local oscillator is crystal controlled.

crystal-controlled transmitter A radio transmitter whose master oscillator is crystal controlled.

crystal counter A device for counting the frequency of subatomic particles, based on their ability to change the conductivity of a crystal. The particles can be photons, electrons, protons, neutrons, or the nuclei of atoms.

crystal current Current flowing through a crystal; specifically, the radio-frequency (RF) current flowing through a quartz plate in a crystal-controlled oscillator.

crystal cuts The classification of piezoelectric plates according to the angle at which they were cut from a quartz crystal. Common cut designations are AT, BT, CT, DT, X, Y, and Z. Various cuts afford such complementary factors as frequency, temperature, and thickness. Also see CRYSTAL AXES.



crystal cuts

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.

crystal diffraction The tendency of electromagnetic waves to be scattered when passing through a crystal material.

crystal diode Archaic term for SEMICONDUCTOR DIODE. Also see GALLIUM-ARSENIDE DIODE; GERMANIUM DIODE; JUNCTION DIODE; LASER DIODE; POINT-CONTACT DIODE; SELENIUM DIODE; SIGNAL DIODE; SILICON DIODE.

crystal earphone An earphone in which the transducer is a piezoelectric crystal. Electrical impulses applied to the crystal vary its shape and cause a vibration that is transmitted to a diaphragm; this in turn produces corresponding sound waves.

crystal filter See CRYSTAL RESONATOR.

crystal headphone See CRYSTAL EARPHONE.

crystal holder A fixture specially designed to hold a piezoelectric crystal; it ensures minimum distortion of crystal dimensions and minimum residual capacitance, inductance, and resistance.

crystal imperfection A flaw in the lattice structure of a crystal.

crystal lattice The orderly, redundant pattern of atoms and molecules within a crystalline material; it is a characteristic of a given material.

crystal-lattice filter A crystal resonator in which piezoelectric crystals are used to give a desired shape to the filter response curve.

crystalline material A material exhibiting the characteristic properties of a crystal (see CRYSTAL, **1**).

crystallogram An X-ray photograph or other record of crystal structure.

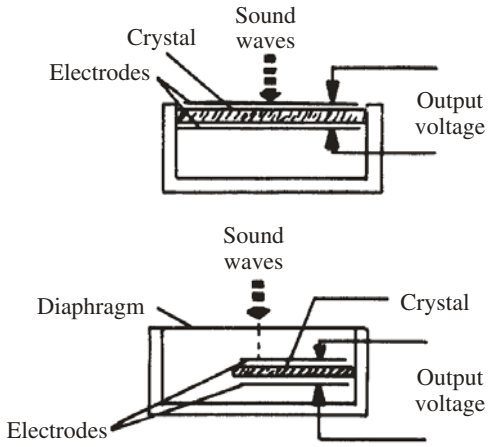
crystallography The science dealing with crystals and their properties (see CRYSTAL, **1**).

crystal loudspeaker A loudspeaker whose transducer is a piezoelectric crystal. Electrical impulses applied to the crystal vary its shape and

cause vibrations that are transmitted to a diaphragm or cone, which produces corresponding sound waves.

crystal meter A rectifier-type ac meter using a semiconductor diode in series with a dc milliammeter or microammeter.

crystal microphone A microphone whose transducer is a natural or synthetic piezoelectric crystal. Sound waves striking the crystal (directly or via a diaphragm) vary its shape, making it produce an audio-frequency (AF) output voltage.



crystal microphones

crystal mixer A mixer (converter) circuit utilizing the nonlinearity of a semiconductor diode to mix signals.

crystal operation **1.** The characteristics of a piezoelectric crystal in a particular circuit. **2.** Crystal frequency control.

crystal oscillator An oscillator whose operating frequency is determined by the dimensions of an oscillating piezoelectric quartz-crystal plate. Compare SELF-EXCITED OSCILLATOR.

crystal oven A constant-temperature chamber for stabilizing the frequency of a quartz crystal by maintaining its operating temperature at a fixed point.

crystal photocell A photoelectric cell in which the light-sensitive material is a crystalline substance, such as germanium, selenium, silicon, etc.

crystal pickup A phonograph pickup whose transducer is a natural or synthetic piezoelectric crystal. The crystal is attached (either directly or through a mechanical linkage) to a stylus, whose movement in the disk groove varies the shape of the crystal. The resultant vibration generates a corresponding audio-frequency (AF) output voltage across the crystal.

crystal probe A radio-frequency (RF) probe, whose rectifying element is a semiconductor diode.

crystal pulling **1.** The extraction of a single crystal from a molten mass of crystalline material. Single crystals are used for high-quality semiconductor devices. Also see CZOCHRALSKI METHOD, SINGLE CRYSTAL, and SINGLE-CRYSTAL MATERIAL. **2.** The use of an inductor or capacitor in a crystal-controlled radio-frequency (RF) oscillator circuit to allow adjustment of the frequency over a small range.

crystal receiver See CRYSTAL SET.

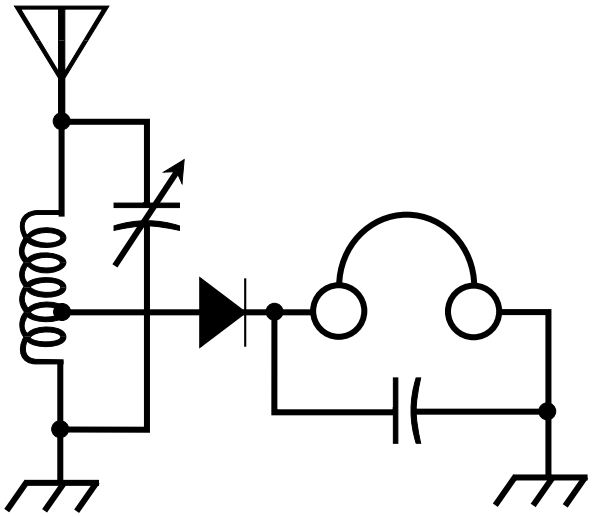
crystal rectifier **1.** A semiconductor diode used for the purpose of rectifying alternating current (dc), usually in a power supply.

crystal resistor A temperature-sensitive resistor made from silicon, and exhibiting a positive temperature coefficient of resistance.

crystal resonator A highly selective resonant circuit in which the center frequency is the resonant frequency of a piezoelectric quartz-crystal plate.

crystal sensor See CRYSTAL TRANSDUCER.

crystal set A simple radio receiver that uses a tuned circuit, semiconductor-diode detector, and earphones.



crystal set

crystal slab See QUARTZ BAR.

crystal socket **1.** A low-capacitance, low-loss socket for a piezoelectric crystal. **2.** A socket for a semiconductor diode.

crystal tester **1.** An oscillator used to check quartz crystals. Most such units check only the crystal's ability to oscillate; more elaborate ones also check crystal current, frequency, temperature coefficient, activity, filter action, etc. **2.** An instrument for checking the electrical characteristics of semiconductor diodes. **3.** An instrument for checking the performance of piezoelectric ceramics.

crystal tetrode A transistor having four elements: emitter, collector, and two bases.

crystal transducer A transducer using a piezoelectric crystal as the sensitive element. Examples: crystal earphone, crystal loudspeaker, crystal microphone, and crystal pickup.

crystal triode See TRANSISTOR.

Cs Symbol for CESIUM.

CS Abbreviation of COMPLEMENTARY SYMMETRY. Also COS.

C_S **1.** Symbol for *standard capacitance.* **2.** Symbol for *source capacitance.*

csc Abbreviation of COSECANT.

C scan See C DISPLAY.

csch Abbreviation of HYPERBOLIC COSECANT.

C scope A cathode-ray tube used in radar to provide a C DISPLAY.

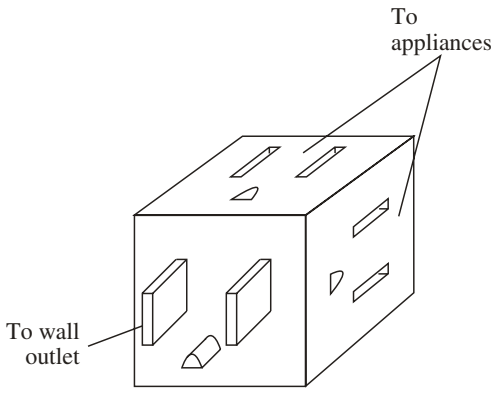
CT-cut crystal A piezoelectric plate cut from a quartz crystal at an angle of rotation around the X-axis of +38°. Such a plate has a zero temperature coefficient of frequency at 25°C. Also see CRYSTAL AXES and CRYSTAL CUTS.

CTL Abbreviation of *complementary-transistor logic.*

Cu Symbol for COPPER.

cube **1.** A regular polyhedron with six identical square faces and eight vertices. At each vertex, three edges converge at mutual right angles. **2.** The third power of a number; thus the cube of n is written n^3.

cube tap An electrical adapter, in which a set of male prongs and three sets of female contacts are on the sides of a molded cube. Allows three appliances to be used with a single electrical socket.



cube tap

cubical antenna An antenna in which the elements form the outline of a geometric cube or rectangular prism. The most common example is the QUAD ANTENNA.

cubical quad antenna See QUAD ANTENNA.

cubic equation A polynomial equation of the third 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 receiver used to pick up cues. Example: a receiver carried by a technician, actor, or lecturer. **2.** A receiver or other pickup circuit that receives a cuing pulse, which it uses to set another circuit.

cu ft Abbreviation of *cubic foot* or *cubic feet.*

cu in Abbreviation of *cubic inch* or *cubic inches.*

cumulative error In a sum or other final value, the total error that has accumulated from the individual errors in the terms. Also called *systematic error.*

cup core A coil core that also forms a magnetic shield around the coil.

cuprous-oxide rectifier See COPPER-OXIDE RECTIFIER.

cur Abbreviation of CURRENT.

curie Abbreviation Ci. A unit of radioactivity; 1 curie is the amount of radiation from (or in equilibrium with) 1 gram of radium. Also equivalent to 3.7×10^{10} atomic breakdowns per second.

Curie point **1.** The temperature above which a ferromagnetic material loses its magnetism or becomes paramagnetic. **2.** The temperature at which the ferroelectric properties of a substance disappear.

curie temperature As a magnetized substance is heated, the lowest temperature at which magnetization is lost. It is generally measured in degrees Celsius or degrees Kelvin. For iron, this temperature is 760 degrees Celsius; for nickel, it is 356 degrees Celsius.

Curie's law For a paramagnetic substance, the ratio of the magnetization to the magnetizing force is inversely proportional to the absolute temperature.

Curie-Weiss law Above the Curie point, the susceptibility of a paramagnetic material varies inversely as the excess of temperature above the Curie point increases. This law is invalid for applications at or below the Curie point.

curium Symbol, Cm. A radioactive metallic element 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 extent 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 *current 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 (always less than one) of output current to input current, I_{out}/I_{in}.

current balance An instrument for determining the size of the ampere. This is done by measuring the force between two current-carrying conductors.

current-balance switch A switch or relay, operated 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.

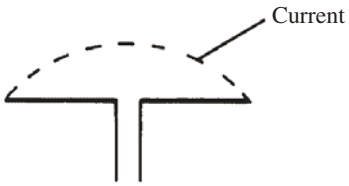
current density The current (usually expressed in amperes per square centimeter) passing through a cross-sectional area of a conductor.

current drain **1.** The current supplied to a load by a generator or generator-equivalent. **2.** The current required by a device for its operation; also, the current taken by the device during standby periods.

current echo Reflected current in a transmission line that is not terminated in an impedance exactly matching its characteristic impedance.

current-fed antenna An antenna in which the transmission 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. Compare VOLTAGE FEED. **2.** In an antenna, feeding it at a current maximum.



Current feed

current feedback **1.** A feedback signal consisting of current fed from the output to the input circuit of an amplifier. **2.** A system or circuit for obtaining current feedback.

current-feedback pair A two-stage, direct-coupled transistor amplifier having direct-current shunt-series feedback.

current flow Charge carriers passing through a solid, liquid, gas, or vacuum. Also see CURRENT and CURRENT DENSITY.

current gain See CURRENT AMPLIFICATION.

current hogging **1.** An undesirable condition that sometimes takes place when two or more transistors are operated in parallel. One device tends to do all the work, taking all the current. The result can be destruction of that device. **2.** 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 characteristic 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 CURRENT 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 inserted into a circuit to limit the current to a prescribed value.

current loop A point on a transmission line or antenna radiator at which the current reaches a local maximum. Compare CURRENT NODE.

current meter A usually direct-reading instrument, such as an ammeter, milliammeter, or microammeter, used to measure current strength. Also see ELECTRONIC CURRENT METER.

current-meter operation The operation of a voltmeter as a current meter by connecting it to respond to the voltage drop across a resistor that carries the current of interest.

current-mode logic In computer operations, transistor logic in which the transistors operate in the unsaturated mode.

current node A point on a transmission line or antenna radiator at which the current reaches a local minimum. Compare CURRENT LOOP.

current noise Electrical noise produced by current flowing through a resistor.

current probe A transformer usually having a snap-around, one-turn coil that picks up energy from a conductor and couples it into an alternating-current ammeter.

current rating **1.** A specified value of operating current. **2.** See CURRENT-CARRYING CAPACITY.

current-regulated supply See CONSTANT-CURRENT SOURCE.

current regulation The stabilization of current at a predetermined level or value.

current regulator See BARRETTER.

current relay A relay actuated by specific values of pickup and dropout current.

current saturation In the operation of a device (such as a transistor, saturable reactor, or magnetic amplifier), the leveling off 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 sensitivity of, or 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, L_S. The low-frequency inductance of a single-layer coil, calculated with the formula $L_S = (0.10028\ a^2N^2)/s$, where L_S is in microhenrys, a is the coil radius in inches, N is the total number of turns, and s 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 amplifier to make the response of the amplifier proportional to input-signal current.

current sink A circuit or device through which a constant current can be maintained.

current-sinking logic A form of bipolar digital logic. Current flows from one stage to the input of the stage immediately before.

current-squared meter An ammeter or milliammeter whose deflection is proportional to the square of the current.

current-stability factor In a common-base connected bipolar transistor, the ratio dI_E/dI_C, where I_E is the emitter current and I_C 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 transformer **1.** A transformer used to increase or decrease current flow. A primary-to-secondary step-up turns ratio reduces the current; a primary-to-secondary step-down turns ratio increases the current. **2.** A particular transformer (as in 1) used to change the range of an alternating-current milliammeter or ammeter.

current vector In a vector diagram, a line with an arrowhead (vector) 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 and voltage 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 alphanumeric display. Commonly used in computers 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 a component or circuit under test, at the same time supplying a sweep voltage to an oscilloscope. The component's output voltage is also presented to the oscilloscope. As a result, the response curve of the component appears on the oscilloscope screen. **2.** A device that produces a permanent record (photographic or graphic) of an electrical phenomenon. Also called OSCILLOGRAPH or RECORDER.

curvilinear trace A trace made on paper with curved vertical lines. The lines are curved to match the arc through which the recording pen swings.

cut-in angle In a semiconductor rectifier circuit, a phase angle slightly greater than zero degrees, at which current conduction begins. Compare CUTOUT ANGLE.

Cutler antenna A parabolic-dish antenna, in which the driven element consists of a waveguide that has two apertures on opposite sides of a resonant cavity.

Cutler feed An aircraft antenna feed system in which radio-frequency (RF) energy is fed to the reflector by a resonant cavity at the end of a waveguide.

Cutler tone control A dual resistance-capacitance (RC) filter circuit of the general bridged-tee variety. Variation of the series leg provides adjustable treble boost; variation of the shunt leg provides adjustable bass boost.

cutoff **1.** The process of reducing some operating parameter, such as collector current, to zero by adjusting the bias at the input electrode. **2.** The point on the characteristic curve of an amplifying device, at which the output current drops to zero under no-signal conditions. **3.** The lowest frequency at which a waveguide will efficiently function. **4.** The frequency or frequencies corresponding to the point or points in a filter response, at which the attenuation is three decibels greater than the lowest attenuation within the passband. See also CUTOFF FREQUENCY.

cutoff attenuator A variable, nondissipating attenuator consisting of a variable length of waveguide used at a frequency below cutoff.

cutoff bias In a transistor or vacuum-tube circuit, the value of control-electrode bias that produces output current cutoff.

cutoff current Symbol, I_{co}. In a transistor, the small collector current that flows when the emitter current is zero (common-base circuit) or when the base current is zero (common-emitter circuit).

cutoff frequency **1.** Symbol, f_{co}. The high frequency at which the current-amplification factor

of a transistor drops to 70.7% of its 1-kHz value. **2.** In a filter, amplifier, or transmission line, the frequency point(s) at which transmission loss or filter rejection begins. It is generally specified as the half-power point(s), or the point(s) at which the attenuation is three decibels, relative to the lowest attenuation. Examples: the high-frequency cutoff of an amplifier and the upper and lower cutoff points of a bandpass filter.

cutoff limiting Output-peak clipping that results from overdrive 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 free space (3×10^8 meters per second) to the cutoff frequency of the waveguide in Hz. The result is thus expressed in meters.

cutout **1.** A device, such as a circuit breaker, that automatically disconnects a circuit, usually to prevent overload, but occasionally to prevent underload. **2.** Emergency switch. **3.** Fuse.

cut-out angle In a semiconductor rectifier circuit, a phase angle slightly less than 180 degrees at which current conduction ceases. Compare CUT-IN ANGLE.

cutout base A fuse block.

cut rate **1.** The speed at which a cutter moves across the 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 filter In a communications receiver, a highly selective filter 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 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 heterodynes a radiotelegraph signal in the intermediate-frequency (IF) amplifier chain, to make audible the continuous-wave dits and dahs. **2.** Sometimes, an external variable-frequency radio-frequency (RF) oscillator, whose output beats against the actual carrier of a continuous-wave radiotelegraph signal, making it audible as dits and dahs. **3.** An unmodulated, unkeyed oscillator.

