

SEVENTH EDITION

MODERN

DICTIONARY
of
ELECTRONICS

RUDOLF F. GRAF



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of
ELECTRONICS**

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REVISED AND UPDATED



Rudolf F. Graf is an author whose name is well-known to engineers, technicians, and hobbyists around the world. He graduated as an electronics engineer from Brooklyn Polytechnic Institute and did his graduate work New York University. Mr. Graf has been active in the electronics industry for more than fifty years in capacities ranging from design and consulting engineer, chief engineer, chief instructor at electronics and television schools, and consulting editor. He also held various sales and marketing positions. Mr. Graf is the author or co-author of more than 150 technical articles published by major magazines. He has written about 50 books on electricity and electronics, with more than 2 million copies in print, including the best-selling *Video Scrambling & Descrambling for Satellite & Cable TV, Second Edition* and the *Circuits* series of books, both published by Newnes. A number of his books have been translated into several European languages as well as Chinese, Japanese, and Russian.

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Boston Oxford Auckland Johannesburg Melbourne New Delhi

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*It gives me great pleasure to dedicate this edition to
Allison, Sheryl, Daniel, David, Russell and Scott,
the loveliest children this side of heaven.*

Preface

When the first edition of this dictionary was published in 1961, today's everyday items like color TVs, VCRs, CD players, computers, FAX machines, ATMs, cordless and cell phones, pagers, tape recorders, digital watches, pocket calculators, lasers, and many others too numerous to mention, were non-existent or mere laboratory curiosities. Since then, electronics has undergone significant changes based primarily on the meteoric expansion of integrated circuits and their apparently limitless applications. Vacuum tubes were replaced by semiconductors, and numerous technologies like ferrite core or bubble memories were relegated to the electronics graveyard. No other industry has ever grown so much and matured so fast, paced by technological advances that occur at a feverish pace. The first edition of this dictionary contained about 10,000 definitions of then current terms. And now, a scant 38 years later, this seventh edition contains approximately 25,000 terms—a clear indication of the phenomenal growth of our industry.

As technologies evolve and fresh products and concepts are introduced, suitable terminology must be developed to be able to communicate. The originators of the new words give them their initial meaning, but their exact definitions change with technological advances and through actual use by others. The contents of this dictionary is thus an analysis of words and their meanings as determined by common usage, written in a modern and popular style to provide clear and concise explanations of each entry. Continual updating of a work such as this is vital, so that those involved in the world of electronics have the power to communicate with those about them and to grasp new concepts as they emerge.

All entries are allowed as much space as is necessary for complete and meaningful definitions. Terms are explained clearly and precisely without excessive technical jargon. Original entries from the previous edition have been reviewed and many were revised to keep pace with current usage. Where more than one definition exists for a term, they are arranged numerically. This method, however, does not necessarily imply a preferred order of meanings. Important words from formative technologies that are no longer in use are retained in this edition for their historical interest.

My thanks go out to Ms. Tara Troxler Thomas and to Charles Thomas whose dedication to this project and skill at the word processor made it possible to deliver the manuscript for this work to the publisher in a timely fashion.

Industry and technical sources—notably the IEEE and the ASA—generously aided in defining many terms during the preparation of earlier editions of this work.

While this volume is as up-to-date as possible at the time of writing, the field of electronics is expanding so rapidly that new terms are constantly being developed and older terms take on broader or more specialized meanings. It is the intention of the publisher to periodically issue revised editions of this dictionary; thus suggestions for new terms and definitions are always welcome.

Rudolf F. Graf
February 1999

A

A—1. Abbreviation for angstrom unit, used in expressing wavelength of light. Its length is 10^{-8} centimeter. 2. Chemical symbol for argon, an inert gas used in some electron tubes. 3. Letter symbol for area of a plane surface. 4. Letter symbol for ampere.

a—Letter symbol for atto- (10^{-18}).

A0—The Federal Communications Commission (FCC) designation for radio emission consisting solely of an unmodulated carrier.

A1—The FCC designation for radio emission consisting of a continuous-wave carrier keyed by telegraphy.

A-1 or **A.1**—The atomic time scale maintained by the U.S. Naval Observatory; presently it is based on weighted averages of frequencies from cesium-beam devices operated at a number of laboratories.

A2—The FCC designation for radio emission consisting of a tone-modulated continuous wave.

A3—The FCC designation for radio emission consisting of amplitude-modulated speech transmission.

A4—The FCC designation for radio emission consisting of amplitude-modulated facsimile signals.

A5—The FCC designation for radio emission consisting of amplitude-modulated television video signals.

A- (**A-minus** or **A-negative**)—Sometimes called F-. Negative terminal of an A battery or negative polarity of other sources of filament voltage. Denotes the terminal to which the negative side of the filament-voltage source should be connected.

A+ (**A-plus** or **A-positive**)—Sometimes called F+. Positive terminal of an A battery or positive polarity of other sources of filament voltage. The terminal to which the positive side of the filament voltage source should be connected.

ab-—The prefix attached to names of practical electric units to indicate the corresponding unit in the cgs (centimeter-gram-second) electromagnetic system, e.g., abampere, abvolt, abcoulomb.

abac—See alignment chart.

abampere—Centimeter-gram-second electromagnetic unit of current. The current that, when flowing through a wire 1 centimeter long bent into an arc with a radius of 1 centimeter, produces a magnetic field intensity of 1 oersted. One abampere is equal to 10 amperes.

A battery—Source of energy that heats the filaments of vacuum tubes in battery-operated equipment.

abbreviated dialing—1. A system using special-grade circuits that require fewer than the usual number of dial pulses to connect two or more subscribers. 2. Ability of a phone system to require only two to four digits, while the network dials the balance of the seven to fourteen digits required.

abc—Also ABC. See automatic bass compensation.

abcoulomb—Centimeter-gram-second electromagnetic unit of electrical quantity. The quantity of electricity

passing any point in an electrical circuit in 1 second when the current is 1 abampere. One abcoulomb is equal to 10 coulombs.

aberration—1. In lenses, a defect that produces inexact focusing. Aberration may also occur in electron optical systems, causing a halo around the light spot. 2. In a cathode-ray tube, a defect in which the electron "lens" does not bring the electron beam to the same point of sharp focus at all points on the screen. 3. Failure of an optical lens to produce exact point-to-point correspondence between an object and its image. 4. Blurred focusing of light rays due to the difference in bending (refraction) imparted on different light frequencies (colors) as they pass through a lens.

abfarad—Centimeter-gram-second electromagnetic unit of capacitance. The capacitance of a capacitor when a charge of 1 abcoulomb produces a difference of potential of 1 abvolt between its plates. One abfarad is equal to 10^9 farads.

abhenry—Centimeter-gram-second electromagnetic unit of inductance. The inductance in a circuit in which an electromotive force of 1 abvolt is induced by a current changing at the rate of 1 abampere per second. One abhenry is equal to 10^{-9} henry.

abmho—Centimeter-gram-second electromagnetic unit of conductance. A conductor or circuit has a conductance of 1 abmho when a difference of potential of 1 abvolt between its terminals will cause a current of 1 abampere to flow through the conductor. One abmho is equal to 10^9 mho. Preferred term: absiemens.

abnormal glow—In a glow tube, a current discharge of such magnitude that the cathode area is entirely surrounded by a glow. A further increase in current results in a rise in its density and a drop in voltage.

abnormal propagation—The phenomenon of unstable or changing atmospheric and/or ionospheric conditions acting on transmitted radio waves. Such waves are prevented from following their normal path through space, causing difficulties and disruptions of communications.

abnormal reflections—See sporadic reflections.

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

abohm—Centimeter-gram-second electromagnetic unit of resistance. The resistance of a conductor when, with an unvarying current of 1 abampere flowing through it, the potential difference between the ends of the conductor is 1 abvolt. One abohm is equal to 10^{-9} ohm.

abort—1. To cut short or break off (an action, operation, or procedure) with an aircraft, guided missile, or the like, especially because of equipment failure. An abort may occur at any point from start of countdown

or takeoff to the destination. An abort can be caused by human technical or meteorological errors, miscalculation, or malfunctions. 2. The process of halting a computer program in an orderly fashion and returning control to the operator or operating system. 3. Abnormal termination of a computer program, caused by hardware or software malfunction or operator cancellation.

AB power pack—Assembly in a single unit of the A and B batteries of a battery-operated circuit. Also, a unit that supplies the necessary A and B voltages from an ac source of power.

abrasion machine—A laboratory device for determining the abrasive resistance of wire or cable. The two standard types of machines are the squirrel cage with square steel bars and the abrasive grit types.

abrasion resistance—A measure of the ability of a wire or wire covering to resist damage due to mechanical causes. Usually expressed as inches of abrasive tape travel.

abrasion soldering—Soldering difficult metals by abrading the surface oxide film beneath a pool of molten solder.

abrasive trimming—Trimming a ceramic capacitor or a film resistor to its nominal value by notching the surface with a finely adjusted stream of abrasive material such as aluminum oxide.

abscissa—Horizontal, or x , axis on a chart or graph.

absence-of-ground searching selector—In dial telephone systems, an automatic switch that rotates, or rises vertically and rotates, in search of an ungrounded contact.

absolute accuracy—1. The tolerance of the full-scale set point referred to as the absolute voltage standard. 2. Parameter for a d/a converter. It is the overall accuracy of the converter, in which all levels are compared with an absolute standard. Absolute accuracy includes the combination of all nonlinearity and end-point errors.

absolute address—1. An address used to specify the location in storage of a word in a computer program, not its position in the program. 2. A binary number assigned permanently as the address of a storage location in a computer. 3. A fixed location in the memory of the CPU, as opposed to a relative address, which is specified according to its distance from another location.

absolute altimeter—1. Electronic instrument that furnishes altitude data with regard to the surface of the earth or any other surface immediately below the instrument, as distinguished from an aneroid altimeter, the readings of which depend on air pressure. 2. An altimeter that employs transmitted and reflected radio waves for its operation and thus does not depend on barometric pressure for its altitude indication.

absolute code—A code using absolute addresses and absolute operation codes; that is, a code that indicates the exact location where the reference operand is to be found or stored.

absolute coding—Coding written in machine language. It can be understood by the computer without processing.

absolute delay—The time interval between the transmission of two synchronized radio, loran, or radar signals from the same or different stations.

absolute digital position transducer—A digital position transducer, the output signal of which is indicative of absolute position. Also called encoder.

absolute efficiency—Ratio of the actual output of a transducer to that of a corresponding ideal transducer under similar conditions.

absolute error—1. The amounts of error expressed in the same units as the quantity containing the error.

2. Loosely, the absolute value of the error, that is, the magnitude of the error without regard to its algebraic sign.

absolute gain of an antenna—The gain in a given direction when the reference antenna is an isotropic antenna isolated in space.

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

absolute language—The language in which instructions must be given to the computer. The absolute language is determined when the computer is designed. Synonyms: machine language, machine code.

absolute loader—Program to load a computer program at specified numerical addresses.

absolute maximum rating—Limiting values of operating and environmental conditions, applicable to any electron device of a specified type as defined by its published data and not to be exceeded under the worst probable conditions. Those ratings beyond which the life and reliability of a device can be expected to decline.

absolute maximum supply voltage—The maximum supply voltage that may be applied without the danger of causing a permanent change in the characteristics of a circuit.

absolute minimum resistance—The resistance between the wiper and the termination of a potentiometer, when the wiper is adjusted to minimize that resistance.

absolute Peltier coefficient—The product of the absolute temperature and the absolute Seebeck coefficient of a material.

absolute power—Power level expressed in absolute units (e.g., watts or dBm).

absolute pressure transducer—1. A pressure transducer that accepts two independent pressure sources simultaneously, and the output of which is proportional to the pressure difference between the sources. 2. A transducer that senses a range of pressures, which are referenced to a fixed pressure. The fixed pressure is normally total vacuum.

absolute scale—See Kelvin scale.

absolute Seebeck coefficient—The integral from absolute zero to the given temperature of the quotient of the Thomson coefficient of a material divided by its absolute temperature.

absolute spectral response—Output or response of a device, in terms of absolute power levels, as a function of wavelength.

absolute system of units—Also called coherent system of units. A system of units in which a small number of units is chosen as fundamental, e.g., units of mass, length, time, and charge. Such units are termed absolute units. All other units are derived from them by taking a definite proportional factor in each of those laws chosen as the basic laws for expressing the relationships between the physical quantities. The proportional factor is generally taken as unity.

absolute temperature—Temperature measured from absolute zero, a theoretical temperature level variously defined as -273.2°C , -459.7°F , or 0 K .

absolute temperature scale—Thermodynamic temperature scale, named for Lord Kelvin (1848), in which temperatures are given in kelvins (K). (In the SI system the degree sign and the word *degree* are not used for Kelvin temperatures.) The absolute zero of temperature is 0 K , -273.2°C , or -459.7°F . The kelvin is the same size as the Celsius degree.

absolute tolerance—Also called accuracy. The maximum deviation from the nominal resistance (or capacitance) value, usually given as a percentage of the nominal value.

absolute units — A system of units based on physical principles, in which a small number of units are chosen as fundamental and all other units are derived from them; e.g., abohm, abcoulomb, abhenry, etc.

absolute value — The numerical value of a number or symbol without reference to its algebraic sign. Thus, 3 is the absolute value of $|3|$ or $|-3|$. An absolute value is signified by placing vertical lines around the number or symbol.

absolute value device — A computing element that produces an output equal to the magnitude of the input signal, but always of one polarity.

absolute zero — Lowest possible point on the scale of absolute temperature; the point at which all molecular activity ceases. Absolute zero is variously defined as -273.2°C , -459.7°F , or 0 K .

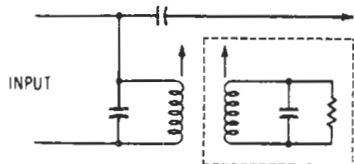
absorbed wave — A radio wave that becomes lost in the ionosphere due to molecular agitation and the accompanying energy loss it undergoes there. Absorption is most pronounced at low frequencies.

absorber — 1. In a nuclear reactor, a substance that absorbs neutrons without reproducing them. Such a substance may be useful in control of a reactor or, if unavoidably present, may impair the neutron economy. 2. Any material or device that absorbs and dissipates radiated energy. 3. In microwave terminology, a material or device that takes up and dissipates radiated energy. It may be used for shielding, to prevent reflection, or to transmit one or more radiation components selectively.

absorption — 1. Dissipation of the energy of a radio or sound wave into other forms as a result of its interaction with matter. 2. The process by which the number of particles or photons entering a body of matter is reduced by interaction of the particle or radiation with matter. Similarly, the reduction of the energy of a particle while traversing a body of matter. This term is sometimes erroneously used for capture. 3. Penetration of a substance into the body of another. 4. Conversion of radiant energy into other forms by passage through, or reflection from, matter. 5. The adhesion of a fluid in extremely thin layers to the surfaces of a solid. 6. Reduction in strength of an electromagnetic wave propagating through a medium, determined by dielectric properties of the material.

absorption attenuation — Loss in an optical fiber due primarily to impurities, including metals, such as cobalt, chromium, and iron, as well as OH ions.

absorption circuit — A tuned circuit that dissipates energy taken from another circuit or from a signal source. This effect is especially evident in a resonant circuit such as a wavemeter or wave trap.



Absorption circuit.

absorption coefficient — 1. Measure of sound-absorbing characteristics of a unit area of a given material compared with the sound-absorbing characteristics of an open space (total absorption) having the same area. 2. Ratio of loss of intensity caused by absorption to the total original intensity of radiation.

absorption current — The current flowing into a capacitor following its initial charge, due to a gradual

penetration of the electric stress into the dielectric. Also, the current that flows out of a capacitor following its initial discharge.

absorption dynamometer — An instrument for measuring power, in which the energy of a revolving wheel or shaft is absorbed by the friction of a brake.

absorption fading — A slow type of fading, primarily caused by variations in the absorption rate along the radio path.

absorption frequency meter — See absorption wavemeter.

absorption loss — 1. That part of transmission loss due to dissipation or conversion of electrical energy into other forms (e.g., heat), either within the medium or attendant upon a reflection. 2. The loss of optical flux or energy caused by impurities in the transmission medium as well as intrinsic material absorption. Expressed in decibels per kilometer.

absorption marker — 1. A sharp dip on a frequency-response curve due to the absorption of energy by a circuit sharply tuned to the frequency at which the dip occurs. 2. A small pip or blank introduced on an oscilloscope trace to indicate a frequency point. It is so called because it is produced by a frequency-calibrated tuned trap similar to an absorption wavemeter.

absorption modulation — Also called loss modulation. A system for amplitude-modulating the output of a radio transmitter by means of a variable-impedance device (such as a microphone semiconductor or vacuum-tube circuit) inserted into or coupled to the output circuit.

absorption trap — A parallel-tuned circuit coupled either magnetically or capacitively to absorb and attenuate interfering signals.

absorption wavemeter — Also called absorption frequency meter. An instrument for measuring frequency. Its operation depends on the use of a tuned electrical circuit or cavity loosely coupled inductively to the source. Maximum energy will be absorbed at the resonant frequency, as indicated by a meter or other device. Frequency can then be determined by reference to a calibrated dial or chart.

absorptivity — A measure of the portion of incident radiation or sound energy absorbed by a material.

abstraction — A simplified description or specification of a system that emphasizes some of the system's details or properties while suppressing others. A high level of abstraction or a highly abstract machine is one in which very few machine details are apparent to a programmer, who sees only a broad set of machine concepts. Abstract machines are created by surrounding a primitive machine with layers of operating systems. To converse with higher levels of abstract machines, the user needs higher levels of languages.

A/B switch — A switch that selects one of two inputs (A or B) for routing to a common output while providing adequate isolating between the two signals.

A-B test — 1. Direct comparison of two sounds by playing first one and then the other. May be done with two tape recorders playing identical tapes (or the same tape), two speakers playing alternately from the same tape recorder, or two amplifiers playing alternately through one speaker, etc. 2. An audio comparison test for evaluating the relative performance of two or more components or systems by quickly changing from one to the other. The left- and right-hand channels or the record and replay sound signals are often designated A and B. A and B test facilities are installed at most high-fidelity dealers.

abvolt — Centimeter-gram-second electromagnetic unit of potential difference. The potential difference between two points when 1 erg of work is required to

transfer 1 abcoulomb of positive electricity from a lower to a higher potential. An abvolt is equal to 10^{-8} volt.

ac—Abbreviation for alternating current.

ac bias—The alternating current, usually of a frequency several times higher than the highest signal frequency, that is fed to a record head in addition to the signal current. The ac bias serves to linearize the recording process.

accelerated aging—A test in which certain parameters, such as voltage and temperature, are increased above normal operating values to obtain observable deterioration in a relatively short period. The plotted results give expected service life under normal conditions. Also called accelerated life test.

accelerated graphics port—Abbreviated AGP. A slot inside PCs for high speed video to be used instead of the standard slot type, called PCI.

accelerated life test—Test conditions used to bring about, in a short time, the deteriorating effect obtained under normal service conditions.

accelerated service test—A service or bench test in which some service condition, such as speed, temperature, or continuity of operation, is exaggerated to obtain a result in a shorter time than that which elapses in normal service.

accelerating conductor or relay—A conductor or relay that causes the operation of a succeeding device to begin in the starting sequence after the proper conditions have been established.

accelerating electrode—An electrode in a cathode-ray or other electronic tube to which a positive potential is applied to increase the velocity of electrons or ions toward the anode. A klystron tube does not have an anode but does have accelerating electrodes.

accelerating time—The time required for a motor to reach full speed from a standstill (zero speed) position.

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

acceleration—1. The rate of change in velocity. Often expressed as a multiple of the acceleration of gravity ($g = 32.2 \text{ ft/s}^2$). 2. The rate of change in velocity of a stepping motor measured in rad/s; it is the result of rotor torque divided by rotor and load inertia. 3. A vector quantity that specifies rate of change of velocity.

acceleration at stall—The value of servomotor angular acceleration calculated from the stall torque of the motor and the moment of inertia of the rotor. Also called torque-to-inertia ratio.

acceleration time—In a computer, the elapsed time between the interpretation of instructions to read or write on tape and the possibility of information transfer from the tape to the internal storage, or vice versa.

acceleration torque—Numerical difference between motor torque produced and load torque demanded at any given speed during the acceleration period. It is this net torque that is available to change the speed of the driven load.

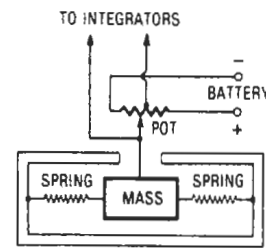
acceleration voltage—Potential between a cathode and anode or other accelerating element in a vacuum tube. Its value determines the average velocity of the electrons.

accelerator—A device for imparting a very high velocity to charged particles such as electrons or protons. Fast-moving particles of this type are used in research or in studying the structure of the atom itself. 2. A circuit that speeds up a computer or monitor. Typically a circuit card with an extra processing chip and/or additional RAM.

accelerator board—An adapter with a microprocessor that makes a computer run faster.

accelerator dynamic test—A test performed on an accelerometer by means of which information is gathered pertaining to the overall behavior frequency response and/or natural frequency of the device.

accelerometer—1. An instrument or device, often mounted in an aircraft, guided missile, or the like, used to sense accelerative forces and convert them into corresponding electrical quantities, usually for measuring, indicating, or recording purposes. It does not measure velocity or distance, only changes in velocity. 2. A transducer that measures acceleration and/or gravitational forces capable of imparting acceleration. 3. A sensor whose electrical output is proportional to acceleration.



