

A Dictionary of
Computing

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subset X of S , f maps the least upper bound of X to the least upper bound of the *image of X under f . Continuous functions are significant in *denotational semantics since they correspond to the requirement that a computational process produces arbitrarily close approximations to the final output, given arbitrarily close approximations to the total input.

A continuous function $f(x)$ has no breaks or instantaneous changes in value. In the hierarchy of mathematical functions the smoothest are those, such as $\sin x$, $\cos x$, that can be differentiated any number of times, always producing a continuous function.

continuous inkjet printer See INKJET PRINTER.

continuous signal, system See DISCRETE AND CONTINUOUS SYSTEMS.

continuous simulation See SIMULATION.

continuous stationery See STATIONERY.

continuous-tone image An image, such as a photograph, where the gray levels in the image are continuous and not discrete.

contradiction See TAUTOLOGY.

contrapositive of a conditional, $P \rightarrow Q$. The statement

$$\neg Q \rightarrow \neg P$$

where \neg denotes negation. The contrapositive of a conditional is therefore equivalent to the original conditional. See also CONVERSE, INVERSE.

control bus A *bus that is dedicated to the passing of control signals.

control character A character that when typed at a keyboard or sent to a peripheral device is treated as a signal to control operating functions. See also CHARACTER SET, ASCII.

control circuitry Electric circuits within a computer or peripheral that regulate its operation.

Control Data Corporation See CDC.

control design The design of a *control unit. Control units may be designed using *random logic or *microprogramming. Microprogramming was well suited to the control of the complex sequences of register transfers required by CISC instruction sets.

RISC processors with their emphasis on the rapid execution of simple instruction sets usually employ random logic control to optimize performance.

control flow The sequence of execution of statements in a program.

control-flow graph A *directed graph representing the sequence of execution in a program unit, in which nodes represent branching points or subprogram calls in a program, and arcs represent linear sequences of code. From the control-flow graph an analysis can show

the structure of the program,
starts and ends of program segments,
unreachable code and dynamic halts,
branches from within loops,
entry and exit points for loops,
paths through the program.

See also STATIC ANALYSIS.

control key See KEYBOARD, CONTROL CHARACTER.

controlled sharing Making used resources available to more than one using resource through an *access control mechanism.

controller A subsystem that governs the functions of attached devices but generally does not change the meaning of the data that may pass through it. The attached devices are usually peripherals or communication channels. One of the functions of the controller may involve processing the data stream in order to format it for transmission or recording.

control line A conductor in a multiwire interface that conveys a control signal.

control memory Another name for microprogram store.

control points Points used in the specification of curves to define the general required shape.

control record A record that contains control totals derived by summing values from other records in a file. The totals may or may not have some sensible meaning. Their purpose is to check that none of the preceding records has been lost or altered in some way. See also HASH TOTAL.

control sequence A string of characters used to control the operation of a peripheral

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oxygen and adjustment of the relative proportions of carbon dioxide and nitrogen. CO₂ is bacteriostatic for spoilage bacteria and slightly increases the acidity, while reducing oxygen delays spoilage due to oxidation. Abbrev CAP. Also *modified atmosphere packing (MAP)*.

controlled carrier (ICT) Transmission in which the magnitude of the carrier is controlled by the signal, so that the depth of modulation is nearly independent of the magnitude of the signal.

controlled cooling (Eng) Methods of heat treatment in which the cooling cycle is accurately controlled so as to impart the desired properties or structure.

controlled degradation (Chem) Chemical type of analysis for helping to identify polymers, esp thermosets, which often have functional groups susceptible to hydrolysis. Soluble fragments may then be identified.

controlled drugs (Pharmacol) Drugs that can only be prescribed under guidelines laid down in legislation. Usually drugs that have the potential to cause addiction and dependence.

controlled variable (Eng) Quantity or condition which is measured and controlled in eg a servo system.

controller (ICT) A device that controls a functional element within a computer system, eg HARD-DISK controller, CACHE CONTROLLER.

controller (ElecEng) An assembly of equipment for controlling the operation of electric apparatus.

control limit-switch (ElecEng) A limit-switch connected in the control circuit of the motor whose operation is to be limited.

control-line (ElecEng) A train-line used on multiple-unit trains for connecting master controllers or contactor gear on the different coaches.

control magnet (ElecEng) A magnet used in electric indicating instruments to provide a force for controlling the movement of the moving system.

control measure (FoodSci) Action required to eliminate or reduce a hazard to an acceptable level, eg a heat process step at a specified temperature and holding time will eliminate an identified microbiological hazard. See HACCP.

control panel (ElecEng) A panel containing a full set of indicating devices and remote-control units required for operation of industrial plant, reactor, chemical works, etc. Cf CONSOLE.

control point (ElecEng) The value of a controlled variable, departure from which causes a controller to operate in such a sense as to reduce the ERROR and restore an intended steady state. Also *set point*.

control points (BioSci) Places in the cell cycle where the cell's behaviour may be changed. Also *checkpoints*. See panel on CELL CYCLE.

control program (ICT) See MONITOR, OPERATING SYSTEM.

control register (ICT) Computer REGISTER within the CONTROL UNIT and that stores a single control instruction.

control relay (ElecEng) See RELAY.

control reversal (Aero) See REVERSAL OF CONTROL.

control rod (NucEng) A rod moved in and out of the reactor core to vary reactivity. May be a neutron-absorbing rod, eg boron or cadmium, or, less often, a fuel rod. Also *control absorber*. See REGULATING ROD, SHIM ROD and panel on NUCLEAR REACTORS.

control rod worth (NucEng) The change in reactivity of a critical reactor caused by the complete insertion or withdrawal of the control rod.

control total (ICT) The sum resulting from the addition of a specified field from each of a group of records, often used for checking purposes.

control track (ImageTech) A linear track, outside the video area of the tape, where the control or sync pulses are recorded, one per frame, to ensure accurate tracking during playback.

control turns (ElecEng) Those wires on the core of a magnetic amplifier or transducer which carry the control current. Also *control windings*. US *signal windings*.

control unit (ICT) Part of the CENTRAL PROCESSOR that supervises the execution of instructions.

control voltage (ElecEng) One which, by its magnitude, direction or relative phase, determines the operation of an item of plant and/or electrical circuit.

control windings (ElecEng) See CONTROL TURNS.

control word (ICT) One that transmits an operating instruction to a CENTRAL PROCESSOR, eg XEQ for execute. Cf CONTROL CHARACTER.

control zone (Aero) A volume of controlled air space, precisely defined in plan and altitude, including airports, in which flight rules additional to those in a control area pertain. ICAO defines a specific upper limit.

conus (BioSci) Any cone-shaped structure or organ.

conus arteriosus (BioSci) In some lower vertebrates, a valvular region of the TRUNCUS ARTERIOSUS, adjacent to the heart.

conus medullaris (BioSci) The conical termination of the spinal cord.

convection (Geol) The very slow mass movement of subcrustal material; believed to be the mechanism that drives tectonic plates.

convection (Phys) The process by which energy or mass is transmitted through a material by bulk motion of the medium itself.

convection current (Phys) Current in which the charges are carried by moving masses appreciably heavier than electrons.

convection of heat (Phys) The transfer of heat in a fluid by the circulation flow due to temperature differences. The regions of higher temperature, being less dense, rise, while the regions of lower temperature move down to take their place. The convection currents so formed help to keep the temperature more uniform than if the fluid was stagnant.

convective transfer (Astron) The transfer of energy from one part of a star to another by convection.

convector (Eng) Heater which warms the air passing over it. Cf RADIATOR.

conventional memory (ICT) The MAIN MEMORY delivered as standard with an IBM-COMPATIBLE AT computer using MS-DOS. This is usually considered to be the memory between ADDRESS 0 and 640 KBYTES. See fig. at MEMORY MAP.

conventional signs (CivEng, Surv) Standard symbols, universally understood, used in the representation on maps and plans of features which would otherwise be difficult or impossible to represent.

convention of signs (Phys) Sign convention used in lens calculations to ensure consistency in the derivation and use of lens formulae, in which all distances must be measured from some origin. More than one is in use, but in the cartesian convention all distances are measured from the reflecting or refracting surface being considered, or from the principal planes in the case of a thick lens or lens system. Distances measured in the direction in which the incident light is travelling are given a positive sign, and those in the opposite direction a negative sign. Distances measured perpendicular to the axis, eg size of image or object, are measured from the axis; above is positive, below is negative.

convergence (EnvSci) Negative DIVERGENCE.

convergence (ImageTech) In a colour TV display, alignment of the three electron or optical beams for correct image registration over the whole picture.

convergence (MathSci) (1) An infinite sequence a_1, a_2, \dots is said to be convergent to a if, as n tends to infinity, a_n tends to the limit a , ie

$$\lim_{n \rightarrow \infty} a_n = a$$

(2) An infinite series $a_1 + a_2 + \dots + a_n + \dots$ is said to be convergent to the sum A , if the sum of the terms tends to the limit A , as the number of terms tends to infinity, ie

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n a_k = A$$

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controlled rectifier a rectifier that uses switching elements that have forward voltage blocking capability to allow a variable voltage DC output. *See also* thyristor.

controlled source a voltage or current source whose intensity is controlled by a circuit voltage or current elsewhere in the circuit. Also called dependent source.

controlled variable (1) the quantity, usually the output of a plant or process, that is being controlled for the purpose of the desired behavior, for example, transient response or steady-state response.

(2) variable associated with the behavior of the controlled process and such that one wants this variable either to follow a desired trajectory over a given time interval or to be kept at a prescribed constant value, i.e., at a specified set-point; introduction of a set of controlled variables is necessary to define a two-layer industrial controller with the regulation direct control layer and the set point optimizing control layer.

See also controller.

controller (1) the entity that enforces the desired behavior — as specified by the control objectives — of the controlled process by adjusting the manipulated inputs. The values of these inputs are either predetermined or decided upon (computed) using on-line, i.e., real time, decision mechanism of the controller — based on the currently available information. *See also* controlled variable.

(2) a device that generates the input to the plant or process. The role of the controller is to force the controlled variable of the plant or process to behave in a desired manner.

(3) a unit that directs the operation of a subsystem within a computer. For instance, a disk controller interprets data access commands from host computer (via a bus), and sends read/write, track seeking, and other control signals to the drive. During this time, the computer can perform other tasks, until the controller signals DATA READY for transfer via the CPU bus.

convection current a current in which electrons are released for movement outside of a material.

convective heat transfer the process by which a moving fluid transfers heat to or from a wetted surface.

convergence the condition when the electron beams from a multi-beam CRT meet at a single point. For example, the correct registration of the three beams in the color picture tube.

convergence in probability for some sequences of random numbers, the tendency to a single number.

To wit, for a sequence of numbers x_n , and a random variable x , if for all $\epsilon > 0$,

$$P \{ |x_n - x| > \epsilon \} \rightarrow 0$$

for $n \rightarrow \infty$, then the sequence x_n tends to x in probability.

convergent state the equilibrium state of a dynamic system described by a first order vector differential equation is said to be convergent if there exists a $\delta = \delta(t_0)$, such that,

$$\|x(t_0) - x_e\| < \delta \Rightarrow \lim_{t \rightarrow \infty} x(t) = x_e$$

See also stable state.

converter a generic term used in the area of power electronics to describe a rectifier, inverter, or other power electronic device that transforms electrical power from one frequency and voltage to another.

convex fuzzy set (1) a fuzzy set that has a convex type of membership function.

(2) a fuzzy set in which all α -level sets are convex. *See also* α -level set.

convolution the mathematical operation needed to determine the response of a system from its

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broadband multimedia. Terry's obsession in a nutshell:

- As we wire the world for broadband communications and as the cost drops dramatically (a factor of a hundredfold over the past five years), we open the world to an entire new range of new telecommunications opportunities – those involving video, voice and data combined as a viewable, storable, retrievable record. Visiting patients electronically makes for happier nurses, happier, longer living patients. Ditto for on-line, broadband education. Shrinkage (i.e. stealing) is a \$32 billion "industry" in the U.S. Cut it by 10% with extensive video surveillance tied to cash register transactions and you'll increase retail store net income by 18%. In the utility industry (pipelines, electricity, oil, etc.) security and operations managers must manage hundreds of remote installations, mitigating threats to reliable power delivery. Centralizing video and data records from remote sites allows utilities to collect valuable multimedia (graphic and useful) information that can significantly lower operations cost. Such applications include verification of alarms reported by SCADA (Supervisory Control And Data Acquisition) systems, visual equipment inspection, remote project management and monitoring of conditions at dams, rivers and other electricity generating sites.
- The telecommunications industry is about to enter a new era – selling speciality multimedia vertical industry applications. This contrasts with what we do today. We sell horizontal applications. This means that the industry's services are the same for every customer. Every customer buys bandwidth in various widths. And because my bandwidth is indistinguishable from your bandwidth, our major method of competing as telecom carriers has been to cut prices. No more.
- Selling these new broadband multimedia applications will help chew up the excess bandwidth carriers installed in recent years.
- Selling these applications as applications, not as bandwidth, will significantly boost profits.
- Selling these new applications as applications is akin to selling additional channels of television programming on one common pipe – the coaxial cable which your CATV brings to your house.

Broadband over Power Line See BPL.

Broadband Passive Optical Network See BPON.

Broadband Personal Communications Standards BPCS. Consists of 120 MHz of new spectrum available for new cellular networks. Also known as wideband PCS.

Broadband Service Provider BSP. Once upon a time, companies which provided access for you and me to the Internet were called Internet Service Providers (ISPs, for short). But they largely provided dial-up service. Then came broadband. Now an ISP that provides broadband access to the Internet is called a broadband service provider, or BSP. Such companies may provide service by cable modems over cable TV coaxial cable, DSL or ADSL, T-1 lines, wireless or satellite. Broadband service providers (BSPs) are also trying to generate both revenue and stickiness with broadband content.

Broadband Switching System See BSS.

Broadband Wireless Local Loop B-WLL is also known as local multi-point distribution service, i.e. LMDS. B-WLL is a way of getting various multimedia services such as high-speed Internet, cable TV, and VOD (video-on-demand) to subscribers. The great advantage of B-WLL is that wireless technology can be used to connect the costly last mile of high data speed networks from an operator's backbone network to individual users. The technology uses millimeter wave signals in the 28 GHz spectrum to transmit voice, video, and data signals within a three-mile to 10-mile radius.

LMDS differs from an ordinary transport system in the way a train differs from a pipeline. Both are data transport systems, but a pipeline can transport only one product from one place to another. A train, on the other hand, can transport many different products over the same infrastructure. LMDS, implemented with multi-service protocol such as AIM, can transport, among others, voice, Internet, Ethernet, video, computer files, and transaction data. It is the multipoint radio technology, combined with the appropriate protocol and access method that gives LMDS its potential tremendous potential. LMDS/B-WLL infrastructure technology can be divided into two basic multiple access technologies: FDD and TDD. FDD equipment uses separate frequencies for the up-link and down-link channels, as opposed to TDD, which uses the same frequency channel for both up-link and down-link, separating the traffic by the use of time slots. FDD equipment differs among vendors in the type of backbone network technology incorporated into the system. The two primary divisions are cable-modem-based versus telecom-network-based. With respect to the telecom-backbone-based solutions, there are two basic architectures being developed: time division multiplex (TDM) and packet-based (either ATM or IP). B-WLL has some advantages: (1) It can be engineered to provide 99.99% availability, rivaling that of the best fiber backbones.

(2) It can be deployed quickly. Once a hub is installed (a matter of days), new customers can be added in a matter of hours. (3) It is estimated that deployment of a B-WLL system is about 60% cheaper than fiber-optic cable-based networks. Physical technologies such as copper or fiber require individual rights-of-way to each building, as well as the physical placement of the transport media. (4) Wireless equipment is less vulnerable to sabotage, theft, or damage resulting from exposure to the elements. There are negatives. (1) It requires line-of-sight. You typically can't shoot it through buildings or hills. (2) Bad weather can affect it.

broadcast 1. To send information to two or more receiving devices simultaneously – over a data communications network, voice mail, electronic mail system, local TV/radio station or satellite system. Broadcast involves sending a transmission simultaneously to all members of a group. In the context of an intelligent communications network, such devices could be host computers, routers, workstations, voice mail systems, or just about anything else. In the less intelligent world of "broadcast media," a local TV or radio station might use a terrestrial antenna or a satellite system to transmit information from a single source to any TV set or radio capable of receiving the signal within the area of coverage. See also Narrowcasting and Pointcasting. Contrast with Unicast, Anycast and Multicast.

2. As the term applies to cable television, broadcasting is the process of transmitting a signal over a broadcast station pursuant to Parts 73 and 74 of the FCC rules. This definition is deliberately restrictive: it does not include satellite transmission, and it does not include point-to-multipoint transmission over a wired or fiber network. In spite of the fact that the broadcast industry and the cable television industry are forever bound together in a symbiotic relationship, they are frequently at odds over policy issues. See Broadcast Station. Compare with Cablecast.

