

**MODERN
DICTIONARY
of
ELECTRONICS**

SEVENTH EDITION

REVISED AND UPDATED

Rudolf F. Graf



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air-spaced coax—A coaxial cable in which air is basically the dielectric material. The conductor may be centered by means of a spirally wound synthetic filament, by beads, or by braided filaments. This construction is also referred to as an air dielectric.

air surveillance—Systematic observation of airspace by electronic, visual, or other means, primarily to identify and determine the movements of aircraft and missiles, friendly and enemy, in the airspace under observation.

airtime—Time spent on a cellular phone, which is usually billed to the subscriber on a per-minute basis.

air-to-ground communication—Transmission of radio signals from an aircraft to stations or other locations on the earth's surface, as differentiated from ground-to-air, air-to-air, or ground-to-ground communications.

air-to-ground radio frequency—The frequency or band of frequencies agreed upon for transmission from an aircraft to an aeronautical ground station.

air-to-surface missile—A missile designed to be dropped from an aircraft. An internal homing device or the aircraft's radio guides it to a surface target.

airwaves—Slang expression for radio waves used in radio and television broadcasting.

alacrized switch—1. A mercury switch treated to yield a low adhesion force between the rolling surface and mercury pool, resulting in a decreased differential angle. 2. A mercury switch in which the tendency of the mercury to stick to the mating parts has been reduced.

alarm—A device that signals the existence of an abnormal condition by means of an audible or visible discrete change, or both, intended to attract attention. An alarm circuit produces or transmits an alarm signal.

alarm condition—A threatening condition, such as an intrusion, fire, or holdup, sensed by a detector.

alarm device—A device that signals a warning in response to an alarm condition, such as a bell, siren, or annunciator.

alarm discrimination—The ability of an alarm system to distinguish between those stimuli caused by an intrusion and those which are a part of the environment.

alarm hold—A means of holding an alarm once sensed. The typical magnetic trap does not hold or latch, and thus the reclosing of a trapped door resets the typical magnetic trap. A hold circuit applied to such a device indicates that the door has been opened and continues to so indicate until reset.

alarm line—A wired electrical circuit used for the transmission of alarm signals from the protected premises to a monitoring station.

alarm relay—A relay, other than an annunciator, used to operate, or to operate in connection with, a visual or audible alarm.

alarm state—The condition of a detector that causes a control unit in the secure mode to transmit an alarm signal.

alarm system—An assembly of equipment and devices designated and arranged to signal the presence of an alarm condition requiring urgent attention, such as unauthorized entry, fire, temperature rise, etc. The system may sound a local warning or alert the police, a central station, or a proprietary service.

albedo—The reflecting ability of an object. It is the ratio of the amount of light reflected compared with the amount received.

ALC—Abbreviation for automatic level (volume) control. 1. A special compressor circuit included in some tape recorders for automatically maintaining the recording volume within the required limits regardless of changes in the volume of the sound. 2. A circuit that automatically maintains recording levels within permissible limits, so that, no matter how loud or soft the sound being recorded,

the signal on the tape will not get strong enough to over-modulate and distort or soft enough to be lost in noise. Also known as automatic volume control (AVC).

Alexanderson alternator—An early mechanical generator used as a source of low-frequency power for transmission or induction heating. It is capable of generating frequencies as high as 200,000 hertz.

Alexanderson antenna—A vlf antenna consisting of a horizontal wire connected to ground at equally spaced points by vertical wires with base-loading coils; the transmitter is coupled to an end coil.

Alford antenna—A square loop antenna comprising four linear sides with their ends bent inward so that capacitive loading is provided to equalize the current around the loop.

algebraic adder—In a computer, an adder that provides the algebraic rather than arithmetic sum of the entered quantities.

algebraic logic—A calculator mode that permits all calculations to be done in the order in which they are written.

algebraic sum—The sum of two or more quantities combined according to their signs. (Compare with arithmetic sum.)

ALGOL—1. An international problem language designed for the concise, efficient expression of arithmetic and logical processes and the control (iterative, etc.) of these processes. From *algorithmic language*. 2. A high-level language that has a context-free structure.

algorithm—1. A set of rules or processes for solving a problem in a finite number of steps (for example, a full statement of an arithmetic procedure for finding the value of $\sin x$ with a stated precision). See also procedure. 2. A series of equations, some of which may state inequalities, that cause decisions to be made and the computational process to be altered based on these decisions. 3. A set of rules or directions for getting a specific output from a specific input. The distinguishing feature of an algorithm is that all vagueness must be eliminated; the rules must describe operations that are so simple and well defined they can be executed by a machine. Furthermore, an algorithm must always terminate after a finite number of steps. 4. An ordered sequence of mathematical steps that always produces the correct answer to a problem, though the solution may be more lengthy than necessary. 5. A set of well-defined procedures for the solution of a problem in a limited number of steps. Algorithms are implemented in a computer by a programmed sequence of instructions.

algorithmically generated pattern—An array of digital data automatically generated by a predetermined software routine or program.

algorithmic language—An arithmetic language by which a numerical procedure may be presented to a computer precisely and in a standard form.

algorithmic pattern generation—Real-time generation of input test patterns during test execution according to specified procedures, formulas, or algorithms. Also refers to procedures or algorithms used in automatic-test-generation software for specific fault sets.

alias—An alternate label. For instance, a label and one or more aliases may be used to identify the same data element or point in a computer program.