Accelerometer.

accentuation—Also called preemphasis. The emphasizing of any certain band of frequencies, to the exclusion of all others, in an amplifier or electronic device. Applied particularly to the higher audio frequencies in frequency-modulated (FM) transmitters.

accentuator—1. Network or circuit used for preemphasis, that is, an increase in amplitude of a given band of usually audible frequencies. 2. A circuit or device, such as a filter, tone control, or equalizer, used to emphasize a band of frequencies, usually in the audio-frequency spectrum.

acceptable-environmental-range test—A test to determine the range of environmental conditions for which an apparatus maintains at least the minimum required reliability.

acceptable quality level—Abbreviated AQL. The maximum percentage of defective components considered to be acceptable as an average for a process or the lowest quality a supplier is permitted to present continually for acceptance. *Also see* AQL.

acceptance angle—1. The solid angle within which all incident light rays will enter the core of an optical fiber. Expressed in degrees. 2. In fiber optics, a measure of the maximum angle within which light may be coupled from a source or emitter. It is measured relative to the fiber's axis. 3. The critical angle, measured from the core centerline, above which light will not enter an optical fiber. It is equal to the half-angle of the acceptance cone. 4. The maximum angle within which light will be accepted by an element, such as a detector.

acceptance cone—1. A parameter that defines acceptable light-launching angles. Only light launched at angles within this cone will be waveguided (fiber optics). 2. A cone with an included angle twice that of the acceptance angle.

acceptance pattern—In fiber optics, a curve of total transmitted power plotted against the launch angle.

acceptance sampling plan—A plan for the inspection of samples as a basis for acceptance or rejection of a lot.

acceptor—Also called acceptor impurity. An impurity lacking sufficient valence electrons to complete the

bonding arrangement in the crystal structure. When added to a semiconductor crystal, it accepts an electron from a neighboring atom and thus creates a hole in the lattice structure of the crystal, making a p-type semiconductor. 2. An impurity from column III of the periodic table, which adds a mobile hole to silicon, thereby making it more p-type and accepting of electrons. Boron is the primary acceptor used to dope silicon (compare with *donor*).

acceptor circuit — 1. A circuit that offers minimum opposition to a given signal. 2. A circuit tuned to respond to a single frequency.

acceptor impurity — See acceptor.

acceptor-type semiconductor — A p-type semiconductor.

access — 1. To gain access to a computer's memory location in which binary information is already stored or can be stored. 2. To open up a set of connections to allow reading from or writing into this location.

access arm — In a computer storage unit, a mechanical device that positions the reading and writing mechanism.

access code — 1. The preliminary digit or digits that a telephone user must dial to be connected to a particular outgoing trunk group. 2. A group of characters or numbers that identifies a user to a computer or any other secure system. 3. One or more numbers and/or symbols that are keyed into the repeater with a telephone tone pad to activate a repeater function, such as an autopatch.

access control — 1. The control of pedestrian and vehicular traffic through entrances and exits of a protected area or premises. 2. The process of limiting access to resources of a system to only authorized users, programs, processes, or other systems.

access grant — Multiprocessor system response that satisfies a previous service request.

access hole — A hole drilled through successive layers of a multilayer board to gain access to a land or pad location on one of the inside layers.

access method — 1. A data-management technique available for use in transferring data between the main storage and an input/output device. 2. A software component of a computer operating system that controls the flow of data between application programs and either local or remote peripheral devices.

access mode — 1. A technique used in COBOL to obtain a specific logic record from, or to place it into, a file assigned to a mass storage device. 2. The operation of an alarm system such that no alarm signal is given when the protected area is entered; however, a signal may be given if the sensor, annunciator, or control unit is tampered with or opened.

accessory card — An additional circuit card that can be mounted inside a personal computer and connected to the system bus.

access protocol — A defined set of procedures that function as an interface between a computer user and a network, enabling the user to employ the services of that network.

access provider — Telecommunications company that links businesses and individuals to the Internet using modem devices, high-speed ISDN lines, or dedicated links.

access time — Also called waiting time. 1. The time interval (called read time) between the instant of calling for data from a storage device and the instant of completion of delivery. 2. In a memory system, the time delay, at specified thresholds, from the presentation of an enable or address input pulse until the arrival of the memory data output. 3. The time required for a computer to move data between its memory section and its

CPU. 4. A time interval that is characteristic of a storage device. Essentially, it is a measure of the time required to communicate with that device, or, more specifically, it is the time between the application of a specified input pulse (assuming that other necessary inputs are also present) and the availability of valid data signals at an output. The access time can be defined only with reference to an output signal. 5. The time required by a computer to begin delivering information after the memory or storage has been interrogated. 6. The time it takes a computer to retrieve a piece of information. With hard disks or compact discs, maximum access time is measured as the time it takes to move from one end of the disk to the other, find a piece of information, and transfer that information to RAM.

accidental jamming — Jamming caused by transmission from friendly equipment.

ac circuit breaker — A device that is used to close and interrupt an ac power circuit under normal conditions or to interrupt this circuit under faulty or emergency conditions.

accompanying audio (sound) channel — Also known as co-channel sound frequency. The rf carrier frequency that supplies the sound to accompany a television picture.

ac component — In a complex wave (i.e., one containing both ac and dc), the alternating, fluctuating, or pulsating member of the combination.

accordion — A type of contact used in some printed-circuit connectors. The contact spring is given a z shape to permit high deflection without excessive stress.

ac-coupled flip-flop — A flip-flop that changes state when triggered by the rise or fall of a clock pulse. There is a maximum allowable rise or fall time for proper triggering.

ac coupling — Coupling of one circuit to another circuit through a capacitor or other device that passes the varying portion but not the static (dc) characteristics of an electrical signal.

accumulation key — In a calculator, it automatically accumulates products and totals of successive calculations.

accumulator — 1. In an electronic computer, a device which stores a number and which, on receipt of another number, adds the two and stores the sum. An accumulator may have properties such as shifting, sensing signals, clearing, complementing, etc. 2. A chemical cell able to store electrical energy (British). Also called secondary cell. 3. The "scratch pad" section of the computer, in which arithmetic operations are carried out. 4. A register and related circuitry that hold an operand for arithmetic and logic operations. 5. A register or latch internal to the MPU where data is stored temporarily before being sent to another location internal or external to the MPU chip.

accuracy — 1. The maximum error in the measurement of a physical quantity in terms of the output of an instrument when referred to the individual instrument calibration. Usually given as a percentage of full scale. 2. The quality of freedom from mistake or error in an electronic computer, that is, of conformity to truth or to a rule. 3. The closeness with which a measured quantity approaches the true value of that quantity. (See true value.) 4. The degree to which a measured or calculated value conforms to the accepted standard or rule. 5. The measure of a meter's ability to indicate a value corresponding to the absolute value of electrical energy applied. Accuracy is expressed as a percentage of the meter's rated full-scale value. To be meaningful, accuracy specifications must always consider the effects of time, temperature, and humidity. 6. Confidence in the correlation between measurements in one location and another,

or between a measurement and a recognized standard. 7. The correctness or certainty of position when the rotor of a stepping motor comes to rest. It is usually expressed as a percentage of the step angle, but can also be specified in degrees or minutes of arc. In steppers, the error is not cumulative, but occurs only at the completion of the last step. 8. The degree of freedom from error, that is, the degree of conformity to some standard. Accuracy is contrasted with *precision*. For example, four-place numbers are less precise than six-place numbers; however, a properly computed four-place number might be more accurate than an improperly computed six-place number. 9. As applied to an adc, the term describes the difference between the actual input voltage and the full-scale weighted equivalent of the binary code.

accuracy rating of an instrument—The limit, usually expressed as a percentage of full-scale value, not exceeded by errors when the instrument is used under reference conditions.

ACD—Abbreviation for automatic call distributor. A switching system that automatically distributes incoming calls to a centralized group of receivers in the sequence in which the calls are received. It holds calls until a receiver is available.

ac/dc—Electronic equipment capable of operation from either an ac or dc primary power source. Abbreviation for alternating current/direct current.

ac/dc receiver—A radio receiver designed to operate directly from either an ac or a dc source.

ac/dc ringing—A method of telephone ringing in which alternating current is used to operate a ringing device, and direct current is used to aid the action of a relay that stops the ringing when the called party answers.

ac directional overcurrent relay—A device that functions on a desired value of ac overcurrent flowing in a predetermined direction.

ac dump—The intentional, accidental, or conditional removal of all alternating-current power from a system or component. An ac dump usually results in the removal of all power, since direct current is usually supplied through a rectifier or converter.

ac erasing head—In magnetic recording, a device using alternating current to produce the magnetic field necessary for removal of previously recorded information.

acetate—A basic chemical compound in the mixture used to coat recording discs.

acetate base—The transparent plastic film that forms the tough backing for acetate magnetic recording tape.

acetate disc—A mechanical recording disc, either solid or laminated, made mostly from cellulose nitrate lacquer plus a lubricant.

acetate tape—A sound-recording tape with a smooth, transparent acetate backing. One side is coated with an oxide capable of being magnetized.

ac generator—1. A rotating electrical machine that converts mechanical power into alternating current. Also known as an alternator. 2. A device, usually an oscillator, designed for the purpose of producing alternating current.

A channel—One of two stereo channels, usually the left.

achieved reliability—Reliability determined on the basis of actual performance of nominally identical items under equivalent environmental conditions. Also called operational reliability.

achromatic—1. In color television, a term meaning a shade of gray from black to white, or the absence of color (without color). 2. Black-and-white television, as distinguished from color television. 3. Literally, color free. In an optical system, the term is used when chromatic aberration is corrected for at least two wavelengths. A

color that is defined as being achromatic is often referred to as gray. 4. Having no color; being a neutral such as black, white, or gray.

achromatic lens—A lens that has been corrected for chromatic aberration. Such a lens is capable of bringing all colors of light rays to approximately the same point of focus by combining a concave lens of flint glass with a convex lens of crown glass. A lens that transmits light without separating it into its constituent colors.

achromatic locus—Also called achromatic region. On a chromaticity diagram, an area that contains all points representing acceptable reference white standards.

achromatic region—See achromatic locus.

acicular—Needle-shaped; descriptive of the shape of the magnetizable particles composing the coating of a recording tape. Modern tapes are premagnetized during the coating process to line the “needles” up with the direction of the tape, thus providing maximum sensitivity from the oxide.

acid—A chemical compound that dissociates and forms hydrogen ions when in aqueous solution.

acid depolarizer—An acid, such as nitric acid, sometimes introduced into a primary cell to prevent polarization.

acid fluxes—Fluxes consisting of inorganic acids and salts, which are used when a surface to be soldered is below the ideal for rapid wetting. Also called corrosive fluxes.

acknowledge—A control signal used to complete a handshaking sequence in telecommunications. The acknowledge signal indicates that the information has been accepted by the receiving computer.

ac line—A power line delivering alternating current only.

ac line filter—A filter designed to dissipate or bypass to ground any extraneous signals or electrical noise on an ac power line, while causing virtually no reduction of the power-line voltage or power. Used to keep unwanted signals and noise out of sensitive equipment.

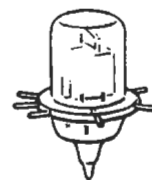
acclinic line—Also called isoclinic line. On a magnetic map, an imaginary line that connects points of equal magnetic inclination or dip.

ac magnetic biasing—In magnetic recording, the method used to remove random noise and/or previously recorded material from the wire or tape. This is done by introducing an alternating magnetic field at a substantially higher frequency than the highest frequency to be recorded.

ac noise—Noise that displays a rate of change that is fast relative to the response capability of the device.

ac noise immunity—A measure of a logic circuit's ability to maintain the prescribed logic state in the presence of such noise. It is defined in terms of the amplitude and pulse width of an input noise signal to which the element will not respond.

acorn tube—A button- or acorn-shaped vacuum tube with no base, designed for UHF applications. Electrodes are brought out through the glass envelope on the side, top, and bottom.



Acorn tube.

acoustic—Also acoustical. Pertaining to sound or the science of sound.

acoustic absorption loss—The energy lost by conversion into heat or other forms when sound passes through or is reflected by a medium.

acoustic absorptivity—The ratio of sound energy absorbed by a surface to the sound energy arriving at the surface. Equal to 1 minus the reflectivity of the surface.

acoustical—See acoustic.

acoustical attenuation constant—The real part of the acoustical propagation constant. The commonly used unit is the neper per section or per unit distance.

acoustical coupler—A device for connecting a telephone handset to a computer input port.

acoustical-electrical transducer—A device designed to transform sound energy into electrical energy and vice versa.

acoustical material—Any material considered in terms of its acoustical properties; especially, a material designed to absorb sound.

acoustical mode—A mode of crystal-lattice vibration that does not produce an oscillating dipole.

acoustical ohm—A measure of acoustic resistance, reactance, or impedance. One acoustical ohm is equal to a volume velocity of 1 cubic centimeter per second when produced by a sound pressure of 1 microbar.

acoustical phase constant—The imaginary part of the acoustical propagation constant. The commonly used unit is the radian per section or per unit distance.

acoustical reflectivity—See sound-reflection coefficient.

acoustical transmittivity—See sound-transmission coefficient.

acoustic burglar alarm—Also called acoustic intrusion detector. A burglar alarm that is responsive to sounds produced by an intruder. Concealed microphones connected to an audio amplifier trip an alarm when sounds within a predetermined range of frequencies exceed a predetermined normal level.

acoustic capacitance—In a sound medium, a measure of volume displacement per dyne per square centimeter. The unit is centimeter to the fifth power per dyne.

acoustic clarifier—A system of cones loosely attached to the baffle of a speaker and designed to vibrate and absorb energy during sudden loud sounds, thereby suppressing them.

acoustic compliance—1. The measure of volume displacement of a sound medium when subjected to sound waves. 2. That type of acoustic reactance which corresponds to capacitive reactance in an electrical circuit.

acoustic coupler—1. A device that converts digital signals into audio signals, enabling data to be transmitted over the telephone lines via a conventional telephone. 2. A modem device that connects a terminal or computer to the handset of a telephone.

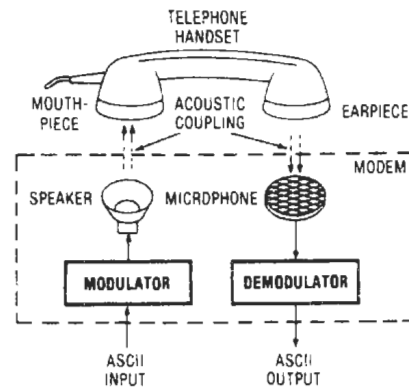
acoustic coupling—Coupling resonator elements by mechanical means through the use of wires, rods, or nonelectroded sections of quartz or ceramic. The terms *acoustic* and *mechanical* can be used interchangeably.

acoustic delay line—A device that retards one or more signal vibrations by causing them to pass through a solid or liquid.

acoustic dispersion—The change of the speed of sound with frequency.

acoustic elasticity—1. The compressibility of the air in a speaker enclosure as the cone moves backward. 2. The compressibility of any material through which sound is passed.

acoustic — acoustic inertance



Acoustic coupler.

acoustic feedback—1. Also called acoustic regeneration. The mechanical coupling of a portion of the sound waves from the output of an audio-amplifying system to a preceding part or input circuit (such as the microphone) of the system. When excessive, acoustic feedback will produce a howling sound in the speaker. 2. The pickup, by a turntable, of vibrations from the speaker. If these vibrations reach the cartridge, they will be reamplified, causing noise (usually a rumble, but in extreme cases a howl) and/or distortion. Also, feedback resulting from such sound waves setting some part of an amplifier circuit into vibration and thus modulating the currents in the circuit. Acoustic feedback usually causes howling or whistling.

acoustic filter—1. A sound-absorbing device that selectively suppresses certain audio frequencies while allowing others to pass. 2. Any sound-absorbing or sound-transmitting arrangement, or combination of the two, that passes sound waves of desired frequency while attenuating or eliminating others.

acoustic frequency response—The voltage-attenuation frequency measured into a resistive load, producing a bandwidth approaching sufficiently close to the maximum.

acoustic generator—A transducer, such as a speaker, headphones, or a bell, that converts electrical, mechanical, or other forms of energy into sound.

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

acoustic horn—Also called horn. 1. A tube of varying cross section having different terminal areas that change the acoustic impedance to control the directivity of the sound pattern. 2. A tapered tube (round or rectangular, but generally funnel shaped) that directs sound and, to some extent, amplifies it.

acoustic impedance—1. Total opposition of a medium to sound waves. Equal to the force per unit area on the surface of the medium divided by the flux (volume velocity or linear velocity multiplied by area) through that surface. Expressed in ohms and equal to the mechanical impedance divided by the square of the surface area. One unit of acoustic impedance is equal to a volume velocity of 1 cubic centimeter per second produced by a pressure of 1 microbar. Acoustic impedance contains both acoustic resistance and acoustic reactance. 2. The degree of resistance to transmitting sound imparted by the characteristic elasticity of a given substance.

acoustic inertance—A type of acoustic reactance that corresponds to inductive reactance in an electrical circuit. (The resistance to movement or reactance offered by

the sound medium because of the inertia of the effective mass of the medium.) Measured in acoustic ohms.

acoustic intensity—The limit approached by the quotient of acoustical power being transmitted at a given time through a given area divided by the area as the area approaches zero.

acoustic interferometer—An instrument for measuring the velocity or frequency of sound waves in a liquid or gas. This is done by observing the variations of sound pressure in a standing wave, established in the medium between a sound source and a reflector, as the reflector is moved or the frequency is varied.

acoustic intrusion detector—*See* acoustic burglar alarm.

acoustic labyrinth—A loudspeaker enclosure in which the rear of the loudspeaker is coupled to a tube which, at the resonant frequency of the loudspeaker, is one quarter of a wavelength long. The tube, folded upon itself in order to save space, gives the appearance of a labyrinth.

acoustic lens—1. An array of obstacles that refract sound waves in the same way that an optical lens refracts light waves. The dimensions of these obstacles are small compared with the wavelengths of the sounds being focused. 2. A device that produces convergence or divergence of moving sound waves. When used with a loudspeaker, the acoustic lens widens the beam of the higher-frequency sound waves.

acoustic line—Mechanical equivalent of an electrical transmission line. Baffles, labyrinths, or resonators are placed at the rear of a speaker to help reproduce the very low audio frequencies.

acoustic memory—A computer memory using an acoustic delay line. The line employs a train of pulses in a medium such as mercury or quartz.

acoustic mine—Also called sonic mine. An underwater mine that is detonated by sound waves, such as those from a ship's propeller or engines.

acoustic mirage—The distortion of a sound wavefront by a large temperature gradient in air or water. This creates the illusion of two sound sources.

acoustic ohm—The unit of acoustic resistance, reactance, or impedance. One acoustic ohm is present when a sound pressure of 1 dyne per square centimeter produces a volume velocity of 1 cubic centimeter per second.

acoustic phase constant—The imaginary part of the acoustic propagation constant. The commonly used unit is the radian per section or per unit distance.

acoustic phonograph—A mechanical record player (now obsolete) in which the needle sets a thin diaphragm into vibration. The diaphragm in turn causes the air in a horn to vibrate, thus reproducing the recorded sound.

acoustic pickup—1. In nonelectrical phonographs, the method of reproducing the material on a record by linking the needle directly to a flexible diaphragm. 2. In an acoustic phonograph, a pickup consisting of a needle, needle holder, and vibrating diaphragm.

acoustic radiator—In an electroacoustic transducer, the part that initiates the radiation of sound vibration. A speaker cone or headphone diaphragm is an example.

acoustic radiometer—An instrument for measuring sound intensity by determining the unidirectional steady-state pressure caused by the reflection or absorption of a sound wave at a boundary.

acoustic reactance—That part of acoustic impedance due to the effective mass of the medium, that is, to the inertia and elasticity of the medium through which

the sound travels. The imaginary component of acoustic impedance; expressed in acoustic ohms.

acoustic reflectivity—The ratio of the rate of flow of sound energy reflected from the surface on the side of incidence to the incident rate of flow.

acoustic refraction—A bending of sound waves when passing obliquely from one medium to another in which the velocity of sound is different.

acoustic regeneration—*See* acoustic feedback.

acoustic resistance—That component of acoustic impedance responsible for the dissipation of energy due to friction between molecules of the air or other medium through which sound travels. Measured in acoustic ohms and analogous to electrical resistance.

acoustic resonance—An increase in sound intensity as reflected waves and direct waves that are in phase combine. May also be due to the natural vibration of air columns or solid bodies at a particular sound frequency.

acoustic resonator—An enclosure that intensifies those audio frequencies at which the enclosed air is set into natural vibration.

acoustics—1. Science of production, transmission, reception, and effects of sound. 2. In a room or other location, those characteristics that control reflections of sound waves and thus the sound reception in it.

acoustic scattering—The irregular reflection, refraction, or diffraction of a sound wave in many directions.

acoustic shock—Physical pain, dizziness, and sometimes nausea brought on by hearing a loud, sudden sound. (The threshold of pain is about 120 dBm.)

acoustic surface-wave component—A passive electroacoustic device that has metallized interdigital transducer elements deposited on the surface of a piezoelectric substrate. The device allows acoustic energy to be generated, manipulated, and detected on the substrate surface. Most of the acoustic energy is confined to a region within one wavelength of the surface of the substrate. When the metallization is subjected to an alternating voltage, a strain develops between the interdigital fingers and also at the frequency of excitation. This alternating strain on the crystal surface launches a Rayleigh surface-wave front that travels in both directions and that originates from the center of the transducer. The wave exists as an electroacoustic vibration.

acoustic suspension—1. A loudspeaker system in which the moving cone is held by an overcompliant suspension, the stiffness required for proper operation being supplied by air that is trapped behind the cone in a sealed enclosure. While relatively inefficient, such a system permits good bass reproduction in a unit of moderate size. 2. A speaker enclosure design in which the speaker cone is suspended in an airtight box. This enables the acoustic pressure of the air enclosed therein to provide the principal restoring force for the diaphragm of the speaker. It needs somewhat more power from the amplifier than a free speaker but has better low-frequency performance.

acoustic system—Arrangement of components in devices designed to reproduce audio frequencies in a specified manner.

acoustic telemetry—The utilization of sound energy for the transmission of information. It differs from other telemetry methods in that information derived from the received signal is encoded by the transmitting source.

acoustic transformer—A device that transmits power along a glass or ceramic rod and isolates the power supply from the signal input.

acoustic transmission—Direct transmission of sound energy without the intermediary of electric currents.

acoustic transmission system—An assembly of elements adapted for the transmission of sound.