Broadcast Channel BCCH. A wireless term for the logical channel used in certain cellular networks to broadcast signaling and control information to all cellular phones. BCCH is a logical channel of the FDCCH (Forward Digital Control Channel), defined by IS-136 for use in digital cellular networks employing TDMA (Time Division Multiple Access). The BCCH comprises the E-BCCH, F-BCCH and S-BCCH. The E-BCCH (Extended-BCCH) contains information which is not of high priority, such as the identification of neighboring cell sites. The F-BCCH (Fast-BCCH) contains critical information which must be transmitted immediately; examples include system information and registration parameters. S-BCCH (System message-BCCH), which has not yet been fully defined, will contain messages for system broadcast. See also IS-136 and TDMA.

broadcast domain Set of all devices that receive broadcast frames originating from any device within the set. Broadcast domains typically are bounded by routers because routers do not forward broadcast frames.

broadcast list A list of two or more system users to whom messages are sent simultaneously. Master Broadcast Lists are shared by all system users and are set up by the System Administrator. Personal Lists are set up by individual subscribers.

broadcast message A message from one user sent to all users. Just like a TV station signal. On LANs, all workstations and devices receive the message. Broadcast messages are used for many reasons, including acknowledging receipt of information and locating certain devices. On voice mail systems, broadcast messages are important announcement messages from the system administrator that provide information and instructions regarding the voice processing system. Broadcast messages play before standard Voice Mail or Automated Attendant messages.

broadcast net A British Telecom turret feature that allows each trader single key access to a group of outgoing lines. This is designed primarily for sending short messages to multiple destinations. The "net" function allows the user to set up and amend his broadcast group.

broadcast quality A specific term applied to pickup tubes of any type – vidicon, plumbicon, etc. – which are without flaws and meet broadcast standards. Also an ambiguous term for equipment and programming that meets the highest technical standards of the TV industry, such as high-band recorders.

broadcast station An over-the-air radio or television station licensed by the FCC pursuant to Parts 73 or 74 of the FCC Rules, or an equivalent foreign (Canadian or Mexican) station. Cable television systems are authorized by FCC rules to retransmit broadcast stations; however, such retransmission is subject to a number of restrictions:

- The cable television operator is liable for copyright royalty fees collected by the Copyright Office.
- Under certain conditions, certain broadcast stations are eligible for mandatory carriage.
- Under certain conditions, the cable operator must obtain the permission of the

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For my daughter, Claire.
—B.H.

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Wheatstone bridge.

bridge disc (n.) A technique for storing data on a CD-ROM XA disc that allows the data to be played back on several platforms. A Photo-CD is a type of bridge disc that can be played on a CD-i or Photo-CD player, as well as on a multiple-session CD-ROM drive.

bridge/router (n.) A sophisticated networking device that performs the functions of a bridge, a router, or both simultaneously. It can route multiple protocols, such as TCP/IP and XNS, while bridging other traffic.

bridge tap (n.) In telecommunications, a segment of cable not on a direct path between a central office (CO) and a subscriber.

broadband (adj.) Describes any transmission medium that supports a wide frequency range, including audio and video frequencies. It can be multiplexed to carry several independent channels, each in its own bandwidth. Broadband transmission is often in the range of 1 MHz or more. At the minimum, the term refers to bandwidth greater than that required for voice, which telecommunications standards have set at 4 kHz. ISDN is considered a broadband medium. Cable television employs broadband techniques to send multiple channels over a single cable. Compare *baseband*.

Broadband Integrated Services Digital Network (B-ISDN) (n.) ISDN services offered at rates higher than the Primary access rate (23B+D) of 1.544 Mbps or 2.048 Mbps. Proposed broadband ISDN service is defined by CCITT as switched services from 150–600 Mbps) using cell-relay technology or ATM.

broadband LAN (n.) A local area network

(LAN) that is distributed via broadband coaxial cable, often using CATV technology and broadband modems. It is most commonly used with Ethernet (CSMA/CD) and token bus.

broadband PCS (BPCS) (n.) Services that transmit voice, data, and multimedia information. Messaging, caller ID, and voice-mail are typically supported by broadband PCS services over frequency bands in the 1850–2200 MHz range.

broadband wireless (n.) A generic term for high-speed wireless transmission at rates above 250 kbps. Broadband for wired connections is generally considered above 1.5 Gbps.

broadcast (v.) 1. To transmit television and radio programs through the air. 2. In network applications, to forward a message to numerous destinations.

broadcast quality (n.) Loosely defined, the level of quality at which television stations will transmit, adhering to the NTSC format in the United States. This format calls for 525 lines of video at a rate of 60 fields per second, with the appropriate levels of brightness and color (luma and chroma).

browse (v.) To scan networked information with no particular target in mind.

browser (n.) 1. Software that allows a user to search through information on a server. The term usually refers to a universal client application, such as Netscape Navigator or MS Internet Explorer, that interprets HTML documents. 2. The name Eastman Kodak uses on Photo-CDs for the database program that lets users search for images by keyword or title.

brute force (n.) A way of programming that

B

Tech Terms

What Every Telecommunications and
Digital Media Professional Should Know

Jeff Rutenbeck, Ph.D.
University of Denver



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phone system. More generally, AUX refers to any type of secondary input to an electronic device.

Used in a sentence: "We had to switch over to an auxiliary system when the storm tore down the telephone lines."

Auxiliary (See *AUX.*)

A/V (Audio/Visual)

Level: 1

Definition: A traditional reference to any type of electronic network, setup, or connection used to provide both audio and video material to end users (e.g., what are your A/V requirements?). The term is also often used to refer to any type of electronic programming content that can be seen and heard (e.g., we need your A/V clip). A more contemporary usage references computer-developed programming materials containing audio, video, and other electronic media content or multimedia. (See also *Multimedia.*)

Available Bit Rate (See *ABR.*)

Avalanche Photodiode (See *AP.*)

Avatar

Level: 2

Definition: A graphical image or representation of a person or a specific character identity. Avatars are often used in a multi-user virtual reality environment. An avatar could be as simple as a color photograph of a cartoon character or a movie star. More complex avatars, commonly used in online games, are animated images that visually respond to computer commands. Many predict that computer-controlled avatars will eventually be used to represent individuals in Internet advertisements/commercial spaces, in online meeting places, and in a variety of other computer-based interactive environments. (See also *Computer-mediated Communication.*)

AVI (Audio Video Interleaved)

Level: 2

Definition: The transmission process (created by Microsoft) of alternating audio and video digital samples. By interleaving the two signals,

both arrive at a receiving point at relatively the same time, and maintain their necessary synchronization without use of special hardware. In different networks, protocols have been established to define the ratio of audio packets that need to travel at one time compared to video packets. Data packets usually have lower priority because text can basically arrive at any time without creating a distinct timing problem. In applications such as videoconferencing, the voice information needs to be "in sync" with the video information as closely as possible. Otherwise, delays would prove too disruptive to carry on interactive conversation.

Axis

Level: 2

Definition: (1) A real or imaginary line on which an object, such as the earth, rotates. (2) The central core of a fiber optic line. (See also *Optical Fiber.*)

Azimuth

Level: 2

Definition: Expressed in terms of a compass heading, azimuth is a measure of the rotation of a selected point along the horizon with respect to true north. For users of satellite antennas, the position of a geostationary satellite can be determined using the azimuth in conjunction with the so-called "look angle," which is measured in degrees from the horizon up to the satellite. (See Figure A-4.)

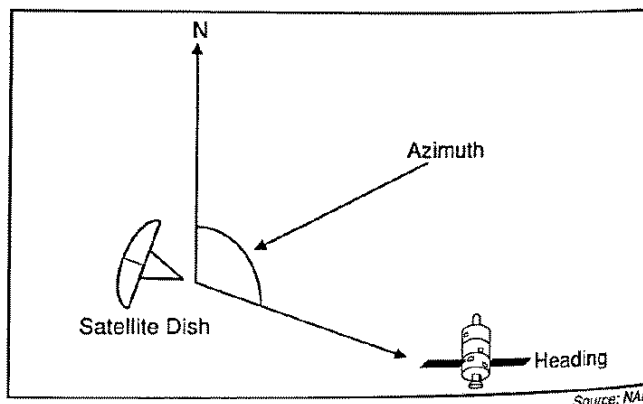


FIGURE A-4. Azimuth.

will eventually no longer be true. IXC's now have the right to provide local services, and LEC's will be granted permission by the FCC to provide long-distance services. (See also *LATA* and *Telecommunications Act of 1996*.)

Interface

Level: 1

Definition: A point of connection (virtual or physical) between two pieces of equipment or two software systems, or between a user and a computer or electronic system.

Used in a sentence: "I found the interface for that particular web site to be confusing and difficult to use." (See also *GUI*.)

Interference

Level: 2

Definition: In RF communications, refers to any unwanted energy received along with a transmitted signal that disrupts, causes degradation, or otherwise decreases the quality of the signal. Often referred to as "noise," interference can decrease quality to the point of total loss of the original transmitted signal. Interference comes from many sources, including electronic devices or even fluorescent lights, which create stray signals that interfere with broadcasting or other communications signals.

Interlace Scanning

Level: 3

Definition: In current NTSC and PAL television broadcasting, interlace scanning is a technique in which alternating video lines (beginning with the odd-numbered lines) are traced by an electron gun onto the television set tube to create television pictures. It is called interlace because there are two sets of lines, called fields, that need to be traced for every frame of video, and when the two sets of scan lines are combined by the viewer this creates a complete video frame. A standard NTSC television signal consists of 525 scan lines (the frame). Interlace scanning requires tracing every other scan line, moving from left to right and from top to bottom. The system then resets itself to the top of the screen again. The entire process is repeated 30 times a second (30-Hz rate). However,

because a picture with half the lines of a frame (a field) occurs at twice that rate, television signals are said to be displayed at a 60-Hz rate, or 60 fields per second. Other line rates for interlace scanning are used in certain computer displays, but more commonly the computer industry has embraced and promotes non-interlace technology, also called progressive scanning. Both interlace and progressive scanning methods can be handled by most advanced digital television or HDTV systems. With digital systems, the scanning format for the display does not need to be the same as the video capture system. Scanning is distinctly different from 35-mm film display, which has no defined line locations, but instead is actually a series of still photographs run in sequence and displayed at a frame rate typically of 24 frames per second. (See also *Progressive Scanning*.)

Inter-LATA

Level: 2

Definition: Telephone industry lexicon for transmissions that cross from one particular geographic area (referred to as a LATA) into any other designated LATA. As part of the divestiture of AT&T in 1984, the country was divided into 161 LATAs. Local telephone companies (i.e., LEC's) were not permitted to deliver inter-LATA services but had to deliver their calls or other services to a separate inter-exchange carrier (IXC) for final delivery to the intended party. (See also *IXC* and *LATA*.)

Interleaving

Level: 3

Definition: A multiplexing technique where two or more signals are sent over a medium in an alternating pattern. In data transmission, time division multiplexing (TDM) is used to achieve interleaving. In broadcast television, a form of interleaving is used where the color subcarrier is suppressed within the video signal, where it alternates with the luminance information. In essence, the subcarrier fits within the signal. Therefore, no further bandwidth is required outside the 6-MHz allotment to carry color information. The YUV (Y meaning luminance and UV meaning

more and more Linux versions of traditional computer applications (such as WordPerfect) being released for Linux. Linux has also come to be widely implemented by companies such as IBM and Hewlett-Packard. (See also *Open Source* and *Operating System*.)

Liquid Crystal Display (See LCD.)

Liquid Crystal on Silicon (See LCoS.)

Listserv

Level: 2

Definition: An electronic mailing list application that manages lists of subscribers and handles e-mail communications to that list. Most mailing lists are organized around topics or common interests, and most listserv applications provide automated means of adding and deleting subscribers, confirming e-mail addresses, providing ways for users to opt out, and so on.

Used in a sentence: "I signed up for a listserv about high-altitude gardening so that I could learn more about special techniques and ask questions of a group of others with similar interests." (See also *Computer-Mediated Communication*, *Mailing List*, and *Majordomo*.)

Lithium-ion Battery

Level: 1

Definition: A great improvement over NiCaD, lithium-ion batteries take advantage of lighter metals and more sophisticated chemicals to provide a longer-lasting, lighter source of power that does not suffer from the "memory effect" (whereby charging a battery that is not already fully discharged shortens the life of the battery). Lithium-ion batteries are now the power source of choice for most portable devices, including laptops, cell phones, music players, and so on. Lithium-ion batteries work better with a partial rather than a full discharge. Frequent full discharges should be avoided when possible. Lithium-based batteries have a lifetime of two to three years, which can cause problems for devices such as cell phones or music players that have the batteries built in (cannot be easily removed). The clock starts ticking as soon as the battery

comes off the manufacturing line. Avoid purchasing spare lithium-ion batteries for later use. Observe manufacturing date. Do not purchase old stock, even if sold at clearance prices. (See also *NiCaD* and *NiMH*.)

LMDS (Local Multipoint Distribution System)

Level: 3

Definition: A U.S. regulatory designation for fixed wireless services used to deliver digital broadband video and other services to consumers. LMDS services are relative short-range operations, and employ multiple low-power transmitters distributed throughout a geographic area, rather than a single centralized transmitter as is used in MMDS services. Two gigahertz of spectrum was allocated for LMDS at 27.5 to 29.5 GHz, with two licensees awarded 1 GHz apiece in each of 489 designated service areas around the country. (See also *MMDS*, *Wireless Broadband Fixed Access*, and *Wireless Communications*.)

Load

Level: 2

Definition: (1) The amount of electrical energy used by an electric appliance or electronic equipment, or the total amount used by a system connected or plugged into an electrical network or power grid. (2) In computer environments, refers to the process of taking information from external sources such as CD-ROMs or a hard drive and transporting it into active computer memory or RAM. (See also *RAM*.)

Local Access and Transport Area (See LATA.)

Local Area Network (See LAN.)

Local Exchange Carrier (See LEC.)

Local into Local

Level: 3

Definition: Refers to the retransmission of local television broadcast stations back into their own local markets from DBS satellite services. Until 1999, DBS operators were not permitted to

Transponder

Level: 2

Definition: An electronic device used primarily in satellite communications that combines the functions of transmitter, receiver, and amplifier and is used for receiving uplinked signals and for down-linking or transmitting communications signals on specified frequency channels.

Transport Layer

Level: 3

Definition: The fourth layer in the seven-layer open system integration model used for digital communications networks. (See also *OSI*.)

Treo

Level: 1

Definition: A smart phone device originally released by Handspring (which has since been acquired by PalmOne), the Treo has become one of the most successful smart phone or integrated PDA/phone appliances to date. Competing directly with the Blackberry and one of the first and most widely used mobile e-mail devices, the Treo has emerged as a proof-of-concept device that incorporates mobile phone functions, contact lists, web browsing, e-mail, and the entire array of Palm OS applications combined with a QWERTY thumb pad, digital camera, MP3 player, Bluetooth, and expansion slot for extra memory or other peripherals. (See also *PDA* and *Smart Phone*.)

Trial Version

Level: 1

Definition: Refers to a service made available by many software vendors to acquire (usually via CD or Internet download) and install on a temporary basis a piece of software, usually for a period of 30 days. Many software applications today include a trial version feature that when enabled starts a countdown that measures the amount of time left until the trial version expires. Many people use trial versions to explore the features and functions of an application before they decide to purchase it. Some people opt to download a trial version of software for temporary use, never intending to purchase it. However, because most trial version implementations prohibit the

installation of more than one instance of that trial version on the same machine, a user who wants to avoid paying for the software would have to switch to a completely different machine every 30 days.

Trigger

Level: 2

Definition: An action that occurs when some pre-specified condition or conditions are met. For example, in some word processing software applications pressing the combination of CTRL + S on the computer keyboard triggers an instruction to be processed that saves the current word processed document. (See also *GPI Trigger*.)

Triple DES (Triple Data Encryption Standard)

Level: 2

Definition: A strong method of encryption using DES that encrypts each block three times using at least two different keys. (See also *Encryption*.)

Trojan Horse

Level: 2

Definition: Used by hackers to invade or destroy computer systems, it refers to a malicious computer program disguised as a harmless program. Once the Trojan horse program is allowed to run on the targeted computer, it can do everything from installing software the hackers will use later to install viruses that destroy data on the system. One of the most common Trojan horse vulnerabilities now shows up in the form of e-mail attachments promising to rid your personal computer of viruses. However, when users open the attached file their computer is actually infected with viruses. (See also *Anti-Virus Software*, *Attachment*, *E-mail Attachment*, *Hacker*, and *Virus*.)

True Color

Level: 2

Definition: Refers to the use of a 24-bit graphics system whereby each primary color of red, green, and blue can be represented by a total of 256 intensities. This makes it possible to render more than 16.7 million colors ($256 \times 256 \times 256$).

