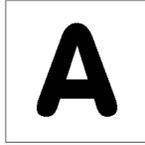


**a:** Abbreviation for **atto** ( $10^{-18}$ ).  
See **metric system**.



**abandoned call:** A call in which the call originator disconnects or cancels the call after a connection has been made, but before the call is established.

**abbreviated dialing:** A telephone service feature that (a) permits the user to dial fewer digits to access a network than are required under the nominal numbering plan, and (b) is limited to a subscriber-selected set of frequently dialed numbers. *Synonym* **speed dialing**.

**abort:** **1.** In a computer or data transmission system, to terminate, usually in a controlled manner, a processing activity because it is impossible or undesirable for the activity to proceed. **2.** In data transmission, a function invoked by a sending station to cause the recipient to discard or ignore all bit sequences transmitted by the sender since the preceding flag sequence.

**abrasive:** Any of a number of hard materials, such as aluminum oxide, silicon carbide, and diamond, that are powdered and carefully graded according to particle size, and used to shape and/or finish optical elements, including the endfaces of optical fibers and connectors. *Note:* For finishing the endfaces of optical fiber connectors, abrasive particles are adhered to a substrate of plastic film, in a fashion after that of sandpaper. The film is in turn supported by a hard, flat plate. The connector is supported by a fixture that holds it securely in the proper position for finishing. The grinding motion may be performed manually or by a machine. [After FAA]

**absolute delay:** The time interval or phase difference between transmission and reception of a signal. (188)

**absolute gain:** **1.** Of an antenna, for a given direction and polarization, the ratio of (a) the power that would be required at the input of an ideal isotropic radiator to (b) the power actually supplied to the given antenna, to produce the same radiation intensity in the far-field region. *Note 1:* If no direction is given, the absolute gain of an antenna corresponds to the direction of maximum effective

radiated power. *Note 2:* Absolute gain is usually expressed in dB. (188) *Synonym* **isotropic gain**. **2.** Of a device, the ratio of (a) the signal level at the output of the device to (b) that of its input under a specified set of operating conditions. *Note 1:* Examples of absolute gain are no-load gain, full-load gain, and small-signal gain. *Note 2:* Absolute gain is usually expressed in dB. (188)

**absolute temperature:** See **thermodynamic temperature**.

**absorption:** In the transmission of electrical, electromagnetic, or acoustic signals, the conversion of the transmitted energy into another form, usually thermal. (188) [After 2196] *Note 1:* Absorption is one cause of signal attenuation. *Note 2:* The conversion takes place as a result of interaction between the incident energy and the material medium, at the molecular or atomic level.

**absorption band:** A spectral region in which the absorption coefficient reaches a relative maximum, by virtue of the physical properties of the matter in which the absorption process takes place. [FAA]

**absorption coefficient:** A measure of the attenuation caused by absorption of energy that results from its passage through a medium. [After 2196] *Note 1:* Absorption coefficients are usually expressed in units of reciprocal distance. *Note 2:* The sum of the absorption coefficient and the scattering coefficient is the attenuation coefficient.

**absorption index:** **1.** A measure of the attenuation caused by absorption of energy per unit of distance that occurs in an electromagnetic wave of given wavelength propagating in a material medium of given refractive index. *Note:* The value of the absorption index  $K'$  is given by the relation

$$K' = \frac{K\lambda}{4\pi n} ,$$

where  $K$  is the absorption coefficient,  $\lambda$  is the wavelength in vacuum, and  $n$  is the refractive index of the absorptive material medium. (188) [After 2196] **2.** The functional relationship between the

Sun angle—at any latitude and local time—and the ionospheric absorption. (188)

**absorption loss:** That part of the transmission loss caused by the dissipation or conversion of electrical, electromagnetic, or acoustic energy into other forms of energy as a result of its interaction with a material medium.

**absorption modulation:** Amplitude modulation of the output of a radio transmitter by means of a variable-impedance circuit that is caused to absorb carrier power in accordance with the modulating wave.

**abstract syntax:** In open systems architecture, the specification of application-layer data or application-protocol control information by using notation rules that are independent of the encoding technique used to represent the information. (188)

**abstract syntax notation one (ASN.1):** A standard, flexible method that (a) describes data structures for representing, encoding, transmitting, and decoding data, (b) provides a set of formal rules for describing the structure of objects independent of machine-specific encoding techniques, (c) is a formal network-management Transmission Control Protocol/Internet Protocol (TCP/IP) language that uses human-readable notation and a compact, encoded representation of the same information used in communications protocols, and (d) is a precise, formal notation that removes ambiguities. (188)

**ac:** *Abbreviation for alternating current.*

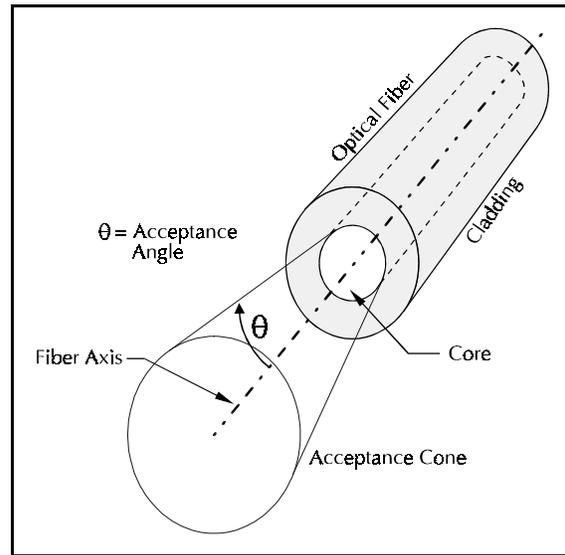
**accept:** In data transmission, the condition assumed by a primary or secondary station upon correct receipt of a frame for processing.

**acceptance:** The condition that exists when a system or functional unit meets the specified performance and security requirements.

**acceptance angle:** In fiber optics, half the vertex angle of that cone within which optical power may be coupled into bound modes of an optical fiber. *Note 1:* The axis of the cone is collinear with the fiber axis, the vertex of the cone is on the fiber end-face, and the base of the cone faces the optical

power source. *Note 2:* The acceptance angle is measured with respect to the fiber axis. *Note 3:* Rays entering an optical fiber at angles greater than the acceptance angle are coupled into unbound modes. (188) [After 2196]

**acceptance cone:** In fiber optics, the cone within which optical power may be coupled into the bound modes of an optical fiber. *Note:* The acceptance cone is derived by rotating the acceptance angle about the fiber axis. (188) [After 2196]



acceptance cone

**acceptance pattern: 1.** Of an antenna, for a given plane, a distribution plot of the off-axis power relative to the on-axis power as a function of angle or position. (188) [After 2196] *Note:* The acceptance pattern is the equivalent of a horizontal or vertical antenna pattern. **2.** Of an optical fiber or fiber bundle, a curve of total transmitted power plotted against the launch angle.

**acceptance test:** A test of a system or functional unit to ensure that contractual requirements are met. *Note:* An acceptance test may be performed at the factory or user premises by the user, vendor, or a third party.

**acceptance testing:** Operating and testing of a communication system, subsystem, or component, to

ensure that the specified performance characteristics have been met. (188)

**acceptance trial:** A trial carried out by nominated representatives of the eventual military users of the weapon or equipment to determine if the specified performance and characteristics have been met.

**accepted interference:** Interference at a higher level than that defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations. [NTIA] [RR]

**access:** **1.** The ability and means necessary to store data in, to retrieve data from, to communicate with, or to make use of any resource of a system. (188) **2.** To obtain the use of a resource. **3.** (COMSEC) [The] capability and opportunity to gain detailed knowledge of or to alter information or material. [NIS] **4.** (AIS) [The] ability and means to communicate with (*i.e.*, input to or receive output from), or otherwise make use of any information, resource, or component in an AIS. *Note [for 3 and 4]:* An individual does not have “access” if the proper authority or a physical, technical, or procedural measure prevents him/her from obtaining knowledge or having an opportunity to alter information, material, resources, or components. [NIS] **5.** An assigned portion of system resources for one data stream of user communications or signaling. (188)

**access attempt:** The process by which one or more users interact with a telecommunications system to enable initiation of user information transfer. *Note:* An access attempt begins with an issuance of an access request by an access originator. An access attempt ends either in successful access or in access failure.

**access category:** A class to which a user, such as a person, program, process, or equipment, of a system may be assigned, based on the resources each user is authorized to use.

**access charge:** A charge made by a local exchange carrier for use of its local exchange facilities for a purpose such as the origination or termination of traffic that is carried to or from a distant exchange

by an interexchange carrier. *Note:* Although some access charges are billed directly to local end users, a very large part of all access charges is paid by interexchange carriers.

**access code:** The preliminary digits that a user must dial to be connected to a particular outgoing trunk group or line. (188)

**access contention:** In ISDN applications, *synonymous with “contention.” See contention (def. #2).*

**access control:** **1.** A service feature or technique used to permit or deny use of the components of a communication system. **2.** A technique used to define or restrict the rights of individuals or application programs to obtain data from, or place data onto, a storage device. **3.** The definition or restriction of the rights of individuals or application programs to obtain data from, or place data into, a storage device. **4.** [The] process of limiting access to the resources of an AIS to authorized users, programs, processes, or other systems. [NIS] **5.** That function performed by the resource controller that allocates system resources to satisfy user requests. (188)

**access control message:** A message that is a user request, a resource controller response, or a request/response between resource controllers. (188)

**access coupler:** *Deprecated term. See directional coupler.*

**access denial:** **1.** Access failure caused by the issuing of a system blocking signal by a communications system that does not have a call-originator camp-on feature. **2.** Access failure caused by exceeding the maximum access time and nominal system access time fraction during an access attempt. *Synonym system blocking.*

**access-denial time:** The time between the start of an access attempt and access failure caused by access denial, *i.e.*, system blocking. *Note:* Access denial times are measured only on access attempts that result in access denial.

**access failure:** In a communications system, an unsuccessful access that results in termination of an access attempt in any manner other than initiation of user information transfer between the intended source and destination (sink) within the specified maximum access time. *Note:* Access failure can be the result of access denial, access outage, user blocking, or incorrect access.

**access group:** A group of one or more stations having identical rights to use the available resources on a PBX, network or host computer.

**access line:** A transmission path between user terminal equipment and a switching center.

**access node:** In switching systems, the point where user traffic enters and exits a communications network. *Note:* Access node operations may include various operations, such as protocol conversion and code conversion.

**access originator:** The functional entity responsible for initiating a particular access attempt. *Note:* An access attempt can be initiated by a source user, a destination user, or the telecommunications system.

**access phase:** In an information-transfer transaction, the phase during which an access attempt is made. *Note:* The access phase is the first phase of an information-transfer transaction.

**access point:** **1.** A point where connections may be made for testing or using particular communications circuits. (188) **2.** In telephony, a junction point in outside plant consisting of a semipermanent splice at a junction between a branch feeder cable and distribution cables. (188)

**access request:** A control message issued by an access originator for the purpose of initiating an access attempt.

**access time:** **1.** In a telecommunication system, the elapsed time between the start of an access attempt and successful access. *Note:* Access time values are measured only on access attempts that result in successful access. **2.** In a computer, the time interval between the instant at which an instruction control unit initiates a call for data and the instant at which

delivery of the data is completed. (188) **3.** The time interval between the instant at which storage of data is requested and the instant at which storage is started. (188) **4.** In magnetic disk devices, the time for the access arm to reach the desired track and the delay for the rotation of the disk to bring the required sector under the read-write mechanism.

