

SEVENTH EDITION

MODERN  
DICTIONARY  
of  
ELECTRONICS

RUDDOLF F. GRAF



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DICTIONARY  
of  
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REVISED AND UPDATED

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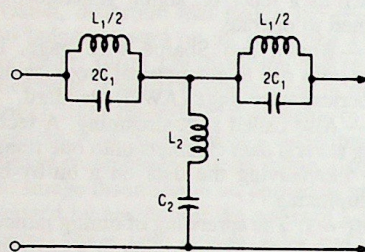
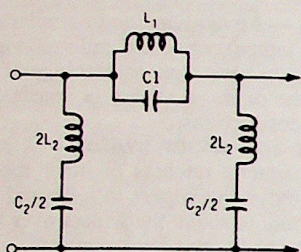
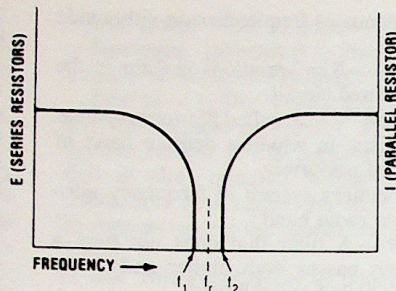
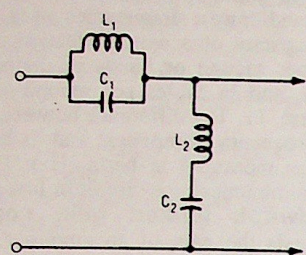
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## bandgap — bandpass filter



Band-elimination filters.

**bandgap**—1. The energy difference between the conduction band and the valence band in a material. 2. The difference in the energy of an electron in a stable state and an electron in an excited state after absorbing energy. 3. The minimum energy required for a valence electron in a semiconductor to make a transition into the conduction band where the electron can move more freely throughout the crystal.

**bandgap energy**—The difference in energy between the conduction band and the valence band.

**band marking**—A continuous circumferential band applied to a conductor at regular intervals for identification.

**band opening**—A condition that results in greater-than-normal communication range on VHF and UHF amateur bands.

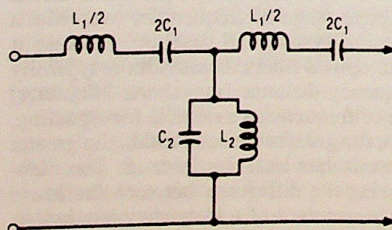
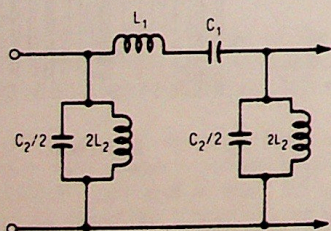
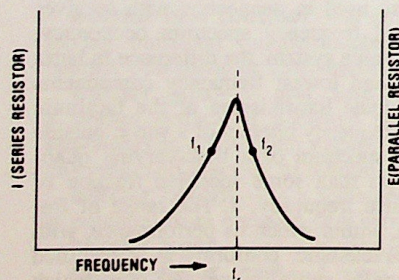
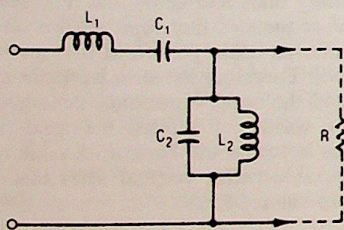
**bandpass**—1. A specific range of frequencies that will be passed through a device. 2. The number of hertz expressing the difference between the limiting frequencies at which the desired fraction (usually half-power) of the maximum output is obtained.

**bandpass amplifier**—An amplifier that is tuned to pass only selected frequencies between preset limits.

**bandpass amplifier circuit**—A stage designed to uniformly amplify signals of certain frequencies only.

**bandpass coupling**—A coupling circuit with an essentially flat-topped frequency response so that a band of frequencies rather than a single frequency is coupled to a following circuit.

**bandpass filter**—A wave filter with a single transmission band, neither of the cutoff frequencies being zero



Bandpass filters.

### compound modulation — computer

range. A compressed signal has a higher average level and therefore less apparent loudness than an uncompressed signal, even though the peaks are no higher in level. An expander reverses the effect of the compressor to restore the original signal.

**compound modulation** — See multiple modulation.

**compound-wound motor** — A dc motor having two separate field windings. One, usually the predominant field, is connected in parallel with the armature circuit, and the other is connected in series.

**compress** — To reduce some parameter of a signal, such as bandwidth, amplitude variation, duration, etc., while preserving its information content.

**compressed-air loudspeaker** — A loudspeaker that has an electrically actuated valve to modulate a stream of compressed air.