CW radar A radar system in which radio-frequency (RF) energy is transmitted continuously.

CW reference signal A sinusoidal radio-frequency (RF) signal, used to control the conduction time of a synchronous demodulator in color television.

C_x Symbol for UNKNOWN CAPACITANCE.

cyan Blue-green, one of the three primary pigments.

cyber- A prefix that indicates relevance to, or involvement with, computers, computer systems, and electronic control systems.

cybernetics The study of control system theory in terms of the relationship 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 *prosthesis* (artificial limb). **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 has been, or must be, iterated in a computer program.

cycle index counter A variable that indicates how often a cycle of computer 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 total 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 CYCLIC SHIFT.

cycles per second Abbreviation, cps. Archaic term for HERTZ.

cycle time Pertaining to an operation, the duration of a complete cycle.

cycle timer A timer that switches a circuit or device on and off, according to a predetermined cycle. Also called *programmed 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.

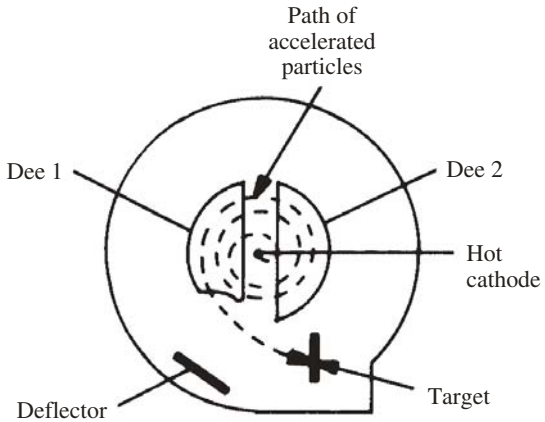
cyclic shift The moving of data out of one end of a storage register and reentering it character-by-character or bit-by-bit at the other end in a closed loop (e.g., 87654 cyclically shifted one place to the right becomes 48765).

cyclic variations Periodic changes in the features of the ionosphere, 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.

cyclogram A method of showing the relationship between two signals on an oscilloscope. The two signals must have a fixed phase relationship.

cyclotron A type of particle 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

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.

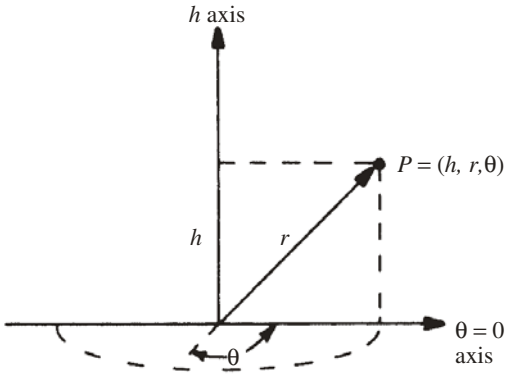
cylinder magnet A permanent magnet in the shape of a cylinder.

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.



cylindrical coordinates

cylindrical magnet See CYLINDER MAGNET.

cylindrical wave An electromagnetic wave whose field surfaces are nearly perfect cylinders.

cylindrical waveguide A waveguide resembling a round pipe.

cylindrical winding A method of coil winding in which the wire is formed into a helix. There might be only one layer, or there might be several layers. The length of the coil is greater than the diameter. Also called a *linear winding.*

Czochralski method A technique for obtaining a relatively large single crystal from a substance, such as the semiconductors germanium and silicon. The method consists essentially of dipping a seed crystal into a molten mass of the same substance, then slowly withdrawing it while rotating it.

D **1.** Symbol for DEUTERIUM. **2.** Symbol for ELECTRIC DISPLACEMENT. **3.** Symbol for ELECTRIC FLUX DENSITY. **4.** Symbol for DISSIPATION FACTOR. **5.** Symbol for *drain* (see DRAIN, **3**). **6.** Abbreviation of DISSIPATION. **7.** Symbol for *determinant.* **8.** Symbol for DIFFUSION CONSTANT.

d **1.** Abbreviation of DECI. **2.** Symbol for DIFFERENTIAL. **3.** Symbol for distance. **4.** Symbol for DENSITY. **5.** Symbol for *drain* (see DRAIN, **3**). **6.** Abbreviation of DISSIPATION. **7.** Abbreviation of day. **8.** Abbreviation of DEGREE. **9.** Abbreviation of diameter. **10.** Abbreviation of DRIVE.

D/A Abbreviation of DIGITAL-TO-ANALOG. See DIGITAL-TO-ANALOG CONVERSION.

dA **1.** Symbol for DIFFERENTIAL OF AREA. **2.** Symbol for *differential of amplification.* **3.** Seldom-used abbreviation of *deciampere.*

da Abbreviation of DEKA.

DAC Abbreviation of DIGITAL-TO-ANALOG CONVERTER.

DACI Abbreviation of *direct adjacent-channel interference.*

DAGC Abbreviation of DELAYED AUTOMATIC GAIN CONTROL.

daisy chain A method of transferring a signal in a computer from one stage to the next.

daisy wheel A form of printing device consisting of a disk having several dozen radial spokes, each of which has a character molded on its face. The disk rotates to the proper position in the printing process, and a hammer strikes the spoke to press the molding against the ribbon and paper.

DAM Abbreviation of *data-addressed memory.*

Damon effect The change that the susceptibility of ferrite undergoes under the influence of high RF power.

damped galvanometer A galvanometer with a provision for overswing limiting or oscillation prevention.

damped loudspeaker A loudspeaker in which undesirable excursions are prevented by damping in the associated amplifier or speaker circuit.

damped meter **1.** A meter with a provision for overswing limiting or oscillation prevention. **2.** A meter that is protected during transport by a shorting bus between the two meter terminals.

damped natural frequency **1.** The frequency at which a damped system having one degree of freedom will oscillate after momentary application of a transient force. **2.** In the presence of damping, the rate at which a sensing element oscillates freely.

damped oscillations Oscillations in which the amplitude of each peak is lower than that of the preceding one; the oscillation eventually dies out (the amplitude becomes zero). Compare CONTINUOUS WAVE.

damped speaker See DAMPED LOUDSPEAKER.

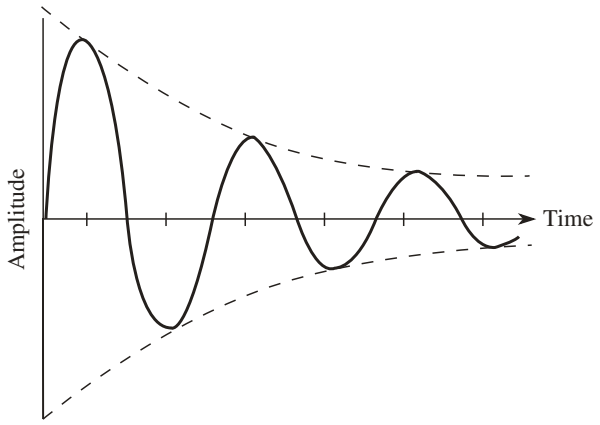
damped wave A wave whose successive peaks decrease in amplitude (i.e., it decays), eventually reaching an amplitude of zero. Compare CONTINUOUS WAVE and UNDAMPED WAVE.

damped-wave decay See DECREMENT, **1**.

dampen To cause the amplitude of a signal to decay.

damper See DAMPING DIODE.

damper diode See DAMPING DIODE.



damped wave

damper winding A special short-circuited motor winding that opposes pulsation or rotation of the magnetic field.

damping **1.** See DAMPING ACTION. **2.** In a loudspeaker, sound-absorbent material used to minimize resonant effects within the enclosure.

damping action **1.** Quenching action. **2.** The prevention of overswing, dither, or flutter in a meter or loudspeaker (see DAMPED GALVANOMETER, DAMPED LOUDSPEAKER, DAMPED METER). **3.** The prevention of oscillation or ringing in a circuit. **4.** Inhibition of the vibration of an acoustic transducer to prevent ringing and other unwanted effects.

damping coefficient A figure expressing the ratio of the damping in a system to critical damping.

damping diode A diode used to prevent oscillation in an electric circuit (e.g., the diode that prevents ringing in the power supply of a television receiver). Also called *damper.*

damping factor **1.** Symbol, *a.* For a coil of inductance L and RF resistance R in a damped-wave circuit, the value $R/2L$, where L is in henrys and R in ohms. **2.** Abbreviation, F_o. For a torque motor, the ratio of the stall torque to the no-load rotational speed.

damping magnet A permanent magnet so situated, with respect to a moving conductor, disk, or plate, that the resulting field opposes the movement.

damping ratio See DAMPING COEFFICIENT.

damping resistance **1.** The value of shunt resistance required to prevent ringing in a coil. **2.** The value of resistance required for critical damping of a galvanometer.

damping resistor **1.** A shunt across a coil to prevent ringing. **2.** A resistor used to provide critical damping of a galvanometer.

Daniell cell A nonpolarizing primary wet cell with zinc (negative) and copper (positive) electrodes. The zinc plate is in a porous cup containing a weak zinc-sulfate solution with a little sulfuric acid; the cup is in a jar filled with a saturated copper-sulfate solution in which the copper electrode is immersed. Typical voltage for the cell is 1.1 V.

daraf The unit of ELASTANCE. Elastance in darafs is the reciprocal of capacitance in farads.

dark conduction The flow of dark current in a photoconductive or glow-discharge device.

dark current The usually tiny current flowing through a darkened photoconductive cell, phototransistor, or glow-discharge device.

dark discharge The occurrence of a discharge in a gas, without the production of visible light.

dark-spot signal A spurious signal generated by some camera tubes, arising from secondary-emission effects.

dark-trace tube An oscilloscope tube on whose white screen a long-persistence magenta image is traced by the electron beam. Illuminating the screen with bright light intensifies the image.

Darlington amplifier A high-gain amplifier that uses a COMPOUND CONNECTION of two bipolar transistors.

Darlington pair See COMPOUND CONNECTION.

D'Arsonval current A large, low-voltage, high-frequency current at one time thought to be therapeutic.

D'Arsonval meter A electromechanical analog meter, in which a coil turns on jeweled pivots between the poles of a strong magnet and against the force of spiral springs. A pointer is attached to the coil. The pointer moves over a calibrated scale.

D'Arsonval movement The mechanism of a D'Arsonval meter.

DART Abbreviation of *data analysis recording tape.*

dart leader A flow of electrons along a path traveled by a lightning stroke, preceding a second stroke. The dart leader, if any, occurs a few milliseconds after the first stroke. Several strokes could occur, each preceded by a dart leader, within less than 1 second.

dash The longer of the two characters (DOT and DASH) of the telegraph code. The duration of the dash is three times longer than that of a dot.

dashpot A delayed-action device in which the movement of a piston is slowed by air or a liquid in a closed cylinder.

dashpot relay A time-delay relay assembly in which the delay is obtained with a DASHPOT.

DAT **1.** Abbreviation of DIGITAL AUDIO TAPE. **2.** Abbreviation of *diffused-alloy transistor.*

data **1.** A collection of digital bits (binary digits) with informational content (e.g., a computer file, a digital image, or a digital sound recording). **2.** General expression for information, especially in encoded or written form.

data acquisition The reception and gathering of data (see DATA COLLECTION and DATA SYSTEM, **1**).

data-acquisition system A computer or dumb terminal used to gather data from one or more external points.

data analysis display unit A video display peripheral for online data analysis.

data area A computer memory 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 system users through remote terminals.

database **1.** 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, **1**.

datacom Acronym for DATA COMMUNICATION.

data communication The transmission and reception of data signals between or among points in a system.

data communication 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 amplitude 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 (A/D), digital to analog (D/A), parallel to serial, or serial to parallel.

data converter **1.** A circuit or device for performing DATA CONVERSION. **2.** An analog-to-digital (A/D) converter. **3.** A digital-to-analog (D/A) converter. **4.** A parallel-to-serial converter. **5.** A serial-to-parallel converter.

data description The description of a unit of data, as included in 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-flow 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, 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 source program.

data pickup **1.** A transducer that collects data signals from a source; it converts nonelectrical data into corresponding electrical signals and delivers its output to a data processing system. **2.** Data acquisition.

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 or the results of a computation. **2.** A permanent printed record, usually of a calculation or computation—especially the printed output of a computer peripheral device.

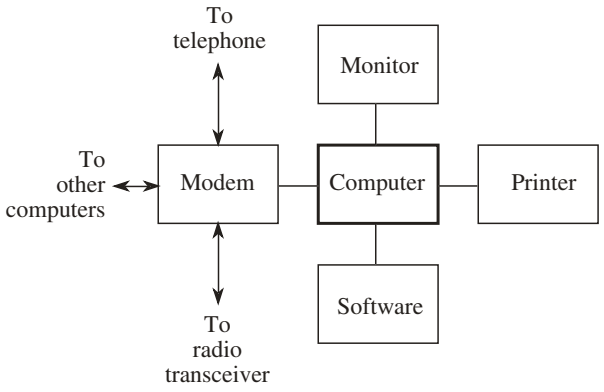
data processing Work performed on acquired data, as in solving problems, making comparisons, classifying material, organizing files. Usually done by a computer.

data-processing equipment A digital computer and the peripheral equipment needed to collate, 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-processing system An electronic system for automatic data processing. It can be based on analog and/or digital techniques.

data processor See DATA-PROCESSING MACHINE.



data-processing system

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 unit.

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 telegraph or telephone 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, and that can be used to actuate indicating instruments during tests or measurements.

data statement A computer source 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 (i.e., 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 electrical quantities 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 text word, or an object such as a circle in vector graphics).

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 paths 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.

DB **1.** Abbreviation of DIFFUSED BASE of a transistor. **2.** Abbreviation of DOUBLE BREAK (relay).

dB **1.** Abbreviation of DECIBEL or *decibels.* **2.** Symbol for *differential of susceptance.*

dBa Abbreviation of ADJUSTED DECIBELS.

dBc Abbreviation of *decibels referred to the carrier.*

DBD Abbreviation of *double-base diode.*

dBd The power gain of an antenna in the direction of maximum radiation, compared to the radiation in the favored direction of a half-wave dipole in free space receiving the same amount of power. Expressed in decibels.

dBi The power gain of an antenna in the direction of maximum radiation, compared to the radiation from a theoretical isotropic antenna in free space receiving the same amount of power. Expressed in decibels.

dBj The level of an RF signal, in decibels, relative to 1 millivolt.

dBk Abbreviation of DECIBELS REFERRED TO 1 KILOWATT.

DBM Abbreviation of *database management.*

dBm Abbreviation of DECIBELS REFERRED TO 1 MILLIWATT.

dBm0 Signal level in dBm, referred to a zero-transmission level.

dBm0p Noise in dBm0, measured with set phosphometric weighting.

dB meter A usually high-impedance ac voltmeter with a scale reading directly in decibels.

dBmp The level in dBm, measured with phosphometric weighting. Generally equal to dBm –2.5, for a noise level that is flat within the communications audio range.

dBmr Decibels measured with respect to zero transmission level.

dBmV Abbreviation of DECIBELS REFERRED TO 1 MILLIVOLT.

dBrap Abbreviation of DECIBELS ABOVE REFERENCE ACOUSTIC POWER (10^{-6} W).

dBrn Abbreviation for *decibels above reference noise.* A level of 0 dBrn is defined as noise power of 10^{-9} W (1 nanowatt).

dBrnc Noise power in dBrn for a circuit with message weighting c.

dBrnc0 Noise in dBrnc measured with respect to zero transmission level.

dBV Abbreviation of DECIBELS REFERRED TO 1 VOLT.

dBW Abbreviation of DECIBELS REFERRED TO 1 WATT.

dBx Abbreviation of DECIBELS ABOVE REFERENCE COUPLING.

dC Symbol for *differential of capacitance.*

dc **1.** Abbreviation of DIRECT CURRENT. **2.** Abbreviation of *direct-coupled.*

dc-ac converter A circuit that converts a dc input voltage into an ac output voltage, with or without step-up or step-down. Also called INVERTER.

dc alpha The current amplification factor (ALPHA) of a common-base transistor stage for a dc input (emitter) signal. Compare DC BETA.

dc amplifier **1.** A *direct-coupled amplifier.* 2. An amplifier for boosting direct-current signals.

dc balance **1.** Adjustment of a circuit or device for dc stability or dc null. **2.** Adjustment of a circuit for dc stability during gain changes. **3.** A potentiometer or other variable component used to stabilize or null a dc circuit.

dc bar See DC BUS.

dc base current Symbol, $I_{B(dc)}$. The static direct current in the base element of a bipolar transistor.

dc base resistance Symbol, $R_{B(dc)}$. The static dc resistance of a bipolar transistor's base element; $R_{B(dc)} = V_B/I_B$.

dc base voltage Symbol, $V_{B(dc)}$. The static dc voltage at 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 ALPHA.

dc block A coaxial section that has a capacitance in series with the inner or outer conductor, or both, to block dc while passing RF. Compare DC SHORT.

dc bus A supply conductor carrying direct current only.

dcc Abbreviation of double cotton covered (wire).

dc cathode current Symbol, $I_{K(dc)}$. The static direct current in the cathode element of an electron tube.

dc cathode resistance Symbol, $R_{K(dc)}$. The static dc resistance of the cathode path of an electron tube.

dc cathode voltage Symbol, $V_{K(dc)}$. The static dc voltage at the cathode of an electron tube.

dc circuit breaker A circuit breaker operated by direct-current overload or underload, depending on its design and application.