**accounting management:** In network management, a set of functions that (a) enables network service use to be measured and the costs for such use to be determined and (b) includes all the resources consumed, the facilities used to collect accounting data, the facilities used to set billing parameters for the services used by customers, maintenance of the data bases used for billing purposes, and the preparation of resource usage and billing reports. (188) [After ANSI T1.210]

**accumulator:** **1.** A register in which one operand can be stored and subsequently replaced by the result of an arithmetic or logic operation. **2.** A storage register. (188) **3.** A storage battery. (188)

**accuracy:** The degree of conformity of a measured or calculated value to its actual or specified value. *Contrast with precision.*

**ACD:** *Abbreviation for automatic call distributor.*

**ac-dc ringing:** Telephone ringing that makes use of both ac and dc voltages and currents. *Note:* An alternating current may be used to operate a ringer and direct current to aid the relay action that stops the ringing when the called telephone is answered.

**ACK:** *Abbreviation for acknowledge character.*

**acknowledge character (ACK):** A transmission control character transmitted by the receiving station as an affirmative response to the sending station. *Note:* An acknowledge character may also be used as an accuracy control character.

**acknowledgement:** **1.** A response sent by a receiver to indicate successful receipt of a transmission. *Note:* An example of an acknowledgement is a protocol data unit, or element thereof, between peer entities, to indicate the status of data units that have been successfully received. **2.** A message from the

addressee informing the originator that the originator's communication has been received and understood. [After JP1]

**acknowledgement delay period:** *Synonym (loosely) sliding window.*

**A-condition:** In a start-stop teletypewriter system, the significant condition of the signal element that immediately precedes a character signal or block signal and prepares the receiving equipment for the reception of the code elements. *Contrast with start signal.*

**acoustic coupler:** **1.** An interface device for coupling electrical signals by acoustical means—usually into and out of a telephone instrument. (188) **2.** A terminal device used to link data terminals and radio sets with the telephone network. *Note:* The link is achieved through acoustic (sound) signals rather than through direct electrical connection.

**acoustic noise:** An undesired audible disturbance in the audio frequency range. (188)

**acoustic wave:** A longitudinal wave that (a) consists of a sequence of pressure pulses or elastic displacements of the material, whether gas, liquid, or solid, in which the wave propagates, (b) in gases, consists of a sequence of compressions (dense gas) and rarefactions (less dense gas) that travel through the gas, (c) in liquids, consists of a sequence of combined elastic deformation and compression waves that travel through the liquid, and (d) in solids, consists of a sequence of elastic compression and expansion waves that travel through the solid. *Note 1:* The speed of an acoustic wave in a material medium is determined by the temperature, pressure, and elastic properties of the medium. In air, acoustic waves propagate at 332 m/s (1087 ft/s) at 0°C, at sea level. In air, sound-wave speed increases approximately 0.6 m/s (2 ft/s) for each kelvin above 0°C. *Note 2:* Acoustic waves audible to the normal human ear are termed *sound waves*. [From Weik '89]

**acousto-optic effect:** A variation of the refractive index of a material caused by interaction with acoustic energy in the form of a wave or pulse. (188) *Note:* The acousto-optic effect is used in devices that modulate or deflect light.

**acousto-optics:** The discipline devoted to the interactions between acoustic waves and light waves in a material medium. (188) [After 2196] *Note:* Acoustic waves can be made to modulate, deflect, and/or focus light waves by causing a variation in the refractive index of the medium.

**acquisition:** **1.** In satellite communications, the process of locking tracking equipment on a signal from a communications satellite. (188) **2.** The process of achieving synchronization. **3.** In servo systems, the process of entering the boundary conditions that will allow the loop to capture the signal and achieve lock-on. (188)

**acquisition and tracking orderwire:** *See ATOW.*

**acquisition time:** **1.** In a communications system, the time interval required to attain synchronism. **2.** In satellite control communications, the time interval required for locking tracking equipment on a signal from a communications satellite. (188)

**active device:** A device that requires a source of energy for its operation and has an output that is a function of present and past input signals. *Note:* Examples of active devices include controlled power supplies, transistors, LEDs, amplifiers, and transmitters.

**active laser medium:** Within a laser, the material that emits coherent radiation or exhibits gain as the result of electronic or molecular transitions to a lower energy state or states, from a higher energy state or states to which it had been previously stimulated. *Note:* Examples of active laser media include certain crystals, gases, glasses, liquids, and semiconductors. *Synonym laser medium.*

**active satellite:** A satellite carrying a station intended to transmit or retransmit radio communication signals. [NTIA] [RR] (188) *Note:* An active satellite may perform signal processing functions such as amplification, regeneration, frequency translation, and link switching, to make the signals suitable for retransmission.

**active sensor:** **1.** A detection device that requires input energy from a source other than that which is being sensed. *Note:* An example of an active sensor

is a photoconductive cell. **2.** In surveillance, a detection device that emits energy capable of being detected by itself. *Note:* An example of an active sensor is a measuring instrument that generates a signal, transmits it to a target, and receives a reflected signal from the target. Information concerning the target is obtained by comparison of the received signal with the transmitted signal. **3.** A measuring instrument in the Earth exploration-satellite service or in the space research service by means of which information is obtained by transmission and reception of radio waves. [NTIA] [RR]

**active star:** *See star coupler, multiport repeater.*

**activity factor:** For a communications channel during a specified time interval, such as the busy hour, the percentage of time that a signal is present in the channel in either direction. (188)

**ACU:** *Abbreviation for automatic calling unit.*

**A-D:** *Abbreviation for analog-to-digital. See analog transmission.*

**Ada®:** The official, high-level computer language of DOD for embedded-computer, real-time applications as defined in MIL-STD-1815. *Note:* Ada® is a registered trademark of the U.S. Government (Ada Joint Program Office).

**adaptive channel allocation:** In communications system traffic flow control, channel allocation in which information-handling capacities of channels are not predetermined but are assigned on demand. *Note:* Adaptive channel allocation is usually accomplished by means of a multiplexing scheme.

**adaptive communications:** Any communications system, or portion thereof, that automatically uses feedback information obtained from the system itself or from the signals carried by the system to modify dynamically one or more of the system operational parameters to improve system performance or to resist degradation. (188) *Note:* The modification of a system parameter may be discrete, as in hard-switched diversity reception, or may be continuous, as in a predetection combining algorithm.

**adaptive differential pulse code-modulation (ADPCM):** Differential pulse-code modulation in which the prediction algorithm is adjusted in accordance with specific characteristics of the input signal.

**adaptive equalization:** Equalization (a) that is automatically accomplished while traffic is being transmitted and (b) in which signal characteristics are dynamically adjusted to compensate for changing transmission path characteristics. (188)

**adaptive predictive coding (APC):** Narrowband analog-to-digital conversion that uses a one-level or multilevel sampling system in which the value of the signal at each sampling instant is predicted according to a linear function of the past values of the quantized signals. *Note:* APC is related to linear predictive coding (LPC) in that both use adaptive predictors. However, APC uses fewer prediction coefficients, thus requiring a higher sampling rate than LPC.

**adaptive radio:** A radio that (a) monitors its own performance, (b) monitors the path quality through sounding or polling, (c) varies operating characteristics, such as frequency, power, or data rate, and (d) uses closed-loop action to optimize its performance by automatically selecting frequencies or channels.

**adaptive routing:** Routing that is automatically adjusted to compensate for network changes such as traffic patterns, channel availability, or equipment failures. *Note:* The experience used for adaptation comes from the traffic being carried.

**adaptive system:** A system that has a means of monitoring its own performance, a means of varying its own parameters, and uses closed-loop action to improve its performance or to optimize traffic. (188)

**ADC:** *Abbreviation for analog-to-digital converter, analog-to-digital conversion.*

**ADCCP:** *Abbreviation for Advanced Data Communication Control Procedures.*

**added bit:** A bit delivered to the intended destination user in addition to intended user information bits and delivered overhead bits. *Synonym* **extra bit**.

**added block:** Any block, or other delimited bit group, delivered to the intended destination user in addition to intended user information bits and delivered overhead bits. *Synonym* **extra block**.

**adder:** **1.** A device whose output data are a representation of the sum of the numbers represented by its input data. *Note:* An adder may be serial or parallel, digital or analog. **2.** A device whose output data are a representation of the sum of the quantities represented by its input data. *Note:* An adder can add things other than representations of numbers. It can add voltages, *etc.* Analog adders are not limited to summing representations of numbers. An adder may operate on digital or analog data.

**adder-subtractor:** A device that acts as an adder or subtracter depending upon the control signal received; the adder-subtractor may be constructed so as to yield a sum and a difference at the same time. *Note:* An arithmetic adder-subtractor yields arithmetic sums and differences, whereas a logical adder-subtractor yields logical sums and differences.

**additive white gaussian noise (AWGN):** *Synonym* **white noise**.

**add mode:** In addition and subtraction operations, a mode in which the decimal marker is placed at a predetermined location with respect to the last digit entered.

**add-on conference:** A service feature that allows an additional party to be added to an established call without attendant assistance. *Note:* A common implementation provides a progressive method that allows a call originator or a call receiver to add at least one additional party.

**address:** **1.** In communications, the coded representation of the source or destination of a message. (188) **2.** In data processing, a character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. (188) **3.** To assign to a device or item of data a label to identify its location. (188) **4.** The

part of a selection signal that indicates the destination of a call. **5.** To refer to a device or data item by its address.

**addressability:** **1.** In computer graphics, the capability of a display surface or storage device to accommodate a specified number of uniquely identifiable points. **2.** In micrographics, the capability of a specified field frame to contain a specific number of uniquely identifiable points. *Note:* The addressability is usually specified as the number of identifiable horizontal points by the number of identifiable vertical points, such as 3000 by 4000.

**addressable point:** In computer graphics, any point of a device that can be addressed.

**address field:** The portion of a message that contains the source-user address and the destination-user addresses. *Note:* In a communications network, the address field is usually contained within the message header portion of the message. A message usually consists of the message header, the user data, and a trailer.

**address-indicating group (AIG):** A station or address designator, used to represent a set of specific and frequently recurring combinations of action or information addresses. *Note:* The identity of the message originator may also be included in the AIG. An address group is assigned to each AIG for use as an address designator.

**address message:** A message sent in the forward direction that contains (a) address information, (b) the signaling information required to route and connect a call to the called line, (c) service-class information, (d) information relating to user and network facilities, and (e) call-originator identity or call-receiver identity.

**address message sequencing:** In common-channel signaling, a procedure for ensuring that address messages are processed in the correct order when the order in which they are received is incorrect.

**address part:** A part of an instruction that usually contains only an address or part of an address.

**address pattern:** A prescribed structure of data used to represent the destination(s) of a block, message, packet, or other formalized data structure.

**address resolution protocol (ARP):** A Transmission Control Protocol/Internet Protocol (TCP/IP) protocol that dynamically binds a Network-Layer IP address to a Data-Link-Layer physical hardware address, *e.g.*, Ethernet address.