aliasing—1. The introduction of error into the Fourier analysis of a discrete sampling of continuous data when components with frequencies too great to be analyzed with the sampling interval being used contribute to the amplitudes of lower-frequency components. 2. A phenomenon arising as a result of the sampling process in which high-frequency components of the original analog signal (whether information or noise) appear as lower frequencies in the sampled signal. Aliasing occurs when the

sampling rate is less than twice the highest frequency existing in the original analog signal. 3. Undesirable distortion component that can arise in digital audio equipment when the input signal's frequency exceeds one-half of the digital circuitry's sampling rate. 4. The mistaking of some object or situation for another, especially because of the way data is examined. Examples: movies of propellers and wagon wheels that seem to turn backward, musical notes that are wrongly analyzed by sequential measurement (for instance, thought to be an octave too low), and, especially, "jaggies." 5. Undesirable stair-step distortions in computer-generated images caused by improper sampling techniques. The most common effect is a jagged edge along object boundaries.

aliasing noise—A distortion component that will be created if a sampled signal bandwidth is effectively greater than one-half the sampling rate.

align—1. To adjust the tuned circuits of a receiver or transmitter for maximum signal response. 2. To put into proper relative position, agreement, or coordination when placing parts of a photomask together or placing a photomask over an etched pattern in the oxide on a semiconductor wafer. 3. To adjust the tuning of a multistage device so that all stages are adjusted to the same frequency or so that they work together properly.

aligned bundle—See coherent bundle.

aligned-grid tube—A multigrid vacuum tube in which at least two of the grids are aligned one behind the other to give such effects as beam formation and noise suppression.

alignment—1. The process of adjusting components of a system for proper interrelationship. The term is applied especially to (a) the adjustment of tuned circuits in a receiver to obtain the desired frequency response and (b) the synchronization of components in a system. 2. In a tape recorder, the physical positioning of a tape head relative to the tape itself. Alignment in all respects must conform to rigid requirements in order for a recorder to function properly. 3. The accuracy or proper relative position of an image on a photomask with respect to an existing image on a substrate, as in a photoresist coating, or etched in the oxide of an oxidized silicon wafer. 4. A technique in the fabrication process of semiconductors by which a series of six to eight masks are successively registered to build up the various layers of a monolithic device. Each mask pattern must be accurately referenced to or aligned to all preceding mask patterns. 5. The accuracy of coordination or relative position of images on a semiconductor oxide coating and on the photomask, or any other images placed in relation to those.

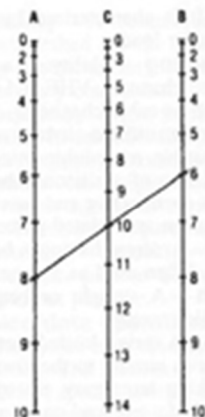
alignment chart—Also called nomograph, or nomogram, or abac. Chart or diagram consisting of two or more lines on which equations can be solved graphically. This is done by laying a straightedge on the two known values and reading the answer at the point where the straightedge intersects the scale for the value sought.

alignment pin—1. A pin in the center of the base of a tube. A projecting rib on the pin ensures that the tube is correctly inserted into its socket. 2. Any pin or device that will ensure the correct mating of two components designed to be connected.

alignment protractor—An instrument that indicates error in a pickup's lateral alignment. It fits on the center spindle of the turntable, and the pickup stylus fits into a small hole on the device. The correct indication is shown when the angle of lateral movement of the pickup head is at 90° to the tangent of the groove at any point, although minimal tracking error is expected with most pickup arms.

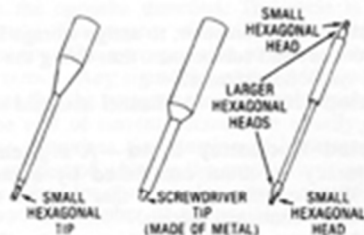
alignment tool—A special screwdriver or socket wrench used for adjusting trimmer or padder capacitors

aliasing noise — alkaline cell



Alignment chart.

or cores in tuning inductances. It is usually constructed partly or entirely of nonmagnetic material. See also neutralizing tool.



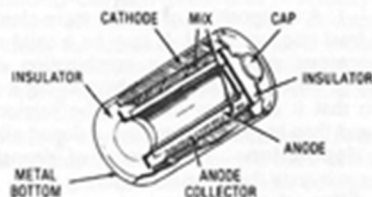
Alignment tools.

alive—1. Electrically connected to a source of potential difference, or electrically charged to have a potential different from that of the earth. 2. Energized. 3. Reverberant, as a room in which sound reflects and echoes.

alive circuit—A circuit that is energized.

alkali—A compound that forms hydroxyl ions when in aqueous solution. Also called a base.

alkaline cell—1. A primary cell, similar to the zinc-carbon cell, in which the negative electrode is granular zinc mixed with a potassium hydroxide (alkaline) electrolyte; the positive electrode is a polarizer in electrical contact with the outer metal can of the cell. A porous separator divides the electrodes. This type of cell delivers a terminal potential of 1.5 volts and has a 50 percent to 100 percent higher capacity than does a 1.5-volt zinc-carbon cell. Also called an alkaline-manganese cell. 2. A primary dry cell that has a very low internal resistance and high



Alkaline cell.

usually be neglected. 4. A material of low electrical conductivity designed for supporting a conductor, physically and electrically separating it from another conductor or object.