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COMPUTER SCIENCE

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John Daintith
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back end 1. A program that is used to convert output from a general-purpose program into a specific form. For example, a graphics program might produce picture information in a quite general form, which is then processed by a back end specific to the sort of output device required. There would be a different back end for each device – plotter, VDU, graphics printer, etc.
2. *See* engine.

background printing The printing of a document at the same time as other processes are being carried out.

background processing The processing of computer programs with a low priority in a way that does not allow interaction with the user through the keyboard. Programs run in this way are called *background programs* and are processed at times when programs with a higher priority are not using the computer. *See also* foreground processing.

backing store (backing storage; secondary store) Storage devices in which programs and data are kept when not required by the PROCESSOR (or processors) of a computer. Programs can only be executed, however, when they are in the computer's MAIN STORE. A program plus associated data is therefore copied from backing store into main store when required. The storage CAPACITY of main store is much smaller than the capacity available as backing store. Only the programs that are currently being executed are (or need to be) in main store. The use of backing store means that a computer has access to a large repertoire of programs and to large amounts of data, and can call on these as and when it needs them.

The time taken to retrieve a particular item from backing store and transfer it directly into main store must be brief. RANDOM ACCESS to these items is thus necessary rather than SERIAL ACCESS. MAGNETIC DISKS, CDS, and DVDS provide random access and are extensively used for on-line backing storage. MAGNETIC TAPES are serial-access devices and are used as off-line backing store. Programs and data can be transferred from tape to disk for processing, or can be copied from disks to tape.

backslash The \ character on a keyboard. In MS-DOS and Windows systems the backslash is used to represent the root directory and also to separate directory names and filenames in a pathname.

backup A file, device, or system that can be used as a substitute in the event of a loss of data, development of a fault, etc. A backup file, for example, is a copy of a file that is taken in case the original is unintentionally altered or destroyed and the data lost. It is not stored ON-LINE. When a copy is made it is said to *back up* the original version. Such a backup is a type of DUMP.

Backus-Naur form /bak-ūs nor/ *See* BNF.

backward compatibility (downward compatibility) Compatibility with earlier versions or models of the same product. A program is backward compatible if the files and data created by previous versions of the program can be used; an operating system is backward compatible if existing application programs continue to operate correctly. A computer is backward compatible if it can run the same applications and operating systems as the previous

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connected to the UK telephone network (NOTE: The approval does not provide any quality assurance about the modem, but ensures that it is manufactured in such a way that it does not damage the telephone network. A green label is visible on modem equipment that has received BAPT approval.)

backbone /'bæk,bəʊn/ *noun* a high-speed, high-capacity connection path that links smaller sub-networks, usually used to connect servers on a network ○ *We have linked the servers in each office using a high-speed backbone.* (NOTE: Smaller workgroups or networks are connected to the backbone as segments or ribs.)

backbone ring /'bæk,bəʊn rɪŋ/ *noun* a high-speed ring network that connects a number of smaller ring networks

back buffer /bæk 'bʌfə/ *noun* a section of memory used as a temporary storage for graphics before they are displayed on screen (NOTE: The image is built up in the back buffer memory area then transferred to the main video memory area for display.)

backdoor /'bæk,dɔː/ *noun* same as trapdoor

backdrop /'bækdɹɒp/ *noun* a static background image in front of which are displayed actors or scenes

back-end network /,bæk end 'netwɜːk/ *noun* a connection between a mainframe computer and a high-speed mass storage device or file server

back-end processor /,bæk end 'prəʊsesə/ *noun* a special purpose auxiliary processor

back-end server /,bæk end 'sɜːvə/ *noun* a computer connected to a network that carries out tasks requested by client workstations

background /'bækgraʊnd/ *noun* 1. the part of a picture which is behind the main object of interest ○ *The new graphics processor chip can handle background, foreground and sprite movement independently.* 2. a system in a computer where low-priority work can be done in the intervals when very important work is not being done

background colour /,bækgraʊnd 'kʌlə/ *noun* the colour of a computer screen display, different from that of characters and graphics ○ *White background colour with black characters is less stressful for the eyes.*

background communication /,bækgraʊnd kə,mjuːnɪ'keɪʃ(ə)n/ *noun* data communication activity, e.g. downloading a file, carried out as a low-priority task in the background

background image /,bækgraʊnd 'ɪmɪdʒ/ *noun* an image displayed as a backdrop behind a program or windows of a GUI (NOTE: The background image does not move and does not interfere with any programs.)

background job /'bækgraʊnd dʒɒb/ *noun* a low-priority task

background mode /'bækgraʊnd ,məʊd/ *noun* in a computer system in which two modes for program execution are possible, the mode that is for house-keeping and other necessary system programs. Compare **foreground mode**

background noise /,bækgraʊnd 'nɔɪz/ *noun* noise which is present along with the required signal ○ *The other machines around this device will produce a lot of background noise.*

background operation /,bækgraʊnd ,ɒpə'reɪʃ(ə)n/ *noun* a low-priority process that works as and when resources become available from high-priority foreground tasks

background printing /,bækgraʊnd 'prɪntɪŋ/ *noun* printing from a computer while it is processing another task ○ *Background printing can be carried out whilst you are editing another document.*

background processing /,bækgraʊnd 'prəʊsesɪŋ/ *noun* the execution of a low-priority job when there are no higher priority activities for the computer to attend to

background program /,bækgraʊnd 'prəʊgræm/ *noun* a computer program with a very low priority

background recalculation /,bækgraʊnd rɪ,kælkju'leɪʃ(ə)n/ *noun* a facility in a spreadsheet program that allows a user to enter new numbers or equations while the program recalculates the solutions in the background

background reflectance /,bækgraʊnd rɪ'flektəns/ *noun* light reflected from a sheet of paper that is being scanned or read by an optical character reader

background task /'bækgraʊnd tɑːsk/ *noun* a process executed at any time by the computer system, not normally noticed by the user

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LIPS

operating systems for developers and people running web-based applications. Unlike many other operating systems, such as Microsoft Windows, the Linux software runs on a range of different types of computer hardware including the PC and Macintosh.

LIPS /lɪps/ *noun* a standard for the measurement of processing power of an inference engine. Full form **logical inferences per second**

liquid crystal display /ˌlɪkwɪd ˌkrɪst(ə)l dɪsˈpleɪ/ *noun* full form of **LCD**

liquid crystal display shutter printer /ˌlɪkwɪd ˌkrɪstəl dɪˈspleɪ ˈʃʌtə ˌprɪntə/ *noun* **LCD shutter printer**

LISP /lɪsp/ *noun* a high-level language used mainly in processing lists of instructions or data and in artificial intelligence work. Full form **list processing**

list /lɪst/ *noun* a series of ordered items of data ■ *verb* to print or display certain items of information □ **to list a program** to display a program line by line in correct order

list box /ˈlɪst ˌbɒks/ *noun* a number of items or options displayed in a list

LIST chunk /ˈlɪst ˌtʃʌŋk/ *noun* (in a RIFF file) a four-character code LIST that contains a series of subchunks

listing /ˈlɪstɪŋ/ *noun* a display or printed copy of the lines in a program in order □ **a program listing** a printed copy of the lines of a program

listing paper /ˈlɪstɪŋ ˌpeɪpə/ *noun* continuous stationery used in computer printers

list processing /ˈlɪst ˌprəʊsesɪŋ/ *noun* 1. the processing of a series of items of data, i.e. such tasks as adding, deleting, sorting or updating entries 2. full form of **LISP**

listserv /ˈlɪstˌsɜːv/, **listserver** /ˈlɪstˌsɜːvə/ *noun* a server on the Internet that sends a newsletter or articles to a list of registered users

listserver /ˈlɪstˌsɜːvə/ *noun* same as **listserv**

literal /ˈlɪt(ə)rəl/ *noun* 1. a computer instruction that contains the actual number or address to be used, rather than a label or its location 2. a printing error when one character is replaced by another or when two characters are transposed

literal operand /ˈlɪt(ə)rəl ˌɒpərænd/ *noun* the actual number or address to be used rather than a label or its location

lithium-ion battery /ˌlɪθiəm ˈaɪən ˌbæt(ə)ri/ *noun* a type of rechargeable battery that provides high output power in a compact and lightweight unit. This type of battery is often used in mobile telephones, PDAs and lightweight laptop computers.

Live3D /ˌlaɪv θriː ˈdiː/ *noun* same as **VRML** (see)

liveware /ˈlaɪvweə/ *noun* the operators and users of a computer system, as opposed to the hardware and software

LLC /ˌel el ˈsiː/ *noun* an IEEE 802.2 standard defining the protocol for data-link-level transmissions. Full form of **logical link control**

LLL *abbr* low-level language

load /ləʊd/ *verb* 1. to transfer a file or program from disk to main memory 2. to put something such as a disk into a computer, so that it can be run

‘...this windowing system is particularly handy when you want to load or save a file or change directories’ [Byte]

load and go /ˌləʊd ən ˈgəʊ/ *noun* same as **load and run**

load and run /ˌləʊd ən ˈrʌn/ *noun* a computer program that is loaded into main memory and then starts to execute itself automatically

loader /ˈləʊdə/ *noun* a program which loads another file or program into computer memory

load high /ˈləʊd ˌhaɪ/ *verb* (using MS-DOS on a PC) to transfer a program into high or expanded memory

loading /ˈləʊdɪŋ/ *noun* the action of transferring a file or program from disk to memory ○ *Loading can be a long process.*

load point /ˈləʊd pɔɪnt/ *noun* the start of a recording section in a reel of magnetic tape

load sharing /ˈləʊd ˌʃeərɪŋ/ *noun* the use of more than one computer in a network to even out the work load on each processor

local /ˈləʊk(ə)l/ *adjective* 1. referring to a device that is physically attached and close to the controlling computer 2. referring to a variable or argument that is only used in a certain section of a computer program or structure 3. referring to a system with limited access □ **on local** (of a terminal) not working with a CPU, but being used as a stand-alone terminal. Exhibit 1030

local area network /ˈləʊk(ə)l ˌæriə ˌnetwɜːk/ *noun* full form of **LAN** Page 28 of 83

relative-time clock

e.g. a mouse, in which the movement of a pointer on screen is relative to the movement of the input device

relative-time clock /,relatɪv taɪm 'klɒk/ *noun* regular pulses that allow software in a computer to calculate the real time

relay /'ri:leɪ/ *noun* an electromagnetically controlled switch ○ *There is a relay in the circuit.* ■ *verb* to receive data from one source and then retransmit it to another point ○ *All messages are relayed through this small micro.*

release /rɪ'li:s/ *noun* 1. a version of a product ○ *The latest software is release 5.* 2. the shape of a sound signal that shows the speed at which a sound signal decreases in strength after a note has stopped playing. ◇ **decay** ■ *verb* 1. to put a new product on the market 2. (of software) to relinquish control of a block of memory or file

release number /rɪ'li:s ,nʌmbə/ *noun* the number of the version of a product

release rate /rɪ'li:s reɪt/ *noun* the speed at which a sound signal decreases in strength after a note has stopped playing. ◇ **decay**

reliability /rɪ,laiə'bɪlɪti/ *noun* the ability of a device to function as intended, efficiently and without failure ○ *It has an excellent reliability record.*

reliable /rɪ'laiəb(ə)/ *adjective* which can be trusted to work properly ○ *The early versions of the software were not completely reliable.*

reliable connection /rɪ,laiəb(ə)l kə 'nekʃən/ *noun* a connection between two modems that are both using an error correction protocol to ensure that data is transmitted without errors

reload /rɪ:'ləʊd/ *verb* to load something again ○ *We reloaded the program after the crash.* ◇ **load**

relocatable /,ri:ləʊ'keɪtəb(ə)/ *adjective* which can be moved to another area of memory without affecting its operation

relocatable program /,ri:ləʊkeɪtəb(ə)l 'prəʊgræm/ *noun* a computer program that can be loaded into and executed from any area of memory ○ *The operating system can load and run a relocatable program from any area of memory.*

relocate /,ri:ləʊ'keɪt/ *verb* to move data from one area of storage to another ○ *The data is relocated during execution.*

relocation /,ri:ləʊ'keɪf(ə)n/ *noun* the process of moving to another area in memory

relocation constant /,ri:ləʊ'keɪf(ə)n ,kɒnstənt/ *noun* a quantity added to all addresses to move them to another section of memory, equal to the new base address

REM /rem/ *noun* a statement in a BASIC program that is ignored by the interpreter, allowing the programmer to write explanatory notes. Full form **remark**

remainder /rɪ'meɪndə/ *noun* a number equal to the dividend minus the product of the quotient and divisor ○ *7 divided by 3 is equal to 2 remainder 1.* Compare **quotient**

remark /rɪ'mɑ:k/ *noun* full form of **REM**

remedial maintenance /rɪ,mɪ'diəl 'meɪntənəns/ *noun* maintenance to repair faults which have developed in a system

remote /rɪ'məʊt/ *adjective* referring to communications with a computer at a distance from the systems centre ○ *Users can print reports on remote printers.*

remote access /rɪ,məʊt 'ækses/ *noun* a link that allows a user to access a computer from a distance, normally using a modem

remote client /rɪ,məʊt 'klaɪənt/ *noun* a user who is accessing mail without being connected to the mail server's local network

remote console /rɪ,məʊt 'kɒnsəʊl/ *noun* an input/output device located away from the computer. Data is sent between the two by line or modem.

remote control /rɪ,məʊt kən'trəʊl/ *noun* a system that allows a remote user to control a computer from a distance

remote control software /rɪ,məʊt kən'trəʊl ,sɒftweə/ *noun* software that runs on a local computer and a remote computer allowing a user to control the remote computer

remote device /rɪ,məʊt dɪ'vaɪs/ *noun* same as **remote console**

remote job entry /rɪ,məʊt dʒɒb 'entri/ *noun* full form of **RJE**

remote procedure call /rɪ,məʊt prə 'si:dʒə ,kɔ:l/ *noun* full form of **RPC**

remote station /rɪ,məʊt 'steɪʃ(ə)n/ *noun* a communications station that can be controlled by a central computer

remote terminal /rɪ,məʊt 'tɜ:mɪn(ə)/ *noun* a computer terminal connected to a distant computer system

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OF MULTIMEDIA

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—B.H.

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is deemed *twice* as loud.

low-frequency oscillator (LFO) (n.) In sound synthesis, a device capable of subsonic frequency generation, used most often as a controller for other functions, such as vibrato or tremolo.

low-level language (n.) An assembly language that translates each statement into a single machine instruction.

low-pass filter (n.) In audio engineering, a filter that allows only the frequencies below a cutoff point to pass through, blocking out the higher frequencies.

L-pad See *attenuator*.

LPT See *line printer port*.

LRC See *longitudinal redundancy check*.

LSI See *large-scale integration*.

LTC See *longitudinal time code*.

LTO See *Linear Tape Open*.

LU See *logical unit*.

luma (n.) Brightness of a transmitted video signal.

lumen (n.) A unit of luminous flux emitted by a light source. Lumens are measured in candelas; 1 candela indicates the intensity radiated by a single candle.

luminance (n.) Degree of brightness or intensity. One of the three image characteristics coded in a component video signal (represented by the letter Y) and measured in lux or foot-candles. Luminance is the black-and-white portion of a video signal. The other two components of a video signal are the red and blue chroma factors.

luminance bandwidth (n.) The frequency range representing the degree of brightness that a video system can record or transmit. Shape detail is determined largely by this factor.

luminance key (n.) A signal that a switcher uses to alternate between two or more video images based on the brightness of one of the signals.

LUN See *logical unit number*.

lurker (n.) Jargon for a subscriber to a mail list or newsgroup who does not post often but who reads group postings regularly.

lux (n.) A unit of measurement equal to one lumen over a one-square-meter surface.

LV See *Laservision*.

LV-ROM See *Laservision read-only memory*.

Lynx (n.) Text-mode universal client, or browser, developed at the University of Kansas, primarily used on the Unix and MS-DOS platforms.

LZW See *Lempel-Ziv-Welch*.

L

typically used to store contact information, telephone numbers, and meeting times and dates. Windows CE, a graphical user interface (GUI), allows the larger palmtops to use a scaled-down version of Microsoft Office applications. The Pilot, developed by PalmOS and marketed by U.S. Robotics, is a popular example.

Palo Alto Research Center (PARC) See *Xerox Corporation Palo Alto Research Center*.

pan (v.) 1. In video and film production, to rotate a camera horizontally across a panorama, changing the angle of view. 2. In computer graphics, to move in one direction along the plane of the drawing, keeping the same scale and orientation. 3. In audio production, to shift the position of a sound between the right and left stereo channels.

pan and scan (n.) A dynamic cropping technique used to translate between materials with different aspect ratios. Pan and scan is often used to translate movies shot on wide-screen film formats to the aspect ratio of a television display. In the pan and scan process, the image is cropped to the new aspect ratio, and the transfer operator pans within the wider original image to include important details that are near the edge. The details would be lost by a simple cropping technique. Movies that have been pan and scanned completely fill the television screen and do not exhibit the letterbox effect (black bands above and below the picture).

panic (v.) To malfunction, as the Unix operating system does when a critical internal consistency check fails in such a way that the system cannot continue. The kernel tries to print a message to the screen and write an image of memory into the swap area on disk for analysis later.

Pantone Matching System (PMS) (n.) A standard trademarked system of identifying more than 500 colors by number. PMS colors are created by an exact mixture of special base colors in specific proportions. Also known as *PMS color*.