**address separator:** A character that separates the different addresses in a selection signal.

**ADH:** *Abbreviation for automatic data handling.*

**adjacent-channel interference:** Extraneous power from a signal in an adjacent channel. (188) *Note 1:* Adjacent channel interference may be caused by inadequate filtering, such as incomplete filtering of unwanted modulation products in frequency modulation (FM) systems, improper tuning, or poor frequency control, in either the reference channel or the interfering channel, or both. *Note 2:* Adjacent-channel interference is distinguished from crosstalk.

**adjunct service point (ASP):** An intelligent-network feature that resides at the intelligent peripheral equipment and responds to service logic interpreter requests for service processing.

**administration:** **1.** Any governmental department or service responsible for discharging the obligations undertaken in the convention of the International Telecommunication Union and the *Regulations*. [RR] **2.** Internal management of units. [JP1] **3.** The management and execution of all military matters not included in strategy and tactics. [JP1] **4.** In international telecommunications for a given country, the government agency assigned responsibility for the implementation of telecommunications standards, regulations, recommendations, practices, and procedures. **5.** In network management, network support functions that ensure that (a) services are performed, (b) the network is used efficiently, and (c) prescribed service-quality objectives are met.

**administrative management complex (AMC):** In network management, a complex that is controlled by a network provider, and is responsible for and performs network management functions such as

network maintenance. (188) [After ANSI T1.218-1991]

**ADP:** *Abbreviation for automatic data processing.*

**ADPCM:** *Abbreviation for adaptive differential pulse-code modulation.*

**ADPE:** *Abbreviation for automatic data processing equipment.*

**ADP system:** *Synonym computer system.*

**Advanced Data Communication Control Procedures (ADCCP):** A bit-oriented Data-Link-Layer protocol used to provide point-to-point and point-to-multipoint transmission of data frames that contain error-control information. *Note:* ADCCP closely resembles high-level data link control (HDLC) and synchronous data link control (SDLC).

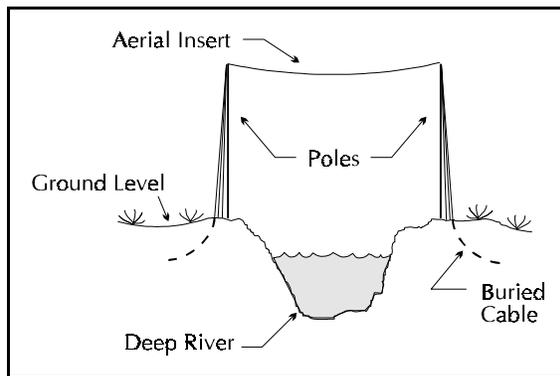
**advanced intelligent network (AIN):** A proposed intelligent-network (IN) architecture that includes both IN/1+ and IN/2 concepts.

**advanced television (ATV):** A family of television systems that is intended to be improvements over current commercial-quality television. *Note:* The ATV family includes improved-definition television (IDTV), extended-definition television (EDTV), and high-definition television (HDTV).

**AECS:** *Abbreviation for Aeronautical Emergency Communications System. See Aeronautical Emergency Communications System Plan.*

**aerial cable:** A communications cable designed for installation on, or suspension from, a pole or other overhead structure. (188)

**aerial insert:** In a direct-buried or underground cable run, a cable rise to a point above ground, followed by an overhead run, *e.g.*, on poles, followed by a drop back into the ground. *Note:* An aerial insert is used in places where it is not possible or practical to remain underground, such as might be encountered in crossing a deep ditch, canal, river, or subway line.



aerial insert

**aeronautical advisory station:** An aeronautical station used for advisory and civil defense communications primarily with private aircraft stations. *Synonym UNICOM station.* [NTIA]

**aeronautical broadcast station:** An aeronautical station which makes scheduled broadcasts of meteorological information and notices to airmen. (In certain instances, an aeronautical broadcast station may be placed on board a ship.) [NTIA]

**aeronautical Earth station:** An Earth station in the fixed-satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service. [NTIA] [RR]

**Aeronautical Emergency Communications System (AECS) Plan:** The AECS Plan provides for the operation of aeronautical communications stations, on a voluntary, organized basis, to provide the President and the Federal Government, as well as heads of state and local governments, or their designated representatives, and the aeronautical industry with an expeditious means of communications during an emergency situation. [47CFR]

**aeronautical fixed service:** A radiocommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport. [NTIA] [RR]

**aeronautical fixed station:** A station in the aeronautical fixed service. [NTIA] [RR]

**aeronautical mobile (OR) [off-route] service:** An aeronautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes. [NTIA] [RR]

**aeronautical mobile (R) [route] service:** An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. [NTIA] [RR]

**aeronautical mobile-satellite service:** A mobile-satellite service in which mobile Earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. [NTIA] [RR]

**aeronautical mobile-satellite (OR) [off-route] service:** An aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes. [NTIA] [RR]

**aeronautical mobile-satellite (R) [route] service:** An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes. [NTIA] [RR]

**aeronautical mobile service:** A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. [NTIA]

**aeronautical multicom service:** A mobile service not open to public correspondence, used to provide communications essential to conduct activities being performed by or directed from private aircraft. [NTIA]

**aeronautical radionavigation-satellite service:** A radionavigation-satellite service in which Earth stations are located on board aircraft. [NTIA] [RR]

**aeronautical radionavigation service:** A radionavigation service intended for the benefit and for the safe operation of aircraft. [NTIA] [RR]

**aeronautical station:** A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. [NTIA] [RR]

**AF:** *Abbreviation for audio frequency.*

**AFNOR:** *Acronym for Association Française Normal.* France's national standards-setting organization. *Note:* AFNOR provides the Secretariat for ISO TC97/SC1, Information Technology Vocabulary, which includes computers, communications information processing, and office machines.

**AGC:** *Abbreviation for automatic gain control.*

**AI:** *Abbreviation for artificial intelligence.*

**AIM:** *Abbreviation for amplitude intensity modulation. See intensity modulation.*

**AIN:** *Abbreviation for advanced intelligent network.*

**AIOD:** *Abbreviation for automatic identified outward dialing.*

**AIOD leads:** Terminal equipment leads used solely to transmit automatic identified outward dialing (AIOD) data from a PBX to the public switched telephone network or to switched service networks (*e.g.*, EPSCS), so that a vendor can provide a detailed monthly bill identifying long-distance usage by individual PBX stations, tie trunks, or the attendant. . . . [from 47CFR]

**airborne radio relay:** **1.** Airborne equipment used to relay radio transmission from selected originating transmitters. [JP1] **2.** A technique employing aircraft fitted with radio relay stations for the

purpose of increasing the range, flexibility, or physical security of communications systems.

**air-conditioning:** The simultaneous controlling of the characteristics of air, such as temperature, humidity, cleanliness, motion, and pollutant concentration, in a space to meet the requirements of the occupants, a process, or equipment. *Synonym environmental control.*

**aircraft Earth station:** A mobile Earth station in the aeronautical mobile-satellite service located on board an aircraft. [NTIA] [RR]

**aircraft emergency frequency:** An international aeronautical emergency frequency, such as 121.5 MHz (civil) and 243.0 MHz (military), for aircraft stations and stations concerned with safety and regulation of flight along national or international civil air routes and maritime mobile service stations authorized to communicate for safety purposes.

**aircraft station:** A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft. [RR]

**airdrome control station:** An aeronautical station providing communication between an airdrome control tower and aircraft. [NTIA] *Synonym airport control station.*

**air-ground radiotelephone service:** A public radio service between a base station and airborne mobile stations. [47CFR]

**air-ground worldwide communications system:** A worldwide military network of ground stations that (a) provides two-way communications links between aircraft and ground stations for navigation and control, including air route traffic control and (b) may also provide support for special functions, such as for civil aircraft providing assistance to military missions and for meeting communications requirements for aircraft flying distinguished visitors.

**air portable:** Denotes materiel that is suitable for transport by an aircraft loaded internally or externally, with no more than minor dismantling and

reassembling within the capabilities of user units. This term must be qualified to show the extent of air portability. [JP1]

**airport control station:** *Synonym airdrome control station.*

**air sounding:** Measuring atmospheric phenomena or determining atmospheric conditions, especially by means of apparatus carried by balloons, rockets, or satellites.

**air terminal:** In grounding systems, the lightning rod or conductor placed on or above a building, structure, or external conductors for the purpose of intercepting lightning. (188)

**AIS:** *Abbreviation for automated information system.*

**alarm center:** A location that receives local and remote alarms. *Note:* An alarm center is usually in a technical control facility. (188)

**alarm indicator:** A device that responds to a signal from an alarm sensor. *Note:* Examples of alarm indicators include bells, lamps, horns, gongs, and buzzers.

**alarm sensor:** **1.** In communications systems, any device that (a) can sense an abnormal condition within the system and provide a signal indicating the presence or nature of the abnormality to either a local or remote alarm indicator, and (b) may detect events ranging from a simple contact opening or closure to a time-phased automatic shutdown and restart cycle. (188) **2.** In a physical security system, an approved device used to indicate a change in the physical environment of a facility or a part thereof. (188) *Note:* Alarm sensors may also be redundant or chained, such as when one alarm sensor is used to protect the housing, cabling, or power protected by another alarm sensor.

**a-law:** *See a-law algorithm.*

**a-law algorithm:** A standard compression algorithm, used in digital communications systems of the European digital hierarchy, to optimize, *i.e.*, modify, the dynamic range of an analog signal for digitizing.

*Note 1:* The wide dynamic range of speech does not lend itself well to efficient linear digital encoding. A-law encoding effectively reduces the dynamic range of the signal, thereby increasing the coding efficiency and resulting in a signal-to-distortion ratio that is superior to that obtained by linear encoding for a given number of bits.

**ALE:** *Abbreviation for automatic link establishment.*

**algorithmic language:** An artificial language established for expressing a given class of algorithms.

**aligned bundle:** A bundle of optical fibers in which the relative spatial coordinates of each fiber are the same at the two ends of the bundle. (188) *Note:* Such a bundle may be used for the transmission of images. *Synonym coherent bundle.*

**Allan variance:** One half of the time average over the sum of the squares of the differences between successive readings of the frequency deviation sampled over the sampling period. *Note:* The Allan variance is conventionally expressed by  $\sigma_y^2(\tau)$ . The samples are taken with no dead-time between them. *Synonym two-sample variance.*

**allcall:** In adaptive high-frequency (HF) radio automatic link establishment (ALE), a general broadcast that does not request responses and does not designate any specific addresses. *Note:* This essential function is required for emergencies ("HELP"), sounding-type data exchanges, and propagation and connectivity tracking. [After FED-STD-1045A] (188)

**all-glass fiber:** *Synonym all-silica fiber.*

**allocation (of a frequency band):** **1.** Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more (terrestrial or space) radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned. [NTIA] [RR] **2.** The process of designating radio-frequency bands for use by specific radio services. (188)

**allotment (of a radio frequency or radio frequency channel):** Entry of a designated frequency channel in an agreed plan, adopted by a component Conference, for use by one or more administrations for a (terrestrial or space) radiocommunication service in one or more identified countries or geographical areas and under specified conditions. [NTIA]

**all-silica fiber:** An optical fiber composed of a silica-based core and cladding. *Note:* The presence of a protective polymer overcoat does not disqualify a fiber as an all-silica fiber, nor does the presence of a tight buffer. [FAA] *Synonym all-glass fiber.*

**all trunks busy (ATB):** An equipment condition in which all trunks (paths) in a given trunk group are busy. *Note:* All-trunks-busy registers do not indicate subsequent attempts to reach trunk groups.