insulator arcing ring—A circular or oval metal part placed at one or both ends of an insulator to prevent current from arcing over and damaging it and/or the conductor.

insulator arcover—The flow of power current over an insulator in the form of an arc following a surface discharge.

insulating—See surface insulation.

insulelectrics—The science encompassing insulating materials in electrical insulation.

integer—A whole number, which may be positive, negative, or zero. It does not have a fractional part. Examples of integers: 1, 2, 48, -136, etc., but not 3.7 or $\frac{3}{4}$.

integral-cavity, reflex-klystron oscillator—A reflex-klystron oscillator in which tuning is accomplished by changing the physical dimensions of the resonant cavity. It is usually referred to as a diaphragm- or grid-gap-tuned klystron, since a flexible diaphragm is used to change the cavity dimension, i.e., the gap between the cavity grids.

integral circuit packages—Microcircuits assembled from discrete components and all circuits created essentially in an active or passive substrate.

integral contact—Current-carrying member of jack, switch, or relay. Usually a flat, flexible spring or other conducting member having no separate contacts attached at point of mating.

integral-external-cavity reflex oscillator—A reflex-klystron oscillator in which a fixed internal cavity is tightly coupled to a permanently attached external cavity. Tuning is achieved by varying a reactance probe in the external cavity.

integral-horsepower motor—A motor that is built into a frame and has a continuous rating of 1 horsepower.

integral resistor—An internal or external resistor preconnected to the electrical element and forming an integral part of the cup assembly to provide a desired electrical characteristic of a precision potentiometer.

integrated—A type of design in which two or more basic components or functions are physically, as well as electrically, combined—usually on one chassis, such as an integrated amplifier.

integrated amplifier—Also called, occasionally, a control amplifier, since it is an amplifier with controls. 1. An amplifier that embodies in a common housing the preamplifier and control section and the power amplifier. Some early amplifiers of large power were in two separate units, one the control unit with preamplifiers and the other the power amplifier. 2. A single component combining the functions and circuitry of a power amplifier and preamplifier. See also amplifier.

integrated circuit—Abbreviated IC. Also called functional device. 1. An electrical network—active or passive—composed of two or more circuit elements inextricably bound on a single semiconductor substrate. To further define the nature of an integrated circuit, additional modifiers may be prefixed. Examples: dielectric-isolated monolithic integrated circuit, beam-lead monolithic integrated circuit, or silicon-chip tantalum thin-film hybrid integrated circuit. See also film integrated circuit; hybrid integrated circuit; monolithic integrated circuit; multichip integrated circuit. 2. Any electronic device in which both active and passive elements are contained in a single package. The term frequently is used for circuits other than those containing semiconductors; for example, microwave

insulator arcing ring — integrated morphology

designers consider many types of waveguide assemblies to be integrated circuits. 3. A small chip of solid material (generally a semiconductor) upon which, by various techniques, an array of active and/or passive components has been fabricated and interconnected to form a functioning circuit. Integrated circuits, which are generally encapsulated with only input, output, power supply, and control terminals accessible, offer great advantages in terms of small size, economy, and reliability. 4. The physical realization of a number of electrical circuit elements inseparably associated on or within a continuous body of semiconductor material to perform the function of a circuit. 5. An electronic device containing several elements, active or passive, that perform all or part of a circuit function. 6. An interconnected array of conventional components—transistors, diodes, capacitors, and resistors—fabricated *in situ* within and on a single crystal of semiconductor material with the capability of performing a complete electronic circuit function. 7. An electronic circuit containing transistors, diodes, resistors, and perhaps capacitors and photocells, along with interconnecting electrical conductors processed and contained entirely within a single chip of silicon. 8. Multiple, interconnected circuit elements, contained on or in a common substrate, that function as a unit and not separately.

integrated-circuit array—Multiple integrated circuits formed on a common substrate and electrically interconnected during fabrication.

integrated-circuit package—The combined mounting and housing for an integrated circuit; the package protects the integrated circuit and permits external connections to be made to it.

integrated communication system—Communication system on either a unilateral or joint basis in which a message can be filed at any communications center in that system and be delivered to the addressee(s) by any other appropriate communication center in that system without reprocessing en route.

integrated component—A number of electrical elements comprising a single structure that cannot be divided without destroying its stated electronic function.

integrated console—Computer control console that is capable of controlling the operation of the switching center equipment of an integrated communications system.

integrated data processing—A method of transforming disjointed and repetitive paperwork tasks into a correlated and mechanized production of information for any purpose.

integrated electronic component—Abbreviated IEC. An assembly that consists of several integrated circuits interconnected on a single chip of silicon to provide a complete electronic function with a circuit content greater than 10 equivalent gates.

integrated electronics—That portion of electronic art and technology in which the interdependence of material, device, circuit, and system-design considerations is especially significant; more specifically, that portion of the art dealing with integrated circuits.

integrated electronic system—See integrated circuit.

integrated equipment components—Abbreviated IECs. Integrated-circuit chips that contain a complete logic function.

integrated injection logic—See I²L.

integrated microcircuit—See integrated circuit.

integrated morphology—The structural characterization of an electronic component in which the identity of the current- or signal-modifying areas, patterns, or volumes has become lost in the integration of electronic

microcircuit module—An assembly of microcircuits or of microcircuits and discrete parts, designed to perform an electronic-circuit function or functions and constructed in such a manner that it is considered to be a single entity for the purposes of specification, testing, commerce, and maintenance.

