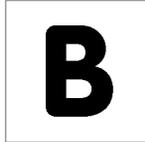


**b:** *Abbreviation for bit.*

**B:** *Abbreviation for bel, byte.*



**babble:** In transmission systems, the aggregate of crosstalk induced in a given line by all other lines.

**backbone:** **1.** The high-traffic-density connectivity portion of any communications network. (188) **2.** In packet-switched networks, a primary forward-direction path traced sequentially through two or more major relay or switching stations. *Note:* In packet-switched networks, a backbone consists primarily of switches and interswitch trunks.

**background noise:** The total system noise in the absence of information transmission. (188)

**background processing:** The execution of lower priority computer programs when higher priority programs are not using the system resources. *Note:* Priorities may be assigned by system software, application software, or the operator.

**backscattering:** **1.** Radio wave propagation in which the direction of the incident and scattered waves, resolved along a reference direction (usually horizontal) are oppositely directed. A signal received by backscattering is often referred to as “backscatter.” [JP1] (188) **2.** In optics, the scattering of light into a direction generally opposite to the original one.

**back-to-back connection:** **1.** A direct connection between the output of a transmitting device and the input of an associated receiving device. (188) *Note:* When used for equipment measurements or testing purposes, such a back-to-back connection eliminates the effects of the transmission channel or medium. **2.** A direct connection between the output of a receiving device and the input to a transmitting device. *Note:* The term “*direct*,” as used in both definitions, may be construed as permitting a passive device such as a pad (attenuator) to accommodate power level constraints.

**backup:** *See backup file.*

**backup file:** A copy of a file made for purposes of later reconstruction of the file, if necessary. *Note:* A backup file may be used for preserving the integrity of the original file and may be recorded on any suitable medium. *Synonym* **job-recovery control file.**

**backward channel:** **1.** In data transmission, a secondary channel in which the direction of transmission is constrained to be opposite to that of the primary, *i.e.*, the forward (user-information) channel. *Note:* The direction of transmission in the backward channel is restricted by the control interchange circuit that controls the direction of transmission in the primary channel. **2.** In a data circuit, the channel that passes data in a direction opposite to that of its associated forward channel. (188) *Note 1:* The backward channel is usually used for transmission of supervisory, acknowledgement, or error-control signals. The direction of flow of these signals is opposite to that in which user information is being transferred. *Note 2:* The backward-channel bandwidth is usually less than that of the primary channel, *i.e.*, the forward (user information) channel.

**backward recovery:** The reconstruction of an earlier version of a file by using a newer version of data recorded in a journal.

**backward signal:** A signal sent from the called to the calling station, *i.e.*, from the original data sink to the original data source. (188) *Note:* Backward signals are usually sent via a backward channel and may consist of supervisory, acknowledgement, or control signals.

**backward supervision:** The use of supervisory signal sequences from a secondary to a primary station.

**balance:** In electrical circuits and networks, to adjust the impedance to achieve specific objectives, such as to reach specified return loss objectives at a hybrid junction of two-wire and four-wire circuits. (188)

**balanced:** Pertaining to electrical symmetry. (188)

**balanced code:** **1.** In PCM systems, a code constructed so that the frequency spectrum resulting from the transmission of any code word has no dc

component. (188) **2.** In PCM, a code that has a finite digital sum variation.

**balanced line:** A transmission line consisting of two conductors in the presence of ground, capable of being operated in such a way that when the voltages of the two conductors at all transverse planes are equal in magnitude and opposite in polarity with respect to ground, the currents in the two conductors are equal in magnitude and opposite in direction. (188) *Note:* A balanced line may be operated in an unbalanced condition. *Synonym* **balanced signal pair.**

**balanced modulator:** A modulator constructed so that the carrier is suppressed and any associated carrier noise is balanced out. *Note 1:* The balanced modulator output contains only the sidebands. *Note 2:* Balanced modulators are used in AM transmission systems. (188)

**balanced signal pair:** *Synonym* **balanced line.**

**balance return loss:** **1.** A measure of the degree of balance between two impedances connected to two conjugate sides of a hybrid set, coil, network, or junction. **2.** A measure of the effectiveness with which a balancing network simulates the impedance of a two-wire circuit at a hybrid coil. (188)

**balancing network:** **1.** In a hybrid set, hybrid coil, or resistance hybrid, a circuit used to match, *i.e.*, to balance, the impedance of a uniform transmission line, *i.e.*, twisted metallic pair, over a selected range of frequencies. *Note:* A balancing network is required to ensure isolation between the two ports of the four-wire side of the hybrid. **2.** A device used between a balanced device or line and an unbalanced device or line for the purpose of transforming from balanced to unbalanced or from unbalanced to balanced. (188)

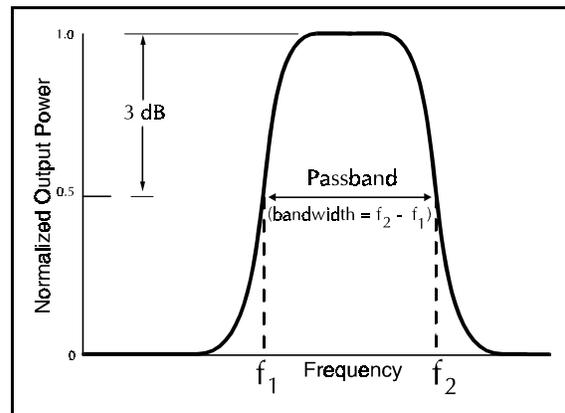
**balun:** *Abbreviation for balanced to unbalanced.* In radio frequency usage, a device used to couple a balanced device or line to an unbalanced device or line. (188)

**band:** **1.** In communications, the frequency spectrum between two defined limits. (188) **2.** A group of tracks on a magnetic drum or on one side of a

magnetic disk. **3.** A set of frequencies authorized for use in a geographical area defined for common carriers for purposes of communications system management.

**band-elimination filter:** *Synonym* **band-stop filter.**

**bandpass filter:** A filter that ideally passes all frequencies between two non-zero finite limits and bars all frequencies not within the limits. *Note:* The cutoff frequencies are usually taken to be the 3-dB points. (188)

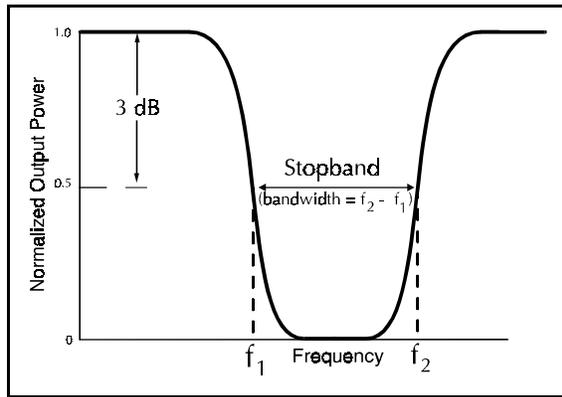


bandpass filter

**bandpass limiter:** A device that imposes hard limiting on a signal and contains a filter that suppresses the unwanted products (harmonics) of the limiting process.

**band-rejection filter:** *Synonym* **band-stop filter.**

**band-stop filter:** A filter that attenuates, usually to very low levels, all frequencies between two non-zero, finite limits and passes all frequencies not within the limits. (188) *Note:* A band-stop filter may be designed to stop the specified band of frequencies but usually only attenuates them below some specified level. *Synonyms* **band-elimination filter, band-rejection filter, band-suppression filter, notched filter.**



band-stop filter

**band-suppression filter:** *Synonym band-stop filter.*

**bandwidth (BW):** **1.** The difference between the limiting frequencies within which performance of a device, in respect to some characteristic, falls within specified limits. (188) **2.** The difference between the limiting frequencies of a continuous frequency band. (188)

**bandwidth balancing mechanism:** In a distributed-queue dual-bus network, a procedure in which a node occasionally skips the use of empty queued arbitrated slots, and which procedure effects sharing of the bandwidth mechanisms.

**bandwidth compression:** **1.** The reduction of the bandwidth needed to transmit a given amount of data in a given time. **2.** The reduction of the time needed to transmit a given amount of data in a given bandwidth. (188) *Note:* Bandwidth compression implies a reduction in normal bandwidth of an information-carrying signal without reducing the information content of the signal.