**alphabet:** **1.** An ordered set of all the letters used in a language, including letters with diacritical signs where appropriate, but not including punctuation marks. **2.** An ordered set of all the symbols used in a language, including punctuation marks, numeric digits, nonprinting control characters, and other symbols. *Note:* Examples of alphabets include the Roman alphabet, the Greek alphabet, the Morse Code, and the 128 characters of the American Standard Code for Information Interchange (ASCII) [IA No. 5]. (188)

**alphabetic character set:** A character set that contains letters and may contain control characters, special characters, and the space character, but not digits.

**alphabetic code:** A code according to which data are represented through the use of an alphabetic character set.

**alphabetic string:** **1.** A string consisting solely of letters from the same alphabet. **2.** A character string consisting solely of letters and associated special characters from the same alphabet.

**alphabetic word:** **1.** A word consisting solely of letters from the same alphabet. **2.** A word that consists of letters and associated special characters, but not digits.

**alphabet translation:** *Deprecated synonym for alphabet transliteration. See alphabet transliteration.*

**alphabet transliteration:** The substitution of the characters of one alphabet for the corresponding characters of a different alphabet, usually accomplished on a character-by-character basis. (188) *Note 1:* An example of alphabet transliteration is the substitution of the Roman letters a, b, and p for the Greek letters  $\alpha$ ,  $\beta$ , and  $\pi$ , respectively. *Note 2:* Alphabet transliteration is reversible. *Note 3:* Alphabet transliteration often becomes necessary in telecommunications systems because of the different alphabets and codes used worldwide. *Note 4:* In alphabet transliteration, no consideration is given to the meaning of the characters or their combinations.

**alphanumeric:** **1.** Pertaining to a character set that contains letters, digits, and sometimes other characters, such as punctuation marks. (188) **2.** Pertaining to a set of unique bit patterns that are used to represent letters of an alphabet, decimal digits, punctuation marks, and other special signs and symbols used in grammar, business, and science, such as those displayed on conventional typewriter keyboards.

**alphanumeric character set:** A character set that contains both letters and digits, special characters, and the space character.

**alphanumeric code:** **1.** A code derived from an alphanumeric character set. **2.** A code that, when used, results in a code set that consists of alphanumeric characters.

**alphanumeric data:** Data represented by letters, digits, and sometimes by special characters and the space character.

**alpha profile:** *See power-law index profile.*

**altazimuth mount:** A mounting, *e.g.*, for a directional antenna, in which slewing takes place in (a) the plane tangent to the surface of the Earth or other frame of reference and (b) elevation about, *i.e.*, above or below, that plane. *Synonym x-y mount.*

**alternate mark inversion (AMI) signal:** A pseudoternary signal, representing binary digits, in which (a) successive “marks” are of alternately positive and negative polarity and the absolute values of their amplitudes are normally equal and (b) “spaces” are of zero amplitude.

**alternate party:** In multilevel precedence and preemption, the call receiver, *i.e.*, the destination user, to which a precedence call will be diverted. *Note 1:* Diversion will occur when the response timer expires, when the call receiver is busy on a call of equal or higher precedence, or when the call receiver is busy with access resources that are non-preemptable. *Note 2:* Alternate party diversion is an optional terminating feature that is subscribed to by the call receiver. Thus, the alternate party is specified by the call receiver at the time of subscription. (188)

**alternate routing:** The routing of a call or message over a substitute route when a primary route is unavailable for immediate use. (188)

**altitude of the apogee or of the perigee:** The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth. [NTIA] [RR] *Note:* In technical usage, the definite article is not used with the term *apogee* or *perigee* alone. A body orbiting the Earth is said simply to be “at apogee” or “at perigee.” It may, however, properly be said to be “at the point of apogee” or “at the point of perigee.”

**ALU:** Abbreviation for **arithmetic and logic unit**.

**AM:** Abbreviation for **amplitude modulation**.

**AMA:** Abbreviation for **automatic message accounting**.

**amateur-satellite service:** A radiocommunication service using space stations on Earth satellites for the same purposes as those of the amateur service. [NTIA] [RR]

**amateur service:** A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorized persons interested in radio

technique solely with a personal aim and without pecuniary interest. [NTIA] [RR]

**amateur station:** A station in the amateur service. [NTIA] [RR]

**ambient noise level:** The level of acoustic noise existing at a given location, such as in a room, in a compartment, or at a place out of doors. *Note 1:* Ambient noise level is measured with a sound level meter. *Note 2:* Ambient noise level is usually measured in dB above a reference pressure level of 0.00002 Pa, *i.e.*, 20  $\mu$ Pa (micropascals) in SI units. A pascal is a newton per square meter. *Note 3:* In the centimeter-gram-second system of units, the reference level for measuring ambient noise level is 0.0002 dyn/cm<sup>2</sup>. (188) *Synonym* **room noise level**.

**ambient temperature:** The temperature of air or other media in a designated area, particularly the area surrounding equipment. (188)

**AME:** Abbreviation for **amplitude modulation equivalent, automatic message exchange**. See **compatible sideband transmission**.

**American National Standards Institute (ANSI):** The U.S. standards organization that establishes procedures for the development and coordination of voluntary American National Standards.

**American Standard Code for Information Interchange (ASCII):** See **ASCII**.

**AMI:** Abbreviation for **alternate mark inversion**. See **alternate mark inversion signal**.

**AMI violation:** A “mark” that has the same polarity as the previous “mark” in the transmission of alternate mark inversion (AMI) signals. *Note:* In some transmission protocols, AMI violations are deliberately introduced to facilitate synchronization or to signal a special event.

**amplifier:** See **fiber amplifier, optical repeater**.

**amplitude distortion:** Distortion occurring in a system, subsystem, or device when the output amplitude is not a linear function of the input amplitude under specified conditions. (188) *Note:*

Amplitude distortion is measured with the system operating under steady-state conditions with a sinusoidal input signal. When other frequencies are present, the term “*amplitude*” refers to that of the fundamental only.

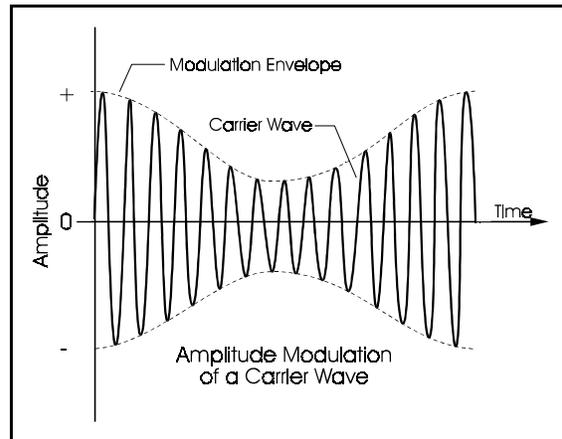
**amplitude equalizer:** A corrective network that is designed to modify the amplitude characteristics of a circuit or system over a desired frequency range. (188) *Note:* Such devices may be fixed, manually adjustable, or automatic.

**amplitude hit:** *See hit (def. #1).*

**amplitude intensity modulation (AIM):** *Deprecated term. See intensity modulation.*

**amplitude keying:** Keying in which the amplitude of a signal is varied among the members of a set of discrete values. (188)

**amplitude modulation (AM):** Modulation in which the amplitude of a carrier wave is varied in accordance with some characteristic of the modulating signal. (188) *Note:* Amplitude modulation implies the modulation of a coherent carrier wave by mixing it in a nonlinear device with the modulating signal to produce discrete upper and lower sidebands, which are the sum and difference frequencies of the carrier and signal. The envelope of the resultant modulated wave is an analog of the modulating signal. The instantaneous value of the resultant modulated wave is the vector sum of the corresponding instantaneous values of the carrier wave, upper sideband, and lower sideband. Recovery of the modulating signal may be by direct detection or by heterodyning.



amplitude modulation

**amplitude modulation equivalent (AME):** *Synonym compatible sideband transmission.*

**amplitude-vs.-frequency distortion:** Distortion in a transmission system caused by nonuniform attenuation, or gain, in the system with respect to frequency under specified operating conditions. (188) *Synonym frequency distortion.*

**AMPS:** *Abbreviation for automatic message processing system.*

**AMTS:** *Abbreviation for automated maritime telecommunications system.*

**analog computer:** A device that performs operations on data that are represented within the device by continuous variables having a physical resemblance to the quantities being represented. *Note:* The earliest analog computers were constructed with purely mechanical components, such as levers, cogs, cams, discs, and gears. These components represented the quantities being manipulated or the operator-inserted values. Modern analog computers usually employ electrical parameters, such as voltages, resistances, or currents to represent the quantities being manipulated.

**analog data:** Data represented by a physical quantity that is considered to be continuously variable and has a magnitude directly proportional to the data or to a suitable function of the data. (188)

**analog decoding:** The portion of the digital-to-analog conversion process that generates an analog signal value from the digital signal that resulted from analog encoding. (188) *Note:* Further action is required to integrate these samples to obtain a continuous approximation of the original signal, because analog decoding does not smooth the signal.

**analog encoding:** The portion of the analog-to-digital conversion process that samples an analog signal and creates a digital signal that represents the value of the sample. (188) *Note:* Multiple samples are needed to digitize a waveform over a time interval.

**analog facsimile equipment:** Facsimile equipment in which (a) analog techniques are used to encode the image detected by the scanner and (b) the output is an analog signal. *Note:* Examples of analog facsimile equipment are CCITT Group 1 and CCITT Group 2 facsimile equipment.

**analog signal:** **1.** A signal that has a continuous nature rather than a pulsed or discrete nature. *Note:* Electrical or physical analogies, such as continuously varying voltages, frequencies, or phases, may be used as analog signals. (188) **2.** A nominally continuous electrical signal that varies in some direct correlation with another signal impressed on a transducer. (188) *Note:* For example, an analog signal may vary in frequency, phase, or amplitude in response to changes in physical phenomena, such as sound, light, heat, position, or pressure.

**analog switch:** Switching equipment designed, designated, or used to connect circuits between users for real-time transmission of analog signals. (188)

**analog-to-digital (A-D) coder:** *Synonym analog-to-digital converter (ADC).*

**analog-to-digital converter (ADC):** A device that converts an analog signal to a digital signal that represents equivalent information. (188) *Synonyms analog-to-digital (A-D) coder, analog-to-digital (A-D) encoder.*

**analog-to-digital (A-D) encoder:** *Synonym analog-to-digital converter (ADC).*

**analog transmission:** Transmission of a continuously varying signal as opposed to transmission of a discretely varying signal.

**angle modulation:** Modulation in which the phase or frequency of a sinusoidal carrier is varied. (188) *Note:* Phase and frequency modulation are particular forms of angle modulation.

**angle of deviation:** In optics, the net angular deflection experienced by a light ray after one or more refractions or reflections. (188)

**angle of incidence:** The angle between an incident ray and the normal to a reflecting or refracting surface. (188)

**angstrom (Å):** A unit of length equal to  $10^{-10}$  m. *Note 1:* The angstrom is not an SI (International System) unit, and it is not accepted for government use (Fed. Std. 376B). *Note 2:* The angstrom is, and historically has been, used in the fields of optics, spectroscopy, and microscopy.