microcircuit wafer—A microwafer carrying one or more circuit functions such as a flip-flop or gate. Integrated-circuit chips may be bonded to deposited conductors.

microcode—1. A computer-coding system that includes suboperations, such as multiplication and division, that ordinarily are inaccessible in programming. A list of very small program steps. 2. A set of control functions performed by the instruction decoding and execution logic of a computer that defines the instruction repertoire of that computer. Microcode is not generally accessible by the programmer. 3. Sequences of low-level steps, making up machine instructions, that are built into a microprocessor that directly control the interaction of the processor's computing elements—that is, machine instructions wired into the hardware that is being controlled. 4. Permanent basic subcommands, built into a computer, that are executed directly by the computer. Generally, these commands define the instruction set of a microprogrammable computer.

microcoding—In a computer, a system of coding that uses suboperations not ordinarily accessible in programming.

microcomponents—1. Those components smaller than existing components by several orders of magnitude. 2. An assembly of very small, interconnected discrete components—active or passive—that forms an electronic circuit. Interconnection of the various leads is by soldering or welding. Microcomponents use no substrates.

microcomputer—1. A general-purpose computer composed of standard LSI components built around a central processing unit (CPU). The CPU (or microprocessor) is program-controlled, featuring arithmetic and logical instructions and a general-purpose parallel I/O bus. The CPU is generally contained on a single chip. Generally intended for dedicated applications, the microcomputer also includes any number of ROMs and RAMs (for instruction and data storage) and, in some cases, one or more I/O devices. The simplest microcomputer consists of one CPU chip and one ROM. 2. A computer whose major sections—CPU, control, timing, and memory—are each contained on a single integrated-circuit chip, or, at most, a few chips. An LSI computer. 3. A computer that has a single or multichip LSI CPU, as distinguished from a minicomputer. 4. A class of computer having all major central processor functions contained on a single printed circuit board constituting a stand-alone module. 5. A computer whose central processing unit is a microprocessor. A microcomputer includes microprocessor, memory, and input/output controllers. 6. A device consisting of a central processor (usually a microprocessor, but sometimes a custom LSI chip set or a bit-slice processor) combined with a memory and input/output.

microcomputer development system—Abbreviated MDS. Also called expandable breadboarding system. 1. A key tool used in the development phase of microprocessor-based computers. It provides an efficient means of program coding, subprogram testing, and final testing for the completed program in a simulated operating condition without the use of the hardware that is contained in the final end product. The elements of the MDS combine to make up a complete microprocessor-based computer, which is composed of the central processing unit or microprocessor unit; a mass-storage memory section; either a floppy disk or tape cassette, complete

with associated drive and control circuits; a CRT terminal (video readout), a keyboard; and, as there is in most systems, a printer. In addition, an emulator module is part of the system and is used to test the operation of the developed system under defined conditions without the use of final hardware. 2. A system designed exclusively to aid in the development of microprocessor systems. Microcomputer development systems enable a designer to develop software and hardware as if many standard operating system utilities were present in his or her final design. These utilities, however, actually reside in the development system and therefore do not require costly additions to every shipped system. 3. Microcomputer equipped with the hardware and software facilities required for efficient program development and hardware debugging.

microcontroller—A complete microprocessor system on a chip. Includes on-chip the CPU, local RAM, local ROM or EPROM, clock and control circuits, and serial and parallel I/O ports that can be programmed for various control functions. See also chip sets.

microcrack—A thin crack in a substrate or chip device, or in thick-film trim-kerf walls, that can only be seen under magnification and which can contribute to latent failure phenomena.

microdensitometer—An instrument used in spectroscopy to measure lines in a spectrum by light transmission measurement.

microelectrode—An extremely small electrode. Some microelectrodes are small enough to contact a single biological cell.

microelectronic circuit—Discrete electrical components assembled and connected in extremely small and compact form.

microelectronic device—An alternate term for integrated circuit.

microelectronics—Also called microsystems electronics. 1. The entire body of electronic art that is connected with or applied to the realization of electronic systems from extremely small electronic parts. 2. See integrated circuit. 3. All techniques for the manufacture of extremely small electronic circuits, generally including all types of silicon integrated circuits, thin-film circuits, and thick-film circuits. 4. The physical realization of electronic circuits or systems from a number of extremely small circuit elements inseparably associated on or within a continuous body. Microelectronics has developed along two basic technologies: monolithic integrated circuits and hybrid integrated circuits. 5. The field that deals with techniques for producing miniature circuits, e.g., integrated circuits, thin-film techniques, and solid-state logic modules. 6. The art of electronic equipment design and construction that uses microminiaturization schemes.

microelement—A resistor, capacitor, or transistor, diode, inductor, transformer, or other electronic element or combination of elements mounted on a small ceramic wafer 0.01 inch (or 0.25 mm) thick and about 0.3 inch (0.75 mm) square. Individual microelements are stacked, interconnected, and potted to form micromodules.

microelement wafer—A microwafer carrying one or more components or a simple network. The network can consist, for example, of several thin-film resistors deposited directly on the wafer.

microfarad—One millionth of a farad. Letter symbol: μF .

microfaradmeter—See capacitance meter.

microflash—An extremely short electronic flash, having a duration of about 1×10^{-6} second. Used in photographing rapidly moving subjects.

microflash lamp—A lamp that emits radiation pulses having a duration of approximately 1 microsecond.