PAP See *Password Authentication Protocol*.

Paradox (n.) Developed by Borland International, the first multi-user relational database for microcomputers with multitasking capabilities. It allows connectivity to Structured Query Language (SQL) data on a database server.

parallel (adj.) 1. Describes a method of transmitting data by sending a byte or a group of bits simultaneously. This contrasts with *serial data transfer*, in which bits are sent one at a time. 2. Describes the simultaneous processing of individual parts of a larger job in a computer application.

parallel port (n.) Interface from a computer system through which multiple bits of data are transferred in or out. This type of interface carries one bit on each wire, thereby multiplying the transfer rate obtainable over a single wire. A typical example of a parallel port is a printer port. The widely used Centronics port transfers eight bits at a time. SCSI and Integrated Drive Electronics (IDE) are special types of parallel ports.

parallel processing (n.) Method of using more than one computer simultaneously to process data. Flynn's taxonomy classifies both parallel and serial computers according to whether their processors execute the same instructions at the same time (single-instruction, multiple-data, or SIMD) or whether each processor executes different instructions (multiple-

P

instruction, multiple-data, or MIMD). A *processor farm* is a group of computers cooperating on a problem or running under the control of another processor that distributes work and collects results.

parallel processor (n.) An integrated circuit that can perform different operations simultaneously.

Parameter RAM (PRAM, pronounced "PEE-ram") (n.) Parameter random-access memory; a portion of RAM used to store system configuration and startup settings on a Macintosh computer. PRAM is powered by a battery and will automatically default to factory settings if the battery is removed from the computer for a few minutes. This procedure, called *zapping* the PRAM, is a last resort when solving system problems.

parametric equalizer (n.) A multi-band variable equalizer that allows control of all the parameters of the internal filters, including *amplitude*, *center frequency*, and *bandwidth*. The user can shift the center frequency and widen or narrow the affected area. Units are available with rotary and slide controls. Some parametric equalizers are available that allow control of center frequency but not bandwidth. Units with slide controls are often called paragraphic equalizers. The frequency control may be variable (analog) or selectable in steps (digital). Cut-only parametric equalizers (with or without adjustable bandwidth) are called notch equalizers or band-reject equalizers.

PARC See *Xerox Corporation Palo Alto Research Center*.

parent directory (n.) In MS-DOS, a directory that lies one step above the child directory.

parity (n.) A technique used to determine

whether errors were introduced in data transmission. A parity bit is appended to an array of bits to make the sum of all the bits always odd or even, and the result is checked on reception.

parser (n.) A computer program that determines the syntactic structure of a sentence or string of symbols in a computer language. As input, the parser takes a sequence of tokens generated by a lexical analyzer. The output from the parser might be an abstract syntax tree. Yacc is an example of a parser generator.

particle animation (n.) An animation technique used to depict natural forces, such as wind or gravity, as controlling the movement of small objects in a sequence.

partition (n.) A section of storage separately addressed by the operating system. Drives may be divided into multiple partitions.

pascal (Pa) (n.) A unit of pressure equal to one newton of force per square meter.

Pascal (n.) A programming language designed by Niklaus Wirth in 1970 and named after the French mathematician Blaise Pascal (1623–1662). The language was designed for teaching programming because it is simpler to grasp than other languages in use at that time. Pascal is based on Algorithmic Language (ALGOL) and emphasizes structured programming constructs, data structures, and strong typing. The language C has displaced Pascal from the niche it acquired in applications and systems programming.

passband (n.) In audio, the range of frequencies passed by a low pass, high pass, or bandpass filter. The passband is normally measured at the -3 dB point, which is the frequency point where the amplitude response is attenuated

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'cause' to the Luddites. Intellectuals and romantics like the poets Blake, Byron, Shelley and Wordsworth picked up that anti-technology theme, but identified with its other side. In the "dark Satanic mills" of industry, they saw the human spirit being stifled. Lord Byron wrote an inflammatory "Song for the Luddites" in 1816. Its first stanza: "As the Liberty lads o'er the sea/Bought their freedom, and cheaply, with blood,/So we, boys, we/Will die fighting, or live free,/And down with all kings but King Ludd!" Mary Shelley, daughter of the feminist Mary Wollstonecraft and wife of the poet, gave the Luddite theme dramatic power in her 1818 novel, "Frankenstein." The danger of rampant technology is expressed by the monster, who says to Dr. Victor Frankenstein, "You are my creator, but I am your master." Between the sweatshop operators and the romantic poets, the meaning of Luddite became fixed as "radical opponent of technological or scientific progress."

LUDs On TV shows like "Law & Order," cops who want info on the bad guys' phone calls, pull their LUDs. LUDs is an acronym for Local Usage Details - a record of incoming and outgoing calls for a particular phone number. The cops get this list from the local phone number. These lists are one reason the bad guys like to use coin phones.

lug Something which sticks out and onto which a wire may be connected by wrapping or soldering.

luma The brightness signal in a video transmission, i.e. Y. See luminance.

luminance The measurable, luminous intensity of a video signal. Differentiated from brightness in that the latter is nonmeasurable and sensory. The color video picture information contains two components: luminance (brightness and contrast) and chrominance (hue and saturation). The photometric quantity of light radiation. Luminance is that part of the video signal which carries the information on how bright the TV signal is to be.

luminiferous Ether Heinrich Rudolf Hertz discovered the phenomenon of the propagation of electromagnetic energy through space. He assumed that there was some conducting matter in the air that supported the arcing of a spark from a positive to a negative terminal. To test the theory, he tried to arc a spark through a vacuum tube, and succeeded. He assumed that the magical conducting matter was so small that it could not be identified and could not be voided from the tube. He named this non-existent matter "luminiferous ether." Bob Metcalfe and his associates later named their magical LAN (Local Area Network) technology Ethernet. See also Edison Effect.

LUNI LANE User Network Interface. Pronounced "looney," as in "Sometimes all these acronyms make me looney." An ATM term for standardized network interface protocol between a LANE (Local Area Network Emulation) client and a LANE Server. See also LANE and LNNI.

LUNS Logical Unit Numbers. An identification number given to devices connected to a SCSI adapter. Each SCSI ID can have eight LUNs. Normally, there is only one device with LUN 0. See Daisy Chain and SCSI.

lurker A person who "hangs around" online bulletin boards and forums, browsing through the messages and, if moved, replying to some of them. That's one definition. Here's another: A visitor to a newsgroup or online service who only reads other people's posts but never posts his or her own messages, thus remaining anonymous. See Lurking.

lurking The practice of reading an Internet mailing list or Usenet newsgroup without posting anything yourself. Everywhere you look there's a Slim Shady lurking. He could be working at Burger King, spitting on your onion rings. Or so I'm told. In the online world, lurking is not considered particularly antisocial; in fact, it is a good idea to lurk for a while when you first subscribe so that you can get a feel for the tone of the discussions in the group and come up to speed on recent history. See Lurker.

Lusha A talented lady with endless patience. She checked and spell-checked every definition until her eyes fell out of her head. She said, politely, she'd had more exciting jobs. Certainly better paying ones. If you find a mistake in this dictionary, please email Lusha. It's all her fault. LDing@Amherst.edu. When she becomes a world-famous concert pianist, you'll be able to tell all your friends, you knew her when she was a lowly lexicographer.

lux A contraction of luminance and flux and a basic unit for measuring light intensity. A lux is approximately 10 foot candles.

LUXPAC A ITU-T X.25 packet switched network operated in Luxembourg by the Luxembourg government.

LVDM A SANS definition. Low-Voltage Differential Multipoint (for low-power bus applications requiring multi-point interconnections, where LVDS is not feasible.)

LVDS Low Voltage Differential Signaling is a new data interface standard that is defined in the TIA/EIA-644 and the IEEE 1596.3 standards. It is essentially a signaling method used for high-speed transmission of binary data over copper. It uses a 350 mV voltage swing between two wires rather than a signal referenced to the ground. This low voltage

differential is what delivers high data transmission speeds and inherently greater bandwidth at lower power consumption with low electromagnetic interference (EMI.) The receiver for LVDS uses the differential signal to determine the state and rejects the common noise for better noise immunity.

LVTTL Low Voltage TTL.

LXSMN Telephone Assistance Plan Surcharge.

Lymph To walk with a lisp.

Lynx A World Wide Web (WWW) browser developed at the University of Kansas for students and faculty who use dumb terminals (e.g., VT100) for connection to mainframe and midrange computers running either the UNIX or the MVS operating system. Lynx was built on an early version of the Common Code Library developed by the CERN WWW project headed by Tim Berners-Lee. Lynx is keyboard-oriented and text-only, rather than being fully featured, graphically-oriented, mouse-driven, audio- and video-capable. Given its origins and orientation (dumb terminals and big computers), that's understandable. In the context of high-performance PCs and Graphical User Interfaces, however, Lynx is not the browser of choice for most of us.

LZ77 A compression approach falling into the general category of "dictionary methods," LZ77 was developed in 1977 by Abraham Lempel and Jakob Ziv. LZ77 involves an implicit dictionary in which data is represented by previously processed data. In other words, a given set of data which is exactly the same as a previously transmitted data need not be restated in full. Rather, a pointer refers to the previous data set. The result is that far fewer bits need be sent to communicate the same information. That yields more efficient use of bandwidth, which always is a limited resource. LZ77 is an asymmetric compression method, as the coding process is relatively time-consuming, while the decoding process is much less so. LZ77 was refined in the LZSS algorithm developed in 1982 by Storer and Szymanski. See also Compression, Dictionary Method, LZSS, LZ78, LZJH, and LZW.

LZ78 A refinement of the LZ77 compression method. A "dictionary method," LZ78 creates a dictionary of data phrases that occur in the input data. When the compression software encounters an input phrase that previously has been entered into the dictionary, the output is in the much-abbreviated form of the index number of that phrase. The result is that far fewer bits need be sent to communicate the same information. That yields more efficient use of bandwidth, which always is a limited resource. LZ78 was further refined in the LZW algorithm developed by Terry Welch in 1984. See also Dictionary Method, LZSS, LZ77, LZJH, and LZW.

LZJH Lempel-Ziv-Jeff-Heath. A compression algorithm developed by Jeff Heath of Hughes Network Systems for use over satellite links, LZJH is based on earlier work by Abraham Lempel and Jakob Ziv. LZJH is the basis for the V.44 compression standard finalized on June 30, 2000 by the ITU-T. V.44, which supplants the earlier V.42bis modem compression technology, provides 6:1 (i.e., 6 to 1) compression performance. V.44 is intended for use in V.92 modems, the successor to V.90 modems. In combination with V.92 modems, V.44 will have a significant effect on the speed of data transmission, as did the earlier move from V.34 to V.90 modems. See also LZ77, LZ78, V.42bis, V.44, V.90, and V.92.

LZS Lempel-Ziv-Stac. A data compression algorithm developed by Stac Electronics and sometimes used by routers. LZS is based on the LZ77 algorithm developed by Abraham Lempel and Jakob Ziv in 1977. See also LZ77.

LZSS Lempel-Ziv-Storer-Szymanski. A data compression method developed in 1982 by Storer and Szymanski, and based on earlier work by Abraham Lempel and Jakob Ziv. LZSS offers a better compression ratio than LZ77, and the decoding process is simpler and faster. Popular archivers such as PKZip make use of LZSS.

LZW Lempel-Ziv-Welsh. A data compression method developed in 1984 by Terry Welch, based on LZ78 by Abraham Lempel and Jakob Ziv. LZW was developed for hardware implementation in high-performance disk controllers. For example, Nortel uses LZW in its Distributed Processing Peripheral (DPP), which is the Automatic Message Accounting Transmitter (AMAT) for the DMS-100 family of central office switches. Nortel selected this non-proprietary protocol and helped promote it as an industry standard. The nominal compression ratio is 2.8:1, without considering field suppression. Transmitting data compressed at a ratio of 2.8:1 at 9600 bps is equivalent to transmitting non-compressed data at 27 Kbps. Compatible compression collectors can poll the DPP in compressed or non-compressed mode. DPPs equipped with the Data Compression feature can transmit in either compressed or non-compressed mode, based on the collector's polling request for a specific polling session. To preserve data integrity, AMA data are still stored in non-compressed form on the DPP disks. LZW is a lossless data-compression algorithm patented by Unisys. See Lossless, Lossy, and LZ78.

is like having a single lane highway. See Parallel Data, Parallel Transmission, Series and Serial Transmission.

parallel circuit In a parallel circuit there are at least two paths for the electric current to flow through. To find the resistance of a parallel circuit, add up the reciprocal of the resistance of each of the paths the electric current may follow. The reciprocal of the sum is the total resistance of the circuit. As components are added to a circuit in series the total resistance of the circuit increases. As components are added to a circuit in parallel, the total resistance of the circuit decreases.

Household wiring is the most common type of parallel circuitry. Every outlet is parallel with every other outlet on the same circuit-breaker. So, if a bulb blows in a light fixture on that circuit, all the other devices on that circuit will still function. Another explanation. Imagine three 1.5 volt batteries. With the batteries connected in parallel, the circuit will deliver 1.5 volts. Connected in series it will deliver 3×1.5 volts, or 4.5 volts. By contrast, a string of Christmas tree lights is strung in a series circuit, one long continuous circuit. Should one bulb go out, usually the rest will also. See also Parallel Data.

parallel connection A connection in which the current divides, only a part of the total current passing through each device.

parallelism Indicates that multiple paths exist between two points in a network. These paths might be of equal or unequal cost. Parallelism is often a network design goal: If one path fails, there is redundancy in the network to ensure that an alternate path to the same point exists.

parallel cut See Cutover.

parallel data The transmission of bits over multiple wires at one time. This is usually accomplished by having one wire for each bit of an eight-bit byte going from a device, usually a computer, to another device, usually a printer. Thus the word "Parallel." Data transmission in parallel is very fast, but usually happens only over short distances (typically under 500 feet) because of the need for huge amounts of cable. In contrast, the other common method of data transmission, serial transmission, takes place over one pair of wires and is usually slower than parallel transmission, but can happen over much longer distances, especially using phone lines. Parallel data transmission does not happen on phone lines. See Serial Data and see the Appendix.

parallel interfacing A method of interfacing peripherals to computers, usually printers. Not as common as RS-232-C serial interfacing.

parallel networks Parallel networks, or segregated networks, exist when a single network location supports more than one physical wide area network connection for the purpose of supporting one or more applications.

parallel optic interfaces See POI.

parallel port An output receptacle often located on the rear of a computer. Unlike serial, there is no EIA standard for parallel transmission, but most equipment adheres to a quasi-standard called the Centronics Parallel Standard. Almost every PC since the original IBM PC has come with an ordinary, 25-pin D-connector parallel port. These low-speed ports are fine for sending output to a printer (which is usually the slowest device in a computer system). But when transferring data between two PC parallel ports or using the parallel port as a method of getting to and from external hard disks, the speed is too slow. As a result, there have been a number of attempts to speed up and add intelligence to the lowly parallel port. How can you tell what type of parallel port you have? A free utility called PARA14.ZIP is available on the Internet at netlab2.usu.edu/misc, or on CompuServe in the IBMHW forum, Library2. See EPP (Enhanced Parallel Port), ECP (Extended Capabilities Port) and USB (Universal Serial Bus).

parallel processing 1. A computer technology in which several or even hundreds of low-cost microprocessors are linked and able to work on different parts of a problem simultaneously.

2. A computer performs two or more tasks simultaneously. This contrasts with multitasking in which the computer works fast and gives the impression of performing several tasks at once.

parallel sessions In IBM's SNA, two or more concurrently active sessions between the same two logical units (LUs), using different network addresses. Each session can have different transmission parameters.

parallel tasking Technology which allows LAN adapters to transmit data to the network before an entire frame has been loaded from the computer to the adapter's buffer and to transmit the data to the computer's main memory before an entire frame has been received from the network. In effect, a frame can reside on the network, the adapter and in the computer memory simultaneously, thus boosting throughput.

parallel transmission 1. Method of information transfer in which all bits of a character are sent simultaneously as opposed to serial transmission where the bits are sent

one after another. See Parallel Data.