acoustic treatment—Use of certain sound-absorbing materials to control the amount of reverberation in a room, hall, or other enclosure; that is, to make the room less live.

acoustic wave—A traveling vibration by which sound energy is transmitted in air, water, or the earth. The characteristics of these waves may be described in terms of change of pressure, particle displacement, or density.

acoustic wave filter—A device designed to separate sound waves of different frequencies. (Through electroacoustic transducers, such a filter may be associated with electric circuits.)

acoustoelectric effect—Generation of an electric current in a crystal by a traveling longitudinal sound wave.

acousto-optic Bragg cell—A modulation device that impresses analog information on light beams. This transducer is composed of two sets of interleaved electrodes of alternating polarities deposited on an optical waveguide. An electrical signal applied to each pair of adjacent electrodes buckles the film between them. This distortion changes the refractive index of the waveguide and creates physical waves in the film, commonly called surface waves. These waves are generated at a rate equal to that of the applied electrical signal.

acousto-optics—The study of the interactions between sound waves and light in a solid medium. Sound waves can be made to modulate, deflect, and focus light waves—an important characteristic in laser and holographic applications.

ac plate resistance—Also called dynamic plate resistance. Internal resistance of a vacuum tube to the flow of alternating current. Expressed in ohms, the ratio of a small change in plate voltage to the resultant change in plate current, other voltages being held constant.

ac power supply—A power supply that provides one or more ac output voltages, e.g., ac generator, dynamotor, inverter, or transformer.

acquisition—1. The process of pointing an antenna or telescope so that it is properly oriented to allow gathering of tracking or telemetry data from a satellite or space probe. 2. In radar, the process between the initial location of a target and the final alignment of the tracking equipment on the target. 3. The gathering of data from transducers or a computer.

acquisition and tracking radar—A radar set that locks onto a strong signal and tracks the object emitting or reflecting the signal. May be airborne or on the ground. Tracking radars use a dish-type antenna reflector to produce a searchlight-type beam.

acquisition radar—A radar set that detects an approaching target and feeds approximate position data to a fire-control or missile-guidance radar, which then takes over the function of tracking the target.

acquisition range—Also called capture range. The range of input frequency about f_0 under which a phase-locked loop, which is initially unlocked, will become locked. This range is narrower than the normal tracking range and is a function of the loop-filter characteristics and the input amplitude.

acquisition time—1. Time delay between request for data conversion and the holding of the analog value by a sample-and-hold amplifier. 2. In a sample-and-hold circuit, how long it takes after the sample command is given for the hold capacitor to be charged to a full-scale voltage change and to remain within a specified error band around its final value. 3. The time it takes for the output of a sample-and-hold circuit to change from its previous value to a new value when the circuit is switched from the hold mode to the sample mode. It includes the slew

time and settling time to within a certain error band of the final value and is usually specified for a full-scale change.

ac receiver—A radio receiver designed to operate from an ac source only.

ac reclosing relay—A device that controls the automatic reclosing and locking out of an ac circuit interrupter.

ac relay—A relay designed to operate from an alternating-current source.

ac resistance—Total resistance of a device in an ac circuit. *See also* high-frequency resistance.

acronym—A word formed from the first letter or letters of the words describing some item, e.g., FORTRAN from *formula translation*.

across-the-line starting—Connection of a motor directly to the supply line for starting. Also called full-voltage starting.

ac signaling—Using ac signals or tones to transmit data and/or control signals.

ACTCRBS—Abbreviation for air traffic control radar beacon system. A control system in use worldwide. Air separation information exchanged between plane and air traffic controller must be sent by radio.

ac time overcurrent relay—A device that has either a definite or an inverse time characteristic and functions when the current in an ac circuit exceeds a predetermined value.

actinic—In radiation, the property of producing a chemical change, such as the photographic action of light.

actinium—A radioactive element discovered in pitchblende by the French chemist Debierne in 1889. Its atomic number is 89, its atomic weight 227, and its symbol Ac.

actinodielectric—A photoconductive dielectric.

actinoelectric—Exhibiting a temporary rise in electrical conductivity during exposure to light.

actinoelectric effect—1. The property of some special materials whereby when an electric current is impressed on them, their resistance changes with light. 2. The property of certain materials (such as selenium, cadmium sulfide, germanium, and silicon) that causes them to change their electrical resistance or generate a voltage on exposure to light.

actinoelectricity—Electricity produced by the action of radiant energy on crystals.

actinometer—An instrument that measures the intensity of radiation by determining the amount of fluorescence produced by that radiation.

action area—In the rectifying junction of a metallic rectifier, that portion which carries the forward current.

action current—A brief and very small electric current that flows in a nerve during a nervous impulse.

action potential—1. The instantaneous value of the voltage between excited and resting portions of an excitable living structure. 2. The voltage variations in a nerve or muscle cell when it is excited or fired by an appropriate stimulus. After a short time, the cell recovers its normal resting potential, typically about 80 millivolts. The interior of the cell is negative relative to the outside.

activate—To start an operation, usually by application of an appropriate enabling signal.

activating—1. Chemically treating a basic metal to remove oxides and other passive films to make it more receptive to electroplating. 2. A treatment that renders nonconductive material receptive to electrodeless deposition. (Nonpreferred synonyms: seeding, catalyzing, and sensitizing.)

activation—1. Making a substance artificially radioactive by placing it in an accelerator such as a cyclotron or by bombarding it with neutrons. 2. To treat the cathode or target of an electron tube in order to create or increase its

emission. 3. The process of adding electrolytes to a cell to make it ready for operation. 4. Causing the acceleration of a chemical reaction.

activation time—In a cell or battery, the time interval from the moment activation is initiated to the moment the desired operating voltage is obtained.

activator—An additive that improves the action of an accelerator.

active—1. Controlling power from a separate supply. 2. Requiring a power supply separate from the controls. 3. Containing, or connected to and using, a source of energy.

active area—The portion of the rectifying junction of a metallic rectifier that carries forward current.

active balance—In operation of a telephone repeater, the summation of all return currents at a terminal network balanced against the local circuit or drop impedance.

active circuit—A circuit that contains active elements such as transistors, diodes, or integrated circuits.

active communications satellite—A communications satellite in which on-board receivers and transmitters receive signals beamed at them from a ground terminal, amplify them greatly, and retransmit them to another ground terminal. Less sensitive receivers and less powerful transmitters can be used on the ground than are needed for passive satellites. Also called active comsat.

active component—1. Those components in a circuit that have gain, or direct current flow, such as SCRs, transistors, thyristors, or tunnel diodes. They change the basic character of an applied electrical signal by rectification, amplification, switching, and so forth. (Passive elements like inductors, capacitors, and resistors have no gain characteristics.) 2. A device, the output of which is dependent on a source of power other than the main input signal. 3. A device capable of some dynamic function (such as amplification, oscillation, signal control) and which usually requires an external power supply for its operation. 4. Broadly, any device (including electromechanical relays) that can switch (or amplify) by application of low-level signals.

active computer—The one of two or more computers in an installation that is online and processing data.

active comsat—*See* active communications satellite.

active current—In an alternating current, a component in phase with the voltage. The working component as distinguished from the idle or wattless component.

active decoder—A device that is associated with a ground station and automatically indicates the radar beacon reply code that is received in terms of its number or letter designation.

active delay line—A digital delay module that incorporates a passive delay line and a series of logical gate circuits. These modules are used specifically with digital or logic signals. Also called digital delay line, digital delay unit, digital delay module, and digital programmable delay line.

active device—*See* active component.

active display—A display, such as a cathode-ray tube, electroluminescent display, or plasma panel, that presents information by emitting light.

active ECM—*See* jamming.

active electric network—An electric network containing one or more sources of energy.

active element—1. The driven or self-excited element in a multielement antenna or antenna array. 2. Also known as the responsive element. That part of a detector on which the infrared energy is projected and which, when radiation falls on it, undergoes a physical change that results in an electrical signal. *See* active component.

active equalizer—An equalizer designed to correct deficiencies in a speaker system's response. Such equalizers, which are designed to precisely match specific speaker systems, usually connect between the amplifier and preamplifier, or in one of the amplifier's tape-monitor circuits.

active filter—1. A device employing passive network elements and amplifiers. It is used for transmitting or rejecting signals in certain frequency ranges or for controlling the relative output of signals as a function of frequency. 2. A high-pass, low-pass, bandpass, or band-elimination filter that uses an active element, such as an operational amplifier, and relatively small capacitors, rather than the larger inductors and capacitors that would be required in a conventional passive filter. 3. A circuit whose gain depends on the frequency of the input signal. 4. A filter, consisting of an amplifier and suitable tuning elements, usually inserted in a feedback path. 5. A filter that uses active devices such as operational amplifiers to synthesize the filter response function. This technique has an advantage at high speeds because the need for inductors (with their poor high-frequency characteristics) is eliminated.

active guidance—*See* active homing.

active homing—A system whereby a missile homes in on a target by means of a radar aboard the missile. Also called active guidance.

active infrared detection—An infrared detection system in which a beam of infrared rays is transmitted toward one or more possible targets, and the rays reflected from the target are detected.

active infrared system—A system in which the object is irradiated by a source of infrared energy, which, in turn, is reflected by the object onto a detector. A snooper scope is an active infrared system.

active intrusion sensor—An active sensor that detects the presence of an intruder within the range of the sensor. Examples are an ultrasonic motion detector, a radio-frequency motion detector, and a photoelectric alarm system. *See also* passive intrusion sensor.

active jamming—1. Intentional radiation or reradiation of electromagnetic waves to impair the use of a specific portion of the electromagnetic-wave spectrum. 2. Transmission or retransmission of signals for the express purpose of disrupting communications.

active junction—In a semiconductor, a change in n-type to p-type doping, or vice versa, by a diffusion step. On discrete transistors there are two active junctions, the collector-base junction and the emitter-base junction.

active leg—Within a transducer, an electrical element that changes its electrical characteristics as a function of the applied stimulus.

active line—In a U.S. television picture, one of the lines (approximately 488) that make up the picture. The remaining 37 of the 525 available lines are blanked; they are called inactive lines.

active maintenance downtime—The time during which work is actually being done on an item, from the recognition of an occurrence of failure to the time of restoration to normal operation. This includes both preventive and corrective maintenance.

active material—1. In the plates of a storage battery, lead oxide or some other active substance that reacts chemically to produce electrical energy. 2. The fluorescent material, such as calcium tungstate, used on the screen of a cathode-ray tube.

active matrix—A display matrix with a transistor at each pixel location to individually store its state (on or off). Pixels in active matrix panels only need to be addressed when they are being turned on or off.

active mixer and modulator—A device requiring a source of electrical power and using nonlinear network elements to heterodyne or combine two or more electrical signals.

active network—1. A network containing passive and active (gain) elements. 2. An electrical network that includes a source of energy.

active pressure—In an ac circuit, the pressure that produces a current, as distinguished from the voltage impressed on the circuit.

active probe—A test probe, generally used with an oscilloscope, that is so named because of the active components used within probe circuitry. These components consist of one or all of the following: transistors, diodes, integrated circuits, or FETs. If FETs are used, these probes are often referred to as FET probes.

active pull-up—An arrangement in which a transistor is used to replace the pull-up resistor in an integrated circuit in order to provide low output impedance without high power consumption.

active RC network—A network formed by resistors, capacitors, and active elements.

active redundancy—That redundancy wherein all redundant items are operating simultaneously rather than being switched on when needed.

active repair time—That portion of corrective maintenance downtime during which repair work is being done on the item, including preparation, fault location, part replacement, adjustment and recalibration, and final test time. It may also include part procurement time under shipboard or field conditions.

active satellite—A satellite that receives, regenerates, and retransmits signals between stations. *See also* communications satellite.

active sensor—A sensor that detects the disturbance of a radiation field that is generated by the sensor. *See also* passive sensor.

active sonar—*See* sonar.

active splitter—*See* line splitter.

active substrate—1. A substrate in which active elements are formed to provide discrete or integrated devices. Examples of active substrates are single crystals of semiconductor materials within which are transistors, resistors, and diodes, or combinations of these elements. Another example is ferrite substrates within which electromagnetic fields are used to perform logical, gating, or memory functions. 2. A substrate for an integrated component in which parts display transistance. 3. A working part of the electronic circuit, which it supports physically. 4. In an integrated circuit, a substrate consisting of single-crystal semiconductor material into which the various IC components are formed; it acts as some or all of the components. This is in contrast to a substrate consisting of a dielectric, on whose surface the various components are deposited.

active swept-frequency interferometer radar—A dual radar system for air surveillance. It provides angle and range information of high precision for pinpointing target locations by trigonometric techniques.

active systems—In radio and radar, systems that require transmitting equipment, such as a beacon or transponder, to be carried in the vehicle.

active tracking system—Usually, a system that requires the addition of a transponder or responder on board the vehicle to repeat or retransmit information to the tracking equipment; e.g., dovap, secor, azusa.

active transducer—1. A type of transducer in which its output waves depend on one or more sources of power, apart from the actuating waves. 2. A transducer that requires energy from local sources in addition to that which is received.

active mixer and modulator — adaptive control

active trim—Trimming of a circuit element (usually resistors) in a circuit that is electrically activated and operating to obtain a specified functional output for the circuit. *See* functional trimming.

active wire—The wire of an armature winding that produces useful voltage. That portion of the winding in which induction takes place.

activity—1. In a piezoelectric crystal, the magnitude of oscillation relative to the exciting voltage. 2. The intensity of a radioactive source. 3. Operations that result in the use or modification of the information in a computer file.

activity curve—A graph showing how the activity of a radioactive source varies with time.

activity ratio—The ratio of the number of records in a computer file that have activity to the total number of records in the file.

ac transducer—A transducer that, for proper operation, must be excited with alternating currents only. Also a device, the output of which appears in the form of an alternating current.

actual height—The highest altitude at which refraction of radio waves actually occurs.

actual power—The average of values of instantaneous power taken over one cycle.

actuating device—A mechanical or electrical device, either manual or automatic, that operates electrical contacts to bring about signal transmission.

actuating system—1. In a device or vehicle, a system that supplies and transmits energy for the operation of a mechanism or other device. 2. A manually or automatically operated mechanical or electrical device that operates electrical contacts to effect signal transmission.

actuating time—The time at which a specified contact functions.

actuator—1. In a servo system, the device that moves the load. 2. The part of a relay that converts electrical energy into mechanical motion. 3. Switch part to which an external force is applied to operate the switch. 4. A manual or automatic switch or sensor, such as a holdup button, magnetic switch, or thermostat, that causes a system to transmit an alarm signal when manually activated or when the device automatically senses an intruder or other unwanted condition. 5. A motorized arm that moves a satellite dish into position under the control of a receiver.

ACU—Abbreviation for automatic calling unit.

ac voltage—*See* alternating voltage.

acyclic machine—A direct-current machine in which the voltage generated in the active conductors maintains the same direction with respect to those conductors at all times.

a/d—Abbreviation for analog-to-digital. Also a-d, A-D, or A/D.

adapter—1. A fitting designed to change the terminal arrangement of a jack, plug, socket, or other receptacle, so that other than the original electrical connections are possible. 2. An intermediate device that permits attachment of special accessories or provides special means for mounting. 3. A device for connecting two parts of an apparatus that would not be directly connectable because of incompatible dimensions, terminations, currents, voltages, frequencies, etc.

adaptive communication—A method in which automatic changes in the communications system allow for changing inputs or changing characteristics of the device or process being controlled. Also called self-adjusting communication or self-optimizing communication.

adaptive control—1. A control method that uses sensors for real-time measurement of process variables

with calculation and adjustment of control parameters as a method of achieving near-optimum process performance.

2. A method of control in which actions are continuously adjusted in response to feedback.

adaptive control system — A device whose parameters are automatically adjusted to compensate for changes in the dynamics of the process to be controlled. An AFC circuit utilizing temperature-compensating capacitors to correct for temperature changes is an example.

adaptive telemetry — Telemetry having the ability to select certain vital information or any change in a given signal.

adaptor — A device that locates and supports products to be tested. Generally, it is made of an insulating material with locator pins mounted to precisely position the product to a spring contact probe test pattern. Also, an adaptor serves as an intermediate between the circuit verifier and the interchangeable test head that contains the test pattern.

adc — Abbreviation for analog-to-digital converter. Also ADC.

Adcock antenna — A pair of vertical antennas separated by one-half wavelength or less and connected in phase opposition to produce a figure-8 directional pattern.

Adcock direction finder — A radio direction finder using one or more pairs of Adcock antennas for directional reception of vertically polarized radio waves.

Adcock radio range — A type of radio range utilizing four vertical antennas (Adcock antennas) placed at the corners of a square, with a fifth antenna in the center.

a/d converter — Abbreviation for analog-to-digital converter. Also a-d, A-D, or A/D converter. 1. A unit or device that converts an analog signal, that is, a signal in the form of a continuously variable voltage or current, to a digital signal. 2. A circuit that accepts information in a continuously varying ac or dc current or voltage and whose output is the same information in digital form. 3. A circuit or device for producing a set of digital output signals representing the magnitude of a voltage applied to its input.

add-and-subtract relay — A stepping relay capable of being operated so as to rotate the movable contact arm in either direction.

addend — A quantity that, when added to another quantity (called the augend), produces a result called the sum.

adder — 1. A device that forms the sum of two or more numbers or quantities impressed on it. 2. In a color TV receiver, a circuit that amplifies the receiver primary signal coming from the matrix. Usually there is one adder circuit for each receiver primary channel. 3. An arrangement of logic gates that adds two binary digits and produces sum and carry outputs.

add-in — Components (expansion boards, cartridges, or chips) that can increase a computer's capabilities, such as memory, graphics, and communications. Add-ins usually refer to an entire circuit board. *See also* add-on.

add-in memory — Additional computer memory that is added to a computer system within the computer's physical housing. Typically the add-in memory is inserted, in board form, into an available card slot on the assembly, the connections for which have already been placed on the existing computer. Additional memory may be in the form of semiconductor RAM, CCD, bubble memory, disk, or tape.

additional station — Any amateur radio station licensed to an amateur radio operator, normally for a specific land location other than the primary station.

addition record — A new record created during the processing of a file in a computer.

additive — Sometimes referred to as the key. A number, series of numbers, or alphabetical intervals added to a code to put it in a cipher.

additive color — A system that combines two colored lights to form a third.

additive primaries — Primary colors that can be mixed to form other colors, but which cannot themselves be produced by mixing other primaries. Red, green, and blue are the primaries in television because, when added in various proportions, they produce a wide range of other colors.

additive process — A printed-circuit manufacturing process in which a conductive pattern is formed on an insulating base by electrolytic chemical deposition.

additive synthesis — A technique for creating musical notes whereby sine waves are added together to create new waveforms. Frequently used in electric organs rather than in synthesizers.

additron — An electrostatically focused, beam-switching tube used as a binary adder in high-speed digital computers. (No longer used.)

add mode — Allows entry of numbers in a calculator to two decimal places without the need to enter the decimal point.

add-on — Circuitry or system that can be attached to a computer to increase memory or performance. *See also* add-in.

add-on component or add-on device — A discrete or integrated prepackaged or chip component that is attached to a film circuit to complete the circuit functions.

add-on memory — Additional computer memory that is added externally and is plug compatible with the computer system. The add-on memory is connected with an external connector cable to the computer, where provision has been made for memory expansion. Such a memory device is also available in its own housing, in which case it is physically placed beside the computer's main cabinet. Additional memory may be in the form of semiconductor RAM, CCD, bubble memory, disk, or tape.

address — 1. An expression, usually numerical, that designates a specific location in a storage or memory device or other source or destination of information in a computer. 2. An identification, as represented by a name, label, or number, for a register, location in storage, or any other data source or destination, such as the location of a station in a communications network. 3. Loosely, any part of an instruction that specifies the location of an operand for the instruction. 4. To select the location of a stored information set for access. 5. In computer technology, a number used by the central processing unit (CPU) to specify a location in memory. 6. Element(s) of a packet frame that identifies the source and/or destination stations by means of an agreed bit pattern. 7. A unique sequence of letters or numbers for the location of data or the identity of an intelligent device.

address bus — 1. A unidirectional bus over which digital information appears to identify either a particular memory location or a particular device. 2. The set of output pins from a microprocessor chip and the associated circuitry linking them to other devices for the purpose of addressing those chips or parts of them. *See also* bus system.

address characters — Blocks of alphanumeric characters that identify users or stations uniquely.

address comparator — In a computer, a device that ensures that an address being read is the right one.

address computation — The process by which the address part of an instruction in a digital computer is produced or modified.

address constant — *See* base address.

addressed memory—In a computer, memory sections containing each individual register.

address field—The portion of an instruction that specifies the location of a particular piece of information in a computer memory.

addressing mode—An addressing method. One of several different addressing methods possible in microprocessors.

address modification—In a computer, a change in the address portion of an instruction or command such that, if the routine which contains that instruction or command is repeated, the computer will go to a new address or location for data or instructions.

address part—In an electronic computer instruction, a portion of an expression designating location. *See also* instruction code.

address-routing indicator—Group of characters contained in a message heading that designates the destination of the message.

add-subtract time—The time required by a digital computer to perform addition or subtraction. It does not include the time required to obtain the quantities from storage and put the result back into storage.

add time—The time required in a digital computer to perform addition. It does not include the time required to obtain the quantities from storage and put the result back into storage.

a/d encoder—Analog-to-digital encoder. A device that changes an analog quantity into an equivalent digital representation. Also referred to as an a-d, A-D, or A/D encoder.

adf—*See* automatic direction finder. Also referred to as ADF.

adiabatic damping—A reduction in the size of an accelerator beam as the energy of the beam is increased.

adiabatic demagnetization—A technique used to obtain temperatures within thousandths of a degree of absolute zero. It consists of applying a magnetic field to a substance at a low temperature and in good thermal contact with its surroundings, insulating the substance thermally, and then removing the magnetic field.