micrographics—The use of microfilm and microfiche for filing basic documents that must be retained and made available for infrequent use. Special computer software can be used to maintain an index of such documents and to aid in their retrieval.

microgroove—In disc recording, the groove width of most long-play and 45-rpm records. Normally it is 0.001 inch (25.4 μ m), or about half as wide as the groove on a 78-rpm record. (No longer manufactured.)

microgroove record—See long-play record.

microhenry—One millionth of a henry.

microhm—One millionth of an ohm.

microinstruction—Also called elementary operation, cycle, or function. 1. A very simple instruction (typically a register-to-register copy). 2. A bit pattern that is stored in a microprogram memory word and specifies the operation of the individual LSI computing elements and related subunits, such as main memory and input/output interfaces.

microinstruction sequence—The series of microinstructions that the microprogram control unit (MCU) selects from the microprogram to execute a single macroinstruction or control command. Microinstruction sequences can be shared by several macroinstructions.

microlock—A phase-lock loop system for transmitting and receiving information. Because the system reduces bandwidth drastically, it is used as a radar beacon for tracking, or to provide telemetering data.

micrologic elements—1. A group of high-speed, low-powered integrated logic building blocks primarily intended to be used in building the logic section of a digital computer. 2. Semiconductor networks used in computer and other critical circuits.

micromanipulators—Devices that provide means for accurately moving minuscule tools over and onto the surface of a microscopic object.

micromassage—See intercellular massage.

micrometer—One millionth of a meter.

micromho—One millionth of a mho or of a siemens. Replaced by microsiemens.

micromicro—An obsolete prefix meaning one millionth of a millionth, or 10^{-12} . Now called pico-.

micromicrofarad—Obsolete term for 10^{-12} farad. Now called picofarad.

micromicrowatt—Obsolete term for 10^{-12} watt. Now called picowatt.

microminiature lamp—Any incandescent lamp, usually rated in the milliwatt range, that operates on 3 volts or less. Diameters range from 0.01 to 0.06 inch, or 0.25 to 1.5 mm.

microminiaturization—1. The producing of micro-miniature electronic circuits from individual miniature solid-state and other nonthermionic components. 2. A relative degree of miniaturization resulting in an equipment or assembly volume an order of magnitude smaller than that existing in subminiature equipment. 3. The technique of packaging a microminiature part of an assembly composed of elements radically different in shape and form. Electronic parts are replaced by active and passive elements through use of fabrication processes such as screening, vapor-deposition diffusion, and photoetching. 4. The process of packaging an assembly of microminiature active and passive electronic elements, replacing an assembly of much and different parts.

micromodule—1. A tiny ceramic wafer made from semiconductive and insulative materials. It is capable of functioning as either a transistor, resistor, capacitor, or other basic component. 2. A microcircuit constructed of a number of components (e.g., microwafers) and

micrographics — microphonoscope

encapsulated to form a block that is still only a fraction of an inch in any dimension.

micron—1. An absolute unit of length equal to 10^{-6} meter. The term micrometer is now preferred. 2. A unit used in the measurement of very low pressures. It is equivalent to 0.001 mm (10^{-6} meter) of mercury at 32°F or 0°C.

microphone—1. An electroacoustic transducer that responds to sound waves and delivers essentially equivalent electric waves. 2. A device for converting sound waves or sound-producing vibrations (as from the strings of a guitar) into corresponding electrical impulses. Microphones may use as transducing elements crystal or ceramic chips, ribbons, moving coils, or capacitors, and different recording applications may call for different transducers as well as for different directional patterns and impedances.

microphone amplifier—Also called a microphone preamplifier. An audio-frequency amplifier that boosts the output of a microphone before the signal reaches the main audio-frequency amplifier.

microphone boom—A movable crane from which a microphone is suspended.

microphone button—The resistance element of a carbon microphone. It is button-shaped and filled with carbon particles.

microphone cable—A shielded cable for connecting a microphone to an amplifier.

microphone mixer—An audio mixer that feeds the output from two or more microphones into a single input to an audio amplifier. The output from each microphone is adjustable by individual controls on the mixer.

microphone preamplifier—See microphone amplifier.

microphone sensitivity—The voltage that is produced by a microphone that is exposed to a specified sound pressure level. Usually specified in dBV in a 94 dB sound pressure level (spl) or 74 dB spl sound field, measured with no load on the microphone.

microphone stand—A stand that holds a microphone the desired distance above the floor or a table.

microphone transformer—An iron-core transformer used for coupling certain microphones to an amplifier or transmission line.

microphonics—1. The generation of an electrical noise signal by mechanical motion of internal parts within a device. 2. Electrical disturbance (noise) due to mechanical disturbances of circuit elements. 3. A form of noise interference arising from the tendency for vibrations of certain objects to be converted into corresponding electrical signals. A microphonic device will cause a "bong" or "bing" in the signal when subjected to jarring. 4. Audio-frequency noise caused by the mechanical vibration of elements within a system or component. 5. Microphone noise that occurs in lasers when vibrations are transferred to the resonator structure.

microphonism—1. The production of noise as a result of mechanical shock or vibration. 2. The quasisperiodic voltage output of a tube produced by mechanical resonance of its elements as a result of mechanical impulse excitation. 3. The periodic voltage output of a tube produced by mechanical resonances of its elements as a result of sustained mechanical excitation. 4. The output voltage of a tube acting as an electrical transducer of mechanical energy.

microphonograph—A device that amplifies and records weak sounds; used in training the deaf to speak.