**bandwidth•distance product:** Of an optical fiber, under specified launching and cabling conditions, at a specified wavelength, a figure of merit equal to the product of the fiber's length and the 3-dB bandwidth of the optical signal. *Note 1:* The bandwidth•distance product is usually stated in megahertz•kilometer (MHz•km) or gigahertz•kilometer (GHz•km). *Note 2:* The bandwidth•distance product, which is normalized to 1 km, is a useful figure of merit for predicting the effective fiber bandwidth for other

lengths, and for concatenated fibers. *Synonym bandwidth•length product.*

**bandwidth•length product:** *Synonym for bandwidth•distance product.*

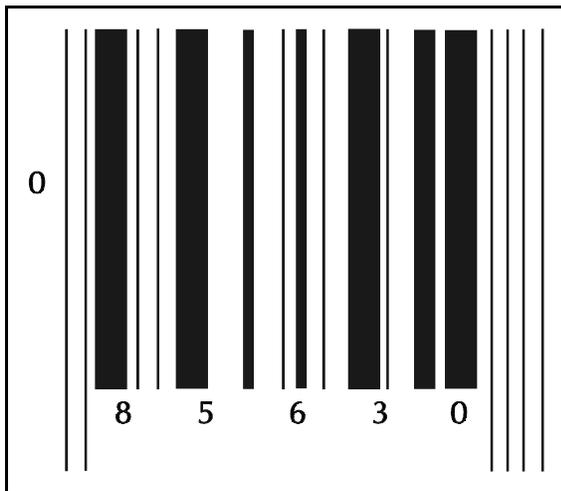
**bandwidth-limited operation:** The condition prevailing when the system bandwidth limits performance. (188) *Note:* Bandwidth-limited operation occurs when the system distorts the signal waveform beyond specified limits. For linear systems, bandwidth-limited operation is equivalent to distortion-limited operation.

**bandwidth (of an optical fiber):** **1.** The lowest modulation frequency at which the RMS peak-to-valley amplitude (optical power) difference of an intensity-modulated monochromatic signal decreases, at the output of the fiber, to a specified fraction (usually one-half) of the RMS peak-to-valley amplitude (optical power) difference of a nearly-zero (arbitrarily low) modulation frequency, both modulation frequencies having the same RMS peak-to-valley amplitude (optical power) difference at the fiber input. *Note 1:* In multimode fibers, multimode distortion is usually the most significant parameter limiting fiber bandwidth, although material dispersion may also play a significant role, especially in the first (850-nm) window. *Note 2:* In multimode fibers, the bandwidth•distance product (colloquially, "fiber bandwidth") is customarily specified by vendors for the bandwidth as limited by multimode distortion only. The spectral width of the optical source is assumed to be extremely narrow. In practice, the effective fiber bandwidth will also be limited by dispersion, especially in the first (850-nm) window, where material dispersion is relatively high, because optical sources have a finite spectral width. Laser diodes typically have a spectral width of several nanometers, FWHM. LEDs typically have a spectral width of 35 to 100 nm, FWHM. *Note 3:* The effective risetime of multimode fibers may be estimated fairly accurately as the square root of the sum of the squares of the material-dispersion-limited risetime and the multimode-distortion-limited risetime. *Note 4:* In single-mode fibers, the most important parameters affecting fiber bandwidth are material dispersion and waveguide dispersion. Practical fibers are designed so that material dispersion and waveguide dispersion cancel one another at the wavelength of interest. *Note 5:*

Regarding effective fiber bandwidth as it affects overall system performance, it should be recognized that optical detectors such as PIN diodes are square-law devices. Their photocurrent is proportional to the optical power of the detected signal. Because electrical power is a function of the square of the current, when the optical power decreases by one-half (a 3-dB decrease), the electrical power decreases by three-fourths (a 6-dB decrease).

**2.** Loosely, *synonym* **bandwidth•distance product.**

**bar code:** A code representing characters by sets of parallel bars of varying thickness and separation that are read optically by transverse scanning. *Note:* Bar code uses include identifying merchandise, sorting mail, and inventorying supplies.



bar code

**barrage jamming:** Jamming accomplished by transmitting a band of frequencies that is large with respect to the bandwidth of a single emitter. *Note:* Barrage jamming may be accomplished by presetting multiple jammers on adjacent frequencies or by using a single wideband transmitter. Barrage jamming makes it possible to jam emitters on different frequencies simultaneously and reduces the need for operator assistance or complex control equipment. These advantages are gained at the expense of reduced jamming power at any given frequency.

**base: 1.** In the numeration system commonly used in scientific notation, the real number that is raised to a power denoted by the exponent and then multiplied

by the coefficient to determine the value of the number represented without the use of exponents. *Note:* An example of a base is the number 6.25 in the expression  $2.70 \times 6.25^{1.5} \approx 42.19$ . The 2.70 is the coefficient and the 1.5 is the exponent. In the decimal numeration system, the base is 10 and in the binary numeration system, the base is 2. The value  $e \approx 2.718$  is the natural base. **2.** A reference value. **3.** A number that is multiplied by itself as many times as indicated by an exponent.

**baseband: 1.** The original band of frequencies produced by a transducer, such as a microphone, telegraph key, or other signal-initiating device, prior to initial modulation. *Note 1:* In transmission systems, the baseband signal is usually used to modulate a carrier. *Note 2:* Demodulation recreates the baseband signal. *Note 3:* *Baseband* describes the signal state prior to modulation, prior to multiplexing, following demultiplexing, and following demodulation. (188) *Note 4:* Baseband frequencies are usually characterized by being much lower in frequency than the frequencies that result when the baseband signal is used to modulate a carrier or subcarrier. **2.** In facsimile, the frequency of a signal equal in bandwidth to that between zero frequency and maximum keying frequency. (188)

**baseband local area network:** A local area network in which information is encoded, multiplexed, and transmitted without modulation of carriers.

**baseband modulation:** Intensity modulation of an optical source, *e.g.*, LED or ILD, directly, without first modulating the signal of interest onto an electrical carrier wave. [After FAA]

**baseband signaling:** Transmission of a digital or analog signal at its original frequencies; *i.e.*, a signal in its original form, not changed by modulation. (188)

**basecom:** *Abbreviation for base communications.*

**base communications (basecom):** Communications services, such as the installation, operation, maintenance, augmentation, modification, and rehabilitation of communications networks, systems, facilities, and equipment, including off-post extensions, provided for the operation of a military

post, camp, installation, station, or activity.  
*Synonym communications base station.*

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

**base station:** **1.** A land station in the land mobile service. [NTIA] [RR] **2.** In personal communication service, the common name for all the radio equipment located at one fixed location, and that is used for serving one or several cells.

**basic exchange telecommunications radio service (BETRS):** A commercial service that can extend telephone service to rural areas by replacing the local loop with radio communications. *Note:* In the BETRS, non-government ultra-high frequency (UHF) and very high frequency (VHF) common carrier and the private radio service frequencies are shared.

**basic group:** *See group.*

**basic mode link control:** Control of data links by use of the control characters of the 7-bit character set for information processing interchange as given in ISO Standard 646-1983 and CCITT Recommendation V.3-1972.

**basic rate interface (BRI):** A CCITT Integrated Services Digital Network (ISDN) multipurpose user interface standard that denotes the capability of simultaneous voice and data services provided over two clear 64-kb/s channels and one clear 16-kb/s channel (2B+D) access arrangement to each user location.

**basic service:** **1.** A pure transmission capability over a communication path that is virtually transparent in terms of its interaction with customer-supplied information. **2.** The offering of transmission capacity between two or more points suitable for a user's transmission needs and subject only to the technical parameters of fidelity and distortion criteria, or other conditioning.

**basic service element (BSE):** **1.** An optional unbundled feature, generally associated with the basic serving arrangement (BSA), that an enhanced-service provider (ESP) may require or find useful in configuring an enhanced service. **2.** A fundamental (basic) communication network service; an optional network capability associated with a BSA. *Note:* BSEs constitute optional capabilities to which the customer may subscribe or decline to subscribe.

**basic serving arrangement (BSA):** **1.** The fundamental tariffed switching and transmission (and other) services that an operating company must provide to an enhanced service provider (ESP) to connect with its customers through the company network. **2.** In an open-network-architecture context, the fundamental underlying connection of an enhanced service provider (ESP) to and through the operating company's network including an ESP access link, the features and functions associated with that access link at the central office serving the ESP and/or other offices, and the transport (dedicated or switched) within the network that completes the connection from the ESP to the central office serving its customers or to capabilities associated with the customer's complementary network services. *Note:* Each component may have a number of categories of network characteristics. Within these categories of network characteristics are alternatives from among which the customer must choose. Examples of BSA components are ESP access link, transport and/or usage.