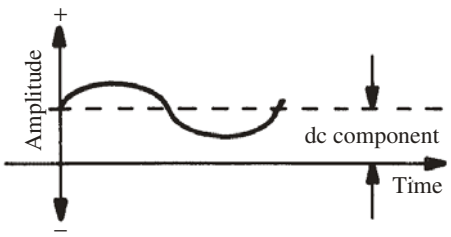
dc collector current Symbol, $I_{C(dc)}$. The static direct current in the collector element of a bipolar transistor.

dc collector resistance Symbol, $R_{C(dc)}$. The static dc resistance of a bipolar transistor's collector element; $R_{C(dc)} = V_C/I_C$.

dc collector voltage Symbol, $V_{C(dc)}$. The static dc voltage at the collector element of a bipolar transistor.

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 alternates, 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

chanically to a higher-voltage dc generator. Compare DC INVERTER.

dc coupling See DIRECT COUPLING.

dc drain current Symbol, $I_{D(dc)}$. The static direct current in the drain element of a field-effect transistor.

dc drain resistance Symbol, $R_{D(dc)}$. The static dc resistance of an FET's drain element; $R_{D(dc)} = V_D/I_D$.

dc drain voltage Symbol, $V_{D(dc)}$. The static dc voltage at the drain element of a field-effect transistor.

dc dump In digital computer operation, removing dc power from a computer, which would eradicate material stored in a volatile memory.

dc emitter current Symbol, $I_{E(dc)}$. The static direct current in the emitter element of a bipolar transistor.

dc emitter resistance Symbol, $R_{E(dc)}$. The static dc resistance of a bipolar transistor's emitter element; $R_{E(dc)} = V_E/I_E$.

dc emitter voltage Symbol, $V_{E(dc)}$. 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 erase head In a magnetic 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, $I_{G(dc)}$. The very small static direct current in the gate element of a field-effect transistor.

dc gate resistance Symbol, $R_{G(dc)}$. The very high, static dc resistance of an FET's gate element; $R_{G(dc)} = V_G/I_G$.

dc gate voltage Symbol, $V_{G(dc)}$. 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 DYNAMOELECTRIC MACHINERY. **2.** Generically, a device that produces direct current: batteries, photocells, thermocouples, 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 AMPLIDYNE.

dc grid bias Steady dc control-grid voltage used to set the operating point of an electron tube.

dc grid current Symbol, $I_{G(dc)}$. The static direct current in the control-grid element of an electron tube.

dc grid resistance Symbol, $R_{G(dc)}$. The static dc resistance in the control-grid element of an electron tube; $R_{G(dc)} = V_G/I_G$.

dc grid voltage Symbol, $V_{G(dc)}$. 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.

dc inverter An electrical, electronic, or mechanical device that converts dc to ac. Also called INVERTER.

dcl Abbreviation of *dynamic load characteristic.*

dc leakage The unintended flow of direct current.

dc leakage current **1.** The direct current that normally passes through a correctly polarized electrolytic capacitor operated at its rated dc working voltage. **2.** The zero-signal reverse current in a semiconductor pn junction.

DCM Abbreviation of DIGITAL CAPACITANCE METER.

D/CMOS Combination of DMOS and CMOS on a monolithic chip.

dc motor A motor that operates from direct current only.

dc noise Noise heard during the playback of magnetic tape that was recorded while direct current was in the record head.

dc noise margin In a digital or switching circuit, the difference $V_o - V_i$, where V_o is the output-voltage level of a driver gate and V_i is the input threshold voltage of a driven gate.

dc operating point For a bipolar transistor, field-effect transistor, or vacuum tube, the static, zero-signal dc voltage and current levels.

dc overcurrent relay A relay or relay circuit actuated by dc coil current rising above a specified level. Compare DC UNDERCURRENT RELAY.

dc overvoltage relay A relay or relay circuit actuated as a result of the dc coil voltage rising above a specified level. Compare DC UNDERVOLTAGE RELAY.

dc patch bay A patch bay in which the dc circuits of a system are terminated.

dc picture transmission In television, transmission of the dc component of the video signal; this component corresponds to the average illumination of the scene.

dc plate current Symbol, $I_{P(dc)}$. The static direct current in the plate element of an electron tube.

dc plate resistance Symbol, $R_{P(dc)}$. The static dc resistance of the internal plate-cathode path of an electron tube; $R_{P(dc)} = V_P/I_P$.

dc plate voltage Symbol, $V_{P(dc)}$. The static dc voltage at the plate electrode of an electron tube.

dc positioning Alignment of the spot on the screen of an oscilloscope tube, by means of adjustable dc voltages applied to the horizontal and vertical deflecting plates.

dc power Symbol, P_{dc}. Unit, watt. The power in a dc circuit; $P_{dc} = EI$, where E is in volts and I is in amperes. Compare AC POWER. Also see POWER.

dc 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.

dc relay A relay having a simple coil and core system for closure by direct current, which can be rectified ac.

dc resistance Resistance offered to direct current, as opposed to in-phase ac resistance.

dc resistivity The resistivity of a sample of material measured using a pure dc voltage under specified conditions (physical dimensions, temperature, etc.).

dc restoration The reinsertion of the dc component into a signal from which the component has been extracted through a capacitor or transformer.

dc 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.

DCS Abbreviation of DORSAL COLUMN STIMULATOR.

dc shift A shift in the DC OPERATING POINT.

dc short A coaxial fitting providing a dc path between the center and outer conductors, while permitting radio-frequency (RF) current to flow easily through the coaxial section. Compare DC BLOCK.

dc signaling A signaling procedure that uses direct current as the medium (e.g., simple wire telegraphy or telephony).

dc source **1.** DC GENERATOR. **2.** A live circuit point from which one or more direct currents can be taken.

dc source current Symbol, $I_{S(dc)}$. The static direct current in the source element of a field-effect transistor.

dc source resistance Symbol, $R_{S(dc)}$. The static dc resistance of an FET's source element.

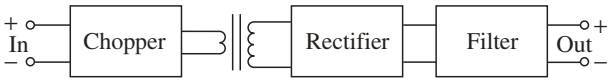
dc source voltage Symbol, $V_{S(dc)}$. The static dc voltage at the source element of a field-effect transistor.

DCTL Abbreviation of DIRECT-COUPLED TRANSISTOR LOGIC.

dc-to-dc inverter See DC INVERTER.

dc transducer **1.** A transducer that depends on direct current for its operation (i.e., it has a dc power supply whose output is modulated by the sensed phenomenon). **2.** A transducer that converts a direct current into some other form of energy, such as heat, pressure, or sound.

dc transformer A dc-to-dc 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.



dc transformer

dc 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.

dc tuning voltage The capacitance-varying dc voltage applied to a varactor in an inductance-capacitance (LC) tuned circuit.

dcu Abbreviation of decimal counting unit.

dc 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.

dc 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.

dcv Abbreviation of DC VOLTS or DC VOLTAGE.

dc voltage Abbreviation, dcv. A voltage that does not change in polarity, an example being the voltage delivered by a battery or dc generator. Also see VOLTAGE.

dc working voltage Abbreviation, dcwv. The rated dc voltage at which a component can be operated continuously with safety and reliability.

dc working volts Abbreviation, dcwv. The actual value, expressed in volts, of a DC WORKING VOLTAGE.

dcwv Abbreviation of DC WORKING VOLTAGE.

dD Symbol for *differential of electric displacement.*

DDA Abbreviation of *digital differential analyzer.*

DDD Abbreviation of DIRECT DISTANCE DIALING (telephone).

D display See D SCOPE.

DE Abbreviation of *decision element.*

dE Symbol for *differential of voltage.*

deac In frequency-modulation (FM) receivers, a device used for deemphasis. The name is short for *deaccentuator.*

deactuating pressure For an electrical contact, the pressure at which contact is made or broken as the pressure reaches the level of activation.

dead **1.** Unelectrified. **2.** Lacking electromagnetic signals or fields. **3.** Electrically or mechanically inoperative.

dead 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.

deadbeat 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.

deadbeat galvanometer See DEADBEAT INSTRUMENT.

deadbeat instrument A meter or recorder that is highly damped to ensure that overswing or oscillation does not occur.

deadbeat meter See DEADBEAT INSTRUMENT.

dead break 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 voltage-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 dimensions 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 related events 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.

debatable time Computer time that cannot be placed in any other category.

debounced switch A switch in sensitive computer or control systems that has circuitry for eliminating the electrical effects of bounce (see BOUNCE, **1**).

de Broglie waves Electromagnetic waves that are believed to be associated with moving particles (such as electrons, protons, and neutrons).

debug **1.** To eliminate errors in, and maximize the efficiency of, a computer program or group of programs. **2.** To optimize the design and construction of electronic equipment.

debugging A process by which engineers eliminate the flaws in a circuit, machine, or computer program.

debugging aid routine A computer program used to test other programs.

debugging period The time interval following completion of a software design, a hardware interconnection, or the manufacture of a piece of electronic equipment, during which errors and imperfections are sought and corrected.

debunching In a velocity-modulated tube, such as a Klystron, a beamspreading space-charge effect that destroys electron bunching.

Debye length The maximum distance between an electron and a positive ion over which the electron is influenced by the field of the ion.

Debye shielding distance See DEBYE LENGTH.

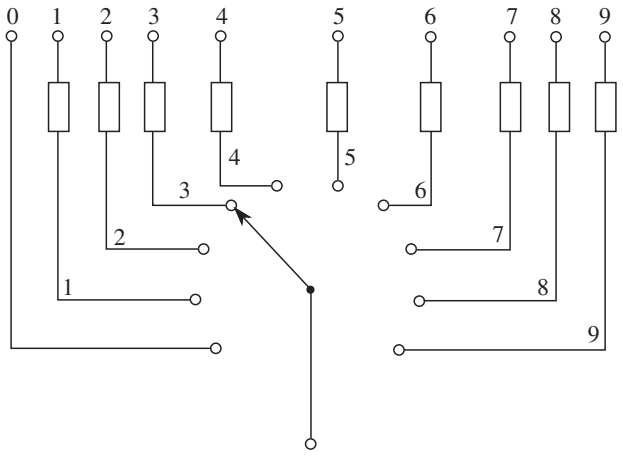
deca- A prefix that indicates multiplication by 10.

decade **1.** A frequency band whose upper limit is 10 times the lower limit. Example: 20 Hz to 200 Hz. **2.** A set of 10 switched or selectable components in which the total value is 10 times that of individual values. Example: a *decade capacitor*. Also called DECADE BOX. **3.** A group, sometimes a unit of access, of 10 computer storage locations.

decade amplifier An amplifier or preamplifier whose gain can 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, DECADE CAPACITOR.

decade capacitor A composite capacitor whose value is variable in 10 equal steps. For example, the values might be set at 100 picofarads (pF), 200 pF, 300 pF, etc., up to 1000 pF. Compare DECADE INDUCTOR and DECADE RESISTOR.



decade box

decade counter A counter (see COUNTER, **1**, **2**) in which the numeric display is 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 steps. 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 counter (i.e., a circuit delivering one output pulse for each group of 10 input pulses).

decametric waves Waves in the 10- to 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 parameter; usually an exponential function. **2.** The persistence time in a storage oscilloscope.

decay curve A curve, usually logarithmic, representing the function of quantity versus time for a signal decrement, the decrement of radioactivity, or other natural process.

decay rate A quantitative expression for the rapidity 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 FALL TIME.

Decca A 70- to 130-kHz CW radio navigation system (British).

decelerated electron A high-speed electron that is abruptly decelerated upon striking a target, causing X-rays to be emitted.

decelerating electrode A charged electrode that slows the electrons in an electron beam.

deceleration Acceleration that results in a decrease 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 mechanical 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 which the computing equipment is distributed among managerial subgroups.

deception A method of producing misleading echoes in enemy radar.

deception device A radar device, or radar-associated device, for deception.

deci- Abbreviation, d. A prefix meaning one-tenth (10^{-1}). Examples: DECIBEL, DECIMETER.

decibel Abbreviation, dB. A practical unit of relative gain. In terms of power, the relative gain in decibels is equal to:

$$\text{Gain (dB)} = 10 \log_{10}(P_{out}/P_{in}),$$

where P_{out} is the output power and P_{in} is the input power. For voltage, if the input and output impedances are the same, the gain in decibels is given by:

$$\text{Gain (dB)} = 20 \log_{10}(V_{out}/V_{in}),$$

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:

$$\text{Gain (dB)} = 20 \log_{10}(I_{out}/I_{in}),$$

where I_{out} is the output current and I_{in} is the input current. Losses are indicated by negative dB gain values.

decibels above reference acoustic power Abbreviation, dBrap. The ratio of a given acoustic power level to a lower reference acoustic power level, specified in decibels.

decibels above reference noise Abbreviation, dBrn. The ratio of the noise level at a selected point in a circuit to a lower reference noise level, in decibels.

decibels referred to 1 millivolt Abbreviation, dBmV. The relative voltage level of a signal when compared with a 1-mV signal measured at the same terminals.

decibels referred to 1 milliwatt Abbreviation, dBm. The ratio, in decibels, of an applied power level to the power level of 1 mW.

decibels referred to 1 volt Abbreviation, dBV. The ratio, in decibels, of a given voltage to 1 V, expressed in decibels.

decibels referred to 1 watt Abbreviation, dBW. The ratio of a given power level to the power level of 1 W, expressed in decibels.

decider See DECISION ELEMENT.

decigram A unit of mass equal to 0.1 gram.

deciliter A unit of volume equal to 0.1 liter, or 10^{-4} cubic meter.

decilog A unit equal to 0.1 times the common logarithm of a ratio.

decimal **1.** Pertaining to the base-10 number system (see DECIMAL NUMBER SYSTEM). **2.** A base-10 numerical fraction, represented by figures to the right of the radix point (decimal point), and arranged serially according to negative powers of 10. Examples: $0.12 = 1.2 \times 10^{-1}$, $0.00135 = 1.35 \times 10^{-3}$.

decimal attenuator An attenuator circuit whose resistances are chosen for attenuation in decimal steps. Thus, one section provides attenuation in steps of 0.1 times the applied voltage, another in steps of 0.01 times the applied voltage, another in steps of 0.001 times the applied voltage, etc.

decimal code A method of defining numbers, in which each place has a value of ten times that immediately to the right.

decimal-coded digit **1.** A numeral from 0 to 9. **2.** A numeral in the DECIMAL NUMBER SYSTEM. **3.** A binary representation of a decimal value from 0 to 9.

decimal digit A numeral from 0 to 9.

decimal equivalent The decimal number equal to a given fraction (e.g., the decimal equivalent of $^{21}/_{64}$ is 0.3281).

decimal fraction See DECIMAL, 2.

decimal notation See DECIMAL NUMBER SYSTEM.

decimal number system The familiar base-10 or radix-10 number system, in which the digits 0 through 9 represent values according to their position, relative to the decimal point (also called the *radix point*). Positions to the left of the point represent successive positive powers of 10, and those to the right represent successive negative powers of 10.

decimal point The radix point in a decimal number. It serves to separate the integral part from the fractional part of the number.

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).*

decineper A natural-logarithmic unit equal to 0.1 *neper.*

decipher See DECODING, **3**.

decision **1.** A choice based on the evaluation and comparison of data, and the identification of a specified objective. **2.** In digital computer operations, the automatic selection of the next step in a sequence, on the basis of data being compared by a relational test.

decision box A block on a computer flowchart indicating the point at which a decision (see DECISION, **2**) must be made as to which of several branches the program will take.

decision elements See LOGIC CIRCUITS.

decision instruction A computer program instruction to compare the values of operands and take an appropriate action, as per the BASIC instruction "IF A = B THEN GO TO (line number)."

decision procedure In decision theory, a series of calculations made to optimize the speed or efficiency of a process, or to minimize risk, failure, cost, etc.

decision theory A statistical discipline concerned with identifying and evaluating choices and alternatives, and determining the best sequence of steps to take in reaching an objective.

decision tree In decision theory, a diagram showing alternative choices, so called from its resemblance to a tree with branches.

