# TECH TERMS

## WHAT EVERY Telecommunications AND Digital Professional SHOULD KNOW

JEFF RUTENBECK

National Association of NAB BROADCASTERS

Focal Press

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Focal Press is an imprint of Elsevier

Acquisitions Editor: Angelina Ward
Project Manager: Andrew Therriault
Assistant Editor: Rachel Epstein
Marketing Manager: Christine Degon Veroulis
Cover Design: Alisa Andreola
Interior Design: Julio Esperas

Focal Press is an imprint of Elsevier
30 Corporate Drive, Suite 400, Burlington, MA 01803, USA
Linacre House, Jordan Hill, Oxford OX2 8DP, UK



The opinions, findings, and conclusions expressed in this publication are those of the author(s) alone, and not necessarily those of the National Association of Broadcasters.



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**Library of Congress Cataloging-in-Publication Data**
Application submitted.

**British Library Cataloguing-in-Publication Data**
A catalogue record for this book is available from the British Library.

ISBN 13: 978-0-240-80757-7
ISBN 10: 0-240-80757-X

For information on all Focal Press publications
visit our website at www.books.elsevier.com

06 07 08 09 10 11 10 9 8 7 6 5 4 3 2 1

Printed in the United States of America

# INTRODUCTION

The purpose of this book is to provide telecommunications and digital media professionals with a collection of must-know terms and concepts that are likely to pop up in their daily conversations or appear in news articles or informational media that address our increasingly technological world. It is also intended for anyone who simply wants to know more of what makes today's technological world go around. The use of "essential" in the title is not accidental.

Although there are many high-quality books and web sites that provide an exhaustive collection of every technical term imaginable, this book aspires to whittle those tens of thousands down to a manageable and practical list of Internet, telephony, telecommunications, broadcasting, and computing terms that most professionals actually need to master—whether they are just getting started in a new field or are well established in their own area of expertise. And for those whose work responsibilities do not fit neatly into a "high-tech" category, many of the terms in this book are still important to know as large-scale digitization continues to shape almost every aspect of modern life.

The very first edition of *Tech Terms* was published by the National Association of Broadcasters in 1996, with a follow-up edition four years later. These earlier editions of *Tech Terms* focused primarily on terms related to the broadcasting and telecommunications industries, with the second edition incorporating some emerging computer and cyberspace terms. This current edition represents an almost complete reworking of the original material, with many less-useful terms eliminated. Almost all remaining terms were extensively revised, and an extensive list of new terms was added. All relevant entries are appropriately cross-referenced.

As I was preparing this latest edition for publication I was struck by how many terms and concepts from the previous edition (terms that seemed so central to the technological world of the late 1990s) had lost their relevance, many of them failing to materialize and many of them fading into obscurity. Although I cannot predict the near future any better than the next person, I have paid careful attention to the inclusion of terms and concepts likely to be just as relevant five years from now as they are today. It is true that the technological world continues to change at breakneck pace. However, it is also true that over the past 20 years there have emerged unquestionably foundational technologies, concepts, and practices that are likely to shape our lives for many years to come. Those are the focus of this book.

## How to Use This Book

Readers should note that each term has been assigned a "level" of 1, 2, or 3. This level indicator represents the degree to which a term or concept can be considered fundamental or foundational to a particular technological area or whether it describes a highly specialized or complicated concept.

Terms marked Level 1 represent those concepts and technologies that form the individual building blocks of an entire area of technological practice. Terms marked Level 2 require some fundamental knowledge of the relevant area but are not particularly specialized in nature.

Terms marked Level 3 characterize highly specific or broadly integrated concepts that commonly require some "Level 1" and "Level 2" knowledge to adequately understand. For example, understanding the nature of a browser (Level 1) is fundamental to understanding the concept of "client/server" (Level 2), which is in turn essential in understanding the idea of "ColdFusion" (Level 3).

Although the levels assigned to these terms are not written in stone, those who are new to technology in general or those who are new to a particular technological area might do well to focus first on the Level 1 terms and then, as those foundational blocks fall into place, build a broader understanding of the more complex terminology by exploring higher-level terms. I have attempted to describe and explain each essential tech term in plain language, and for many terms I have provided sample usages or pronunciations to clarify how they might be used in daily conversation.

My hope is that this collection of terms and concepts proves to be truly useful for those willing to spend a little time exploring ideas with which they are unfamiliar. I have no doubt that our world will become an ever-more technological place, and I have no doubt that a more thorough understanding of technology is absolutely essential for nearly all aspects of modern living.

## Acknowledgments

There were several contributors to the earlier editions of this book, and it is important here to note their important and extensive contributions to those previous editions: Arthur W. Allison, III, senior engineer at the National Association of Broadcasters; Marcia L. DeSonne, who worked as the Director of Technology Assessment for the National Association of Broadcasters; and Robert E. Yadon, professor of information and communication sciences at the Center for Information and Communication Sciences, Ball State University. Without their early efforts this collection would be much less complete and much less compelling. Special thanks must be given to Graham Jones, Director of Communications Engineering with the Science and Technology department at the National Association of Broadcasters, for his careful scrutiny of this current edition, his suggestions for changes and additions, and his brilliance in explaining complex concepts to non-engineers.

I would also like to thank the people at Focal Press (Elsevier); namely, Senior Publisher Joanne Tracy, Senior Acquisitions Editor Angelina Ward, Associate Editor Becky Golden-Harrell, and Assistant Editor Rachel Epstein. I am grateful for all of their hard work and careful guidance bringing this latest edition of *Tech Terms* to fruition.

# A

### AAC (Advanced Audio Coding)

Level: 2

*Definition:* A means of compressing digital audio signals that relies on "perceptual coding schemes" (the removal of data related to audio signals that are not perceptible by the human ear), AAC is widely regarded as a more efficient and effective means of audio compression compared to the long-used MP3 format. AAC provides improved audio quality at relatively low bit rates, and supports multichannel audio in that it provides up to 48 full-frequency channels. Because of its improved quality and its use with the increasingly popular iTunes online music service run by Apple, AAC has emerged as a significant challenger to MP3 and other audio compression formats. (See also ***Compression***, ***MPEG***, and ***MP3***.)

### AAF (Advanced Authoring Format)

Level: 3

*Definition:* Used for video editing projects, AAF is a widely used industry standard for saving and exchanging information related to video editing works in progress (such as transitions, edit history, and so on). AAF is used to improve compatibility among various vendor products and provides significant support for workflow management and archiving.

### A&B Signaling

Level: 2

*Definition:* In telephone T-1 line transmissions, some of the capacity of the line has to be dedicated to internal signaling (call setup). A&B signaling is the process of taking one digital bit of information at a constant interval from each of the 24 subchannels on the T-1 line in order to let the system know that an active call is still in place. (See also ***T-1***.)

### ABR (Available Bit Rate)

Level: 3

*Definition:* A Quality of Service class defined by the ATM Forum for ATM networks that is used for connections that do not require timing relationships between source and destination. ABR adjusts the amount of bandwidth based on the amount of traffic on the network. Traffic sources adjust their transmission rate in response to information they receive describing the status of the network and its capability to successfully deliver data. (See also ***CBR***, ***UBR***, and ***VBR***).

### A/B Roll

Level: 2

*Definition:* The practice of using two video sources simultaneously. An A/B roll in editing means mixing video footage from two separate tape machines onto a master copy. For example, when recording a video dissolve one piece of video is faded or dissolved into another picture.

### A/B Switch

Level: 1

*Definition:* A switching device enables a user to select a desired signal from two different sources. For example, in the past A/B switches were required to be available on television sets connected to cable systems allowing viewers to switch from an off-air television broadcast signal to cable (or vice versa).

*Used in a sentence:* "While I was editing my video I used the A/B switch to change my source signal from the VCR to the DVD player."

### AC (Alternating Current)

Level: 2

*Definition:* Alternating current (AC) is one of two fundamental types of electrical power (the other is direct current, or DC). Utility companies deliver 60 Hz AC to almost all users in the United States, and many other countries carry 120 volts of AC electricity. Alternating current must be converted to direct current for use with electronic devices. (See also ***DC***.)

### Accelerated Graphics Port (AGP)

Level: 2

*Definition:* Refers to an improved interface system for managing the hardware (called "graphics cards" or "graphics accelerators") in a personal computer, which in turn controls the processing of graphical information. AGP enables graphics accelerators to gain faster access to PC system memory (random access memory, or RAM). This faster access to RAM allows a graphics accelerator much more access memory capacity than is available locally on a PC's graphics card. For example, to display an image containing 20 MB of graphical "textures", an 8-MB AGP graphics card could quickly and easily access the PC system memory for the additional 12 MB required to display the image. AGP graphics have quickly become a standard for use with computer games, design programs, and other graphics-intensive computer applications. (See also ***Graphics Adapter*** and ***RAM***.)

### Acceptable Use Policy (See *AUP*.)

### Access Code

Level: 1

*Definition:* A short sequence of numbers, letters, and special characters that act as a password allowing a user to access a specific facility, service, feature, or function of a telecom network, computer system, or secure web site.

*Used in a sentence:* "To prevent unauthorized users from gaining access to this system, please do not give out your access code." (See also ***Password***.)

### Accessible Content

Level: 1

*Definition:* Usually refers to Internet-based content that has been designed to accommodate users with physical disabilities. Although there are no laws governing the accessibility of content for the general public, in 1998 the U.S. Congress amended Section 508 of the Rehabilitation Act of 1973 to include requirements for all federal agencies when they develop, procure, maintain, or use electronic and information technology. Federal agencies must give disabled employees and members of the public access to information that is comparable to the access available to others. Section 508 standards include guidelines for software applications and operating systems, web-based intranet and Internet information and systems, telecommunication products, video and multimedia products, and desktop and portable computing devices. For more information see *http://www.section508.gov*.

*Used in a sentence:* "Our group specifically designed accessible content so that people with disabilities could gain access to our online resources."

### Access Node

Level: 2

*Definition:* Point in the local telephone network where numerous access lines are consolidated into a smaller number of feeder lines. Typically, access lines are multiplexed onto digital loop carrier (DLC) systems supporting T1-rate transmission. Other examples of access nodes are cellular antenna sites, PBXs, and optical network units.

### Account

Level: 1

*Definition:* Refers to the granting of permissions and rights of use to someone on a multi-user computer system. An account usually includes a unique user name and a password that are both entered when a user wants to gain access to the computer system. Some computer systems designed or set up to be used by a single user assume that anyone using that particular machine is the original authorized user, and thus do not allow the creation of formal accounts. Now that PCs are commonly connected to an internal private network, users are often required to log in to their personal computers to gain access to other resources on the network, such as printers, fax machines, data archives, the Internet, and so on.

*Used in a sentence:* "I created a new account with our web hosting company so that we could set up a secure area to share documents with our clients." (See also ***Authentication***, ***Log-in***, and ***Password***.)

**ACD (See *Automatic Call Distributor*.)**

**Acrobat**
Level: 1
*Definition:* A platform developed by Adobe systems that uses a "portable document format" (PDF) for creating, delivering, and printing documents regardless of the computer system used to create or produce them. Acrobat preserves the "look" of the original document if that document is transferred over a network system. This attribute is unlike some other software programs in which document files may lose certain formatting during an electronic transfer. Due to its format preservation advantages, Acrobat is commonly used to distribute forms, manuals, spreadsheets, brochures, newsletters, magazines and many other types of highly formatted file content that are transmitted over the relatively narrowband Internet system. (See also ***PDF*** and ***Plug-in***.)

**AC-3 (Audio Codec 3)**
Level: 2
*Definition:* Also known as "Dolby digital," AC-3 is Dolby's third-generation coding algorithm for audio that is recorded digitally. Optimized for the capacities of human hearing, AC-3 is used for the standard audio track on the digital versatile disc (DVD), is the standard audio format for high-definition television (HDTV), and is being used for digital cable and satellite transmissions. This approach provides five full-bandwidth channels (front left, front right, center, surround left, and surround right), providing what is called "surround sound" quality. Using a comparatively small portion of bandwidth, it also includes a low-frequency effect (LFE) channel that provides the rumbling sound needed for special effects and action sequences in movies. This multichannel approach is known as 5.1 channel. (See also ***Dolby***.)

**ActionScript**
Level: 2
*Definition:* An object-oriented programming language designed specifically for Macromedia Flash applications. ActionScript makes it possible to create interactive web animations, Flash-based business applications, games, advertisements, and more. The ability to program in ActionScript is now one of the most sought-after skills in the content creation business.

*Used in a sentence:* "Our programmers used ActionScript to build an interactive form on the Web so that we can more easily capture customer information." (See also ***Flash***.)

**Active Directory**
Level: 3
*Definition:* Active Directory is part of the Windows network architecture that provides a directory service designed for distributed networking environments. Active Directory allows organizations to share and manage information about network resources and users and acts as the central authority for network security, letting the operating system readily verify a user's identity and control his or her access to resources on that network. (See also ***Windows***.)

**Active Matrix Display**
Level: 2
*Definition:* A type of liquid crystal display (LCD) where each display element (each pixel) includes an active component such as a transistor to maintain and refresh its appearance frequently. One of the most common types of active matrix display uses a technology called "thin film transistor" (TFT). In most cases, the terms *active matrix* and *TFT* are used interchangeably. (See also ***LCD***, ***Monitor***, and ***Pixel***.)

**Active Server Pages (ASP)**
Level: 2
*Definition:* Refers to a set of solutions created by Microsoft specifically for use by Internet web site providers. Similar to the Common Gateway Interface or ColdFusion, ASP software allows for complex interactions between the web pages that are viewable by users on a specific web site and other software tools a company or organization may make available for retrieval of specific information. For example, ASP is commonly being used to allow a web user to search certain

company databases that are made available via the company's own web site. If a user is interested in the retail pricing information of a particular product or service offered by the company, ASP would enable the web user to fill out a pre-set form on the web site to request this information. After submitting the request form, ASP acts to retrieve the information from the database containing this current pricing information. The final step enacted by ASP is to load the desired information back onto a web page for viewing by the user. ASP is also used to enable web users to add their own information to an existing database for use by a web site provider. An example here may be when a user signs up to receive an electronic newsletter or receive weekly news updates from a brokerage house. A user provides a set of information by filling in a pre-set web form and submitting the information (e.g., name, e-mail address, and so on) for storage on a particular web site's database. (See also ***ColdFusion***, ***Common Gateway Interface***, ***E-commerce***, ***.NET***, and ***Web Server***.)

### Active Video Lines

Level: 2

*Definition:* The number of video picture scan lines actually being used for the purpose of picture generation in television broadcast transmissions. Active lines are the total number of scanning lines minus those lines devoted to the vertical blanking interval (VBI). In the standard analog NTSC television system, 525 scan lines are available for television picture transmission. However, traditional broadcast television stations only use about 484 of these lines for the visible picture. Most traditional television sets cannot reproduce this number of video lines. The remaining scanning lines making up the VBI are used for a variety of internal signaling, text, closed captioning, data transmission, or other station or network purposes. (See also ***HDTV***, ***NTSC***, ***Scan Line***, and ***VBI***.)

### ActiveX

Level: 2

*Definition:* A set of software programs developed by Microsoft that are designed to provide interactive control of content files transmitted over electronic communication networks, especially the Internet. Similar in concept to Java (developed by Sun Microsystems), ActiveX delivers small "applet"-sized programs that can be embedded in a web page to produce multimedia effects, enhanced page layout, or add other interactive features users may choose to activate on demand. Because of recent fears about computer security, current versions of the Windows XP operating system make it possible to block ActiveX content. (See also ***Applet*** and ***Java***.)

### ACU (Automatic Calling Unit)

Level: 2

*Definition:* A device that can be programmed to automatically place telephone calls via computer interface, eliminating the need for human action to place the calls.

### A/D (Analog-to-Digital) Conversion

Level: 1

*Definition:* The process of converting or transferring a signal from analog to digital. Analog and digital are two different ways of sending voice, data, or video signals. To convert a signal from its natural analog state (continuous and linear) to digital, the signal must first go through a filter. The filter makes sure that no frequencies are out of the digital sampling range. In the conversion process, analog signals are measured many times in a process called sampling. Each sample of the analog signal is then converted to a discrete digital number based on its approximate amplitude at the instant it is measured.

*Used in a sentence:* "We had to put all of our old source video through an A/D conversion before we could distribute it over the Internet." (See Figure A–1 and also ***Sampling***.)

### Adapter Card

Level: 1

*Definition:* A printed circuit board that can be installed in a personal or desktop computer to provide connectivity to an input/output (I/O) device such as an enhanced graphics card or a network card. Adapter cards are connected to the

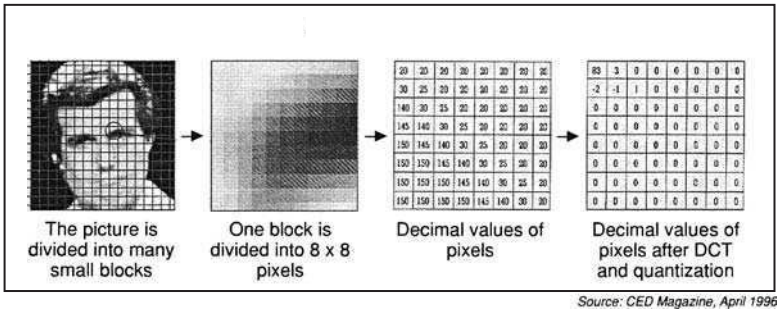


**FIGURE A–1.** Analog-to-digital conversion.

basic PC "bus," which in turn is connected to the CPU.

*Used in a sentence:* "I had to install a new adapter card in my computer so that I could run two monitors at the same time." (See also ***Bus***, ***CPU***, and ***I/O***.)

### Adaptive Discrete Cosine Transform (See *ADCT*.)

### Adaptive Routing

Level: 2

*Definition:* A digital data routing technique using computer software to automatically select the most efficient route for the transmission of traffic. This technique allows for faster data transfers, as it reduces bottlenecks and heavy congestion points in a network. (See also ***Router***.)

### ADC (Analog-To-Digital Converter)

Level: 2

*Definition:* An electronic device that converts analog signals to digital data bit streams, enabling the signal data to be further manipulated, encoded, and transmitted over digital circuits. (See also ***A/D***.)

### ADCT (Adaptive Discrete Cosine Transform) (See *DCT*.)

### Address

Level: 1

*Definition:* The location of a person or node in a computer network from which information is being sent or transferred to. A typical computer network, whether small or large, has multiple nodes connected to it, such as user workstations, system routers, switches, and hub points. Access to an individual node is dependent on the system being able to recognize a specific destination on the network. This applies to in-house local area networks (LANs) or wide area networks (WANs), such as the Internet. Routing information, such as electronic mail, becomes more complex over the Internet because it is actually a network of networks. To send information, a common addressing scheme is needed (or some ability to convert addresses from one network to another) so that each node has a unique address and the system can recognize where to send information packets.

*Used in a sentence:* "We needed to determine the network address of the printer so that everyone in the workgroup could use it." (See also ***IP***, ***Network***, and ***TCP/IP***.)

### Addressability

Level: 2

*Definition:* Refers to the technical capability of a communication system for controlling the delivery of programs or other services to select subsets of subscribers on the system. In the cable industry, addressable control allows a cable operator to remotely activate, disconnect, or unscramble a specific channel or service received by a subscriber from the cable head end. Upon notification from a subscriber via an upstream activation channel, the cable system acknowledges the subscriber's address and resets the signaling scheme in the subscriber's set-top box—temporarily enabling the subscriber's box to

unscramble the desired pay TV, PPV, or VOD program signal and thus allowing the subscriber to view the program. (See also ***Address***, ***Encryption***, ***PPV***, and ***VOD***.)

### Adjacent Channel Interference

Level: 2

*Definition:* Disruptions in a signal channel caused by power leaking from an adjacent channel. Common causes of adjacent channel interference are poor frequency planning, insufficient filtering, use of incorrect power, or anomalies in propagation. (See also ***Interference*** and ***Propagation***.)

### ADS (See *Alternative Data Stream.*)

### ADSL (Asymmetrical Digital Subscriber Line)

Level: 2

*Definition:* A form of digital subscriber line in which the bandwidth available for downstream connection is significantly larger than for upstream. Although designed to minimize the effect of cross-talk between the upstream and downstream channels, ADSL is well suited for web browsing, client-server applications, and providing a voice channel. The data rate of ADSL depends on the length and quality of the line connecting an end user to the telephone company's central office. The upstream data flow is usually between 90 and 640 kilobits per second, whereas the downstream data flow is between 144 k and 8 megabits per second. (See also ***Cable Broadband*** and ***DSL***.)

### Advanced Audio Coding (See *AAC.*)

### Advanced Authoring Format (See *AAF.*)

### Advanced Encryption Standard

Level: 2

*Definition:* An encryption algorithm used to scramble digital data, AES (also known as Rijndael) was adopted by the U.S. government in 2000 after a three year selection process, which was started in September of 1997 by the National Institute of Standards and Technology (NIST). Also known as a "cipher," Rijndael was developed by two Belgian cryptographers, Joan Daemen and Vincent Rijmen. AES displaced DES (Digital Encryption Standard) as the official encryption platform for the U.S. government.

*Used in a sentence:* "Our new security technologies take advantage of the power of the new AES standard, making them more secure than ever before." (See also ***DES***, ***Encryption***, and ***Privacy***.)

### Advanced Intelligent Network (See *AIN.*)

### Advanced Research Projects Agency Network (See *ARPANet.*)

### Advanced Television Systems Committee (ATSC) Standard (See *ATSC Standard.*)

### AES (See *Advanced Encryption Standard.*)

### Afterburner

Level: 2

*Definition:* A device that converts high-definition video to standard-definition video. (See also ***Downconverter*** and ***HDTV***.)

### Agent

Level: 2

*Definition:* Refers to a computer program designed to perform information gathering or other computing task in an automated way. It is becoming popular to use agents to perform complex Internet searches, do online shopping, or help plan a trip—all with minimal interaction required by the user.

*Used in a sentence:* "Our software developers want to develop a software agent that assists customers with their online purchase decisions." (See also ***AI***, ***Bot***, ***Expert system***, and ***Intelligent Agent***.)

### AGP (See *Accelerated Graphics Port.*)

### AHRA (Audio Home Recording Act) of 1992

Level: 1

*Definition:* An amendment to the U.S. Federal Copyright Act of 1976 that requires manufacturers

or importers of digital audio recorders (including DAT, DCC, and MiniDisc recorders) and blank media to make royalty payments. This legislation exempts consumers from lawsuits for copyright violations when they record music for private, noncommercial use. It mandates the inclusion of serial copying management technology in all consumer digital audio recorders to make serial duplication difficult. The AHRA stipulates that manufacturers (not consumers) of covered devices must: (1) register with the Copyright Office, (2) pay a statutory royalty on each device and piece of media sold, and (3) implement serial copyright management technology that prevents the duplication of copies. If these guidelines are followed, the manufacturers of such devices receive statutory immunity from infringement litigation based on the use of those devices by consumers.

### AI (Artificial Intelligence)

Level: 2

*Definition:* Refers to a growing number of high-level software programming systems that strive to enable computers to emulate human-like decision-making functions. Many researchers consider the abilities of learning, reasoning, and decision making essential aspects of artificial intelligence. Today, AI applications are most commonly employed in computer systems to process and integrate vast amounts of information well enough to come to decisions without defined responses being specifically written into software code, such as with expert systems, natural language understanding, speech recognition applications, vision systems, and robotics. (See also ***Agent***, ***Bot***, ***Expert System***, ***Video Games***, and ***Intelligent Agent***.)

### AIFF (Audio Interchange File Format)

Level: 2

*Definition:* A format developed by Apple for storing high-quality audio and musical instrument information in digital form. The format is also used by Silicon Graphics workstations for working on audio and musical files. AIFF does not support data compression, so AIFF files tend to be comparatively large. However, there is a compressed version of this format—AIIF-Compressed (AIFF-C or AIFC)—that supports compression ratios as high as 6:1. (See also ***Compression*** and ***Digital Audio***.)

### AIN (Advanced Intelligent Network)

Level: 3

*Definition:* A telephone network architecture that separates service logic from switching equipment, making it possible to add new services without having to redesign switches to support those new services. AIN technology encourages competition among service providers because it makes it easier for a provider to add services (also giving consumers more service choices). AIN is recognized as an industry standard in North America. (See also ***Switch***.)

### AJAX (Asynchronous JavaScript and XML)

Level: 3

*Definition:* An increasingly popular web application development technique that uses advances in client and server software technologies to create more flexible, better-performing applications. AJAX applications look and function as if they are operating directly on the user's machine rather than through a complex interaction between the user's machine and a remote server. AJAX uses a combination of HTML (or XHTML) and CSS for presenting information; the Document Object Model (DOM), manipulated through JavaScript, to dynamically display and interact with the information presented; and the XMLHttpRequest object to exchange data asynchronously with the web server. AJAX achieves its responsiveness by processing locally any response to a user action that does not require action by the server (e.g., simple data validation, some forms of navigation, and so on). If the application needs something from the server in order to respond to a user action (such as submitting data for processing, loading additional interface code, or retrieving new data), the AJAX application makes those requests asynchronously (typically using XML), without interrupting the user's interaction with the application. AJAX is increasingly used for content aggregation, chat, e-mail and instant messaging applications,

games, map tools, office productivity (including word processing and calendaring), and much more. The use of AJAX applications requires users to have JavaScript-capable browsers (with JavaScript turned "on"). (See also ***Asynchronous***, ***CSS***, ***DOM***, ***Javascript***, and ***XML***.)

### Algorithm

Level: 1

*Definition:* In general terms, an algorithm is a procedure or formula for solving a problem. Examples include the set of calculations used to encrypt digital communications or the process used to compress digital files. Algorithms play an important part in almost all computer software applications.

*Used in a sentence:* "The new compression algorithm did a much better job of maintaining the integrity of the original signal, while reducing the size of the file at the same time." (See also ***Compression*** and ***Encryption***.)

### Alias

Level: 1

*Definition:* A false name, moniker, or invented set of alphanumeric characters created by a computer user as a personal identifier code, or ID. Aliases are usually short and easy to remember, as well as quickly keyed in as text, to gain access to a computer or online system. An alias acts as a substitute for a person's real name, or in some cases it acts as a substitute for a string of characters that is relatively long and/or difficult to remember. Aliases are commonly used in online chat sessions to establish a fictitious identity, or as a shorthand code name for posting comments on Internet message boards.

*Used in a sentence:* "I had to set up an alias on the bulletin board system because I didn't want anyone at work to know the postings came from me." (See also ***Chat***, ***Computer-mediated Communication***, ***Forum***, ***Newsgroup***, and ***Usenet***.)

### Aliasing

Level: 2

*Definition:* A technical condition in which undesirable effects are produced during the digital conversion process due to the sampling rate or the resolution being too low to faithfully reproduce image detail. This occurs when original data or information changes more quickly or shifts more radically than can be captured accurately by the digital sampling process. This results in the incomplete or false reconstruction of the text, picture, or graphical material. For example, in the case of video, jagged edges show up at boundaries during major changes in a video frame, such as shifting from picture data to text. Normally, these jagged edges are technically smoothed out in a second process, called antialiasing, to enhance viewing. (See Figure A–2 and see also ***Antialiasing***.)

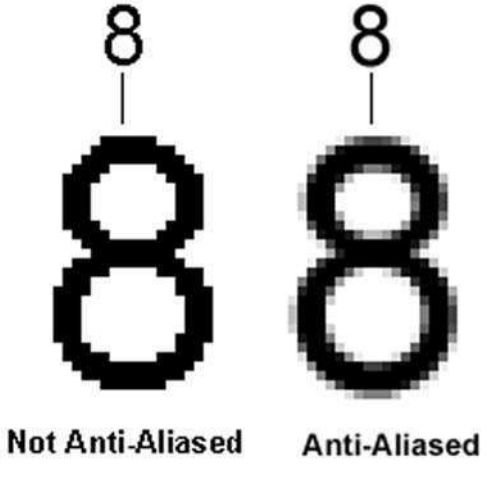


**FIGURE A–2.** Aliasing.

### ALICE (Artificial Linguistic Computer Entity)

Level: 2

*Definition:* A natural language, open source, easy-to-program chatbot that uses AIML (Artifical Intelligence Mark-up Language) to allow Internet users to interact with basic artificial intelligence software. Developed by Dr. Richard S. Wallace starting in 1995, the now world-famous ALICE program won the Loebner Prize for "most human computer" in 2000, 2001, and again in 2004. (See also ***AI*** and ***Bot***.)

### Aloha

Level: 3

*Definition:* The first multiple access network, launched in 1971 in Hawaii, "pure" Aloha is a packet protocol for satellite and terrestrial radio transmissions via which users can transmit at any time. However, they risk collisions with other users' messages. "Slotted Aloha" reduces the chance of collisions by dividing the channel into time slots and requiring that the user send only at the beginning of a time slot. Aloha was the inspiration for Ethernet. (See also ***Ethernet*** and ***Packet***.)

### Alpha Channel

Level: 2

*Definition:* In many image editing and rendering software programs, each pixel in an image is described by "channels" of data that define the mixture of the red, green, and blue (RGB) colors making up that particular pixel. Newer-generation software adds an "alpha" channel that defines the amount of transparency in the pixel. Transparency is achieved through "masking" the other channels so that the colors show through in varying intensity. If a mask is fully transparent, the color of the other channels will display with full intensity. If the mask is set to 50% transparency, only half the color intensity will show through. If the mask is completely opaque, the color information from the other channels will not appear at all.

*Used in a sentence:* "I adjusted the alpha channel transparency to make the image background and the company logo look smoothly blended."

### Alphanumeric

Level: 1

*Definition:* Refers to written text using a set of characters that may contain combinations of alphabetic letters and numbers (0 to 9). For example, in a database application the place for entering user addresses would be designated as an alphanumeric field containing both house and/or apartment number (numeric) and street name (alphabetic).

*Used in a sentence:* "Our system administrators want us to use a combination of letters and numbers in our passwords because alphanumeric combinations make it much more difficult for hackers to break into our computer systems." (See also ***ASCII*** and ***Unicode***.)

### Alternate Routing

Level: 2

*Definition:* A feature used with telephone long-distance or Intra-LATA (local access and transport area) calling allowing the phone system to transmit calls over various network circuit lines in response to congestion and delays encountered on the primary circuit route. (See also ***Intra-LATA***.)

### Alternating Current (See *AC*.)

### Alternative Data Stream (ADS)

Level: 3

*Definition:* Originally designed to make it possible for Microsoft's NTFS capable of acting as a file server for Macintosh clients, alternate data streams can provide hackers with a method of hiding hacker tools on a system they have breached. This allows the hacker to store and execute the files without being detected by the system's administrator. Although there are legitimate uses of ADS, such as storing information about files, most anti-virus programs that scan for ADS have trouble distinguishing innocuous ones from insidious ones.

*Used in a sentence:* "Some software will help you track alternative data stream activity so that you can keep an eye on your computer's security." (See also ***Hacker*** and ***Spyware***.)

### Alt Key

Level: 1

*Definition:* Refers to the alternate key on a personal computer keyboard that functions like a second *Ctrl* key and makes commands available while the user holds down the *Alt* key and presses another key. For example, in all Windows applications holding down the *Alt* key and pressing the *F* key drops down the File menu. On a Macintosh computer, the equivalent key is known as the *Option* key.

*Used in a sentence:* "The instructions say to hold down the Alt key and then press F to bring up the File menu." (See also ***Control (Ctrl) key***.)

### AM (Amplitude Modulation)

Level: 2

*Definition:* AM is a form of modulation in which the amplitude of a carrier wave is altered in direct proportion to that of a modulating signal. Other forms of modulation include "frequency modulation" (FM) and "phase modulation" (in which the phase is varied). AM is commonly used at radio frequencies and was the first method used to broadcast commercial radio. The term *AM* is sometimes used generically to refer to the AM broadcast (mediumwave) band. (See also ***FM***.)

### AM Expanded Band

Level: 2

*Definition:* In a decision by the Federal Communications Commission, the FCC expanded the official allocation for AM radio licenses by opening up 10 new frequencies in the upper part of the AM band (1610 kHz to 1700 kHz). The ruling was to reduce troublesome interference to existing AM radio stations. In a March, 1996 decision, 86 AM stations were designated to migrate to the so-called expanded portion of the AM band. Each of the new AM expanded band licensees are authorized to operate with 10 kW of daytime and 1 kW of nighttime power.

### AMAX

Level: 2

*Definition:* A certification mark placed on AM radios that meet specific high-quality standards established by the National Radio Systems Committee (NRSC). These standards were formulated to increase the reception quality of AM radio. In order to carry the AMAX certification mark, an AM radio must have an audio bandwidth of 50 to 7500 Hz, manual or automatic bandwidth control, and expanded AM band capability (1605 to 1705 kHz). Additionally, if the radio is AM stereo, the certification mark becomes AMAX stereo.

### Ambient Noise

Level: 1

*Definition:* In a general sense, ambient noise is background noise associated with a given environment. Examples of ambient noise sources include the wind, humming fluorescent lights, power transformers, electrical appliances, and other equipment noises. Each of these natural or man-made sources produces some movement that displaces air causing variations in acoustic pressure and thus contributing a small amount of sound that makes up so-called background noise. When noise sources are too distant or weak to be isolated, they are considered ambient noise.

*Used in a sentence:* "I couldn't transcribe the tape because there was too much ambient noise for the recorded dialogue to be audible." (See also ***Interference***.)

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

### Ampere

Level:2

*Definition:* The measurement of electrical current in a circuit, usually abbreviated as amps.

### Amplifier

Level: 1

*Definition:* An electronic device for enhancing or amplifying the power of a signal. For example, as signals are transmitted through a wire-line network (such as telephone twisted-pair copper lines or coaxial cables, or even fiber optic lines), a certain amount of loss in signal power occurs. An amplifier is used to boost the signal power to make up for the loss and thus regenerate the signal. There is a limit as to how many amplifiers can be used in a cascade, as amplifiers are not capable of restoring seriously degenerated signals.

*Used in a sentence:* "The system engineers needed to use an amplifier to boost the signal."