**compressed file** — A file whose contents have been compressed by a special utility program so that it occupies less space on a disk or other storage device than in its uncompressed (normal) state.

**compressed speech** — A representation of speech in which some redundant features of the digitized speech have been removed.

**compression** — 1. A process in which the effective amplification of a signal is varied as a function of the signal magnitude, the effective gain being greater for small than for large signals. In television, the reduction in gain at one level of a picture signal with respect to the gain at another level of the same signal. 2. Electronic reduction of the dynamic range so that quiet sounds are raised and loud sounds lowered. The most common application is an "automatic" recording in which it is important that all sounds recorded are made intelligible when played back. Also used when necessary to avoid overrecording and distortion, or to lift the signal level clear of background noise or hum. 3. A technique used to increase the number of bits per second sent over a data link by replacing often-repeated characters, strings, and command sequences with electronic code. When this compressed data reaches the remote end of the transmission link, data decompression is used to restore the data to its normal form for display. 4. The conversion of information to a format that requires fewer bits and can be reversed to its original state once transferred to a new location.

**compressional wave** — In an elastic medium, a wave that causes a change in volume of an element of the medium without rotation of the element.

**compression driver unit** — A speaker driver unit that does not radiate directly from the vibrating surface. Instead, it requires acoustic loading from a horn that connects through a small throat to an air space adjacent to the diaphragm.

**compression ratio** — The ratio between the magnitude of the gain (or amplification) at a reference signal level and its magnitude at a higher stated signal level.

**compression seal** — A seal made between an electronic package and its leads. The seal is formed as the heated metal, when cooled, shrinks around the glass insulator, thereby forming a tight joint.

**compressor** — 1. A device that performs analog compression. 2. A transducer that, for a given amplitude range of input voltages, produces a smaller range of output voltages. In one important type of compressor, the envelope of speech signals is used to reduce their volume range.

**compressor expander** — See compander.

**compromise network** — In a telephone system, a network used in conjunction with a hybrid coil to balance a subscriber's loop. The network is adjusted for an average loop length, an average subscriber's set, or both,

and gives compromise (not precision) isolation between the two directional paths of the hybrid coil.

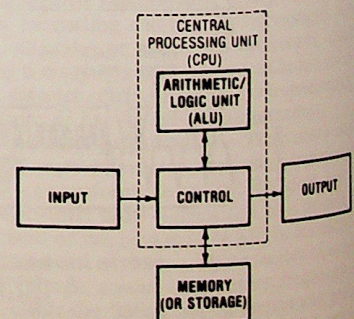
**Compton diffusion** — An elastic shock between a photon and an electron. The photon is diffused with lesser energy and the electron acquires a kinetic energy equal to the energy decrease of the photons.

**Compton effect** — The elastic scattering of photons by electrons. Because the total energy and momentum are conserved in the collisions, the wavelength of the scattered radiation undergoes a change that depends on the scattering angle.

**computational stability** — The degree to which a computational process remains valid when subjected to such effects as errors or malfunctions.

**compute bound** — A program that is speed-limited by the computations being performed.

**computer** — 1. Any device capable of accepting information, applying prescribed processes to the information, and supplying the results of these processes. Sometimes, more specifically, a device for performing sequences of arithmetic and logical operations; sometimes, still more specifically, a stored-program digital computer capable of performing sequences of internally stored instructions, as opposed to calculators on which the sequence is impressed manually (desk calculator) or on tape or cards (card-programmed calculator). 2. A tool for managing data. It can work with numbers and alphanumeric data such as names, words, addresses, and stock numbers. It can be programmed to repeat the same function over and over. It can logically evaluate information given to it, and act on its own findings. It can store huge volumes of data for future use, reference, and updating, and even "converse" with its operator. 3. A machine in which stored instructions operate on other instructions to modify or alter them. Data words and instruction words of the same size, stored in the same medium, differ only in their function. The same word can be both a data word and an instruction word at different times during the execution of a program. 4. An electrical/electronic device that can accept information, process it mathematically (in accordance with previous instructions), and then provide the results of this processing. 5. An electronic device that uses programmed instructions to monitor and control various types of data in order to solve mathematical problems or control industrial applications. Its instructions are executed in various sequences, as required. 6. A calculating device that processes data represented by a combination of discrete data (in digital computers) or continuous data (in analog computers). 7. A device that manipulates data and makes comparisons according to a series of instructions stored in its memory. By changing the instructions the computer can be made to do a completely different



Computer.