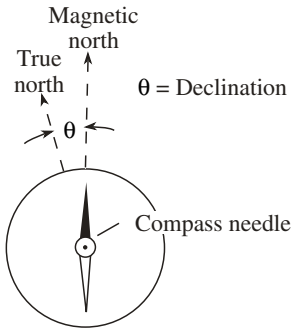
decision value A value that defines the boundary between two intervals in the encoding process.

deck **1.** See TAPE DECK. **2.** A pack of punched cards in a computer file.

declarative macroinstruction As part of an assembly language, instructions to the compiler to do something or record a condition without affecting the object program.

declarative statement A computer source program instruction specifying the size, format, and kind of data elements and variables in a program for a compiler.

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.



declination, 1

declinometer An instrument for measuring declination.

decode **1.** To unscramble a coded message. **2.** In digital computer operations, to deliver a specific output from character-coded inputs. **3.** In a multiplex system, the separation of the subcarrier from the main carrier.

decoder 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. **3.** Translating a message from a secret code (i.e., deciphering a message). **4.** The automatic conversion of a signal into the appropriate switching action (as the enabling of a transmitter or receiver by a tone in a selective calling system).

decoding circuit A circuit intended for the purpose of translating a code into ordinary language.

decollator An offline computer device for separating the parts of output continuous stationery sets. Also see CONTINUOUS STATIONERY.

decommutation The extraction of a signal component from the composite signal, resulting from commutation.

decommutator 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.

decoy In radar, an object that provides misleading reflections. Also see CHAFF.

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 decrement value is the natural (base-*e*) logarithm of the ratio of two successive peaks of the same polarity. **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.

decremeter An instrument for measuring the decrement of a radio wave.

decremeter capacitor A variable capacitor for use in a decremeter. The rotor plates are shaped so that equal angular rotations correspond to the same decrement at all settings. Thus, the percentage 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 commonly recognizable form. Also see CIPHER. Compare ENCRYPTION.

decryption key An algorithm, or a set of algorithms, that converts an encrypted signal from a cipher 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.

dee In a cyclotron, one of the D-shaped chambers in and between which particles accelerate in a spiral path to high velocity.

dee line In a cyclotron, a support for the dee, with which it forms a resonant circuit.

deemphasis In frequency modulation, the introduction of a low-pass characteristic (response falls as modulating frequency increases) to complement the rising response of preemphasis. Also called *postemphasis* or *postequalization.* Compare PREEMPHASIS.

deemphasis amplifier An amplifier used to remove the high-frequency preemphasis applied to signals prior to broadcasting, multiplexing, tape recording, or telemetering. Also see DEEMPHASIS and PREEMPHASIS.

deemphasis circuit A low-pass filter that provides deemphasis in an FM receiver.

deemphasis network See DEEMPHASIS CIRCUIT.

deenergize To take a circuit or device out of operation (i.e., to remove its power or signal excitation).

deep cycle Pertaining to a rechargeable cell or battery that can operate until it is almost completely discharged. It generally has a high ampere-hour capacity.

deep-diffused junction A pn junction made by diffusing the impurity material deep in the semiconductor wafer. Compare SHALLOW-DIFFUSED JUNCTION.

deep discharge The nearly complete discharge of a cell or battery; usually done prior to recharging.

deep-space net A radar system intended for constant monitoring of spacecraft.

defeating **1.** The disabling or circumvention of an alarm or security system, leaving the protected property vulnerable to intrusion. **2.** The dangerous, and potentially lethal, disabling of a safety device in an electrical or electronic system.

defect **1.** Absence of an electron (hence, presence of a hole) in the lattice of a semiconductor crystal. **2.** An abnormality of design, construction, or performance of an electronic circuit or device. **3.** In a computer system, a hardware or software fault that could be the eventual cause of a failure. **4.** A flaw in a crystalline substance.

defect conduction In a semiconductor material, conduction via holes.

deferred addressing Indirect addressing in which a preset counter makes several references to find a desired address.

deferred entry An entry into a computer subroutine, delayed because of a delay in the exit from a control program.

deferred exit An exit from a computer subroutine, delayed because of a particular command.

defibrillation Use of a CARDIAC STIMULATOR to halt fibrillation of the heart, as caused by electric shock.

defibrillator See CARDIAC STIMULATOR.

definite-purpose component A component designed for a specific use, rather than for a wide

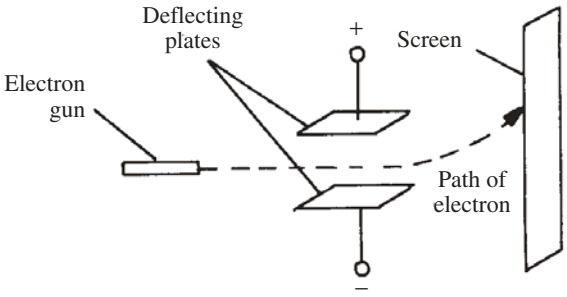
range of possible applications (e.g., a video detector diode, as opposed to a general-purpose diode). Compare GENERAL-PURPOSE COMPONENT.

definition **1.** Clarity of a video image (i.e., one having good contrast and faithful tones). **2.** Good intelligibility of reproduced sounds.

deflecting coil One of a set of external coils carrying sawtooth 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.*

deflecting electrode An electrode, such as a deflecting plate, used to alter the direction an electron beam. Also called *deflection electrode.*

deflecting 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.*



deflecting plate

deflecting torque The torque required to move the pointer of a meter, or the pen or mirror of a recorder.

deflection **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 plane In a cathode-ray tube, the plane perpendicular to the axis of the tube. This plane contains the electromagnetic and/or electrostatic lines of flux that result in deflection of the electron beam.

deflection coil See DEFLECTING COIL.

deflection electrode See DEFLECTING ELECTRODE.

deflection plate See DEFLECTING PLATE.

deflection polarity In a cathode-ray tube, the polarity of the voltage applied to a particular deflecting plate to move the electron beam in a particular direction.

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.

defruiting The elimination of non-synchronized echoes in a radar system.

deg 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.

degausser **1.** A circuit that performs DEGAUSSING. **2.** A device for bulk erasing magnetic tape; also called a *bulk tape eraser.*

degaussing **1.** The demagnetization of 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 thermistor, 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 demagnetizes 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.

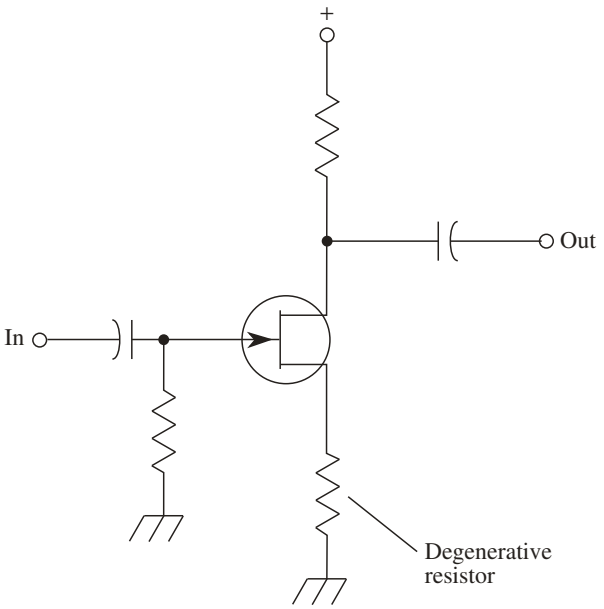
degenerate modes In microwave operations, a set of modes with the same resonant frequency or propagation constant.

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 temperatures.

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.



degenerative resistor

degradation **1.** Gradual deterioration in the condition or performance of a circuit or device. **2.** In a computer system, compromised performance caused by component failure.

degradation failure Failure occurring at the terminal point of degradation.

degraded operation See DEGRADATION.

degreaser See ULTRASONIC CLEANING TANK.

degree **1.** A unit of circular angular measurement equal to $\frac{1}{360}$ of the circumference of a circle. Also called GEOMETRIC DEGREE. **2.** A unit of temperature measurement. See DEGREE ABSOLUTE, DEGREE CELSIUS, DEGREE CENTIGRADE, DEGREE FAHRENHEIT, and DEGREE REAUMUR.

degree absolute Symbol, K. The unit of temperature on the absolute scale. Also see ABSOLUTE SCALE.

degree Celsius Symbol, °C. The unit of temperature on the CELSIUS SCALE.

degree centigrade Symbol, °C. The unit of temperature on the *centigrade scale* (now called CELSIUS SCALE).

degree Fahrenheit Symbol, °F. The unit of temperature on the FAHRENHEIT SCALE.

degree of current rectification For a rectifier, the ratio of the average direct output current to the root-mean-square (rms) alternating input current.

degree of voltage rectification For a rectifier, the ratio of the average direct-current (dc) output voltage to the root-mean-square (rms) alternating-current (ac) input voltage.

degree Reaumur Symbol, °R. The unit of temperature on the REAUMUR SCALE.

degrees of freedom **1.** The ways in which a point can move or a system can change. In three-dimensional space, a rigid body has six degrees of freedom: motion in three linear directions, and rotation around three linear axes extending through its center. **2.** The ways in which a robot arm can move, including linear motion and rotational motion.

degrees 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 angles in radians. To change degrees to radians, multiply degrees by 0.01745. Compare RADIANS-TO-DEGREES CONVERSION.

deion 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.

deionize To restore to an electrically neutral condition (i.e., to convert ions to neutral atoms, as in the deionization of the gas when the discharge in a glow tube is extinguished).

deka- A prefix meaning ten(s) (e.g., DEKAMETER).

dekahexadecimal number system See HEXADECIMAL NUMBER SYSTEM.

delamination The splitting apart, in layers, of an insulating material, such as mica or bonded plastic film.

delay **1.** The interval between the instant at which a signal or force is applied or removed and the instant at which a circuit or 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 retarded 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 behind the other.

delay counter In a digital computer, a device that halts a program run 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 (fax) signal, variations in 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 of weaker signals.

delayed automatic volume control See DELAYED AUTOMATIC GAIN CONTROL.

delayed break In relay or switch operation, contacts separating some time after the switch has been thrown or the relay deenergized. Compare DELAYED MAKE.

delayed close See DELAYED MAKE.

delayed closure See DELAYED MAKE.

delayed contacts Contacts that open or close at a predetermined instant after their activating signal is applied or removed.

delayed drop-in See DELAYED MAKE.

delayed dropout See DELAYED BREAK.

delayed loop In security applications, a circuit or system that registers an alarm some time after intrusion is first detected. The delay can usually be selected or preadjusted.

delayed make In relay 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 PPI Plan-position indicating radar having a delayed time base.

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 regeneration.

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 MONOSTABLE 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 PROPAGATION DELAY-POWER PRODUCT.

delay relay A relay that opens or closes at the end of a predetermined time interval.

delay 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 pulse reaches 10% of 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 relay or switch.

delay unit In a radar system, a circuit for delaying pulses.

delete **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 HYGROSCOPIC MATERIAL.

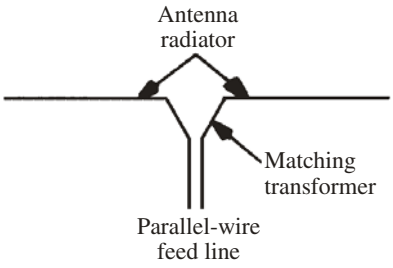
delta circuit A three-phase electrical circuit with no common ground.

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-CONNECTION.

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.



delta-matching transformer

delta modulation The conversion of an analog signal into a digital pulse train that can be decoded to yield the original analog signal.

delta network See DELTA CONNECTION.

delta pulse-code modulation In wire or radio communications, the conversion of an audio signal into a digital pulse train.

delta quantity An increment (i.e., the difference between two values of a variable).

delta rays The emission of secondary electrons as a result of radioactivity.

delta-sigma modulation A method of analog-to-digital conversion. The output is a pulse density function of the input. The input can be obtained by low-pass filtering of the output.

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 9 Hz. Also see ELECTROENCEPHALOGRAPH and ELECTROENCEPHALOGRAM.

Deluc's pile See DRY PILE.

dem Abbreviation of DEMODULATOR.

demagnetization curve The portion of a magnetic hysteresis curve, showing reduction of demagnetization.

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.

demagnetize To remove magnetism from an object, either temporarily or permanently.

demagnetizer See DEGAUSSER.

demagnetizing current The half-cycle of an alternating current (or 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 reduces the magnetic field.

demagnetizing force **1.** A magnetic force whose direction reduces the residual induction 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.

Dember effect The appearance of a voltage between regions in a semiconductor when one of the regions is illuminated.

demodulation The process of retrieving the information (modulation) from a modulated carrier. In receivers and certain test instruments, this process is called DETECTION.

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) Inputting or outputting data blocks to or from a central processor, as needed for processing.

demodulator probe A diode probe that removes the modulation envelope from an applied amplitude-modulated signal, and presents the envelope to a voltmeter or oscilloscope.

demonstrator A device used to show and teach the way in which a component, circuit, or system operates.

DeMorgan's theorem A rule of sequential or digital 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 transmitted over a channel.

demultiplexing circuit See DEMULTIPLEXER.

denary band A band in which the highest frequency is 10 times the lowest frequency.

dendrite **1.** The branching (tree-like) structure formed by some materials, such as semiconductors, 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, **1**). **2.** The process of growing long, flat semiconductor crystals.

dendron See DENDRITE, **2**.

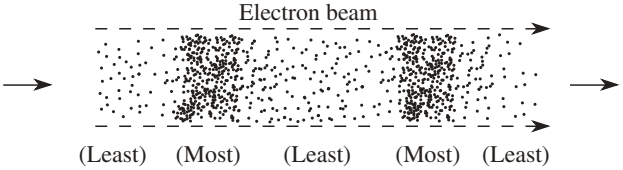
dens Abbreviation of DENSITY.

dense binary code A binary representation system, in which any possible combination of characters is assigned some correspondent.

densitometer An instrument for measuring the density of a body.

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.



density modulation

density of electrons The concentration of electrons (i.e., the number per unit volume, area, distance, or time).

density packing A figure indicating the quantity of bits per inch or per centimeter, stored on a magnetic tape.

dependent equations Equations that are alike and have an infinite number of solutions. Compare INDEPENDENT EQUATIONS and INCONSISTENT EQUATIONS.

dependent linearity Linearity (especially in its deviation from an ideal slope) as a dependent variable.

dependent variable A changing quantity whose value at any instant is governed by the value at that instant of another changing quantity (the independent variable). Compare INDEPENDENT VARIABLE.

depletion-enhancement-mode MOSFET A metal-oxide-semiconductor field-effect transistor (MOSFET) designed for zero gate-bias voltage. An ac gate signal voltage drives the MOSFET alternately into the depletion mode (negative signal half-cycle) and enhancement mode (positive signal half-cycle). Compare DEPLETION-TYPE MOSFET and ENHANCEMENT-TYPE MOSFET.

depletion field-effect transistor A field-effect transistor whose operation is based on the control of depletion layer width.

depletion layer See BARRIER, **1**.

depletion-layer capacitance See JUNCTION CAPACITANCE.

depletion-layer rectification Rectification provided by a semiconductor junction.

depletion-layer transistor A transistor whose action depends on modulation of current carriers in a space-charge region (depletion layer).

depletion mode Operation characteristic of the DEPLETION-TYPE MOSFET.

depletion region See BARRIER, **1**.

depletion-type MOSFET A metal-oxide-semiconductor field-effect transistor (MOSFET) in which the channel directly under the gate electrode is narrowed by a negative gate voltage (in an n-channel device) or by a positive gate voltage (in a p-channel device).

depolarization **1.** In a primary cell, the removal of the agents that have caused polarization. **2.** The addition of a polarization-inhibiting substance to the electrolyte of a primary cell.

depolarizer A substance that retards polarization in an electrochemical cell. An example is the manganese dioxide used in dry cells.

depolarizing agent See DEPOLARIZER.

deposition The application of a layer of one substance (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 indicator **1.** A sounding instrument for determining the depth of a body of water. **2.** On an ACOUSTIC DEPTH FINDER, the meter that indicates the depth of water.

depth of cut On a phonograph disk, the depth of the recorded groove.

depth of discharge Abbreviation, DOD. In a rechargeable cell or battery, a measure of the extent

to which discharging has occurred. It is generally specified as a percentage. For example, if the DOD of a 10-ampere-hour (10-AH) battery is 80 percent, then 8 AH have been used up, and 2 AH remain before recharging will be necessary.

depth of heating In dielectric heating, the depth of heat penetration in the sample when both electrodes are applied to one of its faces.

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 conductor.

depth sounder See ACOUSTIC DEPTH FINDER.

de-Q **1.** To reduce the *Q* of a component or tuned circuit. **2.** To inhibit laser action during an interval when an ion population excess is pumped up.