**basic status:** In data transmission, the status of the capability of a secondary station to send or receive a frame containing an information field.

**batched communications:** *Synonym batched transmission.*

**batched transmission:** The transmission of two or more messages from one station to another without intervening responses from the receiving station. *Synonym batched communications.*

**batch processing:** **1.** The processing of data or the accomplishment of jobs accumulated in advance in such a manner that the user cannot further influence the processing while it is in progress. **2.** The processing of data accumulated over a period of

time. **3.** *Loosely*, the execution of computer programs serially. **4.** Pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set is started. (188) **5.** Pertaining to the sequential input of computer programs or data.

**baud (Bd):** **1.** A unit of modulation rate. *Note:* One baud corresponds to a rate of one unit interval per second, where the modulation rate is expressed as the reciprocal of the duration in seconds of the shortest unit interval. **2.** A unit of signaling speed equal to the number of discrete signal conditions, variations, or events per second. (188) *Note 1:* If the duration of the unit interval is 20 milliseconds, the signaling speed is 50 bauds. If the signal transmitted during each unit interval can take on any one of  $n$  discrete states, the bit rate is equal to the rate in bauds times  $\log_2 n$ . The technique used to encode the allowable signal states may be any combination of amplitude, frequency, or phase modulation, but it cannot use a further time-division multiplexing technique to subdivide the unit intervals into multiple subintervals. In some signaling systems, non-information-carrying signals may be inserted to facilitate synchronization; *e.g.*, in certain forms of binary modulation coding, there is a forced inversion of the signal state at the center of the bit interval. In these cases, the synchronization signals are included in the calculation of the rate in bauds but not in the computation of bit rate. *Note 2:* *Baud* is sometimes used as a synonym for *bit-per-second*. This usage is deprecated.

**Baudot code:** A synchronous code in which five equal-length bits represent one character. *Note 1:* The Baudot code, which was developed circa 1880, has been replaced by the start-stop asynchronous International Alphabet No. 2 (IA No. 2). *Note 2:* IA No. 2 is not, and should not be identified as, the Baudot code. *Note 3:* The Baudot code has been widely used in teletypewriter systems.

**BCC:** *Abbreviation for block check character.*

**BCD:** *Abbreviation for binary coded decimal.*

**B channel:** **1.** A communications channel used for the transmission of an aggregate signal generated by multichannel transmitting equipment. (188) **2.** The

CCITT designation for a clear channel, 64-kb/s service capability provided to a subscriber under the Integrated Services Digital Network offering. *Note:* The B channel, also called the bearer channel, is intended for transport of user information, as opposed to signaling information.

**BCH code:** *Abbreviation for Bose-Chaudhuri-Hochquenghem code.* A multilevel, cyclic, error-correcting, variable-length digital code used to correct errors up to approximately 25% of the total number of digits. *Note:* BCH codes are not limited to binary codes, but may be used with multilevel phase-shift keying whenever the number of levels is a prime number or a power of a prime number, such as 2, 3, 4, 5, 7, 8, 11, and 13. A BCH code in 11 levels has been used to represent the 10 decimal digits plus a sign digit.

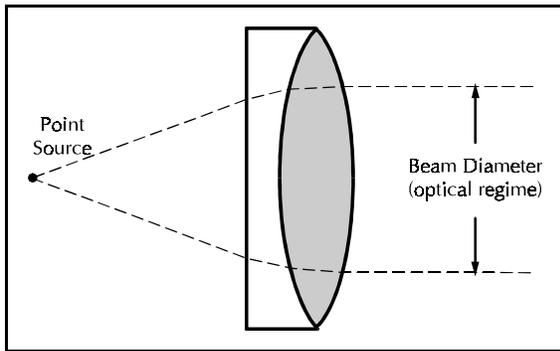
**BCI:** *Abbreviation for bit-count integrity.*

**Bd:** *Abbreviation for baud.*

**beacon:** *See radiobeacon station.*

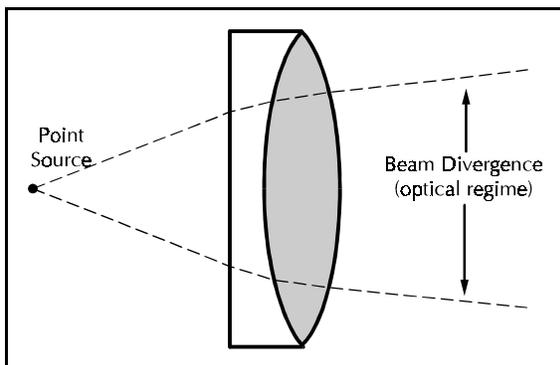
**beam:** **1.** The main lobe of an antenna radiation pattern. **2.** A column of light. *Note:* A beam may be parallel, divergent, or convergent. [After FAA]

**beam diameter:** Of an electromagnetic beam, along any specified line that (a) intersects the beam axis and (b) lies in any specified plane normal to the beam axis, the distance between the two diametrically opposite points at which the irradiance is a specified fraction, *e.g.*,  $\frac{1}{2}$  or  $1/\epsilon$ , of the beam's peak irradiance. (188) *Note 1:* Beam diameter is usually used to characterize electromagnetic beams in the optical regime, and occasionally in the microwave regime, *i.e.*, cases in which the aperture from which the beam emerges is very large with respect to the wavelength. *Note 2:* Beam diameter usually refers to a beam of circular cross section, but not necessarily so. A beam may, for example, have an elliptical cross section, in which case the orientation of the beam diameter must be specified, *e.g.*, with respect to the major or minor axis of the elliptical cross section.



beam diameter

**beam divergence:** Of an electromagnetic beam, in any plane that intersects the beam axis, the increase in beam diameter with distance from the aperture from which the beam emerges. *Note 1:* Beam divergence is usually used to characterize electromagnetic beams in the optical regime, *i.e.*, cases in which the aperture from which the beam emerges is very large with respect to the wavelength. *Note 2:* Beam divergence usually refers to a beam of circular cross section, but not necessarily so. A beam may, for example, have an elliptical cross section, in which case the orientation of the beam divergence must be specified, *e.g.*, with respect to the major or minor axis of the elliptical cross section.



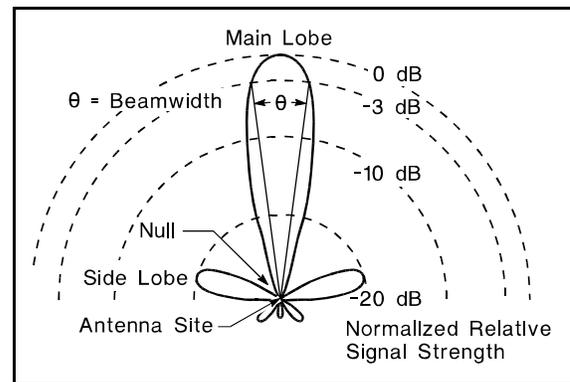
beam divergence

**beamsplitter:** A device for dividing an optical beam into two or more separate beams. *Note:* An example of a beamsplitter is a partially reflecting mirror.

**beam steering:** Changing the direction of the main lobe of a radiation pattern. *Note:* In radio systems, beam steering may be accomplished by switching

antenna elements or by changing the relative phases of the rf signals driving the elements. In optical systems, beam steering may be accomplished by changing the refractive index of the medium through which the beam is transmitted or by the use of mirrors or lenses.

**beamwidth: 1.** In the radio regime, of an antenna pattern, the angle between the half-power (3-dB) points of the main lobe, when referenced to the peak effective radiated power of the main lobe. (188) *Note:* Beamwidth is usually expressed in degrees. It is usually expressed for the horizontal plane, but may also be expressed for the vertical plane. **2.** For the optical regime, *see beam divergence.*



beamwidth

**bearer channel:** *See B channel.*

**bearer service:** A telecommunications service that allows transmission of user-information signals between user-network interfaces. *See B channel, service access.*

**beating:** *See heterodyne.*

**beeping:** *Synonym paging, radio paging.*

**B8ZS:** *Abbreviation for bipolar with eight-zero substitution.* A T-carrier line code in which bipolar violations are deliberately inserted if user data contains a string of 8 or more consecutive zeros. *Note 1:* B8ZS is used to ensure a sufficient number of transitions to maintain system synchronization when the user data stream contains an insufficient number of “ones” to do so. *Note 2:* B8ZS is used in the European hierarchy at the T1 rate.