microphonoscope—A binaural stethoscope using a membrane in the chest piece to accentuate the sound.

pentagrid mixer — A pentagrid vacuum tube used to mix the rf and local-oscillator signals in a superheterodyne receiver.

pentagrid tube — An electron tube having five grids, plus an anode and a cathode.

pentatron — A five-electrode vacuum tube that provides push-pull amplification with a single tube. It has one cathode, two grids, and two anodes. In effect, it is two tubes in one.

pentode — A five-electrode vacuum tube containing an anode, a cathode, a control electrode, and two grids.

pentode field-effect transistor — A five-lead transistor with three gates. It can be connected like a pentode if each of the gates is supplied from an independent bias source.

pentode transistor — A point-contact transistor in which there are four point-contact electrodes; the body serves as a base, and there are three emitters and one collector.

PEP — Abbreviation for peak envelope power.

perceived noise level — An empirical measure that includes allowance for the subjective reaction of people to noise in the various frequency ranges. It is expressed in decibels (PNdB).

percentage differential relay — A differential relay that functions when the difference between two quantities of the same nature exceeds a fixed percentage of the smaller quantity. This term includes relays formerly known as ratio-balance relays, biased relays, and ratio-differential relays.

percentage modulation — See percent of modulation.

percentage of meter accuracy — The ratio of the actual meter reading to the true reading, expressed as a percent.

percentage ripple — See percent of ripple voltage.

percentage supervision — A method of line supervision in which the current in, or resistance of, a supervised line is monitored for changes. When the change exceeds a selected percentage of the normal operating current or resistance in the line, an alarm signal is produced.

percentage sync — Ratio of the amplitude of the synchronizing signal to the peak-to-peak amplitude of the picture signal between blanking and reference white level, expressed in percent.

percentage timer — A repeat-cycle non-reset timer with fixed cycle length, having a dial adjustment of the percentage of the cycle time for which the contacts are operated.

percent break — The period of time, expressed as a percentage, that a dial circuit stands open compared to the total time of the dial signals.

percent conductivity — Conductivity of a material expressed as a percentage of that of copper.

percent make — 1. In pulse testing, the length of time a circuit is closed compared to the duration of the test signal. 2. The portion (in percent) of a pulse period during which telephone-dial pulse springs make contact.

percent-modulation meter — An instrument that indicates the modulation percentage of an amplitude-modulated signal, either on a meter or a cathode-ray tube.

percent of deafness — See percent of hearing loss.

percent of harmonic distortion — A measure of the harmonic distortion in a system or component. It is equal to 100 times the ratio of the square root of the sum of the squares of the root-mean-square harmonic voltages (or currents) to the root-mean-square voltage (or current) of the fundamental.

percent of hearing — At a given frequency, 100 minus the percent of hearing loss at that frequency.

percent of hearing loss — Also called percent of deafness. At a given frequency, 100 times the ratio of the hearing loss in decibels to the number of decibels between the normal threshold levels of audibility and feeling.

percent of modulation — 1. In AM, the ratio of half the difference between the maximum and minimum amplitudes, expressed in percentage. 2. In FM and TV audio transmission, the ratio of the actual frequency swing to the frequency swing defined as 100-percent modulation, expressed in percentage. For FM broadcast stations, a frequency swing of ± 75 kHz is defined as 100-percent modulation. For television, it is ± 25 kHz.

percent of ripple voltage — Ratio of the effective (root-mean-square) value of the ripple voltage to the average value of the total voltage, expressed in percent.

percent of syllabic articulation — See syllabic articulation.

percent ripple (rms) — The ratio of the effective (rms) value of the ripple voltage, expressed in percent. The new term is PARD.

perceptron — A system capable—either in theory or in practice—of performing knowledgeable functions such as recognition, classification, and learning. These functions may exist as mathematical analyses, computer programs, or hardware.

percussion — Musical sounds characterized by sudden or sharp transients. Organ percussion is achieved by causing the tone to start to decay the instant it is played rather than waiting until the key is released.

percussive arc welding — A process in which the surfaces to be welded are held at a fixed gap while rf energy is applied. This ionizes the air gap between the two surfaces, causing the air gap to become a conductor. When the air gap is conductive, a capacitor bank dumps a controlled amount of energy into the system for a controlled time period. This results in an electric arc that scarifies the surfaces to be welded and heats them to welding temperature. As the pulse from the capacitor bank decays, a mechanical system drives the two hot surfaces together, consummating the weld.

perfect dielectric — Also called ideal dielectric. A dielectric in which all the energy required to establish the electric field in it is returned to the electric system when the field is removed. A perfect dielectric has zero conductivity and exhibits no absorption phenomena. A vacuum is the only known perfect dielectric.

perforated tape — See punched tape.

perforator — In telegraphy, a device that punches code signals into paper tape for application to a tape transmitter.

performance — Degree of effectiveness of operation.

performance characteristic — A characteristic measurable in terms of some useful denominator—e.g., gain, power output, etc.

perimeter alarm system — An alarm system that provides perimeter protection.

perimeter protection — Protection of access to the outer limits of a protected area, by means of physical barriers, sensors on physical barriers, or exterior sensors not associated with a physical barrier.