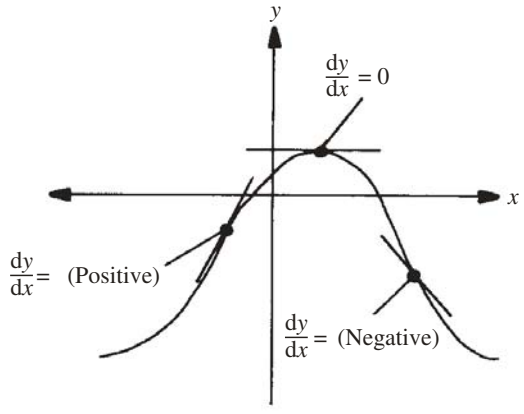
derating To reduce an operating parameter (e.g., current, voltage, power) as another factor (such as temperature) increases, to ensure efficient, reliable, and safe operation.

derating curve A graph that shows the extent to which a quantity (such as allowable power dissipation) must be reduced as another quantity (such as temperature) increases.

derating factor The amount by which a current, power, or voltage must be decreased to ensure safe and efficient operation of a circuit or device in a given environment (temperature, altitude, humidity, etc.). Also see DERATING and DERATING CURVE.

derivative **1.** A mathematical expression indicating the rate at which a function changes, with respect to the independent variable. See DERIVATIVE FUNCTION. **2.** The slope of a line tangent to a curve at a given point. **3.** The output signal of a DIFFERENTIATOR, relative to the input signal.

derivative action In a control system, an action producing a corrective signal proportional to the rate of change (derivative) of the controlled variable.



derivative

derivative control A method of automatic control, actuated according to the number of errors per second.

derivative function For a mathematical function $f(x)$, the function $f'(x) = \mathrm{d}f(x)/\mathrm{d}x$, over the domain of f. For any specific point x_0 in the domain of f, the value of $f'(x_0)$ is equal to the slope of a line tangent to f at the point $(x_0, f(x_0))$.

derived center channel The sum or difference of the left and right channels in a stereophonic system.

Dershem electrometer A variation of the *quadrant electrometer.* In the Dershem instrument, the needle (to which a small mirror is attached) rotates within slots cut in the quadrant plates and, therefore, can never accidentally touch the plates.

descending node For a satellite orbiting the earth or another planet, any point at which the groundtrack crosses the equator as it moves from the northern hemisphere into the southern hemisphere. This node generally changes for each succeeding orbit, because the earth or planet rotates underneath the orbit of the satellite. Compare ASCENDING NODE.

descending pass For a specific point on the earth's surface, the time during which an artificial communications satellite is accessible when its latitude is moving southward. The duration of accessibility depends on the altitude of the satellite and on how close its groundtrack comes to the earth-based point. Compare ASCENDING PASS.

description A data element that is part of a record and is used to identify it.

desensitization **1.** The process of making a circuit or device less responsive to small values of a quantity. **2.** Also called *desensing.* In a communications receiver, an unwanted, often intermittent reduction in front-end gain, caused by an extremely strong local signal.

desensitize **1.** To reduce the sensitivity of a receiver. **2.** To reduce the gain of an amplifier. **3.** To reduce the small-quantity response of an instrument.

desiccant A compound, such as cobalt chloride, used for the purpose of keeping enclosed items dry.

design **1.** A unique, planned arrangement of electronic components in a circuit, in accordance with good engineering practice, to achieve a desired end result. **2.** A unique layout of components or controls, in accordance with good engineering practice, esthetics, and (often) ergonomics. **3.** Invention. **4.** Plan. **5.** To produce a design, as defined in **1**, **2**, **3**, or **4**.

designation Within a computer record, coded information identifying the record so that it can be handled accordingly.

design-center rating A specified parameter that, if not exceeded, should provide acceptable average performance for 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.

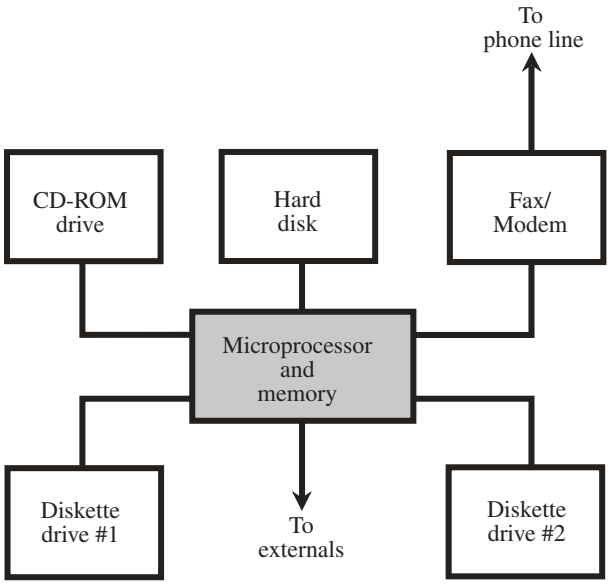
Desk-Fax A facsimile transceiver that can be placed on a desktop, used for wire or radio transmission and reception of still images.

desk microphone A microphone equipped with a stand that sits on a table or desktop. 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.



desktop computer (main unit only)

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.

Destriau 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 (as from 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_H/V_L, where V_H is the amplitude of high-frequency components, and V_L 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 output is available.

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 transducers 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).

detectophone A device for eavesdropping on a conversation. The device can use a tape recorder or a tiny radio transmitter.

detector **1.** In radio communications, a device or circuit that extracts the information from a modulated carrier. Also sometimes called a *demodulator.* **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 demodulator 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 stage 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.

deupdating Producing an earlier form of a computer file by substituting older records for current ones.

deuterium Symbol, D, d, H^2, or ^2H. Also called *heavy hydrogen.* The hydrogen isotope having a nucleus consisting of one proton and one neutron.

deuterium oxide Symbol, D_2O. Also called *heavy water.* This compound has wide use in nuclear reactors.

deuteron The nucleus of a deuterium atom.

deuton See DEUTERON.

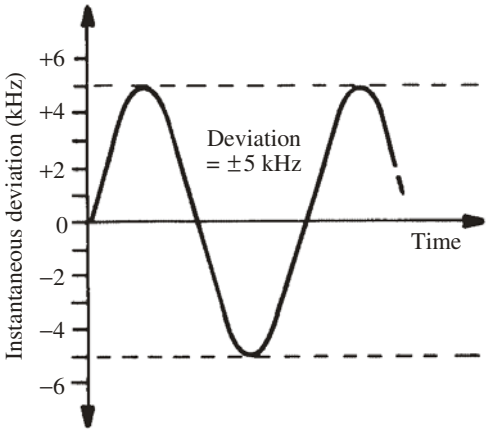
deutron See DEUTERON.

deviation **1.** In a frequency-modulated (FM) radio signal, the instantaneous amount of carrier frequency shift away from the unmodulated frequency. It is usually expressed in kilohertz; directly proportional to the amplitude of the modulating signal, up to a certain maximum that depends on the bandwidth allowed. **2.** The maximum instantaneous carrier frequency shift in a FM signal. **3.** The extent or amount by which a quantity drifts from its proper value.

deviation distortion In a frequency-modulation (FM) receiver, distortion resulting chiefly from discriminator nonlinearity and restricted bandwidth.

deviation ratio In a frequency-modulated (FM) signal, the ratio between the highest modulating frequency and the maximum carrier deviation.

deviation sensitivity For a frequency-modulation (FM) receiver, the smallest deviation that will produce a specified audio output power. Expressed in kilohertz, or as a percentage of rated deviation of the receiver, measured with the receiver set for maximum gain.



deviation

device **1.** A simple or complex discrete electronic component. **2.** A subsystem used as a unit, and regarded as a single component.

device complexity The number of components in an integrated circuit.

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.

D flip-flop A delayed flip-flop. The state of the input determines the state of the output during the following pulse, rather than during the current pulse.

dg Abbreviation of *decigram.*

dia Abbreviation of *diameter.*

diac A two-terminal, bilateral, three-layer semiconductor device that exhibits negative resistance. When the applied voltage exceeds a critical value, the device conducts.

diagnosis **1.** Determination of the cause and location of a hardware malfunction. **2.** In computer 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 electronic hardware. **2.** A computer software package intended for debugging programs, or for finding the cause of a hardware or operating-system malfunction. Also called *diagnostic*, *diagnostic program*, or *diagnostic utility*.

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.

diagnotor 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 can 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 tones that establish contact with another subscriber.

dial cable A flexible cable or belt conveying motion on the shaft of an adjustable component (such as a potentiometer or variable capacitor) to a dial.

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, percentage of input voltage, 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 cable. Cord usually designates a fabric string, whereas a cable is a flexible, braided wire.

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.

dialer See AUTOMATIC DIALING UNIT.

dialing key In a telephone system, a dial that uses keys, rather than a rotary dial.

dial jack In a telephone system, a set of jacks that facilitates interconnections between dial cords and external lines.

dial light A lamp or light-emitting diode placed in the dial mechanism of a radio receiver, transmitter, or transceiver. Allows the dial to be read in dim light or in darkness.

dialog equalizer In sound transmission and recording, a high-pass filter that reduces low-frequency response during dialog and extreme closeups.

dial pulse An interruption of the direct current in a telephone system when the dial contacts of the calling telephone open. The number of such interruptions corresponds to the digit dialed.

dial scale The graduated portion of a dial.

dial system **1.** See DIAL TELEPHONE SYSTEM. **2.** The arrangement of dials and knobs that facilitates adjustment of electronic equipment.

dial telephone A telephone set in which a numbered rotatable disk is used to produce the switch interruptions that cause generation of the transmitted multidigit telephone numbers.

dial telephone system The complete automatic circuit, including central-office facilities, for dial telephone operation.

dial tone In a telephone system, a constant hum or whine heard before dialing, indicating that the system is operational.

dial-up In a telephone system, the calling of one subscriber by another, using a dial system.

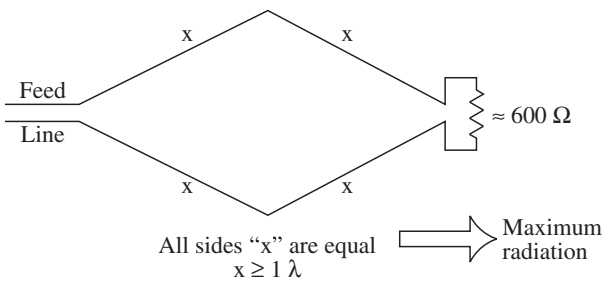
diam Abbreviation of *diameter.*

diamagnetic Pertaining to a material having magnetic permeability less than unity.

diamagnetism The state of having magnetic permeability less than unity. A material with this property reduces the flux density of a magnetic field, relative to the flux density in air or in free space.

diamond antenna Also called *rhombic antenna.* A nonresonant wideband directional antenna whose horizontal wire elements are arranged in the shape of a diamond (rhombus). The arrangement is fed at one corner, the opposite corner being terminated with a noninductive resistor.

diamond lattice The orderly internal arrangement of atoms in a redundant pattern in crystalline materials, such as germanium or silicon.



diamond antenna

diamond stylus A phonograph "needle" having as its point a small, ground diamond.

diapason **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 played is automatically sounded in several octaves. **2.** Tuning fork.

diaphony See DISSONANCE.

diaphragm A usually thin metal or dielectric disk used as the vibrating member in headphones, loudspeakers, and microphones, and as the pressure-sensitive element in some sensors and barometers.

diaphragm gauge A sensitive gas pressure gauge using a thin metal diaphragm stretched flat. Increments of pressure move the diaphragm, relative to a nearby electrode, varying the capacitance between the two.

diathermic Pertaining to a substance that efficiently transfers heat or infrared energy.

diathermotherapy The use of diathermy in the treatment of various physiological disorders.

diathermy **1.** In medicine and physical therapy, the production of heat in subcutaneous (below the skin) tissues by means of high-frequency radio waves. **2.** A radio-frequency (RF) power oscillator and associated equipment used to produce heat in subcutaneous tissues.

diathermy interference Radio-frequency interference (RFI) resulting from the operation of unshielded and/or unfiltered diathermy equipment.

diathermy machine See DIATHERMY, **2**.

diatomic Having two atoms (e.g., a DIATOMIC MOLECULE).

diatomic molecule A molecule (such as that of oxygen) composed of two atoms. Compare MONATOMIC MOLECULE.

dibble A mathematical function in which a number (usually an integer) is doubled, and then one is added to the result. Thus, dibble $n = 2n + 1$.

dibit A combination of two binary digits (bits). The four possible dibits are 00, 01, 10, and 11.

dice Plural of DIE, **1**, **3**.

dichotomizing search Also called *binary search.* In digital computer operations, locating an item in a table of items that are arranged by key values in serial order. The required key is compared with a key halfway through the table; according to this relational test, half of the table is accepted and again divided for comparison, etc. until the keys match and the item is found.

dichotomy Characterized by the usually repetitive branching into two sets, groups, or factions.

dichroism Also called *dichromatism.* **1.** The property of a crystal showing different colors, depending on which axis corresponds to the line of sight. **2.** The property of a solid taking on different colors as the thickness of the transmitting layer changes. **3.** The property of a liquid changing color, according to solution concentration.

dichromate cell An electrolytic cell consisting of electrodes of carbon and zinc. The zinc electrode is immersed in a diluted solution of sulfuric acid, and the carbon electrode in a solution of potassium dichromate.

dicing The cutting of a semiconductor melt, crystal wafer, or other material into dice (see DIE).

dictionary 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, tin, 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 retain some of 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-signal voltage higher than the input-signal voltage.

dielectric antenna An antenna in which some or all of the radiating element is made of a dielectric material, such as polystyrene. Primarily used at microwave frequencies.

dielectric breakdown Sudden, destructive conduction through a dielectric 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 substance.

dielectric capacity See DIELECTRIC CONSTANT.

dielectric constant Symbol, k. For a dielectric 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 *inductivity* and *specific inductive capacity.*

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 cotangent 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 polystyrene.

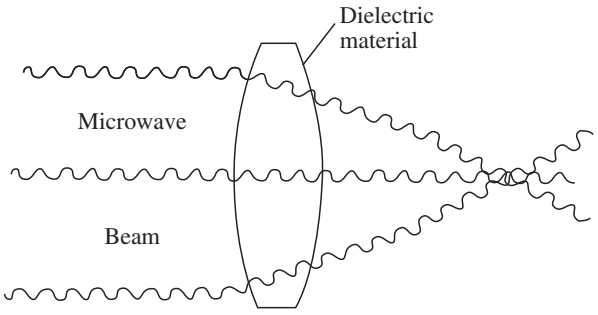
dielectric heater A high-frequency power generator used for DIELECTRIC HEATING.

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 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 PHASE ANGLE.

dielectric loss factor For a dielectric material, the product of the dielectric constant and the tangent of the dielectric loss angle.

dielectric loss index See DIELECTRIC LOSS FACTOR.

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.

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 the dielectric breakdown voltage.

dielectric waveguide See DIELECTRIC GUIDE.

dielectric wedge A wedge-shaped dielectric slug placed inside a waveguide for impedance matching.

dielectric wire A small dielectric waveguide that acts as a wire to carry signals between points in a circuit.

Dietzhold network A four-terminal, shunt m-derived circuit used in some wideband amplifiers.

Dietzhold peaking In some wideband amplifiers, frequency compensation obtained with a shunt m-derived network (see DIETZHOLD NETWORK).

difference amplifier See DIFFERENTIAL AMPLIFIER.

difference channel In a stereophonic amplifier, an audio channel that handles the difference between signals in the right channel and those in the left channel.

difference detector A detector whose output is the difference between two simultaneous input signals.

difference frequency A signal frequency produced by mixing or heterodyning of signals at two other frequencies. If the lower input signal frequency is f_1 and the higher input signal frequency is f_2, then the difference frequency f_d is equal to $f_2 - f_1$.

difference of potential The absolute value of the algebraic difference of voltages at two points of different electrical potential. Thus, the difference of potential between a +5-V point and a –5-V point is +5 – (–5) V = 10 V. Also see POTENTIAL DIFFERENCE.

difference quantity See INCREMENT.

difference signal **1.** The resultant signal obtained by subtracting, at every instant for at least one full cycle, the amplitudes of two signals. **2.** The difference of the left- and right-channel outputs in a stereo system.