**bel (B):** A unit of measure of ratios of power levels, *i.e.*, relative power levels. *Note 1:* The number of bels for a given ratio of power levels is calculated by taking the logarithm, to the base 10, of the ratio. Mathematically, the number of bels is calculated as  $B = \log_{10}(P_1/P_2)$  where  $P_1$  and  $P_2$  are power levels. *Note 2:* The dB, equal to 0.1 B, is a more commonly used unit.

**bell (BEL) character:** A transmission control character that is used when there is a need to call for user or operator attention in a communications system, and that usually activates an audio or visual alarm or other attention-getting device.

**Bell Operating Company (BOC):** Any of the 22 operating companies that were divested from AT&T by court order. *Note:* Cincinnati Bell Telephone Co. and Southern New England Bell Telephone Co. are not included.

**bend loss:** *See* **macro bend loss, micro bend loss.**

**BER:** *Abbreviation for bit error ratio.*

**BERT:** *Acronym for bit error ratio tester.*

**BETRS:** *Abbreviation for basic exchange telecommunications radio service.*

**between-the-lines entry:** Unauthorized access to a momentarily inactive terminal, of a legitimate user, assigned to a communications channel.

**BEX:** *Abbreviation for broadband exchange.*

**bias:** **1.** A systematic deviation of a value from a reference value. (188) **2.** The amount by which the average of a set of values departs from a reference value. (188) **3.** Electrical, mechanical, magnetic, or other force (field) applied to a device to establish a reference level to operate the device. (188) **4.** In telegraph signaling systems, the development of a positive or negative dc voltage at a point on a line that should remain at a specified reference level, such as zero. *Note:* A bias may be applied or produced by (i) the electrical characteristics of the line, (ii) the terminal equipment, and (iii) the signaling scheme. (188)

**bias distortion:** **1.** Signal distortion resulting from a shift in the bias. **2.** In binary signaling, distortion of the signal in which all the significant intervals have uniformly longer or shorter durations than their theoretical durations. (188) *Note:* Bias distortion is expressed in percent of the system-specified unit interval.

**biconical antenna:** An antenna consisting of two conical conductors, having a common axis and vertex, and extending in opposite directions. (188) *Note 1:* In a biconical antenna, excitation is applied at the common vertex. *Note 2:* If one of the cones is reduced to a plane, the antenna is called a disccone.

**bidirectional asymmetry:** In data transmission, the condition that exists when information flow characteristics are different in each direction.

**bidirectional coupler:** *See* **directional coupler.**

**bidirectional symmetry:** The condition that exists when information flow characteristics are the same in each direction.

**BIH:** *French abbreviation for International Time Bureau. See International Atomic Time.*

**bilateral control:** *Synonym* **bilateral synchronization.**

**bilateral synchronization:** A synchronization control system between exchanges A and B in which the clock at exchange A controls the data received at exchange B and the clock at exchange B controls the data received at exchange A. (188) *Note:* Bilateral synchronization is usually implemented by deriving the timing from the incoming bit stream. *Synonym* **bilateral control.**

**billboard antenna:** An array of parallel dipole antennas with flat reflectors, usually positioned in a line or plane. *Note 1:* The spacing and dimensions of the dipoles depend on the wavelength. *Note 2:* The main lobe of a fixed billboard antenna may, within limits, be steered by appropriate phasing of the respective signals to individual elements of the array. *Synonym* **broadside antenna.**

**binary:** **1.** Pertaining to a selection, choice, or condition that has two possible different values or states. **2.** Pertaining to a fixed radix numeration system that has a radix of 2.

**binary code:** A code, the elements of which can assume either one of two possible states. (188)

**binary-coded decimal (BCD):** Pertaining to the representation of a decimal digit by a unique arrangement of no fewer than four binary digits. (188)

**binary-coded decimal code:** *Synonym* **binary-coded decimal notation.**

**binary-coded decimal interchange code:** *See* **binary-coded decimal notation.**

**binary-coded decimal (BCD) notation:** A binary notation in which each of the decimal digits is represented by a binary numeral. *Synonyms* **binary-coded decimal code, binary-coded decimal representation.**

**binary-coded decimal representation:** *Synonym* **binary-coded decimal notation.**

**binary digit (bit):** *See* **bit.**

**binary element:** A constituent element of data that takes either of two values or states. *Note:* “*Binary element*” should not be confused with “*binary digit*.”.

**binary exponential backoff:** *See* **truncated binary exponential backoff.**

**binary modulation:** The process of varying a parameter of a carrier as a function of two finite, discrete states. (188)

**binary notation:** **1.** Any notation that uses two different characters, usually the digits 0 and 1. *Note:* Data encoded in binary notation need not be in the form of a pure binary numeration system; *e.g.*, they may be represented by a Gray code. **2.** A scheme for representing numbers, which scheme is characterized by the arrangements of digits in sequence, with the understanding that successive

digits are interpreted as coefficients of successive powers of base 2. (188)

**binary number:** A number that is expressed in binary notation and is usually characterized by the arrangement of bits in sequence, with the understanding that successive bits are interpreted as coefficients of successive powers of the base 2. (188)

**binary synchronous (bi-sync) communication:** A character-oriented, data-link-layer protocol. *Note:* The bi-sync protocol is being phased out of most computer communication networks in favor of bit-oriented protocols such as SDLC, HDLC, and ADCCP.

**binding:** In computer, communications, and automatic data processing systems, assigning a value or referent to an identifier. *Note:* Examples of binding include assigning a value to a parameter, assigning an absolute address to a virtual or relative address, and assigning a device identifier to a symbolic address or label.

**biphase modulation:** *Synonym* **phase-shift keying.**

**bipolar signal:** A signal that may assume either of two polarities, neither of which is zero. (188) *Note 1:* A bipolar signal may have a two-state non-return-to-zero (NRZ) or a three-state return-to-zero (RZ) binary coding scheme. *Note 2:* A bipolar signal is usually symmetrical with respect to zero amplitude, *i.e.*, the absolute values of the positive and negative signal states are nominally equal.

**birefringence:** In a transparent material, anisotropism of the refractive index, which varies as a function of polarization as well as orientation with respect to the incident ray. (188) *Note 1:* The term “*birefringence*” means, literally, “*double refraction*.” *Note 2:* All crystals except those of cubic lattice structure exhibit some degree of anisotropy with regard to their physical properties, including refractive index. Other materials, such as glasses or plastics, become birefringent when subjected to mechanical strain. *Note 3:* Birefringent materials, including crystals, have the ability to refract an unpolarized incident ray into two separate, orthogonally polarized rays, which in the general case take different paths, depending on orientation of

the material with respect to the incident ray. The refracted rays are referred to as the “ordinary,” or “O” ray, which obeys Snell’s Law, and the “extraordinary,” or “E” ray, which does not. [After FAA] *Synonym* **double refraction**.

**birefringent medium:** *See* **birefringence**.

**B-ISDN:** *Abbreviation for* **broadband ISDN**.

**bistable:** Pertaining to a device capable of assuming either one of two stable states.

**bistable multivibrator:** *Synonym* **flip-flop**.

**bistable trigger circuit:** *Synonym* **flip-flop**.

**bi-sync:** *Abbreviation for* **binary synchronous (communication)**.

**bit:** *Abbreviation for* **binary digit**. **1.** A character used to represent one of the two digits in the numeration system with a base of two, and only two, possible states of a physical entity or system. **2.** In binary notation either of the characters 0 or 1. (188) **3.** A unit of information equal to one binary decision or the designation of one of two possible and equally likely states of anything used to store or convey information. (188)

**bit-by-bit asynchronous operation:** In data transmission, an operation in which manual, semiautomatic, or automatic shifts in the data modulation rate are accomplished by gating or slewing the clock modulation rate. (188) *Note:* For example, bit-by-bit asynchronous operation may be at 50 b/s one moment and at 1200 b/s the next moment.

**bit configuration:** The sequence of bits used to encode a character.

**bit-count integrity (BCI):** **1.** In message communications, the preservation of the exact number of bits that are in the original message. **2.** In connection-oriented services, preservation of the number of bits per unit time. (188) *Note:* Bit-count integrity is not the same as bit integrity, which requires that the delivered bits correspond exactly with the original bits.

**bit density:** The number of bits recorded per unit length, area, or volume. *Note:* Bit density is the reciprocal of bit pitch. *Synonym* **recording density**.