**angular misalignment loss:** Power loss caused by the deviation from optimum angular alignment of the axes of source to waveguide, waveguide to waveguide, or waveguide to detector. *Note 1:* The waveguide may be dielectric (an optical fiber) or metallic. *Note 2:* Angular misalignment loss does not include lateral offset loss and longitudinal offset loss.

**ANI:** *Abbreviation for automatic number identification.*

**anisochronous:** Pertaining to transmission in which the time interval separating any two significant instants in sequential signals is not necessarily related to the time interval separating any other two significant instants. *Note:* Isochronous and anisochronous are characteristics, while synchronous and asynchronous are relationships.

**anisochronous transmission:** *See asynchronous transmission.*

**anisotropic:** Pertaining to a material whose electrical or optical properties vary with (a) the direction of propagation of a traveling wave or with (b) different polarizations of a traveling wave. *Note 1:*

Anisotropy is exhibited by non-cubic crystals, which have different refractive indices for lightwaves propagating in different directions or with different polarizations. *Note 2:* Anisotropy may be induced in certain materials under mechanical strain.

**anomalous propagation (AP):** Abnormal propagation caused by fluctuations in the properties (such as density and refractive index) of the propagation medium. (188) *Note:* AP may result in the reception of signals well beyond the distances usually expected.

**ANS:** Abbreviation for **American National Standard**.

**ANSI:** Abbreviation for **American National Standards Institute**.

**ANSI/EIA/TIA-568:** A U.S. industry standard that specifies a generic telecommunications cabling system, which will support a multiproduct, multivendor environment, for commercial buildings. *Note 1:* The standard specifies performance characteristics for unshielded twisted pair telecommunications cabling, including categories allowing data communications up to 100 Mb/s. These categories are designated 3, 4, and 5. Categories 1 and 2 have not been defined. *Note 2:* The standard has been adopted as FIPS PUB 174.

**answer back:** A signal sent by receiving equipment to the sending station to indicate that the receiver is ready to accept transmission.

**answer signal:** A supervisory signal returned from the called telephone to the originating switch when the call receiver answers. *Note 1:* The answer signal stops the ringback signal from being returned to the caller. *Note 2:* The answer signal is returned by means of a closed loop.

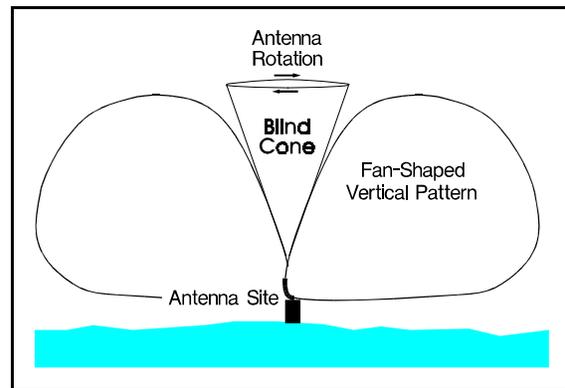
**antenna:** Any structure or device used to collect or radiate electromagnetic waves. (188)

**antenna aperture:** See **aperture (def #1)**.

**antenna array:** An assembly of antenna elements with dimensions, spacing, and illumination sequence such that the fields for the individual elements

combine to produce a maximum intensity in a particular direction and minimum field intensities in other directions.

**antenna blind cone:** The volume of space, usually approximately conical with its vertex at the antenna, that cannot be scanned by an antenna because of limitations of the antenna radiation pattern and mount. *Note:* An example of an antenna blind cone is that of an air route surveillance radar (ARSR). The horizontal radiation pattern of an ARSR antenna is very narrow. The vertical radiation pattern is fan-shaped, reaching approximately 70° of elevation above the horizontal plane. As the antenna is rotated about a vertical axis, it can illuminate targets only if they are 70° or less from the horizontal plane. Above that elevation, they are in the antenna blind cone. *Synonym cone of silence.*



antenna blind cone

**antenna coupler:** A device used to match the impedance of a transmitter and/or receiver to an antenna to provide maximum power transfer.

**antenna dissipative loss:** A power loss resulting from changes in the measurable impedance of a practical antenna from a value theoretically calculated for a perfect antenna.

**antenna effective area:** The functionally equivalent area from which an antenna directed toward the source of the received signal gathers or absorbs the energy of an incident electromagnetic wave. *Note 1:* Antenna effective area is usually expressed in square meters. *Note 2:* In the case of parabolic and horn-parabolic antennas, the antenna effective area is

about 0.35 to 0.55 of the geometric area of the antenna aperture.

**antenna efficiency:** The ratio of the total radiated power to the total input power. *Note:* The total radiated power is the total input power less antenna dissipative losses.

**antenna electrical beam tilt:** The shaping of the radiation pattern in the vertical plane of a transmitting antenna by electrical means so that maximum radiation occurs at an angle below the horizontal plane. [47CFR]

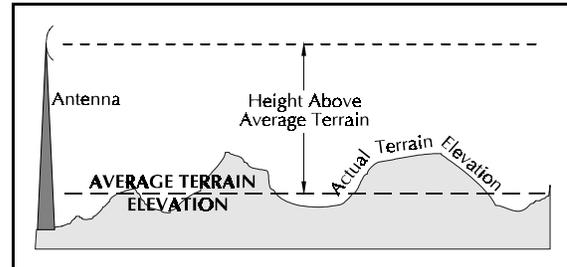
**antenna gain:** The ratio of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength at the same distance. *Note 1:* Antenna gain is usually expressed in dB. *Note 2:* Unless otherwise specified, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization. Depending on the choice of the reference antenna, a distinction is made between:

- absolute or isotropic gain ( $G_i$ ), when the reference antenna is an isotropic antenna isolated in space;
- gain relative to a half-wave dipole ( $G_d$ ) when the reference antenna is a half-wave dipole isolated in space and with an equatorial plane that contains the given direction;
- gain relative to a short vertical antenna ( $G_r$ ), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction. [RR] (188) *Synonyms* **gain of an antenna, power gain of an antenna.**

**antenna gain-to-noise-temperature (G/T):** In the characterization of antenna performance, a figure of merit, where G is the antenna gain in decibels at the receive frequency, and T is the equivalent noise temperature of the receiving system in kelvins.

**antenna height above average terrain:** The antenna height above the average terrain elevations from 3.2 to 16 kilometers (2 to 10 miles) from the antenna for the eight directions spaced evenly for each 45° of azimuth starting with true north. (188) *Note:* In general, a different antenna height above average terrain will be determined in each direction from the

antenna. The average of these eight heights is the antenna height above average terrain. In some cases, such as seashore, fewer than eight directions may be used.



antenna height above average terrain

**antenna lobe:** A three-dimensional section of the radiation pattern of a directional antenna, bounded by one or more cones of nulls or by regions of diminished irradiance. (188)

**antenna matching:** The process of adjusting impedance so that the input impedance of an antenna equals or approximates the characteristic impedance of its transmission line over a specified range of frequencies. (188) *Note:* The impedance of either the transmission line, or the antenna, or both, may be adjusted to effect the match.

**antenna noise temperature:** The temperature of a hypothetical resistor at the input of an ideal noise-free receiver that would generate the same output noise power per unit bandwidth as that at the antenna output at a specified frequency. (188) *Note 1:* The antenna noise temperature depends on antenna coupling to all noise sources in its environment as well as on noise generated within the antenna. *Note 2:* The antenna noise temperature is a measure of noise whose value is equal to the actual temperature of a passive device.

**anti-clockwise polarized wave:** *Synonym* **left-hand polarized wave.**

**anti-interference:** Pertaining to equipment, processes, or techniques used to reduce the effect of natural and man-made noise on radio communications.

**anti-jam:** Measures to ensure that intended transmitted information can be received despite deliberate jamming attempts. [NIS] (188)

**anti-node:** A point in a standing wave at which the amplitude is a maximum.

**antireflection coating:** A thin, dielectric or metallic film, or several such films, applied to an optical surface to reduce its reflectance and thereby increase its transmittance. [After 2196] *Note:* For minimum reflection of a normal incident wave of a single wavelength, the antireflection coating may consist of a single layer and must have (a) a refractive index equal to the square root of the refractive indices of the materials bounding the coating, and (b) a thickness equal to one-quarter the wavelength in question (*i.e.*, the wavelength within the material of which the coating consists). For minimum reflection of multiple wavelengths, additional layers must be added.

**anti-spoof:** Measures to prevent an opponent's participation in a telecommunications network, or operation/control of a cryptographic or COMSEC system. [NIS]

**anycall:** In adaptive high-frequency (HF) radio automatic link establishment, a broadcast in which (a) the called stations are unspecified, (b) stations receiving the call stop scanning, and (c) each station automatically responds in pseudorandom time slots. (188)

**AP:** *Abbreviation for anomalous propagation.*

**APC:** *Abbreviation for adaptive predictive coding.*

**APD:** *Abbreviation for avalanche photodiode.* *Note:* **apd** and **a.p.d.** are also used.

**aperiodic antenna:** An antenna designed to have an approximately constant input impedance over a wide range of frequencies. *Note:* Examples of aperiodic antennas include terminated rhombic antennas and wave antennas. *Synonym* **nonresonant antenna.**

**aperture:** **1.** In a directional antenna, the portion of a plane surface very near the antenna normal to the direction of maximum radiant intensity, through

which the major part of the radiation passes. (188) **2.** In an acoustic device that launches a sound wave, the passageway, determined by the size of a hole in the inelastic material and the wavelength. [After 2196]

**aperture distortion:** In facsimile, the distortion of the recorded image caused by the shape and finite size of the scanning and recording apertures. *Note:* The distortion may occur in one or more attributes of the recorded image, such as in resolution, density, or shape.

**aperture illumination:** **1.** The field distribution, in amplitude and phase, over the antenna physical aperture. **2.** The phase and amplitude of the element feed voltages or the distribution of the currents in an array of elements.

**aperture-to-medium coupling loss:** The difference between the theoretical gain of a very large antenna, such as the antennas in beyond-the-horizon microwave links, and the gain that can be realized in operation. *Note 1:* Aperture-to-medium coupling loss is related to the ratio of the scatter angle to the antenna beamwidth. *Note 2:* The "very large antennas" are referred to in wavelengths; thus, this loss can apply to line-of-sight systems also. (188)

**API:** *Abbreviation for application program interface.*

**apogee:** In an orbit of a satellite orbiting the Earth, the point that is farthest from the gravitational center of the Earth.

**apogee altitude:** *See altitude of the apogee or of the perigee.*

**apparent power:** In alternating-current power transmission and distribution, the product of the rms voltage and amperage. *Note 1:* When the applied voltage and the current are in phase with one another, the apparent power is equal to the effective power, *i.e.*, the real power delivered to or consumed by the load. If the current lags or leads the applied voltage, the apparent power is greater than the effective power. *Note 2:* Only effective power, *i.e.*, the real power delivered to or consumed by the load, is expressed in watts. Apparent power is properly

expressed only in volt-amperes, never watts. *See diagram under effective power.*

**Application Layer:** *See Open Systems Interconnection—Reference Model.*

**application program interface (API):** A formalized set of software calls and routines that can be referenced by an application program in order to access supporting network services.

**applique:** Circuit components added to an existing system to provide additional or alternate functions. (188) *Note:* Applique may be used to modify carrier telephone equipment designed for ringdown manual operation to allow for use between points having dial equipment.