## low-energy criterion — low-pass filter

440

**low-energy criterion** — See Von Hippel breakdown theory.

**low-energy material** — See soft magnetic material.

**lower pitch limit** — The minimum frequency at which a sinusoidal sound wave will produce a pitch sensation.

**lower sideband** — 1. The lower of two frequencies or groups of frequencies produced by the amplitude-modulation process. 2. In carrier transmission, the band of frequencies that is lower than the carrier frequency. It is the difference between the instantaneous values of the carrier frequency and the modulating frequency.

**lowest effective power** — The minimum product of the antenna input power in kilowatts and the antenna gain required for satisfactory communication over a particular radio route.

**lowest useful frequency** — Abbreviated LUF. The lowest frequency in the high-frequency radio band that can be used at a particular time of day for ionospheric propagation between two specified points.

**lowest useful high frequency** — In radio transmission, the lowest frequency effective at a specified time for ionospheric propagation of radio waves between any two points, excluding frequencies below several megahertz. It is determined by such factors as absorption, transmitter power, antenna gain, receiver characteristics, type of service, and noise conditions.

**low filter** — An audio circuit designed to remove low-frequency noises from the program material. Such noises include turntable rumble, tonearm resonance, etc.

**low frequency** — Abbreviated LF. The band of frequencies extending from 30 to 300 kHz (10,000 to 1000 meters).

**low-frequency compensation** — A technique for extending the low-frequency response of a broadband amplifier.

**low-frequency distortion** — Distortion effects that occur at low frequency. In television, generally considered as any frequency below the 15.75-kHz line frequency.

**low-frequency impedance corrector** — An electric network designed to be connected to a basic network, or to a basic network and a building network, so that the combination will simulate, at low frequencies, the sending-end impedance, including the dissipation, of a line.

**low-frequency induction heater or furnace** — A heater or furnace in which the charge is heated by inducing a current at the power-line frequency through it.

**low-frequency loran** — Also called hertz-matching loran. A modification of standard loran, with operation in the frequency range of approximately 100 to 200 kHz, for increased range over land and during daytime. Whereas the envelopes of the pulses are matched to obtain a line of position with ordinary loran, the hertz within the pulses are matched to provide a much more accurate fix with low-frequency loran.

**low-frequency padder** — In a superheterodyne receiver, a small adjustable capacitor connected in series with the oscillator tuning coil. During alignment it is adjusted to obtain correct calibration of the circuit at the low-frequency end of the tuning range.

**low insertion force connector** — See LIF connector.

**low level** — In digital logic, the more negative of the two binary-system logic levels. See also high level; negative logic; positive logic.

**low-level contacts** — Contacts that control only the flow of relatively small currents in relatively low-voltage circuits — e.g., alternating currents and voltages encountered in voice or tone circuits, direct current on the order of microamperes, and voltages below the softening

voltages on record for various contact materials (that is, 0.080 volt for gold, 0.25 volt for platinum, and the like). Also defined as the range of contact electrical loading where there can be no electrical (arc transfer) or thermal effects and where only mechanical forces can change the conditions of the contact interface. In general, loads below 5 volts dc and 10 milliamperes are considered low level.

**low-level crossover network** — A crossover network designed to operate at line levels and which is placed before the power amplifier(s); used in bi-amplified or tri-amplified speaker systems.

**low-level modulation** — 1. The modulation produced in a system when the power level at a certain point is lower than it is at the output. 2. Modulation introduced at a low-level point in a system, before amplification.

**low-level radio-frequency signal (tr, atr, and pre-tr tubes)** — A radio-frequency signal with insufficient power to fire the tube.

**low-level signal** — Very small amplitudes serving to convey information or other intelligence. Variations in signal amplitude are frequently expressed in microvolts.

**low-loss dielectric** — An insulating material, such as polyethylene, that has a relatively low dielectric loss, making it suitable for transmission of radio frequency.

**low-loss insulator** — An insulator with high radio-frequency resistance and hence slight absorption of energy.

**low-loss line** — A transmission line with relatively low losses.

**low-noise amplifier** — Abbreviated LNA. A device that receives and amplifies the weak satellite signal reflected by a dish via a feed. C-band LNAs typically have noise characteristics quoted as noise temperatures rated in degrees Kelvin. Ku-band LNA noise characteristics are usually expressed as a noise figure in decibels.

**low-noise block downconverter** — Abbreviated LNB. A low-noise microwave amplifier and converter that downconverts a block or range of frequencies at once to an intermediate frequency range, such as 950 to 1450 MHz, 950 to 1750 MHz, or 950 to 2050 MHz.