2. Method of achieving higher system reliability through use of completely redundant transmission facilities.

parallel wiretaps A parallel wiretap is connected across the two lines of a telephone line pair in parallel with the telephone instrument. A parallel must have a high resistance, otherwise the telephone line will be closed and the central office will think that the telephone is off hook. Parallel wiretaps can use high value resistors to isolate the tap. These are easy to detect. Serious wiretaps will use capacitors to isolate the tap from the telephone line.

parameter A limit, boundary, or threshold. Software often includes user-definable parameters, which allow the user to set threshold values. If a threshold value is exceeded, an alarm is triggered, an exception report is generated, or an action takes place. For example, you can set a user-definable parameter that causes your PC's screen saver to activate after a certain number of seconds. The screen saver keeps your CRT (Cathode Ray Tube), or monitor, from being ruined.

parameterize A verb which means to control the behavior of a piece of software by supplying required data at time of execution. A basic precept of structured programming is that, wherever possible, data should be kept separate from active program code. If, for example, you're writing a function that dials a phone number, the phone number should never be "hardwired" into the function itself - but should be passed to it, at runtime, as a so-called "argument" or "parameter." This encourages the creation of flexible, bulletproof software components that are easy to re-use. Much application software is written so that its behavior can be controlled by supplying parameters at time of execution. For example, the DOS command 'delete' requires a filename (the name of a file to be deleted) or wildcard expression as a parameter. More complex application programs (e.g., voicemail systems) are configured by supplying parameters on special screens or in dialog boxes, or by modifying external parameter databases.

parameters The record in a stored program control central office's data base that specifies equipment and software and options and addresses of peripheral equipment for use in call processing. See also Parameterize.

parametric amplifier Paramp. An amplifier that (a) has a very low noise level, (b) has a main oscillator that is tuned to the received frequency, (c) has another pumping oscillator of a different frequency that periodically varies the parameters, i.e., the capacitance or inductance, of the main oscillator circuit, and (d) enables amplification of the applied signal by making use of the energy from the pumping action. Note: Paramps with a variable-capacitance main-oscillator semiconductor diode are used in radar tracking and communications Earth stations, Earth satellite stations, and deep-space stations. The noise temperature of paramps cooled to the temperature of liquid helium, about 5 K, is in the range of 20 to 30 K. Paramp gains are about 40 dB.

parametric equalizer A device for manipulating sound by boosting and cutting selected frequencies by specific amounts. Basically, a much more elaborate and precise version of the bass and treble controls found on stereo systems. See Equalization.

Paramp See Parametric Amplifier.

PARC Palo Alto Research Center. A laboratory owned by Xerox and populated by it in the 1970s with some of the most creative scientists of the day. It is legendary for having pioneered technologies ranging from the laser printer to the Ethernet local area network and the graphical user interface for PCs. Sadly, Xerox senior management didn't recognize what it had and didn't recognize the value of its inventions, and didn't exploit most of them. Fortunately, other companies did. PARC was incorporated as a subsidiary company in 2002.

parasite 1. A radio tap that takes its power from the phone line.

2. One seeking financial gain from the effort or fame of another. In the world of the World Wide Web, a parasite is much like a Cyber squatter, or squatter. A squatter simply registers (i.e., squats on) a URL (Uniform Resource Locator) in advance of the "legitimate" owner of a trademark or service mark in hopes that the "rightful owner" will pay an exorbitant sum of money to buy it. A parasite registers a similar URL, which typically is a commonly mistyped version of a well-known name, often taking advantage of telephone dialing mnemonics. For example, AT&T owns 1-800-OPERATOR, which is a collect-calling service access by dialing the telephone number associated with that combination of numbers and digits on the touchtone keypad. Some years ago, another company (which will remain unnamed herein) got the number 1-800-OPERATER, relying on the fact that a large percentage of the US population can't spell "OPERATOR." It worked, and they got a lot of business. AT&T took exception to the parasitic service, i.e., they took legal action. They won. See also Cybersquatter. Roy Horak, my contributing editor, wrote this definition. And while I'm

3. A Windows software that is quietly loaded onto your PC when you install an ordinary

com. Neat. Notice how it tells you how long it takes. Notice that it also tells you what www.HarryNewton.com's numeric domain address is. Hence if you want to find out a web site's numeric domain, ping it.

According to Mr. Muuss, the name "ping" refers to the sound of a SONAR return (used by submarines, for example). It seems as though Mr. Muuss had done a good deal of college work on the modeling of SONAR and RADAR systems, both of which are based on the concept of transmitting a signal, and seeing how long it takes that signal to complete a round trip from the transmitter to the target device and back. Some years later, Mr. David Mills apparently made an acronym out of "ping;" according to his definition, "PING" means "Packet InterNet Groper." PING is an example of a backronym, a word that often is interpreted as an acronym, although it was not so intended.

In any event, the ping utility makes use of ICMP (Internet Control Message Protocol) packets. The pinging device sends ICMP Echo Request Packets to one or more target IP (Internet Protocol) addresses. If the target address is active, it has a working IP protocol stack and is online (i.e., turned on, and networked). Assuming that is so, the target device will return an ICMP Echo Reply Packet. As the IP header contains a Time-To-Live (TTL) counter which is decremented by timers in the intermediate switches and routers, the time of the round-trip signal can be calculated, which yields some information about the performance level that can be expected for a client/server application across a network. If no ICMP packet is returned, the target device is either down or unreachable, or the performance of the networked application is so slow that the packets "timed out" and "died" before they could be accepted and returned. The term is often used as verb: "Ping host X to see if it is up!" Ping is useful for testing and debugging networks. By the way, you can ping your very own PC. Ping 127.0.0.1. See also Acronym.

2. A graphics file format ending in .png, which was developed to overcome deficiencies of .gif and .jpeg file formats, which are commonly used on the Web. Ping allows 16-, 24-, and 32-bit images, providing for better color depth. The downside is that higher-quality images require more storage and involve longer download times.

pingback A pingback is a notification letting a blog or website know that it has been referenced (or linked to) by another blog. Pingbacks usually include a short excerpt of the post containing the link, along with a link to the website. This definition from blogosary.com.

Ping of Death The Ping of Death is a denial-of-service attack that crashes servers by sending invalid IP ping packets. The first version, discovered in early 1997, affected mostly Macintosh and Unix servers, not NT servers. The problem faded after vendors posted patches to their servers, and Microsoft posted a new PING.EXE file that prevented users from generating the invalid pings. The resurrected Ping of Death, however, takes a slightly different approach: According to PC Week, it modifies the header of the ping to indicate that there is more data in the packet than there actually is. "Effectively, the server hangs because the IP stack is waiting for the rest of the data," said Mike Nash, Microsoft's director of server marketing in 1997.

ping pong 1. A method of getting full duplex data transmission over a two wire circuit by rapidly alternating the transmission direction. See Ping Ponging.

2. A disruptive phenomenon that occurs in digital cellular networks when the cell phone repeatedly reselects two cell sites of approximately equal strength. This problem is overcome through the use of a buffer area known as a "hysteresis."

3. A disruptive phenomenon that occurs in digital cellular networks when both transmission and reception take place over the same frequency channel, although in separate time slots. This problem is overcome through the use of separate frequency channels.

ping ponging Routing that causes a packet to bounce back and forth between two nodes. See Ping Pong.

ping scan A ping scan looks for machines that are responding to ICMP echo requests ("pings"). **ping sweep** An exploit that sends ICMP echo requests ("pings") to a range of IP addresses, for the purpose of finding machines that can be probed for vulnerabilities.

pink Adult audiotext, i.e. dirty talking over the phone for money.

pink flamingos See Flamingos, Pink.

pink noise Noise in which power distribution is logarithmic through the spectrum, with an equal amount of power in each octave.

pink pages In Australia, at one stage, the list of businesses organized by industry, were printed on pink paper and called the Pink Pages. They are the equivalent of the North American "Yellow Pages."

pinouts Pin configurations for cabling. In other words, which pin connects to which cable. Not all pins are always connected. Not all cables always connected.

pinosecond One-trillionth of a second. One-millionth of a microsecond.

PINT PSTN and Internet Internetworking. The PINT WG (Working Group) of the IETF (In-

ternet Engineering Task Force) addresses connection arrangements through which Internet applications can request and enrich PSTN (Public Switched Telephone Network) services. For example, PINT might include a Web-based Yellow Pages service, with the ability to launch a return call via the conventional PSTN based on a Web search-and-click process. In this example, the Internet, or other IP-based network, might be used to request the placement of the call, and the PSTN would execute the call. The call might be a return call (either voice or fax) from a call center with a Website, which might include a commercial vendor that might be requested to return a call regarding a product question or service issue, or a governmental agency such as a weather bureau that might be requested to call in the event of a serious weather alert. See also IETF, IP, and PSTN.

pip tone The tone that notifies you of a call waiting, assuming you subscribe to "call waiting." See Call Waiting.

pipe 1. A communications process within the operating system that acts as an interface between a computer's devices (keyboard, disk drives, memory, and so on) and an applications program. A pipe simplifies the development of application programs by "buffering" a program from the intricacies of the hardware or the software that controls the hardware; the application developer writes code to a single pipe, not to several individual devices. A pipe is also used for program-to-program communications and can be a connection between two processes so that the output from one immediately becomes the input for the other. Indicated by the | character.

2. A transmission facility. Pipe usually is used when discussing transmission bandwidth. For instance, fiber optics is a "big pipe," because it offers lots of bandwidth. See also Bandwidth.

3. Private Investment in Public Equities. When public companies become cheaper than private companies, some venture capital firms often invest in public companies. This is called PIPE.

pipe fillers Content providers.

pipe holders See pipe owners.

pipe mount A mounting system used for mounting an antenna mast to a vent pipe on a roof.

pipe owners Carriers and other network operators who own and operate the telecommunications infrastructure. Also called pipe holders.

pipelining 1. Executing instructions by breaking them into component parts and processing them in parallel on separate processors. This reduces reduce cycle time and increases the computer's performance.

2. In imaging, pipelining also lets an imaging card start compressing and writing the image to disk while it is still being scanned.

3. In networking, pipelining is a technique used at the transport layer or data link layer in a layered network architecture that allows for the transmission of multiple frames without waiting to see if they are acknowledged on an individual basis. Each frame may have to be acknowledged later and in sequence, or a process of implied acknowledgment may be employed. Implied acknowledgment is a process whereby negative acknowledgment of a specific frame implies that all previously transmitted frames have been received correctly.

pipes The network infrastructure. See also dumb pipes.

PIR 1. Peak Information Rate. This word is used in context of an Ethernet interface to specify its performance in terms of peak number of frames transmitted per second.

2. Passive Infra-Red.

piracy Any impersonation, unauthorized browsing, falsification or theft of data or disruption of service or control information in a network.

PISD Planned In-Service Date. The date the your vendor quotes for installation of a new system or circuit. A due date, in other words. I think that if your vendor missed the PISD, you would be "PISD off."

PITA Abbreviation for "Pain In The Ass;" commonly used on E-mail and BBSs (Bulletin Board Systems).

pitch In flat cable, the nominal distance between the index edges of two adjacent conductors.

pitch control Variable control for increasing or decreasing the speed of a tape deck or turntable.

pistoning the movement of a connectorized fiber axially in and out of a ferrule end, often caused by changes in temperature.

PIU 1. Path Information Unit in SNA. 2. See Percent of Interstate Usage.

PIX Private Internet eXchange. It's a Cisco term for a family of their remote access routers with firewall capabilities.

pixel Picture Element. The smallest unit of area of a video screen image that can be turned on or off, or varied in intensity. The single point on a CRT display. The single point

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Dictionary of Computer Vision and Image Processing

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Lowe's curve segmentation method: An algorithm that tries to split a curve into a sequence of straight line segments. The algorithm has three main stages: 1) a recursive splitting of segments into two shorter, but more line-like segments, until all remaining segments are very short. This forms a tree of segments. 2) Merging segments in the tree in a bottom-up fashion according to a straightness measure. 3) Extracting the remaining unmerged segments from the tree as the segmentation result.

luma: The luminance component of light. Color can be divided into luma and chroma.

luminance: The measured intensity from a portion of a scene.

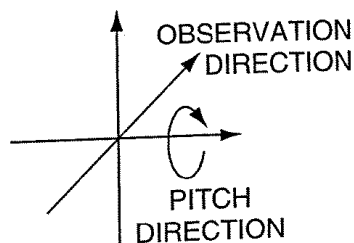
luminance efficiency: The sensor specific function $V(\lambda)$ that determines how the observed light $I(x, y, \lambda)$ at sensor position (x, y) of wavelength λ contributes to the measured luminance $l(x, y) = \int I(\lambda) V(\lambda) d\lambda$ at that point.

luminous flux: The amount of light at all wavelengths that passes through a given region in space. Proportional to perceived brightness.

luminosity coefficient: A component of tristimulus color theory. The luminosity coefficient is the amount of luminance contributed by a given primary color to the total perceived luminance.

pit: 1) A general term for when a signal value is lower than the neighboring signal values. Unlike signal peaks, pits usually refer to two dimensional images. For example, a pit occurs when observing the image of a dark spot on a lighter background. 2) A local point-like concave shape defect in a surface.

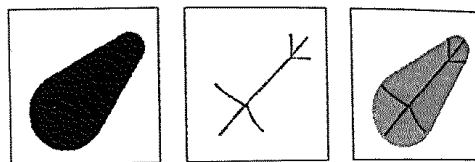
pitch: A 3D rotation representation (along with yaw and roll) often used for cameras or moving observers. The pitch component specifies a rotation about a horizontal axis to give an up-down change in orientation. This figure shows the pitch rotation direction:



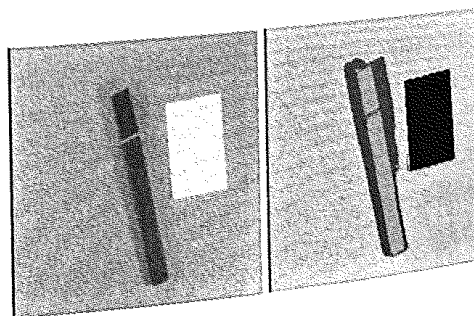
pixel: The intensity values of a digital image are specified at the locations of a discrete rectangular grid; each location is a pixel. A pixel is characterized by its coordinates (position in the image) and intensity value (see intensity and intensity image). Values can express physical quantities other than intensity for different kinds of images, as in, *e.g.*, infrared imaging. In physical terms, a pixel is the photosensitive cell on the CCD or other solid state sensor of a digital camera. The CCD pixel has

a precise size, specified by the manufacturer and determining the CCD's aspect ratio. See also intensity sensor and photosensor spectral response.

pixel addition operator: A low-level image processing operator taking as input two gray scale images, I_1 and I_2 , and returning an image I_3 in which the value of each pixel is $I_3 = I_1 + I_2$. This figure shows at the right the sum of the two images at the left (the sum divided by 2 to rescale to the original intensity level):

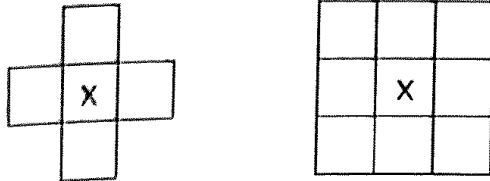


pixel classification: The problem of assigning the pixels of an image to certain classes. See also image segmentation, supervised classification, and clustering. This image shows the pixels of the left image classified into four classes denoted by the four different shades of grey:



pixel connectivity: The pattern specifying which pixels are con-

sidered neighbors of a given one (X) for the purposes of computation. Common connectivity schemes are 4 connectedness and 8 connectedness, as seen in the left and right images here:



pixel coordinates: The coordinates of a pixel in an image. Normally these are the row and column position.

pixel coordinate transformation: The mathematical transformation linking two image reference frames, specifying how the coordinates of a pixel in one reference frame are obtained from the coordinate of that pixel in the other reference frame. One linear transformation can be specified by

$$i_1 = ai_2 + bj_2 + e$$

$$j_1 = ci_2 + dj_2 + f$$

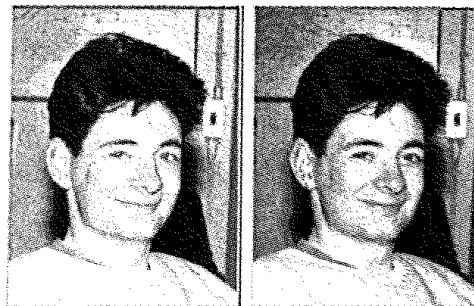
where the coordinates of $\vec{p}_2 = (i_2, j_2)$ are transformed into $\vec{p}_1 = (i_1, j_1)$. In matrix form, $\vec{p}_1 = A\vec{p}_2 + \vec{t}$, with $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ a rotation matrix and $\vec{t} = \begin{pmatrix} e \\ f \end{pmatrix}$ a translation vector. See also Euclidean, affine and holography transforms.

pixel counting: A simple algorithm to determine the area of an image region by counting

the numbers of pixels composing the region. See also region.

pixel division operator: An operator taking as input two gray scale images, I_1 and I_2 , and returning an image I_3 in which the value of each pixel is $I_3 = I_1/I_2$.

pixel exponential operator: A low-level image processing operator taking as input one gray scale image, I_1 , and returning an image I_2 in which the value of each pixel is $I_2 = cb^{I_1}$. This operator is used to change the dynamic range of an image. The value of the basis b depends on the desired degree of compression of the dynamic range. c is a scaling factor. See also logarithmic transformation, pixel logarithm operator. The right image is 1.005 raised to the pixel values of the left image:



pixel gray scale resolution:

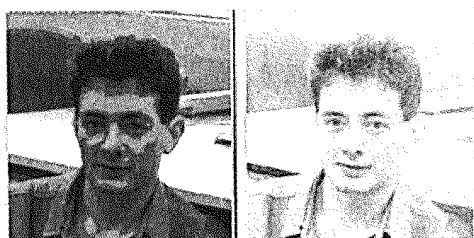
The number of different gray levels that can be represented in a pixel, depending on the number of bits associated with each pixel. For instance, an 8-bit pixel (or image) can represent $2^8 = 256$ different intensity values. See

also intensity, intensity image, and intensity sensor.