**approved circuit:** *Deprecated synonym for protected distribution system.*

**aramid yarn:** Generic name for a tough synthetic yarn that is often used in optical cable construction for the strength member, protective braid, and/or rip cord for jacket removal. [FAA]

**Archie:** Distributed-system-based software that searches indices of files available on public servers on the Internet. *Note 1:* Archie servers may provide access via telnet, E-mail, or a special Archie client. *Note 2:* Using Archie requires a user to be familiar with where the indices are located, *i.e.*, the user must provide an Archie server domain name or IP address.

**architecture:** *See computer architecture, network architecture.*

**archiving:** The storing of files, records, and other data for reference and alternative backup.

**area broadcast shift:** The changing from listening to transmissions intended for one broadcast area to listening to transmissions intended for another broadcast area. *Note 1:* An area broadcast shift may occur when a ship or aircraft crosses the boundary between listening areas. *Note 2:* Shift times, on the date a ship or aircraft is expected to pass into another area, must be strictly observed or the ship or

aircraft will miss messages intended for it. *Synonym radio watch shift.*

**area code:** *See access code, code, country code, NXX code.*

**area loss:** When optical fibers are joined by a splice or a pair of mated connectors, a power loss that is caused by any mismatch in size or shape of the cross section of the cores of the mating fibers. *Note 1:* Any of the above conditions may allow light from the core of the “transmitting” fiber to enter the cladding of the “receiving” fiber, where it is quickly lost. *Note 2:* Area loss may be dependent on the direction of propagation. For example, in coupling a signal from an optical fiber having a smaller core to an otherwise identical one having a larger core, there will be no area loss, but in the opposite direction, there will be area loss. [After FAA]

**argument:** **1.** An independent variable. **2.** Any value of an independent variable. *Note:* Examples of arguments include search keys, numbers that identify the location of a data item in a table, and the  $\theta$  in  $\sin \theta$ .

**arithmetic and logic unit (ALU):** A part of a computer that performs arithmetic, logic, and related operations.

**arithmetic overflow:** **1.** In a digital computer, the condition that occurs when a calculation produces a result that is greater than a given register or storage location can store or represent. (188) **2.** In a digital computer, the amount that a calculated value is greater than a given register or storage location can store or represent. *Note:* The overflow may be placed at another location. (188) *Synonym overflow.*

**arithmetic register:** A register that holds the operands or the results of operations such as arithmetic operations, logic operations, and shifts.

**arithmetic shift:** A shift, applied to the representation of a number in a fixed radix numeration system and in a fixed-point representation system, and in which only the characters representing the fixed-point part of the number are moved. An arithmetic shift is usually equivalent to multiplying the number by a positive or

a negative integral power of the radix, except for the effect of any rounding; compare the logical shift with the arithmetic shift, especially in the case of floating-point representation.

**arithmetic underflow:** In a digital computer, the condition that occurs when a calculation produces a non-zero result that is less than the smallest non-zero quantity that a given register or storage location can store or represent.

**arithmetic unit:** In a processor, the part that performs arithmetic operations; sometimes the unit performs both arithmetic and logic operations.

**Armed Forces Radio Service (AFRS):** A radio broadcasting service that is operated by and for the personnel of the armed services in the area covered by the broadcast. *Note:* An example of an AFRS is the radio service operated by the U.S. Army for U.S. and allied military personnel on duty in overseas areas.

**armor:** Of a communications cable, a component intended to protect the critical internal components, *e.g.*, buffer tubes or fibers, or electrical conductors, from damage from external mechanical attack, *e.g.*, rodent attack or abrasion. [After FAA] *Note:* Armor usually takes the form of a steel or aluminum tape wrapped about an inner jacket that covers the critical internal components. An outer jacket usually covers the armor.

**ARP:** *Abbreviation for address resolution protocol.*

**ARPANET:** *Abbreviation for Advanced Research Projects Agency Network.* A packet-switching network used by the Department of Defense, later evolved into the Internet.

**ARQ:** *Abbreviation for automatic repeat-request.* Error control for data transmission in which the receiver detects transmission errors in a message and automatically requests a retransmission from the transmitter. *Note:* Usually, when the transmitter receives the ARQ, the transmitter retransmits the message until it is either correctly received or the error persists beyond a predetermined number of retransmissions. (188) *Synonyms error-detecting-and-feedback system, repeat-request system.*

**array:** **1.** An arrangement of elements in one or more dimensions. **2.** In a programming language, an aggregate that consists of data objects with identical attributes, each of which may be uniquely referenced by subscription.

**array processor:** A processor capable of executing instructions in which the operands may be arrays rather than data elements. *Synonym vector processor.*

**arrester:** A device that protects hardware, such as systems, subsystems, circuits, and equipment, from voltage or current surges produced by lightning or electromagnetic pulses. *Note:* If the hardware is adequately protected, associated software may also be adequately protected. (188) *Synonym surge suppressor.*

**ARS:** *Abbreviation for automatic route selection.*

**articulation index:** A measure of the intelligibility of voice signals, expressed as a percentage of speech units that are understood by the listener when heard out of context. (188) *Note:* The articulation index is affected by noise, interference, and distortion.

**articulation score (AS):** A subjective measure of the intelligibility of a voice system in terms of the percentage of words correctly understood over a channel perturbed by interference. *Note:* Articulation scores have been experimentally obtained as functions of varying word content, bandwidth, audio signal-to-noise ratio and the experience of the talkers and listeners involved.

**artificial intelligence (AI):** The capability of a device to perform functions that are normally associated with human intelligence, such as reasoning and optimization through experience. *Note:* AI is the branch of computer science that attempts to approximate the results of human reasoning by organizing and manipulating factual and heuristic knowledge. Areas of AI activity include expert systems, natural language understanding, speech recognition, vision, and robotics.

**artificial transmission line:** A four-terminal electrical network, *i.e.* an electrical circuit, that has

the characteristic impedance, transmission time delay, phase shift, and/or other parameter(s) of a real transmission line and therefore can be used to simulate a real transmission line in one or more of these respects. *Colloquial synonym art line.*

**art line:** *Colloquial synonym for artificial transmission line.*

**ARU:** *Abbreviation for audio response unit.*

**ASCII:** *Acronym for American Standard Code for Information Interchange.* The standard code used for information interchange among data processing systems, data communications systems, and associated equipment in the United States. (188) *Note 1:* The ASCII character set contains 128 coded characters. *Note 2:* Each ASCII character is a 7-bit coded unique character; 8 bits when a parity check bit is included. *Note 3:* The ASCII character set consists of control characters and graphic characters. *Note 4:* When considered simply as a set of 128 unique bit patterns, or 256 with a parity bit, disassociated from the character equivalences in national implementations, the ASCII may be considered as an alphabet used in machine languages. *Note 5:* The ASCII is the U.S. implementation of International Alphabet No. 5 (IA No. 5) as specified in CCITT Recommendation V.3.

**ASP:** *Abbreviation for adjunct service point.*

**aspect ratio:** In facsimile or television, the ratio of the width to the height of a picture, document, or scanning field.

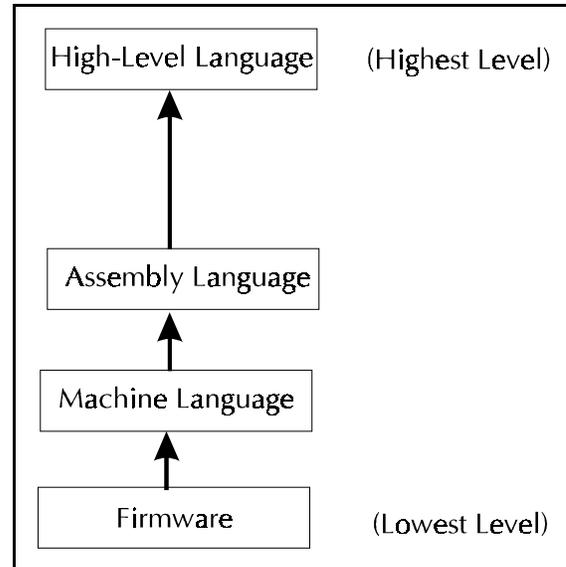
**assemble:** To translate a computer program expressed in an assembly language into a machine language.

**assembler:** A computer program that is used to assemble. *Synonym assembly program.*

**assembly:** In logistics, an item forming a portion of an equipment that can be provisioned and replaced as an entity and which normally incorporates replaceable parts or groups of parts. [JP1]

**assembly language:** A computer-oriented language (a) in which instructions are symbolic and usually in one-to-one correspondence with sets of machine

language instructions and (b) that may provide other facilities, such as the use of macro instructions. (188) *Synonym computer-dependent language.*



a hierarchy of levels of computer language

**assembly program:** *Synonym assembler.*

**assembly time:** The elapsed time taken for the execution of an assembler.

**assigned frequency:** **1.** The center of the assigned frequency band assigned to a station. [RR] **2.** The frequency of the center of the radiated bandwidth. (188) *Note:* The frequency of the rf carrier, whether suppressed or radiated, is usually given in parentheses following the assigned frequency, and is the frequency appearing in the dial settings of rf equipment intended for single-sideband or independent-sideband transmission.

**assigned frequency band:** The frequency band within which the emission of a station is authorized; the width of the band equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface. [NTIA] [RR]

**assignment:** For NS/EP, the designation of priority level(s).

**assignment (of a radio frequency or radio frequency channel):** Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. [NTIA] [RR]

**associated common-channel signaling:** Common-channel signaling in which the signal channel is associated with a specific trunk group and terminates at the same pair of switches as the trunk group. (188) *Note:* In associated common-channel signaling, the signaling is usually accomplished by using the same facilities as the associated trunk group.

**associative storage:** **1.** A storage device whose storage locations are identified by their contents, or by a part of their contents, rather than by their names or positions. *Note:* Associative storage can also refer to this process as well as to the device. *Synonym content-addressable storage.* **2.** Storage that supplements another storage.

**asymmetrical modulator:** *Synonym unbalanced modulator.*

**asynchronous communications system:** A data communications system that uses asynchronous operation. *Note 1:* In an asynchronous communications system, extra signal elements are usually appended to the data for the purpose of synchronizing individual data characters or blocks. (188) *Note 2:* The time spacing between successive data characters or blocks may be of arbitrary duration. *Synonym start-stop system.*

**asynchronous network:** A network in which the clocks do not need to be synchronous or mesochronous. (188) *Synonym nonsynchronous network.*

**asynchronous operation:** **1.** A sequence of operations in which operations are executed out of time coincidence with any event. (188) **2.** An operation that occurs without a regular or predictable time relationship to a specified event; *e.g.*, the calling of an error diagnostic routine that may receive control at any time during the execution of a computer program. (188) *Synonym asynchronous working.*

**asynchronous time-division multiplexing (ATDM):** Time-division multiplexing in which asynchronous transmission is used.

**asynchronous transfer mode (ATM):** A high-speed multiplexing and switching method utilizing fixed-length cells of 53 octets to support multiple types of traffic. *Note:* ATM, specified in international standards, is asynchronous in the sense that cells carrying user data need not be periodic.