A-display—Also called A-scan. A radarscope presentation in which time (distance or range) is one coordinate (usually horizontal) and the target appears displaced perpendicular to the time base.

adjacency—In character recognition, a condition in which the character-spacing reference lines of two characters printed consecutively on the same line are less than a specified distance apart.

adjacent- and alternate-channel selectivity—A measure of the ability of a receiver to differentiate between a desired signal and signals that differ in frequency from the desired signal by the width of one channel or two channels, respectively.

adjacent audio (sound) channel—The rf carrier frequency that contains the sound modulation associated with the next-lower-frequency television channel.

adjacent channel—That frequency band immediately above or below the one being considered.

adjacent-channel attenuation—*See* selectance.

adjacent-channel interference—Undesired signals received on one communication channel from a transmitter operating on a channel immediately above or below.

adjacent-channel selectivity—The ability of a receiver to reject signals on channels adjacent to the channel of the desired station.

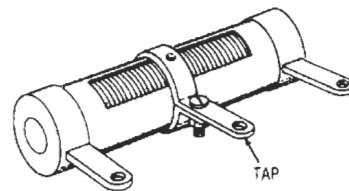
adjacent conductor—Any conductor next to another conductor, either in the same multiconductor cable layer or in adjacent layers.

adjacent sound channel—In television, the rf channel containing the sound signal modulation of the next lower channel.

adjacent video carrier—The rf carrier that carries the picture modulation for the television channel immediately above the channel to which the viewer is tuned.

adjustable component—Any circuit component whose electrical value may be varied at will, e.g., adjustable capacitor, inductor, resistor, or load.

adjustable resistor—1. A resistor that has the resistance wire partly exposed to enable the amount of resistance in use to be adjusted occasionally by the user. Adjustment requires the loosening of a screw, the subsequent moving of the lug, and retightening of the screw. 2. A fixed resistor with a movable contact (or tap) that can be positioned along the length of the resistive path.



Adjustable resistor.

adjustable voltage divider—A wirewound resistor with one or more movable terminals that can be slid along the length of the exposed resistance wire until the desired voltage values are obtained.

adjusted circuit—Also called bolted-fault level. In a circuit, the current measured under short-circuit conditions with the leads that are normally connected to the circuit breaker bolted together.

adjusted decibels—An expression of the ratio of the noise level to a reference noise at any point in a transmission system, when the noise meter has been adjusted to allow for the interfering effect under specified conditions.

admittance—1. The ease with which an alternating current flows in a circuit. The reciprocal of impedance; usually expressed in siemens. Symbol is Y or y . 2. The (sinusoidal) current in a circuit divided by the terminal voltage. 3. The vector sum of a resistive component of conductance and a reactive component of susceptance.

ADP—Abbreviation for automatic data processing.

ADSL—Abbreviation for Asymmetric Digital Subscriber Line. A video display terminal distribution video system delivering video over existing (i.e., copper) telephone lines.

adsorption—The deposition of a thin layer of gas or vapor particles onto the surface of a solid. The process is known as chemisorption if the deposited material is bound to the surface by a simple chemical bond.

ADU—Abbreviation for automatic dialing unit.

advance ball—In mechanical recording, a rounded support (often sapphire) that is attached to a cutter and rides on the surface of the recording medium. Its purpose is to maintain a uniform mean depth of cut and to correct for small irregularities on the surface of the disc.

advance calling—A telecommunications feature in which voice messages can be spoken into the telephone for automatic delivery at a prearranged time to any other telephone or telephones.

advanced license—A license issued by the FCC to amateur radio operators who are capable of sending

and receiving Morse code at the rate of 13 words per minute and are familiar with general and intermediate radio theory and practice. Its privileges include exclusive use of certain frequencies.

advance wire—An alloy of copper and nickel, used in the manufacture of electric heating units and some wirewound resistors.

aeolight—A glow lamp that uses a cold cathode and a mixture of inert gases. Its illumination can be regulated with an applied signal voltage and it is often used as a modulation indicator for motion picture sound recording.

aerial—*See* antenna.

aerial cable—A cable installed on a pole line or similar overhead structure.

aerodiscone antenna—An aircraft antenna that is aerodynamically shaped and is physically small compared with other antennas having similar electrical characteristics. Its radiation pattern is omnidirectional and linearly polarized.

aerodrome control radio station—A radio station providing communications between an airport control tower and aircraft or mobile aeronautical radio stations.

aerodynamics—The science of the motion of air and other gases. Also, the forces acting on bodies such as aircraft when they move through such gases, or when such gases move against or around the bodies.

aeromagnetic—Pertaining to the magnetic field of the earth as surveyed from the air.

aeronautical advisory station—A station used for civil defense and advisory communications with private aircraft stations.

aeronautical broadcasting service—The broadcasting service intended for the transmission of information related to air navigation.

aeronautical broadcast station—A station that broadcasts information regarding air navigation and meteorological data pertinent to aircraft operation.

aeronautical fixed service—A fixed service intended for the transmission of information relating to air navigation and preparation for and safety of flight.

aeronautical fixed station—A station operating in the aeronautical fixed service.

aeronautical ground station—A radio station operated for the purpose of providing air-to-ground communications in connection with the operation of aircraft.

aeronautical marker-beacon station—A land station operating in the aeronautical radionavigation service and providing a signal to designate a small area above the station.

aeronautical mobile service—A radio service between aircraft and land stations or between aircraft stations.

aeronautical radio-beacon station—An aeronautical radionavigation land station transmitting signals that are used by aircraft and other vehicles to determine their position bearing or position in relation to the aeronautical radio beacon station.

aeronautical radionavigation service—A radionavigation service intended for use in the operation of aircraft.

aeronautical radio service—1. Service carried on between aircraft stations and/or land stations. 2. Special radio for air navigation. 3. Service that includes aircraft-to-aircraft, aircraft-to-ground, and ground-to-aircraft communications important to the operation of aircraft.

aeronautical station—A land station (or in certain instances a shipboard station) in the aeronautical mobile service that carries on communications with aircraft stations.

aeronautical telecommunication—Electronic and nonelectronic communications used in the aeronautical service.

aeronautical telecommunication agency—An agency to which is assigned the responsibility for operating a station or stations in the aeronautical telecommunication service.

aeronautical telecommunication log—A record of the activities of an aeronautical telecommunication station.

aeronautical telecommunications—Any telegraph or telephone communications of signals, writing, images, and sounds of any nature by wire, radio, or other system or process of signaling, used in the aeronautical service.

aeronautical telecommunication service—Telecommunication service provided for aeronautical purposes.

aeronautical telecommunication station—A station in the aeronautical telecommunication service.

aeronautical utility land station—A land station located at an airport control tower and used for communications connected with the control of ground vehicles and aircraft on the ground.

aeronautical utility mobile station—A mobile station used at an airport for communications with aeronautical utility land stations, ground vehicles, and aircraft on the ground.

aerophare—*See* radio beacon.

AES—Abbreviation for Audio Engineering Society. A professional group; the official association of technical personnel, scientists, engineers, and executives in the audio field.

AF—*See* audio frequency.

AFC—*See* automatic frequency control.

afocal—An optical system with one set of object and image points at infinity. Literally, "without a focal length." An afocal system receives its input image from infinity and projects its output image to infinity.

AFSK—Abbreviation for audio-frequency shift keying. With this method of modulation, two tones (mark = 2125 Hz, space = 2295 Hz) are fed directly into the microphone jack of the transmitter.

afterglow—Also called phosphorescence. 1. The light that remains in a gas-discharge tube after the voltage has been removed, or on the phosphorescent screen of a cathode-ray tube after the exciting electron beam has been removed. 2. The luminosity that remains in a rarefied gas after an electrodeless discharge has traversed the gas.

afterpulse—In a photomultiplier, a spurious pulse induced by a preceding pulse.

AGC—*See* automatic gain control.

age—To maintain an electrical component in a specified environment, as with respect to pressure, temperature, applied voltage, etc., until its characteristics stabilize.

aggregate function—A command that performs calculations based on a set of values rather than on a single value.

agile receiver—A satellite receiver that can be tuned to any desired channel.

aging—1. Storing a permanent magnet, capacitor, semiconductor, meter, or other device, sometimes with voltage applied, until its desired characteristics become essentially constant. 2. The change of a component or a material with time under defined environmental conditions, leading to improvement or deterioration of properties.

agonic line—An imaginary line on the earth's surface, all points of which have zero magnetic declination.

AGP—Abbreviation for accelerated graphics port.

AGREE—Advisory Group on Reliability of Electronics Equipment.

AI—See artificial intelligence.

aided tracking—A system of tracking a target signal in bearing, elevation, or range (or any combination of these variables) in which manual correction of the tracking error automatically corrects the rate at which the tracking mechanism moves.

AIEE—Abbreviation for American Institute of Electrical Engineers. Now merged with IRE to form IEEE.

air bearing—A means of supporting magnetic tape on an air film rather than by means of a sliding or rolling contact. Usually, an air bearing is a perforated cylinder; pressurized air flows through the perforations and forms a film that prevents the tape from contacting the cylinder.

airborne intercept radar—Short-range airborne radar employed by fighter and interceptor planes to track down their targets.

airborne long-range input—Airborne equipment designed to extend air-surveillance coverage seaward so that long-range interceptors may be used.

airborne moving-target indicator—A type of airborne-radar display that does not present essentially stationary objects.

airborne noise—Undesired sound in the form of fluctuations of air pressure about the atmospheric pressure as a mean.

airborne radar platform—Airborne surveillance and height-finding radar for early warning and control.

air capacitor—A capacitor in which air is the only dielectric material between its plates.

aircarrier aircraft station—A radio station aboard an aircraft that is engaged in or essential to the transportation of passengers or cargo for hire.

air cell—A primary cell in which depolarization at the positive electrode is accomplished chemically by reduction of the oxygen in the air.

air column—The air space within a horn of an acoustic chamber.

air condenser—See air capacitor.

air-cooled tube—An electron tube in which the generated heat is dissipated to the surrounding air directly, through metal heat-radiating fins, or with the aid of channels or chimneys that increase the air flow.

air-core cable—A telephone cable in which the interstices in the cable core are not filled with a moisture barrier.

air-core coil—A number of turns of spiral wire in which no metal is used in the center.

air-core transformer—A transformer (usually rf) having two or more coils wound around a nonmetallic core. Transformers wound around a solid insulating substance or on an insulating coil form are included in this category.

aircraft bonding—Electrically connecting together all the metal structure of the aircraft, including the engine and metal covering of the wiring.

aircraft flutter—Flickering (repetitive fading and intensifying) in a TV picture as the signal is reflected from flying aircraft. The reflected signal arrives in or out of phase with the normal signal and thus strengthens or weakens the latter.

aircraft station—A radio station installed on aircraft and continuously subject to human control.

air defense control center—Principal information, communications, and operations center from which all aircraft, anti-aircraft operations, air-defense artillery, guided missiles, and air-raid warning functions of a

specific area of air defense responsibility are supervised and coordinated.

air defense identification zone—Airspace of defined dimensions within which the ready identification, location, and control of aircraft is required.

air dielectric capacitor—A capacitor with a dielectric consisting of air.

airdrome control station—A station used for communication between an airport control tower and aircraft.

air environment—In communications electronics, all airborne equipment that is part of the communications-electronics system, as distinguished from the equipment on the ground, which belongs to the ground environment.

air gap—1. A nonmagnetic discontinuity in a ferromagnetic circuit. For example, the space between the poles of a magnet—although filled with brass, wood, or any other nonmagnetic material—is nevertheless called an air gap. This gap increases magnetic reluctance and prevents saturation of the core. 2. The air space between two magnetically or electrically related objects.

air/ground control radio station—An aeronautical telecommunication station with the primary responsibility of handling communications related to the operation and control of aircraft in a given area.

air/ground liaison code—Set of symbols for a limited number of words, phrases, and sentences used for communications between air and ground forces.

air-motion transformer—A type of speaker in which the air is not pushed into vibration by a piston, but rather squeezed by the contractions of a folded diaphragm.

air navigation radio aids—Aeronautical ground stations, radio beacons, direction finders, and similar facilities.

airplane flutter rejection—The measure of a receiver's immunity to the effects of wavering signals produced by aircraft in the reception path.

airport beacon—A beacon (light or radio) to indicate the location of an airport.

airport control station—A station that furnishes communications between an airport control tower and aircraft in the immediate vicinity; messages are limited to those related to actual aviation needs.

airport radar control—The surveillance-radar portion of radar approach control.

airport runway beacon—A radio-range beacon that defines one or more approaches to an airport.

airport surface detection equipment—Abbreviated ASDE. 1. Radar that shows the movement of aircraft and other vehicles on the ground at an airport. Valuable tool at night and during low visibility. 2. A digital radar system used to track planes and vehicles on airport runways and up to 200 feet in altitude. Unlike previous surface radar systems, ASDE provides clear images in bad weather.

airport surveillance radar—1. Abbreviated ASR. A short-range radar system that maintains constant surveillance over aircraft at the lower levels of flight. Distinct from air route surveillance radar (ARSR), which is long-range radar—150-mile (241-km) radius—to control traffic between terminals. 2. An air-traffic-control radar that scans the airspace 30 to 60 miles (48 to 98 km) around an airport and displays the location of all aircraft below a certain altitude and all obstructions near the control tower.

air-position indicator—Airborne computing system that presents a continuous indication of aircraft position on the basis of aircraft heading, air speed, and elapsed time.

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.

alacritized switch—1. A mercury switch treated to yield a low adhesional 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.

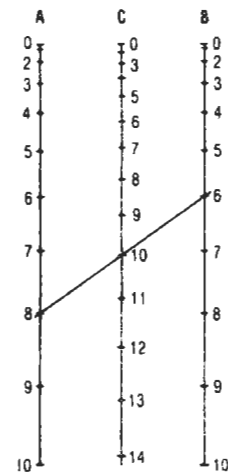
alignment chart—Also called nomograph, nomogram, or abac. Chart or diagram consisting of two or more lines on which equations can be solved graphically. This is done by laying a straightedge on the two known values and reading the answer at the point where the straightedge intersects the scale for the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

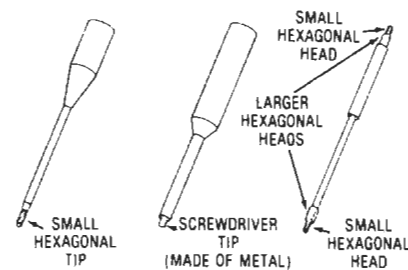
alignment tool—A special screwdriver or socket wrench used for adjusting trimmer or padder capacitors

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.



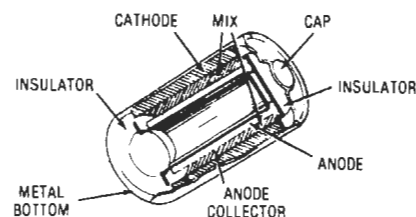
Alignment tools.

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.

service capacity. It is characterized by a relatively flat discharge curve under load.

all-channel tuning—Ability of a television set to receive all assigned channels, VHF and UHF, channels 2 through 83, as well as cable channels.

all-diffused monolithic integrated circuit—Also called compatible monolithic integrated circuit. A microcircuit consisting of a silicon substrate into which all the circuit parts (both active and passive elements) are fabricated by diffusion and related processes.

Allen screw—A screw having a hexagonal hole or socket in its head. Often used as a setscrew.

Allen wrench—A straight or bent hexagonal rod used to turn an Allen screw.

alligator clip—A spring-loaded metal clip with long, narrow meshing jaws similar to the jaws of an alligator; it is used for making temporary electrical connections, generally at the end of a test lead on interconnection wire.



Alligator clip.

allocate—In a computer, to assign storage locations to main routines and subroutines, thus fixing the absolute values of symbolic addresses.

allocated channel—A channel assigned to a specific user.

allocated frequency band—A segment of the radio-frequency spectrum established by a competent authority that designates the use that may be made of the frequencies contained therein.

allocated-use circuit—1. A circuit in which one or more channels have been allocated for the exclusive use of one or more services by a proprietary service; may be a unilateral or joint circuit. 2. Communication link specifically assigned to user(s) warranting such facilities.

allocation technique—The method of providing a process access to a shared resource.

allochromatic—Exhibiting photoelectric effects due to the inclusion of microscopic impurities or as a result of exposure to various types of radiation.

allophone—A variation in the pronunciation of a phoneme. An allophone can be regarded as the sound that results when a phoneme is placed in its environment.

allotter—In a telephone system, a distributor, associated with the finder control group relay assembly, that allots an idle linefinder in preparation for an additional call.

allotter relay—In a telephone system, a relay of the linefinder circuit, the functions of which are to preallot an idle linefinder to the next incoming call from the line and to guard relays.

allowable deviation—The permissible difference between any range of conditions and a reference condition.

alloy—1. A composition of two or more elements, of which at least one is a metal. It may be a solid solution, a heterogeneous mixture, or a combination of both. 2. Method of making pn junctions by melting a metallic dopant so that it dissolves some of the semiconductor material and then hardens to produce a doped alloy.

alloy deposition—The process of depositing an alloy on a substrate during manufacturing.

alloy-diffused transistor—A transistor in which the base is diffused and the emitter is alloyed. The

collector is the semiconductor substrate into which alloying and diffusion are effected.

alloyed contact—An ohmic contact formed by an alloy process.

alloy junction—Also called fused junction. A junction produced by alloying one or more impurity metals to a semiconductor. A small button of impurity metal is placed at each desired location on the semiconductor wafer, heated to its melting point, and cooled rapidly. The impurity metal alloys with the semiconductor material to form a p or n region, depending on the impurity used.

alloy-junction photocell—A photodiode in which an alloy junction is produced by alloying (mixing) an indium disc with a thin wafer of n-type germanium.

alloy-junction transistor—Also called fused-junction transistor. A semiconductor wafer of p- or n-type impurities fused, or alloyed, into opposite sides of the wafer to provide emitter and base junctions. The base region comprises the original semiconductor wafer.

alloy process—A fabrication technique in which a small part of the semiconductor material is melted together with the desired metal and allowed to recrystallize. The alloy developed is usually intended to form a pn junction or an ohmic contact.

alloy transistor—A transistor in which the emitter and collector junctions are both alloy junctions.

all-pass filter—A network designed to produce a delay (phase shift) and an attenuation that is the same at all frequencies; a lumped-parameter delay line. Also called all-pass network.

all-pass network—A network designed to introduce phase shift or delay but not appreciable attenuation at any frequency.

all-relay central office—An automatic central-office dial switchboard in which relay circuits are used to make the line interconnections.

all-wave antenna—A receiving antenna suitable for use over a wide range of frequencies.

all-wave receiver—A receiver capable of receiving stations on all the commonly used wavelengths in shortwave bands as well as in the broadcast band.

alnico—An alloy consisting mainly of aluminum, nickel, and cobalt plus iron. Various subscripts and combinations of letters are available. Material can be found both in cast and sintered form, including isotropic and anisotropic alloys. Capable of very high flux density and magnetic retentivity, the alloy is used in permanent magnets for speakers, magnetrons, etc.

alpha—1. Emitter-to-collector current gain of a transistor connected as a common-base amplifier. For a junction transistor, alpha is less than unity, or 1. Alpha is usually defined as the ratio of a small change in collector current to the corresponding change in emitter current, when the collector-base voltage is kept constant. 2. Brain wave signals whose frequency is approximately 8 to 12 Hz. The associated mental state is relaxation, heightened awareness, elation, and in some cases, dreamlike.

alphabet—An ordered set of all the letters and associated marks used in a language, for example, the Morse code alphabet, the 128 characters of the U.S. ASCII alphabet.

alphabetic coding—A system of abbreviation used in preparing information for input into a computer. Information may then be reported in the form of letters and words as well as in numbers.

alphabetic-numeric—Having to do with the alphabetic letters, numerical digits, and special characters used in electronic data processing work.

alphabetic string—A character string containing only letters and special characters.

alpha cutoff frequency—The frequency at which the current gain of a common-base transistor stage has decreased to 0.707 of its low-frequency value. Gives a rough indication of the useful frequency range of the device.

alphameric (alphanumeric)—Generic term for alphabetic letters, numerical digits, and special characters that are machine processable.

alphameric characters—1. A character set that mixes alphabetic characters, numeric characters, and usually punctuation characters. The alphabetic characters may be uppercase and/or lowercase or even in Japanese or Arabic script. 2. Consisting of letters and numbers. Also called alphameric or alphanumeric.

alphanumeric—1. A generic term for alphabetic letters, numerical digits, and special ASCII characters that can be processed by a computer. A character set containing any combination of the above. 2. Consisting of letters and numbers. 3. All letters in the alphabet, the numbers 0 through 9, and special characters—such as -, /, *, \$, (), +, and #—that are machine processable.

alphanumeric code—In computer practice or in communications, a code in which the letters of the alphabet are represented by numbers.

alphanumeric display—Device consisting of a typewriter-style keyboard and a display (CRT) screen on which text is viewed.

alphanumeric keys—Keys on a data entry device that resemble those on a standard keyboard. Usually they are used to manually input or edit text for the display system, although they can also be used in a function key mode.

alphanumeric reader—An instrument that reads alphabetic, numeric, and special characters by means of a photosensor that measures the varying intensity of the characters reflected from a light source.

alphanumeric readout—A type of digital readout that displays both letters and numerals.

alpha particle—A small, electrically charged particle thrown off at very high velocity by many radioactive materials, including uranium and radium. Identical to the nucleus of a helium atom, it is made up of two neutrons and two protons. Its electrical charge is positive and is equal in magnitude to twice that of an electron.

alpha ray—A stream of fast-moving alpha particles that produce intense ionization in gases through which they pass, are easily absorbed by matter, and produce a glow on a fluorescent screen. The lowest-frequency radioactive emissions.

alpha system—A signaling system in which the signaling code to be used is designated by alphabetic characters.

alpha-wave detector—A device that detects and displays alpha-wave segments of brain wave output. Used in biofeedback. Also called alpha-wave meter or sensor.

alpha-wave meter—*See* alpha-wave detector.