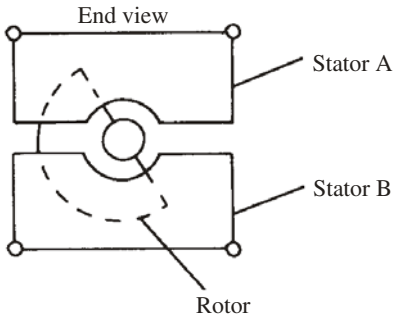
differential **1.** A device, consisting of a gear system, that adds or subtracts angular motions and delivers the result. **2.** A gear system in which the motion of a shaft is transferred to two other shafts aligned with each other and perpendicular to the first shaft. **3.** One of two coils arranged to produce opposite polarities at a point in a circuit. **4.** Pertaining to a difference between two signals or quantities.

differential amplifier A circuit, usually an operational amplifier, that amplifies the voltage difference between two input signals. The instantaneous output voltage is equal to some constant multiple of the difference between the instantaneous input voltages.

differential analyzer An analog computer that solves differential equations using integrators.

differential angle For a mercury switch, the angle between operation and release positions.

differential capacitor A dual variable capacitor with two identical stator sections, and a single rotor section that turns into one stator section and out of the other. The capacitance of one section decreases while that of the other increases.



differential capacitor

differential coil See DIFFERENTIAL, **3**.

differential comparator A linear integrated circuit (IC) that delivers an output proportional to the difference between two input signals.

differential compound dc generator A compound-wound dc generator in which the magnetomotive force of the series field opposes that of the shunt (main) field.

differential compound dc motor A compound-wound dc motor in which the magnetomotive force of the series field coil opposes that of the shunt (main) field coil.

differential cooling Reducing temperature at different points on a surface at different rates.

differential delay The difference $d_{max} - d_{min}$ across a frequency band, where d_{max} is the maximum frequency delay and d_{min} is the minimum frequency delay.

differential discriminator A device that passes pulses, whose amplitudes are between two predetermined values above or below zero.

differential distortion In an automatic-gain-control circuit, distortion from effects that cause shunting of the diode load resistor.

differential flutter Fluctuations in the speed of a magnetic tape that are nonuniform in different parts of the tape.

differential gain In a differential amplifier, the average gain of the two sections of the amplifier. Compare DIFFERENTIAL UNBALANCE.

differential gain control A circuit or device for setting the gain of a radio receiver in terms of an anticipated change in signal strength, to reduce the receiver output signal differential.

differential galvanometer A galvanometer in which currents in two similar coils neutralize each other; thus, there is zero deflection when the currents are equal.

differential gap The smallest range of values that a controlled variable must take to change a three-position controller's output from on to off, or vice versa.

differential heating Increase of temperature at different points on a surface at different rates.

differential impedance See DIFFERENTIAL-INPUT IMPEDANCE.

differential induction coil An induction coil having two differentially wound primary coils.

differential input In a differential amplifier, the circuit between input terminals 1 and 2, as opposed to the circuit between input 1 or input 2 and ground.

differential-input amplifier A differential amplifier whose output is proportional to the difference between two input signals—each applied between an input terminal and common ground.

differential-input capacitance In a differential amplifier, the capacitance between the 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 deflection 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 the oscillator stage of a transmitter containing a keyed amplifier is disabled when the key is open to prevent interference with the receiver at the keying station, and is enabled when the key is closed.

differential-mode gain In an operational amplifier, the ratio, in decibels, between the output voltage and the differential input voltage.

differential-mode input In an operational amplifier in differential mode, the difference between the two input signal voltages.

differential-mode signal In a balanced three-terminal circuit, such as the input of a differential amplifier, a signal applied between the floating (ungrounded) input terminals.

differential multiplexer An analog multiplexer that selects both the high and low portion of the input signal.

differential nonlinearity Incremental error from an ideal analog output difference when the input is changed by a certain value. Generally expressed as a fraction of full-scale output.

differential permeability The derivative of normal induction, with respect to magnetizing force.

differential phase In a television system tested with a low-level, high-frequency sine-wave signal (f_1) superimposed on a low-frequency, sine-wave signal (f_2), the difference in phase shift of f_1 throughout the system for two specified levels of f_2.

differential phase-shift keying Keying of a carrier by varying the carrier phase.

differential pressure The difference in pressure between two points.

differential-pressure transducer A transducer that delivers an output proportional to the difference between two sensed actuating pressures.

differential protective relay A differential relay that operates to protect equipment or personnel when the difference between the two actuating quantities reaches a prescribed level.

differential receiver A synchro differential that receives the electrical output of two synchro transmitters. The receiver can subtract one input voltage from the other.

differential relay A relay actuated by the difference between two currents or voltages.

differential selsyn A selsyn in which the position assumed by the rotor is proportional to the sum of rotor and stator field values.

differential stage See DIFFERENTIAL AMPLIFIER.

differential synchro See DIFFERENTIAL RECEIVER and DIFFERENTIAL TRANSMITTER.

differential transducer A dual-input, single-output sensor, such as a pressure transducer, that is actuated by two sensed quantities and delivers an output proportional to their difference.

differential transformer A variable inductance transformer having a (usually cylindrical) core that is moved in and out to provide adjustable coupling between the interwound primary and secondary windings. This permits adjustment of the amplitude and phase of the transformer output voltage, with respect to the input voltage.

differential transmitter A synchro differential connected to a synchro transmitter. In a synchro receiver supplied by this combination, the change in rotor position is the algebraic difference between the transmitter-rotor position and the differential-rotor position.

differential unbalance For a differential amplifier, the average difference in gain between the two amplifier sections. Compare DIFFERENTIAL GAIN.

differential voltage **1.** The voltage difference between the input signals to a differential device. **2.** The breakdown voltage minus the operating voltage for a lamp.

differential voltage gain **1.** The ratio, in decibels, between the differential output and differential input voltages of an amplifier. **2.** The instantaneous ratio, in decibels, between the rate of change of the output signal voltage and the rate of change of the input signal voltage in an amplifier.

differential-wound field In a motor or generator, a field winding having series and shunt coils whose fields are opposing.

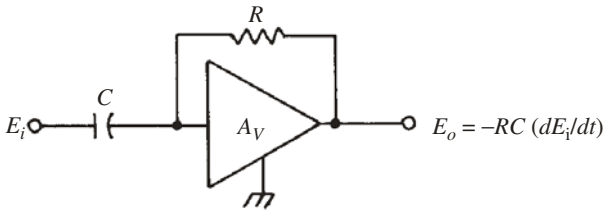
differentiate **1.** To produce an output signal, the instantaneous amplitude of which is proportional to the instantaneous rate of change of the input amplitude. **2.** To determine the derivative of a mathematical function.

differentiating circuit See DIFFERENTIATING NETWORK.

differentiating network A four-terminal resistance-capacitance (RC) network whose output voltage is the derivative of the input voltage, with respect to time. Compare INTEGRATING NETWORK.

differentiation **1.** The processing of an input signal to create an output signal whose voltage waveform represents the derivative, with respect to time, of the input voltage waveform. **2.** The process of computing a mathematical derivative.

differentiator **1.** See DIFFERENTIATING NETWORK. **2.** An operational amplifier whose output waveform is the mathematical derivative of the input waveform.



differentiator, 2

diffracted wave A wave or ray of energy undergoing DIFFRACTION.

diffraction **1.** Interference of one part of an energy beam with another part when the beam is deflected along two or more paths having different lengths. When this happens with visible light, dark and light bands or colored bands appear. This effect is responsible for the rainbow-like appearance of light reflected from the surface of a compact disc. **2.** The bending of electromagnetic waves around an object. This effect explains why radio signals can propagate around large obstructions, such as buildings and hills. The effect becomes more pronounced as the wavelength increases (the frequency decreases). **3.** The bending of acoustic waves around an object. This effect explains why sound propagates around large obstructions, such as buildings. The effect becomes more pronounced as the wavelength increases (the frequency decreases).

diffraction grating A transparent plate containing thousands of parallel lines or grooves spaced extremely close together. Light passing through the slits between the lines produces a rainbow spectrum as a result of DIFFRACTION.

diffraction spectrum **1.** The spectrum produced in visible light by a diffraction grating. **2.** The distribution of energy at various frequencies, produced by diffraction of electromagnetic waves. **3.** The distribution of energy at various frequencies, produced by diffraction of acoustic waves.

diffractometer An instrument for measuring the diffraction of radiation, such as light or X-rays.

diffuse **1.** To produce or cause DIFFUSION. **2.** Energy that is diffused.

diffused-alloy transistor See DRIFT-FIELD TRANSISTOR.

diffused-base transistor A bipolar transistor in which the base region has been diffused into the semiconductor wafer. Also see DIFFUSED JUNCTION.

diffused device A semiconductor device in which the junction is produced by diffusion (see DIFFUSION, **1**). Examples: DIFFUSED-BASE TRANSISTOR, DIFFUSED DIODE, DIFFUSED-JUNCTION RECTIFIER, and DIFFUSED-MESA TRANSISTOR.

diffused diode A semiconductor diode having a diffused junction.

diffused-emitter-and-base transistor A transistor in which n and p materials both have been diffused into the semiconductor wafer to provide emitter and base junctions. Also see DIFFUSION, **1** and DIFFUSED TRANSISTOR.

diffused junction In a semiconductor device, a pn 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.

diffused-junction rectifier A semiconductor rectifier using a diffused junction.

diffused-junction transistor See DIFFUSED-BASE TRANSISTOR, DIFFUSED-MESA TRANSISTOR, and DIFFUSED TRANSISTOR.

diffused-layer resistor In an integrated circuit, a resistor produced by diffusing a suitable material into the substrate.

diffused-mesa transistor A transistor whose base is a n-type layer diffused into a p-type wafer (the remaining p-type material serving as the collector); its emitter is a small p-type area diffused into or alloyed with the n-layer. Unwanted diffused portions are etched away, leaving the transistor in a mesa shape.

diffused planar transistor A diffused transistor in which emitter, base, and collector electrodes are exposed at the face of the wafer, which has an oxide layer to forestall leakage between surface electrodes.

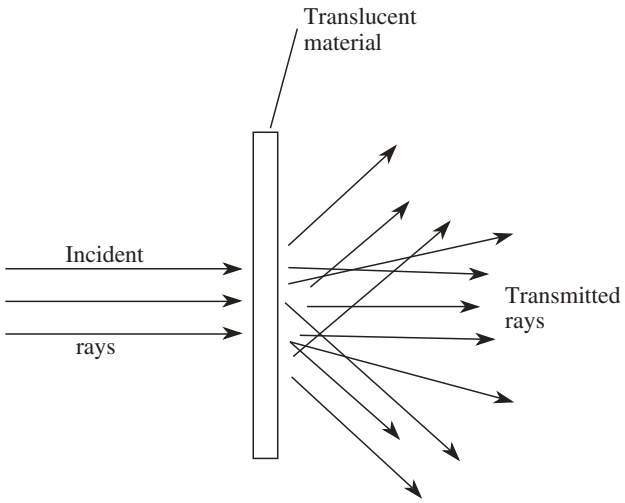
diffused resistor See DIFFUSED-LAYER RESISTOR.

diffused sound **1.** Sound distributed so that its energy flux is the same at all points. **2.** Sound whose source is difficult to locate or seems to shift, as that heard from out-of-phase stereo channels.

diffused transistor A transistor in which one or both electrodes are created by diffusion. See DIFFUSED JUNCTION.

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, 3

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 distance a current carrier travels to the junction during carrier life.

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 pump for fast, efficient creation of a high vacuum in electron tubes and similar devices. In one form, the pump, in conjunction with a force pump, uses mercury vapor as the pumped medium. Gas molecules evacuated 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**).

diffusor In acoustics, a device or structure deliberately installed to spread sound waves throughout a region.

dig-in angle A stylus angle of 90 degrees, relative to the surface of a phonograph disc. Compare DRAG ANGLE.

DIGIRALT Acronym for *digital radar altimetry.* A system that utilizes digital techniques to enhance the accuracy of an altimeter using radar.

digit A single symbol in a numbering system (e.g., 0 through 9 in the decimal system, or 0 or 1 in the binary system), whose value depends on its position in a group and on the radix of the particular system used.

digital **1.** Pertaining to components, circuits, or systems that use signals having an integral number of discrete levels or values, rather than signals, whose levels or values vary over a continuous range. **2.** Pertaining to a numeric readout or display. **3.** See BINARY, **1**.

digital annunciator An annunciator that gives an alphanumeric digital display of information, as well as sounding an alarm.

digital audio tape Abbreviation, DAT. A magnetic tape intended for recording digitally encoded audio data. Used in some high-fidelity applications, and also for computer data storage.

digital barometer An electronic barometer providing a digital readout.

digital capacitance meter Abbreviation DCM. A meter with a digital readout for measuring capacitance values.

digital cellular See PERSONAL COMMUNICATIONS SERVICE.

digital circuit A circuit affording a dual-state switching operation (i.e., on or off, high or low, etc.). Also called *binary circuit.*

digital communications Radio or wire communications using a dual-state mechanism (on/off, positive/negative, or modulated/unmodulated) to represent information.

digital comparator A comparator that presents two digital values, one for each of the quantities being compared.

digital computer A high-speed, electronic machine for performing mathematical operations, file management, machine control, or other "intelligent" functions, and whose basic internal operations (data storage, comparing, and computation) are based on semiconductor devices assuming one of two states (on or off, high or low). Compare ANALOG COMPUTER.

digital data Information represented and processed in the form of combinations of digits (0 and 1, in the binary system).

digital-data cable A cable designed to conduct high-speed digital pulses with minimal distortion and loss.

digital data-handling system A system that accepts, sorts, modifies, classifies, or records digital data, displaying the final result or passing the data to a computer.

digital delay circuit A device that stores digitized audio data, and releases it after a specified delay.

digital device **1.** A digital integrated circuit (IC). **2.** Any circuit or system that operates by digital means.

digital differential analyzer Abbreviation, DDA. A digital computer that can perform integration using specialized circuitry.

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-TYPE METER.

digital divider In a computer, a device that can divide (i.e., provide a quotient and remainder using dividend and divisor signals).

digital electrometer An electrometer that has a digital current or voltage indicator.

digital electronics The branch of electronics concerned with components, circuits, and systems that use signals having an integral number of discrete levels or values, as opposed to signals whose levels or values vary over a continuous range. Compare ANALOG ELECTRONICS.

digital frequency meter A direct-reading frequency meter using high-speed electronic switching circuits and a digital readout. Such instruments read frequency 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, graphs depicting solutions to problems.

digital information See DIGITAL DATA.

digital information display See DIGITAL DISPLAY.

digital integrated circuit An integrated circuit (IC) intended for binary operations, such as switching, gating, etc. Compare LINEAR INTEGRATED CIRCUIT.

digital integrator A device that can perform integration, in which increments in input variables, and an output variable, are represented by digital signals.

digital logic A form of Boolean algebra, consisting of negation, conjunction, and disjunction, in which the binary digit 1 has the value "true" and 0 the value "false" (in positive logic) or vice versa (in negative logic). Digital logic is the basis by which all digital devices function.

digital-logic module **1.** A circuit that performs digital operations. **2.** A logic gate.

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. Compare ANALOG METER.

digital multimeter Abbreviation, DMM. A voltohm-milliammeter producing a digital readout of measured values.

digital multiplex **1.** The combination of several or many digital signals into a single digital signal. **2.** Also called *digital demultiplex.* The reverse process from that defined in 1, in which the original signals are obtained from the combination signal. **3.** Communication using the techniques defined in 1 and 2.

digital multiplex equipment Equipment that accomplishes digital multiplexing or the reverse process, digital demultiplexing.

digital multiplier In a digital computer, a device that produces a product signal from multiplier and multiplicand signals.

digital output An output signal of digital pulses representing a number equal or proportional to the value of a corresponding input signal.

digital panel meter A numeric-readout meter whose relatively small size allows mounting on a panel.

digital phase shifter A phase shifter actuated by a digital control signal.

digital photometer An electronic photometer providing a digital readout of illumination values.

digital power meter An electronic wattmeter providing a digital readout of measured power.

digital readout An indicating device that displays a sequence of numerals that represent a measured value.

digital recording A system for tape-recording high-fidelity sound. The audio is converted from analog to binary digital form, and the binary digits (bits) are recorded on magnetic tape.

digital representation The use of digital signals to represent information as characters or numbers.

digital rotary transducer A device that delivers a digital output signal proportional to the rotation of a shaft.

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 (A/D) 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.

digital signal A signal having an integral number of discrete levels or values, as opposed to a signal whose levels or values vary over a continuous range.

digital signal

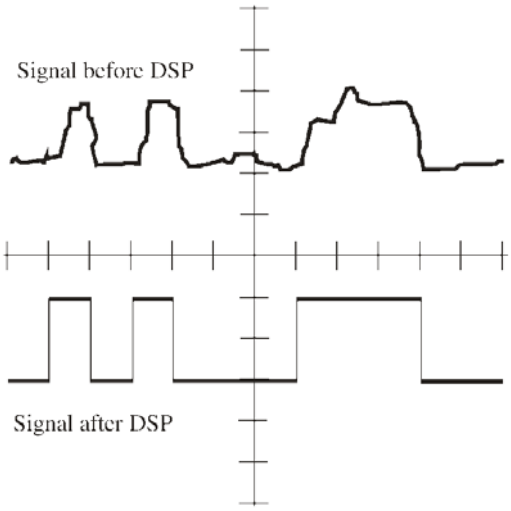
digital signal processing Abbreviation, DSP. A method of signal enhancement that operates by eliminating confusion between digital states. This improves dynamic range and frequency response, reduces the number of errors, and virtually eliminates noise. It is used extensively in digital communication 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 sound Sound recording and reproduction accomplished with digital, rather than analog, signals. Advantages include wideband frequency response, superior dynamic range, and relative immunity to noise.

digital speech communications A system of voice communications, in which the analog voice signal is encoded into digital pulses at the transmitter, and decoded at the receiver.

digital subtractor In a computer, a device that produces an output signal whose value is equal to the difference of the values of two input signals.

digital switching Routing operations carried out on digital signals to establish communications links between specified system users.



digital signal processing

digital television **1.** A television system in which the picture information is encoded into digital form at the transmitter, and decoded at the receiver. **2.** A form of television picture transmission that functions according to picture motion, rather than absolute brightness.

digital temperature indicator See DIGITAL THERMOMETER.

digital thermometer An electronic thermometer that provides a digital readout of temperature.

digital-to-analog conversion The conversion of a digital quantity into an analog representation, such as shown by a performance curve. Compare ANALOG-TO-DIGITAL CONVERSION.