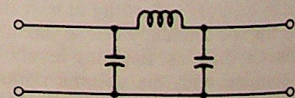
**low-noise cable** — Cable configuration specially constructed to eliminate spurious electrical disturbances caused by capacitance changes of self-generated noise induced by either physical abuse or adjacent circuitry.

**low-noise converter** — Abbreviated LNC. A combination low-noise amplifier and remote downconverter housed in one weatherproof box.

**low-noise tape** — Magnetic tape with a signal-to-noise ratio 3 to 5 dB better than conventional tapes, making it possible to record sound — especially music with a wide frequency range — at reduced tape speeds without incurring objectionable background noise (hiss) and with little compromise of fidelity.

**low order** — The least significant half of a word. Usually bits 0–7 of a 16-bit word.

**low-pass filter** — 1. A filter network that passes all frequencies below a specified frequency with little or no loss but discriminates strongly against higher frequencies. 2. Wave filter having a single transmission band extending from zero frequency up to some critical or cutoff frequency not infinite. 3. Filter that passes all frequencies below a certain cutoff point and attenuates all frequencies above that point.



Low-pass filter.

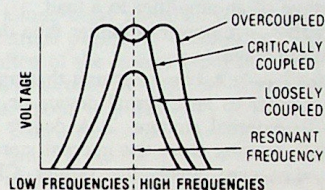
**overbunching** — The condition in which the buncher voltage of a velocity-modulation tube is higher than required for optimum bunching of the electrons.

**overcharging** — Continued charging of a battery after it has reached a charged condition. This action damages the battery and shortens its life.

**overcoat** — A thin film of insulating material, either plastic or inorganic (e.g., glass or silicon nitride), applied over integral circuit elements for the purposes of mechanical protection and prevention of contamination.

**overcompounding** — In a compound-wound generator, use of sufficient series turns to raise the voltage as the load increases, in order to compensate for the increased line drop. In a motor, overcompounding makes it run faster as the load increases.

**overcoupled circuit** — A tuned circuit in which the coupling is greater than the critical coupling. The result is a broadband response characteristic.



Overcoupled circuit.

**overcurrent** — In a circuit, the current that will cause an excessive or even dangerous rise in temperature in the conductor or its insulation.

**overcurrent protection** — See overload protection.

**overcurrent protective device** — 1. A device operative on excessive current that causes and maintains the interruption of power in the circuit. 2. A device designed to open an electric circuit automatically at a predetermined overcurrent level.

**overcurrent relay** — A protective device that separates one portion of an electric network from another when current exceeds a predetermined value.

**overcutting** — In disc recording, the cutting through of one groove into an adjacent one when the level becomes excessive.

**overdamping** — Any periodic damping greater than the amount required for critical damping. See also aperiodic damping.

**overdriven amplifier** — An amplifier stage designed to distort the input-signal waveform by permitting the driving signal to drive it beyond cutoff or even into saturation.

**overflow** — 1. The condition occurring whenever the result of an arithmetic operation exceeds the capacity of the number representation in a digital computer. 2. The carry digit arising from (1) above. 3. The generation of a quantity that exceeds the capacity of the computer storage facility. 4. That portion of the result of an operation that exceeds the capacity of the intended unit of storage. 5. In a calculator, when a number that is entered, or the answer to a calculation, exceeds the capacity of the working register, the excess digits overflow the register. In most machines, an overflow signal (either audible or visible) indicates when overflow occurs.

**overflow indicator** — 1. A bistable trigger that changes state on the occurrence of overflow in the computer register with which it is associated. The overflow

indicator may be interrogated and/or restored to the original state. 2. In a calculator, a warning light or illuminated letter E to indicate existence of overflow condition.

**overflow position** — In a computer, an extra register position in which the overflow digit is developed.

**overflow storage** — Additional storage provided in a store and forward switching center of a computer to prevent the loss of messages (or parts of messages) offered to a completely filled line store.

**overglaze** — 1. A glass coating that is over another component or element, normally for physical or electrical protection purposes. 2. A glass compound in low-melting, vitreous form, used as a coating for passivate thick-film resistors and offering mechanical protection.

**overglazed** — Coated with a layer of printed and fired glass paste. Overglazing may be a solder barrier, a protective coating for resistors, or an insulator to prevent possible short circuits, as in the case of a wire bond crossing over a printed conductor.

**overhang** — 1. In terms of printed wiring, the inverted shelf of plating formed when conductor material is selectively removed from under the plating. The measurement between the base copper and the plating (generally refers to one side of the conductor only; thus, for a conductor width reduction, one must take two times the overhang). 2. The critical dimension by which the stylus overreaches the center spindle of a turntable when an offset tonearm is mounted for minimum tracking error.