ALS—Abbreviation for advanced low-power Schottky (Texas Instruments). A low-power, high-speed transistor-transistor logic (TTL) family.

alterable memory—A storage medium that may be written into.

alteration switch—A manual switch on a computer console or a program-simulated switch that can be set on or off to control coded machine instructions.

alternate channel—A channel located two channels above or below the reference channel.

alternate-channel interference—Interference caused in one communication channel by a transmitter operating in the channel after an adjacent channel. *See also* second-channel interference.

alternate facility—A communications-electronics facility that is established for the purpose of replacing or supplementing another facility or facilities under real or simulated emergency conditions.

alternate frequency—The frequency assigned for use at a certain time, or for a certain purpose, to replace or supplement the frequency normally used.

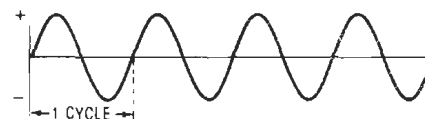
alternate mode—A means of displaying on an oscilloscope the output signals of two or more channels by switching the channels, in sequence, after each sweep.

alternate route or routing—A secondary or backup communications path to be used if the normal (primary) routing is not possible.

alternate voice/data operation—Modem operations coordinated by voice over the same line that accommodates transmission. The modem is patched out of the circuit to allow this. A special switch, called an exclusion key, converts the line from voice to data.

alternating-charge characteristic—The function relating, under steady-state conditions, the instantaneous values of the alternating component of transferred charge to the corresponding instantaneous values of a specified periodic voltage applied to a nonlinear capacitor.

alternating current—Abbreviated ac. 1. A flow of electricity that reaches maximum in one direction, decreases to zero, then reverses itself and reaches maximum in the opposite direction. The cycle is repeated continuously. The number of such cycles per second is the frequency. The average value of voltage during any cycle is zero. 2. Any signal that varies with time. It usually means that the current actually changes polarity with time. The plot of current versus time usually is a sine wave that comprises a succession of instantaneous values, the greatest of which is the amplitude or peak value. The time taken by one complete cyclic repetition is the period, and the number of periods in one second is the frequency.



Alternating current.

alternating current/direct current—A term applied to electronic equipment indicating it is capable of operation from either an alternating-current or direct-current primary power source.

alternating-current erasing head—An erasing head used in magnetic recording, in which alternating current produces the magnetic field necessary for erasing. Alternating-current erasing is achieved by subjecting the medium to a number of cycles of a magnetic field of a decreasing magnitude. The medium is, therefore, essentially magnetically neutralized.

alternating-current generator—A rotary machine that generates alternating current when its rotor, which may be either the armature or the field, is rotated by an engine or a motor. Also called an alternator.

alternating-current pulse—An alternating-current wave of brief duration.

alternating-current transmission—In television, that form of transmission in which a fixed setting of the controls makes any instantaneous value of signal correspond to the same value of brightness only for a short time.

alternating flasher—A control that provides voltage first to one load and then to another load. This cycle repeats normally at a fixed rate per minute.

alternating quantity—A periodic quantity that has alternately positive and negative values, the average value of which is zero over a complete cycle.

alternating voltage—Also called ac voltage. Voltage that is continually varying in value and reverses its direction at regular intervals, such as that generated by an alternator or developed across a resistance or impedance through which alternating current is flowing.

alternation—One-half of a cycle—either when an alternating current goes positive and returns to zero, or when it goes negative and returns to zero. Two alternations make one cycle. The complete rise and fall of a current traveling in one direction, or one-half of an alternating-current cycle.

alternator—A device for converting mechanical energy into electrical energy in the form of an alternating current.

alternator transmitter—A radio transmitter that generates power by means of a radio-frequency alternator.

altimeter—An instrument that indicates the altitude of an aircraft above a specific reference level, usually sea level or the ground below the aircraft. It may be similar to an aneroid barometer, which utilizes the change of atmospheric pressure with altitude, or it may be electronic.

altimeter station—An airborne transmitter, the emissions from which are used to determine the altitude of an aircraft above the surface of the earth.

altitude delay—The synchronization delay introduced between the time of transmission of the radar pulse and the start of the trace on the indicator. This is done to eliminate the altitude circle on the plan-position-indicator display.

ALU—Abbreviation for arithmetic and logic unit. 1. A device that performs the basic mathematical operations such as addition, subtraction, multiplication, and division of numbers (usually binary) presented to its inputs and provides an output that is an appropriate function of the inputs. 2. The arithmetic and logic unit internal to the microprocessor chip. This register handles all arithmetic and logical operations carried out as part of a microprocessor instruction. 3. The part of a CPU that executes adds, subtracts, shifts, AND logic operations, OR logic operations, etc. 4. A complex array of gates that can be used to perform binary arithmetic, logic operations, shifts and rotates, and complementing. 5. One of the three essential components of a microprocessor, the other two being data registers and control. The ALU performs addition and subtraction, logic operations, masking, and shifting (multiplication and division).

alumina—1. A ceramic used for insulators in electron tubes or substrates in thin-film circuits. It can withstand continuously high temperatures and has a low dielectric loss over a wide frequency range. Aluminum oxide (Al_2O_3). 2. The substrate material on which are deposited thin conductive and resistive layers for thin-film microwave integrated circuits.

aluminized-screen picture tube—A cathode-ray picture tube that has a thin layer of aluminum deposited on the back of its fluorescent surface to improve the brilliance of the image and also prevent ion-spot formation.

aluminizing—The process of applying a film of aluminum to a surface, usually by evaporation in a vacuum.

aluminum-electrolytic capacitor—A capacitor with two aluminum electrodes (the anode has the oxide film) separated by layers of absorbent paper saturated with the operating electrolyte. The aluminum-oxide film

or dielectric is repairable in the presence of an operating electrolyte.

aluminum-steel conductor—A composite conductor made up of a combination of aluminum and steel wires. In the usual construction, the aluminum wires surround the steel.

alumoweld—A thin coating of aluminum fused to a steel core. Used in line wire and cable messengers.

AM—See amplitude modulation.

amateur—Also called a ham. 1. A person licensed to operate radio transmitters as a hobby. Any amateur radio operator. 2. A nonprofessional, usually noncommercial, devotee of any technology (as a hobby).

amateur band—Any one of several radio frequency bands assigned for noncommercial use by licensed radio amateurs. In the United States, there are twelve such bands between 1.80 MHz and 1.3 GHz. Assignments are made by the Federal Communications Commission.

amateur call letters—Call letters and numbers assigned to amateur stations by the licensing authority. Call-letter combinations consist of a letter prefix denoting the country in which the station is situated, plus a number designating the location within the country, and two or more letters identifying the particular station. Example: K2ABC (K or W = United States, 2 = New York, and ABC = identification of individual licensee issued alphabetically except for special circumstances).

amateur extra license—A license issued by the FCC to amateur radio operators who are able to send and receive Morse code at the rate of 20 words per minute and who are familiar with general, intermediate, and advanced radio theory and practice. Its privileges include all authorized amateur rights and the exclusive rights to operate on certain frequencies.

amateur radio—The practice of operating electronic communications equipment as a hobby in the amateur service. Also refers to the equipment used for this purpose.

amateur radiocommunication—Noncommercial radiocommunication by or among radio stations solely with a personal aim and without pecuniary or business interest.

amateur radio license—The instrument of authorization issued by the Federal Communications Commission, comprised of a station license and, in the case of the primary station, incorporating an operator license.

amateur radio operation—Radiocommunication conducted by an amateur radio operator from an amateur radio station.

amateur radio operator—1. A person interested in radio technique solely with a personal aim and without pecuniary interest, and holding a valid Federal Communications Commission license to operate amateur radio stations. 2. A private citizen who operates electronic communications equipment as a hobby.

amateur radio service—A radiocommunication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.

amateur service—A radiocommunication service that licensed operators with no pecuniary interest use for self-training, communication, and technical investigations.

amateur station—A radio transmitting station operated by one or more licensed amateur operators.

amateur-station call letters—See amateur call letters.

ambience—1. Reverberant or reflected sound that reaches a listener's ear from all directions as sound waves "bounce" successively off the various surfaces of a listening area—the walls, ceiling, etc. The term is usually reserved for large areas such as auditoriums and

concert halls, though home listening-rooms have their own ambience effects. 2. The indirect sounds heard in a concert hall or other large listening area that contribute to the overall auditory effect obtained when listening to live performances.

ambient — Surrounding. The surrounding environment coming into contact with the system or component in question. *See also* ambient noise; ambient temperature.

ambient level — The level of interference emanating from sources other than the test sample, such as inherent noise of the measuring device and extraneous radiated fields.

ambient light — Normal room light. Light existing in a room or other location that is characteristic of the environment.

ambient-light filter — A filter used in front of a television picture-tube screen to reduce the amount of ambient light reaching the screen and to minimize the reflections of light from the glass face of the tube.

ambient lighting — Lighting designed to provide a substantially uniform level of illumination throughout an area, exclusive of any provision for special local requirements.

ambient noise — 1. Acoustic noise in a room or other location. Usually measured with a sound-level meter. The term *room noise* commonly designates ambient noise at a telephone station. 2. Unwanted background noise picked up by a microphone, that is, any extraneous clatter in a room. Also any acoustic coloration that influences sounds, brought about by the acoustic properties of a room in which a recording is being made or replayed. 3. Interference present (in a communication line) at all times. 4. Background electrical noise in electrical measurements and operation.

ambient operating temperature — The temperature of the air surrounding an object, neglecting small localized variations.

ambient pressure — The general surrounding atmospheric pressure.

ambient temperature — 1. Temperature of air or liquid surrounding any electrical part or device. Usually refers to the effect of such temperature in aiding or retarding removal of heat by radiation and convection from the part or device in question. 2. The prevailing temperature in the immediate vicinity of an object; the temperature of its environment. 3. A temperature within a given volume, e.g., a room or building.

ambient temperature range — The range of environmental temperatures in the vicinity of a component or device over which it may be operated safely and within specifications. For forced-air cooled operation, the ambient temperature is measured at the air intake.

ambiguity — 1. An undesirable tendency of a synchro or servo system to seek a false null position in addition to the proper null position. 2. Inherent error resulting from multiple-bit changes in a polystropic code. (Proper logic design prevents such errors.)

ambiguous count — A count on an electronic scaler that is obviously impossible.

ambisonic reproduction — The recreation of the ambience of an original recording situation with associated directionality. Sound from every direction is picked up by a tetrahedral microphone array and is then encoded onto two channels, which, upon decoding, produce sound through several speakers in a continuous range of directions around the listener, thus approximating the original. It can be subdivided into periphonic and pantophonic systems, the former concerning a complete sphere of information, the latter relating to a horizontal circle. Pantophonic reproduction does not distinguish vertical directionality, but still achieves remarkable realism.

AM broadcast channel — Any of the 10-kHz wide bands of radio frequencies, which extend from 530 to 1710 kHz and are used for standard amplitude-modulated radio broadcasts.

American Institute of Electrical Engineers (AIEE) — Now merged with IRE to form the IEEE.

American Morse code — A system of dot-and-dash signals originated by Samuel F. B. Morse and still used to a limited extent for wire telegraphy in North America. It differs from the international Morse code used in radiotelegraph transmission.

American National Standards Institute, Inc. — Abbreviated ANSI. An independent, industry-wide association that establishes standards for the purpose of promoting consistency and interchangeability among the products of different manufacturers. Formerly United States of America Standards Institute (USASI) and American Standards Association (ASA).

American Radio Relay League (ARRL) — An organization of amateur radio operators.

American Standards Association — Abbreviated ASA. *See* American National Standards Institute, Inc.

American wire gage (AWG) — The standard system used for designating wire diameter. Gage sizes range from No. 40, the smallest diameter wire, to No. 4/0, the largest. AWG sizes are used for specifying both solid and stranded wire. Gage numbers have an inverse relationship to size, i.e., larger numbers have smaller diameter.

American wire gage (AWG)

AWG	Diameter (mm)	AWG	Diameter (mm)
1	7.35	21	0.723
2	6.54	22	0.644
3	5.83	23	0.573
4	5.19	24	0.511
5	4.62	25	0.455
6	4.12	26	0.405
7	3.67	27	0.361
8	3.26	28	0.321
9	2.91	29	0.286
10	2.59	30	0.255
11	2.31	31	0.227
12	2.05	32	0.202
13	1.83	33	0.180
14	1.63	34	0.160
15	1.45	35	0.143
16	1.29	36	0.127
17	1.15	37	0.113
18	1.02	38	0.101
19	0.912	39	0.090
20	0.812	40	0.080

AM/FM receiver — A device capable of converting either amplitude- or frequency-modulated signals into audio frequencies.

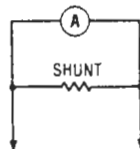
AM/FM tuner — A device capable of converting either amplitude- or frequency-modulated signals into low-level audio frequencies.

AML — Abbreviation for automatic modulation limiting. A circuit that uses an agc (automatic gain control) effect to prevent overmodulation. As a stronger voice signal is applied, this stage reduces the gain of the

audio amplifier(s), keeping the modulation level below 100 percent.

ammeter — An instrument for measuring either direct or alternating electric current. Its scale is usually graduated in amperes, milliamperes, microamperes, or kiloamperes.

ammeter shunt — A low-resistance conductor placed in parallel with the meter movement so that most of the current flows through this conductor and only a small part passes through the movement itself. This arrangement extends the usable range of the meter.



Ammeter shunt.

amorphous — A characteristic, particularly of a crystal, determining that it has no regular structure.

amorphous silicon — A noncrystalline form of silicon used to fabricate transistors on large-area flat displays. Although it is not as good a semiconductor as crystalline silicon, amorphous silicon is much easier to lay down.

amorphous silicon cell — A photovoltaic cell made of silicon and hydrogen atoms deposited in an irregular atomic structure on substrate.

amortisseur winding — See damper winding.

amp — Abbreviation for ampere.

ampacity — The maximum current an insulated wire or cable can safely carry without exceeding either the insulation or jacket material limitations. Expressed in amperes. See also current-carrying capacity.

amperage — The number of amperes flowing in an electrical conductor or circuit.

ampere — Letter symbol: A. 1. A unit of electrical current or rate of flow of electrons. One volt across 1 ohm of resistance causes a current flow of 1 ampere. A flow of 1 coulomb per second equals 1 ampere. An unvarying current is passed through a solution of silver nitrate of standard concentration at a fixed temperature. A current that deposits silver at the rate of 0.001118 gram per second is equal to 1 ampere, or 6.25×10^{18} electrons per second passing a given point in a circuit. 2. The constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular sections, and placed 1 meter apart in a vacuum will produce between these conductors a force equal to 2×10^{-7} newtons per meter of length.

ampere-hour — A current of 1 ampere flowing for 1 hour. Multiplying the current in amperes by the time of flow in hours gives the total number of ampere-hours. Used mostly to indicate the amount of energy a storage battery can deliver before it needs recharging, or the energy a primary battery can deliver before it needs replacing. One ampere-hour equals 3600 coulombs.

ampere-hour capacity — The amount of current a battery can deliver in a specified length of time under specified conditions. For example, a 100-ampere-hour battery can supply 20 amperes for 5 hours.

ampere-hour efficiency — The number of ampere-hours obtained from a storage battery divided by the number of ampere-hours required to recharge the storage battery to its original condition.

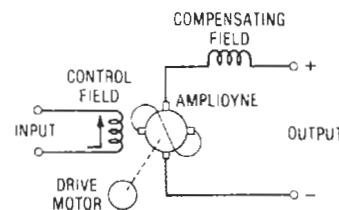
ampere-hour meter — An electrical meter that measures and registers the amount or the integral, with respect to time, of the current that passes through it and is consumed in the circuit.

Ampère's rule — Current in a certain direction is equivalent to the motion of positive charges in that direction. The magnetic flux generated by a current in a wire encircles the current in the counterclockwise direction when the current is approaching the observer.

ampere-turn — A measure of magnetomotive force, especially as developed by an electric current, defined as the magnetomotive force developed by a coil of one turn through which a current of 1 ampere flows; that is, 1.26 gilberts.

amp-hr — Abbreviation for ampere-hour or ampere-hours.

amplidyne — A special direct-current generator used extensively in servo systems as a power amplifier. The response of its output voltage to changes in field excitation is very rapid, and its amplification factor is high.



Amplidyne.

amplification — 1. Increase in size of a medium in its transmission from one point to another. May be expressed as a ratio or, by extension of the term, in decibels. 2. An increase in the magnitude of a signal brought about by passing through an amplifier.

amplification factor (λ) — 1. In a vacuum tube, the ratio of a small change in plate voltage to a small change in grid voltage required to produce the same change in plate current (all other electrode voltages and currents being held constant). 2. In any device, the ratio of output magnitude to input magnitude.

amplified AGC — An automatic gain-control (AGC) circuit in which the control voltage is amplified before being applied to the tube or transistor, the gain of which is to be controlled in accordance with the strength of the incoming signal.

amplified back bias — Degenerative voltage developed across a fast time-constant circuit within a stage of an amplifier and fed back into a preceding stage.

amplifier — 1. A device that draws power from a source other than the input signal and that produces as an output an enlarged reproduction of the essential features of its input. The amplifying element may be an electron tube, transistor, magnetic circuit, or any of various devices. 2. A device for increasing the magnitude of a signal by means of a varying control voltage, maintaining the signal's characteristic form as closely as possible to the original. 3. An electronic device for magnifying (and usually controlling) electrical signals. High-fidelity amplifiers consist of a preamplifier equalizer section, plus a power or basic amplifier section. In an integrated amplifier, both sections are built on one chassis and made available as a single unit. Alternately, the two sections are available as separate units. 4. Device for increasing power associated with a signal (voltage or

current). Basic types include dc, ac, audio, linear, radio, video, differential, pulse, logarithmic.

amplifier noise—All spurious or unwanted signals, random or otherwise, that can be observed in a completely isolated amplifier in the absence of a genuine input signal.

amplifier nonlinearity—1. The inability of an amplifier to produce an output at all times proportionate to its input. 2. Gain deviation from a straight line on a plot of amplifier output versus input (the transfer curve).

amplify—To increase in magnitude or strength, usually said of a current or voltage.

amplifying delay line—A delay line used in pulse-compression systems to amplify delayed superhigh-frequency signals.

amplistat—A self-saturating type of magnetic amplifier.

Amplatron—(Raytheon) A broadband crossed-field amplifier with a reentrant electron stream. The electron stream interacts with the backward wave of a nonreentrant rf structure.

amplitude—1. The magnitude of variation in a changing quantity from its zero value. The word must be modified with an adjective such as peak, rms, maximum, etc., which designates the specific amplitude in question. 2. The level of an audio or other signal in voltage or current terms. 3. The extent to which an alternating or pulsating current or voltage swings from zero or from a mean value.

amplitude-controlled rectifier—A rectifier circuit in which a thyatron is the rectifying element.

amplitude density distribution—A function that gives the fraction of time that a voltage is within a narrow range.

amplitude distortion—Distortion that is present in an amplifier when the amplitude of the output signal fails to follow exactly any increase or decrease in the amplitude of the input signal. It results from nonlinearity of the transfer function and gives rise to harmonic and intermodulation distortion. No amplifier is completely free from the effect because its transfer function is slightly curved. The nature of the curvature determines the order of the distortion produced, but negative feedback and other circuit configurations help minimize the curvature within the dynamic range and hence keep the distortion at a very low level.

amplitude distribution function—A function that gives the fraction of time that a time-varying voltage is below a given level.

amplitude fading—Fading in which the amplitudes of all frequency components of a modulated carrier wave are uniformly attenuated.

amplitude-frequency distortion—The distortion that occurs when the various frequency components of a complex wave are not amplified, attenuated, or transmitted equally well.

amplitude-frequency response—The variation of gain, loss, amplification, or attenuation of a device or system as a function of frequency. Usually measured in the region where the transfer characteristic is essentially linear.

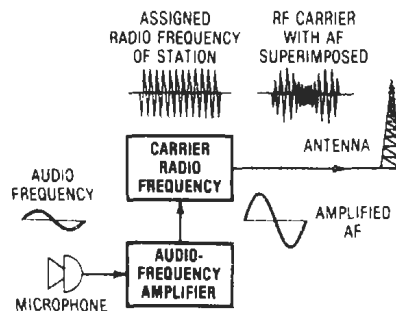
amplitude gate—See slicer.

amplitude-level selection—The choice of the voltage level at which an oscilloscope sweep is triggered.

amplitude limiter—A circuit or stage that automatically reduces the amplification to prevent signal peaks from exceeding a predetermined level.

amplitude-modulated transmitter—A transmitter in which the amplitude of its radio-frequency wave is varied at a low frequency rate—usually in the audio or video range. This low frequency is the intelligence (information) to be conveyed.

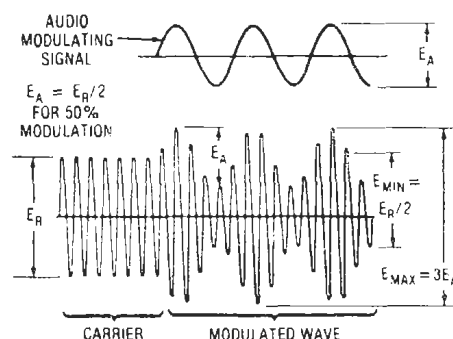
amplifier noise — amplitude of noise



Amplitude-modulated transmitter.

amplitude-modulated wave—A constant-frequency waveform in which the amplitude varies in step with the frequency of an impressed signal.

amplitude modulation—Abbreviated AM. 1. Modulation in which the amplitude of a wave is the characteristic subject to variation. Those systems of modulation in which each component frequency (f) of the transmitted intelligence produces a pair of sideband frequencies at carrier frequency plus f and carrier frequency minus f . In special cases, the carrier may be suppressed; either the lower or upper sets of sideband frequencies may be suppressed; the lower set of sideband frequencies may be produced by one or more channels of information. The carrier may be transmitted without intelligence-carrying sideband frequencies. The resulting emission bandwidth is proportional to the highest frequency component of the intelligence transmitted. 2. A process in which the program information is imposed on a carrier signal of constant frequency by varying its amplitude in proportion to program level. Used on the standard broadcast band (530 to 1710 kHz) and on long-wave and shortwave bands.