### Amplitude Modulation (See *AM*.)

### Amplitude Shift Keying (ASK)

Level: 3

*Definition:* A simple form of signal modulation in which a carrier frequency is switched on or off to represent the presence or absence of a signal. ASK is useful only in simplified transmissions going in a single direction (simplex mode), or at least in one single direction at a time (half-duplex).

Other forms of shift key technologies are much more prevalent (phase-shift keying) because signals are often divided into many channels and multiplexed using multiple frequencies. (See also ***FDMA*** and ***PSK***.)

### Analog

Level: 1

*Definition:* In terms of electronics, analog is a traditional electronic process in which information such as audio and video signals is represented as a continuous electronic wave. Using time-variant electrical characteristics in combination with specified electromagnetic spectrum frequencies can represent the physical world of sight and sound. Analog signals have typically been used for transmitting voice and video communications (e.g., telephone voice calls, television video, and radio/TV audio signals).

*Used in a sentence:* "The analog video source had to be converted to digital before we could compress it and send it over the network."

### Analog-to-Digital (See *A/D*.)

### Analog-to-Digital Converter (See *ADC*.)

### Anamorphic DVD (Anamorphic Digital Video Device)

Level: 2

*Definition:* Anamorphic DVD is a relatively efficient way of bringing more lines of resolution for those watching a DVD on widescreen televisions or computer monitors. The wider film picture fits better in the wider display and less space goes unused (in the black bars on the top and bottom). When a widescreen movie is shown on a traditional television (with 4:3 aspect ratio), 346 scan lines (horizontal lines drawn on the screen) are used for the picture, and the remaining 184 are filled in with black on the top and bottom of the screen. But when an anamorphic widescreen image is shown on a widescreen television (16:9 aspect ratio), 461 scan lines are used for the film and only 19 are thrown away in the black bars, making for a sharper, more detailed picture that fits almost perfectly in the available screen. Because most people still have standard 4:3 televisions, it would not be financially viable for DVD manufacturers to have to ship different versions for different TV sets. For display on an ordinary 4:3 television, the anamorphic image must be reduced from the top and bottom by reducing every four lines in the picture to three and adding extra black space to the top and bottom. If the image is shown on a 4:3 TV without being reduced, it appears horizontally squished, making everything look taller and skinnier. This can occur when people have their DVD players inadvertently set to 16:9 mode instead of 4:3 mode. (See also ***DVD*** and ***HDTV***.)

### ANI (Automatic Number Identification)

Level: 2

*Definition:* In video applications, ANI refers to a type of pay-per-view (PPV) or near video-on-demand ordering system through which a cable customer calls into an interface computer located at the phone company to order specific PPV programming. Callers are automatically identified by telephone number, thus allowing the local cable system to authorize subscriber access to the programming event and initiate billing. The same or similar type of ANI operations may be used by the telephone companies themselves now that they are also getting into the video delivery business. (See also ***PPV*** and ***VOD***.)

### Animated GIF (Graphics Image Format) File

Level: 1

*Definition:* A type of graphical image file typically seen on web pages that appear to be animated. The GIF file format allows for multiple frames of an image to be created and then cycled through, thus creating the animation effect. Animated GIFs are popular on the Web because the files are usually small and can be downloaded quickly.

*Used in a sentence:* "The advertising agency wanted to use an animated GIF on the client's web site to make it look like smoke was coming out of the house's chimney." (See also ***Bitmap Graphics*** and ***GIF***.)

### Anonymous FTP (Anonymous File Transfer Protocol)

Level: 2

*Definition:* A generic password system to enable Internet users to access and download certain

data files or programs that have been made available to the public. By setting up an anonymous FTP site, users can log in to an area using the password "anonymous" or "guest" instead of their own name and download whatever files are available. (See also ***FTP***.)

### Anonymous Remailer

Level: 2

*Definition:* An Internet service that allows users to send e-mail or to post messages to a discussion group while remaining personally anonymous. This is accomplished by stripping all identifying information from the message and forwarding the message to its destination. For example, if users want to send anonymous e-mail messages that are not traceable back to them, they would access an anonymous remailer web site, type in the e-mail address of their intended recipient, and compose the message. When they click on Submit or Send the anonymous remailer packages the e-mail address and the message together and sends them to the destination, leaving out any identifying information about who sent the message and from where it was sent. (See also ***Computer-mediated Communication***, ***E-mail***, ***Newsgroup***, and ***Usenet***.)

### Antenna Farm

Level: 2

*Definition:* A centralized location for installing multiple satellite or broadcast antennas. In congested areas where satellite links as well as other communications connections are needed (e.g., microwave links), a centralized location is established. The location is usually isolated as much as possible to enhance signal receptivity, allow for easy maintenance and troubleshooting, and provide clear paths for transmission and reception. (See also ***Teleport***.)

### Antenna Gain

Level: 2

*Definition:* Expressed in decibels, gain is a ratio of the amount of power required at the input of a theoretical loss-free reference antenna and the actual amount of power required for a signal to have the same field strength at a specific distance in a specific direction.

### Antialiasing

Level: 1

*Definition:* A technical process to smooth out distortions or aliasing effects created during the process of converting images to digital form. A picture on a computer screen is divided into a large number of very small blocks or squares called picture elements (pixels). With quick changes in color, brightness, or motion from one pixel to the next, the rate of the digital sampling process is not sufficient to capture these changes. Aliasing effects result because the pixels at the point of a major color change can be erroneously assigned alternating adjacent colors. Normally, these effects show up as jagged edges and are smoothed out using an antialiasing technique such as making the cutting-edge pixels gray in color to lessen the jagged appearance, or by making them a color that is an average of nearby pixels.

*Used in a sentence:* "Our graphic designer used antialiasing on the main title graphic to give the words and letters a more professional, typeset look." (See also ***Aliasing*** and ***Pixel***.)

### Anti-virus Software

Level: 1

*Definition:* Software used to screen out, detect, and eradicate intentionally malicious computer programs known as viruses. Viruses are typically spread to home computers and the computer network systems of businesses and organizations through use of "infected" external memory devices, from corrupted files downloaded from the Internet, and/or hidden in attachments to electronic mail messages. By running an anti-virus program on a computer, the software constantly checks all new files for infections and warns the user if any suspicious files have been detected. All anti-virus programs must be updated regularly in order to include information on the thousands of new computer viruses written and distributed each year. Some vendors are now bundling anti-virus capabilities with personal firewalls, anti-spyware software, and privacy protection.

*Used in a sentence:* "Be sure to update your anti-virus software so that your computer is not vulnerable to the latest computer viruses." (See also ***Firewall***, ***Spyware***, and ***Virus***.)

### Apache Web Server

Level: 2

*Definition:* Apache Web server was created in 1995 by a group of computer programmers called the Apache Group. The founder of the Apache Group, Brian Behlendorf, was chief engineer for *HotWired* Internet magazine in 1994 and wanted to create a database of the magazine's readers. The system he and his fellow programmers developed is now one of the most widely used web server platforms in the world. The program was developed and is maintained by a loose coalition of programmers and is available free of charge. (See also ***Open Source***, ***UNIX***, and ***Web Server***.)

### APD (Avalanche Photodiode)

Level: 3

*Definition:* A light-wave fiber optic detector device that causes photons to cascade or avalanche thus generating a light-wave output significantly stronger than the original incoming signal. APDs are used in fiber optic networks to strengthen or amplify the laser light-waves carrying communications signals over long distances. (See also ***Fiber Optic***.)

### API (Application Program Interface)

Level: 3

*Definition:* A series of software routines and development tools that are intended to enable interaction between a computer application and lower-level services and functions, such as the operating system, device drivers, and so on. Essentially, APIs are building blocks that programmers can use to put together software applications.

### APIPA (Automatic Private IP Addressing)

Level: 3

*Definition:* Allows a computer to obtain a temporary Internet protocol address (which is necessary to connect to other computers) when the DHCP server that usually performs that task is unavailable. When a DHCP server fails, APIPA allocates addresses in the private range 169.254.0.1 to 169.254.255.254. When the DHCP server is back online, the client computers update their addresses automatically. APIPA is a feature generally only useful on home or other small intranet LANs. (See also ***Address***.)

### Apogee

Level: 2

*Definition:* The point in the elliptical orbit of a celestial body (e.g., planet or moon) or a man-launched satellite that is farthest from the gravitational center (e.g., star/sun or planet) around which it is orbiting. (See also ***Elliptical Orbit*** and ***Perigee***.)

### Apple

Level: 1

*Definition:* Founded in 1976 by Steve Jobs, Steve Wozniak, and Ronald Wayne, Apple was the driving force behind the creation of the personal computer market. The Apple II was released in 1977, several years before IBM's PC, and millions were sold well into the 1980s. Apple's product line includes Power Macs, PowerBooks, iMacs, iBooks, and the popular hard drive-based MP3 player, the iPod. Apple also develops a wide range of important software programs, including iTunes, iPhoto, iMovie, and iDVD. Even though its share of the personal computer market continues to hover around only 10%, Apple continues to drive innovation in the digital media industries with its innovative ideas and loyal customer following. (See also ***Digital Media***, ***iPod***, ***MP3***, and ***PC***.)

### Applet

Level: 3

*Definition:* A term that refers to a relatively small, compact computer software application. Applets were originally Java-based computer programs that could be easily distributed over the Internet or other computer networks. This easy distribution is due to their relatively compact size and ability to be executed (opened) by a computer user regardless of the basic operating system on the computer. Other software developers are now

producing applets, such as Microsoft's ActiveX products. Applets are commonly used in designing web pages to produce multimedia effects, enhance web page interactivity, or to deliver customized functions such as calendars, calculators, or simple games. Unlike full-blown Java applications, applets are not allowed to access files and serial devices (such as modems, printers, and so on) on the local computer, and they are prohibited from communicating directly with other computers across a network. (See also ***ActiveX*** and ***Java***.)

### Appletalk

Level: 2

*Definition:* A local area network protocol that is built into all Apple Macintosh computers and printers. Developed in the early 1980s, Appletalk is one of the early implementations of a distributed client/server networking system. (See also ***Client/Server***.)

### Application

Level: 1

*Definition:* In most general terms, an application is any computer program. Applications are sometimes distinguished by the environment in which they are designed to run. For example, Windows applications have a file extension of *.exe* to indicate that they are "executable" files.

*Used in a sentence:* "Our programmers had to develop a new application to automate the handling of client inquiries about our new rebate offer."

### Application Layer

Level: 3

*Definition:* The seventh and highest layer of the Open Systems Interconnection (OSI) data communications model. (See also ***OSI***.)

### Application Program Interface (See *API*.)

### Application Server

Level: 2

*Definition:* The server component of a three-tier system that in addition to running the application logic runs the services that access databases or other resources. The services are initiated by client computers or by services running on other servers. Platforms such as ColdFusion, Oracle, Java 2 Enterprise Edition (J2EE), and many others use an application server architecture to orchestrate complex transaction-based processes such as online travel reservation services and online banking. Because application servers are usually critical to the mission of a business or organization, they often have built-in redundancy and run on high-performance machines that can handle many simultaneous processes and support complex database access.

*Used in a sentence:* "When I clicked on Submit on the online web form, the application server tried to process the request but returned an error message." (See also ***ASP***, ***ColdFusion***, ***PHP***, and ***Tomcat.***)

### Application Service Provider

Level: 2

*Definition:* ASPs have emerged because some business customers are finding it more economical to lease or rent a specific computer program for a period of time rather than purchase an entire suite of software applications "off the shelf." Under the ASP model, customers usually contract to have the software they need hosted on an ASP's computer. A customer then pays a monthly fee to access that particular software through a web browser. In most cases, client companies pay for the software lease license up front and also agree to a multi-year maintenance contract to avoid having to contend with software upgrades or technical problems on their own computer systems.

### Application Sharing

Level: 2

*Definition:* Refers to the feature of many videoconferencing systems that makes it possible for conference participants to simultaneously run the same application and see the activities on their own screens, all at the same time. For example, any given participant in a videoconference could start up a spreadsheet program and open a financial report that would be seen directly by all of

those participating in the conference. (See also ***Videoconferencing*** and ***Whiteboard***.)

### Application-Specific Integrated Circuit (See *ASIC*.)

### Archive

Level: 2

*Definition:* In the computer world, archiving refers to the process of copying files for long-term storage or backup purposes. The archiving of digital files raises many important concerns. Companies and organizations that maintain digital archives must decide how long they are going to maintain the archive, how they are going to protect the information contained in the archive from hackers or catastrophic system failures, and how they are going access and use the archive in their day-to-day operation. Archiving is also used in the broadcast world to describe the storage of audio and video assets. (See also ***Data Mining***, ***Data Vaulting***, ***Data Warehousing***, and ***Incremental Backup***.)

### ARPANet (Advanced Research Projects Agency Network)

Level: 2

*Definition:* An acronym for the Advanced Research Projects Agency Network, which became the nucleus for the far-flung network of networks that is now the Internet. This network was developed in the 1960s and 1970s by the U.S. Department of Defense as an experimental wide area network connecting computer networks at research labs at universities across the country. Security requirements for the network led to the development of a robust, decentralized, redundant network capable of functioning in a catastrophic environment. ARPANet, merged with advancing technology, evolved into the Internet and the Web. (See also ***Internet***.)

### Array

Level: 2

*Definition:* An organized arrangement of multiple items, devices, factors, and so on. An array might consist of digital bits, numbers, antennas (such as on a broadcast tower), solar panels on a satellite, fibers in an optical fiber cable, or even a chessboard, which depicts a square array. In computer programming terms, an array is a collection of data items, all of the same type, in which each item's position is uniquely designated by an integer so that it can be called to or referred to in an algorithmic process. (See also ***Algorithm***.)

### Artifact

Level: 2

*Definition:* In the video realm, an artifact is an undesired visual distortion caused by noise (which produces "snow" in analog systems or "hits" in a digital system).

### Artificial Intelligence (See *AI*.)

### Artificial Linguistic Computer Entity (See *ALICE*.)

### ASCII (*American Standard Code for Information Interchange*)

Level: 2

*Definition:* ASCII is considered a world-wide standard method of representing the uppercase and lowercase Latin letters, numbers, punctuation, and so on used by computers. In other words, ASCII is a type of "universal language" in the computer world. ASCII can be used to bridge incompatibilities among various software and computer operating languages. Because ASCII is the most common coding technique defining each of 256 possible characters in one byte, it is used for transferring text files on the Internet. (See also ***Plain Text*** and ***Unicode***.)

### ASIC (*Application-Specific Integrated Circuit*)

Level: 3

*Definition:* A custom-designed microchip intended to perform a very specific purpose. Recent industry development of ASICs has focused on microchip design to perform very specific tasks in order to speed up information processing without having to pay for capabilities that are not really needed in a particular system. For example, a computer microprocessor is a type of ASIC. Using specially designed ASICs

as components in some electronic devices can improve performance, reduce power consumption, increase safety, and reduce costs.

**ASP (See *Active Server Pages.*)**

**Aspect Ratio**
Level: 1
*Definition:* Refers to the basic ratio of the width of a rectangular object, such as a display screen, to the height. As such, the aspect ratio represents the proportional difference between width and height and is becoming commonly used in reference to television sets, TV or computer monitors, and various other video displays such as on laptops, handheld PDAs, and so on. The aspect ratio of a standard NTSC television video screen is actually 12:9, but when reduced to its lowest common denominator form it becomes 4:3. Video systems such as those for digital high-definition television systems have a wider display aspect ratio of 16:9, which is much closer to those used for traditional 35-mm theatrical films in theaters.

*Used in a sentence:* "I really like the new 16:9 aspect ratio of HDTV because the wider screen allows me to see much more of the action during the football game." (See Figure A–3 and see also ***HDTV*** and ***NTSC***.)

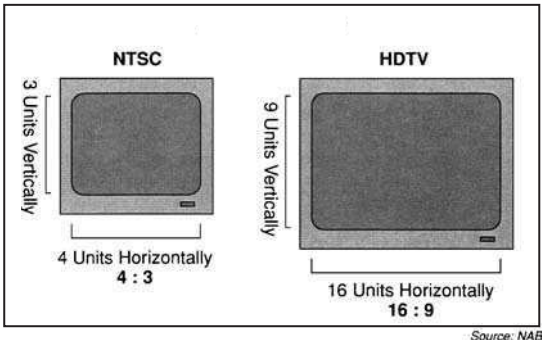


**FIGURE A–3.** Aspect Ratio.

**Asymmetrical**
Level: 2
*Definition:* In most general terms, asymmetrical means not symmetrical or not having equal proportions. In communications systems it is used to refer to systems where information channels or transmission paths are not of equal size or capacity. For example, the downstream flow of information, data, or video signal requires a much larger "pipeline" in terms of bandwidth than for upstream return-signaling requirements. In some telecom networks, heavy traffic patterns are compensated by gatekeeping mechanisms dependent on timing such as letting a channel or line with the most traffic pass data for longer periods than another smaller traffic channel. In an asymmetrical ATM network, some lines, channels, or data are prioritized to be delivered before others. (See also ***ADSL***, ***Asymmetrical Compression***, and ***ATM***.)

**Asymmetrical Compression**
Level: 2
*Definition:* A digital signal compression technique in which the compression and decompression processes intentionally are not the same. Compression requires more processing power than decompression, and thus asymmetrical compression is often used in creating CD-ROMs, for which a longer period of time may be taken to produce the compressed data but the decompression mode must occur in real time. This type of technique was prevalent before the advent of real-time MPEG-2 compression hardware (when even MPEG-2 video was asymmetrical). (See also ***Asymmetrical***, ***Compression***, and ***MPEG-2***.)

**Asymmetrical Digital Subscriber Line (See *ADSL*.)**

**Asynchronous Communication**
Level: 1
*Definition:* Refers to a non timing-dependent communications protocol where both sender and receiver do not have to be connected online for a message to be delivered. An example of this is e-mail, where a user enters a message to be sent across a private or public network to a remote destination in a different time zone. The message is then "waiting" in the intended recipient's e-mail inbox, ready to be opened whenever the recipient chooses to do so. The term is also used to describe

a method of communication using a series of bits that carry their own timing information.

*Used in a sentence:* "I like the asynchronous aspect of voicemail because I don't ever have to actually talk with anyone in real time." (See also ***Computer-mediated Communication***, ***E-mail***, and ***Newsgroup***.)

### Asynchronous JavaScript and XML (See *AJAX*.)

### Asynchronous Transfer Mode (See *ATM*.)

### ATM (Asynchronous Transfer Mode)

Level: 2

*Definition:* A high-speed digital switching and transmission technology allowing voice, video, and data to be sent over a single wire or fiber optic line. ATM network information is divided into a series of fixed-length data packets called cells. Each cell is routed through the network at a constant data rate using header information contained in each cell. A cell path is established and then each individual node along the way uses this information to speed the cell on its way. As a result, delay or system latency is reduced drastically. Transmission between ATM switches takes place at the very high speeds made possible by fiber optic technologies that are now commonplace in the public telecommunications infrastructure. These rates are measured in multiples of gigabits per second. (See also ***Network***.)

### ATSC (Advanced Television Systems Committee)

Level: 2

*Definition:* The Advanced Television Systems Committee was formed in 1982 as an international nonprofit organization developing voluntary standards for digital television. The ATSC member organizations represent a wide range of interests, including the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries. The ATSC is coordinating television standards primarily for terrestrial broadcasting. ATSC is also developing digital television implementation strategies and presenting educational seminars on the ATSC standards. There are now about 130 members representing the previously cited industries. ATSC digital TV standards range from digital high-definition television (HDTV), standard definition television (SDTV), data broadcasting, multichannel surround-sound audio, and satellite direct-to-home broadcasting (see *http://www.atsc.org*). (See also ***HDTV***.)

### ATSC (Advanced Television Systems Committee) Standard

Level: 2

*Definition:* Refers to the standard selected for digital television in the United States. The ATSC Standard incorporates both standard definition television (SDTV)—which is equivalent to or better than conventional NTSC signals—and high-definition television (HDTV), which is equivalent to 35-mm film quality. One television channel can accommodate a single HDTV signal or multiple SDTV signals as well as some ancillary data services. (See also ***HDTV***, ***NTSC***, and ***SDTV***.)

### Attachment

Level: 1

*Definition:* Commonly refers to a computer file that is "attached" to, or accompanies, an e-mail message. E-mail programs that support attachments make it possible for users to send and receive word processing documents, spreadsheets, graphics, images, sound files, and computer programs. Users should always be careful opening e-mail attachments because the attachments might carry computer viruses.

*Used in a sentence:* "The document you sent me as an e-mail attachment had a virus." (See also ***E-mail Attachment***, ***MIME***, ***Trojan Horse***, and ***Virus***.)

### Attenuation

Level: 2

*Definition:* In communications, attenuation is the natural physical effect of degradation experienced by a signal as it travels through a medium. Adhering to the basic law of physics, when moving from an originating point through a medium (whether in the air or via copper or fiber lines) a signal encounters resistance from the physical

medium, resulting in a loss in signal strength. The amount of attenuation varies with the frequency of the signal and the medium used, and is often measured in units called decibels (dB), where the amount of loss is indicated as a negative such as –1 dB. (See also ***Attenuator***.)

**Attenuator**
Level: 2
*Definition:* At times, a reduction in a communication signal is desirable for certain specified purposes. To accomplish this reduction, an attenuator device is used to artificially induce loss in signal power. (See also ***Attenuation***.)

**Auction**
Level: 1
*Definition:* The public sale of an item, or items, to the highest bidder. Attracting considerable attention of late, certain spectrum frequencies or RF bandwidth have been auctioned in open bidding. The Federal Communications Commission (FCC) has auctioned licenses for new wireless services such as cellular and personal communication services (PCSs). (See also ***Spectrum***.)

**Audible tone**
Level: 2
*Definition:* In telephone communications, an audible tone is a sound within the range of human hearing that is used to indicate the status of a call connection. Examples include ringing, busy signal, call waiting tone, and dial tone. In older systems, other subaudible tones may have been used for internal network functions, telemetry, or signal processing.

**Audio Codec 3 (See *AC-3*.)**

**Audio Home Recording Act (See *AHRA*.)**

**Audio Interchange File Format (See *AIFF*.)**

**Audio/Video Interleaved (See *AVI*.)**

**Audio/Visual (See *A/V*.)**

**Audit Trail**
Level: 1
*Definition:* In computer systems, an audit trail is a chronological record of system resource usage. This includes user log-in information, files accessed, programs executed, and so on. They are often used to monitor whether any actual or attempted security violations occurred, legitimate and unauthorized. Audit trails are also useful for recovering from lost or corrupted transactions. Audit trail components are included in most database management systems and accounting systems, and standalone audit trail software products are available as well.

*Used in a sentence:* "We examined the audit trail to determine that our servers have not been directly accessed by any unauthorized individuals."

**AUP (Acceptable Use Policy)**
Level: 1
*Definition:* A set of rules and guidelines that specify the rules and procedures that govern access to and use of a computer network. For example, many networks prohibit "spamming" (sending mass unsolicited commercial e-mails) or identity spoofing (pretending to be someone else). Network administrators are often the ones charged with enforcing acceptable use policies. The most common punishment for violating an AUP is termination of account privileges. Some system administrators reserve the right to report possible illegal behaviors to appropriate law enforcement agencies.

*Used in a sentence:* "After looking at their acceptable use policy I realized that my university did not allow me to distribute copyrighted material from my student web site." (See also ***Account***.)

**Authentication**
Level: 1
*Definition:* The process of verifying the identity of a person via an established process. For computer systems, this process often involves typing in a user name (or log-in) and a password, which are compared against an established database of users that have authorized access to the system.

If a user has been "authenticated" it means that he or she has been granted access to a particular system. In communication systems, an authentication process might verify that a specific message really came from its stated source.

*Used in a sentence:* "Every person trying to access our system has to go through an authentication process before they are allowed to log on." (See also ***Log-in/Log-on*** and ***Password***.)

### Authoring

Level: 1

*Definition:* Authoring commonly refers to the creative process of utilizing computers, video equipment, scanners, and other digital equipment or tools to create web sites, multimedia presentations, programs, clips, or graphics in digital formats. Most consumer-grade computers, if equipped with the right authoring software tools, are capable of producing web and multimedia content that can then be stored on hard drives, large removable drives, burned onto CD-ROMs or DVDs, and/or delivered via the Internet.

*Used in a sentence:* "The multimedia authoring process is complex because the designer has to integrate everything from text to graphics to video to audio to animation content."

### Automatic Call Distributor (ACD)

Level: 2

*Definition:* A specialized phone system designed to manage high-volume calling, both incoming and outgoing. Originally for incoming traffic (e.g., for customer service call centers), the system is increasingly being used by call-generating firms (e.g., telemarketers). An ACD will recognize and answer an incoming call, search a database for instructions on how to handle the call, and send the call to a recorded prompt or to an appropriate service or telemarketer representative. For outgoing traffic, ACD systems can automatically dial numbers and transfer the call to an operator only if a human voice is detected when the call is answered.

### Automatic Calling Unit (See *ACU*.)

### Automatic Number Identification (See *ANI*.)

### Automatic Private IP Addressing (See *APIPA*.)

### Autoresponder

Level: 1

*Definition:* Similar to a telephone answering machine for e-mail, an autoresponder is a program on e-mail server systems designed to respond automatically to incoming e-mail messages. Often an autoresponder is used to indicate that a person receiving an e-mail is away from the office or will not be available to answer e-mail for a specified period of time. Autoresponders are sometimes used by businesses to deliver commercial messages to anyone who sends e-mail to their specified address. Users of autoresponders need to keep in mind that some spammers will send out random e-mail blasts, that because of the autoresponder, produce confirmed "good" addresses to which the spammer then sends a deluge of unsolicited commercial e-mail.

*Used in a sentence:* "I was a big fan of autoresponders until I realized that spammers were using the automated response to verify my e-mail address." (See also ***E-mail***.)

### Autosave

Level: 1

*Definition:* Many software applications have a built-in feature that will automatically save, at regular intervals, a document or file that is currently open and being worked on. Users who are concerned about losing their work because of a system crash or a power failure can use autosave to reduce the risk of losing large portions of unsaved work.

*Used in a sentence:* "If I hadn't been using autosave I would have lost everything when the power went out."

### AUX (Auxiliary)

Level: 1

*Definition:* A backup system or device put into use when a primary system fails or is unable to be accessed. An auxiliary system could be an alternate power source, such as another battery. In telephony, an auxiliary system could be voice mailboxes attached to the regular

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 town 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.)

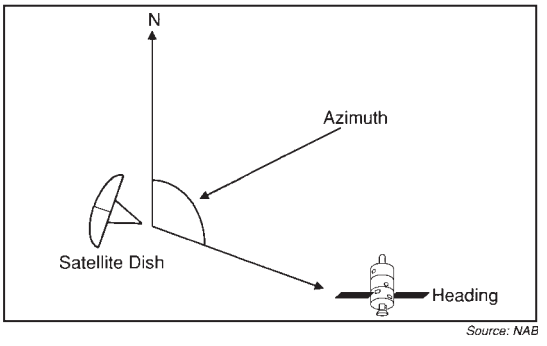


**FIGURE A–4.** Azimuth.

# B



### Baby Bell

Level: 1

*Definition:* Refers to one of the original seven Regional Bell Operating Companies formed as a result of the divestiture of AT&T (i.e., Ma Bell) in 1984. (See also ***RBOC***.)

### Back Channel

Level: 2

*Definition:* Typically a narrowband link that takes advantage of unused bandwidth to send return signals from users back to a content provider. For example, at the same time that content providers are transmitting interactive television to their customers, users can connect through a back channel to a web site for additional information supplied from the original content provider or to an advertiser. A back channel can be used by customers to provide feedback, purchase goods and services, or access a wide variety of supplementary information. A simple type of back channel is the telephone modem connection from a PC to the Internet. (See also ***Interactive Television***.)

### Back Door

Level: 2

*Definition:* A "hole" in a security system intentionally left there by the system designer. For example, programmers who design a computer security system might embed a special user name and password in the system that becomes part of the security program. Because the design team knows this special user name and password, they could access a system running their security program through the "back door." Although back doors are sometimes intended to allow for convenient access to a system by those who build and maintain it, they can also be a liability enabling malicious hackers to gain access to information or disable computer systems.

### Backbone Network

Level: 2

*Definition:* Refers to the major trunk line(s) in a telecom network or cable system. Backbone networks are the central or main support system of a network with capabilities for handling more traffic than smaller connected network branches or terminals. One example would be an Ethernet LAN with a maximum digital data transmitting capacity of 10 Mbps that is connected to an ATM backbone able to carry data at a maximum rate of 622 Mbps. (See also ***ATM*** and ***Ethernet***.)

### Backhaul

Level: 2

*Definition:* Generally speaking, a backhaul is a transmission from a remote site to a central site from which it can then be distributed network wide. In television distribution systems, this might involve transmitting from the end of a microwave system to central point or network distribution center. In computer networks, "backhauling" describes the process of transmitting information to the "backbone" of the network to improve global distribution.

*Used in a sentence:* "Those who set up and maintain a wireless network face a common challenge: how to provide adequate backhaul from each wireless access point onto the public Internet and other networks."

### Backlighting

Level: 2

*Definition:* Refers to a display technology intended to make flat-panel displays easier to read, especially on laptop computers. Backlighting produces an effect that makes the text and images on the screen appear brighter in contrast to the background. (See also ***Flat-panel Display*** and ***LCD***.)

### Backplane

Level: 2

*Definition:* A backplane is an electronic circuit board containing circuitry and sockets into which

additional electronic devices on other circuit boards or cards can be plugged. In terms of personal computers, the backplane is the large circuit board that contains sockets for expansion cards.

### Backward Compatibility

Level: 1

*Definition:* Refers to the ability of any electronic system—consumer or professional equipment, software system, or software application—to operate in a compatible manner with an earlier generation of the same technology to prevent immediate market obsolescence. Backward compatibility is as much a policy issue as a consumer economics issue, particularly in areas where serious dislocations could occur as a result of major upgrading of television and radio broadcast or telecommunications systems from analog to new digital formats.

*Used in a sentence:* "Our IT department wanted to ensure backward compatibility for our new billing system so that the software would work with our legacy systems."

### Band

Level: 2

*Definition:* In communications systems, the term *band* refers to radio frequency (RF) spectrum in a range between two defined limits. In addition to the fundamental electromagnetic frequency bands, other, more narrowly defined frequency bands are designated with letter codes, and subsets of bands often are designated under international agreement by the ITU. Historically, blocks of frequencies have been allocated by the FCC for a specific service, and have come to be commonly known by their band name. For instance, the AM and FM bands for radio, VHF and UHF for television, or the C-band and Ku-band for certain satellite services. The audible band or the range of frequencies that can be detected by human hearing runs only between about 20 Hz to 20,000 Hz (20 kHz). (See Table B–1 and see also ***Frequency Allocation***, ***ITU***, and ***Spectrum***.)

### Band-Pass Filter

Level: 3

*Definition:* A type of electronic filtering device used to screen out or allow certain spectrum frequencies to pass through to another part of a system. (See also ***Filter***.)

### Bandwidth

Level: 1

*Definition:* Bandwidth in the digital domain refers to how much digital data can be transferred over a given wired or wireless communications "pipeline" within a given span of time. Bandwidth capacity is typically measured in digital bits per second (bps) and applies to bandwidth transmission capacity, also referred to as the data rate of a particular RF transmission, wired phone line, cable, satellite, fiber-optic, computer bus, or network interface system. A larger amount of bandwidth is needed to transmit at a faster rate and/or to transmit more complex digital data to ensure high-quality real-time delivery. Audio and video services require more bandwidth due to the complexity and high degree of changes involved in these signals compared to ordinary text or phone communications. The larger amount of bandwidth available the greater the quality and transmission speed capacity of a voice, video, or data link.

*Used in a sentence:* "Downloading high-quality streaming video requires a lot more bandwidth than accessing a simple web page." (See Tables B–2 and B–3 and see also ***Broadband***.)

### Banner Ad

Level: 1

*Definition:* In electronic commerce, a banner ad refers to an advertisement prominently located at the top of an Internet web site. Banner ads are typically prominently displayed in a rectangular box at the top of a web page, and normally provide information (paid client ad, "in-kind" advertisement, or in-house promotion). To gain viewer "eyeball" attention, banner ads are usually designed with bright colors, animation graphics, and "hotspots" for linking directly to another web site.

### Barreling Distortion

Level: 2

*Definition:* Distortion near the edges of CRT displays that occurs when vertical lines bow outward. (See also ***Pincushioning***.)

**TABLE B–1** Electromagnetic frequency bands.

| Band Reference | Radio Electromagnetic Spectrum Frequency Hierarchy | RF Spectrum Limits |
|---|---|---|
| ELF | Extremely low frequency | Below 300 Hz (hertz) |
| ILF | Infra low frequency | 300–3,000 Hz |
| VLF | Very low frequency | 3–30 kHz (kilohertz) |
| LF | Low frequency | 30–300 kHz |
| MF | Medium frequency | 300–3,000 kHz |
| HF | High frequency | 3–30 MHz (megahertz) |
| VHF | Very high frequency | 30–300 MHz |
| UHF | Ultra high frequency | 300–3,000 MHz |
| SHF | Super high frequency | 3–30 GHz (gigahertz) |
| EHF | Extremely high frequency | 30–300 GHz |
| THF | Tremendously high frequency | 300–3,000 GHz |

**TABLE B–2** Bandwidths.

| Wire-line System/Service | Data Rate |
|---|---|
| Ethernet | 10 Mbps |
| Fast Ethernet | 100 Mbps |
| Gigabit Ethernet | 1,000 Mbps |
| Token ring | 4.0, 16.0 Mbps |
| Fast token ring | 100, 128 Mbps |
| FDDI | 100 Mbps |
| ADSL | 1.5–9.0 Mbps |
| T-1 | 1.5 Mbps |
| T-3 | 44.7 Mbps |
| Dial-up modem | 28.8, 33.6, 56 kbps |
| ISDN | 1.544 Mbps |
| DS-O | 64 kbps |
| Frame relay | 56 kbps to 45 Mbps |
| SMDS | 45.0, 155.0 Mbps |
| ATM | 25, 45, 155, 622 Mbps, 2.488 Gbps |
| Cable modem | 27 Mbps |

**TABLE B–3** Examples of digital video data rates.

| Transmitted Signal | Digital Data Rate | Notes |
|---|---|---|
| NTSC video | 143 Mbps | Uncompressed |
| NTSC video | 45 Mbps | Compressed telco. DS3 (video) Standard |
| HDTV-DBS | 27 Mbps | Compressed |
| HDTV terrestrial | 19–23 Mbps | Compressed |
| DBS | 3–10 Mbps | VCR-quality to NTSC-quality |
| Satellite business television | 3–10 Mbps | Rate depends on desired picture quality and degree of motion |
| Satellite video-conferencing | 56 kbps to 2.4 Mbps | Rate depends on desired picture quality and degree of motion |
| ADSL telco. video | 3–4 Mbps | Projected high-end rate for compressed NTSC video over telco. copper loops |

### Baseband

Level: 2

*Definition:* Refers to a basic set of frequencies of an RF signal prior to any modulation; essentially, an unmodulated signal. For example, the signal output from a television camera contains baseband information representing color frequencies for each line. A baseband network is limited to a single unmodulated signal, although it can be fairly complex. An example is a typical LAN. (See also ***Modulation***.)