period — Sometimes called periodic time. 1. The time required for one complete cycle of a regular, repeating signal, function, or series of events. 2. The time between two consecutive transients of the pointer or indicating means of an electrical indicating instrument in the same direction through the rest position. 3. The time elapsing between two consecutive passages of a satellite through a characteristic point on its orbit. 4. Of an underdamped instrument, the time required, following an abrupt change in the measurand, for the pointer or other indicating means

to make two consecutive transits in the same direction through the rest position.

periodic—Repeating itself regularly in time and form.

periodic antenna—An antenna in which the input impedance varies as the frequency does (e.g., open-end wires and resonant antennas).

periodic current—Oscillating current, the values of which recur at equal time intervals.

periodic damping—Also called underdamping. Damping in which the pointer of an instrument oscillates about the final position before coming to rest. The point of change between periodic and aperiodic damping is called critical damping.

periodic duty—Intermittent duty in which the load conditions recur at regular intervals.

periodic electromagnetic wave—A wave in which the electric field vector is repeated in detail—either at a fixed point, after a lapse of time known as the period; or at a fixed time, after the addition of a distance known as the wavelength.

periodic electromotive force—An oscillating electromotive force that repeats its sequence of values over equal intervals of time.

periodicity—The variations in the insulation diameter of a transmission cable that result in reflections of a signal when its wavelength or a multiple thereof is equal to the distance between two diameter variations.

periodic line—A line consisting of identical, similarly oriented sections, each section having nonuniform electrical properties.

periodic PARD—Pertains to that portion of the total PARD in an electronic power supply whose frequency is identical or harmonically related to the input frequency and/or intentionally internally generated signal frequencies. This phenomenon is frequently referred to as ripple.

periodic pulse train—A pulse train made up of identical groups of pulses repeated at regular intervals.

periodic quantity—An oscillating quantity in which any value it attains is repeated at equal time intervals.

periodic rating—The load that can be carried for the alternate periods of load and rest specified in the rating without exceeding the specified heating limits.

periodic resonance—Also called natural resonance. Resonance in which the applied agency maintaining the oscillation has the same frequency as the natural period of oscillation in a system.

periodic time—See period.

periodic vibration—1. A vibration having a regularly recurring waveform, e.g., sinusoidal vibration. 2. An oscillator motion whose amplitude pattern repeats after fixed increments of time.

periodic wave—1. Wave in which the displacement has a periodic variation with time, distance, or both. 2. A wave that repeats itself at regular intervals of time.

peripheral—1. Having to do with a device by means of which a computer communicates to the outside world. Auxiliary memories, such as tape, disk, and drum, may also be considered to be peripheral devices. 2. Any external device used in a computer system. 3. A device used to extend the operation of a computer, either with regards to functionality or capacity. Peripherals are connected to the central processor of a computer system by appropriate data paths. 4. Any human interface device connected to a computer. 5. A noncomputing input or output device, external to the CPU and main memory of a computer but connected by the appropriate electrical connections, thus allowing the computer to perform various external functions.

peripheral bus—For a computer, a dedicated bus for high-speed transfer of blocks of data between a system and its peripherals, including tape and disk drives.

peripheral control unit—An intermediary control device that links a peripheral unit to the central processor, or, in the case of offline operation, to another peripheral unit.

peripheral device—1. Any instrument or machine that enables a computer to communicate with the outside world or that otherwise aids the operation of the computer, but does not form part of the basic installation. 2. A general term designating various kinds of machines that operate in combination or conjunction with a computer but are not physically part of the computer. Peripheral devices typically display computer data, store data from the computer and return the data to the computer on demand, prepare data for human use, or acquire data from a source and convert it to a form usable by a computer. Peripheral devices include printers, keyboards, graphic display terminals, paper tape reader/punches, analog-to-digital converters, disks, and tape drives. 3. Any device distinct from the computer that can provide input to and/or accept output from the computer.

peripheral electron—Also called a valence electron. One of the outer electrons of an atom. Theoretically, it is responsible for visible light, thermal radiation, and chemical combination.

peripheral equipment—1. In a data processing system, any unit of equipment, distinct from the central processing unit, that may provide the system with outside communication. 2. Equipment that is external to and not a part of the central processing instrumentation. Includes such equipment as tape punches and readers, magnetic tape or disk storage units, digital printers, graphic recorders, and typewriters. 3. Equipment used in connection with or attached to electronic computers. This includes typewriters, calculators and accounting machines, cash registers, tape readers, and similar devices. 4. Units that may communicate with the programmable controller, but are not part of the programmable controller, e.g., Teletype, cassette recorder, CRT terminal, tape reader, etc. 5. Equipment that works in conjunction with a computer or a communication system but is not a part of it. 6. Machines such as card readers, magnetic tape units, fast driver scanners, and other equipment bearing a similar working relationship to the computing device. In general they can be considered a sink and source of information external to the information process.

peripheral processor—A general term for a laser computer associated with a large machine. Among the functions may be multiplexing, data formatting, concentrating, polling, and the handling of simple routines to increase the capacity of a communications channel or relieve the main (often called host) computer.

peripherals—Accessory parts of a computer system not considered essential to its operation, such as printers and modems.

peripheral transfer—The transmission of data between two peripheral units.

peripheral units—Equipment that works in conjunction with a data terminal or computer but is not a part of that unit, such as cards, paper-tape readers, punches, or keyboards.

periphonic system—See ambisonic reproduction.