**overhead line** — A conductor carried on elevated poles (e.g., telephone or telegraph wires).

**overinsulation** — In a coil, the insulating material placed over a wire that is brought from the center over the top or bottom wall.

**overlap** — 1. The amount by which the effective height of a scanning facsimile spot exceeds the nominal width of the scanning line. When the spot is rectangular, overlap may be expressed as a percentage of the nominal width of the scanning line. 2. To perform one operation at the same time that another operation is being performed; for example, to carry on input/output operations at the same time that instructions are being executed by the central processing unit. 3. The contact area between a film resistor and film conductor. 4. A mode of computer operation in which several processes take place seemingly simultaneously. In a multiprocessor system, simultaneous operation is truly possible. In a single-processor system, processes time-share the processor and appear to happen simultaneously but actually they occur in a time-sequential mode. Real time savings can be realized in either case, especially when extensive I/O to many devices of differing speeds is taking place.

**overlapping contacts** — Combinations of two sets of contacts actuated by a common means, each set closing in one of two positions and so arranged that the contacts of one set open after the contacts of the other set have been closed.

**overlap radar** — Long-range radar that is located in one sector but also covers a portion of another sector.

**overlay** — 1. In a computer, the technique of using the same blocks of internal storage for different routines during different stages of a problem, e.g., when one routine is no longer needed in internal storage, another routine can be placed in that storage location. 2. Memory management technique in which various routines occupy overlapping memory areas in succession. 3. A technique used to execute programs that are larger than the available memory size in systems without paging or segmentation capabilities. To utilize this method a program must be manually divided into a number of mutually exclusive groups of software modules.

## simultaneous transmission — single-degree-of-freedom system

**simultaneous transmission** — Transmission of control characters or data in one direction at the same time that information is being received in the opposite direction.

**SINAD or sinad** — Abbreviation for signal-to-noise and distortion. 1. A measurement of the signal-to-noise ratio of a receiver system in which the signal level measurement includes the system noise and distortion:  $(s + n + d)/n$ .

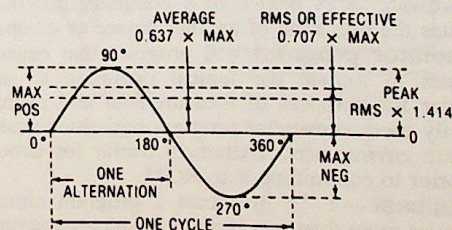
**sine** — The sine of an angle of a right triangle is equal to the side opposite that angle divided by the hypotenuse (the long side opposite the right angle).

**sine galvanometer** — An instrument resembling a tangent galvanometer except that its coil is in the plane of the deflecting needle. The sine of the angle of deflection will then be proportionate to the current.

**sine law** — The law which states that the intensity of radiation in any direction from a linear source varies in proportion to the sine of the angle between a given direction and the axis of the source.

**sine potentiometer** — A dc voltage divider (potentiometer) whose output is proportionate to the sine of the shaft-angle position.

**sine wave** — 1. A wave that can be expressed as the sine of a linear function of time, space, or both. 2. A waveform (often viewed on an oscilloscope) of a pure alternating current or voltage. It is drawn on a graph of amplitude versus time or radial degrees and follows the rules of sine and cosine values in relation to angular rotation of an alternator. It can be simulated by means of an electronic oscillator. 3. The only waveform that cannot be considered to be a pulse. All other waveforms consist of more than one frequency, all harmonically related. A sine wave has a single frequency and therefore occupies a very small bandwidth. It passes through circuitry of any bandwidth with no change in waveform, but it may be changed in amplitude.



*Sine wave.*

**sine-wave modulated jamming** — A jamming signal consisting of a cw signal modulated by one or more sine waves.

**singing** — 1. An undesired self-sustained oscillation at a frequency in or above the passband of a system or component. 2. An unwanted self-sustained audio-frequency oscillation in an audio system or device.

**singing margin** — Also called gain margin. The excess of loss over gain around a possible singing path at any frequency, or the minimum value of such excess over a range of frequencies.

**singing point** — 1. The condition of a circuit or transmission path where the sum of the gains exceeds the sum of the losses. When expressed in decibels, it is the gain that can be added to the circuit equivalent before singing will begin. 2. The amount of total gain in the transmission system (most commonly used in connection with two-wire repeaters) that causes the system to begin to

lose efficiency of performance because the self-oscillating point is too closely approached. 3. The singing point of a circuit that is coupled back to itself is the point at which the gain is just sufficient to make the circuit break into oscillation.