### BASIC (Beginners All-purpose Symbolic Instruction Code)

Level: 2

*Definition:* A relatively simple programming language (created in 1963) often used to write software. BASIC was the primary computer programming language for many years, and although it is still in use, more commonly used software languages today include C++ and Java. (See also ***C***++ and ***Java***.)

### Basic Input/Output System (See *BIOS*.)

### Basic Rate Interface (See *BRI*.)

### Basic Trading Area (BTA)

Level: 2

*Definition:* Refers to the geographic boundaries that segment the country for licensing purposes. Based on Rand McNally's *Commercial Atlas & Marketing Guide*, BTA boundaries follow county lines and usually include the county or counties whose residents make the majority of their shopping purchases in the area. The FCC has used BTAs to license a number of services, including broadband and narrowband personal communication services. (See also ***Major Trading Area***.)

### Baud Rate

Level: 2

*Definition:* Baud rate is the speed at which digital signal information is transmitted over an analog line, such as a phone line. The baud rate is the number of changes made to the analog sine wave per second. Analog baud rates are not to be equated with data rates, which reflect the amount of digital bits of information transmitted per second. Computer signals transmitted over analog phone lines require use of an analog modem to first convert the digital computer signal into a continuous analog signal for transmission. (See also ***Modem***.)

### Bayesian Filtering

Level: 2

*Definition:* A type of spam filtering that calculates the likelihood of a message being spam based on its content. Unlike most filtering schemes, which require users/administrators to create extensive spam definition and characteristic lists, Bayesian filtering "learns" from each operation and tries to intelligently identify spam that has not yet been identified by the user. Because most spam does not look like "normal" mail, Bayesian filtering is becoming more and more effective. For example, it builds a list of words in known spam messages, and it builds a list of words in known "good" messages. From these lists it continuously infers whether or not new messages are spam or not. Named after English mathematician Thomas Bayes, Bayesian filtering also incorporates context indicators that can help in the analysis of a message.

*Used in a sentence:* "Our spam-fighting software uses Bayesian filtering to help identify possible unsolicited commercial e-mail." (See also ***Spam***.)

### BCC (Blind Carbon Copy)

Level: 1

*Definition:* An e-mail option used when an individual wishes to send an e-mail message to another person without that persons's e-mail address appearing in the header of the message. This makes it possible to send a message to many different people without any of them knowing who else may have received the message. This technique is especially popular for mass mailing so that the header of the e-mail messages received does not include a long list of all other recipients' e-mail addresses. In terms of netiquette, sending a blind carbon copy (BCC) of an e-mail opens up the sender to some vulnerabilities if the recipient

of the BCC message forgets the clandestine nature of the communication and accidentally forwards it to someone else. (See also ***E-mail***, ***Header***, and ***Netiquette***.)

### BCD (Binary Coded Decimal)

Level: 2

*Definition:* Also called packed decimal, binary coded decimal is a standardized computer process for converting decimal numbers (e.g., 1, 2, 4.56, 9999, and so on) to binary numbers (e.g., 0001 1001). (See also ***Binary***.)

### B-Channel (Bearer Channel)

Level: 2

*Definition:* A bearer channel is a fundamental component of ISDN telecommunications systems. B-channels are able to transmit 64 kbps of digital information in both upstream and downstream directions. The channel can be circuit switched and is capable of carrying either voice or data signals. (See also ***BRI*** and ***ISDN***.)

### Beam Splitter

Level: 2

*Definition:* Relates to fiber-optic transmissions where a light-wave can be split into two or more separate beams, allowing the original signal to be transmitted to more than one receiver. (See also ***Fiber Optic***.)

### Bellcore (Bell Communications Research)

Level: 1

*Definition:* Technical laboratory and R&D facility formed at the time of the 1984 divestiture of AT&T into seven Regional Bell Operation Companies. Originally jointly owned by RBOCs, Bellcore provided centralized research and other technical R&D functions to its client-owners. Passage of telecommunications reform in 1996 enabling the RBOCs to compete more aggressively with each other prompted the privatization and sale of the facility. Bellcore became Telcordia Technologies in 1999. (See also ***RBOC***.)

### Bell Laboratories

Level: 1

*Definition:* The highly regarded technical research arm of AT&T, which was permitted to be retained by AT&T after divestiture in 1984. AT&T split into three separate companies in 1996, with Bell Labs joining AT&T's manufacturing divisions to form Lucent Technologies.



### Benchmark

Level: 2

*Definition:* Refers to a standard program or set of programs that can be run on different computers to give an accurate measure of their performance and computing power. A benchmark may attempt to indicate the overall power of a system by including a "typical" mixture of programs, or it may attempt to measure more specific aspects of performance, such as how quickly graphics can be displayed, how fast certain types of mathematical computations can be performed, and so on. Although there is no single benchmark that can fully characterize computer system performance, many computer trade magazines have developed their own benchmark tests, which they use when reviewing the performance of various computer products.

### BER (Bit Error Rate)

Level: 3

*Definition:* A measure of data integrity, bit error rate examines the average ratio of received bits that are in error relative to the total number of bits sent over a certain period of time. BER is expressed as a negative power of 10. BER on a typical hard disk is 1 in $10^{12}$ or 1 in 10 trillion. Usually bits that come back in error (perhaps because of a media flaw or not being written correctly) can be recovered by an error correction code (ECC). (See also ***Bit*** and ***Hard Disk***.)

### Bearer Channel (See *B-channel*.)

### Beginners All-purpose Symbolic Instruction Code (See *BASIC*.)

### Betacam SP

Level: 2

*Definition:* Standard professional-quality half-inch videotape developed by Sony. It is a higher quality than the consumer version of Betamax. Both systems provides higher technical quality than VHS videotape.

### Beta Test

Level: 1

*Definition:* Traditionally referred to as a testing phase by a panel of users for products in development or being refined (e.g., software packages or new electronics equipment) prior to final market release. Product versions are often relatively complete when submitted for beta testing, but the hands-on rigors of real users often reveal design flaws or glitches not envisioned. Thus, additional refinements can be made to improve final product quality. Now with the prominence of Internet-based software products, some companies are releasing "beta" versions to the general public. For example, Google released its now famous "Google Tool Bar" as a "beta" application and has allowed hundreds of millions of downloads with no "final" or "completed" version in sight.

*Used in a sentence:* "We performed beta tests with a representative sample of our target market to determine if our new product met their needs." (See also ***Application*** and ***Application Service Provider***.)

### Bezel

Level: 2

*Definition:* A covering or panel on an electronic device, most often used in conjunction with protecting a visual display or connection port.

### Binary

Level: 1

*Definition:* The language of computers where all information is converted into binary form (i.e., using only two digits) of ones and zeros. Binary code was adopted for computers because using ones or zeros best represented the two fundamental conditions of an electronic circuit, which is either "on" or "off." By stringing together series of zeros and ones, programmers can write programs to control computer functions, write sets of instructions to perform tasks, or represent information of any type in digital form for processing, manipulation, or transmission from one computer or digital system to another. (See also ***Binary Numbering*** and ***Bit***.)

### Binary Coded Decimal (See *BCD*.)

### Binary Hexadecimal (See *BINHEX*.)

### Binary Numbering

Level: 2

*Definition:* In one single bit the value of the bit can be either 0 or 1, thus there are only two possible values. The numbering system with only two possible values is called a binary system and is the basis for all digital computer coding. Just as 99 is the largest two-digit number in the decimal numbering system, the largest number in a two-digit or binary coding system is 11 (one, one; not eleven). The decimal equivalent of the largest binary number in a group of bits is one less than the total number of values. For example, in four bits with two binary numbers possible for each bit there are 16 possible values. In the base 10 (decimal) system, the largest binary equivalent is 1111 (15 in decimal). (See also ***Binary***.)

### Binary Phase-Shift Keying (See *BPSK*.)

### BINHEX (Binary Hexadecimal)

Level: 2

*Definition:* Most commonly used with Macintosh computers, binary hexadecimal provides a method of converting graphic, text, or binary files into ASCII code so that they can be transferred from one computer platform to another or so that they can be attached to an e-mail message and easily decoded by the recipient. (See also ***ASCII***.)

### Biometrics

Level: 1

*Definition:* The somewhat controversial process of identifying a user based on physical characteristics, such as a fingerprint, iris, face, voice, vein, or handwriting. The costs of biometric authentication systems have been declining and the reliability has been improving. However, many users are still wary of being identified by personal, unchangeable characteristics. For example, thumbprint readers are now available on portable hard drives and laptop computers.

*Used in a sentence:* "My new laptop used a fingerprint biometric system to make it more difficult for unauthorized users to gain access to my computer."

**BIOS (Basic Input/Output System)**
Level: 2
*Definition:* Part of the system software of an IBM-compatible personal computer that installs the operating system and subsequently controls the initial start-up (or "boot") process for active use of the system. For example, when a user turns on the power to an IBM-compatible computer the first thing that is displayed is a series of text lines containing information such as "Generic BIOS, Version AAO5, Copyright 2003-05," along with various other system information. (See also ***Boot*** and ***Firmware***.)

**Bird**
Level: 1
*Definition:* Commonly used slang for a communications satellite. (See also ***Satellite***.)

**Bird Time**
Level: 1
*Definition:* Slang referring to the period(s) of time leased on a satellite for specific use. Incorporated in this leased time is usually a thirty-minute setup and testing period, which is added to the rental cost.

**Bit**
Level: 1
*Definition:* A contraction of *binary digit*. A bit is the smallest unit of information a computer can process, with a "byte" representing a collection of 8 bits. The speed at which bits are transmitted, or "bit rate," is usually expressed as "bits per second" or abbreviated as bps. (See also ***Binary*** and ***Byte***.)

**Bit Density**
Level: 2
*Definition:* The number of bits in a given image area or other digitized material. As technology improves the ability to detect smaller changes faster, bit density allows the storage locations on magnetic disks or tapes to be closer together—thus increasing their storage capacity and performance. (See also ***Bit***.)

**Bit Error Rate (See *BER*.)**

**Bit-Energy–to–Noise-Density Ratio (See *Eb/No*.)**

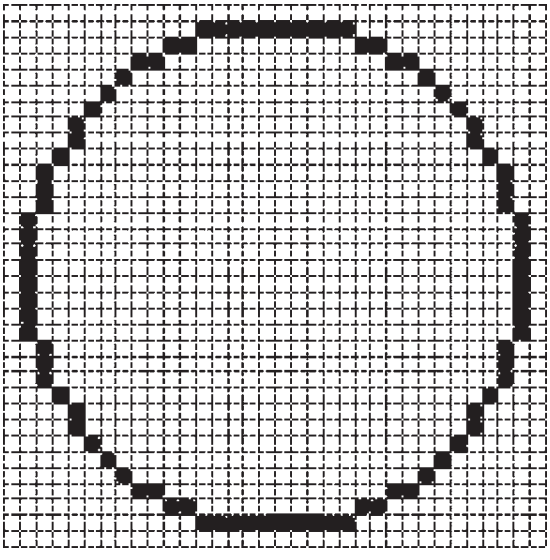

**FIGURE B–1.** Bitmap.

**Bitmap**
Level: 2
*Definition:* A bitmap is a file or image structure representing, "bit" by "bit," an image displayed on a computer monitor. Bitmaps define the width and height of images and the various parts of images. If a bitmap image includes color, more than one bit is needed to define each pixel. (See Figure B–1 and see also ***BMP***.)

**Bits per second (See *bps*.)**

**Bit Stream**
Level: 2
*Definition:* A time series of bits used extensively in telecommunications and computing. For example, capturing a bit stream and storing it on any type of computer storage medium creates a computer file. (See also ***Video Bit Stream***.)

**BitTorrent**
Level: 2
*Definition:* A peer-to-peer file-sharing platform particularly well suited to distributing very large digital files (e.g., concerts, movies, television shows) because it takes advantage of the unused bandwidth of broadband network connections. Instead of connecting to a single computer to download a file, BitTorrent works by connecting that user with potentially hundreds of other

computers to download individual parts of the file that are put together once all of the pieces have reached their destination. The more people storing and sharing files over the network the more capacity there is to distribute files quickly over that network. Each new downloader not only uses up bandwidth but contributes bandwidth back to the network. The more bandwidth a user contributes to other clients, the faster that user is able to execute downloads. (See also ***File Sharing***.)

### Blackberry

Level: 1

*Definition:* One of the first and most usable wireless applications solutions available, BlackBerry has played an important role in the wireless revolution. Running on an increasingly wide variety of devices, the technology that makes BlackBerry is more than just a handheld gizmo. Research In Motion's (RIM) enterprise solution consists of BlackBerry Enterprise Server Software, BlackBerry Desktop Software, a handheld wireless device, and handheld software. Founded in 1984 and based in Waterloo, Ontario, RIM provides platforms and solutions for quick access to time-sensitive information—including e-mail, phone, SMS messaging, Internet, and enterprise applications. RIM technology also enables a broad array of third-party developers and manufacturers to enhance their products and services with wireless connectivity. (See Figure B–2 and see also ***Handheld*** and ***SmartPhone***.)

### Black Box

Level: 1

*Definition:* A generic slang term referring to an electronic device that performs complex functions usually too complicated to explain easily. Examples include encoders, decoders, A/D or D/A converters, set-top boxes, and so on.

### Black Burst

Level: 2

*Definition:* Black burst is used to synchronize other video sources to the same sync and color information. A master black burst generator normally distributes master synchronization signals


**FIGURE B–2.** Blackberry device.

to an entire video production facility so that all equipment at that location can be synchronized. (See also ***Video Signal***.)

### Blanking Intervals (Horizontal and Vertical)

Level: 2

*Definition:* Blanking occurs when a video or television monitor's electron beam is positioned to start a new line (horizontal blanking) and a new field (vertical blanking). (See also ***HBI*** and ***VBI***.)

### Bloatware

Level: 1

*Definition:* A derogatory term used in the computer industry to describe software programs that are increasing in code size and thus take up more and more disk space and more memory as new features are added. But in practical terms, such bloated software does not add proportional advantages either to the utility of the program or to its ease of use. Bigger is not necessarily better.

### Block

Level: 2

*Definition:* A block is a segment of digital data information treated as a single unit. A part of each block or segment is header or parity information that assists in directing the data through a network or acts as an error check in transmissions. Depending on the type of network, blocks can be of fixed or variable size and may be referred to as a "packet." (See also ***Packet***.)

### Blog

Level: 1

*Definition:* Short for *web log*, a blog is a web page or web site that is regularly updated, usually by a single person (although a common blog can have many different authors contributing to the same page). Blogs are often personal in nature, but recently more and more blogs have entered the mainstream for opinion, political commentary, news, and corporate information sharing. From a technical standpoint, a blog is simply a content management system (CMS) for allowing a person to use a web browser to directly create, edit, and add to a publicly accessible web page. This allows people who know very little or nothing about web page development to publish on the Web with ease. Many blogs also include areas where readers can post their comments. There now exist literally millions of blogs on every imaginable subject. There are many directories of blogs on the Web, with *blogwise.com*, *blogarama.com*, and *bloogz.com* being among the most popular.

*Used in a sentence:* "I found the greatest blog yesterday, run by someone who loves long-distance running just as much as I do and who writes about it almost every day." (See also ***Computer-mediated Communication***.)

### Blowfish

Level: 2

*Definition:* Available to anyone for free, Blowfish is a means of encrypting digital communications. It is a fast, compact, simple block cipher that encrypts a message by breaking it down into blocks and encrypting each block. Developed by Bruce Schneier in 1993 as a general replacement for DES, its level of security can vary according to the length of its keys, which can vary from 32 to 448 bits in length. (See also ***Block***, ***Encryption*** and ***Public Key***.)

### Blu-Ray

Level: 2

*Definition:* The same physical size as today's DVDs, Blu-Ray is a next-generation optical disc format designed to accommodate high-definition video and other large-format digital files. Blu-Ray discs are designed to hold 25 Gb (single layer) to 50 Gb (double layer), with the single-layer disc capable of holding two hours of high-definition video and audio. Blu-Ray was developed by a group of consumer electronics and personal computer companies and gets its name from its use of blue lasers (rather than the traditional red), which makes it possible to operate at a shorter wavelength. A prototype four-layer Blu-Ray disc is reported to have a 100-Gb capacity. Blu-Ray's most direct competition comes from the HD-DVD format. (See also ***HD-DVD*** and ***HDTV***.)

### Blue Screen

Level: 1

*Definition:* In computers, a Windows 95/98 or Windows NT error message with a blue background. Sometimes referred to as the "blue screen of death" (BSOD) because systems displaying the blue screen error message are often "frozen" or "locked up," requiring a reboot (restart) that deletes all unsaved data. In video production, "blue screen" refers to a visual effects process of shooting in a studio against a large blue or greenish backdrop. This allows the screen color to be deleted from the video image in favor of a background to be superimposed on the final image. Most desktop video editing and effects software can now handle source video shot on blue screen (or other color of one's choice), making it possible for home users to produce professional-looking visual effects.

*Used in a sentence:* "I couldn't believe that after all of that work I got the dreaded blue screen and lost everything." (See also ***Windows***.)

### Bluetooth

Level: 2

*Definition:* Named for a Viking king who unified Denmark, Bluetooth is a specification for

a small form-factor, low-cost radio, short-range (usually less than 30 feet) solution that provides links among mobile computers, mobile phones, PDAs, and other portable handheld devices. With the proper hardware, Bluetooth can also provide connectivity to the Internet. It enables users to connect a wide range of computing and telecommunications devices easily and simply, without the need to carry or connect cables. For example, a smart-phone user might use a Bluetooth-enabled headset to listen wirelessly to music or telephone conversations that are processed by the smart phone. Bluetooth might also connect a wireless keyboard to a PC. (See also ***Handheld***, ***Internet Appliance***, ***Palm-top Computing***, and ***Smart Phone***.)

### BMP (Bitmap) Graphics File Format

Level: 1

*Definition:* Used as a Windows file extension name for bitmap data files containing digitized graphical information. (See also ***Bitmap***.)

### BNC Connector

Level: 2

*Definition:* A type of electronic cabling connector used in both video and data communications that connects equipment with coaxial cable. A coaxial cable can have different types of physical connectors attached to it. A BNC connector is differentiated by its bayonet styling from the more common F connectors, which are used to connect television sets to a cable system or antenna.

### Board

Level: 1

*Definition:* Shorthand reference to a computer board or electronic circuit board (also called a card), which contains electronic components and the printed IC chip circuitry. Boards contain the necessary wiring for connecting them to other boards or to a bus system for interconnection to other electronic processors. Some boards or cards are permanently mounted, whereas others are installed by plugging them into designated slots in a PC processor (called expansion cards). Boards are designed to manage computer processors or other communications system devices, functions, or peripheral equipment. Cards or boards allow relatively easy modification, repair, or replacement and are thus a common component of most PC systems. (See also ***Expansion Card***.)

### Bookmarks/Favorites

Level: 1

*Definition:* A web browser feature enabling users to store a personal list of web site addresses for future reference and easy access. Bookmarks (on Netscape, Firefox, Mozilla) or favorites (on Internet Explorer) offer easy one-click access to a chosen site by displaying a drop-down list, menu, or special web page containing the stored links.

*Used in a sentence:* "I forgot to bookmark the web page I found yesterday so it was a bit difficult to find it again." (See also ***Browser***.)

### Boolean Search

Level: 2

*Definition:* The term Boolean is taken from the 19th-century English mathematician George Boole, who is best known for his contributions to symbolic logic. A Boolean search is a logic-based technique for searching a set of information data (database) using the Boolean-designated operators AND, OR, and NOT. Along with the use of parentheses, these operators can be used to define relatively complex data criteria designed out of these simpler search terms or commands. Although Boolean search operators have been important tools in seeking out specific information on the Internet in the past, with the creation and increasing use of search engines and directories it is now more common for typical users to get the results they want with simple keyword and phrase searches. (See also ***Search Engine***.)

### Boot (or Boot-Up)

Level: 1

*Definition:* Computer slang for the start-up process during which a computer gets powered up and loads the operating system and various programs. (See also ***Reboot***.)

### Bot

Level: 1

*Definition:* An abbreviation of *robot*, the term refers to a type of computer software application designed specifically to automatically run or manage specific computing tasks not requiring direct human intervention. For example, bots are used on computer networks to monitor system security or can be launched by Internet users via a search engine to compile indexed lists of web sites or pages on a specific subject. "Chatbot" programs are a variation and enable a computer to interact with people in "chat rooms." (See also ***Agent***, ***AI***, ***ALICE***, ***Expert System***, and ***Spider***.)

### Bottleneck

Level: 1

*Definition:* In communications, as in other real-life situations, bottlenecks occur when too much traffic tries to get through the same narrow space at the same time. When more data are being transmitted through a network than one or more components of the network cannot adequately handle, a backlog of data accumulates at that point. When data jam-up occurs, they can grow quickly and information is either lost or by necessity is rerouted back to the originating point.

### Bozo Filter

Level: 1

*Definition:* A software setting in an e-mail program or a newsreader that skips (filters out) messages or postings from unwanted sources. Users can usually filter by sender, organization, topic, date, and so on. Some programs call this function a "kill file" or "kill filter," although with a bozo filter the message is actually ignored rather than deleted.

*Used in a sentence:* "I was hoping that my Bozo filter would ignore all of those mortgage refinancing e-mails I kept getting at work." (See also ***Spam***.)

### Bps (Bits per second)

Level: 2

*Definition:* Expresses the rate at which digital bits are transmitted. Common speeds or data rates for digital networks range in kilobits/second (kbps) and megabits/second (Mbps), but more advanced broadband fiber and satellite systems are expected to be capable of gigabits per second (Gbps) transmission rates. For clarification, a typical confusion relates to transmission data rate capacity versus computer disk memory or other types of digital storage capacity. Information stored in memory is expressed in bytes, meaning that it is already divided into 8 bits. Transmission data rates are expressed in bits (not bytes) per second. (See Table B–4.)

**TABLE B–4** Digital hierarchy.

| |
|---|
| Kilobit = 1 thousand bits |
| Megabit = 1 million bits |
| Gigabit = 1 billion bits |
| Terabit = 1 trillion bits |
| Petabit = 1 quadrillion bits |

### BPSK (Binary Phase-Shift Keying)

Level: 3

*Definition:* A variation of the digital modulation method of phase-shift keying. (See also ***PSK***.)

### BRI (Basic Rate Interface)

Level: 3

*Definition:* Refers to a level or grade of ISDN telecommunications service that uses two bearer (B) channels and one data (D) channel. Often denoted as 2B+D, BRI has two 64-kbps channels that are used for video or audio information transmission, and one 16-kbps channel devoted to internal signaling, maintenance, and call status information. This level of ISDN service is also referred to as "basic access." (See also ***B-Channel*** and ***ISDN***.)

### Bridge

Level: 2

*Definition:* Similar to its physical world meaning, a bridge is a physical device that connects two or more existing LANs, forwarding or filtering data packets between them based on their destination addresses. (See also ***Brouter***.)

### Bridge Amplifier

Level: 2

*Definition:* A type of cable TV amplifier that taps a signal from the main cable trunk line, amplifies the signal, and transmits the boosted signal further along to one or more feeder lines.

### Brightness

Level: 2

*Definition:* In the video realm, the degree of brightness is the luminance of a video signal. (See also ***Luminance***.)

### Broadband

Level: 1

*Definition:* In general terms, broadband systems are integrated communications networks in which the equipment and transmission network bandwidth capacities are relatively high in comparison to other network systems. Broadband systems are typically used for transmitting multichannel video, along with other data, text, or information services. Broadband does not necessarily mean a terrestrial wire-line, cable, or fiber-optic system. RF-based broadcast television and satellite systems are broadband services with very high bandwidth capacities compared to most other services. Also, broadband does not necessarily connote a digital system, although certainly this is much more the case today than in the past. Fiber-optic and upgraded coaxial cable systems are typical broadband systems where numerous video channels and high-bandwidth telephony and data services can be supported simultaneously. Technically, some consider systems with a transmitting capacity above 4 kHz voice-grade (narrowband) channels as a broadband system. Others set a bandwidth limit of 20 kHz to be considered broadband, although a growing segment of engineers consider any service exceeding the telephone industry's T-1 line standard of 1.544 Mbps as defining a broadband system. Consequently, systems with rates between 20 kHz and 1.544 Mbps are defined as wideband, and systems with less capacity are narrowband systems.

*Used in a sentence:* "Because of our need for massive data transfer between branch offices, we required the installation of company-wide broadband network connections." (See also ***Bandwidth***.)

### Broadband Wireless Access

Level: 3

*Definition:* Generally refers to large-capacity wireless network access technologies. Fixed wireless equipment capable of broadband speeds generated widespread interest in the last few years of the twentieth century. After a series of bankruptcies and standards conflicts, broadband wireless access is poised to make a comeback of sorts, especially in Europe. The cost of building a wired broadband infrastructure and the success of Wi-Fi equipment based on the 802.11 standard has renewed interest in wireless as a potentially important broadband technology. There is now emerging a new generation of equipment (referred to as "N-BWA") that promises greater effectiveness but costs less. Most agree that N-BWA can fill an important niche for those who cannot get wire-line broadband services. (See also ***802.11*** and ***Wimax***.)

### Broadcast

Level: 1

*Definition:* Broadcast or broadcasting basically is the distribution of RF communications signals in a point-to-multipoint transmission mode. The term is most often associated with television and radio broadcasting. However, there are other instances of "broadcast" transmission modes in LANs, datacasting businesses, or broadcast fax systems. In each case the concept is the same, which is to reach multiple viewers or users simultaneously from a single transmission source.

### Broadcast Flag

Level: 2

*Definition:* A sequence of digital bits embedded in a digital television (DTV) signal that allows for the restriction of distribution of the program in which it is found. If the flag is set to "true," the restrictions are put in place. If it is set to "false," the receiver is supposed to let users do anything they want with it. Ratified by the Advanced Television Systems Committee (ATSC), which is the standards-setting organization that developed

the technical specifications for digital television in the United States, many content producers are reluctant to make their program available via digital television because they fear unrestricted copying and redistribution of their products, thus slowing the spread of digital television. Critics claim that the broadcast flag and other technologies such as "rights management systems" give too much power to the content producers and take too many choices away from consumers.



**Broadcast Quality**
Level: 1
*Definition:* Refers to the relatively high quality or grade of signals commonly used in standard television broadcasting operations. Video signal quality can vary due to a range of factors, but there are certain quality requirements that must be met in order to be considered a broadcast-quality video service.

**Broadcast Satellite Service (See *BSS*.)**

**Brouter**
Level: 2
*Definition:* On a computer network, a brouter is a device that functions as both a router and a bridge. Based on its own configuration information, a brouter can route specific bits of information (packets) to a specific destination, or via a bridge can simply forward packets to another network to be eventually handled by routers somewhere else. (See also ***Bridge*** and ***Router***.)

**Browser**
Level: 1
*Definition:* Browsers provide a user interface that is used to access, look at, and navigate through web content. Although Microsoft's Internet Explorer has dominated the browser market for the past eight years, there are several browsers making a strong showing because of their simplicity, security features, and convenience—including Firefox, Mozilla, Opera, Safari (Macintosh), and Netscape.

*Used in a sentence:* "I couldn't believe how much faster web pages loaded after I upgraded my web browser."

**BSS (Broadcast Satellite Service)**
Level: 2
*Definition:* An internationally designated class of satellite service for the transmission of video programming. BSS services were traditionally transmitted on domestic fixed satellites having low to mid-power J capabilities and operating in C-band and Ku-band frequencies. (See also ***C-band***, ***Ku-band***, and ***Spectral Allocation***.)

**BTA (See *Basic Trading Area*.)**

**Buffer**
Level: 2
*Definition:* Temporary storage capacity used by digital computer and communications systems to assist data flow transactions, or system or network operations. In a voice or data network, a buffer stores overflow information until it can be accessed for further processing. Buffers are used in computers, on major nodes in a network, and in most devices connected to a network. (See also ***Buffer Overflow*** and ***Buffer Underrun***.)

**Buffer Overflow**
Level: 2
*Definition:* Not unlike filling a pyramid of champagne glasses with liquid, a buffer overflow occurs when too much information is sent to a "buffer" (temporary memory storage), forcing the excess data to "spill over" into other buffers for which it was not intended. A malicious hacker can purposely induce a buffer overflow, inserting instructions that are damaging to a computer system, flooding the system memory, and unleashing the instructions into the operation of the computer. Buffer overflows exist on all major computer network operating systems. (See also ***Buffer*** and ***Hacker***.)

**Buffer Underrun**
Level: 2
*Definition:* Usually occurring when a user is attempting to "burn" (record) to a CD, a buffer underrun happens when the stream of data from the computer system to the CD burner is interrupted. Because CD burning is a "real-time" process that cannot be interrupted, a buffer underrun usually ruins that particular burn process

(sometimes ruining the CD). The most common way of preventing a buffer underrun is to reduce the recording rate or burn speed (e.g., from 8x to 2x) or to close all other programs before initiating the burn.

### Bundle

Level: 2

*Definition:* A physical grouping of optical fibers, electrical wires, coaxial cables, or other lines combined into a common sheath to increase efficiency in network construction. Components in bundles are often identified by different wire colors.

### Bundling

Level: 2

*Definition:* Refers to the combining of various types or levels of communications services into attractive, cost-efficient packages, which are marketed to business customers or consumers by telephone, cable, or other network providers of telephony, data, video, or other information services.

### Burn

Level: 1

*Definition:* To write data or files onto a recordable CD or DVD using a hardware device called a burner. Generally, you create either an audio or a data disc when you burn a CD. If you create an audio disc, you will be able to play that CD in any standard audio CD player. A data disc contains computer files and can only be read on computers.

*Used in a sentence:* "I decided to burn all of my digital photos to CDs so that I wouldn't lose any of them if something went wrong with my computer." (See also ***CD*** and ***DVD***.)

### Burst

Level: 2

*Definition:* A sequence of connected information that is transmitted together over a medium. (See also ***Bursty Data***.)

### Bursty Data

Level: 2

*Definition:* Term used to characterize data transmissions that are not typically continuous in form, but rather are broken up in noncontinuous bursts so that only part of a network's bandwidth capacity is being used at any time. Such data transmissions make inefficient use of a network. Thus, much effort has been made to design network protocols to alleviate the inefficiency by filling in the gaps between active digital information with other transmitted data.

### Bus

Level: 2

*Definition:* Parallel electronic circuits acting as connecting pathways for data transfers within a computer. Higher numbers of bus circuits in a system mean more bits can be sent simultaneously, where the number of parallel lines connecting any two devices within a computer equals the maximum amount of bits that can be transferred per clock cycle. Most computers have bus architectures allowing data transfer rates of 8, 16, 32, 64, or 128 bits. All internal components are connected via one or more bus systems, but not all computer segments require the same capacity for expansion buses (buses located on the I/O modules of a computer system). Standard bus architectures vary for each I/O module, depending on the purpose for which that module is dedicated. For example, the VL bus, developed by the Video Electronics Standards Association (VESA), is twenty times faster than the more common ISA bus. Both buses, however, could be used within the same computer. (See also ***I/O***.)

### Byte

Level: 1

*Definition:* Combining 8 digital bits in a single group, which are processed as a single unit. (See also ***Binary***, ***Bit***, and ***Word***.)

# C



### C Programming Language
Level: 2
*Definition:* A high-level programming language developed in the 1970s that is not as user friendly as BASIC, but much easier to use than binary commands. Designed to reduce software development time and to make efficient use of computer resources, C uses some symbols instead of requiring written programming commands and has emerged as one of the most popular software development languages for personal computer applications. (See also ***BASIC*** and ***C***++.)

### C++ Programming Language
Level: 2
*Definition:* An extension of the C programming language combining features of the original and other programming languages. C++ emphasizes the use of small sequences of commands called objects, which are reused to save development time, and is one of the most popular languages for developing graphical applications. (See also ***C Programming Language***.)

### C# Programming Language
Level: 3
*Definition:* A hybrid programming language created by Microsoft, C# (pronounced "C sharp") is a modern object-oriented language that enables programmers to quickly build a wide range of applications for the Microsoft .NET platform and is generally seen as a competitor to Java (developed by Sun Microsystems). (See also ***.NET*** and ***Service-oriented Development***.)

### CA (See *Certification Authority.*)

### Cable Broadband
Level: 2
*Definition:* Refers to a specific type of broadband network connectivity made possible through connections, via coaxial cable, to a cable company's head end (where users are then connected to the Internet). Cable broadband services increasingly combine advanced television services (such as HDTV and video on demand) with high-speed access and telephony services. (See also ***ADSL***, ***Broadband***, ***Cable Modem***, ***HDTV***, and ***VOD***.)