Permalloy—A high-permeability magnetic alloy composed mainly of iron and nickel.

permanent circuit—An alarm circuit that is capable of transmitting an alarm signal whether the alarm control is in access mode or secure mode. Used, for example, on foil fixed windows, tamper switches, and

sound—1. Also called a sound wave. An alteration in pressure, stress, particle displacement or velocity, etc., propagated in an elastic material, or the superposition of such propagated alterations. 2. Also called a sound sensation. The auditory sensation usually evoked by the alterations described in (1) above. 3. An undulatory motion of air or other elastic medium, which can produce the sensation of hearing when incident on the ear. (Sound requires a medium for propagation, for unlike electromagnetic waves, sound cannot travel through a vacuum.)

sound absorption—The conversion of sound energy into some other form (usually heat) in passing through a medium or on striking a surface.

sound-absorption coefficient—The incident sound energy absorbed by a surface or medium, expressed in the form of a fraction.

sound analyzer—A device for measuring the amplitude and frequency of the components of a complex sound. It usually consists of a microphone, an amplifier, and a wave analyzer.

sound articulation—The percent of articulation obtained when the speech units are fundamental sounds (usually combined into meaningless syllables).

sound bars—Alternate dark and light horizontal bars caused in a television picture by audio-frequency voltage reaching the video-input circuit of the picture tube.

sound board—A hardware adapter that dramatically adds digital sound reproductions capabilities to IBM-compatible computers.

sound carrier—The frequency-modulated carrier that transmits the sound portion of television programs.

sound concentrator—A parabolic reflector used with a microphone at its focus to obtain a highly directive pickup response.

sound-effect filter—A filter, usually adjustable, designed to reduce the passband of a system at low and/or high frequencies in order to produce special effects.

sound energy—The total energy in a given part of a medium, minus the energy that would exist there if no sound waves were present.

sound-energy density—At a point in a sound field, the sound energy contained in a given infinitesimal part of the medium, divided by the volume there. The commonly used unit is the erg per cubic centimeter.

sound-energy flux—The average rate at which sound energy flows through any specified area for a given period. The commonly used unit is the erg per second.

sound-energy flux density—See sound intensity.

sounder—See telegraph sounder.

sound field—A region in any medium containing sound waves.

sound film—Motion-picture film having a sound track along one side of the picture frames for simultaneous reproduction of the sounds that accompany the film. A beam of light is projected through the sound track and is modulated at an audio rate by the variations in the width or density of the track. A phototube and amplifier then convert these modulations into sound.

sound gate—A mechanical device through which film is passed in a projector to convert the sound track into audio signals that can be amplified and reproduced. In a television camera used for pickups, a sound gate provides the sound accompaniment for the motion picture being televised. Associated with the sound gate are an exciter lamp, a lens assembly, and a phototube.

sound head—The part of a sound motion-picture projector that converts the photographic or magnetic sound track on the film into audible sound signals.

sounding—Determination of the depth of water or the altitude above the earth.

sound intensity—Also called specific sound-energy flux or sound-energy flux density. The average rate of sound energy transmitted in a specified direction through a unit area normal to this direction at the point considered. The common unit is the erg per second per square centimeter, although sound intensity expressed in watts per square centimeter may occasionally be used.

sound intensity level—The amount of sound power passing through a unit area.

sound level—A measure of the overall loudness of sounds on the basis of approximations of equal loudness of pure tones. It is expressed in decibels with respect to 0.0002 microbar.

sound-level meter—An instrument—including a microphone, amplifier, output meter, and frequency-weighting networks—for the measurement of noise and sound levels. The measurements approximate the loudness level obtained for pure tones by the more elaborate ear-balance method.

sound-on-sound recording—1. A method by which material previously recorded on one track of a tape may be recorded on another track while simultaneously adding new material to it. 2. A method of tape recording in which an original sound track may be impressed with an added sound track for special effects, such as one performer appearing to play two instruments, etc.

sound-powered telephone set—1. A telephone set in which the transmitter and receiver are passive transducers; operating power is obtained from the speech input only. The voice sound waves operate a moving coil or variable-reluctance transmitter to produce the current waves transmitted to the telephone line. No external power is used, but the output level is lower than that of a battery-powered phone. 2. A telephone set whose transmitter is a dynamic microphone. It requires no power other than that of the voice of the user.

sound-power level—1. The ratio, expressed in decibels, of the sound power emitted by a source to a standard reference power of 10^{-12} watt. 2. The number of watts of acoustic power radiated by a noise source.

sound power of a source—The total sound energy radiated by the source per unit of time. The common unit is the erg per second, but the power may also be expressed in watts.

sound pressure—The instantaneous pressure minus the static pressure at some point in a medium when a sound wave is present.

sound-pressure level—Abbreviated SPL. 1. In decibels, 20 times the logarithm of the ratio of the pressure of a sound to the reference pressure, which must be explicitly stated (usually, either 20 μ Pa, 2×10^{-4} microbar, or 1 microbar). 2. The pressure of an acoustic wave stated in terms of newtons/square meter, dynes/square centimeter, or microbars. (One microbar is approximately equal to one millionth of the standard atmospheric pressure.)

sound probe—A small microphone (or tube added to a conventional microphone) for exploring a sound field without significantly disturbing it.

sound recordings—Records, tapes, or other sonic components upon which audio intelligence is inscribed or recorded or can be reproduced.

sound-recording system—A combination of transducing devices and associated equipment for storing sound in a reproducible form.

sound-reflection coefficient—Also called acoustical reflectivity. Ratio at which the sound energy reflected from a surface flows on the side of incidence to the incident rate of flow.