Amplitude modulation.

amplitude-modulation noise level—Undesired amplitude variations of a constant radio-frequency signal, especially in the absence of any intended modulation.

amplitude noise—The effect on radar accuracy of the fluctuations in amplitude of the signal returned by the target. These fluctuations are caused by any change in aspect if the target is not a point source.

amplitude of noise—When impulse-type noise is of random occurrence and so closely spaced that the individual waveshapes are not separated by the receiving equipment, then the noise has the waveshape and characteristics of random noise. Random-noise amplitude is proportional to the square root of the bandwidth. If the impulses are separated, the noise no longer has the

waveshape of random noise and its amplitude is directly proportional to the bandwidth of the transmission system.

amplitude permeability—The relative permeability at a stated value of field strength and understated conditions, the field strength varying periodically with time and no direct magnetic-field component being present.

amplitude range—The ratio, usually expressed in decibels, between the upper and lower limits of program amplitudes that contain all significant energy contributions.

amplitude resonance—The condition that exists when any change in the period or frequency of the periodic agency (but not its amplitude) decreases the amplitude of the oscillation or vibration of the system.

amplitude response—The maximum output amplitude that can be obtained at various points over the frequency range of an instrument operated under rated conditions.

amplitude selection—The process of selecting that portion of a waveform which lies above or below a given value or between two given values.

amplitude separator—A television-receiver circuit that separates the control impulses from the video signal.

amplitude-shift keying—Abbreviated ask. The modulation of digital information on a carrier by changing the amplitude of the carrier.

amplitude-suppression ratio—In frequency modulation, the ratio of the magnitude of the undesired output to the magnitude of the desired output of an FM receiver when the applied signal is simultaneously amplitude and frequency modulated. Generally measured with an applied signal that is amplitude modulated 30 percent at a 400-hertz rate and is frequency modulated 30 percent of the maximum system deviation at a 1000-hertz rate.

amplitude versus frequency distortion—Distortion caused by the nonuniform attenuation or gain of the system, with respect to frequency under specified terminal conditions.

AM rejection ratio—The ratio of the recovered audio output produced by a desired FM signal with specified modulation, amplitude, and frequency to that produced by an AM signal, on the same carrier, with specified modulation index.

AM suppression—The ability of an FM tuner to reject AM signals. Expressed in decibels, it is the ratio between the tuner output with a 100-percent modulation FM signal to its output with a 30-percent modulated AM signal.

AM tuner—A device capable of converting amplitude-modulated signals into low-level audio frequencies.

amu—Abbreviation for atomic mass unit.

analog—1. In electronic computers, a physical system in which the performance of measurements yields information concerning a class of mathematical problems. 2. Of or pertaining to the general class of devices or circuits in which the output varies as a continuous function of the input. 3. The representation of numerical quantities by means of physical variables, e.g., translation, rotation, voltage, resistance; contrasted with *digital*. 4. A continuous representation of phenomena in terms of points along a scale, each point merging imperceptibly into the next. An analog voltage, for example, may take any value. Real-world phenomena, such as heat and pressure, are analog (compare with *digital*).

analog adder—An analog circuit or device that receives two or more inputs and delivers an output that is equal to their sum.

analog amplifier—A device whose output is continuously proportional to the input stimulus.

analog channel—A computer channel in which the transmitted information can have any value between the defined limits of the channel.

analog circuit—A circuit in which the output varies as a continuous function of the input, as contrasted with digital circuits.

analog communications—A system of telecommunications employing a nominally continuous electrical signal that varies in frequency, amplitude, etc., in some direct correlation to nonelectrical information (sound, light, etc.) impressed on a transducer.

analog computer—1. A computer operating on the principle of creating a physical (often electrical) analogy of the mathematical problem to be solved. Variables such as temperature, light, pressure, distance, angle, shaft speed, or flow are represented by the magnitude of a physical phenomenon such as voltage or current. The computer manipulates these variables in accordance with the mathematical formulas “analogued” on it. 2. A computer system in which both the input and output are continuously varying signals. 3. A computing machine that works on the principle of measuring, as distinguished from counting. 4. A computer that solves problems by setting up equivalent electric circuits and making measurements as the variables are changed in accordance with the corresponding physical phenomena. An analog computer gives approximate solutions, whereas a digital computer gives exact solutions. 5. A nondigital computer that manipulates linear (continuous) data to measure the effect of a change in one variable on all other variables in a particular problem. (Compare: *digital computer*.)

analog computing—Computing system in which continuous signals represent mechanical (or other) parameters.

analog data—1. A physical representation of information such that the representation bears an exact relationship to the original information. The electrical signals on a telephone channel are an analog data representation of the original voice. 2. Data represented in a continuous form, as contrasted with digital data represented in a discrete (discontinuous) form. Analog data is usually represented by physical variables, such as voltage, resistance, rotation, etc.

analog input module—An I/O rack module that converts an analog signal from a user device to a digital signal that may be processed by the processor.

analog meter—An indicating instrument that employs a movable coil and pointer arrangement (or equivalent) to display values along a graduated scale.

analog multiplexer—1. Circuit used for time-sharing of analog-to-digital converters between a number of different analog information channels. Consists of a group of analog switches arranged with inputs connected to the individual analog channels and outputs connected in common. 2. Two or more analog switches with separate inputs and a common output, with each gate separately controllable. Multiplexing is performed by sequentially turning on each switch one at a time, switching each individual input to a common output. 3. A device that selects one of several analog signals according to a digital code. Analog multiplexers (amux) are available in many forms; their chief application is as a front end in data-acquisition systems, enabling a single analog-to-digital converter to monitor more than one information channel.

analog network—A circuit or circuits that represent physical variables in such a manner as to permit the expression and solution of mathematical relationships between the variables, or to permit the solution directly by electric or electronic means.

analog output—1. A signal (voltage) whose amplitude is continuously proportionate to the stimulus, the proportionality being limited by the resolution of the device. 2. An output quantity that varies smoothly over a continuous range of values rather than in discrete steps.

analog panel meter—See APM.

analog recording—A method of recording in which some characteristic of the record current, such as amplitude or frequency, is continuously varied in a manner analogous to the time variations of the original signal.

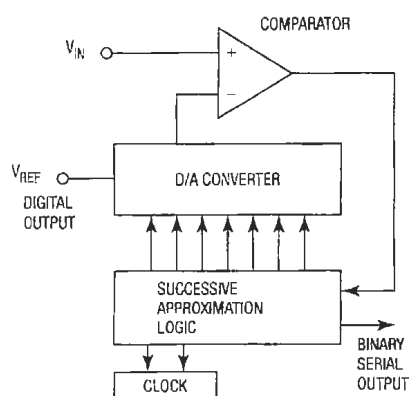
analog representation—A representation that does not have discrete values, but is continuously variable.

analog signal—1. An electrical signal that varies continuously in both time and amplitude, as obtained from temperature or pressure, or speed transducers. A voltage level that changes in proportion to the change in a physical variable. 2. A signal representing a variable that may be continuously observed and continuously represented.

analog switch—1. A device that either transmits an analog signal without distortion or completely blocks it. 2. Any solid-state device, with or without a driver, capable of bilaterally switching voltages or current. It has an input terminal, output terminal, and, ideally, no offset voltage, low *on* resistance, and extreme isolation between the signal being gated and control signals. 3. A means to interconnect two or more circuits whose information is represented in analog form using a network that may or may not be time divided and may or may not consist of linear elements.

analog-to-digital conversion—1. The process of converting a continuously variable (analog) signal to a digital signal (binary code) that is a close approximation of the original signal. 2. The process of quantizing a continuous function.

analog-to-digital converter—Abbreviated a-d converter, adc, or ADC. 1. A circuit that changes a continuously varying voltage or current (analog) into a digital output. The input may be ac or dc, and the output may be serial or parallel, binary or decimal. 2. Device that translates analog signals (voltages, pressures, etc.) from sensors into numerical digital form (binary, decimal, etc.).



Analog-to-digital converter.

analog transmission—Transmission of a continuously variable signal as opposed to a discretely variable one.

analog value—A continuously variable value, such as a current or voltage.

Analytical Engine—An early form of general-purpose digital computer invented in 1833 by Charles Babbage.

analyzer—1. An instrument or other device designed to examine the functions of components, circuits, or systems and their relations to each other, as contrasted with an instrument designed to measure some specific parameter of such a system or circuit. 2. Of computers, a routine the purpose of which is to analyze a program written for the same or a different computer. This analysis may consist of summarizing instruction references to storage and tracing sequences of jumps. 3. An instrument that evaluates and/or measures one or more specific parameters (e.g., voltage, current, frequency, logic level, bit time, distortion). 4. A test assembly that checks the performance of, or locates trouble in, electronic equipment. Also called test set and tester.

anastigmat—A lens system designed so as to be free from the aberration called astigmatism.

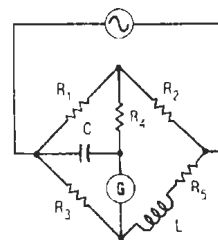
anchor—An object, such as a metal rod, set into the ground to hold the end of a guy wire.

ancillary equipment—Equipment not directly employed in the operation of a system but necessary for logistic support, preparation for flight, or assessment of target damage; e.g., test equipment, vehicle transport.

AND circuit—Synonym for AND gate.

AND device—A device that has its output in the logic 1 state if and only if all the control signals are in the logic 1 state.

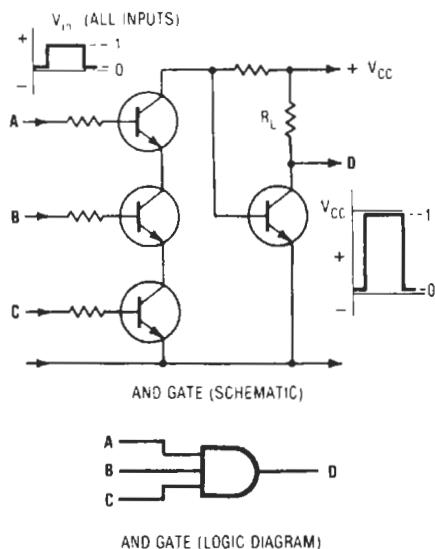
Anderson bridge—A bridge normally used for the comparison of self-inductance with capacitance. It is a six-branch network in which an outer loop of four arms is formed by four nonreactive resistors and the unknown inductor. An inner loop of three arms is formed by a capacitor and a fifth resistor in series with each other and in parallel with the arm opposite the unknown inductor. The detector is connected between the junction of the capacitor and the fifth resistor and at that end of the unknown inductor separated from a terminal of the capacitor by only one resistor. The source is connected to the other end of the unknown inductor and to the junction of the capacitor with two resistors of the outer loop. The balance is independent of frequency.



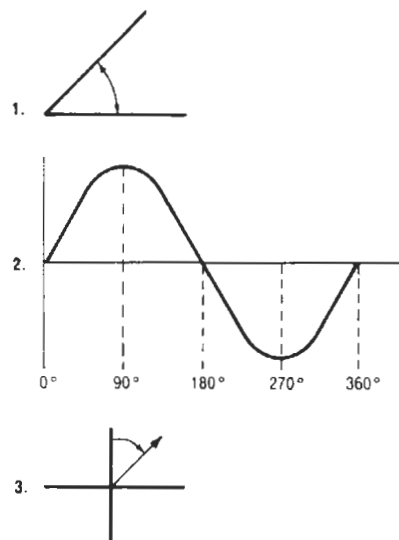
Anderson bridge.

AND gate—1. In an electronic computer, a gate circuit with more than one control (input) terminal. No output signal will be produced unless a pulse is applied to all inputs simultaneously. 2. A binary circuit, with two or more inputs and a single output, in which the output is logic 1 only when all inputs are logic 1, and the output is logic 0 if any one of the inputs is logic 0.

AND/NOR gate—A single logic element that performs the operation of two AND gates with outputs feeding a NOR gate. No access to the internal logic elements is provided (i.e., no connection is available at the outputs of the AND gates).



AND gate with three inputs.



Angle.

AND/OR circuit—A gating circuit that produces a prescribed output condition when several possible combinations of input signals are applied. It exhibits the characteristics of the AND gate and the OR gate.

android—1. A mobile mechanism possessing the ability to manipulate objects external to itself under the constant control of its own resident intelligence, operating within guidelines initially established and occasionally updated by a human being, a computer, or some other external intelligence. 2. Automaton of manlike form.

anechoic—Nonreflective, producing no echoes.

anechoic chamber—1. A room or chamber specially designed to absorb all sound within, thus preventing sound reflections or reverberation. Such rooms are used for evaluation of microphones and speakers. 2. A room lined with material that traps sound waves so the sound is perfectly absorbed and the room is acoustically dead. Such a chamber is used for testing microphones and speakers. 3. A derived term for a room or enclosure that is designed to be echo free over a specified frequency range. Any sound reflections within this frequency range must be less than 10 percent of the source sound pressure.

anechoic enclosure—A special echo-free enclosure used for testing audio transducers, in which all wall surfaces have been covered with acoustically absorbent materials so that reflections of the sound waves are eliminated. Also known as a dead room or an anechoic room.

anechoic room—A room whose walls have been treated so as to make them absorb a particular kind of radiation almost completely; used for testing components of sound systems, radar systems, etc., in an environment free of reflections.

anelectronic—See anelectrotonus.

anelectrotonus—The reduced sensitivity produced in a nerve or muscle in the region of contact with the anode when an electric current is passed through it.

anemometer—An instrument used for measuring the force or speed of wind.

angels—Short-duration radar reflections in the lower atmosphere. Most often caused by birds, insects, organic particles, tropospheric layers, or water vapor.

angle—1. A fundamental mathematical concept formed when two straight lines meet at a point. The lines are the sides of the angle, and the point of intersection

is the vertex. 2. A measure of the distance along a wave or part of a cycle, measured in degrees. 3. The distance through which a rotating vector has progressed.

angle jamming—An electronic countermeasures technique in which azimuth and elevation information present in the modulation components of the returning echo pulse of a scanning fire-control radar is jammed by transmitting a pulse similar to the radar pulse but with angle information of erroneous phase.

angle modulation—Modulation in which the angle of a sine-wave carrier is the characteristic varied from its normal value by modulation. Phase and frequency modulation are particular forms of angle modulation.

angle noise—Tracking error introduced into radar by variations in the apparent angle of arrival of the echo from a target due to finite target size. (This effect is caused by variations in the phase front of the radiation from a multiple-point target as the target changes its aspect with respect to the observer.)

angle of arrival—Angle made between the line of propagation of a radio wave and the earth's surface at the receiving antenna.

angle of azimuth—The angle measured clockwise in a horizontal plane, usually from the north. The north used may be true north, Y-north, or magnetic north.

angle of beam—The angle that encloses most of the transmitted energy from a directional-antenna system.

angle of convergence—Angle formed by the lines of sight of both eyes when focusing on an object.

angle of deflection—The angle formed between the new position of the electron beam in a cathode-ray tube and the normal position before deflection.

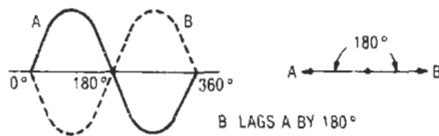
angle of departure—The angle of the line of propagation of a radio wave with respect to a horizontal plane at the transmitting antenna.

angle of divergence—In cathode-ray tubes, a measure of its spread as the electron beam travels from the cathode to the screen. The angle formed by an imaginary center line and the border line of the electron beam. In good tubes, this angle is less than 2°.

angle of elevation—The angle between the horizontal plane and the line ascending to the object.

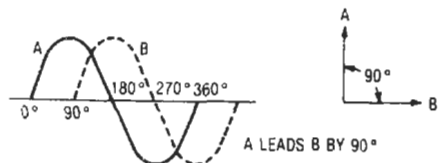
angle of incidence—The angle between a wave or beam striking a surface and a line perpendicular to that surface.

angle of lag—The angular phase difference between one sinusoidal function and a second having the same frequency. Expressed in degrees, the amount the second function must be retarded to coincide with the first.



Angle of lag.

angle of lead—1. The time or angle by which one alternating electrical quantity leads another of the same cyclic period. 2. The angle through which the commutator brushes of a generator or motor must be moved from the normal position to prevent sparking.



Angle of lead, 1.

angle of radiation—The angle between the surface of the earth and the center of the beam of energy radiated upward into the sky from a transmitting antenna.

angle of reflection—The angle between a wave or beam reflected from a surface and a line perpendicular to that surface. This angle lies in a common plane with the angle of incidence and is equal to it.

angle of refraction—The angle between a wave or beam as it passes through a medium and a line perpendicular to the surface of that medium. This angle lies in a common plane with the angle of incidence.

angle tracking noise—Any deviation of the tracking axis from the center of reflectivity of a target. The resultant of servo noise, receiver noise, angle noise, and amplitude noise.

angstrom unit—A unit of measurement of wavelength of light and other radiation. Equal to one ten-thousandth (10^{-4}) of a micrometer or one hundred-millionth of a centimeter (10^{-8} cm). The visible spectrum extends from about 4000 to 8000 angstrom units. Blue light has a wavelength in the region of 4700 angstroms; yellow, 5800; and red, 6500. A measure of wavelength equal to 10^{-10} meter, or 0.1 nanometer, the preferred term.

angular acceleration—The rate at which angular velocity changes with respect to time, generally expressed in radians per second.

angular accelerometer—A device capable of measuring the magnitude of, and/or variations in, angular acceleration.

angular aperture—The largest angular extent of wave surface that an objective can transmit.

angular deviation loss—The ratio of the response of a microphone or speaker on its principal axis to the response at a specified angle from the principal axis (expressed in decibels).

angular distance—The angle subtended by two bodies at the point of observation. It is equal to the

distance of wavelengths multiplied by 2π radians or by 360° .

angular frequency—Frequency expressed in radians per second. It is equal to the number of hertz (cycles per second) multiplied by 2π .

angular length—Length expressed in radians or equivalent angular measure equal to 2π radians, or 360° , multiplied by the length in wavelengths.

angular momentum—The momentum that a body has by virtue of its rotational movement.

angular phase difference—Phase difference between two sinusoidal functions expressed as an angle.

angular rate—The rate of change of bearing.

angular resolution—The ability of a radar to distinguish between two targets solely on the basis of angular separation.

angular velocity—The rate at which an angle changes. Expressed in radians per second, the angular velocity of a periodic quantity is the frequency multiplied by 2π . If the periodic quantity results from uniform rotation of a vector, the angular velocity is the number of radians per second passed over by the rotating vector. Generally designated by the Greek letter omega (ω).

anharmonic oscillator—An oscillating system in which the restoring force is a nonlinear function of the displacement from equilibrium.

anhysteresis—The process whereby a material is magnetized by applying a unidirectional field upon which is superimposed an alternating field of gradually decreasing amplitude.

ANIK—The Canadian domestic satellite system used to transmit the network television feeds of the Canadian Broadcasting Corporation. All ANIK satellites are operated by TeleSat Canada of Ottawa. ANIK satellites have both 4-GHz C-band and 12-GHz Ku-band transponders. ANIK means *brother* in Inuit (Eskimo).

animation—A moving on-screen representation of the activities taking place in a simulation.

anion—1. A negatively charged ion which, during electrolysis, is attracted toward the anode. A corresponding positive ion is called a cation. 2. A negative ion that moves toward the anode in a discharge tube, electrolytic cell, or similar device.

anisotropic—1. Describing a substance that exhibits different magnetic, electrical, optical, and other physical properties when measured along axes in different directions. 2. A material that has characteristics such as wave propagation constant, magnetic permeability, conductivity, etc., that vary with direction; that is, not isotropic.

anisotropic body—A body in which the value of any given property depends on the direction of measurement, as opposed to a body that is isotropic.

anisotropic magnet—A magnetic material having a better magnetic characteristic along the preferred axis than along any other.

anisotropic material—A material having preferred orientation so that the magnetic characteristics are superior along a particular axis. This may be as a result of rolling, heat treatment in a magnetic field, or, in the case of some of the sintered magnets, the direction of press.

anisotropy—Directional dependence of magnetic properties, leading to the existence of easy or preferred directions of magnetization. Anisotropy of a particle may be related to its shape, to its crystalline structure, or to the existence of strains within it.

anneal—1. To heat a metal to a predetermined temperature and then let it cool slowly. This process prevents brittleness and often stabilizes electrical characteristics.

2. To heat and then gradually cool in order to relieve mechanical stresses. Annealing copper makes it softer and less brittle.

annealed laminations—Laminations that have been annealed for transformers or choke coils.

annealed wire—Wire that has been softened by heating and gradual cooling to remove mechanical stresses.

annotation—An added descriptive comment or explanatory note.

annular—Ringed; ring-shaped.

annular conductor—A conductor consisting of a number of wires stranded in three reversed concentric layers surrounding a saturated hemp core. The core is usually made wholly or mostly of nonconducting material. This construction has the advantage of lower total ac resistance for a given cross-sectional area of conducting material by eliminating the greater skin effect at the center.

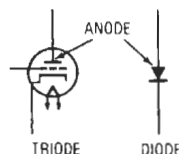
annular transistor—A mesa transistor in which the semiconductor regions are arranged in concentric circles about the emitter.

annulling network—An arrangement of impedance elements connected in parallel with filters to annul or cancel capacitive or inductive impedance at the extremes of the passband of a filter.

annunciation relay—1. An electromagnetically operated signaling apparatus that indicates whether a current is flowing or has flowed in one or more circuits. 2. A nonautomatic reset device that gives a number of separate visual indications upon the functioning of protective devices, and which may also be arranged to perform a lockout function.

annunciator—1. A visual device consisting of a number of pilot lights or drops. Each light or drop indicates the condition that exists or has existed in an associated circuit and is labeled accordingly. 2. A device for sounding an alarm or attracting attention. The indication is usually aural, but occasionally may be visual or both aural and visual. 3. An alarm-monitoring device that consists of a number of visible signals, such as flags or lamps indicating the status of the detectors in an alarm system or systems. Each circuit in the device is usually labeled to identify the location and condition being monitored. In addition to the visible signal, an audible signal is usually associated with the device. When an alarm condition is reported, a signal is indicated—visible, audible, or both. The visible signal is generally maintained until reset either manually or automatically.

anode—1. The positive electrode, such as the plate of a vacuum tube; the element to which the principal stream of electrons flows. 2. In a cathode-ray tube, the electrodes connected to a source of positive potential. These anodes are used to concentrate and accelerate the electron beam for focusing. 3. The less noble and/or higher-potential electrode of an electrolytic cell, at which corrosion occurs. This may be an area on the surface of a metal or alloy, the more active metal in a cell composed of two dissimilar metals, or the positive electrode of an impressed-current system.