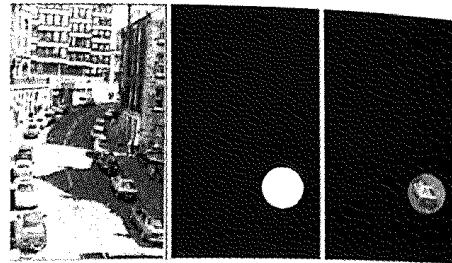
pixel interpolation: See image interpolation.

pixel jitter: A frame grabber must estimate the pixel sampling clock of a digital camera, i.e., the clock used to read out the pixel values, which is not included in the output signal of the camera. Pixel jitter is a form of image noise generated by time variations in the frame grabber's estimate of the camera's clock.

pixel logarithm operator: An image processing operator taking as input one gray scale image, I_1 , and returning an image I_2 in which the value of each pixel is $I_2 = c \log_b (|I_1 + 1|)$. This operator is used to change the dynamic range of an image (see also contrast enhancement), such as for the enhancement of the magnitude of the Fourier transform. The base b of the logarithm function is often e , but it does not actually matter because the relationship between logarithms of any two bases is only one of scaling. See also pixel exponential operator. The right image is the scaled logarithm of the pixel values of the left image:

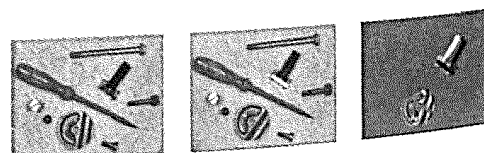


pixel multiplication operator: An image processing operator taking as input two gray scale images, I_1 and I_2 , and returning an image I_3 in which the value of each pixel is $I_3 = I_1 * I_2$. The right image is the product of the left and middle images (scaled by 255 for contrast here):



pixel subsampling: The process of producing a smaller image from a given one by including only one pixel out of every N . Subsampling is rarely applied this literally, however, as severe aliasing is introduced; scale space filtering is applied instead.

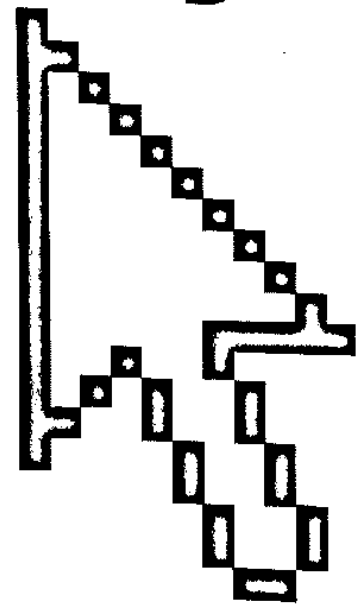
pixel subtraction operator: A low-level image processing operator taking as input two gray scale images, I_1 and I_2 , and returning an image I_3 in which the value of each pixel is $I_3 = I_1 - I_2$. This operator implements the simplest possible change detection algorithm. The right image (with 128 added) is the middle image subtracted from the left image:



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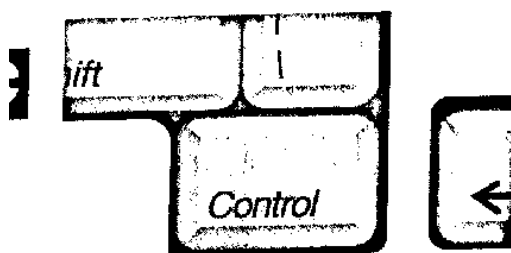
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Control key.

controller *n.* A device that other devices rely on for access to a computer subsystem. A disk controller, for example, controls access to one or more disk drives, managing physical and logical access to the drive or drives.

control logic *n.* The electronic circuitry that generates, interprets, and uses control data.

control panel *n.* In Windows and Macintosh systems, a utility that allows the user to control aspects of the operating system or hardware, such as system time and date, keyboard characteristics, and networking parameters.

control panel device *n.* See *cdev*.

control sequence *n.* See *control code*.

control signal *n.* An electronic signal used to control internal or external devices or processes.

control statement *n.* A statement that affects the flow of execution through a program. Control statements include conditional statements (CASE, IF-THEN-ELSE), iterative statements (DO, FOR, REPEAT, WHILE), and transfer statements (GOTO). See also *conditional statement*, *iterative statement*, *statement*, *transfer statement*.

control strip *n.* 1. An equipment calibration tool used to determine the corrections needed to restore accuracy by comparing recorded data against known values. 2. A utility that groups shortcuts to commonly used items or information, such as time, battery power level, desktop items, and programs, in an easily accessible place. See also *shortcut*.

control structure *n.* A portion of a program defined by the relationship between the statements, used in structured programming. There are three basic control structures: sequence, where one statement simply follows another; selection, where program flow depends on which criteria are met; and iteration, where an action is repeated until some condition occurs.

control unit *n.* A device or circuit that performs an arbitrating or regulating function. For example, a memory

controller chip controls access to a computer's memory and is the control unit for that memory.

control variable *n.* In programming, the variable in a control statement that dictates the flow of execution. For example, the index variable in a FOR loop controls the number of times a group of statements are executed. See also *control statement*.

convenience adapter *n.* See *port replicator*.

convention *n.* Any standard that is used more or less universally in a given situation. Many conventions are applied to microcomputers. In programming, for example, a language such as C relies on formally accepted symbols and abbreviations that must be used in programs. Less formally, programmers usually adopt the convention of indenting subordinate instructions in a routine so that the structure of the program is more easily visualized. National and international committees often discuss and arbitrate conventions for programming languages, data structures, communication standards, and device characteristics. See also *CCITT*, *ISO*, *NTSC*, *standard (definition 1)*.

conventional memory *n.* The amount of RAM addressable by an IBM PC or compatible machine operating in real mode. This is typically 640 kilobytes (KB). Without the use of special techniques, conventional memory is the only kind of RAM accessible to MS-DOS programs. See also *protected mode*, *real mode*. Compare *expanded memory*, *extended memory*.

convergence *n.* A coming together. Convergence can occur between different disciplines and technologies, as when telephone communications and computing converge in the field of telecommunications. It can also occur within a program, such as a spreadsheet, when a circular set of formulas are repeatedly recalculated (iterated), with the results of each iteration coming closer to a true solution.

conversational *adj.* Of, pertaining to, or characteristic of the mode of operation, typical of microcomputers, in which the computer user and the system engage in a dialogue of commands and system responses. See also *interactive*.

conversational interaction *n.* Interaction in which two or more parties alternately transmit and receive messages from each other. See also *interactive processing*.

conversational language *n.* Any programming language that allows the programmer to instruct the computer in a conversational mode, as opposed to more formal, structured languages. For example, in a COBOL program, in order to execute a procedure called CHECK 10 times, a

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For my daughter, Claire.
—B.H.

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MS-DOS, the "defragment" command in Windows, or the "optimize" command with a Macintosh utility.

continuity (n.) 1. A condition that exists in an uninterrupted circuit or signal path. A continuity test determines whether a circuit is complete by measuring 0 ohms of resistance, whereas a broken circuit shows infinite ohms of resistance. 2. In video production, a logical succession of events that requires a video producer to position characters consistently and to place props in scenes that are meant to appear as a natural progression in time. 3. Directional consistency in camera angles from shot to shot.

continuous branching (n.) A feature of an interactive program that modifies the environment constantly in response to the user, rather than only at predetermined branching points or menus.

Continuous Variable Slope Delta modulation (CVSD) (n.) A speech digitizing and encoding technique that uses a one-bit sample to encode the difference between two successive signal levels. The sampling is usually done at 32,000 times a second, although some implementations employ lower sampling rates.

contour control (n.) A control found on professional DJ performance mixers that is used to change the shape or taper of the fader action. At 50 percent of travel, a fader may allow 50 percent, 10 percent, or 90 percent of the audio signal to pass depending on the taper of the control. The contour control (switched, continuous, or stepped variable) changes this amount.

contrast (n.) The range between the darkest and brightest components in an image. Displays often provide hardware adjustments for controlling contrast, and scanners permit soft-

ware controls. Adjusting contrast in a selective manner can make relatively light or dark areas of an image visible while increasing detail.

control channel (n.) In wireless communications, a channel used to transmit digital control information from a base station to a cellular phone (forward), or from a cellular phone to a base station (reverse).

control code (n.) One of the 32 ASCII codes reserved for issuing hardware control commands, such as advancing a printer page.

control voltage (n.) In audio electronic circuits using voltage-controlled amplifiers, this is a DC voltage proportional to the audio input signal amplitude, sometimes frequency-dependent, which is used to set the instantaneous gain of some other device.

Control-L (n.) A one-way communication system in consumer model camcorders and VCRs that is used to approximately coordinate tape transport commands for automated editing.

controller (n.) 1. In computer hardware, a processing component that manages the flow of data between the computer and peripheral devices. 2. The input device for a video game that moves and manipulates objects on the screen. A mouse is a controller for a computer with a graphical user interface (GUI).

control panel (n.) In a graphical user interface (GUI), a utility program that may be used to adjust parameters for system settings, such as volume, color, and the rate of response to input devices.

control panel device (CDEV, pronounced "SEE-dev") (n.) A piece of system code used in the Mac OS to extend functionality.

DICTIONARY OF COMPUTING

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= graphic cells or characters which touch each other; *most display units do not provide contiguous graphics: their characters have a small space on each side to improve legibility*

QUOTE: If you later edit the file again, some of the new data clusters will not be contiguous with the original clusters but spread around the disk.

Computing

contingency plan *noun* secondary plan or equipment that will be used if the first fails to work

continual *adjective* which happens again and again; *the continual system breakdowns have slowed down the processing*

continually *adverb* again and again

continuation *noun* act of continuing; **continuation page** = page or screen of text that follows on from a main page

continue *verb* to go on doing something or to do something which you were doing earlier

continuity *noun* clear conduction path between two points

continuous *adjective* with no end or with no breaks; which goes on without stopping; **continuous data stream** = high speed serial data transmission, in which data words are not synchronized, but follow on immediately one after the other; **continuous feed** = device which feeds continuous stationery into a printer; **continuous loop** = endless piece of recording or projection tape; **continuous signal** = analog (continuously variable) signal; **continuous stationery** = paper made as one long sheet, used in computer printers; **continuous tone** = image that uses all possible values of grey or colours, such as a photograph; *see also* GREY-SCALE, LINE ART

continuously *adverb* without stopping; *the printer overheated after working continuously for five hours*

contouring *noun* (i) (in a graphics application) process that converts a wire-frame drawing into a solid-looking object by adding shadows and texture; (ii) (in a graphics application) function that creates realistic-looking ground or a

surface, for example to create the ground in a virtual-reality system

contrast 1 *noun* (a) difference between black and white or between colours; *the control allows you to adjust brightness and contrast*; **contrast enhancement filter** = special filter put over a monitor to increase contrast and prevent eye-strain (b) control knob on a display that alters the difference between black and white tones or between colours **2** *verb* to examine the differences between two sets of information; *the old data was contrasted with the latest information*

control 1 *verb* to be in charge of something or to make sure that something is kept in check; **controlled vocabulary** = set of terms or words used in an indexing language **2** *noun* (a) restricting or checking something or making sure that something is kept in check; **control computer** = dedicated computer used to control a process or piece of equipment; **control total** = result of summing certain fields in a computer file to provide error detection; **out of control** = not kept in check (b) (i) section of a computer or device that carries out instructions and processes signals, etc.; (ii) conditional program statements; **control statement** = program instruction that redirects a program (to another branch, etc.); **control structure** = set of instructions that are run in a particular circumstance; an IF.THEN statement selects a particular control structure depending on the value of a variable; **control unit (CU)** = section of central processor that selects and executes instructions; **control word** = word which defines the actions (in a particular process) that are to be followed; **device control character** = special code sent in a transmission to a device to instruct it to perform a special function; **line control** = special code used to control a communications link (c) (i) key on a computer keyboard which sends a control character; (ii) data or a key which controls something; **control block** = reserved area of computer memory that contains control data; **control bus** = set of connections to a microcomputer that carry the control signals between CPU, memory and input/output devices; **control cards** = in a punched card system, the first cards which contain the processor control instructions; **control**

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G

Gg

G = GIGA prefix meaning one thousand million

COMMENT: in computing G refers to 2^{30} , equal to 1,073,741,824

G.711 standard used in multimedia and telephony to define an audio signal with a 3.4KHz bandwidth transferred over a 64Kbits/second data channel

GaAs = GALLIUM ARSENIDE

gain 1 *noun* increase or becoming larger; amount by which a signal amplitude is changed as it passes through a circuit, usually given as a ratio of output to input amplitude **2** *verb* to get; **to gain access to a file** = to be able to access a file; **the user cannot gain access to the confidential information in the file without a password**

gallium arsenide (GaAs) *noun* semiconductor compound, a new material for chip construction, that allows faster operation than silicon chips

game *noun* something which is played for enjoyment or relaxation; **computer game** = game played on a computer, using special software; **game cartridge** = ROM device that contains the program code for a computer game, and which is plugged into a game console; **game console** = dedicated computer, joystick and display adapter that is designed to be only used to play games; **game paddle** = device held in the hand to move a cursor or graphics in a computer game; **game port** = connection that allows a joystick to be plugged into a computer

gaming gear *noun* accessories (for a computer) that are designed to increase the enjoyment of playing a computer game; for example, a joystick for action games or a steering wheel and foot pedals for a driving game

ganged *adjective* mechanically linked devices that are operated by a single action; **ganged switch** = series of switches that operate on different parts of a circuit, but which are all switched by a single action; **a ganged switch is used to select which data bus a printer will respond to**

gap *noun* (a) space between recorded data; **block gap or interblock gap (IBG)** = blank magnetic tape between the end of one block of data and the start of the next in backing store; **gap character** = an extra character added to a group of characters (for parity or another purpose, but not data or instructions); **gap digit** = an extra digit added to a group of data (for parity or another purpose, but not data or instructions); **record gap** = blank section of magnetic tape between two consecutive records (b) space between a read head and the magnetic medium; **air or head gap** = narrow gap between a recording or playback head and the magnetic medium; **gap loss** = signal attenuation due to incorrect alignment of the read/write head with the storage medium

garbage *noun* (a) radio interference from adjacent channels (b) data or information that is no longer required because it is out of date or contains errors; **garbage collection** = reorganization and removal of unwanted or out of date files and records; clearing a section of memory of a program or its data that is not in use; **garbage in garbage out (GIGO)** = expression meaning that the accuracy and quality of information that is output depends on the quality of the input

COMMENT: GIGO is sometimes taken to mean 'garbage in gospel out': i.e. that whatever wrong information is put into a computer, people will always believe that the output results are true

luma *noun* black and white parts of an image or video signal, represented by the symbol Y; *see also* S-VIDEO, Y/C

luminance *noun* part of a video signal or image that defines the brightness at each point; *see also* YUV ENCODING

lurk *verb* to join an online conference, discussion group or chat room and listen to the messages without contributing anything yourself. Most discussion forums don't mind lurking, since it helps to build confidence from new users and lets someone check the content before joining in, however some chat rooms do not

approve of lurking and immediately identify anyone joining to discourage people who do not contribute to the forum.

LUT LOOK-UP TABLE

QUOTE:an image processing system can have three LUTs that map the image memory to the display device

Byte

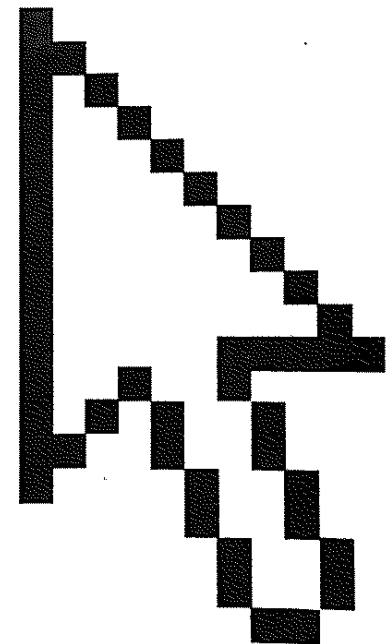
LV *see* LASERVISION

LV-ROM 12-inch diameter optical disc developed by Philips that can store both analog video and digital data

Microsoft

Computer Dictionary

Fifth Edition



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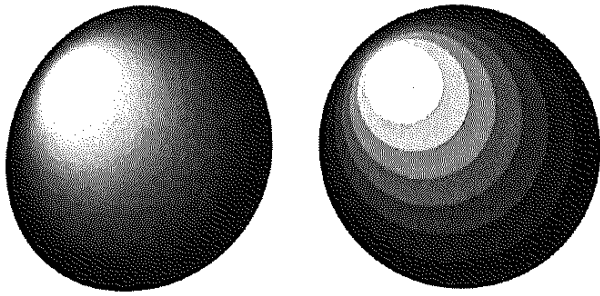
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**Contouring.**

contrast *n.* 1. The degree of difference between light and dark extremes of color on a monitor or on printed output. 2. The control knob by which the contrast of a monitor is changed.

control *n.* 1. Management of a computer and its processing abilities so as to maintain order as tasks and activities are carried out. Control applies to measures designed to ensure error-free actions carried out at the right time and in the right order relative to other data-handling or hardware-based activities. In reference to hardware, control of system operations can reside in a data pathway called a *control bus*. In reference to software, *control* refers to program instructions that manage data-handling tasks. 2. In a graphical user interface, an object on the screen that can be manipulated by the user to perform an action. The most common controls are buttons, which allow the user to select options, and scroll bars, which allow the user to move through a document or position text in a window.

control break *n.* A transition in control of the computer that typically gives control of the CPU (central processing unit) to the user console or to some other program.