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

digital transmission **1.** 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-type meter An indicating instrument in which a row of numeral indicators displays a value. Compare ANALOG-TYPE METER.

digital voltmeter Abbreviation, DVM. An electronic voltmeter having a direct numerical readout, rather than an analog display.

digital wattmeter See DIGITAL POWER METER.

digital compression In digital computer operation, the process of representing data with an economy of characters to reduce file size.

digit current In digital computer operations, the current associated with writing or reading a digit into or out of a memory cell.

digit delay element A logic element (gate) whose output signal lags the input signal by one digit period.

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.

digitizer See ANALOG-TO-DIGITAL CONVERTER.

digit period In a digital circuit or system, the time interval between the start of one digital pulse and the start of the next pulse.

digit place See DIGIT POSITION.

digit plane In a matrix-type computer memory, the plane within a three-dimensional array of memory storage elements representing a DIGIT POSITION.

digit position The ordinal position of a digit in a numeral, the first position being occupied by the least-significant digit (e.g., 7 is in the third position in the numeral 756).

digit pulse A pulse that energizes magnetic core memory elements representing a digit position in several words.

digitron A display in which all of the characters lie in a single, flat plane.

digit time The duration of a digit signal in a series of signals.

digit time slot In digital communications, the interval of time assigned to one bit or one digit.

digit-transfer bus In a digital computer, a main line (of conductors) that transfers information among various registers; it does not handle control signals.

diheptal CRT base The 14-pin base of a cathode-ray tube. Also see BIDECAL, DUODECAL, and MAGNAL.

DIIC Abbreviation for *dielectric-isolated integrated circuit.* Several separate integrated-circuit wafers are contained in a single package, and kept electrically insulated by layers of dielectric.

dilatometer An instrument used to measure expansion.

dimension **1.** Any measurable quantity, such as distance, time, temperature, humidity, etc. **2.** An axis in the three-dimensional Cartesian coordinate system. **3.** An independent variable in a function of one or more variables.

dimensional analysis A mathematical procedure whereby an equation involving quantities with different units is verified as being *dimensionally correct.* The original variables are replaced with fundamental quantities, such as resistance (R), current (I), length or displacement (d), and time (t), applicable to electrical systems. The equation is dimensionally correct if it can be shown that the left and right sides of the equation are identical.

dimensional ratio In magnetism, the ratio of the longest diameter of an elongated ellipsoid of revolution to the shortest.

dimensional stability Nonvariance or little variance in the shape and size of a medium (such as film) during the processing of that material.

dimensionless quantity A quantity that is merely a real number. Example: logarithm, exponent, numerical ratio, etc. In contrast are physical quantities: 3 volts, 5000 hertz, 10 amperes, etc.

diminished radix complement See COMPLEMENT.

dimmer An electronic device used for controlling the brightness of incandescent lamps. Using amplified control, the device enables high-wattage lamp loads to be smoothly adjusted via a small rheostat or potentiometer. A photoelectric-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 Normenausschuss.* 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.

diode action **1.** The characteristic behavior of a diode (i.e., rectification and unidirectional conduction). **2.** Two-electrode rectification or unidirectional conductivity in any device other than a diode (e.g., asymmetrical conductivity between the collector and base of a transistor).

diode amplifier **1.** A parametric amplifier employing a varactor. **2.** An amplifier utilizing hole-storage effects in a semiconductor diode. **3.** A negative-resistance amplifier using a tunnel diode.

diode array A combination of several diodes in a single housing.

diode assembly See DIODE ARRAY.

diode bias A steady direct-current (dc) voltage applied to a diode to establish its operating point.

diode capacitance The capacitance existing at the p-n junction of a semiconductor diode when the junction is reverse-biased. The capacitance generally varies, depending on the reverse-bias voltage.

diode capacitor **1.** A capacitor normally operated with a diode. **2.** A voltage-variable capacitor utilizing the junction capacitance of a semiconductor diode (e.g., a varactor).

diode-capacitor memory cell A high-value capacitor in series with a high-back-resistance semi-

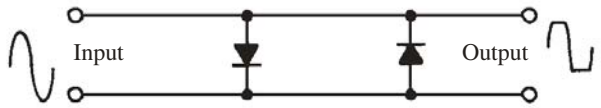
conductor diode. A data pulse forward-biases the diode and charges the capacitor, which remains charged, thus holding the data bit, because of the long time constant of the high capacitance and the high back resistance of the diode.

diode characteristic The current-versus-voltage curve for a diode.

diode checker An instrument for testing semiconductor diodes. There are two forms: A static checker, which measures forward and reverse current; and a dynamic checker (see DYNAMIC DIODE TESTER), which displays the entire diode response curve on an oscilloscope screen.

diode chopper A chopper using an alternately biased diode as the switching element.

diode clipper A clipper using one or more diodes. A single biased diode will limit the positive or negative peak of an applied alternating-current (ac) voltage, depending on diode polarity and bias. Two biased diodes with opposing polarity will clip both peaks. Also see LIMITER.



diode clipper

diode converter See DIODE MIXER.

diode current The forward or reverse current flowing through a diode.

diode current meter A direct-current (dc) milliammeter or microammeter with a semiconductor-diode rectifier that allows the measurement of alternating current (ac).

diode curve changer A diode or network of diodes used to make a linear current-voltage curve acquire some nonlinear shape.

diode demodulator See DEMODULATOR PROBE and DIODE DETECTOR.

diode detector A detector circuit in which a diode demodulates a signal. The diode, a simple device, provides linear response at high signal amplitudes, but affords no amplification.

diode feedback rectifier **1.** In a rectified-carrier, negative-feedback system for an amplitude-modulated (AM) transmitter, the diode that rectifies the modulated carrier and provides the audio envelope for use as negative-feedback voltage. This voltage is applied to the speech amplifier/modulator channel to reduce distortion, noise, and hum, at the same time providing automatic modulation control. **2.** The diode that rectifies a part of the signal at the output of an audio amplifier and provides a proportional direct-current (dc) voltage for use as bias in an automatic-gain-control (AGC) circuit.

diode field-strength meter A simple meter for measuring the intensity of a radio-frequency (RF) electromagnetic field. It consists of a short whip antenna, an inductance-capacitance (LC) tuned circuit, a diode detector, and a direct-current (dc) microammeter. The deflection of the meter is roughly proportional to the RF signal voltage.

diode gate A passive switching circuit of biased diodes. Also see AND CIRCUIT and OR CIRCUIT.

diode impedance The vector sum (resultant) of the resistive and reactive components of a diode. In a semiconductor diode, the inductive component of reactance is almost entirely the inductance of leads and electrodes, whereas the capacitive component of reactance is the shunting capacitance between leads and electrodes, plus the voltage-variable capacitance of the pn junction. The resistive component is almost entirely the voltage-variable resistance of the pn junction.

diode isolation A means of insulating an integrated-circuit chip from its substrate. The chip is surrounded by a pn junction that is reverse-biased. This prevents conduction between the chip and the substrate.

diode lamp See LASER DIODE.

diode laser See LASER DIODE.

diode light source See LASER DIODE.

diode limiter See DIODE CLIPPER.

diode load **1.** The current drawn from a diode acting as a rectifier or demodulator. **2.** The output (load) resistor into which a diode operates.

diode load resistance The required value for a diode load resistor.

diode load resistor A resistor usually connected to the output of a diode rectifier or diode detector.

diode logic Digital circuitry, such as AND and OR circuits, using diodes as the principal components.

diode matrix In some digital devices, a grid of wires, the intersections of some being interconnected through diodes, whose polarities determine circuit operation. A series of AND circuits is provided by this arrangement, which acts as a high-speed rotary switch when it is supplied with input pulses.

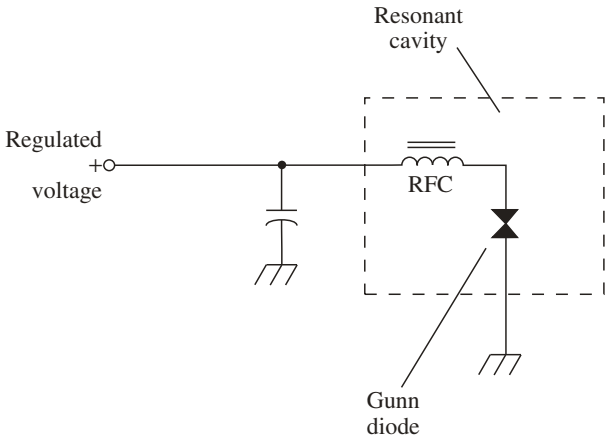
diode mixer A frequency converter that operates via the nonlinearity of semiconductor diodes.

diode noise limiter A noise limiter circuit having one or more biased diodes.

diode oscillator An oscillator based on the negative resistance or breakdown characteristics of certain diodes, such as high-reverse-biased germanium diodes, tunnel diodes, Gunn diodes, and four-layer diodes. It is generally used at microwave frequencies.

diode pack A device containing more than one diode. An example is the full-wave bridge-rectifier integrated circuit.

diode peak detector A diode detector whose load resistance is high at modulation frequencies; the voltage across the resistance is proportional to the peak amplitude of the modulated signal.



diode oscillator, 1

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 rectification Conversion of alternating current (ac) to pulsating direct current (dc) by diode action.

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 converts ac to dc in the automatic-gain-control (AGC) circuit of a superheterodyne receiver. Also called *AGC rectifier.*

diode resistor **1.** A resistor usually operated with a diode. **2.** A voltage-variable resistor utilizing the (usually forward) resistance of a semiconductor diode.

diode storage The charge carriers (electrons and holes) remaining within a pn junction for a short time after forward bias has been either removed or switched to reverse polarity.

diode storage time See DIODE RECOVERY TIME.

diode switch See DIODE GATE.

diode sync separator A diode used in a television receiver circuit to separate and deliver the sync pulses from the composite video signal.

diode temperature stabilization **1.** Keeping the temperature of a diode at a constant level. **2.** Using the temperature-resistance characteristic of a forward-biased semiconductor diode to stabilize a circuit (such as a transistor amplifier stage) (i.e., to prevent variations caused by temperature changes).

diode tester See DIODE CHECKER.

diode transistor **1.** See UNIJUNCTION TRANSISTOR. **2.** A semiconductor diode whose operation simulates that of a transistor by means of pulsed operation that alternately makes the single junction an emitter or collector. **3.** A transistor connected to operate solely as a diode.

diode-transistor logic Abbreviation, DTL. Logic circuitry in which a diode is the logic element and a transistor acts as an inverting amplifier.

diode-type meter A rectifier-type alternating-current (ac) meter consisting of a semiconductor diode(s) and a direct-current (dc) milliammeter or microammeter. The diode rectifies the ac input, the resulting dc deflecting the meter.

diode varactor A conventional semiconductor diode or rectifier used as a makeshift varactor (voltage-variable capacitor).

diode variable resistor See DIODE VARISTOR.

diode varistor A conventional diode used as a makeshift varistor (voltage-variable resistor).

diode voltage reference See ZENER VOLTAGE REFERENCE.

diode voltage regulator See ZENER VOLTAGE REGULATOR.

DIP Abbreviation of DUAL IN-LINE PACKAGE.

dip **1.** A distinct decrease in the value of a varying quantity, followed by an increase [e.g., the sudden drop, followed by a rise, in collector current when a bipolar-transistor radio-frequency (RF) power amplifier is tuned through resonance]. **2.** Also called *magnetic inclination.* The slanting of a compass needle, resulting from the orientation of the geomagnetic lines of flux, with respect to the earth's surface. It varies, depending on magnetic latitude.

dip adapter An external accessory that allows a radio-frequency (RF) signal generator to be used as a DIP METER.

dip coating **1.** Applying a protective coat of insulating material to a conductor or component by dipping it into the liquid material, then draining and drying it. Compare SPRAY COATING. **2.** The coat applied in this way.

dip encapsulation Embedding a component or circuit in a protective block of insulating material (such as a plastic) while the material is in a liquid state, and then allowing the material to harden in ambient air or in an oven.

dip impregnation Saturating a component or material (such as absorbent film) with a substance (such as oil or wax) by dipping or vacuum forcing.

diplexer A coupler that permits two or more transmitters to operate simultaneously into a single antenna.

diplex operation **1.** Simultaneous transmission or reception of two signals using a single antenna. **2.** Simultaneous transmission or reception of two signals on a single carrier.

diplex reception The reception of signals while transmitting with the same antenna.

diplex 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 under test. 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 poles separated by a specific distance. **2.** A pair of magnetically opposite poles separated by a specific distance. **3.** See DIPOLE ANTENNA. **4.** See FOLDED DIPOLE.

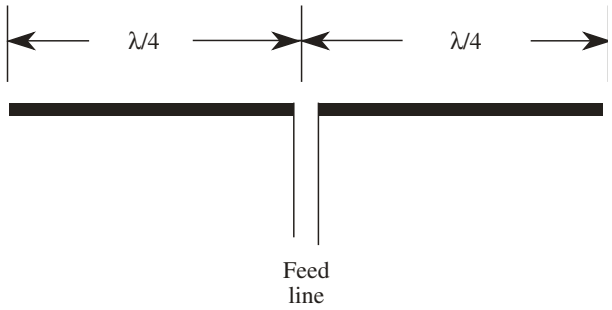
dipole antenna Also called *dipole* and *doublet*. A half-wavelength radiator fed at the center with a two-wire or coaxial transmission line. Each "leg" of the antenna is one-quarter wavelength long. Such an antenna can be oriented horizontally or vertically, or at a slant. The radiating element is usually straight. For a straight wire radiator, properly insulated at the ends and placed well away from obstructions, the length L_{ft} (in feet) at a design frequency f (in megahertz) is approximately

$$L_{ft} = 467/f$$

The length L_m (in meters) is close to

$$L_m = 143/f$$

Because of its simplicity, this antenna is popular among shortwave listeners and radio amateurs, especially at frequencies 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 antenna

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.

dipotassium tartrate Abbreviation, DKT. An organic piezoelectric material.

dipped component 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.

dipper interrupter A cyclic switching device in which a contact pin is part of a revolving wheel partially immersed in mercury.

dipping **1.** The application of a protective coating or impregnant to a component by immersing it in a suitable material. Also see DIP COATING, DIP ENCAPSULATION, and DIP IMPREGNATION. **2.** In a resonant (tuned) amplifier circuit, the adjustment of the resonant circuit for minimum current through the amplifying device.

dipping needle See INCLINOMETER.

dip soldering **1.** Soldering leads or terminals by dipping them into molten solder and then removing excess solder. **2.** Tinning printed-circuit patterns by dipping the boards into molten solder or placing them in contact with the surface of a solder bath. **3.** Soldering leads in printed circuits by the methods defined in (2).

DIP switch 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-acting recorder See GRAPHIC RECORDER.

direct-acting recording instrument See GRAPHIC RECORDER.

direct address The actual address of a computer storage location (i.e., the one designated by machine code 0. Also called *absolute address* or *real address*.

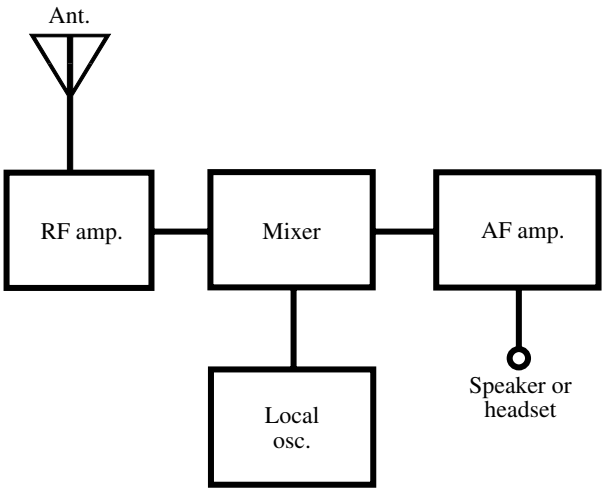
direct capacitance The capacitance between two points in a circuit, as opposed to the capacitance between either point and other objects (including ground).

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 robot by a central computer system.

direct-conversion receiver A heterodyne receiver in which the incoming radio-frequency (RF) signal



direct-conversion receiver

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 (IF) 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 intervening 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, DCTL. In digital computer and switching circuits, a logic system using only direct-coupled transistor stages.