### Cable Modem
Level: 2
*Definition:* A digital modulating device enabling home computers to use a local cable system to interconnect directly with public or private computer online networks and the Internet. Development of cable modems was a strategic move by cable operators to tap into growing consumer interest in the Internet and online services and offer a competitive alternative to telephone company computer modem hookups. (See also ***Cable Broadband*** and ***DSL***.)

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

### Cable Radio
Level: 1
*Definition:* Digitally transmitted music services offered by some cable systems, some of which provide dozens of channels of digital stereo audio services on a subscription basis. Some cable audio services also carry local radio station signals. After conversion back to analog, cable-delivered digital subscription and local station services are reproduced through the television receiver or home theater system for consumer listening.

### Cable Television
Level: 1
*Definition:* The cable television industry originally began as an antenna service in locations that could not easily receive local television signals. As a mature industry today, it consists of about half a dozen leading multiple system operators (MSOs), with a shrinking number of small independent local operators. Cable systems are

private coaxial communications networks that distribute satellite-delivered multichannel pay-TV and other cable program network services, and are required by federal law to carry all local off-air television signals in a local market. Many systems now use hybrid fiber/coaxial networks. In addressable systems, pay-per-view programming and the delivery of video on demand and other interactive programming are becoming more common. (See also ***MSO***.)

**Cache**
Level: 2
*Definition:* A special type of computer memory designed to speed up the processing of information display by storing often-used information in an easy-to-access location. One example of cache use is allowing web browsers to save the content of recently accessed web pages. Such temporary caching of web pages enables the user to return to a recently used web page and the text and graphics will load directly from cache and thus be displayed for viewing much more quickly than having to access the Internet again to retrieve the desired web pages.

*Used in a sentence:* "I was able to retrace my steps when browsing the Internet because all of the pages I had visited were being stored in my computer's temporary cache." (See ***Browser*** and ***RAM***.)

**CAD/CAM (Computer-Aided Design/Computer-Aided Manufacture)**
Level: 2
*Definition:* Computer software or hardware designed specifically to assist engineers in the creation and implementation of physical product design. CAD refers to the creation of materials with different software applications on computer hardware. CAM is the process that actually produces a finished product. Often computer-aided engineering (CAE) is used to describe both aspects of computer-dependent design and manufacture.

**Caller ID**
Level: 2
*Definition:* A telephone company call-tracing service that allows subscribers to use a display device to reveal the phone number and possibly the name (company or listed name) of the party initiating an incoming call. Users can choose to pick up and receive the call or not based on this information.

**Call Tree**
Level: 2
*Definition:* A telecom call management system where incoming calls such as to an 800-number help line or other central information source are held in a buffer or queue until the next available operator can accept a call. Large systems have numbers of branches to route calls, and internal signaling allows the system to recognize when operators are available.

**Camcorder**
Level: 1
*Definition:* A portable electronic device (commonly a digital camera) for recording video images and audio onto an included storage device. The term comes from a combination of "camera" and "recorder," relating to previous technology where the two capabilities were handled with separate pieces of equipment.

**Campus Area Network (See *CAN*.)**

**CAN (Campus Area Network)**
Level: 2
*Definition:* A telecommunications/computer network encompassing a number of buildings located in a relatively centralized area. Business parks and traditional university environments are candidates for limited CAN systems. (See also ***Network***.)

**CAP (Competitive Access Provider)**
Level: 2
*Definition:* Refers to a segment of the telecommunications industry; specifically, commercial services that bypass the traditional telephone local network to connect local, long-distance, and switching services in competition with local exchange carriers (LECs). CAPs typically offer high-capacity network links for business customers and inter-exchange carriers (IXCs), enabling

them to avoid paying access charges to LECs. Many states continue to deregulate their traditional telecommunications rate regulation roles and instead are encouraging the growth of competition in the local exchange market. These are also known as alternative access providers (ALTs) and competitive access vendors (CAVs). (See also ***IXC*** and ***LEC***.)

### Capacitance

Level: 2

*Definition:* Physical properties in an electronic system permitting the storage of electrical charges between two electrical conductors. Capacitor devices allow electrical energy to be stored in a certain area of an electrical circuit and accessed when needed.

### Capacitor

Level: 2

*Definition:* A component of an electrical circuit designed to hold or store electrons (i.e., energy). The addition of electrons charges up a capacitor device and the release of electrons discharges electrical power from it. The unit of measurement for capacitance is farads (F).

### Capacity

Level: 2

*Definition:* In communications, capacity refers to the maximum throughput of a transmission medium, system, or network and of related electronic hardware devices. System capacity is always limited to its weakest link. For example, in a 10-Mbps Ethernet network the capacity or bandwidth throughout the entire network is assumed to be a rate of 10 Mbps. If this same network is connected to a 56-kbps modem, communication with the outside world is limited to that data rate instead of the 10 Mbps. (See also ***Bandwidth*** and ***Bottleneck***.)

### CAP Code

Level: 2

*Definition:* Each pager has a specific identification sequence called a Channel Access Protocol (CAP) code. The pager listens for its unique CAP code, and when it hears its code it alerts the user, sometimes providing additional information depending on the pager type.

### Card

Level: 2

*Definition:* Computer and telecommunications reference to any circuitry-based hardware mounted on a single small board. Add-in cards are used in solid-state electronics to add new functions or capabilities to existing hardware. Examples are enhanced video cards for PCs or an Ethernet network interface card (NIC) for a LAN system. Small PC cards (PCMCIA) fit into laptop and notebook computers to provide new functions such as modem access to wireless cell phone networks, network interfaces, and fax modems. (See also ***NIC*** and ***PCMCIA***.)

### Carnivore

Level: 2

*Definition:* A computer traffic monitoring system, also known as Data Collection System 1000 (DCS1000), made up of specifically configured hardware and software used by the Federal Bureau of Investigation (FBI) to snoop on data traffic. Carnivore was abandoned by the FBI in favor of commercially available eavesdropping software.

### Carrier

Level: 2

*Definition:* A wire-line RF-based microwave satellite company or other type of company providing telecommunications, voice, video, data, or other services on a lease or contract basis to others. The term *common carrier* is a regulatory definition for service providers such as telephone companies required to hold their services out to any party wanting lease access to the network. (See also ***Common Carrier***.)

### Carrier-to-Interference (C/I) Ratio

**(See *C/I (Carrier-to-Interference) Ratio*.)**

### Carrier-to-Noise (C/N) Ratio

**(See *C/N (Carrier-to-Noise) Ratio*.)**

### Carrier Wave

Level: 2

*Definition:* An electrical signal that runs at a single continuous frequency. A carrier wave has the ability to be modified or changed to carry information on the signal wave. Information is imposed upon the carrier wave during modulation. (See also ***Modulation***.)

### Cascading Style Sheets (See *CSS*.)

### Case Sensitive

Level: 1

*Definition:* Indicates whether a computer system distinguishes between uppercase letters and lowercase letters when performing computer operations such as searches, sorts, typing in web addresses, and so on. Older computer systems are more likely to be case sensitive. For example, the UNIX operating system treats *file.doc* and *File.doc* as two completely different files with completely different names. On the other hand, newer systems from Microsoft (such as Windows XP) tend to not recognize the difference between uppercase and lowercase characters.

*Used in a sentence:* "Because the UNIX operating system is case sensitive, I had to be careful to note when I was using uppercase and lowercase letters in my file names." (See also ***UNIX*** and ***Windows***.)

### CAT5

Level: 2

*Definition:* Describes network cabling that consists of four twisted pairs of copper wire. CAT5 cabling is the most common cable used to connect Ethernet networks, and it supports speeds up to 100 Mbps. It can be used for ATM, token ring, 1000Base-T, 100Base-T, and 10Base-T networking. (See also ***ATM***, ***Ethernet***, ***LAN***, and ***Token Ring***.)

### Cathode Ray Tube (CRT)

Level: 2

*Definition:* An evacuated tube (without air) containing an anode (the positive end of an electric field) and a cathode (the negative end of an electric field) that generates cathode rays (electrons) when operated at a high voltage. When the cathode rays strike phosphors on a screen, which causes them to glow, they produce an image on the screen. Refers commonly to a computer or television screen. The charged particles each have a color value of red, green, or blue from which video images are composed for display. CRT technology has taken a back seat because of the growing popularity of LCD monitors in the computer world, along with plasma and LCD monitors in the television world. (See also ***LCD***.)

### CAT6

Level: 1

*Definition:* CAT6 is the sixth generation of twisted pair Ethernet cabling used to connect computers to one another. CAT6 contains four pairs of copper wire and unlike CAT5 takes advantage of all four pairs. CAT6 is significantly more expensive than CAT5. However, it supports gigabit (1000 Mbps) Ethernet transfer rates, enabling communications at more than twice the speed of CAT5e (the most popular standard for gigabit Ethernet cabling). Similar to other types of twisted pair cabling, CAT6 cable runs are limited to a maximum recommended run rate of 100 m (328 feet). Twisted pair cable, like CAT6, comes in two main varieties: solid and stranded. Solid CAT6 cable is ideal for longer runs and works best in fixed wiring configurations, such as office buildings. On the other hand, stranded CAT6 cable is more pliable and better suited for shorter-distance movable cabling (such as "patch" cables, which connect a computer to an Ethernet wall jack).

*Used in a sentence:* "We decided to install CAT6 instead of CAT5 in our new building so that we could take advantage of future technological improvements."

### CATV (Community Antenna Television)

Level: 2

*Definition:* Earlier name used for cable television systems. Community antenna services originated from efforts to transmit local broadcast television signals to areas that could not receive signals in mountainous regions of Pennsylvania.

The system consisted of a main antenna placed in a high location connected by cable lines to provide access to television programming to homes in valleys. (See also ***Cable Television***.)

### C-band

Level: 2

*Definition:* A segment or portion of the electromagnetic spectrum that has been allocated on a shared basis for satellite and terrestrial microwave transmissions. C-band spectrum extends from 3.4 to 6.4 GHz. C-band satellite transmissions require use of large transmitting antennas to uplink signals to satellites in geosynchronous orbit and relatively large receiving antennas (3 to 5 feet), often referred to as television receive-only (TVRO) antennas. Use of TVROs began in the 1980s to receive satellite-delivered cable programming, creating the so-called "backyard antenna" (or TVRO) market. (See Table C–1 and see also ***Clarke Belt***, ***Geostationary***, and ***Spectrum Frequency***.)

**TABLE C–1** Letter bands and designated frequencies.

| Letter Band | Designated Frequency (Ghz) |
|---|---|
| C-band | 4–8 |
| K-band | 18–27 |
| Ka-band | 27–40 |
| Ku-band | 12–18 |
| L-band | 1–2 |
| Q-band | 20–46 |
| S-band | 2–4 |
| V-band | 40–75 |
| W-band | 75–110 |
| X-band | 8–12 |

### CBR (Constant Bit Rate)

Level: 3

*Definition:* A data transmission that can be represented by a nonvarying, or continuous, stream of bits or cell payloads. Applications such as voice circuits generate CBR traffic patterns. CBR is an ATM service type in which the ATM network guarantees to meet the transmitter's bandwidth and quality-of-service (QoS) requirements.

*Used in a sentence:* "Because we were planning to offer so many voice and video services over our local network, we had to make sure the system could deliver a constant bit rate quality of service." (See also ***ABR***, ***ATM***, ***Quality of Service (QoS)***, ***UBR***, and ***VBR***.)

### CC (Closed Captioning)

Level: 1

*Definition:* Abbreviation for *closed captioning*, referring to text information embedded within transmitted television signals developed to assist hearing-impaired viewers in understanding dialog or spoken words on television entertainment and news broadcasts. (See also ***Closed Captioning***.)

### CCD (Charge-Coupled Device)

Level: 2

*Definition:* An image-capturing device in a video camera using silicon chips to replace older vacuum tube technology. CCDs are sensitive to image light changes and assign a digital value to each level of light intensity, which are stored on the silicon memory chips. Advantages over the standard analog tube cameras are that IC chips do not usually require replacement, image coloring is improved, picture clarity is crisper and truer to an original image, and color balancing on the camera is much easier.

### CD (Compact Disc)

Level: 1

*Definition:* Disc-based format for digital recording and the playback of music/audio information. Digital CDs are based on layers of digitally encoded "pits" that do or do not reflect light when read by a playback machine. Recorded music in its natural analog state is converted to digital information (1s and 0s) and stored on CDs for crisp, clear sound during playback. (See Figure C–1.)

### CD (Compact Disc) Quality

Level: 1

*Definition:* Digital compact discs (CDs) have become the informal benchmark for measuring the audio quality level of all types of consumer recordings and corresponding capabilities of electronic receiver equipment to reproduce this

**FIGURE C–1.** Compact disc.

level of quality. CD recordings encompass, or exceed, a frequency range of 20 Hz to 20 kHz, with a noise floor of −90 dB and a digital sampling rate of 44.1 kHz. (See also ***CD***.)

### CDMA (Code Division Multiple Access)

Level: 3

*Definition:* A technology for digital transmission of radio signals that has become a common method of mobile telephone service in the United States. CDMA can manage multiple conversations on the same radio frequency by cutting each conversation into snippets and then remodulating and reassembling them at the other end. Advantages of newer digital technologies compared to older analog systems include improved wireless call clarity and voice encryption support, caller line identification, short messaging, and over-the-air activation. Used in cellular and satellite communications, CDMA differentiates multiple signals transmitted over a broadband channel by coded binary digits attached as a header for a signal. In cellular systems, such methods are useful because calls are assigned to different open frequencies, especially when a mobile phone user enters a different cell area. (See also ***GSM***, ***TDMA***, and ***3G***.)

### CDPD (Cellular Digital Packet Data)

Level: 3

*Definition:* A technique being used in some wireless cellular phone systems to transmit packetized units of digital data. Operating at 19.2 kbps, CDPD makes efficient use of its wireless spectrum during open intervals in a cellular phone conversation, during which segments of encoded data (called packets) are inserted and sent over a cellular system via a wire, cable, or fiber optic carrier.

### CD-R/CDR (Compact Disc, Recordable)

Level: 1

*Definition:* A recordable compact disc technology that allows for one-time recording of music or data. Because CD-R technology was adapted for audio recordings, the capacity of CD-R media is measured in minutes as well as data capacity—such as 74 min (650 MB) and 80 min (700 MB).

### CD-ROM (Compact Disc, Read-Only Memory)

Level: 1

*Definition:* A read-only format for multimedia software products using a digital disk-based data storage medium. Information on a CD-ROM (including text, audio, video, data, and graphics) can only be retrieved or read by a user, not changed or manipulated like the data on a floppy disk. With a storage capacity of 650 to 700 MB, CD-ROMs are being used for a wide variety of educational, training, entertainment, and electronic game applications. (See also ***DVD-ROM***.)

### CD-RW (Compact Disc, Rewritable)

Level: 1

*Definition:* Unlike the write-once recordable CD media, CD-RW discs are rewritable. Providing functionality not unlike a floppy disc or hard drive, information originally recorded on the disc can be added to, erased, and recorded over. CDRW discs introduce some compatibility problems with older CD players and CDROM drives, but most CD players, CDROM drives, and DVD players and drives produced today conform to the "multi-read" standard, which makes them CD-ROM, CD-R, and CD-RW playback compatible.

### CDV (Compressed Digital Video)

Level: 3

*Definition:* Refers to the process of compressing or reducing the amount of bits in digitized video

programming. Generally, digital compression technology is very important in the digital domain but is particularly vital for television and other video transmission systems with limited bandwidth capacities (e.g., satellite). By digitizing analog video, the amount of bits required to capture all color and brightness data in each pixel, scan line, and frame is extremely large. Trying to transmit all digital data from just one half-hour full-motion TV program could take hours. HDTV increases the amount of digital information in the same half-hour program by orders of magnitude. As a result, video compression techniques are absolutely vital to reduce the amount of digital bits down to a level that can be squeezed into a 6-MHz television signal. (See also ***Compression***, ***Grand Alliance***, ***HDTV***, ***Indeo***, and ***MPEG***.)

### Cell

Level: 2

*Definition:* In wireless cellular telephone systems, signals are transmitted from a central transmitter to a large network of local transmitters, which send and receive mobile calls in relatively small geographic areas called cells. The cells of the honeycomb making up a cellular phone service area overlap only slightly. A similar type of system architecture is used for wireless PCS services. (See also ***Cellular Telephone*** and ***PCS***.)

### Cellular Digital Packet Data (See *CDPD*.)

### Cellular Telephone

Level: 2

*Definition:* Wireless cellular mobile phone systems are licensed to operate in the United States using frequencies between 825 and 845 MHz and from 870 to 890 MHz, with each channel separated by 30 kHz. While traveling, calls of mobile phone users are handed off from one cell and its specified frequencies to another cell and its frequencies. The seamlessness of the hand-off process is critical to cellular business operations. Cellular phones can be portable handheld devices or installed in motorized vehicles. In either case, the cell phone has to be authorized for interconnections by a cellular service operator before becoming activated.

### Censorware

Level: 1

*Definition:* A somewhat derogatory term referring to various types of software used to filter or block Internet content. Often used in public schools, public libraries, and public access terminals to limit access to pornographic sites, this type of software has been growing in popularity but has not necessarily been growing in reliability. Because it usually relies on keyword matching, some sites the administrator wishes to be blocked are not. On the other hand, some sites the administrator does not intend to restrict are blocked. Those intending to control the Internet use of others typically have to rely on a range of strategies, one of which is censorware. Other strategies include system monitoring, key logging, and packet sniffing. (See also ***CIPA*** and ***Key Logger***.)

*Used in a sentence:* "Our public library had installed censorware so restrictive that I was not able to carry out some health-related searches."

### Central Office (CO)

Level: 1

*Definition:* A telephone company end office or local switching facility where customer phone lines are terminated and interconnected via switching equipment to appropriate local or long-distance lines. In the United States, a CO can serve as few as 5,000 subscribers and as many as 100,000.

### Central Processing Unit (See *CPU*.)

### Certification Authority (CA)

Level: 2

*Definition:* In computer security, a certificate authority is an organization that issues digital certificates used to increase the security of digital transactions. Verifying the certificate owner's identity and the services the owner is authorized to use, it also handles the process of issuing new certificates and revoking certificates from unauthorized users who are no longer authorized to use them. Certificates are a crucial technology in the quest for more secure online transactions. (See also ***SSL***.)

### CG (Character Generator)

Level: 1

*Definition:* A character generator is a text processor for insertion into video productions. Credits rolling at the beginning or end of television programs are originated by a CG system. In high-end systems, character generators perform additional functions to create various visual effects such as wipes, dissolves, color changes, and melting of letters. A library of commonly used transition effects for video is stored on computer disk for later recall as needed.

### CGI (See *Common Gateway Interface*.)

### Challenge/Response

Level: 2

*Definition:* Refers to the basic process for determining if a person (often a computer user) has the right to access a secure place or a secure computer system. When users try to access a protected system or place, they are prompted to supply information such as a user name or to use a smart card (the challenge), after which users then supply the requested information or swipe the card so that they can gain access (the response). (See also ***Authentication***, ***Log-in/Log-on***, ***Password***, and ***Smart Card***.)

### Channel

Level: 1

*Definition:* A generic term for any communications pathway, but usually the term is a more specific reference to a pathway assigned a certain frequency and of a defined bandwidth. In cable systems, multiple channels are sent over a single coax cable or fiber-optic line, but channels are separated by their individual assigned frequencies. In digital telecommunications systems, subscribers can lease or rent space (actually time) on a channel along with other subscribers. On a digital T-1 line, the transmission frequency is divided into 24 discrete segments called channels, and leased out to subscribers having 24 different telephone numbers. (See also ***T-1***.)

### Channel Bonding

Level: 3

*Definition:* Bonding is a technique of combining data channels to form a higher-capacity data channel, typically used to obtain more capacity before a high-data-rate session such as a videoconference. A router that supports bonding will dial and/or connect one or more extra transmission lines and combine them into a single channel. After the videoconference, the bonding of the channels can be easily terminated. Although the term has traditionally been used to refer to the process of combining telephone lines to increase the transfer rates for data, it is now possible to channel bond Ethernet connections between two personal computers. It is becoming more and more common to use gigabit Ethernet to connect PCs in low-cost clusters, providing a theoretical maximum of 1,000 Mbps (reaching 900 Mbps in practice with some tuning of the system).

### Channel Service Unit (See *CSU*.)

### Character Generator (See *CG*.)

### Character Oriented

Level: 3

*Definition:* A signaling protocol for data transfer where the information being transported has unique characters placed at the beginning and end of the data. These bracketing characters indicate to the receiver or transmitter the parameters of the data being transferred. This capability is especially important when a network is congested with data because it permits sorting or more rapidly distinguishing one segment of data from another for circuit assignment purposes.

### Charge-Coupled Device (See *CCD*.)

### Chat

Level: 1

*Definition:* A computer slang term referring to real-time "online conversations" between any number of networked computer users. A chat system supports the capability for any number of users that are accessing an Internet site or a specific online communication system at the

same time to exchange typed text messages in real time. Such online conversations can be participated in either by all users logged into the same local computer network system or, as is more common today, conduct online conversations via the Internet. (See also ***Bot***, ***Chat Room***, ***Computer-mediated Communication***, and ***IRC***.)

### Chat Room

Level: 1

*Definition:* A virtual room or place on a computer network where users can log in at the same time and participate in real-time text-based conversations. The software used by chat rooms typically splits the screen into two sections: one devoted to the ongoing discussion and one where the individual user can compose his or her contribution to the conversation before sending it. Once the message is ready, the user simply clicks on a Send or Submit button that transmits the message to a location where it can be viewed by anyone logged into that chat room at that time. (See also ***Chat***, ***Computer-mediated Communication***, and ***IRC***.)

### Checksum

Level: 2

*Definition:* A numeric value used to verify the integrity of a block of data, a checksum is used when data are being stored, retrieved, or transmitted. The checksum value is sent along with the data when they are transmitted. The receiving system computes a new checksum based on the received data and compares this value with the one sent with the original. If the two values are the same, the receiver has a high degree of confidence that the data was received correctly. (See also ***Error Correction***.)

### Children's Internet Protection Act (See *CIPA*.)

### Chip

Level: 1

*Definition:* Refers to an electronic integrated circuit (IC) embedded in a silicon wafer or chip capable of performing designated instructions or controlling certain electronic functions in computers or other electronic devices installed in everything from car ignition systems to DVD players. (See Figure C–2 and see also ***Integrated Circuit***.)

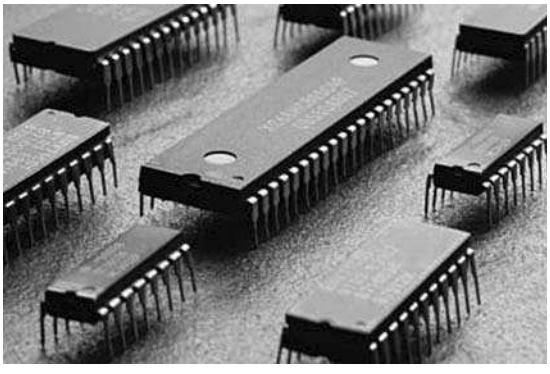

**FIGURE C–2.** Chips.

### Chipset

Level: 2

*Definition:* Refers to a collection of integrated circuits designed to be used together for some specific purpose. For example, one chipset may provide the basic functions of a graphics adapter, whereas another provides the CPU functions for a computer. The term is sometimes used to refer to the primary functionality of a motherboard. (See also ***Chip***, ***CPU***, ***Integrated Circuit***, and ***Motherboard***.)

### Chroma Key

Level: 2

*Definition:* A special effects technique used in video production where one source of video is inserted into a portion of another video segment through the use of color substitution. For example, when shooting video of a spacecraft model so that it appears to be in space, the model is positioned in front of an evenly lit blue screen. The intended space background is shot separately or more likely computer generated. A chroma key effect is used to insert the desired cosmos background to replace the blue screen. The chroma frequencies for blue color are dropped out, creating a hole that is filled in by the filmed background shots or the computerized visual display. The use of chroma keying is most often seen in

news weather forecasting where map visuals are inserted to appear as if they are behind an on-camera meteorologist. Actually, they are standing in front of a green background and a computer-generated map is "keyed" into the green area. Chroma keying replaces everything that is green in the image, so attention must be paid to such things as clothing or other items that may be used in the newscast. (See also ***Virtual Set***.)



### Chrominance

Level: 2

*Definition:* A video signal is made up of two primary characteristics: luminance and chrominance. Chrominance ("chroma" for short) is the color information, which is based on different values of the three primary colors red, green, and blue. Two attributes define chrominance: hue and saturation. Hue denotes the basic color, whereas saturation defines the percentage of white within the color. A greater percentage of white pushes the color saturation into more of a pastel range, whereas less saturation produces a deeper or more vivid version of the hue. (See also ***Component Video*** and ***RGB***.)

### Churn

Level: 1

*Definition:* A term commonly used in telecommunications industries to describe the turnover rate in the number of subscribers to a service or product. Churn rates indicate that subscribers are switching to a different service or company, or eliminating service altogether. Many companies have gone to great expense via promotions and advertising to acquire customers, and find it necessary to keep investing especially in customer service areas to retain their customer base. High churn rates make business planning difficult and are costly for companies, as companies must continually allocate revenues for not only promotion and marketing to attract new customers but to keep current customers happy and to reacquire previous subscribers.

*Used in a sentence:* "Because of the stiff competition among providers, most companies expect a certain amount of customer churn as customers try to find the best deals possible."

### C/I (Carrier-to-Interference) Ratio

Level: 3

*Definition:* The ratio between the signal strength of the carrier and a particular type of noise. Interference can occur throughout a communication transmission and is identified generally as coming from three defined areas: the source, the channel, and/or the receiver. Interference differs from noise in the respect that it comes from some specific, although often unidentified, source.

### CIF (Common Intermediate Format)

Level: 2

*Definition:* Supporting both NTSC and PAL, CIF is a video format that is part of the CCITT H.261 videoconferencing standard, which determines the picture resolution quality of images in videoconferencing. The accepted NTSC CIF standard for videoconferencing is for picture resolution of 288 × 352 pixels at a progressively scanned rate of 30 Hz (i.e., 30 cycles per second). (See also ***NTSC***, ***PAL***, and ***Videoconference***.)

### CIFS (Common Internet File System)

Level: 2

*Definition:* Refers to a protocol that makes it possible for files on different computers around the world to be available for users around the world, no matter what operating system they are using on their computer. CIFS uses Internet protocols (TCP/IP) to connect to other computers, but it also uses a special SMB (server message block) protocol contained in Microsoft Windows for file and printer access. Therefore, without installing any special software users on a CIFS network are be able to open and share files across the Internet using their own familiar desktop software applications such as word processors and spreadsheets. (See also ***Internet***, ***Network***, and ***TCP/IP***.)

### CIM (Computer-Integrated Manufacturing)

Level: 2

*Definition:* A broad term used for manufacturing tools connected to computer control devices. An example would be robotic arms on an assembly line. They perform manufacturing functions

and are either computer controlled via a telecom link or have computer functions installed directly into the robotics. CIM devices tend to cut labor costs and improve precision. Typical CIM functions also include automated supply ordering and quality control checking activities.

### CIPA (Children's Internet Protection Act)

Level: 1

*Definition:* Signed into law in December of 2000, the Children's Internet Protection Act (CIPA) requires libraries and schools to install filters on their Internet computers if they plan to retain federal funding and discounts for computers and computer access. The American Library Association and the Freedom to Read Foundation filed a lawsuit to overturn CIPA, but the Supreme Court on June 23, 2003 (in a 6-to-3 decision), upheld the constitutionality of the Children's Internet Protection Act (CIPA). (See also ***Censorware*** and ***Filter***.)

### Cipher Text

Level: 2

*Definition:* Another term for encrypted text, or text that has been encrypted and cannot be read by machines (or humans) until it has been decrypted using the appropriate key.

*Used in a sentence:* "We received the message, but it must have been in some type of cipher text because we couldn't read it." (See also ***Encryption***.)

### Circuit

Level: 1

*Definition:* A pathway established between two end terminals or stations for purposes of one-way or two-way communication. An electronic circuit provides a physical pathway for the flow of electrons in the intended direction at the intended time.

### Circuit Switching

Level: 2

*Definition:* A type of switching protocol that establishes a communication pathway and maintains the connection until the transaction has been completed. The pathway is a "dedicated circuit" in that the signal will maintain the same course of travel as a continuous stream and at the same transfer rate throughout the transaction until the communication is terminated. Circuit switching was originally designed for the analog-based phone networks but was later modified to use a digital circuit-switching technology called TDM.

### Cladding

Level: 3

*Definition:* The part of a fiber-optic cable that comes in direct contact with the glass core. It is used as a protective device and a method of insulating the light-waves being transmitted. Although some light is absorbed into the cladding, one of its primary purposes is to surround the core with a refractive surface that is used to redirect any lost light back into the core. This helps ensure that the light-wave carrying communication information will not deteriorate or diminish before reaching its intended destination. (See also ***Fiber Optic***.)

### Clarke Belt

Level: 2

*Definition:* In an early science fiction novel, scientist and author Arthur C. Clarke discussed a concept in which every point on earth could be covered by three satellites placed equidistantly in an orbit 22,300 miles above the earth's surface. The purpose in the novel for such satellites was futuristic "big brother" government surveillance. Clarke's fiction was grounded in reality when scientists confirmed the logic of satellites in geostationary orbit almost precisely at 22,300 miles above the equator that could create communications networks covering the earth except for the polar regions. To honor this futurist, the geosynchronous orbit has been named the "Clarke Belt." (See Figure C–3 and see also ***Geostationary Orbit***.)

### CLASS (Custom Local Area Signaling Service)

Level: 3

*Definition:* A grouping of optical enhancements to basic local exchange telephone service. CLASS operations use digital switching and

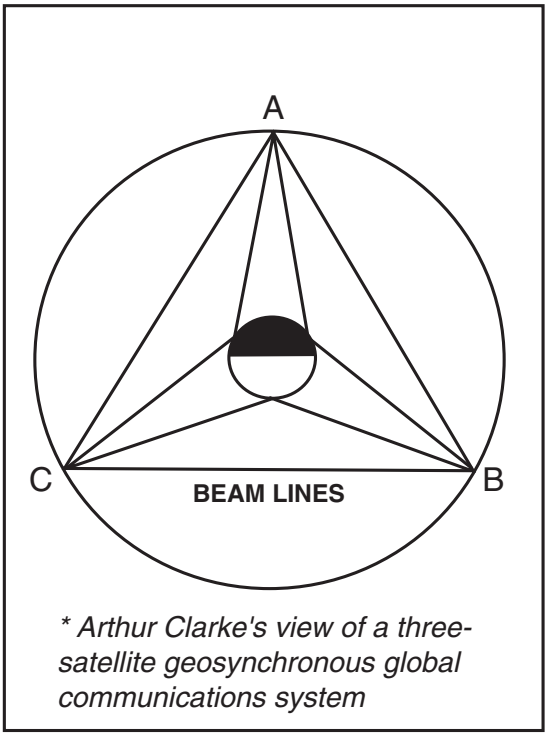


**FIGURE C–3.** Clarke Belt.

out-of-band network control signaling enabling subscribers to screen, selectively reject, forward, trace, or redial incoming calls. Caller ID is a feature enabled by the CLASS system. (See also ***Central Office***.)

### Clean Room

Level: 1

*Definition:* In general terms, an enclosed area in which airborne particles, temperature, relative humidity, and pressure are controlled to specified requirements. Clean rooms are commonly used by semiconductor manufacturers, hard drive manufacturers, and many repair facilities in order to reduce the chances for contamination of the manufacturing or repair process.

### Clear Channel

Level: 2

*Definition:* In radio broadcasting, a 50,000-watt AM radio station that has the right to transmit at full power at night is referred to as a clear-channel station. Other radio stations operating at less power in other markets may use the same frequency during the daytime hours as a clear-channel station, but at night they must significantly reduce power or stop operations to create an interference-free environment for the clear-channel station. Clear-channel stations are usually "grandfathered" in acquiring this nighttime clearance as they have typically been licensed since the earliest days in radio. Clear-channel stations at night have been known to reach thousands of miles across the country, or even further. In another communicationss environment, a clear channel is a transmission line that has access to its full bandwidth for data transmission. In ISDN lines, a 64-kbps channel is considered to be a clear channel because no part of the line is used for signaling, status, or maintenance of the line. Instead, such information is communicated using a method called "out-of-band signaling." (See also ***Out-of-band Signaling***.)

### Click-and-Mortar

Level: 1

*Definition:* Refers to a commercial business that exists in the physical world as well as online, and as distinct from traditional "brick-and-mortar" companies with only fixed building-based operations. (See also ***E-commerce***.)

### Click-Through Rate

Level: 1

*Definition:* Refers to the average number of instances in which an online advertisement was clicked on per hundred ad impressions (expressed as a percentage). Although the click-through rate measures what percentage of people clicked on the ad to arrive at the destination site, it does not include the users who did not click on the ad but arrived at the site later as a result of having seen the ad. In other words, it may be seen as a measure of the immediate response to an ad but it does not measure the overall response to an ad.

### Client/Server (CS)

Level: 2

*Definition:* Client and server distribute the processing of a computer application between two

or more computers, with one or more computers working as the "client" (usually as PC) and one or more computers working as the "server" (usually at a remote location). As the client makes requests of the server, the server processes and delivers information back to the client that can then be used in various ways determined by the goals of the computer application. Most client/server applications can be used by more than one user at a time, with some supporting thousands of simultaneous connections. Client/server networks provide shared access to network resources, including operating systems, database files, software applications, information files, electronic mail messaging, and access to online systems. (See also ***Apache***, ***Tomcat***, and ***Web Server***.)

### Cliff Effect

Level: 2

*Definition:* A characteristic of the digital transmission of radio frequency (RF) signals where there is a drastic change in reception quality resulting from a small change in reception power. By comparison, when an analog RF signal approaches the limits of acceptable reception power the television picture begins to experience gradual degradation with increasing sparkles or snow. (See also ***DTV***.)