**asynchronous transmission:** Data transmission in which the instant that each character, or block of characters, starts is arbitrary; once started, the time of occurrence of each signal representing a bit within the character, or block, has the same relationship to significant instants of a fixed time frame. (188)

**asynchronous working:** *Synonym asynchronous operation.*

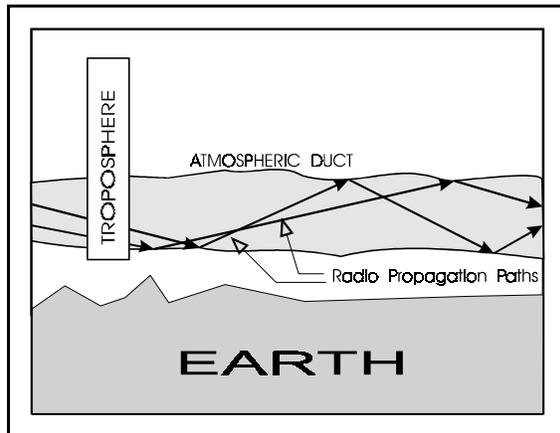
**ATB:** *Abbreviation for all trunks busy.*

**AT Commands:** A *de facto* standard for modem commands from an attached CPU, used in most 1,200 and 2,400 b/s modems.

**ATDM:** *Abbreviation for asynchronous time-division multiplexing.*

**ATM:** *Abbreviation for asynchronous transfer mode.*

**atmospheric duct:** A horizontal layer in the lower atmosphere in which the vertical refractive index gradients are such that radio signals (a) are guided or focused within the duct, (b) tend to follow the curvature of the Earth, and (c) experience less attenuation in the ducts than they would if the ducts were not present. (188) *Note:* The reduced refractive index at the higher altitudes bends the signals back toward the Earth. Signals in a higher refractive index layer, *i.e.*, duct, tend to remain in that layer because of the reflection and refraction encountered at the boundary with a lower refractive index material.



atmospheric ducting

**atmospheric noise:** Radio noise caused by natural atmospheric processes, primarily lightning discharges in thunderstorms. (188)

**atomic time:** See **International Atomic Time**.

**ATOW:** Acronym for **acquisition and tracking orderwire**. A downlink circuit that provides a terminal with information regarding uplink acquisition and synchronization status. (188)

**attachment unit interface (AUI):** In a local area network, the interface between the medium access unit (MAU) and the data terminal equipment within a data station.

**attack time:** The time between (a) the instant that a signal at the input of a device or circuit exceeds the activation threshold of the device or circuit and (b) the instant that the device or circuit reacts in a specified manner, or to a specified degree, to the input. *Note:* Attack time occurs in devices such as clippers, peak limiters, compressors, and voxes.

**attendant access loop:** A switched circuit that provides an attendant with a manual means for call completion and control. *Note:* An attendant access loop might be given a specific telephone number.

**attendant conference:** A network-provided service feature that allows an attendant to establish a conference connection of three or more users.

**attendant position:** The part of a switching system used by an attendant, *i.e.*, an operator, to assist users in call completion and use of special services. (188)

**attention signal:** The attention signal to be used by AM, FM, and TV broadcast stations to actuate muted receivers for inter-station receipt of emergency cuing announcements and broadcasts involving a range of emergency contingencies posing a threat to the safety of life or property. [47CFR]

**attenuation:** The decrease in intensity of a signal, beam, or wave as a result of absorption of energy and of scattering out of the path to the detector, but not including the reduction due to geometric spreading. [After JP1] *Note 1:* Attenuation is usually expressed in dB. *Note 2:* "Attenuation" is often used as a misnomer for "**attenuation coefficient**," which is expressed in dB per kilometer. *Note 3:* A distinction must be made as to whether the attenuation is that of signal power or signal electric field strength.

**attenuation coefficient:** The rate of diminution of average power with respect to distance along a transmission path. *Synonym* **attenuation rate**.

**attenuation constant:** **1.** The real part of the propagation constant in any electromagnetic propagation medium. *Note 1:* The attenuation constant is usually expressed as a numerical value per unit length. *Note 2:* The attenuation constant may be calculated or experimentally determined for each medium. **2.** For a particular propagation mode in an optical fiber, the real part of the axial propagation constant.

**attenuation-limited operation:** The condition that prevails when attenuation, rather than bandwidth, limits the performance of a communications link. (188)

**attenuation rate:** *Synonym* **attenuation coefficient**.

**attenuator:** **1.** In electrical systems, a network that reduces the amplitude of a signal without appreciably distorting its waveform. *Note 1:* Electrical attenuators are usually passive devices. *Note 2:* The degree of attenuation may be fixed,

continuously adjustable, or incrementally adjustable. Fixed attenuators are often called pads, especially in telephony. *Note 3:* The input and output impedances of an attenuator are usually matched to the impedances of the signal source and load, respectively. **2.** In optical systems, a device that reduces the amplitude of a signal without appreciably distorting its waveform. *Note 1:* Optical attenuators are usually passive devices. *Note 2:* The degree of attenuation may be fixed, continuously adjustable, or incrementally adjustable.

**attribute:** **1.** In database management, a property inherent in an entity or associated with that entity for database purposes. (188) **2.** In network management, a property of a managed object that has a value. (188) *Note 1:* Mandatory initial values for attributes can be specified as part of the managed object class definition. *Note 2:* Attributes may be either mandatory or conditional.

**ATV:** *Abbreviation for advanced television.*

**audible:** *Synonym for audible ringing tone.*

**audible ringing tone:** In telephony, a signal, usually consisting of an audio tone interrupted at a slow repetition rate, provided to a caller to indicate that the called-party instrument is being sent a ringing signal. (188) *Note:* The audible ringing tone may be generated by the called-party servicing switch or by the calling-party servicing switch, but it is not generated by the called telephone instrument. *Synonyms* **audible, ringback tone.**

**audio frequency (AF):** The band of frequencies (approximately 20 Hz to 20 kHz) that, when transmitted as acoustic waves, can be heard by the normal human ear. (188)

**audio response unit (ARU):** A device that provides synthesized voice responses to dual-tone multifrequency signaling input by processing calls based on (a) the call-originator input, (b) information received from a host data base, and (c) information in the incoming call, such as the time of day. *Note:* ARUs are used to increase the number of information calls handled and to provide consistent quality in information retrieval.

**audit:** **1.** To conduct an independent review and examination of system records and activities in order to test the adequacy and effectiveness of data security and data integrity procedures, to ensure compliance with established policy and operational procedures, and to recommend any necessary changes. **2.** Independent review and examination of records and activities to assess the adequacy of system controls, to ensure compliance with established policies and operational procedures, and to recommend necessary changes in controls, policies, or procedures. [NIS]

**audit review file:** A file created by executing statements included in a computer program for the explicit purpose of providing data for auditing.

**audit trail:** **1.** A record of both completed and attempted accesses and service. **2.** Data in the form of a logical path linking a sequence of events, used to trace the transactions that have affected the contents of a record. **3.** [In INFOSEC, a] chronological record of system activities to enable the reconstruction and examination of the sequence of events and/or changes in an event. *Note:* Audit trail may apply to information in an AIS, or to the transfer of COMSEC material. [NIS]

**AUI:** *Abbreviation for attachment unit interface.*

**aurora:** Sporadic radiant emission from the upper atmosphere that usually occurs about the North and South magnetic poles of the Earth. *Note 1:* Auroras are most intense at times of intense magnetic storms caused by sunspot activity. The distribution of auroral intensity with altitude shows a pronounced maximum near 100 km above the Earth. Auroras may occasionally be observed within 40° or less of the equator. *Note 2:* Auroras interfere with radio communications. *Note 3:* In the Northern hemisphere, the aurora is called the Aurora Borealis (Northern Lights). In the Southern hemisphere, the aurora is called the Aurora Australis (Southern Lights).

**authenticate:** **1.** To establish, usually by challenge and response, that a transmission attempt is authorized and valid. **2.** Verify the identity of a user, user device, or other entity, or the integrity of data stored, transmitted, or otherwise exposed to

unauthorized modification in an automated information system, or establish the validity of a transmitted message. [NIS] **3.** A challenge given by voice or electrical means to attest to the authenticity of a message or transmission. [JP1]

**authentication:** [Any] Security measure designed to establish the validity of a transmission, message, or originator, or a means of verifying an individual's eligibility to receive specific categories of information. [NIS]

**authenticator:** **1.** A symbol or group of symbols, or a series of bits, selected or derived in a prearranged manner and usually inserted at a predetermined point within a message or transmission for the purpose of attesting to the validity of the message or transmission. [JP1] **2.** A letter, numeral, group of letters or numerals, or any combinations of these, attesting to the authenticity of a message or transmission. [After JP1] **3.** [In INFOSEC,] means used to confirm the identity or eligibility of a station, originator, or individual. [NIS]

**authorization:** **1.** The rights granted to a user to access, read, modify, insert, or delete certain data, or to execute certain programs. **2.** Access rights granted to a user, program, or process. [NIS]

**authorized bandwidth:** Authorized bandwidth is, for purposes of this Manual, the necessary bandwidth (bandwidth required for transmission and reception of intelligence) and does not include allowance for transmitter drift or Doppler shift. [NTIA]

**authorized frequency:** A frequency that is allocated and assigned by a competent authority to a specific user for a specific purpose. (188) *See* **assigned frequency.**

**AUTODIN:** *Acronym for automatic digital network. See Defense Data Network.*

**automated data medium:** *Synonym machine-readable medium.*

**automated information system (AIS):** **1.** An assembly of computer hardware, software, firmware, or any combination of these, configured to accomplish specific information-handling

operations, such as communication, computation, dissemination, processing, and storage of information. **2.** [In INFOSEC,] any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of data and includes computer software, firmware, and hardware. *Note:* Included are computers, word processing systems, networks, or other electronic information handling systems, and associated equipment. [NIS]

**automated information systems security:** **1.** Measures and controls that ensure confidentiality, integrity, and availability of the information processed and stored by automated information systems. *Note 1:* The unauthorized disclosure, modification, or destruction may be accidental or intentional. *Note 2:* Automated information systems security includes consideration of all hardware and software functions, characteristics and features; operational procedures; accountability procedures; and access controls at the central computer facility, remote computer, and terminal facilities; management constraints; physical structures and devices, such as computers, transmission lines, and power sources; and personnel and communications controls needed to provide an acceptable level of risk for the automated information system and for the data and information contained in the system. Automated information systems security also includes the totality of security safeguards needed to provide an acceptable protection level for an automated information system and for the data handled by an automated information system. **2.** In INFOSEC, *synonym* **computer security.**

**automated maritime telecommunications system (AMTS):** An automatic, integrated and interconnected maritime communications system serving ship stations on specified inland and coastal waters of the United States. [47CFR]

**automated radio:** A radio that can be automatically controlled by electronic devices and that requires little or no human intervention.

**automated tactical command and control system:** A command and control system, or part thereof, that manipulates the movement of information from

source to user without human intervention. *Note:* In an automated tactical command and control system, automated execution of a decision without human intervention is not mandatory.

**automatic answering:** A service feature in which the called terminal automatically responds to the calling signal and the call may be established whether or not the called terminal is attended by an operator.

**automatic callback:** A service feature that permits a user, when encountering a busy condition, to instruct the system to retain the called and calling numbers and to establish the call when there is an available line. *Note 1:* Automatic callback may be implemented in the terminal, in the switching system, or shared between them. *Note 2:* Automatic callback is not the same as camp-on.