**singing-stovepipe effect** — Reception and reproduction of radio-signal modulation by ordinary pieces of metal, such as sections of stovepipe, in contact with each other. It is caused by mechanically poor connections, such as rusty bolts or faulty welds, that act as nonlinear diodes and produce intermodulation distortion when subjected to strong radiated fields near transmitters.

**single-address code** — An instruction that contains the location of the data as well as the operation or sequence of operations to be performed on this data.

**single amplitude** — With reference to vibratory conditions, the peak displacement of an oscillating structure from its average or mean position.

**single-anode tank** — See single-anode tube.

**single-anode tube** — Also called a single-anode tank. An electron tube with one anode (used chiefly for pool-cathode tubes).

**single-assignment language** — A programming language that allows only one value to be assigned to a variable in a single expression.

**single-axis gyro** — A type of gyro in which the spinning rotor is mounted in a gimbal arranged so as to tilt about only one axis relative to the stable element.

**single-board microcomputer** — Also called monoboard microcomputer. A single printed circuit board containing, as a minimum, processor, memory (ROM and/or RAM), and input/output—usually a combination of serial and parallel ports. May also include a counter/timer function and bus interconnection scheme. A single-board microcomputer family may also include other functional system elements (such as memory and I/O functions) on circuit boards of the same format as the microcomputer board.

**single-button carbon microphone** — A microphone having a carbon-filled buttonlike container on one side of its flexible diaphragm. As the sound waves move the diaphragm, the resistance of the carbon changes, and the microphone current constitutes the desired audio-frequency signal.

**single-carrier FM recording** — The method of recording in which the input signal is frequency modulated onto a carrier and the carrier is recorded on a single track at saturation and without bias.

**single-channel** — A carrier-only or single-tone modulated radio control transmitter and matching receiver installation.

**single-channel monopulse tracking system** — See monopulse tracking.

**single-channel simplex** — Nonsimultaneous communication between stations over the same frequency channel.

**single circuit** — A telegraph circuit capable of nonsimultaneous two-way communication.

**single-circuit system** — An alarm circuit that routes only one side of the circuit through each sensor. The return may be through either ground or a separate wire.

**single-conversion receiver** — A receiver employing a superheterodyne circuit in which the input signal is downconverted once.

**single crystal** — A piece of material in which the crystallographic orientation of all the basic groups of atoms is the same.

**single-degree-of-freedom system** — A system for which only one coordinate is required to define the configuration of the system.

## transaction processing — transfer characteristic

**transaction processing**—A processing method in which transactions are executed immediately after they are received by the computer. The largest single application for fault-tolerant computers, which involves repetitive, typically financial, tasks in banking, stock trading, and the like.

**transadmittance**—From one electrode to another, the alternating components of the current of the second electrode divided by the alternating component of the voltage of the first electrode, all other electrode voltages being maintained constant. As most precisely used, the term refers to infinitesimal amplitudes.

**transceiver**—The combination of radio transmitting and receiving equipment in a common housing, usually for portable or mobile use and employing some common circuit components for both transmitting and receiving.

**transceiving data link**—Integrated data processing by means of punched cards, using transceivers as terminal equipment. The transmission path can be wire or radio.

**transconductance**—Symbolized  $g_m$ . Also called mutual conductance. An electron-tube rating equal to the change in anode current divided by the change in grid voltage causing the anode-current change. The unit of transconductance is the siemens; a more commonly used unit is the microsiemens ( $10^{-6}$  siemens).

**transconductance amplifier**—An amplifier that supplies an output current proportional to its input voltage. From its output terminals the amplifier appears to be a current source with a high output impedance  $Z_o$ . Its input impedance  $Z_{in} \gg Z_g$ , and the output impedance  $Z_o \gg Z_L$ , where  $Z_g$  and  $Z_L$  are the source and load impedances.

**transconductance meter**—Also called a mutual-conductance meter. An instrument for indicating the transconductance of a grid-controlled electron tube.

**transconductance tube tester**—Also called a mutual-conductance or dynamic mutual-conductance tube tester. A tube tester with circuits set up in such a manner that the test is made by applying an ac signal of known voltage to the control grid, and the tube amplification factor or mutual conductance is measured under dynamic operating conditions.

**transconductor**—An active or passive network whose short-circuit output current is a specific, accurately known, linear or nonlinear function of the input voltage, thereby establishing a predetermined relationship between input voltage and output current.

**transcribe**—1. To copy, with or without translating, from one external storage medium of a computer to another. 2. To copy from a computer into a storage medium or vice versa.

**transcriber**—Equipment associated with a computing machine for the purpose of transferring input or output data from a record of information in a given language to the medium and language used by a digital computing machine, or from a computing machine to a record of information.

