

WEBSTER'S NEW WORLDTM

Telecom Dictionary

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c 1. Symbol for the velocity of light in a vacuum, which is exactly 299,792.458 kilometers per second, or 186,282.397 miles per second. The nominal figures, used for ease of reference and approximate calculations, are 300,000 km/s and 186,000 miles per second. The velocity of propagation (V_p) is sensitive to the medium. See also *Vp*. 2. In 1900 the *Ladies Home Journal* magazine predicted that by the year 2000 the letters *c*, *x*, and *q* would be banished from the English alphabet. The expectation was that spelling would be phonetic and that those letters would be unnecessary. It was a perfectly logical prediction, but no more correct than the predictions that the use of jetpacks, teleportation, videophones, and smell-o-vision would be widespread. (Note: I make no predictions in this dictionary.) See also *Smell-O-Vision*, *teleportation*, and *videophone*.

C 1. The symbol for capacitance, or capacity. See *capacitance*. 2. The symbol for coulomb. See *coulomb*.

CA (Certificate Authority) In a public key infrastructure (PKI), an entity that issues and verifies digital certificates that contain an encryption key and attest to the authenticity of the transaction party. See also *authentication*, *digital certificate*, *encryption*, *key*, and *PKI*.

cable A group or bundle of conductors, fibers, or wires, or bound together, sharing a common protective sheath or jacket, and perhaps strength members and shielding. See also *aerial cable*, *direct bury cable*, *submarine cable*, and *underground cable*. See also *conductor*, *fiber*, and *wire*.

Cable Communications Policy Act (CCPA) In the United States, an act of Congress (1984) that amended the Communications Act of 1934 and established a national policy with respect to cable television (CATV) communications. The Act sought to facilitate cable system and services deployment by regulating what were considered the excessive demands that some local governments attempted to impose on CATV providers. In exchange for what was widely considered a curtailment of the authority of local governments to regulate cable systems, local governments were granted the right to collect franchise fees not to exceed five percent of the cable operator's gross revenues. The Act, among other things, regulates the local franchise renewal and transfer process as well as protects the personal information of customers of CATV operators by restricting the collection, maintenance, and dissemination of subscriber data by cable operators. The CCPA was later amended by the Cable Television Protection and Competition Act of 1992 and the Telecommunications Act of 1996. See also *Cable Television Protection and Competition Act*, *CATV*, *Communications Act of 1934*, *franchise*, and *Telecommunications Act of 1996*.

cable jacket Synonymous with *cable sheath*. See *cable sheath*.

CableLabs (Cable Television Laboratories) A not-for-profit research and development organization for the benefit of its member companies in the cable television (CATV) business. CableLabs' stated mission is that of pursuing new cable telecommunications technologies and helping its cable operator members integrate them into their business objectives. Of particular significance is the Data over Cable Service Interface Specification (DOCSIS) suite of specifications for which CableLabs assumed administrative responsibility from Multimedia Cable Network Systems Partners Ltd. (MCNS). DOCSIS defines the interface requirements for cable modems in support of high speed data communications and Internet access over CATV networks. The CableHome initiative is geared toward developing the interface specifications necessary to extend cable-based services to devices within the home. PacketCable is a CableLabs initiative aimed at developing interoperable interface specifications of real-time multimedia over two-way cable plant. For contact information, see Appendix A. See also *cable modem*, *CATV*, *DOCSIS*, and *modem*.

cable modem (CM) A modem designed to support high speed data communications over hybrid fiber/coax (HFC) CATV networks. Cable modems are positioned at the customers' premises and in a cable

modem termination system (CMTS) at the service provider's headend. The initial Data over Cable Service Interface Specification (DOCSIS), released in 1997, standardized cable modems. Continuing research and development efforts directed at cable modems and related CATV network standards are largely the responsibility of CableLabs. See also *CableLabs*, *CATV*, *CMTS*, *DOCSIS*, *HFC*, and *modem*.

Cable Modem Termination System (CMTS) See *CMTS*.

cable sheath A close-fitting tubular covering that protects a cable. See also *cable*.

cable television Formally known as *community antenna television* (CATV), cable TV is transmitted from a service provider's headend to the subscribers' premises via a cable system, as opposed to over-the-air broadcast via ultra high frequency (UHF) or very high frequency (VHF) radio, or direct broadcast satellite (DBS). See also *cable*, *CATV*, *DBS*, *headend*, *UHF*, and *VHF*.

Cable Television Protection and Competition Act In the United States, an Act of Congress (1992) that amended the Communications Act of 1934 to provide increased consumer protection and to promote increased competition in the cable television (CATV) and related markets. The Act included provisions for rate regulation, customer service guidelines, and broadcast radio retransmission. The Act further included provisions with respect to local signal carriage regulation, specifically, must-carry and may-carry, i.e., retransmission consent. The Act was amended in important respects by the Telecommunications Act of 1996, particularly with respect to regulation of cable rates. See also *broadcast radio*, *CATV*, *Communications Act of 1934*, *Telecommunications Act of 1996*.

Cable Television Laboratories (CableLabs) See *CableLabs*.

cable TV (cable TeleVision) Synonymous with *community antenna television* (CATV). See *CATV*.