**automatic call distributor (ACD):** A device that distributes incoming calls to a specific group of terminals. *Note:* If the number of active calls is less than the number of terminals, the next call will be routed to the terminal that has been in the idle state the longest. If all terminals are busy, the incoming calls are held in a first-in-first-out queue until a terminal becomes available. (188)

**automatic calling:** Calling in which the elements of the selection signal are entered into the data network contiguously at the full data signaling rate. The selection signal is generated by the data terminal equipment. *Note:* A limit may be imposed by the design criteria of the network to prevent more than a permitted number of unsuccessful call attempts to the same address within a specified period.

**automatic calling unit (ACU):** A device that enables equipment, such as computers and card dialers, to originate calls automatically over a telecommunications network.

**automatic data handling (ADH):** 1. A generalization of automatic data processing to include the aspect of data transfer. [JP1] 2. Combining data processing and data transfer.

**automatic data processing (ADP):** 1. An interacting assembly of procedures, processes, methods, personnel, and equipment to perform automatically

a series of data processing operations on data. *Note:* The data processing operations may result in a change in the semantic content of the data. (188) 2. Data processing by means of one or more devices that use common storage for all or part of a computer program, and also for all or part of the data necessary for execution of the program; that execute user-written or user-designated programs; that perform user-designated symbol manipulation, such as arithmetic operations, logic operation, or character-string manipulations; and that can execute programs that modify themselves during their execution. *Note:* Automatic data processing may be performed by a stand-alone unit or by several connected units. 3. Data processing largely performed by automatic means. [JP1] 4. That branch of science and technology concerned with methods and techniques relating to data processing largely performed by automatic means. [JP1]

**automatic data processing equipment (ADPE):** Any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception, of data or information (i) by a Federal agency, or (ii) under a contract with a Federal agency which (i) requires the use of such equipment, or (ii) requires the performance of a service or the furnishing of a product which is performed or produced making significant use of such equipment. Such term includes (i) computer, (ii) ancillary equipment, (iii) software, firmware, and similar procedures, (iv) services, including support services, and (v) related resources as defined by regulations issued by the Administrator for General Services. . . . [Public Law 99-500, Title VII, Sec. 822 (a) Section 111(a) of the *Federal Property and Administrative Services Act of 1949 (40 U.S.C. 759(a)) revised.*] *See also paragraph #3 of the Foreword above.*

**automatic dialing:** *See automatic calling unit.*

**Automatic Digital Network (AUTODIN):** Formerly, a worldwide data communications network of the Defense Communications System, now replaced by the **Defense Switched Network (DSN)**. (188)

**automatic error correction:** *See error-correcting code.*

**automatic exchange:** In a telephone system, an exchange in which communications among users are effected by means of switches set in operation by the originating user equipment without human intervention at the central office or branch exchange.

**automatic frequency control (AFC):** A device or circuit that maintains the frequency of an oscillator within the specified limits with respect to a reference frequency.

**automatic function:** A machine function or series of machine functions controlled by a program and carried out without assistance of an operator.

**automatic gain control (AGC):** A process or means by which gain is automatically adjusted in a specified manner as a function of a specified parameter, such as received signal level. (188)

**automatic identified outward dialing (AIOD):** A service feature of some switching or terminal devices that provides the user with an itemized statement of usage on directly dialed calls. *Note:* AIOD is facilitated by automatic number identification (ANI) equipment to provide automatic message accounting (AMA).

**automatic link establishment (ALE):** **1.** In high-frequency (HF) radio, the capability of a station to make contact, or initiate a circuit, between itself and another specified radio station, without human intervention and usually under processor control. *Note:* ALE techniques include automatic signaling, selective calling, and automatic handshaking. Other automatic techniques that are related to ALE are channel scanning and selection, link quality analysis (LQA), polling, sounding, message store-and-forward, address protection, and anti-spoofing. **2.** In HF radio, a link control system that includes automatic scanning, selective calling, sounding, and transmit channel selection using link quality analysis data. *Note:* Optional ALE functions include polling and the exchange of orderwire commands and messages. (188)

**automatic message accounting (AMA):** A service feature that automatically records data regarding user-dialed calls. (188)

**automatic message exchange (AME):** In an adaptive high-frequency (HF) radio network, an automated process allowing the transfer of a message from message injection to addressee reception, without human intervention. *Note:* Through the use of machine-addressable transport guidance information, *i.e.*, the message header, the message is automatically routed through an on-line direct connection through single or multiple transmission media.

**automatic message processing system (AMPS):** Any organized assembly of resources and methods used to collect, process, and distribute messages largely by automatic means. [JP1]

**automatic number identification (ANI):** A service feature in which the directory number or equipment number of a calling station is automatically obtained. *Note:* ANI is used in message accounting.

**automatic operation:** The functioning of systems, equipment, or processes in a desired manner at the proper time under control of mechanical or electronic devices that operate without human intervention.

**automatic redial:** A service feature that allows the user to dial, by depressing a single key or a few keys, the most recent telephone number dialed at that instrument. *Note:* Automatic redial is often associated with the telephone instrument, but may be provided by a PBX, or by the central office. *Synonym last number redial. Contrast with automatic calling unit.*

**automatic reload:** *See bootstrap (def.#3).*

**automatic remote rekeying:** [In INFOSEC, a] procedure to rekey a distant crypto-equipment electronically without specific actions by the receiving terminal operator. [NIS] *Note:* Automatic remote rekeying may also apply to non-crypto devices.

**automatic remote reprogramming and rekeying:**

The procedure by which distant equipment is reprogrammed or rekeyed electronically without specific actions by the receiving terminal.

**automatic repeat-request (ARQ):** *See* **ARQ**.

**automatic ringdown circuit:** A circuit providing priority telephone service, typically for key personnel; the circuit is activated when the telephone handset is removed from the cradle causing a ringing signal to be sent to the distant unit(s). *See* **verified off-hook**.

**automatic route selection (ARS):** Electronic or mechanical selection and routing of outgoing calls without human intervention.

**Automatic Secure Voice Communications Network (AUTOSEVOCOM):** A worldwide, switched, secure voice network developed to fulfill DOD long-haul, secure voice requirements. [JP1] (188)

**automatic sequential connection:** A service feature in which the terminals at each of a set of specified addresses are automatically connected, in a predetermined sequence, to a single terminal at a specified address.

**automatic signaling service:** *Synonym* **hotline**.

**automatic sounding:** The testing of selected channels or paths by providing a very brief beacon-like identifying broadcast that may be used by other stations to evaluate connectivity, propagation, and availability, and to identify known working channels for possible later use for communications or calling. (188) *Note 1:* Automatic soundings are primarily intended to increase the efficiency of the automatic link establishment (ALE) function, thereby increasing system throughput. *Note 2:* Sounding information is used for identifying the specific channel to be used for a particular ALE connectivity attempt.

**automatic switching system:** **1.** In data communications, a switching system in which all the operations required to execute the three phases of information-transfer transactions are automatically executed in response to signals from a user end-instrument. *Note:* In an automatic switching system,

the information-transfer transaction is performed without human intervention, except for initiation of the access phase and the disengagement phase by a user. **2.** In telephony, a system in which all the operations required to set up, supervise, and release connections required for calls are automatically performed in response to signals from a calling device. (188)

**Automatic Voice Network (AUTOVON):** Formerly, the principal long-haul, unsecure voice communications network within the Defense Communications System, now replaced by the Defense Switched Network (DSN). (188)

**automation:** **1.** The implementation of processes by automatic means. [JP1] **2.** The investigation, design, development, and application of methods of rendering processes automatic, self-moving, or self-controlling. **3.** The conversion of a procedure, a process, or equipment to automatic operation. [JP1]

**AUTOSEVOCOM:** *Acronym for Automatic Secure Voice Communications Network.*

**AUTOVON:** *Acronym for Automatic Voice Network. Superseded by Defense Switched Network.*

**auxiliary operation:** An offline operation performed by equipment not under control of the processing unit.

**auxiliary power:** Electric power that is provided by an alternate source and that serves as backup for the primary power source at the station main bus or prescribed sub-bus. (188) *Note 1:* An offline unit provides electrical isolation between the primary power source and the critical technical load whereas an online unit does not. *Note 2:* A Class A power source is a primary power source, *i.e.*, a source that assures an essentially continuous supply of power. *Note 3:* Types of auxiliary power services include Class B, a standby power plant to cover extended outages of the order of days; Class C, a 10-to-60-second quick-start unit to cover short-term outages of the order of hours; and Class D, an uninterruptible non-break unit using stored energy to provide continuous power within specified voltage and frequency tolerances.

**auxiliary storage:** **1.** Storage that is available to a processor only through its input/output channels. **2.** In a computer, any storage that is not internal memory, *i.e.*, is not random access memory (RAM). *Note:* Examples of auxiliary storage media are magnetic diskettes, optical disks including CD ROM, and magnetic tape cassettes.

**availability:** **1.** The degree to which a system, subsystem, or equipment is operable and in a committable state at the start of a mission, when the mission is called for at an unknown, *i.e.*, a random, time. *Note 1:* The conditions determining operability and committability must be specified. (188) *Note 2:* Expressed mathematically, availability is 1 minus the unavailability. **2.** The ratio of (a) the total time a functional unit is capable of being used during a given interval to (b) the length of the interval. *Note 1:* An example of availability is 100/168 if the unit is capable of being used for 100 hours in a week. *Note 2:* Typical availability objectives are specified in decimal fractions, such as 0.9998.

**available line:** **1.** In voice, video, or data communications, a circuit between two points that is ready for service, but is in the idle state. **2.** In facsimile transmission, the portion of the scanning line that can be specifically used for image signals. (188) *Synonym useful line.*

**available time:** From the point of view of a user, the time during which a functional unit can be used. *Note:* From the point of view of operating and maintenance personnel, the available time is the same as the uptime, *i.e.*, the time during which a functional unit is fully operational.

**avalanche multiplication:** A current-multiplying phenomenon that occurs in a semiconductor photodiode that is reverse-biased just below its breakdown voltage. *Note:* Under such a condition, photocurrent carriers, *i.e.*, electrons, are swept across the junction with sufficient energy to ionize additional bonds, creating additional electron-hole pairs in a regenerative action. [After FAA]

**avalanche photodiode (APD):** A photodiode that operates with a reverse-bias voltage that causes the primary photocurrent to undergo amplification by

cumulative multiplication of charge carriers. *Note:* As the reverse-bias voltage increases toward the breakdown, hole-electron pairs are created by absorbed photons. An avalanche effect occurs when the hole-electron pairs acquire sufficient energy to create additional pairs when the incident photons collide with the ions, *i.e.*, the holes and electrons. Thus, a signal gain is achieved. [After 2196]

**average picture level (APL):** In video systems, the average level of the picture signal during active scanning time integrated over a frame period; defined as a percentage of the range between blanking and reference white level.

**average rate of transmission:** *Synonym effective transmission rate.*

**avoidance routing:** The assignment of a circuit path to avoid certain critical or trouble-prone circuit nodes.

**AWGN:** *Abbreviation for additive white gaussian noise. See white noise.*

**axial propagation constant:** In an optical fiber, the propagation constant evaluated along the optical axis of the fiber in the direction of transmission. *Note:* The real part of the axial propagation constant is the attenuation constant. The imaginary part is the phase constant. [After 2196]

**axial ratio:** Of an electromagnetic wave having elliptical polarization, the ratio of the magnitudes of the major axis and the minor axis of the ellipse described by the electric field vector.

**axial ray:** A light ray that travels along the optical axis. (188)

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