Anode.

anode-balancing coil—A set of mutually coupled windings used to maintain approximately equal currents in anodes operating in parallel from the same transformer terminal.

anode breakdown voltage—The potential required to cause conduction across the main gap of a gas tube when the starter gap is not conducting and all other tube elements are held at cathode potential.

anode-bypass capacitor—Also called plate-bypass capacitor. A capacitor connected between the anode and ground in an electron-tube circuit. Its purpose is to bypass high-frequency currents and keep them out of the load.

anode characteristic curve—A graph that shows how the anode current of an electron tube is affected by changes in the anode voltage.

anode circuit breaker—A device used in the anode circuits of a power rectifier for the primary purpose of interrupting the rectifier circuit if an arcback should occur.

anode current—The electron flow in the element designated as the anode. Usually signifies plate current.

anode dark space—In a gas tube, a narrow, dark zone next to the surface of the anode.

anode dissipation—The power dissipated as heat in the anode of an electron tube because of the bombardment by electrons and ions.

anode efficiency—See plate efficiency.

anode-load impedance—See plate-load impedance.

anode modulation—See plate modulation.

anode neutralization—Also called plate neutralization. A method of neutralization in which a portion of the anode-cathode ac voltage is shifted 180° and applied to the grid-cathode circuit through a neutralizing capacitor.

anode power input—See plate power input.

anode power supply—The means for supplying power to the plate of an electron tube at a more positive voltage than that of the cathode. Also called plate power supply.

anode pulse modulation—See plate pulse modulation.

anode rays—Positive ions coming from the anode of an electron tube; these ions are generally due to impurities in the metal of the anode.

anode saturation—See plate saturation.

anode sheath—A layer of electrons surrounding the anode in mercury-pool arc tubes.

anode strap—A metallic connector between selected anode segments of a multicavity magnetron, used principally for mode separation.

anode supply—Also called plate supply. The dc voltage source used in an electron-tube circuit to place the anode at a high positive potential with respect to the cathode.

anode terminal—1. In a diode (semiconductor or tube), that terminal to which a positive dc voltage must be applied to forward-bias the diode. Compare with *cathode terminal*. 2. In a diode (semiconductor or tube), that terminal at which a negative dc voltage appears when the diode is employed as an ac rectifier (blocking). 3. That terminal which is internally connected to the anodic element of any device.

anode voltage—The potential difference existing between the anode and cathode.

anode voltage drop (of a glow-discharge, cold cathode tube)—Difference in potential between cathode and anode during conduction, caused by the electron flow through the tube resistance (*IR* drop).

anodic protection—Corrosion inhibition based on the electrolytic formation of a protective passive film on

metals by applying to them a positive (anodic) potential; e.g., aluminum is anodized (oxidized) by a positive charge in a sulfuric acid solution.

anodic silver—A precious metal used in plating; fine silver in different configurations, such as shot, cones, bars, etc., is sacrificed during the silver-plating process.

anodization—The formation of an insulating oxide over certain elements, usually metals, by electrolytic action. The most commonly anodized materials are tantalum, aluminum, titanium, and niobium. Anodization is particularly useful where protection of a conductor is required. The base metal can form the conductor and the anodized surface layer can form the insulator.

anodize—To deposit a protective coating of oxide on a metal by means of an electrolytic process in which it is used as the anode.

anodizing—An electrochemical oxidation process used to improve the corrosion resistance or to enhance the appearance of a metal surface. Aluminum and magnesium parts are frequently anodized.

anomalous displacement current—Also called dielectric absorption. The current in addition to the normal leakage current in a circuit containing a capacitor with an imperfect dielectric after the normal charging or discharging current has become negligibly small.

anomalous photoconductivity—A spectral phenomenon in which the degree of the photoresponse of an illuminated semiconductor is determined by the wavelength composition of the incident light.

anomalous propagation—1. Propagation that is unusual or abnormal. 2. The conduction of UHF signals through atmospheric ducts or layers in a manner similar to that of a waveguide. These atmospheric ducts carry the signals with less than normal attenuation over distances far beyond the optical path taken by UHF signals. Also called superrefraction. 3. In sonar, pronounced and rapid variations in the strength of the echo due to large, rapid focal fluctuations in propagation conditions.

anonymous FTP (File Transfer Protocol)—The procedure of connecting to a remote computer as an anonymous or guest user in order to transfer public files back to a local computer. *See also* FTP; protocol.

A-N radio range—A navigational aid that provides four equisignal zones for aircraft guidance. Deviation from the assigned course is indicated aurally by the Morse code letters A (—) or N (—·). On-course position is indicated by an audible merging of the A and N code signals into a continuous tone.

ANSI—American National Standards Institute. The U.S. government organization with responsibility for the development and promulgation of (among others) data processing standards.

A-N signal—A radio-range, quadrant-designation signal that indicates to the pilot whether he or she is on course or to the right or left.

ANSI keyboard—Abbreviation for American National Standards Institute keyboard. A typewriter standard unit that offers a choice of uppercase characters only or uppercase and lowercase combined.

ANSI standards—A series of standards recommended by the American National Standards Institute.

answerback—1. The response of a terminal to remote-control signals. 2. A signal sent by a data receiver to a data transmitter indicating that it is ready to receive data or is acknowledging the receipt of data. *See also* handshaking. 3. A reply message from a terminal, manually or automatically initiated, to verify that the right terminal has been accessed and is in operation.

answerback (W-R-U) system—A system capable of being remotely controlled by another station. When

tripped by a unique access code, a short predetermined message is broadcast.

answerback unit—An electromechanical device used with a teletypewriter set to transmit a predetermined message of not more than 21 characters in response to a request signal. It can transmit either a five-level 7.42 unit code or an eight-level 11.0 unit code at speeds of up to 100 words per minute.

answering cord—The cord nearest the face of a telephone switchboard. It is used for answering subscriber's calls and calls on incoming trunks.

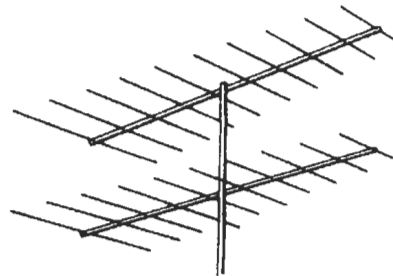
answering service—A business that contracts with subscribers to answer incoming telephone calls after a specified delay or when scheduled to do so. It may also provide other services, such as relaying fire or intrusion alarm signals to proper authorities.

answer lamp—In a telephone switchboard, a lamp that lights when an answer cord is plugged into a line jack; it extinguishes when the telephone answers and lights when the call is complete.

answer tone—Tone signal, with a frequency between 2025 and 2225 Hz and a duration of at least 1.5 s, used by an answering modem to indicate its ready condition to an originating modem.

antenna—Also called aerial. 1. That portion, usually wires or rods, of a radio transmitter or receiver station used for radiating waves into or receiving them from space. It changes electrical currents into electromagnetic radio waves, and vice versa. 2. A section of wire or a metallic device designed to intercept radio waves in the air and convert them to an electrical signal for feeding to a receiver. Under relatively difficult reception conditions, such as created by location, terrain, obstructions, etc., an antenna becomes fairly critical and should be one especially designed for its intended purposes. 3. A device for transmitting and receiving radio waves. Depending on their use and operating frequency, antennas can take the form of a single piece of wire, a dipole, a grid such as a yagi array, a horn, a helix, a sophisticated parabolic-shaped dish, or a phase array of active electronic elements of virtually any flat or convoluted surface. 4. A device that collects and focuses electromagnetic energy, i.e., contributes an energy gain. Gain is proportional to surface area for a microwave dish.

antenna array—1. A combination of antennas assembled to obtain a desired pickup or rejection pattern. 2. An arrangement of two or more directional antennas, spaced and connected so that they are in phase and their effects are electrically additive.



Antenna array.

antenna bandwidth—1. The range of frequencies over which the impedance characteristics of the antenna are sufficiently uniform that the quality of the radiated signal is not significantly impaired. 2. The frequency range

over which a certain antenna characteristic falls within acceptable limits. For instance, an antenna may have a bandwidth of 1 MHz over which the standing-wave ratio is 2:1 or less. 3. The frequency range throughout which an antenna will operate at a specified efficiency without the need for alteration or adjustment.

antenna beam width—The angle, in degrees, between two opposite half-power points of an antenna beam.

antenna coil—In a radio receiver or transmitter, the inductance through which antenna current flows.

antenna coincidence—That instance when two rotating, highly directional antennas are pointed toward each other.

antenna-conducted interference—Any signal that is generated within a transmitter or receiver and appears as an undesired signal at the antenna terminals of the device, e.g., harmonics of a transmitter signal, or the local-oscillator signal of the receiver.

antenna cores—Ferrite cores of various cross sections for use in radio antennas.



Antenna core.

antenna coupler—1. A radio-frequency transformer used to connect an antenna to a transmission line or to connect a transmission line to a radio receiver. 2. A radio-frequency transformer, link circuit, or tuned line used to transfer radio-frequency energy from the final plate-tank circuit of a transmitter to the transmission line feeding the antenna.

antenna crosstalk—A measure of undesired power transfer through space from one antenna to another. Usually expressed in decibels, the ratio of power received by one antenna to the power transmitted by the other.

antenna current—The radio-frequency current that flows in an antenna.

antenna detector—A device consisting of an antenna and electronic equipment to warn aircraft crew members of their being observed by radar sets. The device is usually located in the nose or tail of the aircraft and illuminates a light on one or more panels when radar signals are detected.

antenna diplexer—A coupling device that permits several transmitters to share one antenna without troublesome interaction.

antenna-directivity diagram—A curve representing, in polar or Cartesian coordinates, a quantity proportional to the gain of an antenna in the various directions in a particular plane or cone.

antenna disconnect switch—A safety switch or interlock plug used to remove driving power from the antenna to prevent rotation while work is being performed.

antenna duplexer—A circuit or device that permits one antenna to be shared by two transmitters without undesirable interaction.

antenna effect—1. Cause of error in a loop antenna due to the capacitance to ground. 2. In a navigational system, any undesirable output signal that results when a directional antenna acts as a nondirectional antenna. 3. The tendency of wires or metallic bodies to act as antennas, i.e., to radiate or pick up radio signals.

antenna effective area—In any specified direction, the square of the wavelength multiplied by the power gain (or directional gain) in that direction, and divided by 4π . (When power gain is used, the effective area is that for power reception; when directive gain is used, the effective area is that for directivity.)

antenna efficiency—The relative ability of an antenna to convert rf energy from a transmitter into electromagnetic waves. If the gain rating of a directional antenna is 10 dB, for example, it is often assumed that the effective radiated power will be 10 times greater than the rf power fed to it. However, if the antenna efficiency is, say, 50 percent, a loss of 3 dB, the true gain will be only 7 dB ($10 - 3 = 7$ dB).

antenna elevation—The physical height of an antenna above the earth.

antenna factor—The value of decibel that must be added to a two-terminal voltmeter reading to obtain the actual induced antenna open-circuit voltage or the electric-field strength.

antenna farm—A large plot of ground (5 to 2000 acres) surrounding a radio transmitting or receiving station that provides space and adequate clearance for the installation of several large antennas, such as rhombic antennas.

antenna field—1. The region defined by a group of antennas. 2. A group of antennas placed in a geometric configuration that is specific for a particular trajectory measuring system. 3. The effective free-space energy distribution produced by an antenna or group of antennas.

antennafier—An integrated low-profile antenna and amplifier for use with compact, portable communications systems.

antenna front-to-back ratio—The ratio of field strength in front of a directional antenna (i.e., directly forward in the line of maximum directivity) to the field strength in back of the antenna (i.e., 180° from the front). Measured at a fixed distance from the radiator.

antenna gain—1. The effectiveness of a directional antenna in a particular direction, compared against a standard (usually an isotropic antenna). The ratio of standard antenna power to the directional antenna power that will produce the same field strength in the desired direction. 2. The increase in signal level at the antenna terminals with reference to the level at the terminals of a half-wave dipole antenna, expressed in decibels. 3. For a given antenna, the ratio of signal strength (received or transmitted) to that obtained with a simple dipole antenna.

antenna ground system—That portion of an antenna closely associated with the earth and including an extensive conducting surface, which may be the earth itself.

antenna height—The average height above the terrain from 2 to 10 miles (3.2 to 16 km) from the antenna. In general, the antenna height will be different in each direction from the antenna. The average of these various heights is considered the antenna height above average terrain.

antenna height above average terrain—The height of the center of radiation of an antenna above an averaged value of the elevation above sea level for the surrounding terrain.

antenna illumination—Describes how a feedhorn "sees" the surface of a dish as well as the surrounding terrain.

antenna impedance—The impedance an antenna presents to a transmitter or receiver at the attachment point of the transmission line or feeder. It varies from about 50 to 600 ohms, depending on antenna type and installation.

antenna induced microvolts—The voltage that exists across the open-circuited antenna terminals, as calculated from a measurement.

antenna lens—An arrangement of metal vanes or dielectric material used to focus a microwave beam in a manner similar to an optical lens.

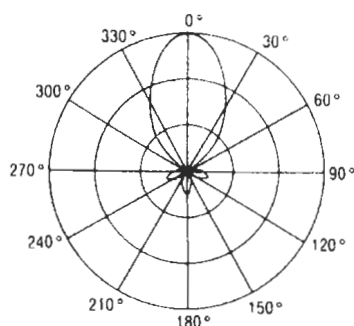
antenna lobe—*See* lobe.

antenna matching—Selection of components to make the impedance of an antenna equal to the characteristic impedance of its transmission line.

antennamitter—An integrated low-profile antenna and oscillator for use with compact, portable communications systems.

antenna pair—Two antennas located on a base line of accurately surveyed length. The signals received by these antennas are used to determine quantities related to a target position.

antenna pattern—Also called antenna polar diagram. A plot of angle versus free-space field intensity at a fixed distance in the horizontal plane passing through the center of the antenna.



Antenna pattern.

antenna-pattern measuring equipment—Devices used to measure the relative field strength or intensity existing at any point or points in the space immediately surrounding an antenna.

antenna pedestal—A structure that supports an antenna assembly (motors, gears, synchros, rotating joints, etc.).

antenna polar diagram—*See* antenna pattern.

antenna polarization—The position of an antenna, with respect to the surface of the earth, that determines the wave polarization for which the antenna is most efficient. A vertical antenna radiates and receives vertically polarized waves; a horizontal antenna radiates and receives horizontally polarized waves broadside to itself and vertically polarized waves at high angles off its ends.

antenna power—The square of the antenna current of a transmitter, multiplied by the antenna resistance at the point where the current is measured.

antenna power gain—The power gain of an antenna in a given direction is four times the ratio of the radiation intensity in that direction to the total power delivered to the antenna. (The term is also applied to receiving antennas.)

antenna preamplifier—A low-noise rf amplifier, usually mast-mounted near the terminals of the receiving antennas, used to compensate for transmission-line loss and thereby improve the overall noise figure.

antenna reflector—In a directional-antenna array, an element that modifies the field pattern in order to reduce the field intensity behind the array and increase

it in front. In a receiving antenna, the reflector reduces interference from stations behind the antenna.

antenna relay—A relay used in radio stations to automatically switch the antenna to the receiver or transmitter and thus protect the receiver circuits from the rf power of the transmitter.

antenna resistance—The total resistance of a transmitting antenna system at the operating frequency. The power supplied to the entire antenna circuit, divided by the square of the effective antenna current referred to the feed point. Antenna resistance is made up of such components as radiation resistance, ground resistance, radio-frequency resistance of conductors in the antenna circuit, and equivalent resistance due to corona, eddy currents, insulator leakage, and dielectric power loss.

antenna resonant frequency—The frequency (or frequencies) at which an antenna appears to be a pure resistance.

antenna stabilization—A system for holding a radar beam steady despite the roll and pitch of a ship or airplane.

antenna structure—A structure that includes the radiating system, its supporting structures, and appurtenances mounted thereon.

antenna switch—Switch used for connecting an antenna to or disconnecting it from a circuit.

antenna system—An assembly consisting of the antenna and the necessary electrical and mechanical devices for insulating, supporting, and/or rotating it.

antenna terminals—On an antenna, the points to which the lead-in (transmission line) is attached.

antenna tilt error—The angular difference between the antenna tilt angle shown on the mechanical indicator and the electrical center of the radar beam.

antennaverter—A receiving antenna and converter combined in a single unit that feeds directly into the receiver IF amplifier.

antenna wire—A wire, usually of high tensile strength, such as copperweld, bronze, etc., with or without insulation, used as an antenna for radio and electronic equipment.

antiaircraft missile—A guided missile launched from the surface against an airborne target.

anti-aliasing—The smoothing or removal of diagonal lines in digitized images at low resolutions that appear as stair-steps in order to recreate smoother diagonal lines.

anti-aliasing filter—A filter (normally low pass) that band-limits the input signal before sampling to less than half the sampling rate to prevent aliasing noise.

anticapacitance switch—A switch with widely separated legs, designed to keep capacitance at a minimum in the circuits being switched.

anticathode—Also called target. The target of an X-ray tube on which the stream of electrons from the cathode is focused and from which the X-rays are radiated.

anticlutter circuit—In a radar receiver, an auxiliary circuit that reduces undesired reflection in order to permit the detection of targets that otherwise would be obscured by such reflections.

anticlutter gain control—A device that automatically and gradually increases the gain of a radar receiver from low to maximum within a specified period after each transmitter pulse. In this way, short-range echoes producing clutter are amplified less than long-range echoes.

anticoincidence—A nonsimultaneous occurrence of two or more events (usually, ionizing events).

anticoincidence circuit—1. A counter circuit that produces an output pulse when either of two input circuits receives a pulse, but not when the two inputs receive

pulses simultaneously. 2. A circuit that provides an output only when all inputs are absent; a NAND circuit.

anticollision radar—A radar system used in an aircraft or ship to warn of possible collision.

antiferroelectricity—The property of a class of crystals that also undergo phase transitions from a higher to a lower symmetry. They differ from the ferroelectrics in having no electric dipole moment.

antiferroelectric materials—Those materials in which spontaneous electric polarization occurs in lines of ions; adjacent lines are polarized in an antiparallel arrangement.

antiferromagnetic materials—Those materials in which spontaneous magnetic polarization occurs in equivalent sublattices; the polarization in one sublattice is aligned antiparallel to the other.

antiferromagnetic resonance—The absorption of energy from an oscillating electromagnetic field by a system of processing spins located on two sublattices, with the spins on one sublattice going in one direction and the spins on the other sublattice in the opposite direction.

antiferromagnetism—A phenomenon of magnetism characterized by the elimination of magnetic moments and decrease in magnetic susceptibility with a decrease in temperature due to the equal power of atomic magnets.

antihunt—A stabilizing signal or equalizing circuit used in a closed-loop feedback system of a servomechanism to prevent the system from hunting, or oscillating. Special types of antihunt circuits are the anticipator, derivative, velocity feedback, and damper.

antihunt circuit—A circuit used to prevent excessive correction in a control system.

antihunt device—A device used in positioning systems to prevent hunting, or oscillation, of the load around an ordered position. The device may be mechanical or electrical. It usually involves some form of feedback.

antijamming—1. Minimizing the effect of enemy electronic countermeasures to permit echoes from targets detected by radar to be visible on the indicator. 2. Controls or circuit features incorporated to minimize jamming.

antijamming radar data processing—Use of data from one or more radar sources to determine target range in the presence of jamming.

antilogarithm—The number from which a given logarithm is derived. For example, the logarithm of 4261 is 3.6295. Therefore the antilogarithm of 3.6295 is 4261.

antimagnetic—Made of alloys that will not remain in a magnetized state.

antimicrophonic—Specifically designed to prevent microphonics. Possessing the characteristic of not introducing undesirable noise or howling into a system.

antimissile missile—A missile that is launched to intercept and destroy another missile in flight.

antinode—The point on a transmission line at which the current is maximum and the voltage is minimum.

antinodes—Also called loops. The points of maximum displacement in a series of standing waves. Two similar and equal wave trains traveling at the same velocity in opposite directions along a straight line result in alternate antinodes and nodes along the line. Antinodes are separated from their adjacent nodes by half the wavelength of the wave motion.

antinoise carrier-operated device—A device commonly used to mute the audio output of a receiver during standby or no-carrier periods. Usually the automatic volume control voltage is used to control a squelch tube which, in turn, controls the bias applied to the first audio tube so that it is permitted to operate only when a

carrier is present at the receiver input. Thus, the receiver output is heard when a signal is received, and is muted when no signal is present.

antinoise microphone—A microphone that discriminates against acoustic noise. A lip or throat microphone is an example.

antiphase—Two identical signals disposed in 180° phase opposition. When superimposed, they tend to cancel each other because their waveform patterns are of equal magnitude but opposite polarity.

antiproton—An elementary atomic particle that has the same mass as a proton but is negatively charged.

antirad—A material that inhibits damage caused by radiation.

antiresonance—A type of resonance in which a system offers maximum impedance at its resonant frequency.

antiresonant circuit—A parallel resonant circuit offering maximum impedance to the series passage of the resonant frequency.

antiresonant frequency—1. The frequency at which the impedance of a system is very high. 2. Of a crystal unit, the frequency for a particular mode of vibration at which, neglecting dissipation, the effective impedance of the crystal unit is infinite.

antisidetone—1. In a telephone circuit, special circuits and equipment that are so arranged that only a negligible amount of the power generated in the transmitter reaches the associated receiver. 2. Pertaining to the reduction or elimination of interference in telephone circuits between the microphone and earphone of the same telephone.