**biternary transmission:** Digital transmission in which two binary pulse trains are combined for transmission over a channel in which the available bandwidth is sufficient for transmission of only one of the two pulse trains at a time if they remain in binary form.

**bit error rate:** *Deprecated term. See* **bit error ratio**.

**bit error ratio (BER):** The number of erroneous bits divided by the total number of bits transmitted, received, or processed over some stipulated period. (188) *Note 1:* Examples of bit error ratio are (a) transmission BER, *i.e.*, the number of erroneous bits received divided by the total number of bits transmitted; and (b) information BER, *i.e.*, the number of erroneous decoded (corrected) bits divided by the total number of decoded (corrected) bits. *Note 2:* The BER is usually expressed as a coefficient and a power of 10; for example, 2.5 erroneous bits out of 100,000 bits transmitted would be 2.5 out of  $10^5$  or  $2.5 \times 10^{-5}$ .

**bit error ratio tester (BERT):** A testing device that compares a received data pattern with a known transmitted pattern to determine the level of transmission quality.

**bit interval:** *See* **bit, character interval, unit interval**.

**bit inversion:** **1.** The changing of the state of a bit to the opposite state. (188) **2.** The changing of the state that represents a given bit, *i.e.*, a 0 or a 1, to the opposite state. (188) *Note:* For example, if a 1 is represented by a given polarity or phase at one stage in a circuit, the 1 is represented by the opposite polarity or phase at the next stage.

**bit pairing:** The practice of establishing, within a code set, a number of subsets that have an identical bit representation except for the state of a specified bit. (188) *Note:* An example of bit pairing occurs in the International Alphabet No. 5 and the American Standard Code for Information Interchange (ASCII),

where the upper case letters are related to their respective lower case letters by the state of bit six.

**bit position:** A character position in a word in a binary notation.

**bit rate (BR):** In a bit stream, the number of bits occurring per unit time, usually expressed in bits per second. (188) *Note:* For n-ary operation, the bit rate is equal to  $\log_2 n$  times the rate (in bauds), where  $n$  is the number of significant conditions in the signal.

**bit-rate•distance product:** See **bandwidth•distance product**.

**bit robbing:** In digital carrier systems, the practice or technique of preempting, at regular intervals and for the purpose of transmitting signaling information, one digit time slot that (a) is associated with the given user channel for which signaling is required, and (b) is used primarily for transporting encoded speech via that channel. *Note 1:* Bit robbing is an option in networks compatible with T-carrier, e.g., an ISDN. *Note 2:* In conventional T-carrier systems, bit robbing uses, in every sixth frame, the time slot associated with the least significant bit. *Synonym speech digit signaling.*

**bit-sequence independence:** A characteristic of some digital data transmission systems that impose no restrictions on, or modification of, the transmitted bit sequence. *Note:* Bit-sequence-independent protocols are in contrast to protocols that reserve certain bit sequences for special meanings, such as the flag sequence, 01111110, for HDLC, SDLC, and ADCCP protocols.

**bit slip:** In digital transmission, the loss of a bit or bits, caused by variations in the respective clock rates of the transmitting and receiving devices. *Note:* One cause of bit slippage is overflow of a receive buffer that occurs when the transmitter's clock rate exceeds that of the receiver. This causes one or more bits to be dropped for lack of storage capacity.

**bits per inch (b/in):** A unit used to express the linear bit density of data in storage. *Note:* The abbreviation "bpi" is not in accordance with international standards, and is therefore deprecated.

**bits per second (b/s):** A unit used to express the number of bits passing a designated point per second. (188) *Note 1:* For example, for two-condition serial transmission in a single channel in which each significant condition represents a bit, i.e., a 0 or a 1, the bit rate in bits per second and the baud have the same numerical value only if each bit occurs in a unit interval. In this case, the data signaling rate in bits per second is  $1/T$ , where  $T$  is the unit interval. *Note 2:* The abbreviation "bps" is not in accordance with international standards, and is therefore deprecated.

**bit-stepped:** Pertaining to the control of digital equipment in which operations are performed one step at a time at the applicable bit rate. (188)

**bit-stream transmission:** **1.** In bit-oriented systems, the transmission of bit strings. **2.** In character-oriented systems, the transmission of bit streams that represent characters. *Note:* In bit-stream transmission, the bits usually occur at fixed time intervals, start and stop signals are not used, and the bit patterns follow each other in sequence without interruption.

**bit string:** A sequence of bits. *Note:* In a bit stream, individual bit strings may be separated by data delimiters.

**bit stuffing:** The insertion of noninformation bits into data. *Note 1:* Stuffed bits should not be confused with overhead bits. *Note 2:* In data transmission, bit stuffing is used for various purposes, such as for synchronizing bit streams that do not necessarily have the same or rationally related bit rates, or to fill buffers or frames. The location of the stuffing bits is communicated to the receiving end of the data link, where these extra bits are removed to return the bit streams to their original bit rates or form. Bit stuffing may be used to synchronize several channels before multiplexing or to rate-match two single channels to each other. (188) *Synonym positive justification.*

**bit stuffing rate:** See **nominal bit stuffing rate**.

**bit synchronization:** Synchronization in which the decision instant is brought into alignment with the received bit, i.e., the basic signaling element. (188)

**bit synchronous operation:** Operation in which data circuit terminating equipment (DCE), data terminal equipment (DTE), and transmitting circuits are all operated in bit synchronism with a clock. *Note 1:* In bit synchronous operation, clock timing is usually delivered at twice the modulation rate, and one bit is transmitted or received during each clock cycle. *Note 2:* Bit synchronous operation is sometimes erroneously referred to as digital synchronization. (188)

**BIU:** *Abbreviation for bus interface unit. See network interface device.*

**BLACK:** [A] designation applied to telecommunications and automated information systems, and to associated areas, circuits, components, and equipment, in which only unclassified signals are processed. *Note:* Encrypted signals are unclassified. [NIS] (188)

**blackbody:** A totally absorbing body that does not reflect radiation. *Note:* In thermal equilibrium, a blackbody absorbs and radiates at the same rate; the radiation will just equal absorption when thermal equilibrium is maintained.

**black facsimile transmission:** **1.** In facsimile systems using amplitude modulation, that form of transmission in which the maximum transmitted power corresponds to the maximum density of the subject. (188) **2.** In facsimile systems using frequency modulation, that form of transmission in which the lowest transmitted frequency corresponds to the maximum density of the subject. (188)

**black noise:** Noise that has a frequency spectrum of predominately zero power level over all frequencies except for a few narrow bands or spikes. *Note:* An example of black noise in a facsimile transmission system is the spectrum that might be obtained when scanning a black area in which there are a few random white spots. Thus, in the time domain, a few random pulses occur while scanning.

**black recording:** **1.** In facsimile systems using amplitude modulation, recording in which the maximum received power corresponds to the maximum density of the record medium. (188) **2.** In a facsimile system using frequency modulation,

recording in which the lowest received frequency corresponds to the maximum density of the record medium. (188)

**black signal:** In facsimile, the signal resulting from scanning a maximum-density area of the object. (188)

**BLACK signal:** A signal that represents only unclassified or encrypted information, usually in cryptographic systems. (188)

**blanketing:** The interference that is caused by the presence of an AM broadcast signal of one volt per meter (V/m) or greater strengths in the area adjacent to the antenna of the transmitting station. The 1 V/m contour is referred to as the blanket contour and the area within this contour is referred to as the “*blanket area.*” [47CFR]

**blanketing area:** In the vicinity of a transmitting antenna, the area in which the signal from that antenna interferes with the reception of other signals. *Note:* The blanketing area around a given transmitting antenna depends on the selectivity and sensitivity of the receiver, and on the respective levels of the other signals in question.

**blanking:** In graphic display, the suppression of the display of one or more display elements or display segments.

**blind transmission:** Transmission without obtaining a receipt, *i.e.*, acknowledgement of reception, from the intended receiving station. *Note:* Blind transmission may occur or be necessary when security constraints, such as radio silence, are imposed, when technical difficulties with a sender’s receiver or receiver’s transmitter occur, or when lack of time precludes the delay caused by waiting for receipts.

**blinking:** In graphic display devices, an intentional periodic change in the intensity of one or more display elements or display segments.