**transcription**—1. An electrical recording (e.g., a high-fidelity, 33 1/3-rpm record) containing part or all of a (radio) program. It may be either an instantaneous recording disc or a pressing. 2. A phonograph record, especially the 33 1/3-rpm 16-inch (40.6-cm) record, used to record broadcast programs.

**transdiode**—A transistor so connected that the base and collector are actively maintained at equal potentials, although not connected together. The logarithmic transfer relationship between collector current and base-emitter voltage very closely approximates that of an ideal diode.

**transducer**—1. A device that when actuated by signals from one or more systems or media can supply related signals to one or more other systems or media.

2. A device, component, machine, system, or combination of these that converts energy from one form to another. The energy may be in any form, such as electrical, mechanical, acoustical, etc. The term transducer is often restricted to a device in which the magnitude of an applied stimulus is converted into an electrical signal proportional to the quantity of the stimulus. 3. A device used to convert physical parameters, such as temperature, pressure, or weight, into electrical signals. 4. A device that converts information from one physical form to another. Examples include the phono cartridge (mechanical to electrical), speaker (electrical to acoustical), and microphone (acoustical to electrical). 5. A force-measuring device. It has the characteristics of providing an output, usually electrical, that serves as the measurement of load, force, compression, pressure, etc., when placed along the sensitive axis of the force cell. 6. An electromechanical device for translating a physical quantity such as pressure, temperature, displacement, acceleration, etc., into a proportional electrical quantity, such as voltage or current. 7. A device that converts something measurable into another form; often, a physical property such as temperature or flow into an electrical signal. Frequently used interchangeably with *sensor*.

**transducer-coupling system efficiency**—The power output at the point of application, divided by the electrical power input into the transducer.

**transducer efficiency**—Ratio of the power output to the electrical power input at the rated power.

**transducer equivalent noise pressure (of an electroacoustic transducer or system used for sound reception)**—Also called equivalent noise pressure. For a sinusoidal plane-progressive wave, the rms sound pressure that, if propagated parallel to the principal axis of the transducer, would produce an open-circuit signal voltage equal to the rms of the inherent open-circuit noise voltage of the transducer in a transmission band having a bandwidth of 1 hertz and centered on the frequency of the plane sound wave.

**transducer gain**—Ratio of the power that the transducer delivers to the load under specified operating conditions to the available power of the source.

**transducer insertion loss**—See insertion loss.

**transducer loss**—Ratio of the available power of the source to the power that the transducer delivers to the load under specified operating conditions.

**transducer pulse delay**—The interval of time between a specified point on the input pulse and on its related output pulse.

**transfer**—1. To transmit, or copy, information from one device to another. 2. To jump. 3. The act of transferring. 4. In electrostatography, the act of moving a developed image, or a portion thereof, from one surface to another without altering its geometrical configuration (e.g., by electrostatic forces or by contact with an adhesive-coated surface). 5. In a computer, to terminate one sequence of instructions and start another.

**transfer accuracy**—The input-to-output error as a percentage of the input. Transfer accuracy depends on the source impedance, switch resistance, load impedance if the multiplexer is not buffered, and the signal frequency.

**transfer admittance**—1. The complex ratio of the current at the second pair of terminals of an electrical transducer to the electromotive force applied between the first pair, all pairs of terminals being terminated in any specified manner. 2. The reciprocal of transfer impedance.

**transfer characteristic**—1. The relationship, usually shown by a graph, between the voltage of one electrode and the current to another electrode, all other electrode voltages being maintained constant. 2. The characteristics pertaining to the degree of output activity for an input stimulus, or vice versa. 3. Function that when

**negate** — To invert the value of a function or variable; that is, to change it to 1 if it is 0 or to 0 if it is 1. The symbol for negation is a superscript bar.

**negated-input OR gate** — A gate that has a high output when one or both inputs are low. A negated-input OR gate is identical with a NAND gate in function.

**negation** — The NOT operation in Boolean algebra.

**negative** — Abbreviated neg. 1. Less than zero. 2. The opposite of positive (e.g., negative resistance, transmission, feedback, etc.). 3. A terminal or electrode having an excess of electrons. Electrons flow out of the negative terminal of a voltage source, toward a positive source. 4. An artwork, artwork master, or production master in which the intended conductive pattern is transparent to light, and the areas to be free from conductive material are opaque.

**negative acceleration** — A relative term often used to indicate that, referenced to zero acceleration, a negative electrical output will be obtained from a linear accelerometer when its sensitive axis is oriented normal to the surface of the earth and a given minus reference point along the center of the seismic mass.