### Clipboard

Level: 1

*Definition:* A temporary memory area used by computers that enables the "cutting and pasting" of information from one place in a document to another place in that document or to another document or program. When users select a portion of their document and select "Cut," the information is transferred to the clipboard. When they position the insertion point where they want the information to end up, they can "paste" the information from the clipboard to that specific location. In Microsoft Windows and the Apple Macintosh operating system, the Clipboard can also be used to copy information from one application to another.

### Cloaking

Level: 2

*Definition:* A process by which a web site can display different pages under different circumstances, cloaking is sometimes used to show an optimized page to search engines and a different page to humans. Most search engine companies will refuse to index a site if they discover that it is attempting to use cloaking. Cloaking uses server-side technology that delivers different web pages depending on whether the IP address is from a known search engine spider or someone else. If the page request comes from a search spider, the server feeds an optimized page. Otherwise, a regular page is served.

### Clock/Clock Speed

Level: 2

*Definition:* Generally, clocking elements in a computer or other electronic system are used to synchronize functions, actions, and/or instructions. In a computer, a clock is a timing control device based on the movements of an oscillator. The vibration rate or clock speed is one of the determinant factors regarding the speed with which a computer processes information. If a computer runs at 3 GHz, the clock runs the computer at 3 billion cycles per second. Understanding how many digital bits of information or instructions can be processed per second is related to other factors, such as bus architecture or how the computer's instruction sets are composed. For example, if a computer has a 32-bit bus architecture theoretically 32 bits can be transferred over that bus every clock cycle. If the clock speed of a computer were 1 GHz, 32 billion bits could be transferred per second. In actuality, retrieval of data, storage, and other cycle-intensive processes reduce that data transfer rate considerably. (See also ***Microcomputer***.)

### Closed Captioning (CC)

Level: 1

*Definition:* Refers to text information embedded within transmitted television signals developed to assist hearing-impaired viewers understand dialog or spoken words on television entertainment and news broadcasts. The closed captioning

service was launched in 1980. Dialog or other explanatory text is shown in a display box at the bottom of the screen. A special decoder is necessary in order to have the captioned text displayed. In 1990, Congress enacted legislation requiring all television sets with diagonal screen sizes of 13 inches or greater that are sold or distributed in the United States after July of 1993 to have built-in closed caption decoders. In the case of digital television, closed captioning is transmitted as data in the video user bits of the compressed video signal. (See also ***DTV*** and ***VBI***.)



### Closed System
Level: 2
*Definition:* A computer or communications system in which the technical specifications for interconnections are withheld intentionally from distributors, users, or other third parties. Such systems are also known as "proprietary systems."

### CMC (See *Computer-Mediated Communication*.)

### CMOS (Complementary Metal Oxide Semiconductor)
Level: 3
*Definition:* Originally an abbreviation for complementary metal oxide semiconductor, which is a semiconductor technology used in many integrated circuits, CMOS is now often used to describe the low-level hardware that contains a personal computer's BIOS setting and its hardware clock. Research and development efforts continue to improve integrated circuit chip speeds using CMOS processing. (See also ***BIOS***.)

### CMRS (Commercial Mobile Radio Service)
Level: 2
*Definition:* Regulatory classification by the Federal Communications Commission applicable to all commercial wireless communications service providers, including cellular telephone, personal communications services (PCSs), and enhanced specialized mobile radio. (See also ***ESMR***.)

### CMTS (Cable Modem Termination System)
Level: 3
*Definition:* A CMTS is a set of components on the cable head end that manages digital signals between cable modems and the Internet. When a CMTS receives signals from a cable modem (upstream), it converts them into Internet Protocol (IP) packets and sends the signal to a router for transmission over the Internet. A CMTS can also send transmissions to the cable modem (downstream).

### CMYK (Cyan-Magenta-Yellow-Key)
Level: 2
*Definition:* A color model used for printing that refers to each color according to the presence of cyan, magenta, yellow, and "key" (black). CMYK colors are subtractive, meaning that mixing multiple colors creates black. By contrast, RGB color is additive, meaning that mixing multiple colors creates white. (See also ***Primary Color*** and ***RGB***.)

### CMS (See *Content Management System*.)

### C/N (Carrier-to-Noise) Ratio
Level: 2
*Definition:* A commonly used technical way of expressing the amount of disturbance ("noise") present in a signal. All communications systems have noise. The lowest level of noise in a signal channel or line is background noise due to vibration of atoms. The relationship of signal to noise is represented as a ratio of the measured strength of a carrier signal to the amount of noise present in an RF channel or wire-line link. Noise is considered any disturbance or undesirable energy that negatively affects, impinges upon, or alters the signal. If the amount of noise (i.e., the combined strength of all noise sources) is greater than the power of the signal, the original signal becomes unrecognizable for most communications systems. Devising techniques to eliminate, reduce, mask, or even innovatively reuse the energy in noise are ongoing efforts by communications engineers.

### CO (See *Central Office*.)

**Coarse Wave Division Multiplexing (See *CWDM*.)**

**Coax (Coaxial) Cable**

Level: 1

*Definition:* Refers to a type of broadband communication cable capable of transporting very large amounts of analog or digital information. Coaxial cables are classified into many grades but generally have a center conductor wire, surrounding shielding, and insulation material between the two. The physical design enables signals to be kept inside while other unintended signals are kept out. Some advantages of coax are that it offers a large amount of bandwidth, has good signal isolation, and is useful for carrying very high-frequency as well as low-frequency signals. Common uses of coax include delivery of multichannel video signals in cable systems, connecting computers together in LAN networks, or connecting high-power television and radio transmitters to station antennas. (See Figure C–4.)

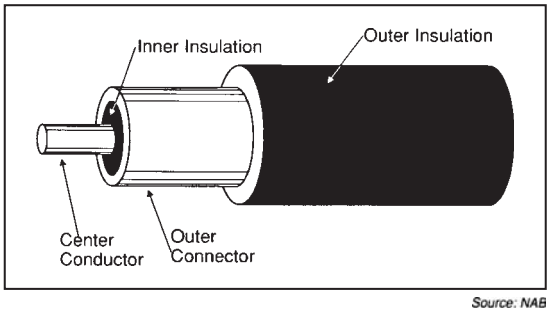


**FIGURE C–4.** Coaxial cable.

**COBOL (Common Business Oriented Language)**

Level: 2

*Definition:* A computer programming language, first developed in the late 1950s, designed to meet the needs of business. Although less often used today, COBOL was well suited for writing programs that process large files and generate detailed reports. The COBOL 2002 standard supports object-oriented programming and includes other modern programming language features. Many COBOL programs are still running today, especially within large financial institutions.

**Code**

Level: 1

*Definition:* Generally refers to any sequence of information written according to a set of defined meanings. Morse code is the transmission of dots and dashes. To encode analog information into digital means using binary code used in computers to convert the signal to correspond to 1s and 0s representing the basic "on" and "off" states in electronic circuits. Alphanumeric code means representing both numbers and letters. Using another more sophisticated set of defined number codes (algorithms), signals can be further encoded using encryption or scrambling code. In digital pay-TV systems such as DBS, end-user equipment decodes or reverses all previous binary and encryption encoding processes for home viewing. (See also ***Binary*** and ***Encryption***.)

**CODEC (Coder/Decoder)**

Level: 2

*Definition:* A term combining coder and decoder and referring to an electronic device or equipment designed specifically to convert voice, video, data, or other analog signals to a digital form for transmission. CODECs can also transform received digital signals back to their original analog form. (See also ***Analog***, ***Compression*** and ***Digital***.)

**Code Division Multiple Access (See *CDMA*.)**

**Coded Orthogonal Frequency Division Multiplexing (See *COFDM*.)**

**Coder/Decoder (See *CODEC*.)**

**COFDM (Coded Orthogonal Frequency Division Multiplexing)**

Level: 3

*Definition:* A technique based on the transmission of a very large number of individual, closely spaced RF carrier signals to transmit digital information. In conventional digital transmission, a single RF carrier is used to transport a signal

from one place to another. Combined with an interleaving mechanism, COFDM techniques can reduce the amount of digital information affected by signal interference when transmitted over the air and help in digital error correction efforts. COFDM has become widely used for various digital radio and television transmission systems and for some computer networking applications. It has been adopted as part of the Eureka-147 digital radio standard and the Digital Video Broadcast (DVB) System for digital video broadcasting in Europe.

### ColdFusion

Level: 3

*Definition:* A product developed to make it easier to integrate web pages with the information contained in databases. Created by Allaire Corporation of Cambridge, Massachusetts (which was later purchased by Macromedia, which has recently been purchased by Adobe Systems), ColdFusion allows for the creation of dynamic content on the Internet. For example, a client/server application built in ColdFusion allows web users to enter information into a web form, submit that information, and generate a custom web page that answers the user's query. For instance, a user might be interested in finding a Chinese restaurant near his home. ColdFusion would allow that user to enter his address into the web form, submit it to a database that compares his address with the addresses of Chinese restaurants in the area, rank order them by proximity, and then show the results to the user. ColdFusion web pages are written in standard HTML but include tags written in ColdFusion Markup Language (CFML) that make it easy to integrate web pages with databases. (See also ***Active Server Pages***, ***Client/Server***, ***ColdFusion***, ***Common Gateway Interface***, ***E-commerce***, and ***Middleware***.)

### Cold Site

Level: 2

*Definition:* Sometimes called a "shell site," "backup site," or "recovery site," *cold site* refers to the physical space of an alternate computing facility that is often leased by a company or organization as part of their disaster recovery plan. The equipment and resources necessary to form a fully functional backup location need to be installed to duplicate critical organizational functions of an organization. Cold sites have many variations depending on their geographic location, communication facilities, power systems, or mobility.

### Collision

Level: 2

*Definition:* Refers to what happens when two or more devices try to send a signal along the same channel at the same time, usually resulting in a garbled or corrupted message. Computer networks use various protocols to either prevent or to minimize the damage done by data collisions as they inevitably occur. (See also ***Protocol***.)

### Color (See *RGB*.)

### Color Burst

Level: 3

*Definition:* In broadcast television, a color burst is a series of 9 to 11 cycles of a color subcarrier signal (carried at 3.579545 MHz) that is inserted into the horizontal blanking interval (HBI). The color burst acts as a color reference to allow TV sets to remain consistently at assigned color values each time a video line is scanned. Without a color burst, the accuracy of the color reproduction would be lower. (See also ***HBI***, ***RGB***, ***Vectorscope***, and ***Video Signal***.)

### Color Subsampling (See *4:2:2*.)

### Comma Delimited

Level: 2

*Definition:* Also referred to as comma-separated values (CSVs), a comma-delimited file separates integral pieces (or "chunks") of data by a comma—making it easier to share plain text information from one software application to another (such as between a database and a word processor). For example, users might store their contact names and addresses in a personal digital assistant but then use that information to print address labels from their personal computer.

They can export their contact database as a comma-delimited (or *.csv*) file, open it in a program such as Microsoft Word, and then print the labels from there. A comma-delimited file would look as follows (with each new line representing a new row in the spreadsheet).

Region, Q1, Q2, Q3, Q4
North, 12, 15, 16, 11
South, 8, 13, 14, 8
East, 22, 26, 29, 20
West, 21, 24, 26, 16

A spreadsheet of this data would look like that shown in Table C–2.

**TABLE C–2** Spreadsheet for a comma-delimited file.

| Region | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|
| North | 12 | 15 | 16 | 11 |
| South | 8 | 13 | 14 | 8 |
| East | 22 | 26 | 29 | 20 |
| West | 21 | 24 | 26 | 16 |

*Used in a sentence:* "My accountant asked me to send her the spreadsheet as a comma-delimited file so that she could import it directly into her accounting software."

### Command Prompt
Level: 2

*Definition:* A display prompt used in computer systems to indicate when the system is ready to receive a user command. In computers or networks running under disk operating systems (DOSs), the command prompt is referred to as the DOS prompt. Although its appearance can be customized, the prompt is typically *A*:\>, where *A* is the drive being activated. On PC systems, the *C* drive is usually reserved for the hard drive and the DOS prompt would be *C*:\> and would be followed by a keyed-in user command. On UNIX systems, the command prompt is often indicated by a *$* sign. (See also ***DOS*** and ***UNIX***.)

### Comma-Separated Value (See *CSV*.)

### Commerce XML (See *cXML*.)

### Commercial Mobile Radio Service (See *CMRS*.)

### Common Business Oriented Language (See *COBOL*.)

### Common Carrier
Level: 2

*Definition:* In telecommunications, a company furnishing communication services to the general public. Interstate common carriers are governed at the federal level and licensed by the FCC according to defined regulatory rules. Service providers such as telephone companies, satellite carriers, or other licensed communications services such as cellular and some new PCS phone services are required to hold out their services on a nondiscriminatory basis to any party seeking to access the network. (See also ***FCC*** and ***PCS***.)

### Common Gateway Interface (CGI)
Level: 3

*Definition:* CGI amounts to a set of rules that orchestrate the communication between a web server and other pieces of software that are handling input and output according to the CGI standard. In many cases, a CGI program is a relatively small program (written in a computer program such as Perl) that takes data from a web server and does something with it, such as putting the content of a submitted online form into an e-mail message. Generally regarded to be the backbone for early Internet e-commerce applications, CGI is still widely used today—making it relatively easy for Internet customers to add items to online "shopping carts," obtain current pricing information on goods, or search for the lowest priced hotel rooms and rental cars available in a certain location. (See also ***Active Server Pages***, ***E-business***, ***E-commerce***, and ***Perl***.)

### Common Intermediate Format (See *CIF*.)

### Common Internet File System (See *CIFS*.)

### Common Object Request Broker Architecture (See *CORBA*.)

### Community Antenna Television (See *CATV*.)

**Compact Disc (See *CD*.)**

**Compact Disc, Read-Only Memory (See *CD-ROM*.)**

**Compact Disc, Recordable (See *CD-R/CDR*.)**

**Compact Disc Rewritable (See *CD-RW*.)**

**CompactFlash**
Level: 1
*Definition:* Invented by SanDisk Corporation in 1994, CompactFlash cards are small, lightweight removable storage cards (using a 50-pin connection standard) that are relatively durable, operate at low voltages, and retain data when power is off. Current storage capacities range from 64 Mb to 4 Gb. There are two types: Type I is 3.3 mm thick, and Type II is 5.5 mm thick. The standard has been expanded to support other peripherals such as modems, network cards, and other types of input/output devices. Today's most popular uses for CompactFlash cards include digital cameras, cell phones, printers, handheld computers, pagers, and audio recorders.

**Competitive Access Provider (See *CAP*.)**

**Complementary Metal Oxide Semiconductor (See *CMOS*.)**

**Component Video**
Level: 2
*Definition:* Color signals used in video production are originated from three basic color forms: red, green, and blue (referred to as RGB). Processing that uses these separate signals is called component video. Certain video cameras can combine these signals into one output signal, but most professional cameras typically provide three separate color component outputs. A component video system will process these signals while keeping them separate. (See also ***RGB***.)

**Composite Video (CV)**
Level: 2
*Definition:* A video signal that contains all of the color information, including luminance and chrominance, as well as any synchronization information within a single signal. This timing information includes both horizontal and vertical synchronization signals. NTSC uses these combined signals for sending broadcast television. In relation to component video, composite has somewhat less resolution due to the fact that all of the information is sent over the same bandwidth instead of separating the RGB information from luminance. However, the quality of composite video has been accepted as the standard for traditional broadcast television.

**Compressed Digital Video (See *CDV*.)**

**Compressed Video**
Level: 2
*Definition:* Digitized video contains an enormous number of bits of information due in part to the rapid picture frame rate of 30 frames per second required to produce full-motion video pictures. For example, traditional NTSC television video is digitized to about 143 Mbps, whereas new HDTV video signals require digital transmission about 1.486 Gbps. Without compression, transmission of video signals at these high bit rates would be prohibitively expensive (or logistically impossible with today's technology) due to the large channel bandwidth capacity required to handle these signals (especially over long distances). Digital compression techniques are used to create a compressed video format to reduce transmission costs, among other things. Depending on the degree of video compression applied, either some or quite a bit of original picture information that is determined to be redundant or unnecessary is eliminated. The quality of the delivered video is determined by how much the signal is compressed. For example, video that is compressed below standard broadcast quality includes VHS-quality or videoconferencing-quality images. (See also ***Indeo*** and ***MPEG***.)

**Compression**
Level: 1
*Definition:* Compression is the technical process of reducing digital information to its essential components for the purpose of reducing the

amount of space it takes up and the amount of time and network capacity it takes to transfer it without eliminating the ability for the information to be recreated at the receiving end. Data compression is different from audio or video compression in that data compression systems need to be of the highest quality to avoid losing any digital bits of information. Such systems use what is called lossless compression. In comparison, audio or video compression techniques discard certain digital bits of information deemed unnecessary or redundant, or remove digital information that will not really be noticeable to human ears or eyes. Removing "redundant" or unnecessary information greatly streamlines the digital transmission process. The removed information is not totally discarded, but through other interpolation techniques the data bits are reproduced and restored at the receiving end. This technique or process is referred to as lossy compression. Using compression techniques, digital audio and video information can be sent at much faster rates without much loss in quality, and they require the use of less channel bandwidth—be it over-the-air spectrum, coaxial cable, fiber, or copper wire line. (See also ***Algorithm***, ***Compression Algorithm***, ***Digital***, ***Lossy Compression***, ***Lossless Compression***, and ***MP3***.)

### Compression Algorithm

Level: 2

*Definition:* A set of mathematical formulas designed to reduce digital information to its barest essentials, but only to a level that will allow the compressed information to be accurately restored at the receiving end and by decompressing the digital information by reversing the application of the same set of formulas. (See also ***Compression***, ***MPEG***, and ***MP3***.)

### Compulsory License

Level: 2

*Definition:* In general terms, a compulsory license allows the use of copyrighted content under "reasonable and nondiscriminatory terms." For example, broadcasters do not need to obtain permission from copyright holders to play songs. However, they must pay usage fees to the copyright holders based on how often a particular song is played. Another example is the copyright license issued to cable operators and others for the carriage of copyrighted works (programming) in broadcast signals without the consent of the originator or owner of the material. Users must comply with established guidelines and pay prescribed royalty fees. The collected fees are redistributed annually to the various copyright owners. Compulsory licenses have been required of cable operators and recently were extended to DBS operators to facilitate their carriage of the signals of local television broadcasters. Television broadcasters previously negotiated and paid for the rights to package the copyrighted programming from various sources, including movie studios, sports rights holders, and syndication program distributors/owners. In addition, copyrighted materials include local-origination programming (notably, local station newscasts, sports coverage, and locally produced programming). (See ***Must-carry*** and ***Retransmission Consent***.)

### Computer

Level: 1

*Definition:* Any device electronically performing mathematical calculations or logical functions based on a set of instructions. In its simplest form, a computer can be a device (such as a numerically based calculator) dedicated to one type of function. Computers, in the literal sense, are now appearing in everything from automobiles to household appliances to mobile phones. (See also ***Mainframe Computer*** and ***Microcomputer***.)

### Computer-Aided Design/Computer-Aided Manufacture (See *CAD/CAM*.)

### Computer Graphics

Level: 1

*Definition:* A type of visual information that can be created, stored, received, and manipulated as data in a computer. Graphics include letters as well as pictures.

### Computer-Integrated Manufacturing (See *CIM*.)

### Computer-Mediated Communication (CMC)

Level: 1

*Definition:* Refers to any human communication that takes place or is facilitated by computers. Under this heading are included communications activities such as e-mail, Internet chat rooms, web discussion groups, instant messaging, and computer video conferencing. (See also ***Chat Room***, ***E-mail***, ***Instant Messaging***, ***IRC***, ***Usenet***, and ***Videoconferencing***.)

### Computer Telephony Integration (See *CTI*.)

### Concentrator

Level: 2

*Definition:* A device that provides a central connection point for cables from workstations, servers, and peripherals. Most concentrators contain the ability to amplify the electrical signal they receive. Concentrators can be used to divide a data channel into two or more channels of average lower speed, dynamically allocating space according to demand in order to maximize data throughput at all times.

### Conditioning

Level: 3

*Definition:* Installation of corrective equipment, typically on a telecommunications line, which modifies or improves certain transmission characteristics such as audio frequency response. This is normally done to increase the digital data carrying capacity of the line or reduce disruptive errors that are being introduced into data signals by the physical line.

### Conductivity

Level: 1

*Definition:* Refers to how well a transmission medium can pass an electric signal through it, depending on the resistance properties of the medium. Before the development of optical glass fiber, measures of conductivity were limited to gauging the speed at which an electrical current could pass through a line. Some media (such as copper wires) were found to be excellent conductors.

### Connection

Level: 1

*Definition:* In its most basic sense, a connection is an established pathway allowing a signal to be transferred from one source to another. Connections apply to any medium, including signals transmitted using RF spectrum (e.g., microwave signals), satellites, fiber optics, cable, or copper wire, among others.

### Connectionless Network

Level: 2

*Definition:* A type of digital data network commonly used for transmitting packetized data in which the packets do not necessarily have to follow the same path as previously sent data. In connectionless networks, no firm connections or pathways are established. Rather, packetized data is sent using all different routes (and routing can change dynamically depending on congestive traffic patterns in switching nodes along the way). (See also ***Internet*** and ***TCP/IP***.)

### Constant Bit Rate (See *CBR*.)

### Contact Manager

Level: 1

*Definition:* In general terms, a contact manager is a software application that allows users to easily store and retrieve contact information such as names, addresses, phone numbers, fax numbers, e-mail addresses, and so on. Some specific implementations of contact management allow users within a group or a company to access the same set of contacts, add notes to each contact, track the frequency of contacts, and much more.

### Content Management System (CMS)

Level: 2

*Definition:* Software that enables an authenticated user (via a web browser) to create, add to, or manipulate content on a web site. Sophisticated content management systems allow an administrator to assign different roles to different users, which makes it possible for one person to take editorial responsibility for a portion of a web site while other parts of the site are maintained by other people. Most CMS applications allow

users with little or no knowledge of web site construction to maintain elaborate sites. Once costing hundreds of thousands of dollars (or more) to develop for each application, there are now a wide range of free-to-use open source content management systems widely available and widely supported. One of the most popular, Mambo, also has components for discussion forums, contact management, document management, and more.

*Used in a sentence:* "Our firm decided to use a content management system to deal with our web presence, allowing us to directly involve employees throughout the company in the day-to-day maintenance of the web site." (See also ***Mambo***.)

### Content Provider

Level: 2

*Definition:* Refers to owners, originators, licensed distributors, syndicators, or any other sources of media and/or multimedia material, programming, text, data, and so on. The major movie studios and television producers are prime examples of content providers. However, web-based efforts from the likes of CNN, Microsoft, and Bloomberg are shaping the content provider landscape. Boundaries between traditional content providers and software and multimedia developers are blurring as the end products become more collaboratively created or re-purposed. (See also ***Digital Watermark***.)

### Context Sensitive

Level: 1

*Definition:* A characteristic of a user interface that adjusts software program actions to respond to the type of operation the user is currently trying to perform. For example, a context-sensitive help system will provide support for the specific actions a user is trying to perform. Another example would be a graphics program that provides text-editing tools/options when the user is editing text versus providing image-editing tools/options when the user is editing an image.

*Used in a sentence:* "I found the context-sensitive help system to be really useful because it would bring up information about the exact feature I was using at the time."

### Contextual Advertising

Level: 1

*Definition:* The process by which advertising is made visible to a computer user based on the content of the web page the user is currently viewing. For example, many search engines and directories have enabled contextual advertising to correspond with the key words or phrases for which the user is searching. So, a Google search for "dogs and cats" produces sponsored links from pet stores, dog trainers, and book publishers. Or a search on a travel web site for flights to Africa might produce pop-up ads, banner ads, or sponsored links to travel agencies. Although most automated contextual advertising systems appear relatively harmless, it is not uncommon for awkward juxtapositions to occur.

### Control (Ctrl) Key

Level: 1

*Definition:* Refers to the key on a PC keyboard labeled Ctrl, which (like the Shift key) is used to gain access to a series of keyboard commands that are activated when pressing the Ctrl key along with another key. The equivalent key on a Macintosh computer is known as the Command key. (See also ***Alt Key***.)

### Controller

Level: 2

*Definition:* Refers to the part of a computer (typically a separate circuit board) that allows the computer to use certain types of peripheral devices, such as hard disks, floppy disks, network cards, keyboards, and so on.

### CONUS

Level: 2

*Definition:* An acronym for *Continental U.S.* and meaning the contiguous lower 48 states of the United States. The term is used commonly to refer to the ability of a communications satellite to provide signal coverage from a specific geostationary orbital location. In video satellite applications such as DTH pay-TV and DBS services, satellites licensed to operate from certain orbital positions are capable of providing full CONUS coverage. Such orbital positions are considered

more advantageous than those that allow only half- or quarter-CONUS coverage.



### Convergence
Level: 2

*Definition:* Term often applied to a continuing trend where telecommunications and media communications businesses that operated as previously separate industries—telephones, television, radio, cable, computer, and electronic information—are converging through mega-mergers, buyouts, partnerships, and strategic alliances. Driven by the digitization of nearly all forms of content and interaction, convergence is also promoted by the easing of restrictive regulatory structures, national moves toward privatization of state-run communications businesses, and increasing global competition. Until now, there have been technological factors that have kept telephone companies from offering video—and cable companies from offering telephone services. In the digital domain, these technology barriers are quickly eroding. Fueled by reforms in federal telecommunications policies, regulatory or structural barriers are also being eliminated or lessened—enabling many industries to take advantage of next-generation technologies.

### Converging
Level: 2

*Definition:* Technical reference to the process within a cathode ray tube or television tube of bringing the three color values (RGB) together from the separate beams projected onto the display screen from an electron gun. For a picture to have clarity, the three separate beams must converge as close together as possible and are thus focused with electronic magnets providing direction for the beams. Each color beam hits a hole in a shadow mask, which is similar to a mesh screen, which further focuses the rays to avoid spillover. In computer networks, "converging" refers to the point where two networks with different protocols share a common language and are thus able to communicate with each other. Wide area networks (WANs) commonly mix different protocols (such as Ethernet with token ring), and convergence points allow this mixing to occur.

### Coordinated Universal Time (See *UTC*.)

### Cookie
Level: 1

*Definition:* Refers to a packet of information automatically sent from a web server and stored in a file on an individual's computer. Cookies are typically used by web sites to track whether or not a web browser has visited that web site on a previous occasion, where the user went on the web site, and whether or not that user is a registered "member" of the web site. Cookie entries can only be read by the web server that sent them, and thus the user information recorded by one web site provider cannot be read by any other party. Nearly all commercial web sites use cookies, prompting concerns among many users that their online privacy is being invaded. (See also ***E-commerce***, ***Spyware***, and ***Web Server***.)

### Co-processor
Level: 2

*Definition:* Similar to the engine that drives a special car, the term refers to any computer processor that assists the main processor in performing special operations, such as mathematical calculations (known as a "math co-processor"). (See also ***CPU*** and ***Processor***.)

### Copyleft
Level: 1

*Definition:* A play on the term *copyright*, copyleft refers to the process of giving the public the legal right to make changes to, make copies of, or distribute a work for free. (See also ***Creative Commons Licensing*** and ***GPL***.)

### Copy Protection
Level: 1

*Definition:* Generally refers to any technological means of preventing the copying of intellectual property. Commonly used by software developers in the 1980s, the technique involved encoding a software program with a digital "lock" making it difficult to provide copies to unauthorized users. Some programs also used a hardware lock (sometimes called a "dongle") to authorize use of the software only on the machine with

the approved piece of hardware. Most copy protection schemes were at one time relatively easy to break, and some produce unwanted conflicts with other software running on a particular machine. Although most software vendors now use registration/activation codes to thwart rampant piracy, copy protection has reemerged as a hot topic with the increase of illegal digital music and video sharing. (See also ***Digital Rights Management (DRM)***.)

### CORBA (Common Object Request Broker Architecture)

Level: 3

*Definition:* Developed by an industry consortium known as the Object Management Group and first released in 1991, CORBA is an architecture that enables pieces of computer programs called "objects" to communicate with one another regardless of where they are located, what programming language they were written in, or on what operating system they are running. The CORBA architecture is widely used by large corporations and organizations working toward interoperable systems. However, both Microsoft [with its Component Object Model (COM) architecture] and Sun Microsystems [with its Remote Method Invocation (RMI)], provide competing approaches.

### Core

Level: 2

*Definition:* The smallest element of a fiber-optic cable. The core is a solid fiber through which light-waves are transmitted. The glass core is surrounded by an optic cladding and buffer material that combined with the core creates the possibility of light-wave transfers via internal reflection. However, being made of glass it has disadvantages in terms of fragility and in making clean connections between two fiber lines. (See also ***Fiber Optic***.)

### CPE (Customer Premises Equipment)

Level: 2

*Definition:* A term initially coined in 1968 after a federal antitrust suit against AT&T opened up the customer premise equipment market. *CPE* was a term initially used to describe any telephone instrument that was not proprietary to AT&T, but later was expanded to include coin-operated phones, PBXs, main stations, and key systems. (See also ***PBX***.)



### CPU (Central Processing Unit)

Level: 2

*Definition:* The critical part of a computer that performs all logical functions, calculations, and transfers and assembles data according to instructions. Computers basically deal with two types of information: instructions and data. Both types of information are represented in binary (0s and 1s) language, which is the only language computers understand. The function of the CPU is to interpret and execute instructions in order to process data. For a command to be processed it must go through the CPU. In the past, all personal computers had only one microprocessor or CPU, but today certain consumer computers are built with multiple processors. Each interprets instructions and processes data, but it may be associated with certain computer functions or tasks—thereby freeing up the main processor (CPU) to perform higher-level tasks. Some people refer to the entire case/box that contains all of the computer's internal components as the "CPU." (See also ***Binary*** and ***Computer***.)

### Crawl

Level: 2

*Definition:* A text-based message aired during a television broadcast usually to inform viewers of important information without interrupting the program in progress. Crawls are created by a character generator and were named to reflect the slow manner in which the text moves across the lower portion of the screen. Examples of crawl messages would be information about tornado sightings, school closings, or local flooding.

### Creative Commons Licensing

Level: 1

*Definition:* A licensing system that offers a wide range of flexible options for creators/owners of various works. Creative Commons licensing is

available under a variety of conditions, including attribution (lets others copy, distribute, display, and perform a copyrighted work, including derivative works based on it but typically only if they give the owner credit), noncommercial use, no derivative work (which allows others to copy, distribute, display, and perform only verbatim copies of a work), and "share alike" (which allows others to distribute derivative works only under a license identical to the license that governs the original work). The Creative Commons was founded as a nonprofit organization in 2001 and offers a wide variety of licensing services through its web site: *http://creativecommons.org.* (See also ***Copyleft*** and ***GPL***.)

### CRM (Customer Relationship Management)

Level: 1

*Definition:* Customer relationship management is a process of integrating business processes (such as sales, marketing, service, and so on) to handle interactions with customers in an organized way. Usually software and Internet based, most CRM systems today help coordinate everything from telephone and regular mail contacts to matching clients with new offers based on past purchase history or expressed preferences. Typically, the CRM system is available to a number of different people within the business or organization, and some systems provide access to customers themselves. For some Internet-based businesses, such as *Amazon.com* or *Netflix.com*, many aspects of the CRM system and the front-end user experience are almost indistinguishable from each other.

### Cross Connect

Level: 2

*Definition:* In telecom networks, this refers to connecting two wires through a phone company main distribution frame (MDF). MDFs at business sites are where any series of telecommunications lines are terminated on a "punch-down block," which exposes the conductive copper of various lines. Cross connects from one line to another can be made to provide direct connections between two separate lines. (See also ***MDF***.)

### Cross Platform

Level: 1

*Definition:* A term that describes languages, software applications, or hardware devices that work on more than one type of computer system. Software makers have to build different versions of their products to make them compatible with various computer systems, such as Word for Macintosh versus Word for Windows. Java programs are an increasingly popular example of cross-platform applications because they can run on Microsoft, Macintosh, UNIX, and other computer operating systems.

*Used in a sentence:* "Because our company uses both PCs and Macs, we had to make sure all of our software was cross platform." (See also ***Java*** and ***Linux***.)

### Cross-Site Scripting (See *XSS*.)

### Crosstalk

Level: 2

*Definition:* A condition where the signal from one circuit crosses over to another circuit. This is what occurs when phone conversations on one line can be heard by those on another line. Traditional telephone copper pair wires are twisted to reduce instances of crosstalk. Typically, 25 to 50 pairs of wire are housed inside a protective sheath. Twisting copper wire pairs together was a technique to reduce voice signals from constantly crossing over to other lines. Outside the telephone system, this is a generic term for stray pick-up from another circuit.

### CRT (See *Cathode Ray Tube*.)

### CS (See *Client/Server*.)

### C7 Standard

Level: 3

*Definition:* The European standard equivalent of the North American telephony switching system, SS7. C7 is not completely compatible with SS7, and thus international gateway switches need to convert the signaling between the two systems in real time prior to domestic distribution on the respective network system. (See also ***SS7***.)

**CSS (Cascading Style Sheets)**
Level: 2
*Definition:* Cascading style sheets contain formatting and style information that is "attached" to a web page, describing how the page is to be displayed in a web browser. CSS supports "cascading," which makes it possible for a single document to use two or more style sheets that are then applied according to specified priorities. Cascading Style Sheets, Level 2 (CSS2) is a more recently developed style sheet language that gives authors more power to separate the presentation style of documents from the content of documents, thus simplifying page authoring and site maintenance. CSS2 is largely backward compatible with the first-generation CSS and supports device-specific style sheets so that authors may tailor the presentation of their documents to visual browsers, screen readers, printers, braille devices, handheld devices, and so on. This specification also supports content positioning, downloadable fonts, table layout, features for internationalization, automatic counters and numbering, and more.

*Used in a sentence:* "Our web developer used cascading style sheets to adapt our content to whatever device a user might employ to access our information, whether it be a personal computer, a handheld computer, or a cell phone."