Control-Break *n.* See Break key.

control bus *n.* The set of lines (conductors) within a computer that carry control signals between the CPU (central processing unit) and other devices. For example, a control bus line is used to indicate whether the CPU is attempting to read from memory or to write to it; another control bus line is used by memory to request an interrupt in case of a memory error.

control character *n.* 1. Any of the first 32 characters in the ASCII character set (0 through 31 in decimal representation), each of which is defined as having a standard control function, such as carriage return, linefeed, or backspace. 2. Any of the 26 characters Control-A through Control-Z (1 through 26 in decimal representation) that can be typed

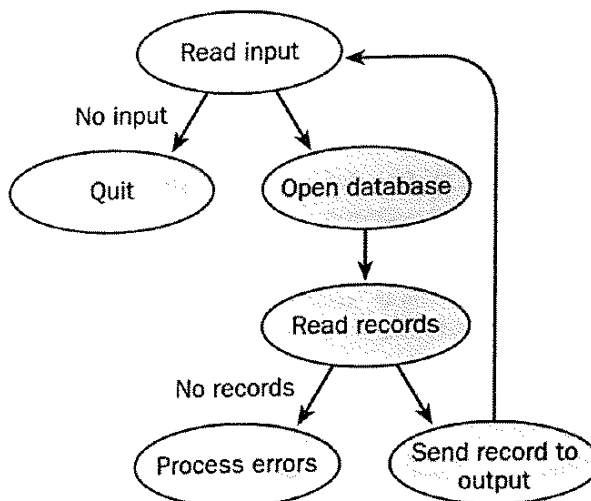
at the keyboard by holding the Control key down and typing the appropriate letter. The six remaining characters with control functions, such as Escape (ASCII 27), cannot be typed using the Control key. *Compare* control code.

control code *n.* One or more nonprinting characters used by a computer program to control the actions of a device, used in printing, communications, and management of display screens. Control codes are mainly employed by programmers or by users to control a printer when an application program does not support the printer or one of its specialized features. In video, control codes are sent from a computer to a display unit to manipulate the appearance of text or a cursor on the screen. Popular video control code sets are ANSI and VT-100. *Also called:* escape sequence, setup string. *See also* control character.

control console *n.* See console.

control data *n.* Data that consists of information about timing and switching, used to synchronize and route other data or to manage the operation of a device such as a bus or a port.

control flow *n.* The tracing of all possible execution paths in a program, often represented in the form of a diagram. See the illustration.

**Control flow.**

Control key *n.* A key that, when pressed in combination with another key, gives the other key an alternative meaning. In many application programs, Control (labeled CTRL or Ctrl on a PC keyboard) plus another key is used as a command for special functions. See the illustration. *See also* control character (definition 2).

C

video display tube *n.* See CRT.

video display unit *n.* See monitor.

video DRAM *n.* See video RAM.

video driver *n.* Software that provides the interface between the video adapter hardware and other programs, including the operating system. The user can access the video driver to specify the resolution and color-bit depth of images on the monitor during the setup process. See also driver, monitor, video adapter.

video editor *n.* A device or program used to modify the contents of a video file.

Video Electronics Standards Association *n.* See VESA².

video game *n.* See computer game.

Video Graphics Adapter or Video Graphics Array *n.* See VGA.

video graphics board *n.* A video adapter that generates video signals for displaying graphical images on a video screen.

video look-up table *n.* See color look-up table.

video memory *n.* Memory from which a display image is created, located in the video adapter or video subsystem. If both the video processor and the central processing unit (CPU) have access to video memory, images are produced by the CPU's modification of video memory. Video circuitry normally has priority over the processor when both attempt to read or write to a video memory location, so updating video memory is often slower than accessing main memory. See also video RAM.

video mode *n.* The manner in which a computer's video adapter and monitor display on-screen images. The most common modes are text (character) mode and graphics mode. In text mode, characters include letters, numbers, and some symbols, none of which are "drawn" on screen dot by dot. In contrast, graphics mode produces all screen images, whether text or art, as patterns of pixels (dots) that are drawn one pixel at a time.

videophone *n.* A device equipped with camera and screen, as well as a microphone and speaker, capable of transmitting and receiving video signals as well as voice over a telephone line. Using conventional telephone lines, a videophone can transmit only freeze-frame video. See also freeze-frame video.

video port *n.* A cable connector or port on a computer that outputs video signals to a monitor.

video RAM *n.* A special type of dynamic RAM (DRAM) used in high-speed video applications. Video RAM uses separate pins for the processor and the video circuitry, providing the video circuitry with a back door to the video RAM. The video circuitry can access the video RAM serially (bit by bit), which is more appropriate for transferring pixels to the screen than is the parallel access provided by conventional DRAM. *Acronym:* VRAM. See also dynamic RAM.

video server *n.* A server designed to deliver digital video-on-demand and other broadband interactive services to the public over a wide area network.

video signal *n.* The signal sent from a video adapter or other video source to a raster display. The signal can include horizontal and vertical synchronization signals, as well as image information. See also composite video display, RGB monitor.

video terminal *n.* See terminal (definition 1).

videotex *n.* An interactive information retrieval service designed to be accessed by subscribers over telephone lines. Information can be displayed on a home television screen or a videotex terminal. Subscribers use keypads to choose from menus and to request specific screens, or pages. Also called: videotext.

videotext *n.* See videotex.

Vienna Definition Language *n.* See VDL.

view¹ *n.* 1. The display of data or an image from a given perspective or location. 2. In relational database management systems, a logical table created through the specification of one or more relational operations on one or more tables. A view is equivalent to a divided relation in the relational model. See also relational database, relational model.

view² *vb.* To cause an application to display information on a computer screen.

viewer *n.* An application that displays or otherwise outputs a file in the same way as the application that created the file. An example of a viewer is a program to display the images stored in GIF or JPEG files. See also GIF, JPEG.

viewport *n.* In computer graphics, a view of a document or an image. A viewport is similar to the view in a window, but usually only part of the document or graphical image is visible. Compare window.

vine *n.* A means of distributing audiotape copies that is similar to a tape tree. Because vine tapes are digital in for-

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see also BAUD, PARALLEL PORT, SERIAL PORT, USB

black and white (i) (in an image) use of shades of grey to represent colours on a monitor or display; (ii) an image in which each pixel is either black or white with no shades of grey

compare with HALFTONE

black box device that performs a function without the user knowing how

black level level of a video signal that represents absolutely no light: total blackness

black matrix CRT monitor tube in which the color phosphor dots are surrounded by black for increased contrast

blanking (interval) period during which a screen displays nothing, in between two images or during the picture beam flyback

see also FLYBACK, REFRESH RATE

blink way a cursor flashes on and off to show you where you are positioned on the screen or in a document.

blit or bitblt (in computer graphics) moving a block of bits from one memory location to another; if the computer has a memory-mapped display a bitblt effectively moves an image on screen

blitter electronic component designed to process or move a bit-mapped image from one area of memory to another

blitting transferring a bitmap image from a storage device to an output window

blob BINARY LARGE OBJECT field in a database record that can contain a large quantity of binary data; for example, normally a bitmap image bit (in Windows)

Bluetooth a short-range radio communications system that is designed to provide a simple way for computer, Internet and input devices to communicate; for example, a palm-top computer could transfer information to a mobile phone using a Bluetooth link. The technology was developed by a group of computer and telecoms companies that included Ericsson, IBM, Intel, Nokia and Toshiba

BMP three letter file name extension used to identify files that store bitmap image data

see also BITMAP, GIF, JPEG, TIFF

BNC connector connector with a central metal pin that carries a high-frequency signal; BNC connectors are used to link coaxial cable to equipment and are often used for video connections, Ethernet networks, radar, measuring equipment and other sensitive devices that work with high-frequency signals

body or body text (i) main text of a document or book. *VIZIO, Inc. Exhibit 1030*

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content provider company that supplies information (text, news stories, images, video, software) for a website, product or publication

content-rich multimedia application or website that contains a lot of useful information

context-sensitive help help message that gives useful information about the particular function or part of the program you are in rather than general information about the whole program

context-switching process in which several programs are loaded in memory, but only one at a time can be executed. Unlike a true multitasking system which can load several programs into memory and run several programs at once, context-switching only allows one program to be run at a time

contiguous graphics graphic cells or characters which touch each other

continuous tone image that has the entire range of greys or colours between 0 and 100% (between black and white); for example, a photograph is a continuous tone image, a line drawing is not
see also GREY-SCALE, LINE ART

contouring (i) (in a graphics application) process that converts a wire-frame drawing into a solid-looking object by adding shadows and texture; (ii) (in a graphics application) function that creates realistic-looking ground or a surface, for example to create the ground in a virtual-reality system

contrast (i) difference between black and white tones or between colours; (ii) control knob on a display that alters the difference between black and white tones or colours

contrast enhancement filter special filter put over a monitor to increase contrast and prevent eye-strain

control change (in MIDI) message sent to a synthesizer to instruct it to change a setting, for example to change the volume of a MIDI channel

control character special character that provides a control sequence rather than an alphanumeric character; normally a non-printing character that changes the appearance of text

control key or Ctrl (on IBM-PC compatible systems) special key (in the lower left corner) that provides a secondary function when pressed with another key

control menu (in Microsoft Windows) menu that allows you to move, resize or close the current window; the menu is accessed by pressing Alt-Space

control panel (i) main computer system control switches and status

Gg

G GIGA meaning one thousand million; in computing G refers to 2^{30} , equal to 1,073,741,824

GaAs

see GALLIUM ARSENIDE

gain increase or becoming larger; amount by which a signal amplitude is changed as it passes through a circuit, usually given as a ratio of output to input amplitude

gallium arsenide (GaAs) substance used to manufacture high-speed integrated circuit chips, an alternative to silicon

game paddle device held in the hand to move a cursor or graphics in a computer game

game port connection that allows a joystick to be plugged into a computer

games console dedicated computer, joystick and display adapter that is designed to be used to play games

gaming gear accessories (for a computer) that are designed to increase the enjoyment of playing a computer game; for example, a joystick for action games or a steering wheel and foot pedals for a driving game

gap loss signal attenuation due to incorrect alignment of the read/write head with the storage medium (such as magnetic tape)

garbage (i) radio interference between adjacent analog or digital channels; (ii) data or information that is no longer required because it is out of date or contains errors

garbage in garbage out

see GIGO

gas discharge display or gas plasma display flat, lightweight display screen that is made of two flat pieces of glass covered with a grid of conductors, separated by a thin layer of a gas which luminesces when one point of the grid is selected by two electric signals
see also LCD

Gb

see GIGABYTE

General MIDI standards for a synthesizer that set out the first 128
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LTC

see LONGITUDINAL TIME CODE

luma black and white parts of an image or video signal, represented by the symbol Y

see also S-VIDEO, Y/C

luminance part of a video signal or image that defines the brightness at each point

see also YUV ENCODING

LUT

see LOOK-UP TABLE

LV

see LASERVISION

LV-ROM 12-inch diameter optical disc developed by Philips that can store both analog video and digital data

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*Terms &
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teractive program that modifies the environment constantly in response to the user, rather than only at predetermined branching points or menus.

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control code (n.) One of the 32 ASCII codes reserved for issuing hardware control commands, such as advancing a printer page.

Control-L (n.) A one-way communication system in consumer model camcorders and VCRs that is used to approximately coordinate tape transport commands for automated editing.

controller (n.) 1. In computer hardware, a processing component that manages the flow of data between the computer and peripheral devices. 2. The input device for a video game that moves and manipulates objects on the screen. A mouse is a controller for a computer with a graphical user interface (GUI).

control panel (n.) In a graphical user interface (GUI), a utility program that may be used to adjust parameters for system settings, such as volume, color, and the rate of response to input devices.

control panel device (CDEV, pronounced "SEE-dev") (n.) A piece of system code used in the Mac OS to extend functionality.

Control Program for Microprocessors (CP/M) (n.) A specific microcomputer operating system (OS) developed by Digital Research Incorporated.

Control-S (n.) Bidirectional communication system that allows an external edit controller or compatible deck to issue tape transport commands to a slave unit VCR or camera.

control track (n.) 1. A track on video recorders that is imprinted with pulses to set timing and to align the tape with the recording and playback heads. 2. A rudimentary method of video positioning that counts pulses on the tape rather than reading time-stamped data to identify a frame's location.

convergence (n.) In a computer monitor, the alignment of the red, green, and blue light beams aimed at phosphors in a triad. The simultaneous firing of the red, green, and blue beams excites the three corresponding phosphors to generate the color white. Slight deviation of the beams due to magnetic misalignment of the electron trajectory causes colored shadows around pixels, giving the beams poor convergence. If the beams are perfectly aimed at the pixels on the screen, the monitor has good convergence.

cookie (n.) A handle, transaction ID, or other token of agreement between programs. The purpose of a cookie is to relate a later transaction to the current one. When a web server places a cookie on a client's hard disk, it can use that information in a subsequent connection to determine how information should be sent to that particular client. Netscape originated the concept. The decision of whether to accept a cookie offered by a web server is entirely up to the client. There is nothing inherently harmful or dangerous in accepting cookies, except that the client has no idea what information is transferred in the process. See also *HTTP cookie*.

Coordinating Committee for Intercontinental Research Networks (CCIRN) (n.) A com-

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Black Jack When Samuel Morse won a contract from the U.S. Congress in the 1800s to build a telegraph line from Washington, DC to Baltimore, he initially tried to install the lines underground, alongside railroad tracks. There were problems with the lines and the wires were later suspended from poles. To this day, millions of miles of communications cables are installed on utility poles. Since the wooden poles are subject to weathering, they are coated with creosote, a preservative derived from coal tar. It has come to be called black jack.

Black Level The lowest luminance level that can occur in video or television transmission and which, when viewed on a monitor, appears as the color 'black.'

Black Matrix Picture tube in which the color phosphors are surrounded by black for increased contrast.

Black Recording 1. In facsimile systems using amplitude modulation, that form of recording in which the maximum received power corresponds to the maximum density of the record medium.

2. In a facsimile system using frequency modulation, that form of recording in which the lowest received frequency corresponds to the maximum density of the record medium.

Black Signal 1. In facsimile, the signal resulting from the scanning of a maximum-density area of the subject copy.

2. In cryptographic systems, a signal containing only unclassified or encrypted information.

Black Thursday The day that began the Great Depression. It was October 24, 1929.

Blackbird Blackbird is a multifunction system, providing home users with a single box that can work as a game system, network computer, home broadband router, and set-top box. The primary backer behind Blackbird is Motorola. Much of Blackbird's "middleware" software was developed with partners. According to David Lammers, of EE Times, Spyglass built a browser and other networking software that will let companies customize their own offerings and get to the retail channel by next year. Another key partner is VM Labs, a Silicon Valley-based game company headed up by former Atari president Richard Miller. VM Labs worked with Motorola to create a media processor, Nuon, which, at different times, has gone under the code names of Merlin and Project X, Burgess said. Nuon is a 128-bit VLIW engine that will work in tandem with the CPU in Blackbird, a PowerPC 860 core.

Blackout A total loss of commercial electric power. A blackout has a decidedly negative effect on your ability to compute and communicate, assuming that your systems are wired, rather than wireless. UPS (Uninterruptible Power Supply) systems provide battery backup protection from a blackout. Carriers use diesel power generators to keep their central offices operating during a blackout—that way, the phones still work when the lights go out.

Blackout Area A CATV and satellite TV definition. A pre-defined area of the country where a particular programming service will not be available, usually because of contractual agreements.