**block:** **1.** A group of bits or digits that is transmitted as a unit and that may be encoded for error-control purposes. (188) **2.** A string of records, words, or characters, that for technical or logical purposes are treated as a unit. (188) *Note 1:* Blocks (a) are

separated by interblock gaps, (b) are delimited by an end-of-block signal, and (c) may contain one or more records. *Note 2:* A block is usually subjected to some type of block processing, such as multi-dimensional parity checking, associated with it. **3.** In programming languages, a subdivision of a program that serves to group related statements, delimit routines, specify storage allocation, delineate the applicability of labels, or segment parts of the program for other purposes.

**block character:** *See* **end-of-transmission-block character.**

**block check:** In the processing or transmission of digital data, an error-control procedure that is used to determine whether a block of data is structured according to given rules. (188)

**block check character (BCC):** A character added to a transmission block to facilitate error detection. *Note:* In longitudinal redundancy checking and cyclic redundancy checking, block check characters are computed for, and added to, each message block transmitted. This block check character is compared with a second block check character computed by the receiver to determine whether the transmission is error free.

**block code:** An error detection and/or correction code in which the encoded block consists of  $N$  symbols, containing  $K$  information symbols ( $K < N$ ) and  $N - K$  redundant check symbols, such that most naturally occurring errors can be detected and/or corrected.

**block diagram:** A diagram of a system, a computer, or a device in which the principal parts are represented by suitably annotated geometrical figures to show both the basic functions of the parts and their functional relationships.

**block distortion:** In the received image in video systems, distortion characterized by the appearance of an underlying block encoding structure.

**block efficiency:** In a block, the ratio of the number of user information bits to the total number of bits. *Note:* For a given block scheme, block efficiency represents the maximum possible efficiency for a

given block scheme transmitted over a perfect transmission link.

**block-error probability:** The expected block-error ratio. (188)

**block-error ratio:** The ratio of the number of incorrectly received blocks to the total number of blocks transferred. (188) *Note:* The block-error ratio is calculated using empirical measurements. Multiple block-error ratios may be used to predict block-error probability.

**blocking:** **1.** The formatting of data into blocks for purposes of transmission, storage, checking, or other functions. **2.** Denying access to, or use of, a facility, system, or component. **3.** The failure of a telecommunications network to meet a user service demand, because of the lack of an available communications path.

**blocking criterion:** In telephone traffic engineering, a criterion that specifies the maximum number of calls or service demands that fail to receive immediate service. *Note:* The blocking criterion is usually expressed in probabilistic notation, such as P.001.

**blocking factor:** The number of records in a block. *Note:* The blocking factor is calculated by dividing the block length by the length of each record contained in the block. If the records are not of the same length, the average record length may be used to compute the blocking factor. *Synonym* **grouping factor.**

**blocking formula:** A specific probability distribution function intended to model calling patterns of users who fail to find available facilities. *Note:* There are several blocking formulas. The applicability of each to a given situation depends on its underlying assumptions regarding caller behavior.

**blocking network:** In telecommunications, a network that has fewer transmission paths than would be required if all users were to communicate simultaneously. *Note:* Blocking networks are used because not all users require service simultaneously. Certain statistical distributions apply to the patterns of user demand.

**block length:** The number of data units, such as bits, bytes, characters, or records, in a block.

**block-loss probability:** The ratio of the number of lost blocks to the total number of block transfer attempts during a specified period. (188)

**block-misdelivery probability:** The ratio of the number of misdelivered blocks to the total number of block transfer attempts during a specified period. (188)

**block parity:** The designation of one or more bits in a block as parity bits used to force the block into a selected parity, either odd or even. (188) *Note:* Block parity is used to assist in error detection or correction.

**block transfer:** The process, initiated by a single action, of transferring one or more blocks of data.

**block transfer attempt:** A coordinated sequence of user and telecommunication system activities undertaken to effect transfer of an individual block from a source user to a destination user. *Note:* A block transfer attempt begins when the first bit of the block crosses the functional interface between the source user and the telecommunication system. A block transfer attempt ends either in successful block transfer or in block transfer failure.

**block transfer efficiency:** The average ratio of user information bits to total bits in successfully transferred blocks.

**block transfer failure:** Failure to deliver a block successfully. *Note:* The principal block transfer failure outcomes are: lost block, misdelivered block, and added block.

**block transfer rate:** The number of successful block transfers during a performance measurement period divided by the duration of the period. (188)

**block transfer time:** The average value of the duration of a successful block transfer attempt. *Note:* A block transfer attempt is successful if (a) the transmitted block is delivered to the intended destination user within the maximum allowable performance period and (b) the contents of the delivered block are correct.

**blue noise:** In a spectrum of frequencies, a region in which the spectral density, *i.e.*, power per hertz, is proportional to the frequency.

**blue-screening:** *See chroma keying.*

**blurring:** In video systems, a global distortion, characterized by reduced sharpness of edges and limited spatial detail.

**BOC:** *Abbreviation for Bell Operating Company.*

**Boltzmann's constant (k):** The number that relates the average energy of a molecule to its absolute temperature. *Note:* Boltzmann's constant is approximately  $1.38 \times 10^{-23}$  J/K (joules/kelvin).

**bond:** An electrical connection that provides a low-resistance path between two conducting surfaces. (188)

**bonding:** **1.** In electrical engineering, the process of connecting together metal parts so that they make low resistance electrical contact for direct current and lower frequency alternating currents. [JP1] **2.** The process of establishing the required degree of electrical continuity between two or more conductive surfaces that are to be joined. (188)

**Boolean function:** **1.** A mathematical function that describes Boolean operations. **2.** A switching function in which the number of possible values of the function and each of its independent variables is two.

**Boolean operation:** **1.** Any operation in which each of the operands and the result take one of two values. *Note:* Typical states are "0 or 1," "on or off," "open or closed," or "present or absent." **2.** An operation that follows the rules of Boolean Algebra.

**bootstrap:** **1.** A technique or device designed to bring about a desired state by means of its own action. (188) **2.** That part of a computer program that may be used to establish another version of the computer program. **3.** The automatic procedure whereby the basic operating system of a processor is reloaded following a complete shutdown or loss of memory. **4.** A set of instructions that cause additional instructions to be loaded until the complete

computer program is in storage. **5.** To initialize a system by means of a bootstrap.

**boresight:** **1.** The physical axis of a directional antenna. **2.** To align a directional antenna, using either an optical procedure or a fixed target at a known location.

**Bose-Chaudhuri-Hochquenghem code:** *See* **BCH code.**

**bound mode:** In an optical fiber, a mode that (a) has a field intensity that decays monotonically in the transverse direction everywhere external to the core and (b) does not lose power to radiation. *Note:* Except for single-mode fibers, the power in bound modes is predominantly contained in the core of the fiber. (188) [After 2196] *Synonyms* **guided mode, trapped mode.**

**bound ray:** *Synonym* **guided ray.**

**bpi:** *See* **bits per inch.**

**braid:** **1.** An essential part of many fiber-optic cable designs, consisting of a layer of woven yarn. *Note:* In the case of single-fiber loose-buffered or two-fiber “zip-cord” loose-buffered fiber-optic cables, the braid is situated between the buffer tube and jacket. In the case of cables having multiple buffer tubes, the braid is usually situated between the inner jacket and outer jacket. **2.** Loosely, an unwoven parallel bundle of yarn situated around the tight buffer of a single-fiber or two-fiber “zip-cord” fiber-optic cable. *Note 1:* The braid serves to add tensile strength to the cable. The braid may also be anchored to an optical connector or splice organizer assembly to secure the end of the cable. *Note 2:* The braid is often of an aramid yarn. [After FAA]

**branch:** **1.** In a computer program, a conditional jump or departure from the implicit or declared order in which instructions are being executed. (188) **2.** To select a branch, as in definition #1. **3.** A direct path joining two nodes of a network or graph. **4.** In a power distribution system, a circuit from a distribution device (power panel) of a lower power handling capability than that of the input circuits to the device. (188)

**branching network:** A network used for transmission or reception of signals over two or more channels. (188)

**branching repeater:** A repeater with two or more outputs for each input. (188) *Contrast with* **multiport repeater.**