**CSU (Channel Service Unit)**
Level: 2
*Definition:* A telecommunications device used in digital T-1 or ISDN lines to check the integrity of the line as well as to provide connectivity to other digital sources. A CSU is sort of a demarcation point where the telephone company's digital line connects to a user's digital premise equipment. (See also ***ISDN*** and ***T-1***.)

**CSV (Comma-Separated Value; see *Comma-Delimited*.)**

**CTI (Computer Telephony Integration)**
Level: 2
*Definition:* Existing in a commercial form since the mid 1980s, computer telephony is the technique of coordinating the actions of telephone and computer systems. Originally designed to work in call centers, where large call volumes created the need for computer-coordinated telephone systems, by the 1990s the emergence of cheaper technologies, well-established standards, and a growing interest in computer telephony made the practice more widespread.

**Ctrl (Control) Key (See *Control (Ctrl) Key*.)**

**Current (Electrical)**
Level: 1
*Definition:* A measure of the amount of electrons that flow in one second through a point in an electrical circuit.

**Custom Local Area Signaling Service (See *CLASS*.)**

**Customer Premises Equipment (See *CPE*.)**

**Customer Relationship Management (See *CRM*.)**

**CV (Composite Video)**
Level: 2
*Definition:* A video signal that contains all of the color information, including luminance and chrominance, as well as any synchronization information within a single signal. (See also ***Composite Video***.)

**CWDM (Coarse Wave Division Multiplexing)**
Level: 3
*Definition:* One way of increasing bandwidth on a fiber-optic cable, CWDM is a method of combining multiple signals using uncooled lasers to overlay optical light channels for transmission along fiber-optic cables. Dense wavelength division multiplexing (DWDM) provides more bandwidth (using cooled lasers) but is more expensive to implement. (See also ***DWDM*** and ***WDM***.)

**cXML (Commerce XML)**
Level: 2
*Definition:* **cXML** emerged in 1999 as a business-friendly XML document type definition that facilitates the online exchange of data about

products, especially in the form of automated order receipt, fulfillment updates, and catalogue transport. Originally created by a group of several dozen companies to streamline the exchange of information among them, cXML is now widely implemented and supported by the business community to handle content and supplier descriptions, master agreements, purchase orders (create, edit, and delete), order confirmations, ship notices, invoices, and so on. (See also ***XML***.)



### Cyan-Magenta-Yellow-Key (See *CMYK*.)

### Cyberspace

Level: 1

*Definition:* A term coined in 1984 by science fiction author William Gibson in his seminal book *Neuromancer*. Literally, "the space of cybernetics," the virtual space of computer memory and networks, global telecommunications, and digital media. Cyberspace refers to the virtual space where messages and information reside in transit between telephones, televisions, and computers. The term is now almost synonymous with the Internet, online, and digital worlds. (See also ***Internet*** and ***Online***.)

### Cybersquatting

Level: 2

*Definition:* Refers to the action of registering one or many Internet domain names for the expressed purpose of reselling the name for a profit. One of the more notable transactions was the domain name *wallstreet.com*, which was registered in 1994 for $70 and sold for one million in 1999. Some people have registered every common name and name combination in the off chance of making a fortune from selling it to another organization or person.

### Cycles per second

Level: 3

*Definition:* A unit of measurement for the frequency of an electromagnetic signal (sine wave) where 1 hertz represents one cycle per second. (See also ***Hertz***.)

# D



### D/A (Digital-to-Analog) Conversion

Level: 2

*Definition:* The process of converting digital binary samples of information to analog signals representing sounds or pictures. This is the reverse process of converting an analog signal into a digital signal. Devices for D/A conversions are necessary in all digital systems carrying audio or video, as human eyes and ears essentially operate as physical analog receivers capturing sight and sound as either light images or vibrations. As a result, all digital music or video must be converted back to its original analog form for user playback. (See also ***A/D***.)

### DAC (Digital-to-Analog Converter/Conversion) (See *D/A*.)

### Daisychain

Level: 1

*Definition:* Refers to connecting a number of electronic devices in a network where a signal has to pass through each device to be received by the one located at the end of the chain. Depending on the connections, some networks, using daisychains, provide two-way communication, whereas in connecting equipment such as VCRs in a daisychain the transfer of information is only one-way.

### DAM (Digital Asset Management)

Level: 2

*Definition:* A system that creates a coordinated repository for any type of content that exists in digital form, such as photos, video files, sound files, documents of all types, scanned images, graphics, and so on. All of this content can be archived and stored in databases along with text-based information about each object (also known as "metadata"), making the storehouse fully searchable. Although usually expensive to create or acquire, a well-designed digital asset management system can efficiently facilitate distribution, sharing, and reuse of digital objects.

*Used in a sentence:* "We chose a digital asset management system that made it easier to archive, find, and share all of our graphics, video files, and design documents."

### Dark Fiber

Level: 2

*Definition:* Also referred to as "dim" fiber, it is optical fiber that has been installed for future use, is no longer in use, or the communications system for which it is installed is not yet up and running. As a result, no light-waves are transmitted on the line. Hence, the fiber is dark. (See also ***Fiber Optic***.)

### DAT (Digital Audiotape)

Level: 2

*Definition:* A technology for recording digital music on high-quality magnetic tape. The digital tape format was developed by Sony in 1987 in response to the popularity of digital CDs. DAT has not been popular outside the professional and semiprofessional musician circles.

### Data

Level: 1

*Definition:* A generic reference to any type of digitized information. Digital data may be traditional number data such as banking transactions. But in the digital domain, all information is converted to numbers in the form of binary bit streams of 1s and 0s. Hence, there is voice data, audio or music data, picture or video data, text, graphics, or symbol data. A lot of data is often later transformed back into video images, words, music, graphics, or even "regular" numbers (in base 10) and used as financial information, news clips, movie scores, animated cartoons, and so on.

### Database

Level: 1

*Definition:* A collection of computerized information (i.e., data) that is related to a particular topic

or purpose. Databases generally impose structure to the information, enabling easier and faster data retrieval, manipulation, and management. Some of the leading database application software includes Access, Oracle, MySQL, and SQL Server. A database management system (DBMS) is a formal system of rules, logic, relationships, and data that can be maintained independently of specific hardware platforms and operating environments.

*Used in a sentence:* "We kept a database of all of our customer contact information, which made it much easier to generate mass mailings and follow-up information." (See also ***Data Mining***, ***Data Vaulting***, ***Data Warehousing***, ***Flat File***, ***Middleware***, ***MySQL***, ***ODBC***, ***Relational Database***, ***Replication***, ***SQL***, ***SQL Server***, and ***Table***.)

### Database Server
Level: 3

*Definition:* A database server is designed specifically to store a large database of information that can be accessed by other computers or workstations on a network. Typically, database server systems operate with more memory and management capabilities than other computers in a network. Such servers allow information to be shared among many users, thus eliminating the need to store applications, files, or other network services on each individual computer in the network.

### Data Broadcasting
Level: 2

*Definition:* Refers to a broad range of digital data services that might be provided by radio and television broadcasters to carry digitized information or data. Data broadcasting services can be provided using exiting analog subcarriers or via other in-band digital RF transmission techniques. Pending transitions to all-digital radio and television broadcasting platforms, datacasting will provide expanded options to offer multiple audio, video, and other supplementary data/information or interactive services within the same bandwidth now allocated to each station. A host of new consumer digital receiver devices will be able to decode data broadcast signals for display as simple text, video, graphics, multimedia news clips, tie-in advertising coupons, or subscription data or text services. Digital compression expands future opportunities to offer multiple datacasting services even further. Essentially, data broadcasting relies on digitization of information (e.g., voice, video, data, graphics, and so on) to transmit addressable packetized data simultaneously to a wide variety of specialized receivers. Data/information services could be transmitted for display or storage to TV set-top boxes, PCs, laptops equipped with wireless modems, PDAs, or other wireless appliances.

### Datacasting
Level: 2

*Definition:* A developing industry providing digital data transmission services over television or radio broadcasting facilities. Datacasting is part of the expanding wireless communications universe. Regardless of the datacast service (e.g., data, text, interactive video program-related information, and downloading of advertising coupons to home viewers), it often provides news, weather, traffic, stock market, and other information. The term usually refers to supplemental information sent by television stations along with digital television, but it may also be applied to digital signals on analog TV or radio.

### Data-Circuit-Terminating Equipment (See *DCE*.)

### Data Communications (See *Data*.)

### Data Encryption Standard (See *DES*.)

### Data Glove
Level: 2

*Definition:* Often used as part of the interface between humans and immersive virtual reality environments, a data glove responds to physical movements of the hand as it manipulates objects in the simulated environment. Data gloves can be put to a variety of uses, providing its users with a tactile sense of interacting with a computer. Not all uses are designed for virtual environments: a 2001 high school science fair winner designed

a data glove system that could translate sign language into spoken words via a computer. (See also ***Haptic***.)

### Data Link
Level: 2
*Definition:* Series of digital telecommunications transmission elements (equipment, line, computer interfaces) combined to provide connectivity between two end users in a network. The successful transfer of digital information between the two nodes in a network establishes a data link. (See also ***Network***.)

### Data Mining
Level: 2
*Definition:* The process of analyzing data and looking for trends or tendencies in large databases that might produce economically viable information. Data mining focuses on making productive use of the massive amounts of information stored in all types of databases, from customer records to transaction reports to inventories and product histories. Data mining is just one of the many dimensions of the growing "Information Age," in which information itself becomes a commodity. (See also ***Data Warehousing*** and ***Relational Database***.)

### Data Over Cable Service Interface Specification (See *DOCSIS*.)

### Data Packet
Level: 3
*Definition:* Refers to a single frame in a digital packet-switched message. Most data communications is based on dividing the transmitted message into packets. For example, an Ethernet packet can be from 64 to 1,518 bytes in length. (See also ***Ethernet***, ***Packet***, and ***TCP/IP***.)

### Data Rate
Level: 2
*Definition:* A measure of the amount of digital bits transferred in a set period of time. The data rate of a line or channel in the network is its capacity to transmit digital information at a constant speed and is measured typically in bits per second (bps). (See Table D–1 and see also ***bps***.)

**TABLE D–1** Digital data rate measures.

| Prefix | Letter Abbreviation | Number of Bits | Power of 10 |
|---|---|---|---|
| Kilo | K | 1 thousand | $10^3$ |
| Mega | M | 1 million | $10^6$ |
| Giga | G | 1 billion | $10^9$ |
| Tera | T | 1 trillion | $10^{12}$ |
| Peta | P | 1 quadrillion | $10^{15}$ |
| Exa | E | 1 quintillion | $10^{18}$ |
| Zetta | Z | 1 sextillion | $10^{21}$ |
| Yotta | Y | 1 septillion | $10^{24}$ |

### Data Stream
Level: 2
*Definition:* Refers to the transmission of a series of data in a continuous stream where there are no gaps or pauses. (See also ***Bit Stream Transmission***.)

### Datasuit
Level: 2
*Definition:* A body suit with an array of electronic motion devices that translate physical body movements into digital data, enabling the wearer to be used as the motions for graphical animations or to enable the user to participate in a virtual reality system. (See also ***Data Glove***, ***Motion-capture Bodysuit***, and ***Virtual Reality***.)

### Data Terminal Equipment (See *DTE*.)

### Data Vaulting
Level: 2
*Definition:* Also referred to as "remote backup services," data vaulting is a process used to protect important data by storing it at another physical location, usually off-site, for safekeeping. Some companies provide web-based backup services, enabling customers to store data on their servers. These firms offer several security measures, including backup power supplies, data encryption, and staffed security. (See also ***Archive***, ***Data Mining***, ***Data Warehousing***, ***Encryption***, and ***Incremental Backup***.)

### Data Warehousing

Level: 2

*Definition:* The process of storing, organizing, and retrieving information in typically large databases. Data warehousing often involves the use of special software that compresses the data and makes it more easily searchable. Data warehouses can also contain "snapshots" of corporate data that can be analyzed without slowing down the day-to-day operations of the company. As more and more companies convert their operations from paper to computer, more and more thought and planning needs to be devoted to deciding how much information needs to be "warehoused," for how long, and in what format. (See also ***Data Mining*** and ***Relational Database***.)

### Daughterboard

Level: 3

*Definition:* A daughterboard is an extension of a computer's "motherboard" (main circuit board). It is usually a secondary circuit board that is used to plug in smaller boards. A daughterboard needs to be connected to the motherboard, but not all data has to be transferred through the motherboard. If two peripherals need to communicate with each other, the information transfer could take place through the daughterboard (provided both peripherals are connected to it). (See also ***Motherboard***.)

### dB (Decibel)

Level: 3

*Definition:* A logarithmic measurement unit that describes the relative loudness of a sound, although it can also be used to describe the relative difference between two power levels. For example, dBk is the amount of power in a system relative to 1 kilowatt of power. The letter after the dB is critical because that establishes the reference point of the ratio. If there is no letter after dB, only the ratio (not the absolute value) of the measurement can be determined. For example, a change of +3 dB in the power of a signal is the same as doubling the power, and a change of –3 dB is the same as halving the power. Decibel ratios are calculated by taking the logarithm of a ratio and multiplying that by a constant, usually 10 or 20. The dB method is used to describe differences in voltage, current, field strength, pressure, density, and so on, but the constants in the formula for the ratio of each of these quantities are different. Because the calculations involve logarithms, converting values to dB ratios reduces the chance of mistakes in placing a decimal when working with systems that have very large and very small values, such as TV and radio signal generation and transmission systems.

### DBS (Direct Broadcast Satellite)

Level: 1

*Definition:* Direct broadcast satellite services, also referred to as direct-to-home (DTH) services, use high-power satellites transmitting on internationally designated Ku-band frequencies to provide hundreds of channels of video, sports, news, pay-TV, premium PPV events (e.g., sports, concerts), and, more recently, Internet services. Since its debut in the United States in late 1994, DBS has continued to take market share away from the cable industry, impacting cable's long-held dominance as the leading multichannel provider of video entertainment services.

### DC (Direct Current)

Level: 1

*Definition:* Direct current (DC) is one of two fundamental types of electrical power; the other is alternating current (AC). Batteries produce DC. Utility companies deliver 60 Hz AC to almost all users in the United States. Electronic devices need DC power. A converter changes the AC power to DC power for use by electronic equipment. Some appliances may not convert the AC into DC. For example, a simple toaster may not. All devices that have electronic controls make the conversion, or use batteries. (See also ***AC (Alternating Current)***.)

### DCE (Data Circuit-Terminating Equipment)

Level: 3

*Definition:* Also known as "data communication equipment," DCE makes up the device and connections of a communications network that comprises the network end of the user-to-network

interface. DCE provides physical connection to the network, forwards traffic, and provides clocking signals used to synchronize data transmission between DTE devices and itself. (See also ***DTE***.)

### DCT (Discrete Cosine Transform)

Level: 3

*Definition:* A set of mathematical manipulations that generates information describing the signal being processed. The description is in a form such that important information can be distinguished from less important information. Compression, by throwing away information that will not be missed when the signal is reconstructed, can be more easily accomplished after this transform is performed. DCT is a step in the process of both JPEG and MPEG compression algorithms. (See also ***JPEG*** and ***MPEG***.)

### Debugging

Level: 1

*Definition:* The process of detecting, diagnosing, and correcting faults, flaws, or anomalies in computer system circuitry, computer management software, program applications, databases, or other related hardware or software systems.

*Used in a sentence:* "It took a lot of debugging to make our new software work with our existing hardware systems."

### Decibel (See *dB*.)

### Decoder

Level: 2

*Definition:* Any electronic device used to reconvert or translate information from one established protocol or standard to another. In computer and digital communications systems, digital decoders could be used both internally and externally. Inside a computer, digital bits are converted into text words on a display screen using a particular word processing application program. Decoders are also used in video distribution systems such as interactive TV, cable, or new telephone-based broadband networks in which subscriber set-top boxes are used to decode or unscramble video channels to provide access to subscribers or those ordering PPV events. Other types of digital decoders are used to reconstruct error-protected coded signals so that information removed in compression or actually lost or damaged bits can be recovered or restored to the original form of the signal. (See also ***Encoding/Decoding***.)

### Decryption

Level: 2

*Definition:* Decryption is the process of restoring or reversing an encoded or encrypted signal to its original form. Encryption involves modifying, rearranging, or scrambling a signal such as a pay-TV channel through the use of an algorithm designed to make the source material (audio, video, text, and so on) unable to be heard, viewed, or interpreted by an unauthorized recipient. (See also ***Encryption***.)

### Decryption Content Scrambling System (See *DeCSS*.)

### DeCSS (Decryption Content Scrambling System)

Level: 2

*Definition:* DeCSS is a decryption program developed in 1999 that removes copy protection from DVDs. CSS stands for content scrambling system, a weak encryption used for movie DVDs. DeCSS was used as a blueprint by programmers around the world to create hundreds of similar programs. DeCSS is a tiny (60 KB) utility that copies the encrypted DVD video file, giving it a *.vob* file extension, and saving it to the hard disc without encryption (i.e., without being "scrambled"). That *.vob* file can then be copied and distributed at will. In the United States, DeCSS is being treated as a violation of the Digital Millenium Copyright Act of 1998. However, DeCSS is widely available on the Internet. (See also ***DMCA***, ***DMCA 1201***, and ***Encryption***.)

### Dedicated Line

Level: 1

*Definition:* Phone industry terminology for a telephone line that has been leased by a specific customer (usually a business) for exclusive use of the line for its own communications needs. Dedicated lines are often leased to provide an easy

connection from one building to another to link offices within the same company.

**Defrag (Defragment)**
Level: 1
*Definition:* A term referring to a process for making more efficient use of computer hard drive space. This is necessary because as files are continually stored and deleted, small noncontiguous "sectors" or "clusters" of the hard drive become unusable, forcing large files to be stored in bits and pieces all over the hard drive. Continually accessing these noncontiguous blocks of data slows down the computer operation and contributes to physical wear and tear on the disk drive itself. "Defragging" the disk rearranges the information stored on the drive into larger contiguous blocks, typically freeing up previously unusable space and making the drive work more efficiently.

**Defragment (See *Defrag.*)**

**Delta Modulation (See *DM.*)**

**Delta YUV (See *DYUV.*)**

**Demarc (Demarcation) Point (See *Demarcation (Demarc) Point.*)**

**Demarcation (Demarc) Point**
Level: 2
*Definition:* The point of separation between telephone company communication facilities and those of a business or residential subscriber. It refers to the physical interconnection point where legal jurisdiction is transferred from the phone company to a subscriber or user so that servicing of terminal equipment, protective apparatus, or writing at a subscriber's premise is the responsibility of the user.

**Demodulation**
Level: 2
*Definition:* The process of recovering information from a previously modulated carrier frequency. Modulation and demodulation are used in transmitting commercial radio and television broadcasting signals, as well as in many other communication services that are transmitted using radio waves. In computer communications, demodulation is the means by which a modem converts data transmitted in audio form over a telephone line to the digital form needed by a computer, with as little distortion as possible.

**Demultiplexing (Demux)**
Level: 3
*Definition:* The process of separating or recovering the individual signals or channels that had been combined into a single multiplexed signal for transmission. (See also ***Multiplexing***.)

**DeMUX (See *Demultiplexing.*)**

**Denial-of-Service (DoS) Attack (See *DoS (Denial of Service) attack.*)**

**Dense Wave Division Multiplexing (DWDM)**
Level:3
*Definition:* A more recent type of digital photonics technology where data transmissions are sent as multiple optical signals through a single fiber-optic line. Dense wave techniques use several laser light sources and detectors operating simultaneously at different light wavelengths.

**Deregulation**
Level: 1
*Definition:* The reversing, easing, or elimination of previous regulatory policies or laws that have generally become outdated, outmoded, or unduly restrictive as a result of changes in business market conditions, competitive structures, and/or technical advancements since the regulations were first enacted. For example, the Telecommunications Act of 1996 deregulated many segments of the communications industry, allowing for more direct competition among different businesses and industries. Because of this legislation, cable operators are allowed to provide telephony services, local phone companies may offer interactive video, and long-distance companies (including notably AT&T) may provide local telephone services, among other major reforms. (See also ***Telecommunications Act of 1996***.)

### DES (Data Encryption Standard)

Level: 2

*Definition:* Developed in 1977 by IBM, this is a means of scrambling digital data (via an encryption block cipher). DES provides strong encryption based on "symmetric cryptography," the process whereby both the sender and receiver must use the same secret key for both encryption and decryption. DES can also be implemented by individual users who want to encrypt information (such as files and folders) on a hard disk. "Triple DES," a variation of the original, uses up to three keys, each encrypted, to increase security. The U.S. government adopted the DES standard in 1977, which has been recertified many times by the National Institute of Standards and Technology (NIST). In 1997, more than 14,000 computer users orchestrated an attempt to crack a DES-encrypted message and succeeded, leading NIST to open a competition for its replacement. The Advanced Encryption Standard (AES) has emerged as the new government-endorsed method of scrambling digital information. (See also ***AES*** and ***Triple DES***.)

### Descriptive Video Service (See *DVS*.)

### Designated Market Area (See *DMA*.)

### Desktop Publishing (DTP)

Level: 1

*Definition:* Computer-based hardware systems, including peripheral devices, and specialized publishing-oriented software designed to easily create, compose, and manipulate various word processing text files, graphics, and other special effect or design elements into publication layout formats for newsletters, brochures, magazines, or reports.

### Desktop Videoconferencing

Level: 1

*Definition:* The process of using a personal computer with graphics capabilities and desktop cameras to enable videoconferencing among two or more parties in remote locations. From the computer, this connection can be transferred over standard analog telephone lines, but it is more commonly used with high-speed Internet connections. Higher transfer rates translate into a sharper picture that has the ability to refresh itself more often, thereby giving the receiver a more continuous and less static picture. Through the use of desktop videoconferencing, virtual offices can be created where an employee has the flexibility to work from any location as long as he or she is connected visually to the main office and/or clients. (See also ***Broadband***, ***ISDN***, ***Teleconferencing***, and ***Videoconferencing***.)

### Device Manager

Level: 2

*Definition:* Refers to a feature of a computer's operating system that allows the user to view and change the settings or "properties" of the various computer devices such as printers, modems, disk drives, and so on. (See also ***Operating System*** and ***Windows***.)

### Deutsches Institut für Normung (See *DIN*.)

### Dictionary Attack

Level: 2

*Definition:* A "brute force" method used by hackers to break into password-protected computer systems by using software that includes an exhaustive list of possibilities to determine another user's password. For example, if someone were using *aardvark* as his or her computer password, a dictionary attack utilizing entries in a common word dictionary would quickly yield a match. Dictionaries can include not only what one would find in a common word dictionary but lists of places, proper names, single-word movie and book titles, and so on. Most system administrators and password generator systems attempt to thwart dictionary attackers by issuing passwords that combine alphabetic and numeric strings into "nonsense" passwords (such as n7df435s) that are unlikely to appear in any "dictionaries" used by hackers. However, many users find such passwords difficult to remember. A more recent practice that makes it easier for users to remember relatively strong passwords puts together two words in unusual combinations, such as *timeword* or *laserknuckle*.

*Used in a sentence:* "The hacker was using a dictionary attack that went through three different versions of an English dictionary, a name dictionary, and a collection of book and movie titles trying to figure out the password to our system." (See also ***Hacker***, ***Password***, and ***Strong Password***.)



**Differential Phase-Shift Keying (See *DPSK*.)**

**Differential Pulse Code Modulation (See *DPCM*.)**

**Differential Quaternary Phase-Shift Keying (4 PSK) (See *DQPSK*.)**

**Digital**
Level: 1
*Definition:* Digital formats, digital systems, and digital equipment all rely on the same fundamental operating condition—which is that all information processing, transfers of signals, storage of information, and related functions are represented in numerical code or form (but not just any numerical form). For reasons of simplicity, digital computers were intentionally designed to function by corresponding to the two states of transmitted electrical pulses (namely, power is either On or Off). On and off conditions could be represented precisely by using two numbers: 0 and 1. This set of two digits is also a particular numbering system called binary ("bi" meaning "two" and "nary" loosely meaning numbers). Digital information is a precise way of expressing different forms of information that can be quantified in some way. How precisely the information is quantified, or by what technique(s), goes a long way toward determining how close a digital signal such as a video clip is compared to the original 35-mm film. Digital formats are rapidly replacing analog signal formats (tapes, records, film), which were really just an earlier form of information technology that seeks to replicate real-world sights and sounds using a continuous waveform. Because digital systems require the conversion of images, audio recordings, or voice conversations into numerical code, some things get lost in the translation—either intentionally as with compression or unintentionally due to a variety of degradation errors. Most newer electronic formats, CDs, CD-ROMs, DVDs, computers, wireless PCSs, HDTV, and DAB are digital. Digital's advantages are that it is simple and numerical, and thus errors can be mathematically predicted and therefore reduced and/or corrected. Digital is also flexible, can be manipulated and encoded, lends itself to various transmisson methods, and is less subject to degradation than traditional analog signal technology.

**Digital Asset Management (See *DAM*.)**

**Digital Audiotape (See *DAT*.)**

**Digital Betacam**
Level: 2
*Definition:* Launched by Sony in 1993, Digital Betacam is a widely used recording format used in video production that provides an excellent reliability and cost-to-quality ratio. (See also ***Betacam SP***.)

**Digital Cable**
Level: 2
*Definition:* Using digital compression, digital cable delivers to customers' homes a significant increase in the number of channels offered by most of today's cable companies. Because it has the ability to handle two-way communication (without the use of a telephone line), digital cable has opened up a compelling array of interactive and on-demand services.

**Digital Camera**
Level: 1
*Definition:* Refers to a camera that stores images in digital form rather than on film. Once the pictures have been taken and stored on a memory card, they can be downloaded to a computer or printed out on a special printer. The quality of images taken by a digital camera is limited to the quality of the photosensors (measured in megapixels) and the amount of memory the camera is able to use in storing the image. One advantage of using a digital

camera is that users do not have to use a scanner to input photos into a computer. Rather, they can simply download the images directly into the computer and then manipulate them however they wish.

### Digital Certificate (Digital ID)

Level: 3

*Definition:* An entity (typically a company) that issues digital certificates to other organizations or individuals to allow them to prove their identity to others. A certificate authority might be an external company such as VeriSign (which offers digital certificate services) or an internal organization such as a corporate MIS department. The certificate authority's chief function is to verify the identity of entities and issue digital certificates attesting to that identity. (See also ***Authentication*** and ***Certificate Authority***.)

### Digital Copyright

Level: 1

*Definition:* An increasingly complex and difficult issue in the digital age for all creators, producers, and originators of intellectual property content from authors, newspapers, and film studio to music composers, video programmers, and artists of all types. The seminal advantage of digitization is its ability to offer relatively easy access to an enormous wealth of digital information/material content. This accessibility is also its biggest liability in terms of the ease of unauthorized distribution and duplication on a mass scale. The Digital Millennium Copyright Act is one example of an effort to address the interconnected issues of consumer right to access and traditional copyrights for content originators. (See also ***DMCA*** and ***Digital Rights Management***.)

### Digital8

Level: 2

*Definition:* Developed by Sony in the late 1990s, Digital8 is a consumer digital videotape format that combines Hi8 tape transport with the DV codec. Digital8 encodes signals digitally using the same videocassette media as its analog Hi8 predecessor. Although Digital8 recordings can be made on standard-grade Video8 cassettes, Hi8 metal-particle cassettes are recommended for Digital8 recording.

### Digital ID (See *Digital Certificate.*)

### Digital Ink

Level: 2

*Definition:* In a general sense, "digital ink" refers to the process of digitizing handwriting. Usually accomplished with a "pen" or "stylus" that is moved over a screen surface that can communicate its shifts in position to software that then translates the movements into either an image or to typed text (using handwriting recognition software) on the screen. This process is now more widely used with Tablet PCs that allow users to treat the display screen as a writing pad that translates what is written via the stylus into either handwritten or typed text on the screen. (See also ***Tablet PC***.)

### Digital Light Processing (See *DLP.*)

### Digital Media

Level: 2

*Definition:* A general term to refer to any form of media that exists in digital form, including Internet content, audio, video, interactive media, and so on. Digital media are distinct from "electronic media" in that they are encoded digitally, whereas electronic media such as standard television, over-the-air radio, and so on are not necessarily digital.

### Digital Millennium Copyright Act (DMCA)

Level: 1

*Definition:* Designed to bring U.S. copyright laws into the digital age, DMCA was signed into law by President Clinton in 1998. For example, the act criminalizes attempts to use, create, sell, or distribute any technologies that circumvent copyright protection of any digital product. It also requires webcasters who distribute music via the Internet to pay royalty fees to recording companies. The act also increases the penalties for copyright infringement on the Internet, but reduces the liability of online providers for violations

committed by their users. Many have criticized the act for its denial of consumer rights and its far-reaching unintended consequences. (See also ***DeCSS*** and ***Digital Rights Management***.)

**Digital Object Identifier (See *DOI*.)**



**Digital Radio**
Level: 2
*Definition:* Refering to over-the-air broadcast or cable radio that uses a compressed digital format for transmission, digital radio effectively increases the capacity of a transmission channel and can accommodate data transmission. (See also ***IBOC***.)

**Digital Rights Management (See *DRM*.)**

**Digital Satellite System (See *DSS*.)**

**Digital Service Unit (See *DSU*.)**

**Digital Signaling, Zero Level (See *DS-0*.)**

**Digital Signal Processing (See *DSP*.)**

**Digital Signature**
Level: 2
*Definition:* Electronically coded messages that accompany text messages, identifying the author of each document or component. For example, all ActiveX controls transmitted over the Web are digitally signed by their creators.

**Digital Subscriber Line (See *DSL*.)**

**Digital Subscriber Line Access Multiplexer (See *DSLAM*.)**

**Digital Television (See *DTV*.)**

**Digital-to-Analog (D/A) Conversion (See *D/A Conversion*.)**

**Digital-to-Analog Converter (Conversion) (See *DAC*.)**

**Digital Transmission Content Protection Over Internet Protocol (See *DTCP-IP*.)**

**Digital Versatile Disk (See *DVD*.)**

**Digital Video (See *DV*.)**

**Digital Video Broadcasting (See *DVB*.)**

**Digital Video Disk (See *DVD*.)**

**Digital Video Express (See *DivX*.)**

**Digital Video Recorder (See *DVR*.)**

**Digital Watermark**
Level: 1
*Definition:* An invisible identification code permanently embedded into data as a means of preventing piracy or fraud.

**Digitization (See *Digitizing*.)**

**Digitizing (Digitization)**
Level: 2
*Definition:* The process of converting analog signals or physical items such as printed documents and photographs into digital form (computer readable). Methods of digitizing range from typing text into a word processor, using optical character recognition software to scan already-printed text, scanning graphics or photographs, sampling and quantizing sound, and so on. (See also ***Digital***, ***OCR***, and ***Scanner***.)

**DIN (Deutsches Institut für Normung)**
Level: 3
*Definition:* A long-established standards-setting organization that establishes technical standards in Germany for electronic and industrial products. Many of these standards have been accepted in most industrialized nations and many electronic system components employed outside the United States are built to DIN standards. Certain DIN standards have become accepted worldwide, such as those for the dimensions of cable connectors, which are often referred to as DIN connectors.

**Diode**

Level: 3

*Definition:* Diodes are devices that for all practical purposes allow electrical current to flow in only one direction; for example, from positive to negative or negative to positive. An arrangement of diodes can be the basic tool for converting an AC electrical power signal to DC by rearranging the negative and positive pathways of the input current so that the output currents have the same polarity. Some diodes also emit or detect light via a more complex but related process.

**DIP Switch**

Level: 2

*Definition:* One of a series of small switches that provide for manual alterations to the way a computer board or other electronic control board functions. These switches function as either on or off, and as a result a series of linked dip switches can create a binary code, which a computer can interpret. In RF generators, different binary codes represent the frequency of the carrier wave for a modulated signal, thus setting a specific dip switch determines which radio frequency will be generated. Whereas these switches were once common on computer equipment such as modems, innovations in circuitry and standardization in industry protocols has removed the need for such manual alterations on most peripheral devices today.

**Direct Broadcast Satellite (See *DBS*.)**

**Direct Current (See *DC*.)**

**DirectDraw**

Level: 3

*Definition:* Refers to Microsoft's registered trademark of a system developed by Intel that transfers the processing of video signals from the CPU to the computer's video adapter. For example, DirectDraw is often used by TV tuner cards that can be installed in PCs, allowing users to watch TV programs on their computer while they work. DirectDraw can also be used to make computer games display complex graphics more quickly and smoothly, although DirectDraw is not optimized to render 3D graphics. Most of DirectDraw's functionality has been folded into a new package called DirectX Graphics.

**Directional Antenna**

Level: 1

*Definition:* A commonly used terrestrial or ground-based antenna system that propagates signals toward a specific direction or directions. This type of antenna system is useful for AM radio stations seeking to extend signal coverage toward more populated areas in a market. If licensed as a directional AM station, signal strength can be shaped or directed to cover only certain geographic areas. But these directional signals cannot interfere with other stations on the same channel (co-channel) or on adjacent frequency channels. In general, if interference occurs a particular AM station may have to reduce power and/or adopt the use of a directional antenna pattern to avoid the interference, especially at night. Directional antennas are also used for over-the-air television systems.

**Direct-Sequence Spread Spectrum (See *DSSS*.)**

**Direct-To-Home (See *DTH*.)**

**DirecTV (See *DBS*, *DSS*, and *DTH*.)**

**Disaster Recovery Plan (See *DRP*.)**

**Disc**

Level: 1

*Definition:* In common usage, there are disks, and then there are discs. The two generally represent the same type of digital storage function but are not used interchangeably. The primary distinction relates to the type of medium used for digital information storage. A computer device that magnetically stores information is a disk such as a hard disk drive or a floppy disk. Newer optical technologies such as CDs, CD-ROMs, and DVDs appear to prefer to use "disc." Whereas bits are bits, disks are not discs.

**Discontinuity**
Level: 2
*Definition:* An electrical pathway that has been disturbed or altered in some fashion, which interrupts the flow or transfer of a signal.