**negative acknowledgement character** — Abbreviated NAK. A communication control character transmitted from a receiving point as a negative response to a sender. It may also be used as an accuracy control character.

**negative bias** — In a vacuum tube, the voltage that makes the control grid more negative than the cathode.

**negative booster** — A booster used with a ground-return system to reduce the difference of potential between two points to the grounded return. It is connected in series with a supplementary insulated feeder extending from the negative bus of the generating station or substation to a distant point on the grounded return.

**negative charge** — A condition in a circuit when the element in question retains more than its normal quantity of electrons.

**negative conductor** — A conductor connected to the negative terminal of a source of supply. Such a conductor is frequently used as an auxiliary return circuit in a system of electric traction.

**negative differential conductance region** — That part of the characteristic of a tunnel diode between the peak and valley points.

**negative-effective-mass amplifiers and generators** — A class of solid-state devices for broadband amplification and generation of microwave energy. Operation of these devices is based on the phenomenon by which the effective masses of charge carriers in semiconductors become negative when their kinetic energies are sufficiently high.

**negative electricity** — The type of electricity possessed by a body that has an excess of electrons.

**negative electrode** — The electrode from which the forward current flows.

**negative electron** — Also called negatron. An electron, distinguished from a positive electron or positron.

**negative feedback** — Also called degeneration, inverse feedback, or stabilized feedback. A process by which a part of the output signal of an amplifying circuit is fed back to the input circuit. The signal fed back is 180° out of phase with the input signal; therefore, the amplification is decreased, and distortion reduced.

**negative-feedback amplifier** — An amplifier in which negative feedback is employed to improve the stability or frequency response, or both.

**negative ghost** — A ghost that has the opposite shading from that of the original image (i.e., is black when the image is white, and vice versa).

## negate — negative-resistance oscillator

**negative glow** — The luminous glow between the cathode and Faraday dark spaces in a glow-discharge cold-cathode tube. *See also* glow discharge.

**negative-grid generator** — A conventional oscillator circuit in which oscillation is produced by feedback from the plate circuit to a grid that is normally negative with respect to the cathode and that is designed to operate without drawing grid current at any time.

**negative ground** — The negative battery terminal of a vehicle is connected to the body and frame.

**negative image** — 1. A televised picture in which the whites appear black and vice versa. It is due to the picture signal having a polarity opposite to that of a normal signal. 2. A picture signal having a polarity that is opposite to normal polarity and which results in a picture in which the white and black area are reversed.

**negative impedance** — Also called negative resistance when there is no inductance or capacitance in the circuit. A characteristic of certain electrical devices or circuits—instead of increasing, the voltage decreases when the current is increased, and vice versa.

**negative ion** — An atom with more electrons than the normal number. Thus, it has a negative charge.

**negative-ion generator** — A device that bombards air molecules with electrons so that molecules are ionized negatively.

**negative light modulation** — In television, the process whereby a decrease in initial light intensity causes an increase in the transmitted power.

**negative logic** — A form of logic in which the more positive voltage level represents logical 0 and the more negative level represents logical 1.

**negative modulation** — In an AM television system, that modulation in which an increase in brightness corresponds to a decrease in transmitted power.

**negative modulation factor** — The maximum negative departure of the envelope of an AM wave from its average value, expressed as a ratio. This rating is used whenever the modulation signal wave has unequal positive and negative peaks.

**negative phase-sequence relay** — A relay that functions in conformance with the negative phase-sequence component of the current, voltage, or power of the circuit.

**negative picture phase** — 1. For a television signal, the condition in which an increase in brilliance makes the picture-signal voltage swing in a negative direction from the zero level. 2. Positioning the composite video signal so that the maximum level of the sync pulses is at 100% amplitude. The brightest picture signals are in the opposite, negative direction.

**negative picture transmission** — Television transmission system used in North America and other countries in which a decrease in illumination of the original scene causes an increase in percentage of modulation of the picture carrier. When modulated, signals with a higher modulation percentage have more positive voltages.

**negative plate** — The grid and active material connected to the negative terminal of a storage battery. When the battery is discharging, electrons flow from this terminal, through the external circuit, to the positive terminal.

**negative resistance** — 1. A resistance that exhibits the opposite characteristic from normal—i.e., when the voltage is increased across it, the current will decrease instead of increase. 2. A property of some circuits containing no reactance whereby the current increases as the voltage is decreased.

**negative-resistance magnetron** — A magnetron operated so that it acts as a negative resistance.

**negative-resistance oscillator** — An oscillator produced by connecting a parallel-tuned resonant circuit

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