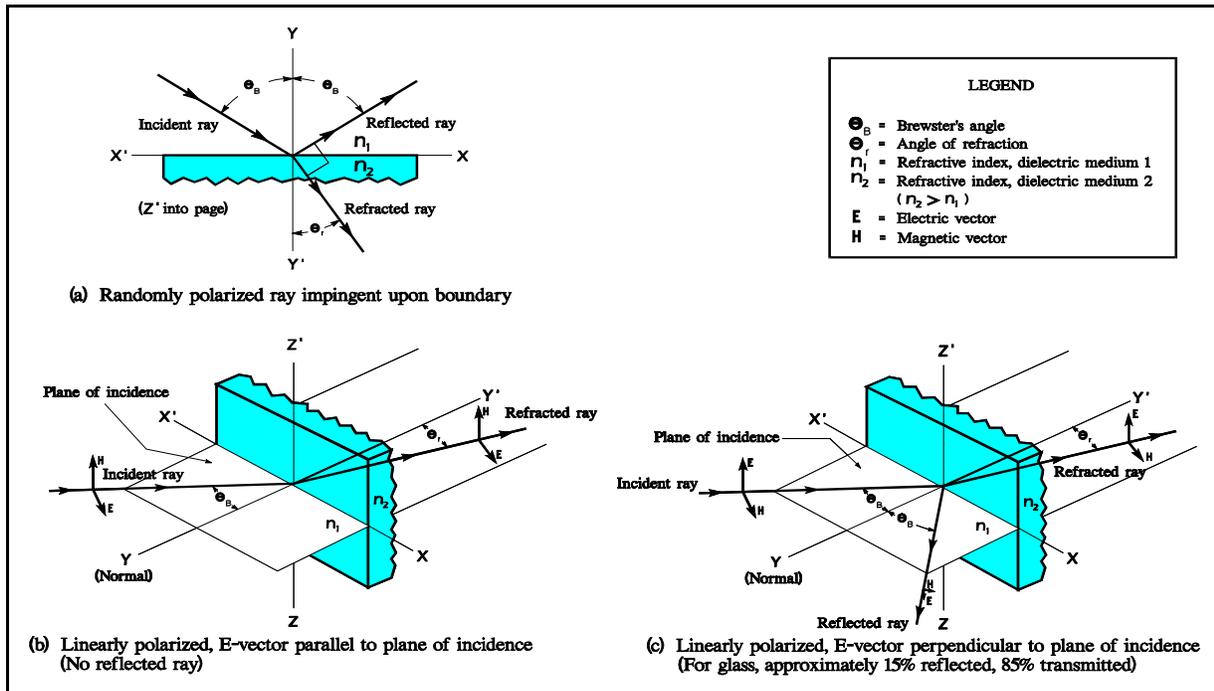
**breadboard:** **1.** An assembly of circuits or parts used to prove the feasibility of a device, circuit, system, or principle with little or no regard to the final configuration or packaging of the parts. (188) **2.** To prepare a breadboard.

**break out:** To separate the individual fibers or buffer tubes of a fiber-optic cable for the purpose of splicing or installing optical connectors. [After FAA] *Synonyms* **fan out, furcate.**

**break-out box:** A testing device that permits a user to access individual leads of an interface cable, using jumper wires, in order to monitor, switch, or patch the electrical output of the cable.

**breakout cable:** A multifiber fiber-optic cable design in which individual fibers, usually tight-buffered, are surrounded by separate strength members and jackets, which are in turn enveloped by a common jacket. *Note 1:* The breakout cable facilitates easy installation of fiber-optic connectors. All that need be done to prepare the ends of the cable to receive connectors is to remove the outer jacket, exposing what are essentially individual single-fiber cables. *Note 2:* Because it tends to induce bends in the fibers, the breakout cable design usually results in slightly higher transmission losses, for a given fiber, than loose-buffer designs. [After FAA] *Synonym* **fanout cable.**

**breakout kit:** A kit of materials, composed of an outer jacket in which is contained a strength member consisting of a bundle of usually aramid yarn, which jacket and yarn may be slipped over a loose buffer tube containing a single fiber, to convert the buffer tube and fiber to a complete single-fiber cable to which a fiber-optic connector may be directly attached. *Note 1:* A heat-shrinkable plastic boot may also be used for cosmetic purposes, strain relief, and to seal the point where the individual cables so created, merge. *Note 2:* Use of a breakout kit



Brewster's angle

enables a fiber-optic cable containing multiple loose buffer tubes to receive connectors without the splicing of pigtails. [After FAA]

**Brewster's angle:** For a plane electromagnetic wavefront incident on a plane boundary between two dielectric media having different refractive indices, the angle of incidence at which transmittance from one medium to the other is unity when the wavefront is linearly polarized with its electric vector parallel to the plane of incidence. *Note 1:* Brewster's angle  $\theta_B$ , is given by

$$\theta_B = \tan^{-1}\left(\frac{n_2}{n_1}\right) = \tan^{-1}\sqrt{\frac{\epsilon_2}{\epsilon_1}}$$

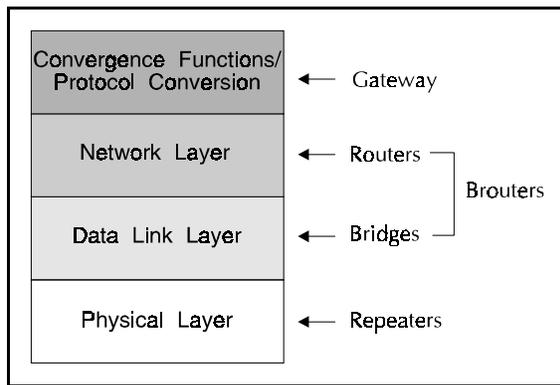
where  $n_1$  and  $n_2$  are the refractive indices of the respective media, and  $\epsilon_1$  and  $\epsilon_2$ , their respective electric permittivities. *Note 2:* For a randomly polarized ray incident at Brewster's angle, the reflected and refracted rays are at  $90^\circ$  with respect to one another.

**Brewster's law:** See Brewster's angle.

**BRI:** Abbreviation for basic rate interface.

**brick:** A colloquial name for a hand-held radiotelephone unit.

**bridge: 1.** In communications networks, a device that (a) links or routes signals from one ring or bus to another or from one network to another, (b) may extend the distance span and capacity of a single LAN system, (c) performs no modification to packets or messages, (d) operates at the data-link layer of the OSI—Reference Model (Layer 2), (e) reads packets, and (f) passes only those with addresses on the same segment of the network as the originating user. (188) **2.** A functional unit that interconnects two local area networks that use the same logical link control procedure, but may use different medium access control procedures. **3.** A balanced electrical network, e.g., a Wheatstone bridge. *Note:* A bridge may be used for electrical measurements, especially resistances or impedances. **4.** See hybrid coil.



typical functional associations in an OSI network

**bridged ringing:** The part of a signaling system in which ringers associated with a particular line are connected across that line.

**bridge lifter:** A device that electrically or physically removes bridged telephone pairs. (188) *Note:* Relays, saturable inductors, and semiconductors are used as bridge lifters.

**bridge-to-bridge station:** A ship station operating in the port operations service in which messages are restricted to navigational communications and which is capable of operation from the ship's navigational bridge or, in the case of a dredge, from its main control station, operating on a frequency or frequencies in the 156-162 MHz band. [NTIA]

**bridge transformer:** *Synonym hybrid coil.*

**bridging connection:** A parallel connection used to extract some of the signal energy from a circuit, usually with negligible effect on the normal operation of the circuit. (188)

**bridging loss:** At a given frequency, the loss that results when an impedance is connected across a transmission line. (188) *Note:* Bridging loss is expressed as the ratio, in dB, of the signal power delivered, prior to bridging, to a given point in a system downstream from the bridging point, to the signal power delivered to the given point after bridging.

**brightness:** An attribute of visual perception in which a source appears to emit a given amount of light. *Note 1:* "Brightness" should be used only for

nonquantitative references to physiological sensations and perceptions of light. *Note 2:* "Brightness" was formerly used as a synonym for the photometric term "luminance" and (incorrectly) for the radiometric term "radiance."

**Brillouin diagram:** *See Brillouin scattering.*

**Brillouin scattering:** In a physical medium, scattering of lightwaves, caused by thermally driven density fluctuations. *Note:* Brillouin scattering may cause frequency shifts of several gigahertz at room temperature. [From Weik '89]

**broadband:** *Synonym wideband.*

**broadband exchange (BEX):** A communications switch capable of interconnecting channels having bandwidths greater than voice bandwidth.