**Discrete**
Level: 3
*Definition:* In communications, this is used as a descriptive term to denote a precise or contained environment, or quantity. In a telecommunications T–1 line, there are 24 discrete or totally separate channels in a single line. In converting audio music information into digital form, discrete samples of the continuous analog signal are extracted and converted to digital for recording or transmission. The term can also be used to describe "discrete components" compared to "integrated circuits."

**Discrete Cosine Transform (See *DCT*.)**

**Dish**
Level: 1
*Definition:* Common term for parabolic satellite antennas, which along with decoder and other electronics are part of a satellite earth station facility. Some dishes can perform both uplink and downlink functions, but most often the term is used for antennas being used by consumers to receive satellite video entertainment programming. Dishes include the older, larger "back-yard" television receive-only (TVRO) antennas measuring 3 to 5 feet and used for C-band reception and the smaller Ku-band antennas able to receive digital DBS or DTH services measuring 18 to 24 inches in diameter. (See also ***DBS***.)

**Disintermediation**
Level: 2
*Definition:* A term that refers to the removal of the "middle man" or the intermediaries typically involved in commercial transactions. It is commonly applied to Internet-based businesses that use the Web to sell products directly to customers rather than going through traditional retail channels. Disintermediation theoretically allows companies to lower their prices and run their businesses more efficiently. (See also ***E-commerce***.)

**Disk**
Level: 1
*Definition:* An electronic storage device for digital information from which data can be retrieved, augmented, or deleted as needed. Magnetic hard disks used in computer operations are organized or divided into tracks and sectors to facilitate and maximize storage and maximize storage and accessing functions. In new multiple platter systems, such as RAID, or in hard drives with multiple disks, the magnetic heads used to write on the disks are lined up on similar tracks and sectors on each platter. Electronic pointers are inserted at the end of a sector to indicate where additional data is stored in another sector. (See also ***RAID***.)

**Disk Cache**
Level: 2
*Definition:* A buffer area in computers used for temporary storage of information being transferred into or out of a hard disk or floppy disk. Such input/output (I/O) transactions are the most time intensive of all computer functions, reducing computer efficiency dramatically. Disk cache accumulates data into bundles before sending it to storage and can retrieve the next logical piece of information from a hard disk. Another type of disk cache keeps recently accessed disk information in memory, reducing the amount of time the CPU has to wait to retrieve this information if accessed again. (See also ***Cache*** and ***I/O***.)

**Disk Operating System (See *DOS*.)**

**Display**
Level: 1
*Definition:* An electronic output device that visually reproduces information from a computer or television receiver. Some displays provide for interactivity in that an individual can access desired information through the use of a touch screen menu. For example, some displays include the standard 525-line (total) NTSC monitor with a 4 × 3 aspect ratio, or the HDTV display, which

provides up to 1,125 lines (total) of resolution with a 16 × 9 aspect ratio. (See also ***DLP***, ***Flat-panel Display***, ***Graphics Adapter***, ***HDTV***, ***LCD***, and ***Plasma***.)

### Dissolve

Level: 2

*Definition:* A transition technique used in video editing and live broadcasts that gradually replaces one on-screen video image with another. As the visual value of the first signal dissipates, the value of the second increases until it becomes 100% of the picture. Dissolves are also used in 35-mm films for montage scenes, typically presenting the illusion of the passage of time or a memory.

### Distance Learning

Level: 2

*Definition:* The process of using telecom networks, satellite video, and computer technology to enable teachers to interact live, in real time, with students located in distant locations across town, state, region, or country. Distance learning has rapidly grown, as it is viewed as a major public benefit that justifies the rapid deployment of advance telecommunications technologies. (See also ***Digital Divide***.)

### Distortion

Level: 2

*Definition:* Alteration or deviation of a signal with a typical example in broadcasting being overmodulation. Distortion from overmodulation may show up in overly bright luminance, causing lettering used in commercial segments to become so "hot" that the information cannot be properly interpreted at the receiving end. In digital voice or data transmissions, distortion interference can disrupt the integrity of the signal and cause misinterpretation of the signal at the receiving end.

### Distributed System

Level: 3

*Definition:* In a distributed network system, various parts of the network have specified functions or capabilities. There is no centralized hub directing the entire system. True client/server architectures are examples of distributed data systems where processing takes place both at the client workstation and the main file server. (See also ***Client/Server***, ***Internet***, and ***Novell***.)

### DivX (Digital Video Express)

Level: 2

*Definition:* A DVD-ROM format promoted by several large Hollywood companies, including Disney, Dreamworks, Paramount, and Universal. A subscriber-based service that is connected to the home through a telephone line, DivX movies were playable only during a specific time frame (typically two days). As soon as the customer begins playing a DivX disc, the countdown is activated. Although the service was for a short time seen as a viable alternative to video store rentals, it was always handicapped by the fact that the DivX format was not backward compatible with current DVD-ROM players. This meant that current DVD player owners needed to purchase a new DivX player to play DivX tides. DivX has now evolved into a digital video compression format based on the MPEG-4 technology that can reduce DVD files down to one tenth of their original size and via which video files can be downloaded over high-speed lines in a relatively short time without sacrificing the quality of the digital video. DivX is often used on the Internet to exchange video files. (See also ***DVD***, ***File sharing***, and ***MPEG***.)

### DLL (Dynamic Link Library)

Level: 3

*Definition:* A technique used extensively by Microsoft that uses a collection of small programs that are activated only when needed by the larger programs to which they are associated. In other words, DLL files allow a very large program such as Microsoft Word to load into the computer's memory without loading all of the possible options that might be needed at any given time. If users choose to print a document, Word finds the printing DLL files and loads them into memory. Once the printing is done, the memory space taken up by the printer DLL files is cleared. This approach makes for much more efficient use of any computer's limited memory resources. Some DLL files can be used by many programs at the same time. On the other hand,

if a DLL file is accidentally deleted, lost, or corrupted it is very likely that certain parts of Windows applications will have difficulty running. DLL files usually end with the extension *.dll*, *.exe*, *.drv*, or *.fon*. (See also ***Microsoft Windows*** and ***Operating System***.)



### DLP (Digital Light Processing)

Level: 3

*Definition:* Something of a breakthrough in projection display technology, DLP is a proprietary electromechanical device invented by Texas Instruments that reflects light, pixel-by-pixel, creating a projected image that is significantly sharper and brighter than conventional LCD projection systems (even in normally lit rooms). The key components of DLP are the digital micromirror device that stores image information and reflects light with thousands of tiny mirrors; a scan converter that decodes multiple signal sources into progressive red, green, and blue information; and an RGB color filter wheel. (See also ***HDTV*** and ***LCD***.)

### DM (Delta Modulation)

Level: 3

*Definition:* A technique used in the telecommunications industry for converting analog voice signals to digital form for transmission.

### DMA (Designated Market Area)

Level: 2

*Definition:* Nielsen Media Research's defined areas for local television viewing markets. DMAs are nonoverlapping geographic markets. Each county in the continental United States is annually assigned to a single DMA based on Nielsen's local audience estimates called the Nielsen Station Index (NSI). DMAs are frequently used for the planning, evaluation, and purchase of commercial time based on television audience estimate data. DMA markets are used in determining the share of local viewing achieved by commercial television stations serving metro areas and/or local DMA television markets. For example, in 2005 the top five DMAs were (in order) New York, Los Angeles, Chicago, Philadelphia, and Boston. (See also ***Nielson/NetRatings***.)

### DMCA (See *Digital Millennium Copyright Act.*)

### DNS [Domain Name (Server, Service, System)]

Level: 2

*Definition:* The system of technologies that allows Internet users to connect to domains using alphabetic names instead of having to use the Internet Protocol (IP) numbers. When the user types the domain name into the location bar of his/her browser, such as *www.nab.org*, the DNS system is accessed and searched. When it finds an IP number to match the domain name (*www.nab.org* = 209.116.240.200), it allows for the initiation of an online connection to the servers hosting that particular web site. If one DNS server cannot make the match, that server passes its request along to other servers until a match is made or an error is generated because there is no corresponding entry. Sometimes when a new domain name is created is takes several hours (or sometimes a day or two) for the DNS entry to make its way into the system.

*Used in a sentence:* "You've received an error message that says 'DNS Entry Not Found,' which means that there's no record of that name currently being listed on the Internet." (See also ***HTTP*** and ***IP Address***.)

### Docking Station

Level: 2

*Definition:* Electronic platform equipment allowing a portable device, such as a laptop or a digital camera, to be plugged into the "dock"—enabling it to be quickly connected to other devices, such as a standard computer monitor, full-function keyboard, mouse or pointing device, and other computer peripheral equipment such as printers, fax machines, or scanners. Full computer docking stations also have expansion slots that make it possible to add expansion cards to the laptop/docking station configuration. Docking stations are used to create a readily accessible workstation for users needing a laptop computer for the mobility but rapid set-up and ergonomic comfort when working at home or in an office for

long periods of time. Most mobile computer manufacturers make docking stations for their brand of laptops, but there is no standard docking station architecture. Typically, the only vendor from which a docking station can be acquired to ensure complete compatibility is the manufacturer of the dockable device. (See also ***Ergonomics*** and ***Port Replicator***.)



### DoCoMo

Level: 2

*Definition:* The dominant provider of mobile services in Japan, the word *docomo* means "everywhere" in Japanese. NTT DoCoMo has more than 50 million subscribers to its digital network (a 56% market share). In terms of subscribers, it is one of the world's largest mobile phone operators (behind Vodafone). More than 41 million customers subscribe to NTT DoCoMo's i-mode service, which provides Internet access from mobile phones. The company also offers maritime and in-flight phone services and sells handsets. (See also ***Internet Appliance***, ***3G***, and ***Wireless Internet Device***.)

### DOCSIS (Data Over Cable Service Interface Specification)

Level: 3

*Definition:* A standard that enables high-speed data distribution over cable television system networks. Developed by CableLabs for interface specifications for cable modems and related equipment, DOCSIS defines functionality that allows cable operators to provide guaranteed bandwidth to cable modem customers. The current version, DOCSIS 2.0, provides support for increased upstream bandwidth and better overall throughput. (See also ***Broadband***.)

### Document Object Model (See *DOM*.)

### Document Type Definition (See *DTD*.)

### DOI (Digital Object Identifier)

Level: 2

*Definition:* Created to assist in the tracking of digital information and to help enforce copyrights online, the digital object identifier (DOI) is a system for identifying content objects in the digital environment. The DOI system assigns a persistent unique name to every digital object on the network, providing information about the object's location, its content, and other information about the object. As the object is changed or as it moves through the network, the DOI information is updated, allowing for easier management of intellectual property in a networked environment and for the expansion of automated services and transactions. Managed by the International DOI Foundation (*www.doi.org*), an open membership consortium including both commercial and noncommercial partners, the DOI system has recently been accepted for standardization within the International Standardization Organization (ISO). According to the DOI Foundation, several million DOIs have been assigned by DOI registration agencies in the United States, Australasia, and Europe. (See also ***DAM***.)

### Dolby

Level: 2

*Definition:* Named for its creator, Ray Dolby, Dolby sound was one of the first stereo systems developed for use in movie theaters. Dolby is currently available in updated surround sound capacity in certain home entertainment systems. Newer movie theaters have enhanced the sound quality of their theaters by installing digitally reproduced surround sound formats such as THX (developed by Lucasfilms). The ultimate goal of these newer digital systems is to give the viewer the feeling of being surrounded by the action. The range of commercially released Dolby technologies is impressive, ranging from Dolby Stereo to Dolby Digital (also known as 5.1 surround sound); to Dolby Digital Surround EX (which introduces a center channel to the 5.1 playback format); Dolby A, B, C, and S (noise reduction systems for tapes and analog cassettes); to Dolby E (used in digital television).

### DOM (Document Object Model)

Level: 3

*Definition:* The Document Object Model is intended to be a platform- and language-neutral interface that allows programs and scripts to

dynamically access and update an HTML or XML document's content (what is in the document), structure (how the document is put together), and style (how the document appears to the user). For example, in web pages the DOM can be used to standardize the look of fonts or for the processes of validating a fill-in form or the visual appearance of rollover effects when a user mouses over one image that dynamically swaps in another image. (See also ***CSS***, ***DHTML***, ***HTML***, and ***XML***.)



### Domain Name

Level: 1

*Definition:* A naming system that identifies each unique web server on the Internet (e.g., *www.nab.org*). When a user types a domain name into the location box of a web browser, a domain name server (DNS) processes the request to match the domain name with its associated address on the Internet, which makes it possible to contact that specific server directly and then download content from that server to the individual user's computer. (See also ***DNS***, ***Domain Name Hijacking***, ***Dot.com***, ***Internet***, ***InterNIC***, and ***Round-robin DNS***.)

### Domain Name Hijacking

Level: 1

*Definition:* Usually refers to the unethical practice of transferring a domain name from its registered holder (the person or organization that currently "owns" the domain name) to a person or organization that intends to either take over the domain or use it as a way to redirect users to a different site. Although there are safeguards in place to prevent such abuses of the system, because of its global reach the domain name registration process still has enough loopholes to make domain name hijacking a relatively common occurrence. Registered owners can protect themselves against hijacking by renewing their registrations in a timely fashion, making sure that their contact information maintained by the registrar is current (some registrars will cancel domain name registrations if they are unable to contact the registered owner within a specified period of time), and by placing a registrar "lock" on their domain. This will lock the domain record at the registry level and prevent it from being transferred, modified, or deleted by a third party. (See also ***DNS***.)

### Domain Name System/Service/Server (See *DNS*.)

### Dongle

Level: 2

*Definition:* Known also as a "hardware key," a dongle is a small electronic device about the size of a matchbox used by some software manufacturers to prevent unauthorized/unlicensed use of their software. The device is usually attached to a computer's parallel port and contains certain authentication settings that verify whether a particular software is acceptable (i.e., not pirated) and thus able to be run on that system. Use of hardware keys or dongles make it nearly impossible for users to install illegally acquired software because the software will not run without an appropriate dongle attached to the machine. However, the use of dongles has declined as more sophisticated software-based copy protection systems have been developed. (See also ***Copy Protection***, ***Parallel Port***, and ***Product Activation***.)

### DoS (Denial-of-Service) Attack

Level: 2

*Definition:* An attack by hackers or computer troublemakers that is designed to shut down a computer network by flooding it with useless, redundant traffic. Three common strategies that fall under the DoS label are the rampant consumption of computational resources (such as bandwidth, disk space, or CPU time), disruption of configuration information (such as network traffic/routing information), and disruption of the actual physical network components. One of the largest DoS attacks in Internet history occurred over several days in February of 2000 when popular web sites such as Yahoo, eBay, CNN.com, and Amazon.com experienced outages caused by an intentional overload of traffic to their sites. In several cases, the instigators were able to flood their targets with more than 10 times the traffic their systems were designed to handle. Although there are software measures that can prevent these types of attacks, there are always

new strategies emerging for shutting down large computer networks. (See also ***Hacker***, ***Internet***, and ***TCP/IP***.)

### DOS (Disk Operating System)

Level: 2

*Definition:* DOS was a type of personal computer operating system commercially developed by IBM and used in all later IBM "clones" or IBM-compatible computers. DOS was created by a small computing company in Seattle as QDOS (Quick and Dirty Operating System) and developed further by Microsoft and Bill Gates. Gates sold QDOS to IBM but retained the intellectual property rights of the operating system for Microsoft. Early versions of Windows were little more than a graphical shell running on top of DOS. Later versions of Windows have moved away from a dependence on the old DOS architecture. However, most legacy DOS-compatible programs will still run under most Windows environments. (See also ***Command Line***, ***GUI***, and ***Windows***.)

### Dot.com

Level: 1

*Definition:* Popularized term that was used to refer to the tremendous growth of companies in the 1990s that sought to establish an Internet presence and to leverage that presence with a mission and business model that was designed to take advantage of the evolving online space. Although the term is still used to refer to the "Dot.com boom" of the late 1990s, it has developed a somewhat negative connotation after the "Dot.com crash" that began in 2000. The term is derived from the original "naming protocol" established to classify or identify different types of Internet domains. The protocol requires the use of a period and a specific three-letter extension to identify a domain. These broad classifications have usually been called "top-level domains" and include the following categories: *.com* (for commercial business providers), *.edu* (for educational institutions), *.gov* (U.S. government agencies), *.mil* (U.S. military), *.net* (network operators), and *.org* (for nonprofit organizations or other groups). (See also ***DNS***, ***Domain Name***, ***E-commerce***, ***Internet***, and ***WWW***.)

### Dot Pitch

Level: 3

*Definition:* Dot pitch is a measurement technique referring to the distance (in millimeters) between the pixels or visual dots that make up the image on a video display screen or PC monitor. It is one of the most common ways to judge the visual quality of a computer monitor. Typical dot pitch measurements range from 0.28 mm to 0.51 mm, but large presentation monitors may have technical capabilities that range up to 1.0 mm. Basically, the smaller the dot pitch or space between the pixels in a video display the crisper the image and higher visual quality. A dot of 0.31 mm or less provides a relatively sharp image for displaying text. High-end video graphics monitors and video game players often use dot pitches at 0.25 mm or less. LCD monitors do not emphasize the same indicator of quality. Rather, their emphasis is on the amount of time it takes to redraw images (which greatly effects the quality of full-motion video and animation).

### Downconverter

Level: 2

*Definition:* A device that converts high-definition television (HDTV) video to standard-definition video so that it can be viewed on conventional television receivers and computer monitors or recorded onto DVD. A full-function HD downconverter performs these functions with a minimum of blurring, aliasing, and conversion noise and can provide output at a variety of refresh rates and aspect ratios. HD downconverters make it possible for HDTV broadcasters to send signals to conventional television users. They can also be used to simulcast HD content over the Internet so that the output can be viewed on a computer monitor.

### Downlink

Level: 2

*Defintion:* Refers to the transmission of a signal from a satellite to an earth-station receiving antenna. Specific downlink frequencies are established for satellites operating in various satellite bands (C-band, Ku-band, and so on). Downlinks are distinctly separate from uplink frequencies that are used for transmitting originating signals

from earth stations to a satellite. Possible interference is greatly reduced by having satellite uplink and downlink frequencies typically located at different ends of their assigned spectrum bands. For example, Ku-band DBS satellites operate with uplink frequencies at 17.3 to 17.8 GHz, and downlink frequencies at 12.2 to 12.7 GHz. Satellite services are identified commonly by their downlink frequencies. As a result, DBS services are described as Ku-band services at 12 GHz. (See also ***Satellite*** and ***Uplink***.)



### Download

Level: 1

*Definition:* Generally means to transfer information from an outside source or a peripheral device into computer memory. Current popular use of the term usually refers to downloading files or information from the Internet. (See also ***File Sharing*** and ***Upload***.)

### Downstream

Level: 1

*Definition:* Refers to the direction of data flow on a data communications link as it flows from the network down to the user. In the case of Internet access, downstream refers to the capacity of data flowing from servers on the Internet to the end user's computer or local network.

*Used in a sentence:* "While I'm accessing the Internet via my satellite connection, the downstream transfer rates are a lot faster that those going upstream." (See also ***Upstream***.)

### Downtime

Level: 1

*Definition:* Usually refers to the time a system is out of operation for any reason, usually for repairs, maintenance, system upgrading, and so on. Computer services are sometimes rated based on the percentage of downtime experienced by the system.

### DPCM (Differential Pulse Code Modulation) (See *PCM*.)

### DPSK (Differential Phase-Shift Keying)

Level: 3

*Definition:* A type of signal modulation that is a variation on PSK, where the system is organized to recognize whether there was a difference between two adjacent bits, and if there is a change (say from 0 to 1) the shift in signal phase is transmitted. If no difference is detected, no shift in phase is required. (See also ***PSK***.)

### DQPSK (Differential Quaternary Phase-Shift Keying (4 PSK)]

Level: 3

*Definition:* A variation of DPSK in which two digital bits can be modulated rather than just one, so twice the amount of signal information can be transmitted using four different phases (e.g., 90, 180, 270, and 360 degrees, representing four different bits, two 1s and two 0s). A further variation is 8 PSK, where eight discrete signals can be modulated using any of eight established phases—allowing four times the amount of information to be transmitted as a regular phase-shift key modulation scheme. (See also ***PSK***.)

### Drag and Drop

Level: 1

*Definition:* A computer operation that came into being with the use of a "mouse" as a pointing device and the introduction of intuitive graphics-oriented "front-end" software such as the Macintosh operating system and Windows from Microsoft. Using a mouse or other pointing device, drag and drop is the process of selecting a picture icon, a portion of text, or some section of a document and dragging it to relocate it to another file folder, open document, or section in the computer's filing system. Graphical user interface (GUI) software was first available in Apple's Macintosh system, and Mac users enjoyed more types of drag-and-drop capabilities such as repositioning files within organizational "folders." Drag and drop has now become a standard feature of most user interfaces. (See also ***GUI***.)

### DRAM (Dynamic Random Access Memory)

Level: 2

*Definition:* The principal memory storage device in PCs and one of two main types of computer RAM. DRAM memory constantly requires being electrically refreshed or recharged or memory will dissipate. Any form of RAM is temporary storage

where instruction sets and data will be lost if power is interrupted. (See also ***RAM***.)

### Drill-Down

Level: 1

*Definition:* A type of information access system in a computer interface that allows the user to access categories, types, or subsections of information at deeper and deeper levels within an information architecture. For example, a series of menu options on a web site might allow a user to "drill down" from general information to very specific information. In a discussion group, one might drill down from a forum to a topic to a thread to a specific message. Or in a database, a drill-down might allow navigation from a general category to a specific field, then to a specific file, and then to a specific record.

*Used in a sentence:* "The drill-down menus made it easy to access really specific information hidden in the inner reaches of the system." (See also ***GUI***.)

### Driver

Level: 2

*Definition:* A type of computer software providing a specific communication link between a peripheral device such as a printer or an MP3 player and the personal computer. Various software drivers enable a range of peripheral devices to communicate with the central microprocessor. Driver software is used to provide instructions to appropriate connection "ports" for particular peripheral devices and provide translation for incompatible instructions. Driver software can become corrupted or lost, requiring reinstallation using the original CD-ROM or downloaded file. Drivers can also be updated to fix bugs or provide more features.

*Used in a sentence:* "My printer wouldn't work until I downloaded and installed the updated driver."

### DRM (Digital Rights Management)

Level: 2

*Definition:* Digital rights management systems, using a set of specific allowances determined by publishers, help protect the copyright of materials by defining how the content can be used. Many DRM systems work by encrypting the data to allow for permitted uses/distribution of the data while at the same time preventing unauthorized use and distribution of that data. A more primitive version of DRM is the "watermark," which embeds bits of information within the digital file that can be used to identify the owner/originator of that work. (See also ***Digital Watermark*** and ***Watermarking***.)



### Drop

Level: 1

*Definition:* In the cable industry, a drop is the portion of the cable network that connects a subscriber's home from the feeder network. A drop line extends from the cable "tap" to a subscriber's set-top converter box. Drop lines may be aerial or buried underground, depending on the method of construction used. (See also ***Cable***.)

### Dropper

Level: 2

*Definition:* Although not as common today as they might become in the future, a "dropper" is a computer program that has been designed or modified to "install" a virus onto the target system. The dropper itself is not the virus. Rather, the virus code is usually contained in a dropper in a way that prevents it from being detected by virus scanners that normally detect that virus. A dropper that installs a virus only into memory is sometimes called an "injector." (See also ***Trojan Horse*** and ***Virus***.)

### DRP (Disaster Recovery Plan)

Level: 1

*Definition:* Refers to the plan used to resume or recover a specific essential operation, function, or process of an enterprise. For example, a database disaster recovery plan usually includes backup and recovery procedures, standby databases, data replication, fail-safe options, and more.

### DSL (Digital Subscriber Line)

Level: 2

*Definition:* A digital technology that significantly increases the digital capacity of ordinary twisted-pair copper phone lines. DLS provides high-speed

**TABLE D–2** DSL variations.

| | |
|---|---|
| ADSL | The widely recognized DSL flavor is Asymmetrical DSL (ADSL), which is available in two modulation schemes: discrete multitone (DMT) or carrierless amplitude phase (CAP). ADSL and its variants can share the same line with regular voice service essentially because they utilize higher frequencies than voice channels. However, they require a splitter at the customer's premises to separate the voice from the ADSL data traffic. |
| Universal ADSL | Also referred to as G-lite, ADSL Lite, or Splitter-less ADSL, eliminates the splitter requirement, but other phones connected to the line may have to plug into low-pass filters to isolate them from the ADSL frequencies. |
| CDSL | Consumer DSL is an asymmetric service that supports regular 56-kbps (V.90) modem connections, if full ADSL service is not available in a particular geographic area. RADSL: Rate Adaptive DSL adjusts transmission speed based on signal quality. |
| IDSL | ISDN DSL provides ISDN speeds, but does not support regular voice service and does not use the switched telephone network as does ISDN. |
| HDSL | High Bit Rate DSL is the most widely used variant of DSL technology, providing T-1 speeds over existing twisted pair without requiring the additional provisioning required for setting up T-1 circuits. |
| SDSL | Single Line DSL is a variation of HDSL but only uses one pair of cables instead of two. Both HDSL and SDSL cannot share lines with regular voice channels. |
| VDSL | Very High Bit Rate DSL is expected to be used as the final drop from a fiber-optic switching point to nearby customers. The extremely high capacity of VDSL would enable an office complex to have high-band-width services using existing copper wires without having to replace the entire infrastructure with optical fiber. Like ADSL, VDSL can share the line with the telephone. |



data connections (up to 6 Mbps) over local loops by dividing the phone line into two segments: one for voice, modems, faxes, and so on and the other exclusively for digital data. The data channel runs parallel, and does not interfere, with the regular voice channel. Thus, users can make phone calls or send faxes while connected to the Internet. The technology is geared to Internet access with its asymmetric architecture (faster downstream than upstream) and relatively short-haul connection distance. Typically, DSL connections provide 512 kbps to 1.544 Mbps (T-1 rate) of downstream capacity and about 128 kbps upstream capacity. DSL is attractive to telecommuters and small- to medium-size businesses because it provides a reliable and affordable means of maintaining a constantly available fast connection to the Internet, while not requiring a second line for phone and fax services. The availability of DSL service depends on the proximity of a user/client to the phone company's local switching office, and is usually limited to a three-mile radius. Unlike digital ISDN, which uses the traditional switched telephone network, DSL provides "always-on" operation. At the telecommunications central office, DSL traffic is aggregated in a unit called the DSL access multiplexor (DSLAM) and forwarded to the appropriate ISP or data network. xDSL refers to different variations of DSL, such as ADSL, HDSL, and RADSL. (See Table D–2 and see also ***ADSL***.)

### DSLAM (Digital Subscriber Line Access Multiplexer)

Level: 3

*Definition:* A device at a phone company's central location that makes it possible to expand its high-speed Internet connection capacity by linking many customer DSL connections to a single high-speed ATM line. (See also ***ATM***.)

### DSP (Digital Signal Processing)

Level: 3

*Definition:* A digital microprocessor that alters, enhances, or filters continuous analog signals through a digitization process. A wide variety of applications and products use DSP, including faxes, modems, computer disk drives, mobile

wireless cellular or PCS service, medical imaging technologies, computer graphics, and so on. Some uses of DSP include the decoding of modulated signals from modems; processing/manipulating sound, video, and images in various ways; and interpreting data from sonar, radar, and seismological readings.

### DSS (Digital Satellite System)

Level: 2

*Definition:* Trade name for a satellite decoder and small 18-inch antenna system developed and sold under the RCA brand of consumer electronics manufacturer, Thomson. The DSS consumer equipment system was developed under an exclusive marketing agreement with DBS service providers DirecTV and USSB, guaranteeing DSS sales to the first million DBS subscribers. (See also ***DBS*** and ***DTH***.)

### DSSS (Direct-Sequence Spread Spectrum)

Level: 3

*Definition:* A wireless network transmission technology where a data signal at the sending station is combined with a higher data rate bit sequence (called a "chipping code") that divides the user data according to a predefined spreading ratio. Because the chipping code is a redundant bit pattern for each bit transmitted, its presence increases the signal's resistance to interference. If one or more bits in the pattern are corrupted during transmission, the original data can be recovered because of the redundant signals embedded in the transmission. (See also ***FHSS***.)

### DSU (Digital Service unit)

Level: 3

*Definition:* In telephone industry lexicon, a device used for converting computer information from data terminal equipment (DTE) devices to digital phone lines. T–1 line services can be distributed to one or more computers or videoconferencing units through a DSU device. A DSU is similar to a computer modem, although information remains in digital form and is not converted to an analog signal. Conversion of the digital information into usable form is necessary for digital network data to be compatible with local phone network connection devices. (See also ***RS-232***.)

### DS-0 (Digital Signaling, Zero Level)

Level: 3

*Definition:* Refers to the lowest level in a set of worldwide digital signaling standards for telecommunications transmission of voice signals using pulse code modulation. DS-0 signals are transmitted at a rate of 64 kbps. Typically, DS-0 lines are divided into two segments: a 56-kbps portion for digitized voice traffic and an 8-kbps portion used for internal network signaling. When all 64 kbps capacity is used, the line is called a "clear channel." Newer standards for higher data rates for optical fiber networks have been established. (See Table D–3 and see also ***SONET***.)

**TABLE D–3** Telephone digital signaling standards.

| Standard | Digital Data Rate |
|---|---|
| DS-0 | 64 kpbs |
| DS-1 | 1.5 Mbps |
| DS-1C | 3.15 Mbps |
| DS-2 | 6.2 Mbps |
| DS-3 | 44.7 Mbps |
| DS-4 | 274 Mbps |

Source: Bellcore.

### DTCP-IP (Digital Transmission Content Protection Over Internet Protocol)

Level: 3

*Definition:* DTCP-IP is an emerging specification that allows for secure transmission of digital content within a "digital home" or "home network." For example, a DTCP-IP-enabled home streaming media device makes it possible for networked computers and other media devices such as televisions and sound amplifiers to share copyrighted material from a commercial provider (such as recorded movies, songs, and so on) without making that content available to people who are not members of that home but are still within that wireless network's transmission range. DTCP-IP

will allow authenticated devices within the home to share information, but it prevents that information from being shared with other users throughout the Internet. Most proponents of DTCP-IP believe it to be an essential piece of the "digital home" or "smart home" implementations that are expected to take off during the next several years. (See also ***Smart Home***.)



### DTD (Document Type Definition)

Level: 3

*Definition:* Used to control the structure and content of an SGML, XML, or HTML document, a DTD states what tags and attributes are used to describe content, where each tag is allowed, and which tags can appear within other tags. For example, an online book would have one DTD and an online journal article would have a different DTD. This allows each DTD to handle elements such as titles, subtitles, bylines, sections, body content, citations, and so on differently for each type of publication. Changes in the format of the document can be easily made by modifying the DTD. (See also ***DOM***, ***HTML***, ***SGML***, and ***XML***.)

### DTE (Data Terminal Equipment)

Level: 3

*Definition:* In general terms, DTE converts user information into signals for transmission or reconverts the received signals into user information. In the telephone industry, DTE is jargon for any equipment that is related to, or connects to, a computer workstation. DTEs refer to equipment at a user's location, and not to any phone company equipment used in its telecom network to provide transport or routing. (See also ***DCE***.)

### DTH (Direct To Home)

Level: 2

*Definition:* Generally associated with satellite industry service providers that deliver video, audio, and some Internet services directly to consumers/subscribers—typically via small, 18-inch home satellite receiving dishes. (See also ***DBS***.)

### DTP (See *Desktop Publishing*.)

### DTV (Digital Television)

Level: 2

*Definition:* DTV refers to all digital television formats and standards established by the Advanced Television Systems Committee (ATSC). Two basic DTV formats are HDTV (high-definition television) and SDTV (standard-definition television). DTV can be employed to carry more channels in the same amount of bandwidth or it can be used to deliver high-definition programming. Because the signal is digital, it eliminates common analog broadcasting artifacts such as ghosting, "snow," and static noises in audio. However, these artifacts can be replaced by digital ones—especially "blocking," which results when encoding bit rates are too low to complete the picture. The DTV system is scheduled to completely replace the NTSC system in the United States as early as 2009, freeing up significant portions of the broadcast spectrum for resale by the government and reuse by new ventures. (See also ***HDTV*** and ***SDTV***.)

### Dubbing

Level: 2

*Definition:* The process of adding audio and/or video material to an existing video source. It involves using a main source input tape and at least one other input source, with the output created on a third tape or recorded medium. In analog dubbing, the quality of the original source material is degraded during the dubbing process due to equipment imperfections. The amount of degradation acceptable for professional television use is typically down to the third or fourth generation of videotape. As an extreme example, if a dub is performed to a VHS tape from a high-quality TV studio tape machine only about half the resolution of the studio tape image could be retained due to the relatively narrow video signal bandwidth of VHS. VHS video contains only about 230 scan lines of picture resolution compared to 484 scan lines for standard NTSC broadcast television. As a result, a VHS-dubbed tape would not be acceptable for broadcast quality after just

one generation. The move to digital format has removed most of the quality loss from the dubbing process as long as appropriate compression schemes are used and appropriate destination media (such as DVDs) are used.

### Dumb Terminal

Level: 2

*Definition:* Refers to a computer terminal system with keyboard and monitor allowing users to interface with a mainframe computer, but without any individual microprocessing functions or capabilities. UNIX and VAX operating systems typically use dumb terminals where users are able to access information but have no local storage capability. (See also ***Telnet*** and ***vt100 (video terminal 100)***.)

### Duplex Communication (See *Full Duplex* and *Simplex*.)

### DV (Digital Video)

Level: 2

*Definition:* Released in 1996, DV is a tape format that has become a mainstay for consumer and semiprofessional video production. Related formats include miniDV, DVCPRO, and DVCAM. DV tapes can be connected to a computer (such as a nonlinear editing system) using an IEEE-1394 connection and a playback device. Unlike analog format, which is an electronic signal that loses quality every time the video signal is duplicated, DV format suffers no loss of quality when duplicating video sources. DV provides good video quality, especially compared to earlier consumer analog formats (such as 8-mm, Hi-8, and VHS-C formats), making it possible for consumers and semiprofessionals to produce relatively good-quality productions at increasingly low costs. (See also ***FireWire***.)