Blacksburg Electronic Village Blacksburg is a town of 40,000 people in the mountains of Southwestern Virginia which contains the main campus of Virginia Polytechnic Institute & State University, also known as Virginia Tech. They have wired both Virginia Tech students and thousands of their town's citizens with email, internet access and bulletin boards. The official explanation is: The Blacksburg Electronic Village (BEV) is a cooperative project of Virginia Tech, Bell Atlantic of Virginia and the Town of Blacksburg. It links the town's citizens to each other and to the Internet via computer lines. Citizens gain access to the Internet from their home or office through a high-speed modem pool or by using Ethernet LANs which are available in some offices and hundreds of apartment units in town. Blacksburg residents may take advantage of a full spectrum of services including the Internet, World Wide Web, Gopher, electronic mail, electronic mailing lists and thousands of Usenet newsgroups. In addition to full Internet access, citizens enjoy the benefits of extensive online local resources. The Blacksburg Electronic Village is famous because it really is the first town to aggressively ensure that the bulk of citizenry could and would have access to electronic mail and to the various resources on the Internet. It has apparently made a major difference in how people live and communicate in Blacksburg. www.bev.net

Blade A blade is any card placed into a backplane in a telephone system. Usually a blade is an additional module. The "blade" term shows the aspect of insertion of the flat plane. This definition contributed by Bob Frankenberger. A blade is also a "computer-on-a-card." Several hundred of these computers can now be crammed into a chassis that now holds 40-plus of today's popular pizza-box shaped server computers. According to the Wall Street Journal, "their small size, their ability to share Internet connections and the disk storage among the blades allow these computers to operate on a fraction of the power and air conditioning of traditional servers" — thereby promising to reduce important costs for data

centers. Says the Journal, "for the companies that house and manage thousands of computers for Internet operations, such very small and cost-efficient machines allow to collect more fees per square foot of computer space."

BLAM Binary Logarithmic Access Method. A proposed alternative to the IEEE 802.3 backoff algorithm.

Blamestorming Blamestorming occurs when people sit around in a group and discuss why a deadline was missed or a project failed, and most importantly, who was responsible.

Blank A character on teletype terminals that does not punch holes in paper tape (except for feed holes to push the paper through). Also the character between words, usually called a "Space" is referred to in IBM jargon as a Blank.

Blank and Burst On the AMPS cellular telephone network, certain administrative messages are sent on the voice channel by blocking the voice signal (blanking) and sending a short high speed data message (burst). The blank and burst technique is one that causes a momentary dropout of the audio connection (and sometimes disconnection of cellular modem connections) when a power level message is transmitted to the cellular phone.

Blank Cell The hollow space of a cellular metal or cellular concrete floor unit without factory installed fittings.

Blanket Covering or intended to cover a large group or class of things, conditions, situations, etc.: a blanket proposal; a blanket LOA (Letter of Agency). An LOA is a letter you give to someone whom you allow to represent you and act on your behalf. For example, a letter of agency is used when your interconnect company orders lines from your local phone company on your behalf. Letters of Agency are also used when companies switch their long distance service from one carrier to another. A blanket LOA can mean everything from a group of numbers belonging to one customer at multiple sites or multiple customers at multiple sites.

Blanking The suppression of the display of one or more display elements or display segments.

Blanking Interval Period during the television picture formation when the electron gun returns from right to left after each line (horizontal blanking) or from top to bottom after each field (vertical blanking) during which the picture is suppressed.

Blanking Pulses The process of transmitting pulses that extinguish or blank the reproducing spot during the horizontal and vertical retrace intervals.

Blast Blocked ASynchronous Transmission. A proprietary technology.

Blatherer A Internet user who takes four screens to say something where four words would work a lot better.

BLEC 1. Broadband Local Exchange Carrier. A service provider offering broadband services locally.

2. Building Local Exchange Carrier. BLECs are business entities — mostly specialists, aligned with REITs (Real Estate Investment Trusts) or landlords — who invest in creating and managing the "intelligent local loop" — a combination of premise wiring, demarc systems, basement POPs filled with co-located equipment and applications servers, and, possibly higher order local aggregation points (i.e. central offices) filled with the same — and all dedicated to providing end-user customers (business and residence) with a wide range of communications services (voice, broadband data, Internet) and computer networking applications (e.g. directory, messaging, DNS, IP telecom gateway, etc.)

Blend To have outbound and inbound phone calls answered by the same agents. See the next two definitions.

Blended Agent A call center person who answers both incoming and makes outgoing calls. This idea of a blended agent is a new concept in a Call Center. In the past call centers have typically kept their inbound and outbound agents separate. The reason? Management felt that the necessary skills were very different and no one could master both.

Blended Call Center A telephone call center whose agents both receive and make calls. In other words, a call center whose phone system acts both as an automatic call distributor and a predictive dialer.

Blended Floor System A combination of cellular floor units with raceway capability and other floor units with raceway capability systematically arranged in a modular pattern.

BLER Block Error Ratio. The ratio of the blocks in error received in a specified time period to the total number of blocks received in the same period.

BLERT Block Error Rate Test. Data transmission testing in which the error rate counted

B

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Harry Newton



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'cause' to the Luddites. Intellectuals and romantics like the poets Blake, Byron, Shelley and Wordsworth picked up that anti-technology theme, but identified with its other side. In the "dark Satanic mills" of industry, they saw the human spirit being stifled. Lord Byron wrote an inflammatory "Song for the Luddites" in 1816. Its first stanza: "As the Liberty lads o'er the sea/Bought their freedom, and cheaply, with blood,/So we, boys, we/Will die fighting, or live free,/And down with all kings but King Ludd!" Mary Shelley, daughter of the feminist Mary Wollstonecraft and wife of the poet, gave the Luddite theme dramatic power in her 1818 novel, "Frankenstein." The danger of rampant technology is expressed by the monster, who says to Dr. Victor Frankenstein, "You are my creator, but I am your master." Between the sweatshop operators and the romantic poets, the meaning of Luddite became fixed as "radical opponent of technological or scientific progress."

LUDs On TV shows like "Law & Order," cops who want info on the bad guys' phone calls, pull their LUDs. LUDs is an acronym for Local Usage Details - a record of incoming and outgoing calls for a particular phone number. The cops get this list from the local phone number. These lists are one reason the bad guys like to use coin phones.

lug Something which sticks out and onto which a wire may be connected by wrapping or soldering.

luma The brightness signal in a video transmission, i.e. Y. See luminance.

luminance The measurable, luminous intensity of a video signal. Differentiated from brightness in that the latter is nonmeasurable and sensory. The color video picture information contains two components: luminance (brightness and contrast) and chrominance (hue and saturation). The photometric quantity of light radiation. Luminance is that part of the video signal which carries the information on how bright the TV signal is to be.

luminiferous Ether Heinrich Rudolf Hertz discovered the phenomenon of the propagation of electromagnetic energy through space. He assumed that there was some conducting matter in the air that supported the arcing of a spark from a positive to a negative terminal. To test the theory, he tried to arc a spark through a vacuum tube, and succeeded. He assumed that the magical conducting matter was so small that it could not be identified and could not be voided from the tube. He named this non-existent matter "luminiferous ether." Bob Metcalfe and his associates later named their magical LAN (Local Area Network) technology Ethernet. See also Edison Effect.

LUNI LANE User Network Interface. Pronounced "looney," as in "Sometimes all these acronyms make me looney." An ATM term for standardized network interface protocol between a LANE (Local Area Network Emulation) client and a LANE Server. See also LANE and LNNI.

LUNS Logical Unit Numbers. An identification number given to devices connected to a SCSI adapter. Each SCSI ID can have eight LUNs. Normally, there is only one device with LUN 0. See Daisy Chain and SCSI.

lurker A person who "hangs around" online bulletin boards and forums, browsing through the messages and, if moved, replying to some of them. That's one definition. Here's another: A visitor to a newsgroup or online service who only reads other people's posts but never posts his or her own messages, thus remaining anonymous. See Lurking.

lurking The practice of reading an Internet mailing list or Usenet newsgroup without posting anything yourself. Everywhere you look there's a Slim Shady lurking. He could be working at Burger King, spitting on your onion rings. Or so I'm told. In the online world, lurking is not considered particularly antisocial; in fact, it is a good idea to lurk for a while when you first subscribe so that you can get a feel for the tone of the discussions in the group and come up to speed on recent history. See Lurker.

Lusha A talented lady with endless patience. She checked and spell-checked every definition until her eyes fell out of her head. She said, politely, she'd had more exciting jobs. Certainly better paying ones. If you find a mistake in this dictionary, please email Lusha. It's all her fault. LDing@Amherst.edu. When she becomes a world-famous concert pianist, you'll be able to tell all your friends, you knew her when she was a lowly lexicographer.

lux A contraction of luminance and flux and a basic unit for measuring light intensity. A lux is approximately 10 foot candles.

LUXPAC A ITU-T X.25 packet switched network operated in Luxembourg by the Luxembourg government.

LVDM A SANS definition. Low-Voltage Differential Multipoint (for low-power bus applications requiring multi-point interconnections, where LVDS is not feasible.)

LVDS Low Voltage Differential Signaling is a new data interface standard that is defined in the TIA/EIA-644 and the IEEE 1596.3 standards. It is essentially a signaling method used for high-speed transmission of binary data over copper. It uses a 350 mV voltage swing between two wires rather than a signal referenced to the ground. This low voltage

differential is what delivers high data transmission speeds and inherently greater bandwidth at lower power consumption with low electromagnetic interference (EMI.) The receiver for LVDS uses the differential signal to determine the state and rejects the common noise for better noise immunity.

LVTTL Low Voltage TTL.

LXSMN Telephone Assistance Plan Surcharge.

Lymph To walk with a lisp.

Lynx A World Wide Web (WWW) browser developed at the University of Kansas for students and faculty who use dumb terminals (e.g., VT100) for connection to mainframe and midrange computers running either the UNIX or the MVS operating system. Lynx was built on an early version of the Common Code Library developed by the CERN WWW project headed by Tim Berners-Lee. Lynx is keyboard-oriented and text-only, rather than being fully featured, graphically-oriented, mouse-driven, audio- and video-capable. Given its origins and orientation (dumb terminals and big computers), that's understandable. In the context of high-performance PCs and Graphical User Interfaces, however, Lynx is not the browser of choice for most of us.

LZ77 A compression approach falling into the general category of "dictionary methods," LZ77 was developed in 1977 by Abraham Lempel and Jakob Ziv. LZ77 involves an implicit dictionary in which data is represented by previously processed data. In other words, a given set of data which is exactly the same as a previously transmitted data need not be restated in full. Rather, a pointer refers to the previous data set. The result is that far fewer bits need be sent to communicate the same information. That yields more efficient use of bandwidth, which always is a limited resource. LZ77 is an asymmetric compression method, as the coding process is relatively time-consuming, while the decoding process is much less so. LZ77 was refined in the LZSS algorithm developed in 1982 by Storer and Szymanski. See also Compression, Dictionary Method, LZSS, LZ78, LZJH, and LZW.

LZ78 A refinement of the LZ77 compression method. A "dictionary method," LZ78 creates a dictionary of data phrases that occur in the input data. When the compression software encounters an input phrase that previously has been entered into the dictionary, the output is in the much-abbreviated form of the index number of that phrase. The result is that far fewer bits need be sent to communicate the same information. That yields more efficient use of bandwidth, which always is a limited resource. LZ78 was further refined in the LZW algorithm developed by Terry Welch in 1984. See also Dictionary Method, LZSS, LZ77, LZJH, and LZW.

LZJH Lempel-Ziv-Jeff-Heath. A compression algorithm developed by Jeff Heath of Hughes Network Systems for use over satellite links, LZJH is based on earlier work by Abraham Lempel and Jakob Ziv. LZJH is the basis for the V.44 compression standard finalized on June 30, 2000 by the ITU-T. V.44, which supplants the earlier V.42bis modem compression technology, provides 6:1 (i.e., 6 to 1) compression performance. V.44 is intended for use in V.92 modems, the successor to V.90 modems. In combination with V.92 modems, V.44 will have a significant effect on the speed of data transmission, as did the earlier move from V.34 to V.90 modems. See also LZ77, LZ78, V.42bis, V.44, V.90, and V.92.

LZS Lempel-Ziv-Stac. A data compression algorithm developed by Stac Electronics and sometimes used by routers. LZS is based on the LZ77 algorithm developed by Abraham Lempel and Jakob Ziv in 1977. See also LZ77.

LZSS Lempel-Ziv-Storer-Szymanski. A data compression method developed in 1982 by Storer and Szymanski, and based on earlier work by Abraham Lempel and Jakob Ziv. LZSS offers a better compression ratio than LZ77, and the decoding process is simpler and faster. Popular archivers such as PKZip make use of LZSS.

LZW Lempel-Ziv-Welsh. A data compression method developed in 1984 by Terry Welch, based on LZ78 by Abraham Lempel and Jakob Ziv. LZW was developed for hardware implementation in high-performance disk controllers. For example, Nortel uses LZW in its Distributed Processing Peripheral (DPP), which is the Automatic Message Accounting Transmitter (AMAT) for the DMS-100 family of central office switches. Nortel selected this non-proprietary protocol and helped promote it as an industry standard. The nominal compression ratio is 2.8:1, without considering field suppression. Transmitting data compressed at a ratio of 2.8:1 at 9600 bps is equivalent to transmitting non-compressed data at 27 Kbps. Compatible compression collectors can poll the DPP in compressed or non-compressed mode. DPPs equipped with the Data Compression feature can transmit in either compressed or non-compressed mode, based on the collector's polling request for a specific polling session. To preserve data integrity, AMA data are still stored in non-compressed form on the DPP disks. LZW is a lossless data-compression algorithm patented by Unisys. See Lossless, Lossy, and LZ78.

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is deemed *twice* as loud.

low-frequency oscillator (LFO) (n.) In sound synthesis, a device capable of subsonic frequency generation, used most often as a controller for other functions, such as vibrato or tremolo.

low-level language (n.) An assembly language that translates each statement into a single machine instruction.

low-pass filter (n.) In audio engineering, a filter that allows only the frequencies below a cutoff point to pass through, blocking out the higher frequencies.

L-pad See *attenuator*.

LPT See *line printer port*.

LRC See *longitudinal redundancy check*.

LSI See *large-scale integration*.

LTC See *longitudinal time code*.

LTO See *Linear Tape Open*.

LU See *logical unit*.

luma (n.) Brightness of a transmitted video signal.

lumen (n.) A unit of luminous flux emitted by a light source. Lumens are measured in candelas; 1 candela indicates the intensity radiated by a single candle.

luminance (n.) Degree of brightness or intensity. One of the three image characteristics coded in a component video signal (represented by the letter Y) and measured in lux or foot-candles. Luminance is the black-and-white portion of a video signal. The other two components of a video signal are the red and blue chroma factors.

luminance bandwidth (n.) The frequency range representing the degree of brightness that a video system can record or transmit. Shape detail is determined largely by this factor.

luminance key (n.) A signal that a switcher uses to alternate between two or more video images based on the brightness of one of the signals.

LUN See *logical unit number*.

lurker (n.) Jargon for a subscriber to a mail list or newsgroup who does not post often but who reads group postings regularly.

lux (n.) A unit of measurement equal to one lumen over a one-square-meter surface.

LV See *Laservision*.

LV-ROM See *Laservision read-only memory*.

Lynx (n.) Text-mode universal client, or browser, developed at the University of Kansas, primarily used on the Unix and MS-DOS platforms.

LZW See *Lempel-Ziv-Welch*.

L

Dictionary of Computer Vision and Image Processing

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contour length: The length of a contour in appropriate units of measurements. For instance, the length of an image contour in pixels. See also arc length.

contour linking: Edge detection or boundary detection processes typically identify pixels on the boundary of a region. Connecting these pixels to form a curve is the goal of contour linking.

contour matching: See curve matching.

contour partitioning: See curve segmentation.

contour representation: See boundary representation.

contour tracing: See contour linking.

contour tracking: See contour linking.

contours: See object contour.

contrast: 1) The difference in brightness values between two structures, such as regions or pixels. 2) A texture measure. In a gray scale image, contrast, C , is defined as

$$C = \sum_i \sum_j (i - j)^2 P[i, j]$$

where P is the gray-level co-occurrence matrix.

contrast enhancement: Contrast enhancement (also known as contrast stretching) expands the distribution of intensity values in an image so that a larger range of sensitivity in the output device can be used. This can make subtle changes in an

image more obvious by increasing the displayed contrast between image brightness levels. Histogram equalization is one method of contrast enhancement. An example of contrast enhancement is here (see plate section for a colour version of these figures):



Input image



After contrast enhancement

contrast stretching: See contrast enhancement.

control strategy: The guidelines behind the sequence of processes performed by an automatic image analysis or scene understanding system. For instance, control can be top-down (searching for image data that verifies an expected

Lowe's curve segmentation method: An algorithm that tries to split a curve into a sequence of straight line segments. The algorithm has three main stages: 1) a recursive splitting of segments into two shorter, but more line-like segments, until all remaining segments are very short. This forms a tree of segments. 2) Merging segments in the tree in a bottom-up fashion according to a straightness measure. 3) Extracting the remaining unmerged segments from the tree as the segmentation result.

luma: The luminance component of light. Color can be divided into luma and chroma.

luminance: The measured intensity from a portion of a scene.

luminance efficiency: The sensor specific function $V(\lambda)$ that determines how the observed light $I(x, y, \lambda)$ at sensor position (x, y) of wavelength λ contributes to the measured luminance $l(x, y) = \int I(\lambda) V(\lambda) d\lambda$ at that point.

luminous flux: The amount of light at all wavelengths that passes through a given region in space. Proportional to perceived brightness.

luminosity coefficient: A component of tristimulus color theory. The luminosity coefficient is the amount of luminance contributed by a given primary color to the total perceived luminance.