antisidetone circuit—A telephone circuit that prevents sound, introduced in the local transmitter, from being reproduced in the local receiver. (Reduces sidetones.)

antisidetone induction coil—An induction coil designed for use in an antisidetone telephone set.

antisidetone telephone set—A telephone set with an antisidetone circuit.

antiskating bias—A bias force applied to a pivoted pickup arm to counteract the inward force (toward the center of the record) resulting from the drag of the stylus in the groove and the offset angle of the head.

antiskating device—A mechanism found on modern phonograph pickups that provides a small outward force on a pickup arm. This counteracts the arm's tendency to move toward the turntable center (inward) due to offset geometry, and reduces stylus/groove friction.

antistatic agents—Methods employed to minimize static electricity in plastic materials. Such agents are of two basic types. Metallic devices that come into contact with the plastics and conduct the static to earth give complete neutralization initially, but because it is not modified, the surface of the material can become prone to further static accumulation during subsequent handling. Chemical additives, which are mixed with the compound during processing, give a reasonable degree of protection to the finished products.

antistatic cleaner—Substance used on phonograph records that helps to prevent the buildup of a static charge that attracts dust.

antistatic coating—1. An electrically conductive layer for carrying off static charges that could accumulate on a surface. 2. A conductive coating applied to a TV or monitor screen (or on a glass panel immediately in front of the screen) that conducts away any static charge and prevents dust from adhering to the surface of the television.

antistatic sprays—Chemical agents which, when applied to circuits and plastic surfaces, leave a conductive

coating that acts to repel dust and dirt and changes surface characteristics. Good antistatic sprays will leave a resistivity reading of 20 to 100 megohms per square inch ($3\text{--}15\text{ M}\Omega/\text{cm}^2$) on plastics and 100 megohms or more per square inch on glass surfaces. *See* static eliminators.

antistickoff voltage—A small voltage, usually applied to the rotor winding of the coarse synchro control transformer in a two-speed system. The antistickoff voltage acts to eliminate the possibility of ambiguous behavior in the system.

antitransmit-receive box—A second transmit-receive switch used in a radar antenna system to minimize absorption of the echo signal in the transmitter circuit during the interval between transmitted pulses.

antitransmit-receive switch—Abbreviated atr switch. An automatic device employed in a radar system to prevent received energy from being absorbed in the transmitter.

antitransmit-receive tube—*See* atr tube.

antivoice-operated transmission—A method of radiocommunication in which a voice-activated circuit prevents the operation of the transmitter during reception of messages on an associated receiver.

aperiodic—1. Having no fixed resonant frequency or repetitive characteristics or no tendency to vibrate. A circuit that will not resonate within its tuning range is often called aperiodic. 2. Not characterized by predictable periods or steps.

aperiodic antenna—An antenna designed to have a constant impedance over a wide frequency range (for example, a terminated rhombic antenna) due to the suppression of reflections within the antenna system.

aperiodic damping—Also called overdamping. The condition of a system when the amount of damping is so large that when the system is subjected to a single disturbance, either constant or instantaneous, the system comes to a position of rest without passing through that position. Although an aperiodically damped system is not strictly an oscillating system, it has such properties that it would become an oscillating system if the damping were sufficiently reduced.

aperiodic function—A function having no repetitive characteristics and not repeatable within a specified period.

aperiodic waveform—A nonrepeating, random, one-shot waveform.

aperture—1. In a unidirectional antenna, that portion of the plane surface which is perpendicular to the direction of maximum radiation and through which the major part of the radiation passes. 2. In an opaque disc, the hole or window placed on either side of a lens to control the amount of light passing through. 3. Also called aperture time. The amount of certainty about the exact time when the encoder input was at the value represented by a given output code. In general, the aperture is equal to the conversion time; it may be reduced by the use of sample-and-hold circuits. 4. In an electron gun, the opening that determines the size of, and has an effect on, the shape of the electron beam. In television optics, it is the effective diameter of the lens that controls the amount of light reaching the photoconductive or photoemitting image pickup tube. 5. An opening that will pass light, electrons, or other forms of radiation.

aperture antenna—A type of antenna whose beam width is determined by the dimensions of a horn, lens, or reflector.

aperture compensation—Reduction of aperture distortion by boosting the high-frequency response of a television-camera video amplifier.

aperture correction—Compensation for the loss in sharpness of detail because of the finite dimensions of a scanning beam in the horizontal dimension.

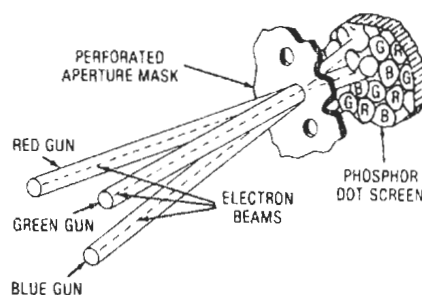
aperture delay time—The time elapsed from the application of the hold (or encode) command until the sampling switch in a sample-and-hold circuit opens fully and the device actually takes the sample. Aperture delay time is a fixed delay time and is normally not an error source since the hold clock edge can be advanced to compensate for it.

aperture distortion—In a television signal, the distortion due to the finite dimension of the camera-tube scanning beam. The beam covers several mosaic globules simultaneously, resulting in a loss of picture detail.

aperture illumination—The field distribution in amplitude and phase through the aperture.

aperture jitter—Also called aperture uncertainty time. 1. In a sample-and-hold circuit, the time variation or uncertainty with which the switch opens, or the time variation in aperture delay. 2. A source of error in a sampling system, which determines the maximum slew rate limitation of the sampled analog input signal for a given system resolution.

aperture mask—Also called shadow mask. A thin sheet of perforated material placed directly behind the viewing screen in a three-gun color picture tube to prevent the excitation of any one color phosphor by either of the two electron beams not associated with that color.



Aperture mask.

aperture plate—A ferrite memory plate containing a large number of uniformly spaced holes arranged in parallel rows and interconnected by plated conductors to provide a magnetic memory plate.

aperture time—1. In a sample-and-hold circuit, the averaging time of a sample-and-hold during the sample-to-hold transition. 2. The time required by a sample-and-hold device to go from the sample mode into the hold mode, once the hold command has been received. The aperture time is generally a few nanoseconds, measured from the 50-percent point of the mode-control transition to the time when the output stops tracking the input. *See* aperture, 3.

aperture-time uncertainty—The possible variation in aperture time from one sample-to-hold transition to the next.

APL—Abbreviation for average picture level. The average luminance level of the part of a television line between blanking pulses.

APM—Abbreviation for analog panel meter. A scale-and-pointer meter capable of indicating a continuous, rather than incremental, range of values from zero to the rated full-scale value.

apogee—The point in an elliptical satellite orbit that is farthest from the surface of the earth. Geosynchronous satellites that maintain circular orbits around the earth are

first launched into highly elliptical orbits with apogees of 22,237 miles. When the communication satellite reaches the appropriate apogee, a rocket motor is fired to place the satellite into its permanent circular orbit of 22,237 miles. *Also see* perigee.

A positive (A+ or A plus)—1. Positive terminal of a battery or positive polarity of any other sources of voltage. 2. The terminal to which the positive side of the filament-voltage source of a vacuum tube should be connected.

A power supply—A power supply used as a source of heating current for the cathode or filament of a vacuum tube.

apparatus—1. Any complex device. 2. Equipment or instruments used for a specific purpose.

apparatus wire and cable—Insulated wire and cable used in connecting electrical apparatus to a power source, also including wire and cable used in the apparatus itself.

apparent bearing—The direction from which the signal arrives with respect to some reference direction.

apparent power—In an ac circuit, the power value obtained by simple multiplication of current by voltage with no consideration of the effect of phase angle. (Compare with *true power*.)

apparent power loss—For voltage-measuring instruments, the product of nominal end-scale voltage and the resulting current. For current-measuring instruments, the product of the nominal end-scale current and the resulting voltage. For other types of instruments (for example, wattmeters), the apparent power loss is expressed for a stated value of current or voltage. Also called volt-ampere loss.

apparent source—*See* effective acoustic center.

Applegate diagram—A graphical representation of electron bunching in a velocity-modulated tube, showing their positions along the drift space. This bunching is plotted on the vertical coordinate, against time along the horizontal axis.

applet—A small computer program that performs a simple task.

AppleTalk—A networking protocol developed by Apple Computer for communication between Apple Computer products and other computers. This protocol is independent of what network it is layered on.

Appleton layer—In the ionosphere, a region of highly ionized air capable of reflecting or refracting radio waves back to earth. It is made up of the F₁ and F₂ layers.

apple tube—A color-television picture tube in which the three colors of phosphors are laid in fine vertical strips along the screen. The intensity of the electron beam is modulated as its sweeps over them so that each color is produced with appropriate brightness.

appliance—Any electrical equipment used in the home and capable of being operated by a nontechnical person. Included are units that perform some task that could be accomplished by other, more difficult means, but usually not those used for entertainment (radios, TVs, hi-fi sets, etc.).

appliance wire and cable—A classification of Underwriters' Laboratories, Inc., covering insulated wire and cable intended for internal wiring of appliances and equipment. Each construction satisfies the requirements for use in particular applications.

application—1. The use of a computer for a specific purpose, e.g., designing a brochure or writing a letter. 2. System or problem to which a computer is applied. An application may be of the computational type, in which arithmetic computations predominate, or of the data-processing type, in which data-handling operations predominate. *See also* application program.

application factor—A modifier of the failure rate. It is based on deviations from rated operating stress (usually temperature and one electrical parameter).

application-oriented language—1. A programming language that is primarily useful in some specialized area. 2. A problem-oriented programming language whose statements resemble or contain the terminology of the computer user.

application program—1. A computer program intended to solve a problem or do a job, as distinct from systems programs, which control the operations of the computer system. 2. A computer program that performs a data-processing function rather than a control operation. 3. A program used to perform some logical or computational task that is important to the user rather than some internal computer function. 4. Software designed for a specific purpose, such as accounts payable, inventory, payroll, and word processing. 5. A computer program that accomplishes specific tasks, such as word processing.

application schematic diagram—Pictorial representation using symbols and lines to illustrate the interrelation of a number of circuits.

application-specific integrated circuit—*See* ASIC.

applications software—1. A program that depends on the specific end application and is used to do the real work or apparent work that is visible to the user. Generally this is the software that is used for dedicated computer-based systems (systems designed to perform a single or specific set of functions). Typical applications include food and chemical processing, production control, automotive electronics, computer-controlled sewing machines, photographic equipment (both for computer-controlled cameras and for darkroom computerized processing), energy distribution systems, word processing, mailing lists, payrolls, and inventory. 2. Computer programs that perform specific tasks, such as word processing or database management.

applicators (applicator electrodes)—1. In dielectric heating, the electrodes between which the dielectric item is placed and the electrostatic field developed. 2. Appropriately shaped conducting surfaces between which an alternating electric field is established for the purpose of producing dielectric heating. 3. In medical electronics, the electrodes applied to a patient undergoing diathermy or ultrasonic therapy.

applied voltage—1. The potential between a terminal and a reference point in any circuit or device. 2. The voltage obtained when measuring between two given points in a circuit with voltage applied to the complete circuit. 3. The voltage presented to a circuit point or system input, as opposed to the voltage drop resulting from current through an element that results from the applied voltage.

applique circuit—A special circuit provided to modify existing equipment in order to allow for some special usage.

approach-control radar—Any radar set or system used in a ground-controlled approach system, e.g., an airport-surveillance radar, precision approach radar, etc.

approach path—In radio aircraft navigation, that portion of the flight path in the immediate vicinity of a landing area where such a flight path terminates at the touchdown point.

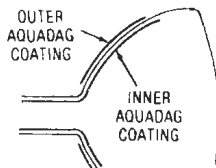
approved circuit—*See* protected wireline distribution system.

APT—Abbreviation for automatically programmed tool. A high-level or simplified programming language.

AQL—Abbreviation for acceptable quality level. A statistically defined quality level, in terms of percent defective accepted on an average of 95 percent of the

time. In other words, a sampling plan with 1 percent AQL passes (accepts) lots 1 percent defective 95 percent of the time.

aquadag layer—Trademark of Acheson Industries, Inc. A conductive graphite coating on the inner side walls of some cathode-ray tubes. It serves as an electrostatic shield or as a postdeflection and an accelerating anode. Also applied to outer walls and grounded; here it serves, with the inner coating, as a capacitor to filter the applied high voltage.



Aquadag coating.

arbiter—The section of a multiprocessor network's operating system that resolves simultaneous system-resource requests.

arbitrary function fitter—A circuit having an output voltage or current that is a presettable, adjustable, usually nonlinear function of the input voltage(s) or current(s) fed to it.

arbitrary waveform generator—*See* waveform generator.

arbor—*See* mandrel.

arc—1. A luminous discharge of electricity through a gas. Characterized by a change in space potential in the immediate vicinity of the cathode; this change is approximately equal to the ionization potential of the gas. 2. A prolonged electrical discharge, or series of prolonged discharges, between two electrodes. (Both produce a bright-colored flame, as contrasted with a dim corona-glow discharge). 3. To form an arc. 4. The electric current in a flamelike stream of incandescent gas particles. 5. An electric current through air or across the surface of an insulator associated with high voltage; usually occurs when a contact is opened, or when deenergizing an inductive load.

arcback—Also called backfire. Failure of the rectifying action in a tube, resulting from the flow of a principal electron stream in the reverse direction due to the formation of a cathode spot on the anode. This action limits the peak inverse voltage that may be applied to a particular rectifier tube.

arc converter—A form of oscillator utilizing an electric arc to generate an alternating or pulsating current.

arc discharge—1. A discharge between electrodes in gas or vapor. Characterized by a relatively low voltage drop and a high current density. 2. The sustained, luminous thermionic discharge between anode and cathode in a gas-filled tube.

arc-discharge tube—A gas-filled or mercury-vapor tube that utilizes ionic phenomena for switching, voltage regulation, or rectification.

arc drop—The voltage drop between the anode and cathode of a gas rectifier tube during conduction.

arc-drop loss—In a gas tube, the product of the instantaneous values of arc-drop voltage and current averaged over a complete cycle of operation.

arc-drop voltage—The voltage drop between the anode and cathode of a gas rectifier tube during conduction.

arc failure—1. A flashover in the air near an insulation surface. 2. An electrical failure in the surface heated by a flashover arc. 3. An electrical failure in the surface damaged by the flashover arc.

arc function—An inverse trigonometric function.

arc furnace—An electric furnace heated by arcs between two or more electrodes.

architecture—1. Organizational structure of a computing system, mainly referring to the CPU or micro-processor. 2. The manner in which the basic computer functions are organized and partitioned on the silicon chips. 3. The manner in which a system (such as a network or a computer) or program is structured.

archival—Pertaining to long-term storage of data.

archival backup—Backing up only files that have been changed since the last backup.

archive—1. A procedure for transferring information from an online storage diskette or memory area to an offline storage medium. 2. To copy computer programs and data onto an auxiliary storage medium, such as a disk or tape, for long-term retention.

arcing—The production of an arc, e.g., at the brushes of a motor or at the contact of a switch.

arcing contacts—Special contacts on which the arc is drawn after the main contacts of a switch or circuit breaker have opened.

arcing time—1. The interval between the parting, in a switch or circuit breaker, of the arcing contacts and the extension of the arc. 2. The time elapsing, in a fuse, from the severance of the fuse link to the final interruption of the circuit under the specified condition.

arc lamp—Source of brilliant artificial light obtained by an electric arc passing between two carbon rods. The arc is struck by bringing the two rods together and then rapidly separating them. As the arc burns, the carbon rods are vaporized away. A mechanism is employed to keep the space between the two rods constant. This type of lamp is used extensively in motion picture projectors and spotlights. The illumination of the arc lamp is derived from the incandescence of the positive electrode and from the heated, luminous, ionized gases or vapor that surround the arc.

arc oscillator—A negative-resistance oscillator comprising a sustained dc arc and a resonant circuit.

arc over—The (usually abrupt) creation of an arc between electrodes, contacts, or plates of a capacitor.

arc over resistance—The resistance of a material to the effects of a high-voltage, low-current arc (under prescribed conditions) passing across the surface of the material. The resistance is stated as a measure of total elapsed time required to form a conductive path on the surface (material carbonized by the arc).

arc over voltage—Under specified conditions, the minimum voltage required to create an arc between electrodes separated by a gas or liquid insulation.

arc percussive welding—A type of welding in which the materials to be welded are separated by a gap, across which an arc is struck; the arc melts the surfaces of the materials, and the materials are simultaneously brought together. *See also* pulse arc welding.

arc resistance—The length of time that a material can resist the formation of a conductive path by an arc adjacent to the surface of the material. Also called tracking resistance.

arc suppressor—A device, or combination of devices, used for arc suppression. *See* spark suppressor.

arc-through—In a gas tube, a loss of control with the result that a principal electron stream flows in the normal direction during what should be a nonconducting period.

area code—A three-digit number code identifying one of the geographic areas of the United States, Canada, and Mexico to permit direct distance dialing on the telephone system. The area code precedes the central office code in the complete 10-digit telephone number, and must be used when the called telephone is in a numbering plan area different from that of the calling telephone. The first digit of the area code is never a 1 or 0. *See also* direct distance dialing.

area protection—Protection of the inner space or volume of a secured area by means of a volumetric sensor.

area redistribution—A method of measuring the duration of irregularly shaped pulses. A rectangle is drawn having the same peak amplitude and the same area as the original pulse under consideration. Because the same time units are used in measuring the original and the new pulse, the width of the rectangle is considered the duration of the pulse.

area sensor—A sensor with a detection zone that approximates an area, such as a wall surface or the exterior of a safe.

A register—The accumulator for all arithmetical operations in a computer. Also called A accumulator.

argon—An inert gas used in discharge tubes and some electric lamps. It gives off a purple glow when ionized; its symbol is Ar.

argon glow lamp—A glow lamp containing argon gas that produces a pale blue violet light.

argument—1. A variable upon which the value of a function depends. The arguments of a function are listed in parentheses after the function name. The computations specified by the function definition are made with the variables specified as arguments. 2. The number that a function works on to produce its results. 3. The independent variable of a function. Arguments can be passed as part of a subroutine call where they would be used in that subroutine.

arithmetic and logic unit—Computer element that can perform the basic data manipulations in the central processor. Usually it can add, subtract, complement, negate, rotate, AND, and OR. Abbreviated ALU.

arithmetic capability—The ability to do addition, subtraction, and in some cases multiplication and division.

arithmetic check—A check of a computation making use of the arithmetical properties of the computation.

arithmetic element—Synonym for arithmetic unit.

arithmetic mean—1. Usually, the same as *average*. It is obtained by first adding quantities together and then dividing by the number of quantities involved. 2. A figure midway between two extremes and is found by adding the minimum and maximum together and dividing by two.

arithmetic operation—1. In an electronic computer, the operations in which numerical quantities form the elements of the calculation, including the fundamental operations of arithmetic (addition, subtraction, multiplication, comparison, and division). 2. Adding, subtracting, incrementing, or decrementing data in registers or memory.

arithmetic organ—*See* arithmetic unit.

arithmetic shift—In a digital computer, the multiplication or division of a quantity by a power of the base used in the notation.

arithmetic statement—1. An expression and a variable separated by an equals sign. The expression is evaluated and the resulting value is assigned to the variable. 2. Instruction specifying an arithmetic operation.

arithmetic sum—The sum of two or more quantities regardless of their signs. Compare with *algebraic sum*.

arithmetic symmetry—Filter response showing mirror-image symmetry about the center frequency when frequency is displayed on an arithmetic scale. Constant

envelope delay in bandpass filters usually is accompanied by arithmetic symmetry in the phase and amplitude responses and generally requires a computer design. *See also* geometric symmetry.

arithmetic unit—Also called arithmetic element or arithmetic organ. In an automatic digital computer, that portion in which arithmetical and logical operations are performed on elements of information.

armature—The moving element in an electromechanical device, such as the rotating part of a generator or motor, the movable part of a relay, or the spring-mounted, iron portion of a bell or buzzer.

armature contacts—1. Contacts mounted directly on the armature. 2. Sometimes used for movable contacts.

armature control of speed—The varying of voltage applied to the armature of a shunt-wound motor to control the motor's speed over the basic speed range.

armature core—An assembly of laminations forming the magnetic circuit of an armature.

armature gap—The space between the armature and pole face.

armature hesitation—A delay or momentary reversal of the motion of the armature.

armature-hesitation contact chatter—Chatter caused by delay or momentary reversal in direction of the armature motion of a relay during either the operate or the release stroke.

armature-impact contact chatter—Chatter caused by impact of the armature of a relay on the pole piece in operation, or on the backstop in release.

armature overtravel—That portion of the available stroke occurring after the contacts of a relay have touched.

armature reaction—In an armature, the reaction of the magnetic field produced by the current on the magnetic lines of force produced by the field coil of an electric motor or generator.

armature rebound—Return motion of a relay armature after striking the backstop.

armature-rebound contact chatter—Chatter caused by the partial return of the armature of a relay to its operated position as a result of rebound from the backstop in release.

armature relay—A relay operated by an electromagnet that, when energized, causes an armature to be attracted to a fixed pole or poles.

armature slot—In the core of an armature, a slot or groove into which the coils or windings are placed.

armature stud—In a relay, an insulating member that transmits the motion of the armature to an adjacent contact member.

armature travel—The distance traveled during operation by a specified point on the armature of a relay.

armature voltage control—A means of controlling the speed of a motor by changing the voltage applied to its armature windings.

armature wire—Stranded annealed copper wire, straight lay, soft loose white cotton braid. It is used for low-voltage, high-current rotor winding motors and generators. Straight lay permits forming in armature slots, and compressibility.

armchair copy—Amateur term for clear, static-free signals.

armed sweep—*See* single sweep.

arming the oscilloscope sweep—Closing a switch that enables the oscilloscope to trigger on the next pulse.

armor—A braid or wrapping of metal, usually steel, placed over the insulation of wire or cable to protect it from abrasion or crushing.

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