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), as well as alternating current (ac).

direct current **1.** Abbreviation, dc. A current that always flows in the same direction (i.e., the polarity never reverses). The current might be constant, as from a battery or a regulated power supply; it might be pulsating, as from an unfiltered rectifier. **2.** Pertaining to current that always flows in the same direction. **3.** Descriptive of a voltage, resistance, or other parameter under conditions in which there is a usually constant current that always flows in the same direction.

direct-current amplifier An amplifier for boosting direct-current (dc) signals, as opposed to dc voltage signals.

direct-current bar See DC BAR.
direct-current beta See DC BETA.
direct-current block See DC BLOCK.
direct-current bus See DC BUS.
direct-current circuit breaker See DC CIRCUIT BREAKER.
direct-current component See DC COMPONENT.
direct-current converter See DC CONVERTER.
direct-current coupling See DC COUPLING.
direct-current dump See DC DUMP.
direct-current equipment See DC EQUIPMENT.
direct-current erase head See DC ERASE HEAD.
direct-current generator See DC GENERATOR.
direct-current inverter See DC INVERTER.
direct-current leakage See DC LEAKAGE.
direct-current motor See DC MOTOR.
direct-current noise See DC NOISE.
direct-current power See DC POWER.
direct-current relay See DC RELAY.
direct-current resistance See DC RESISTANCE.
direct-current shift See DC SHIFT.
direct-current short See DC SHORT.
direct-current signaling See DC SIGNALING.
direct-current source See DC SOURCE.
direct-current transducer See DC TRANSDUCER.
direct-current transformer See DC TRANSFORMER.
direct-current transmission See DC TRANSMISSION.

direct digital control In a digital computer, multiplexing or time sharing among a number of controlled loops.

direct display unit A cathode-ray-tube (CRT) peripheral that displays data recalled from memory.

direct-distance dialing A form of telephone service that allows dialing of long-distance numbers without involving a human operator.

direct drive **1.** Pertaining to electromechanical accessories 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 possible number of gears and other drive systems.

direct-drive torque motor In a positioning or speed-control system, a servoactuator connected directly to the driven load.

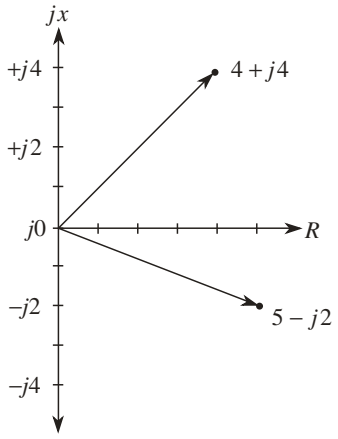
direct-drive tuning A tuning or adjusting mechanism in which the shaft of the variable component (such as a potentiometer or variable capacitor) is turned directly by a knob (i.e., without gearing, dial cable, or similar linkage).

directed number A number having direction as well as magnitude; a vector quantity.

direct electromotive force A direct-current (dc) voltage that does not fluctuate or pulsate.

direct emf See DIRECT ELECTROMOTIVE FORCE.

direct ground **1.** A ground connection made by the shortest practicable route. Compare INDIRECT GROUND. **2.** An earth ground.



directed number

direct induced 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 *directive antenna.*

directional array **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. **2.** 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 invites replies only from 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-back-resistance semiconductor diode inserted into a direct-current (dc) signal circuit or control circuit. Permits unidirectional current flow.

directional filter In carrier-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, k_S. 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 homing 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 horn See DIRECTIVE HORN.

directional hydrophone A hydrophone whose response pattern strongly favors one direction.

directional lobe In the spatial response pattern of a device, such as an antenna or loudspeaker, a portion showing emphasized response in a given direction.

directional microphone A microphone that strongly favors sound emanating from in front of it.

directional pattern See DIRECTIVITY 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 to an extent that depends on the direction from which the effect comes. Directional effects are often, but not always, accompanied by gain in the favored direction(s). Examples: *directional microphone*, *directional speaker*, and *directional antenna.*

directional variation of radio waves Changes in the field strength of radio waves, depending on the direction. There are various causes, including antenna directivity, ground characteristics, ionospheric factors, 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

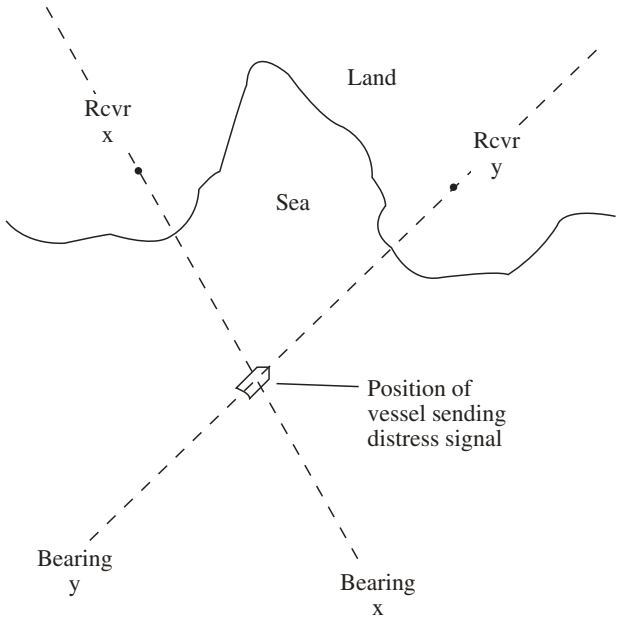
to a transmission line. Such meters fall into two categories. One type has a single scale, calibrated in watts, and sometimes also in milliwatts or kilowatts (switch selectable). The meter reads either forward power or reflected power, depending on the position of a switch or rotatable internal element. Another type has two needles in a single enclosure, with a different calibrated scale for each needle. Both of these scales are graduated in watts, and sometimes also in milliwatts or kilowatts. One needle/scale indicates forward power and the other needle/scale indicates reflected power. There is a third scale, calibrated for the point where the two needles cross. This scale indicates the standing-wave ratio (SWR). See also CROSSED-POINTER INDICATOR.

direction angle In radar operations, the angle between the center of the antenna baseline and a line going to the target.

direction finder A receiver specially adapted to show the direction from which a signal is received, thus revealing the direction of the receiver with respect to the transmitting station, and vice versa. In its simplest form, it is a receiver with a loop antenna that is rotatable over a map or compass card. For increased accuracy, checks are made with signals from two transmitting stations; the exact location of the receiver is pinpointed by triangulation.

direction finding The taking of bearings by means of a direction finder.

direction of lay In a multiconductor cable, the lateral direction of winding of the topmost conductors as they recede from the observer; called *left-hand lay* or *right-hand lay.* If the cable is viewed from either end, left-hand lay is equivalent to conductors that rotate clockwise as they recede from the viewer; right-hand lay is equivalent to conductors that rotate counterclockwise as they recede from the viewer.



direction finding

direction of polarization The direction of the electrostatic field in a linearly polarized wave.

direction of propagation The direction in which energy moves from a transmitter, or between equivalent points in a sector of space under consideration.

direction rectifier In a control system, a rectifier whose direct-current (dc) output voltage has a magnitude and polarity dependent on the magnitude and phase of an alternating-current (ac) selsyn error voltage.

direction resolution **1.** The smallest difference in azimuth that 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 steerable) horizontal direction. Also called *beam antenna* and *directional antenna.*

directive gain For a directional antenna, a rating equal to 12.566(*Pr*/*Pt*), where *Pr* is the radiated power per steradian in a given direction and *Pt* is the total radiated power.

directive horn A microwave antenna having the shape of a (usually rectangular) 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 in 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 DIRECTIVITY PATTERN.

directivity factor **1.** A measure 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 E_1 to E_2,

where E_1 is the average intensity over an entire sphere surrounding the transducer, and E_2 is the intensity on the acoustic axis. **2.** For an acoustic pickup transducer, the ratio, in decibels, of E_1 to E_2, where E_1 is the average response over an entire sphere surrounding the transducer, and E_2 is the response on the acoustic axis.

directivity of antenna For a beam antenna, the ratio E_{max}/E_{avg}, where E_{max} is the maximum field intensity at a selected distance from the antenna and E_{avg} is the average field intensity at the same distance.

directivity of directional coupler The ratio, in decibels, of P_1 to P_2, where P_1 is the power at the forward wave-sampling terminals (measured with a forward wave in the transmission line) and P_2 is the power at the terminals when the wave is reversed in direction.

directivity pattern The calculated or measured radiation or response pattern (transmission or reception) of an antenna, microphone, loudspeaker, or similar device, with particular attention to the directional features of the pattern.

directivity signal A spurious output signal resulting from finite directivity in a coupler.

direct light Light rays traveling directly from a source to a receptor or target without reflection.

directly grounded Connected to earth or to the lowest-potential point in a circuit, without any intervening resistance or reactance.

directly heated cathode A vacuum-tube filament. It is so called because, when heated, it becomes the cathode of the tube (i.e., the emitter of electrons).

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 thermocouple A meter thermocouple heated directly by signal currents passing through it. Compare INDIRECTLY HEATED THERMOCOUPLE.

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 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 numerical control In a computer or data system, the capability for distributing information among numerically controlled machines whenever desired.

director In a multielement directional antenna, an element that is usually mounted in front of the radiator element, and that is phased and spaced to direct the radiation forward. The director functions in conjunction with the reflector element, which is usually mounted behind the radiator.

directory See DICTIONARY.

direct pickup The broadcasting, especially in television, of events at the same time as they occur (e.g., without recording/reproduction).

direct piezoelectricity The production of a piezoelectric voltage by mechanically stressing a suitable crystal.

direct playback In audio or video recording, the reproduction of a recording without additional processing (e.g., the playing of an original recorded tape, rather than a tape that has been mass produced).

direct-point repeater A relay-operated telegraph repeater. The received signals actuate the relay, which switches the second line.

direct-radiator loudspeaker A loudspeaker whose cone or diaphragm is directly coupled to the air.

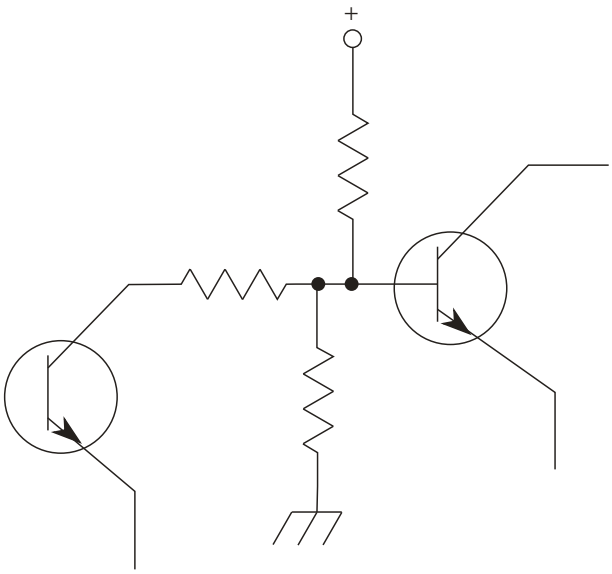
direct ray An electromagnetic ray (wave) that reaches a receiver without reflection or refraction, and without encountering obstructions.

direct recording **1.** A record produced by a graphic recorder. **2.** The technique of producing such a record.

direct-recording instrument A device, such as a graphic recorder, that directly produces a permanent record (such as an inked trace) of the variations of a quantity.

direct resistance coupling A form of coupling in which the output of the first amplifying device is connected through a resistor directly to the input of the second device. The resistance value can vary; sometimes the connection is a short circuit.

directrix A fixed line to which a curve is referred (e.g., the axis of a parabola).



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 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 sound wave A sound wave arriving directly from its source—especially a wave within an enclosure that is not affected by reflection.

direct substitution **1.** An exact component replacement. **2.** Installing an exact component replacement.

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 voltage See DC 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 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-wire circuit A communications or control line of wires connecting a transmitter (or control point) and a receiver (or controlled point) without an intermediary, such as a switchboard.

direct-writing recorder See GRAPHIC RECORDER.

direct-writing telegraph **1.** See PRINTING TELEGRAPH. **2.** See TELAUTOGRAPH.

dis- A prefix meaning "deprived of." For the formation of electronic terms, the prefix must be distinguished from *un-*, meaning "not." For example, a *discharged* body is one that was charged, but has been emptied of its charge. An *uncharged* body is one that ordinarily or presently is not charged.

disable **1.** To deliberately render a circuit, device, or system inoperative. **2.** In digital computer operations, to defeat a software or hardware function.

disc See DISK.

disc engraving **1.** Recording sound by cutting a groove in a record disc. **2.** The groove resulting from such a process.

discharge The emptying or draining of electricity from a source, such as a battery or capacitor. The term also denotes a sudden, heavy flow of current, as in DISRUPTIVE DISCHARGE. Compare CHARGE.

discharge current **1.** Current flowing out of a capacitor. **2.** Current flowing out of a cell—especially a storage cell. Compare CHARGING CURRENT.

discharge key See DISCHARGE SWITCH.

discharge lamp A gas-filled tube or globe in which light is produced by ionization of the gas between electrodes. Familiar examples are the neon bulb and fluorescent tube.

discharge phenomena The effects associated with electrical discharges in gases, such as luminous glow.

discharge potential See IONIZATION POTENTIAL.

discharger **1.** A short-circuiting tool for discharging capacitors. **2.** A spark gap or other device for automatically discharging an overcharged capacitor.

discharge rate **1.** The current that can be supplied by an electrochemical cell or battery reliably during its discharging cycle. Usually expressed in milliamperes or amperes. **2.** An expression of the speed with which a battery is being discharged at a specific point in time. It is usually specified in amperes or milliamperes.

discharge switch A switch for connecting a charged capacitor to a resistor or other load, through which the capacitor discharges. In some circuits, when the switch is in its resting position, it connects the capacitor to the charging source.

discharge voltage See IONIZATION POTENTIAL.

discharging **1.** The conversion of chemical energy to electrical energy by an electrochemical cell or battery. **2.** The release of stored electrical energy from a capacitor, or from a network containing capacitors.

discharging tongs See DISCHARGER, **1**.

discone antenna An antenna consisting of a horizontal metal or wire-mesh disk above a metal or wire-mesh cone. The antenna has an omnidirectional radiation pattern in the horizontal plane, and provides a good match to a coaxial transmission line over a frequency range of several octaves. Commonly used at very-high frequencies (VHF) and ultra-high frequencies (UHF).

disconnect **1.** To separate leads or connections, thereby interrupting a circuit. **2.** A type of connector whose halves can be pulled apart to open a cable or other circuit quickly. **3.** To open a switch or relay.

disconnector See DISCONNECT, **2** and DISCONNECT SWITCH.

disconnect signal A signal sent over a telephone line, ending the connection.

disconnect switch A switch whose main function is to open a circuit quickly (either manually or automatically) in the event of an overload.

discontinuity **1.** A break in a conductor. **2.** A point at which the impedance in a transmission line abruptly changes.

discontinuous wave trains See DAMPED WAVES.

discrete **1.** Complete and self-contained, as opposed to a part of something else. **2.** Composed of individual, separate members.

discrete capacitor Capacitance that is entirely self-contained, rather than being electrically dis-

tributed. Also called LUMPED CAPACITOR. Compare DISTRIBUTED CAPACITANCE.

discrete circuit A circuit comprised of discrete components, such as resistors, capacitors, diodes, and transistors, not fabricated into an integrated circuit.

discrete component A self-contained device that offers one particular 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 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 A source of data containing a finite number of individual elements, rather than a continuously variable parameter.

discrete part See DISCRETE COMPONENT.

discrete resistor A resistive component that is entirely self-contained, rather than being electrically spread out. Also called *lumped resistor.* Compare DISTRIBUTED RESISTANCE.

discrete sampling Sampling of individual bits or characters, one or more at a time.

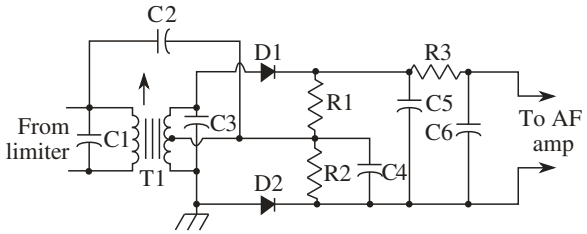
discrete thin-film component A discrete component produced by the thin-film process (e.g., thin-film capacitor, thin-film potentiometer, etc.).

discretionary wiring 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 delivery of an audio signal corresponding to the frequency or phase variations in the FM carrier).

discriminator 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 FOSTER-SEELEY DISCRIMINATOR and TRAVIS DISCRIMINATOR.

discriminator transformer The special input transformer in a DISCRIMINATOR.



discriminator

discriminator tuner A device that tunes a discriminator to a selected subcarrier.

discriminator tuning device See DISCRIMINATOR TUNER.

dish See DISH ANTENNA.

dish antenna A transmitting and/or receiving antenna consisting of a driven element and a large reflector. The reflector has the shape of a shallow, circular section of a paraboloid or sphere. The feed point is at the focus of the reflector. This antenna, noted for its high directivity and gain, is used mainly at ultra-high and microwave frequencies for communications and satellite television. Large antennas of this type are used in some radio telescopes.

dish-type construction A type of panel-and-chassis construction in which the chassis is fastened vertically to the back of the panel.

disintegration **1.** The destructive breakdown of a material. **2.** The stripping of a vacuum-tube cathode of its emissive coating (see DISINTEGRATION VOLTAGE). **3.** The decay of a radioactive material.

disintegration 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 working voltage must be between the ionization and disintegration values.

disintegrator An ultrasonic device for reducing crystals or particles to fine suspensions.

disjunction The logical inclusive-OR operation.

disk **1.** A flat, circular plate (e.g., *rectifier disk*). **2.** See DISKETTE. **3.** See HARD DISK. **4.** See COMPACT DISC. **5.** See CD-ROM. **6.** A phonograph record or the equivalent unrecorded blank.

disk capacitor A fixed (usually two-plate) capacitor consisting of a disk of dielectric material on whose faces are deposited metal-film plates.

disk capacitor