CAC 1. Carrier Access Code. In the United States, a seven-digit code (101 XXXX) that a caller can use to dial around the presubscribed interexchange carrier (IXC) to reach another IXC. The first three digits (101) of the CAC signal the network of the caller's intent. The last four digits (XXXX) of the CAC are the Carrier Identification Code (CIC), which is used for call routing purposes. See also *CIC*, *dial around*, and *IXC*. 2. Carrier Access Charge. In the United States, a set of access charges billed by the local exchange carrier (LEC) to the interexchange carrier (IXC) to compensate the LEC for the costs associated with connecting interexchange long distance calls over LEC local loop facilities. First, the CAC includes flat-rate, recurring charges that apply for tandem exchange termination. Second, the Carrier Common Line Charge (CCLC) is a minutes-of-use charge that applies to each call connected to the IXC. See also *access charges*, *IXC*, and *LEC*.

caching In the context of the Internet, the process of temporarily storing frequently accessed Web content in a local or regional server in order to reduce long haul Internet traffic. The cached content must be refreshed frequently in order to maintain currency with the source content on the distant server. See also *Internet*, *server*, and *Web*.

CAD (Computer-Aided Design) The use of computers and software in design work. CAD is used extensively in architecture, aeronautical engineering, civil engineering, electrical engineering, genetic engineering, mechanical engineering, facilities planning, and interior design.

CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) The use of computers and software in both the design and manufacture of a product. For example, a machine part, aircraft component, or boat hull can be designed with a CAD program that can provide the final design instructions for use in a computer-driven, automated fabrication and assembly process. See also *CAD*.

CAI (Common Air Interface) See *air interface*.

CALC (Customer Access Line Charge) Synonymous with *subscriber line charge* (SLC). See *SLC*.

that knowledge to the design of the electromechanical relays used in telephone switching at the time. He then demonstrated that such relays could be used to solve Boolean algebra problems. While at Bell Labs, Shannon continued that work and published “A Mathematical Theory of Communication,” which became the foundation for digital circuit design and provided the basis for determining the capacity of a channel in bits per second (bps). Shannon later made significant contributions in the areas of cryptology and sampling theory. See also *Boolean logic* and *Shannon's Law*.

Shannon's Law A statement defining the theoretical maximum rate at which error-free digits can be transmitted over a finitely bandwidth-limited channel in the presence of Gaussian noise. Shannon's Law is mathematically expressed as $C = W \log_2 (1 + S/N)$, where C is the channel capacity in bits per second (bps), W is the bandwidth in Hertz, and S/N is the signal-to-noise ratio (SNR). Shannon's Law also is known as the *Shannon-Hartley theorem*, as Shannon developed the theorem in collaboration with R.V.L. Hartley, a colleague at Bell Labs. See also *bandwidth*, *bps*, *channel*, *Gaussian noise*, *Hertz*, *law*, *SNR*, and *theory*.

shared bus switch A switch with a single high-speed bus that is shared by all incoming and outgoing ports on a time-division multiplexing (TDM) basis. This is a relatively low cost approach commonly used in smaller, local area network (LAN) workgroup switches where issues of congestion typically are relatively modest. See also *bus*, *LAN*, *LAN switch*, *port*, *switch*, *TDM*, and *workgroup switch*.

Shared Registry System (SRS) See *SRS*.

SHDSL (Symmetric High-bit-rate Digital Subscriber Line) Specified by the ITU-T as G.991.2 (February 2001), SHDSL is a business-class DSL technology that supports symmetric rate-adaptive transmission rates ranging from 192 kbps at 20,000 feet (6 kilometers) to 2.312 Mbps at 10,000 feet (3 kilometers) in increments of 8 kbps over a single unshielded twisted pair (UTP) local loop. An optional two-pair mode supports transmission rates ranging from 384 kbps to 4.624 Mbps in increments of 16 kbps. In either mode, line doublers can approximately double the distance. SHDSL uses the same trellis-coded pulse amplitude modulation (TC-PAM) line coding technique as HDSL2 and HDSL4. SHDSL also operates in a fixed-rate mode at 784 kbps and 1.544 Mbps. See also *DSL*, *G Series*, *ITU-T*, *line coding*, *line doubler*, *local loop*, *modulation*, *rate adaption*, *symmetric*, *TC-PAM*, *transmission rates*, *UTP*, and *xDSL*.

sheath See *cable sheath*.

SHF (Super High Frequency) SHF radio is in the frequency range of 3–30 GHz and has a wavelength of 10–1 cm. SHF radio has applications in microwave and satellite radio, and wireless LANs. See also *electromagnetic spectrum*, *frequency*, *Hz*, and *wavelength*.

shield A covering, sheath, or screen designed to protect a signal traveling over a conductor from electromagnetic interference (EMI) due to the unwanted coupling of extraneous signals. The shield is in the form of a conductive metal foil, screen, or braid that surrounds a conductor or group of conductors. A dielectric material insulates the conductors from each other and from the shield, which essentially is an outer conductor that intercepts extraneous signals and conducts them to ground. Therefore, the shield must be continuous and must be grounded via a ground wire, or drain wire. To ensure electrical continuity, the shield must be bonded at any splice points and the shield must be bonded to the ground wire, strap, or rod. Coaxial cable, screened twisted pair (ScTP), and shielded twisted pair (STP) are examples of shielded transmission media in telecommunications applications. See also *coaxial cable*, *dielectric*, *EMI*, *ground wire*, *ScTP*, and *STP*.

shielded foil twisted pair (SFTP) Synonymous with shielded twisted pair (STP). See *STP*.

shielded twisted pair (STP) See *STP*.

shift register An area of high speed temporary memory used to interface parallel and serial circuits. A PISO (parallel-in, serial-out) shift register has parallel input ports and serial output ports. A SIPO (serial-in, parallel-out) shift register has serial input ports and parallel output ports. See also *parallel communications*, *register*, *serial communications*, and *shift register*.