**broadband ISDN (B-ISDN):** An Integrated Services Digital Network (ISDN) offering broadband capabilities. *Note 1:* B-ISDN is a CCITT-proposed service that may (a) include interfaces operating at data rates from 150 to 600 Mb/s, (b) use asynchronous transfer mode (ATM) to carry all services over a single, integrated, high-speed packet-switched network, (c) have LAN interconnection capability, (d) provide access to a remote, shared disk server, (e) provide voice/video/data teleconferencing, (f) provide transport for programming services, such as cable TV, (g) provide single-user controlled access to remote video sources, (h) handle voice/video telephone calls, and (i) access shop-at-home and other information services. *Note 2:* Techniques used in the B-ISDN include code conversion, information compression, multipoint connections, and multiple-connection calls. Current proposals use a service-independent call structure that allows flexible arrangement and modular control of access and transport edges. The service components of a connection can provide each user with independent control of access features and can serve as the basis of a simplified control structure for multipoint and multiconnection calls. Such a network might be expected to offer a variety of ancillary information processing functions.

**broadband system:** *See wideband.*

**broadcasting-satellite service:** A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. In the broadcasting-satellite service, the term “*direct reception*” shall encompass both individual reception and community reception. [NTIA] [RR]

**broadcasting satellite space station:** A space station in the broadcasting-satellite service (sound broadcasting). [NTIA]

**broadcasting service:** A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmissions. [NTIA] [RR]

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

**broadcast operation:** The transmission of signals that may be simultaneously received by stations that usually make no acknowledgement. (188)

**broadside antenna:** *Synonym billboard antenna.*

**brouter:** A combined bridge and router that operates without protocol restrictions, routes data using a protocol it supports, and bridges data it cannot route.

**browser:** Any computer software program for reading hypertext. *Note 1:* Browsers are usually associated with the Internet and the World Wide Web (WWW). *Note 2:* A browser may be able to access information in many formats, and through different services including HTTP, FTP, Gopher, and Archie.

**browsing:** [The] act of searching through automated information system storage to locate or acquire information without necessarily knowing of the existence or the format of the information being sought. [NIS]

**b/s:** *Abbreviation for bits per second.*

**BSA:** *Abbreviation for basic serving arrangement.*

**BSE:** *Abbreviation for basic service element.*

**BSI:** *Abbreviation for British Standards Institution.*

**B6ZS:** *Abbreviation for bipolar with six-zero substitution.* A T-carrier line code in which bipolar violations are deliberately inserted if user data contain a string of 6 or more consecutive zeros. *Note 1:* B6ZS is used to ensure a sufficient number of transitions to maintain system synchronization when the user data stream contains an insufficient number of “ones” to do so. *Note 2:* B6ZS is used in the North American hierarchy at the T2 rate.

**B3ZS:** *Abbreviation for bipolar with three-zero substitution.* A T-carrier line code in which bipolar violations are deliberately inserted if user data contain a string of 3 or more consecutive zeros. *Note 1:* B3ZS is used to ensure a sufficient number of transitions to maintain system synchronization when the user data stream contains an insufficient number of “ones” to do so. *Note 2:* B3ZS is used in the North American hierarchy at the T3 rate.

**budgeting:** *Synonym proration (def. #1).*

**buffer:** **1.** A routine or storage medium used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (188) *Note:* Buffers are used for many purposes, such as (a) interconnecting two digital circuits operating at different rates, (b) holding data for use at a later time, (c) allowing timing corrections to be made on a data stream, (d) collecting binary data bits into groups that can then be operated on as a unit, (e) delaying the transit time of a signal in order to allow other operations to occur. **2.** To use a buffer or buffers. (188) **3.** An isolating circuit, often an amplifier, used to minimize the influence of a driven circuit on the driving circuit. *Synonym buffer amplifier.* (188) **4.** In a fiber optic communication cable, one type of component used to encapsulate one or more optical fibers for the purpose of providing such functions as mechanical isolation, protection from physical damage and fiber identification. *Note:* The buffer may take the form of a miniature conduit, contained within the cable and called a loose buffer, or loose buffer tube, in which one or more fibers may be enclosed, often with a lubricating gel. A tight buffer consists of a polymer coating in intimate contact with the primary

coating applied to the fiber during manufacture. (188)

**buffer amplifier:** *Synonym buffer (def. #3).*

**bug:** **1.** A concealed microphone or listening device or other audiosurveillance device. [JP1] (188) **2.** A mistake in a computer program. **3.** To install means for audiosurveillance. [JP1] **4.** A semiautomatic telegraph key. **5.** A mistake or malfunction. (188)

**building out:** The process of adding a combination of inductance, capacitance, and resistance to a cable pair so that its electrical length may be increased by a desired amount to control impedance and loss characteristics. (188) *Synonym line buildout.*

**bulk encryption:** Simultaneous encryption of all channels of a multichannel telecommunications trunk. [NIS] *Note:* A single encryption device can be used to encrypt the output signal from a multiplexer. (188)

**bulletin board:** A form of electronic messaging in which addressed messages or files are entered by users into a computer or network of computers. *Note:* Other users may obtain, at their convenience and request, messages or files available to them.

**bunched frame-alignment signal:** A frame-alignment signal in which the signal elements occupy consecutive digit positions.

**bundle:** A group of optical fibers or electrical conductors, such as wires and coaxial cables, usually in a single jacket. (188) *Note:* Multiple bundles of optical fibers or electrical conductors may be placed in the same cable. [After 2196]

**buried cable:** *See direct-buried cable.*

**burst:** **1.** In data communications, a sequence of signals, noise, or interference counted as a unit in accordance with some specific criterion or measure. (188) **2.** To separate continuous-form or multipart paper into discrete sheets.

**burst isochronous:** *Deprecated synonym for isochronous burst transmission.*

**burst switching:** In a packet-switched network, a switching capability in which each network switch extracts routing instructions from an incoming packet header to establish and maintain the appropriate switch connection for the duration of the packet, following which the connection is automatically released. *Note:* In concept, burst switching is similar to connectionless mode transmission, but it differs from the latter in that burst switching implies an intent to establish the switch connection in near real time so that only minimum buffering is required at the node switch.

**burst transmission:** **1.** Transmission that combines a very high data signaling rate with very short transmission times. (188) **2.** Operation of a data network in which data transmission is interrupted at intervals. *Note:* Burst transmission enables communications between data terminal equipment (DTEs) and a data network operating at dissimilar data signaling rates. *Synonym data burst.*

**bus:** One or more conductors or optical fibers that serve as a common connection for a group of related devices. (188)

**bus interface unit (BIU):** *See network interface device.*

**bus network:** *See network topology.*

**bus topology:** *See network topology.*

**busy back:** *Deprecated term. See busy signal.*

**busy hour:** In a communications system, the sliding 60-minute period during which occurs the maximum total traffic load in a given 24-hour period. (188) *Note 1:* The busy hour is determined by fitting a horizontal line segment equivalent to one hour under the traffic load curve about the peak load point. *Note 2:* If the service time interval is less than 60 minutes, the busy hour is the 60-minute interval that contains the service timer interval. *Note 3:* In cases where more than one busy hour occurs in a 24-hour period, *i.e.*, when saturation occurs, the busy hour or hours most applicable to the particular situation are used. *Synonym peak busy hour.*

**busy season:** During a 1-year cycle, the period of 3 consecutive months having the highest busy hour traffic.

**busy signal:** **1.** In telephony, an audible or visual signal that indicates that no transmission path to the called number is available. *Synonym* **busy tone.** **2.** In telephony, an audible or visual signal that indicates that the called number is occupied or otherwise unavailable. (188) *Synonym* **reorder tone.**

**busy test:** In telephony, a test made to determine whether certain facilities, such as a subscriber line or a central office trunk, are available for use.

**busy tone:** *Synonym* **busy signal.**

**busy verification:** In a public switched telephone network, a network-provided service feature that permits an attendant to verify the busy or idle state of station lines and to break into the conversation. *Note:* A 440-Hz tone is applied to the line for 2 seconds, followed by a 0.5-second burst every 10 seconds, to alert both parties that the attendant is connected to the circuit.

**BW:** *Abbreviation for* **bandwidth.**

**bypass:** **1.** The use of any telecommunications facilities or services that circumvents those of the local exchange common carrier. *Note:* Bypass facilities or services may be either customer-provided or vendor-supplied. **2.** An alternate circuit that is routed around equipment or system component. (188) *Note:* Bypasses are often used to allow system operation to continue when the bypassed equipment or a system component is inoperable or unavailable.

**byte (B):** A sequence of adjacent bits (usually 8) considered as a unit. (188) *Note:* In pre-1970 literature, “*byte*” referred to a variable-length bit string. Since that time the usage has changed so that now it almost always refers to an 8-bit string. This usage predominates in computer and data transmission literature; when so used, the term is synonymous with “*octet.*”

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