### DVB (Digital Video Broadcasting)

Level: 3

*Definition:* Refers to an industry consortium initiated in 1993 to form standards for digital video broadcasting in Europe. Now with more than 300 members, most implementations of DVB are based on the MPEG-2 standard. DVB covers broadcasting by terrestrial systems, satellite, and cable, and is being developed for handheld and mobile devices. Adoption of DVB is progressing in most parts of the world except in North American and Japan, which are using DTV and ISDB, respectively. (See also ***DTV*** and ***ISDB***.)

### DVD (Digital Versatile Disc)

Level: 1

*Definition:* An optical disc-based storage system designed for high-capacity file storage and distribution of digital data (including movies and high-quality audio). DVD uses a 5-inch disc that is identical in dimensions to compact discs. However, DVD technology affords much higher storage capacities, holding anywhere from 4.5 Gb (single layer, single sided) to 17 Gb storage capacity (double layer, double sided). Originally introduced as "digital video disc" in 1996, DVD is now known as "digital versatile disc" to account for its broadening range of uses. Now with the relatively inexpensive influx of DVD recording technology, DVD read/write drives have become common on personal computers and are now appearing as part of digital video recorders (DVRs)—which allow users to record a television program and then "burn" it to DVD for archiving or playing elsewhere. (See also ***Blu-Ray***, ***DVD-R***, ***DVD-RW***, ***DVR***, and ***HD-DVD***.)

### DVD-RW (Digital Versatile Disc, Recordable/Writeable) (See *DVD*.)

### Dvorak Keyboard

Level: 2

*Definition:* Refers to a keyboard designed in the 1930s by August Dvorak intended to overcome the design flaws of the traditional "QWERTY" keyboard and increase typing speed. The most notable difference between the two keyboards is that the Dvorak design groups the most commonly used letters in the middle row of keys. For example, instead of "QWERTY" for the first six alphabetic keys the Dvorak keyboard includes *?,.PYF*. (See Figure D–1 and see also ***QWERTY***.)

**FIGURE D–1.** Dvorak keyboard.

### DVR (Digital Video Recorder)

Level: 1

*Definition:* Similar in function to a video cassette recorder (VCR), a DVR records signals in digital format onto a built-in hard drive. Popularized by the release of the first TIVO system in 1997, the system has two parts: the hardware that makes the recording possible and the software that accesses the program guides and manages access to recorded content. DVR capabilities are now easily available on many current personal computers, and Microsoft has released a special version of its XP operating system (called XP Media Center Edition) that enables DVR capabilities on a PC. Hard-disk digital recording of television programming has made possible many new features of television viewing, including the ability to jump instantly to any program or scene that has been recorded, automated recording settings that allow a user to record every broadcast of a particular show, archiving of programs, and sharing of programs through a wireless home network. (See also ***DTCP-IP (Digital Transmission Content Protection over Internet Protocol)*** and ***Microsoft Windows XP Media Center Edition***.)

### DVS (Descriptive Video Service)

Level: 2

*Definition:* An audio service for the visually impaired providing voice-over descriptions of program storylines or other visual program content to enhance understanding and widen viewer/listener accessibility to aired programming. For example, DVS is transmitted by the Public Broadcasting System (PBS).

### DWDM (Dense Wave Division Multiplexing)

Level: 3

*Definition:* One of the most effective ways of increasing capacity on a fiber-optic network, dense wave division multiplexing combines and transmits multiple signals simultaneously on different frequencies to be transmitted over the same fiber cable. Dense wavelength division multiplexing (DWDM) provides more bandwidth than basic wave division multiplexing (WDM) or coarse wave division multiplexing (CWDM) but is more expensive to implement. However, DWDM can run under a variety of network protocols and bit rates, making it one of the most flexible and cost-effective solutions for diverse network systems. (See also ***CWDM*** and ***WDM***.)

### Dynamic Bandwidth Allocation

Level: 3

*Definition:* Refers to a network management technique for allocating ongoing or dynamic bandwidth capacities of multiple signals being carried over a single main network channel or line. The process allows high-capacity telecom network resources to be subdivided efficiently among multiple transmission applications by providing each application with only that share of channel bandwidth resources actually needed for transmission at that time.

### Dynamic Link Library (See *DLL*.)

### Dynamic Random Access Memory (See *DRAM*.)

### Dynamic Range

Level: 2

*Definition:* Describes the range between the noise floor (lowest possible level of sound) of a device and its defined maximum output level. In digital audio, for example, the maximum possible dynamic range is indicated by the bit resolution.

### DYUV [Delta Luminance (Y) and Chrominance (UV)]

Level:3

*Definition:* A type of component video system based on using or transmitting only the difference (expressed as "delta") in the value of luminance (Y) and chrominance (U&V) in each pixel from one digital frame to another in a video signal.

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# E



### Earth Station

Level: 2

*Definition:* Satellite industry lexicon for ground-based satellite receiving and/or transmitting antenna and equipment. Earth stations (also called earth segments to distinguish them from space segment satellite facilities) are usually large, fixed installations able to perform both uplink and downlink functions. But the term has also been applied to consumer backyard satellite television antennas, particularly the larger 3- to 5-foot antennas used for C-band pay-TV reception. The size of an antenna or dish is dependent on the strength of the satellite signal. Higher-power satellites and digital technology have decreased antenna size dramatically, with home dishes now only 18 inches in diameter and becoming portable. (See also ***DBS*** and ***DTH***.)

### EAS (Emergency Alert System)

Level: 1

*Definition:* Replacing the Emergency Broadcast System (EBS) beginning in 1997, the government-prescribed EAS alerting system is set up to provide information to the public in bona fide emergency situations. Television and radio broadcasters, cable, and certain other multichannel providers acting in voluntary cooperation are a key part of the emergency alerting network that can quickly pass emergency information to local, state, or national regions of the country.

### Eb/No (Bit-Energy–To–Noise-Density) Ratio

Level: 3

*Definition:* Used in digital communications to represent the influence of noise on the digital information being carried by a signal and correlates to a predictable bit error rate (BER) for a signal or channel. As a figure of merit, Eb/No is the ratio of the energy per bit in a digital signal (Eb) divided by the amount of noise power in the signal (No). This measurement of relative noise is akin in analog communications to the carrier-to-noise ratio. (See also ***BER*** and ***C/N***.)

### EBPP (Electronic Bill Presentment And Payment)

Level: 2

*Definition:* Electronic bill presentment and payment is a system used to create, deliver, and pay bills over the Internet. The advantage of EBPP over traditional means is primarily the savings to the operator in terms of the cost to produce, distribute, and collect bills. Although it has been possible for many years to purchase things online using a credit card, only recently have the systems been in place to perform tasks such as viewing a credit card bill online or paying that credit card bill electronically. A wide range of EBPP products are being introduced that include features such as secure e-mail delivery, and EBPP technology is becoming more common in business-to-business e-commerce. However, there are many obstacles to widespread adoption of EBPP, including the complexity of billing systems and processes used by competing banks and financial institutions and the challenges of adopting security standards and eliminating existing revenue streams. (See also ***E-commerce***.)

### E-business (Electronic Business)

Level: 1

*Definition:* Refers to business activity being conducted electronically relying in part, or wholly, on the interactive capabilities and growing penetration and use of the Internet for conducting business transactions. Companies such as Amazon.com and Dell Computer (through its web site, *dell.com*) conduct most, or all, of their commercial consumer business transactions via the Internet. E-business encompasses a range of Net/web-based activities from conducting the direct sales of goods and services, stock trading and other financial brokerage transactions, and

providing customer service support to connecting customers, suppliers, partners, and employees via proprietary linked networks. (See also ***Active Server Pages***, ***Common Gateway Interface***, and ***E-commerce***.)



### ebXML (Electronic Business Using Extensible Markup Language)

Level: 2

*Definition:* A global initiative started in 1999, ebXML is a modular suite of specifications that enables enterprises of any size and in any geographical location to conduct business over the Internet, managing everything from methods to exchange business messages, to conducting trading relationships, to communicating data in common terms and defining and registering business processes. (See *www.ebxml.org* and see also ***EDI*** and ***XML***.)

### E-cash (Electronic Cash)

Level: 2

*Definition:* Generic name for several schemes to enable simple electronic transactions over various telecommunications networks. Key elements of a successful E-cash system include security and wide acceptance. (See also ***PayPal***.)

### ECD (European Copyright Directive)

Level: 2

*Definition:* Similar in scope and spirit to the U.S. Digital Millennium Copyright Act, the ECD was adopted in 2001 as an attempt to harmonize copyright enforcements throughout the European community. (See also ***DMCA***.)

### E-commerce (Electronic Commerce)

Level: 1

*Definition:* Electronic commerce covers an increasingly broad array of traditional and newer business activities. Generally, it refers to the process of conducting business communications and commercial transactions via computer networks that may use standalone private business networks, or which rely on the Internet for carriage of business commerce activities and transactions. The term is especially being applied to business activities such as the buying and selling of goods and services, and the transfer of funds through digital network links connected to the Internet. E-commerce activities also include inter- and intra-company networked-based functions such as marketing, finance, manufacturing, business-to-business selling, and negotiations that facilitate business commerce. Also under the e-commerce umbrella are business activities involving electronic mail, electronic data interchange, business file transfer, facsimile transfer (faxes), video conferencing, workflow processing, and interactions with off-site remote computers. (See also ***Active Server Pages***, ***Common Gateway Interface***, and ***E-business***.)

### EDAC (Error Detection and Correction)

Level: 3

*Definition:* A process in digital communications systems where various degradations or damage to the digital information that results from being transmitted over a network can be detected and corrected through advanced engineering techniques. To accomplish this, included with each digital packet of bits are additional parity bits to help maintain the integrity of the digital signal. Error detection or parity check bits are included as header information and if any damage or corruption occurs during transmission these bits will not match the proper decoding sequence. This means that an error has been detected. EDAC operations increase the efficiency of a network so that fewer bit errors are received at the receiving end. There are some drawbacks, as EDAC systems cause latency (slower data rates) in the system because of the time spent verifying the data at various checkpoints.

### EDI (Electronic Data Interchange)

Level: 2

*Definition:* One of the foundational components of electronic commerce, EDI is an evolving standard developed in the early 1980s that promotes the digital exchange of orders, notices, forms, invoices, and other types of business information over computer networks. EDI is often used to connect various parts of a business (such as billing, ordering, and inventory) with common vendors. Even with the exponential growth of the Internet

and technologies such as XML, EDI is still the mainstay platform for most electronic commerce business-to-business solutions. (See also ***B2B***, ***E-commerce***, and ***XML***.)

**Edit Decision List (See *EDL*.)**

**EDL (Edit Decision List)**
Level: 2
*Definition:* In a general sense, an EDL is a compilation of information related to the editing process in video or film. Specifically, an EDL includes an ordered list of reel, transition, and time-code data indicating where each video clip can be obtained and how they should be put together to produce the desired "final cut."

**EDTV (Enhanced Definition Television)**
Level: 1
*Definition:* A type of digital television display with a limited resolution of 480 lines and either a standard or widescreen aspect ratio. EDTV is considered to be between SDTV and HDTV in terms of picture quality. EDTVs are capable of displaying HDTV content by scaling them to the lower resolution. Although until 2003 some broadcasters (such as Fox) were transmitting in EDTV format, most broadcasters who are transmitting digital television signals today (ABC, CBS, NBC, HBO, FOX, ESPN, and others) have moved to an HDTV format. (See also ***HDTV*** and ***SDTV***.)

**Educational Television (See *ETV*.)**

**EFF (Electronic Frontier Foundation)**
Level: 1
*Definition:* Founded in 1990 as a donor-supported nonprofit organization, the Electronic Frontier Foundation aims to protect civil liberties (including privacy, free expression, access) in cyberspace and keep the public apprised of controversial technologies, policies, and laws. The EFF initiates and defends court cases relevant to civil liberties in cyberspace, hosts frequent educational events, promotes public awareness of cyberspace issues, and publishes a comprehensive archive of digital civil liberties information. (See *http://www.eff.org*).

**Effective Isotropic Radiated Power (See *EIRP*.)**

**EFS (Encrypting File System)**
Level: 2
*Definition:* EFS is a feature of Microsoft Windows NT (except NT version 4), Windows 2000, and Windows XP (except for the XP Home edition) that enables any file, document, or folder to be stored in an encrypted form. Working as part of the NTFS file system, EFS uses public key encryption to scramble files and folders on the user's hard disk. The public key, generated either by the user or automatically by the operating system, works in conjunction with a private key (generated by the operating system) to encrypt individual files or folders. The system can also be configured so that any file saved in an encrypted folder is also encrypted. EFS is useful for storing highly sensitive data and files that may be stolen and supports encryption and decryption of files stored on local drives as well as those stored on remote file servers. (See also ***Encryption***, ***NTFS***, and ***Public Key Encryption***.)

**Egress**
Level: 2
*Definition:* In telecommunications, refers to any signal leakage outside the transport medium. For example, cable systems that are not technically tight will often suffer signal leakage at loose connectors. These points of leakage in the system will interfere with over-the-air communications operating within the same frequency spectrum. (See also ***Interference*** and ***Noise***.)

**Egress Traffic**
Level: 2
*Definition:* Describes the flow of computer data that originates inside a local network and then travels outside that network, usually onto the Internet. (See also ***Ingress Traffic***.)

**EFS (Error-Free Seconds)**
Level: 3
*Definition:* The length of time (measured in seconds) that passes between digital bit errors during digital transmission of a signal. The EFS rate is a

measure of the accuracy and reliability of a digital system.

**EHF (Extremely High Frequency)**
Level: 2
*Definition:* Part of the radio spectrum in the range of 30 to 300 GHz that is used for transmission of signals via a direct line-of-sight path. (See also ***Spectrum***.)



**EIA Interface**
Level: 2
*Definition:* Applies to technical standards established by the Electronics Industry Association (EIA) for connections made between electronic devices. Often loosely used to mean RS-232, which is one of the most widely recognized EIA interface standards. RS-232 connections are used to enable serial data transfers to/from a computer and various external peripheral devices such as modems, printers, or other peripherals. The EIA interface is quickly being surpassed by USB technology for local communications. USB is much faster, easier to use, and has been widely supported in current personal computer operating systems. (See also ***RS-232*** and ***USB***.)

**EIDE (Enhanced Integrated Drive Electronics)**
Level: 2
*Definition:* Refers to an interface standard used on computer hard drives to allow them to access and transfer data more quickly. Sometimes called "fast ATA" or "fast IDE," this standard has made it possible for even inexpensive computers to be used for previously difficult-to-manage tasks such as desktop video editing and complex graphics work.

**EIRP (Effective Isotropic Radiated Power)**
Level: 3
*Definition:* EIRP is a measure of the strength of a transmitted signal such as from a satellite, or a broadcast antenna, as compared to an isotropic source and is expressed as a number of dB. (See also ***dB***.)

**Electromagnetic Interference (See *EMI*.)**

**Electromagnetic Pulse (See *EMP*.)**

**Electromagnetic Spectrum**
Level: 1
*Definition:* Refers to the complete range of electromagnetic waves found in nature, including in order from lowest to highest frequency: radio, infrared, visible light, ultraviolet light, X-ray, gamma-ray, and cosmic ray waves. (See also ***Spectrum***.)

**Electronic Bill Presentment and Payment (See *EBPP*.)**

**Electronic business Using Extensible Markup Language (See *ebXML*.)**

**Electronic Cash (See *E-cash*.)**

**Electronic Coupon**
Level: 2
*Definition:* Technique whereby advertising or other promotional materials can be sent electronically directly to consumers or business customers. Versions of electronic coupons can be found on the Internet (and printed or redeemed electronically) or delivered to a customer's cell phone or PDA. Some emerging systems allow customers to download coupon offers directly onto their smart cards or shopping cards.

**Electronic Data Interchange (See *EDI*.)**

**Electronic Frontier Foundation (See *EFF*.)**

**Electronic Mail (See *E-mail*.)**

**Electronic News Gathering (See *ENG*.)**

**Electronic Newsletter**
Level: 1
*Definition:* Electronic newsletters differ from traditional newsletters primarily in the means of distribution. Whereas traditional printed newsletters are mailed or otherwise physically delivered to recipients, electronic newsletters are sent electronically via e-mail. Speed of delivery offers opportunities for more time-sensitive distribution

of information and on a more frequent basis. Electronic newsletters usually arrive as either a digest of information that is contained on a web site (with links to the information on that web site) or as self-contained collections of fully developed information and stories. In addition, interactive features such as hyperlinks, animations, and even video can be embedded in the newsletter to enhance the informational experience. (See also ***E-mail*** and ***Internet***.)

### Electronic Organizer

Level: 1

*Definition:* Also referred to as a PDA (personal digital assistant), and electronic organizer is designed primarily for the purpose of calendar scheduling, storing important personal information such as address and phone lists, and some have limited word processing capabilities for notes. Electronic organizer functionalities are now being built into many mobile phones, and they are a standard feature in most of today's smart phones. Standalone electronic organizers and PDAs are steadily losing ground to the increasingly popular smart phones that combine these and many other useful functions. (See also ***Handheld***, ***Palm-top Computing***, and ***PDA***.)

### Electronic Paper

Level: 2

*Definition:* Invented by XEROX Corporation and still in its developmental stages, electronic paper (also known as electronic reusable paper) uses a display technology called Gyricon to produce a thin sheet of transparent plastic that can be used to store images and text. These images and text can be produced by a writing implement or by a special printer or copier. The sheet can also serve as a flexible display for a mobile computing device or function as a fold-up or a wall-sized display. A thin layer of plastic ultimately no thicker than a standard overhead transparency, a Gyricon sheet contains millions of small beads that are each contained in an oil-filled cavity. The beads have two sides, a colored side and a white side. When voltage is applied to the surface of the sheet, the beads rotate to present one colored side to the viewer until new voltage patterns are applied. The image persists until new voltage patterns are applied. Although predicted to be much more expensive than a single sheet of paper, electronic paper can be used thousands of times and in conjunction with many devices, making it a potentially revolutionary innovation.

### Electronic Payment System

Level: 2

*Definition:* Monetary exchanges over the Internet or other private digital networks. (See also ***Cybercash***, ***E-commerce***, and ***Electronic Wallet***.)

### Electronic Program Guide (See *EPG*.)

### Electronic Signatures Act (See *ESA*.)

### Electronic Switching System (See *ESS*.)

### Electronic Wallet

Level: 2

*Definition:* Also called a virtual wallet, the term refers to a software mechanism that allows e-commerce users to store and use credit card and electronic payment information on a server. Typically, information in the e-wallet is encrypted and is available from one e-commerce session to the next occasion. (See also ***Cybercash***, ***Electronic Payment System*** and **Encryption**.)

### ELF (Extremely Low Frequency)

Level: 3

*Definition:* Part of the electromagnetic spectrum in the range of 30 to 300 Hz. Such long-wave signals make them propagate well in water and are often used in submarine surveillance operations. (See also ***Spectrum***.)

### Elliptical Orbit

Level: 2

*Definition:* Satellites launched into a noncircular orbit, in contrast to circular geostationary polar or inclined orbits, will have the shape of an ellipse. Elliptical orbits are useful for satellite applications that typically are not for communications but for scientific, remote sensing, monitoring, or other purposes. (See Figure E–1 and see also ***Geostationary Orbit*** and ***Polar Orbit***.)

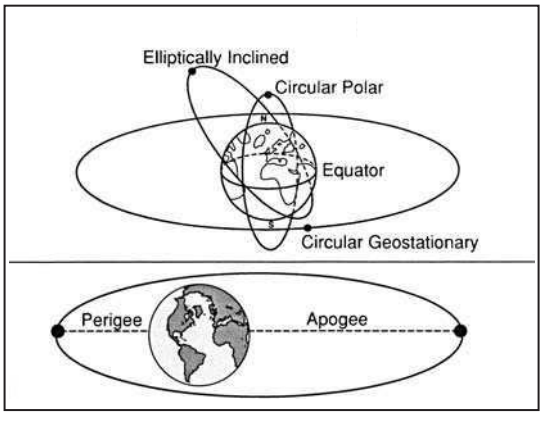



**FIGURE E–1.** Elliptical Orbit.

### E-mail (Electronic Mail)

Level: 1

*Definition:* Electronic text messaging or "mail" software systems that transmit messages via in-house business LANs and a variety of electronic networks, including telephone-based commercial online services, cellular phone networks, or other wireless communication networks. E-mail packages allow computer network users to send and receive text messages and attached binary files such as spreadsheets, word processing documents, graphics files, among others. Growing in use and popularity, e-mail deliveries easily beat "snail mail" delivered by the post office in that e-mail is posted to receivers literally in a matter of minutes across the country or around the globe. (See also ***Computer-mediated Communication***.)

### E-mail (Electronic Mail) Attachment

Level: 1

*Definition:* A computer file that is transmitted along with an e-mail message, attachments are a common way to send or distribute word processing files, spread sheets, graphics, digital photographs, and computer programs. (See also ***Attachment***, ***MIME***, ***Trojan Horse***, and ***Virus***.)

### E-mail (Electronic Mail) Spoofing

Level: 1

*Definition:* Forging the identifying information in an e-mail message to make it appear that the message came from someone (or somewhere) other than its actual originator. E-mail spoofing is commonly used by spammers to avoid being tracked or by general users who want to remain anonymous when sending e-mail or posting messages to bulletin boards and news groups. E-mail spoofing can be used for malicious purposes, using apparently legitimate identification information to persuade users to send sensitive or valuable information to someone else. (See also ***Social Engineering*** and ***Spam***.)

### Embedded System

Level: 2

*Definition:* Refers to a device that contains computer logic on a chip inside it that is not independently programmable by the user. Such equipment is electrical or battery powered, with the chip controlling one or more functions of the equipment, such as remembering how long it has been since the device last received maintenance. Embedded systems are found in everything from watches to microwaves to cars. Some embedded systems are now so sophisticated that they contain their own operating system, but most are still single-function devices that run a single set of instructions.

### Emergency Alert System (See *EAS*.)

### EMI (Electromagnetic Interference)

Level: 2

*Definition:* Although it happens less and less as systems are designed and installed correctly, electromagnetic interference is a problem when radio signals escape their equipment enclosures or transmission media (such as with improperly shielded wires). For example, equipment used in high-speed data systems, including ATM, generate and transmit many signals in the radio frequency portion of the electromagnetic spectrum that can, if improperly shielded, interfere with other equipment or radio signals. In an effort to minimize these types of interferences, national and international regulatory agencies (such as the FCC and others) set limits for these emissions. Class A is for industrial use and Class B is for residential use.

### Emoticon

Level: 1

*Definition:* Refers to the keyboard-generated symbols intended to express emotion. The most commonly used emoticons include the "smiley face," the "frowny face," and the "half smiley," which is intended to communicate a wink of the eye. There are many emoticon dictionaries on the Internet today, some with hundreds of individual entries. (See Table E–1 and see also ***Computer-mediated Communication***.)

**TABLE E–1** Examples of emoticons.

| | |
|---|---|
| :-< | Very sad |
| :-( | Frown |
| :-) | Classic smiley |
| :-* | Kiss |
| :-, | Smirk |
| :-/ | Wry face |
| :-6 | Exhausted |
| :-9 | Licking lips |

### EMP (Electromagnetic Pulse)

Level: 3

*Definition:* An extremely large burst of energy with high intensity that would create a great surge of an electromagnetic wave pulse or pulses. Theoretically, origination of an EMP could be associated with a nuclear explosion in outer space and be potentially dangerous as it could render unhardened communications systems inoperable.

### Emulation

Level: 3

*Definition:* The process of intentionally duplicating the operation of one system through the use of another system. Emulation is the use of hardware and/or software to enable one type of data terminal or computer system to mimic or emulate a different type of terminal or system. Emulation systems or devices are used in networks to overcome certain types of compatibility or interoperability problems between systems that cannot, or will not, "talk" to one another. In a data network, it is often possible to run otherwise incompatible programs by emulating or imitating the originating system. The emulation can be thought of as imitating another system. LAN emulation is being used with asynchronous transfer mode (ATM) networks to make them operate with embedded networks. This could allow an ATM backbone to be attached to an Ethernet LAN and provide all of the transmission advantages of ATM while still allowing the user to interface with the system through the already familiar Ethernet network (See also ***ATM*** and ***Ethernet***.)



### Encapsulated PostScript (See *EPS*.)

### Encoding/Decoding

Level: 2

*Definition:* A system using an algorithm to process information to reduce its bandwidth consumption, make it more robust or more secure, or for other purposes. With audio, for example, encoding refers to the alteration of a signal prior to its being recorded or transmitted (usually to optimize it for storage or transmission), with decoding during playback/reception resulting in the best possible reproduction of the original signal considering the limitations of the recording or transmission medium (i.e., to optimize it for listening).

### Encrypted Container

Level: 2

*Definition:* Designed to prevent abuses of copyright on the Internet and to make sure that owners of computer programs and digital text files are compensated properly, encrypted "containers" use software with information about who owns the work and information about constraints on the work's use and related pricing plans. When a user accesses a copyrighted work, the encrypted container is opened and the user is given several options, from purchasing the entire file for unlimited use to purchasing only a portion for one-time use. (See also ***Digital Rights Management***.)

### Encrypting File System (See *EFS*.)

### Encryption

Level: 2

*Definition:* The process of coding or encrypting any data in which a specific code or "key"

is required to decode, unscramble, or otherwise restore the data to its original form. For a variety of security or signal integrity purposes, data streams often cannot be transmitted in their normal state. In these cases, an algorithm (mathematical process) is applied to the data to convert it so that it cannot be understood or interpreted without first decrypting or reversing the process using the same (or related) algorithm. (See also ***Advanced Encryption Standard***, ***Algorithm***, ***PKI***, ***Secure Server***, and ***Virtual Private Network***.)



**End-User License Agreement (See *EULA*.)**

**ENG (Electronic News Gathering)**
Level: 2
*Definition:* Term applied to capturing news events using portable field television cameras and support equipment using recorded footage or live coverage of events for broadcast during network or local news programs. An ENG truck would generally also have a microwave transmitter in order to beam captured video footage back to the station for immediate processing for use in news broadcasts. (See also ***SNG (Satellite News Gathering)***.)

**Enhanced Definition Television (See *EDTV*.)**

**Enhanced Integrated Drive Electronics (See *EIDE*.)**

**Enhanced 911 (See *E911*.)**

**Enhanced Specialized Mobile Radio (See *ESMR*.)**

**E911 (Enhanced 911)**
Level: 1
*Definition:* A system mandated by the FCC in 1996 for determining the location of a mobile telephone caller. E911 has been launched in two phases: Phase I pinpointed caller location by identifying the nearest cellular tower. Phase II (the current phase) pinpoints caller location to within 100 meters of the actual phone being used. The U.S. Congress passed the ENHANCE 911 Act in 2004 in an attempt to reestablish momentum toward a full build-out of the enhanced service. After filing extensions to the FCC-determined deadline of year-end 2005 for the completion of Phase II, most carriers plan to reach the mandated 95% of users having access to automatic location-based enhanced 911 communications by the end of 2007.

**Enterprise Resource Planning (See *ERP*.)**

**Enterprise Systems Connection (See *ESCON*.)**

**Enterprise-Wide**
Level: 2
*Definition:* Computer networking reference meaning an entire business organization's infrastructure, which might include branch offices as well as the main office and any subsidiaries. The term encompasses the full range of an organization's physical locations as well as the people and other resources available at these locations.

*Used in a sentence:* "We thought it would be worth installing an enterprise-wide database system so that everyone in the company could take advantage of it."

**EPG (Electronic Program Guide)**
Level: 2
*Definition:* Developing segment of the video market comprised of new sophisticated menu-driven program selection navigation tools that are broadcast as part of a digital television or radio signal. EPGs are available with multichannel DBS satellite services, digital radio, and cable systems. Other companies, such as TiVo, have developed greatly expanded program guide features that allow for advanced searching for programs and much more. (See also ***DBS***, ***Digital Video Recorder***, and ***TiVo***.)

**EPS (Encapsulated PostScript)**
Level: 2
*Definition:* A file format for graphics and text created by Adobe Systems, an EPS file can contain two versions of an image: a bitmap used to display the image on the screen and a PostScript description used to print the image. For example, a file

can contain PostScript code for printing and, in the case of PhotoShop, an optional PICT or TIFF image for screen display. EPS is a commonly used format for moving files from one application to another and for color separation.

### Equalizer

Level: 2

*Definition:* An electronic circuit or device that adjusts the frequency response of a system to compensate for already recognized or expected distortions in the system. In audio systems, an equalizer device can be used to manipulate the equality and/or uniformity of designated frequencies in reference to ideal audio signals. A stereo equalizer allows listeners to alter stereo sound according to audible frequency ranges. For example, the bass can be made louder, treble made softer, or any other combinations depending on the sophistication of the equalizer. In digital television broadcast environments, an equalizer would be used to compensate for imperfections in the transmitter. A transmission equalizer would change the original signal by adding an "adjustment" signal so that after combining the two, a correct signal is transmitted. In future digital television receivers, equalizers will compensate for variations in the received signal resulting from time-variance changes as well as adjusting the frequency response of the receiver to better match the theoretical frequency response of the transmitted digital TV signal. (See also ***Frequency Response***.)

### Erase head

Level: 2

*Definition:* A device in audio and videotape recorders that removes or erases information from a tape by demagnetizing it. This is usually done so that new information can be recorded onto a "clean" tape or to insert new material in erased portions.

### Ergonomics

Level: 1

*Definition:* The study and design of the arrangement of equipment, especially computer equipment, so that users can interact with that equipment in a healthy, comfortable, and efficient manner. Ergonomics has become especially important in the design of computer keyboards, monitors, pointing devices (mice), desks, chairs, and the work environment in general. (See also ***Repetitive Strain Syndrome***.)

### Erlang

Level: 3

*Definition:* A measure of time used in telecommunications traffic engineering to determine telephone usage and line needs. A conversation using one full hour is equal to one erlang. Traffic on a trunk group, when measured in erlangs, is equal to the average number of trunk lines in use during a specific time frame and is an indication of network capacity requirements and patterns. The term is named after Danish telephone engineer A. K. Erlang, the "father of queuing theory." (See also ***Traffic Engineering***.)

### ERP (Enterprise Resource Planning)

Level: 2

*Definition:* Refers to any accounting-oriented software system designed to support and automate the business processes of medium and large businesses. ERP applications are especially designed for management of manufacturing and distribution functions, project management, personal office administrative functions, payroll, and company financial accounting requirements.

### Error Correction

Level: 3

*Definition:* A method of ensuring that data received via a system connection is as complete and accurate as the data originally sent over a telecom, satellite, or data network channel or system. Real-world transmission is not lossless, as many factors can be introduced to corrupt transmission bit streams producing data errors due to lost or corrupted bits. Sophisticated error detection and correction schemes are integral parts of digital data transmission systems, with further R&D work consistently in progress to improve performance. (See also ***Checksum***.)

### Error Detection and Correction (See *EDAC*.)

**Error-Free Seconds (See *EFS.*)**

**Error Rate**
Level: 2
*Definition:* A measure of the percentage of errors in a specific digital data transmission. Errors occur when all of the data is not received, or parts are received incorrectly or corrupted. The error rate measures the amount of errors compared to the number of data "pieces" received correctly and accurately. (See also ***BER***.)



**ESA (Electronic Signatures Act)**
Level: 2
*Definition:* Officially named the Electronic Signatures in Global and National Commerce Act, this law was enacted in 2000 and states that electronic signatures may be legally binding for contracts and transactions. Although there are many types of digital signature technologies, law does not specify what type of technology can be used. In some cases, even "click-through" agreements at web sites may also be legally binding. Electronic signatures also may involve biometrics or digitized versions of handwritten signatures. Although the act enables documents to be signed electronically, the option to do so lies solely with the consumer. In other words, no portion of the act requires an individual to "sign" documents electronically. All individuals retain the right to use paper-and-ink documents at their discretion. (See also ***Digital Signature***.)

**Escape Character**
Level: 1
*Definition:* Term often used for any sequence of characters or keyboard commands that temporarily suspends a computer process. An escape character is generated with the Escape key, a special key that exists in the upper lefthand corner on most computer keyboards. When the escape character is combined with other characters, it is called an "escape sequence."

**ESCON (Enterprise Systems Connection)**
Level: 3
*Definition*: An umbrella term for a set of products (many produced by IBM) that emerged in the early 1990s to replace slower and more cumbersome copper cable "bus-and-tag" systems. ESCON interconnects mainframe computers with each other and with attached devices, including storage systems and workstations, using optical fiber technology and dynamically modifiable switches called ESCON directors. The original configuration of ESCON's fiber-optic cabling could sustain a local-to-mainframe network connection up to 60 kilometers (37.3 miles) with a series of chained directors. That distance (and its maximum data transfer rate) has since increased with hardware and software enhancements. (See also ***FICON***.)

**ESMR (Enhanced Specialized Mobile Radio)**
Level: 3
*Definition:* Enhanced SMR services that increase channel capacity up to 18 to 26 times the amount available on traditional SMR systems. In each SMR 25-kHz voice channel, ESMR technology can provide three voice circuits with an equivalent radio frequency bandwidth of approximately 8 kHz each. ESMR uses the TDMA coding scheme with QPSK modulation. Given better digital compression techniques, even further capacity improvements are possible. ESMRs operate cellular-like transmission operations with maximum power of 100 watts at 200 feet, whereas conventional SMRs operate with 1,000 watts at 1,000 feet.

**ESS (Electronic Switching System)**
Level: 3
*Definition:* A telephone switch that uses electronics or computers to control the switching of calls, billing, and other functions. This is in contrast to older switching systems that used actual human operators to make the switched connections. The electronic systems are much more efficient for performing this process.

**Ethernet**
Level: 2
*Definition:* Ethernet provides the most popular form of connecting LANs today. Ethernet provides four different standards, with each corresponding to the transfer capacity of the network: 10 Mbps, 100 Mbps (fast Ethernet), gigabit Ethernet, and 10-gigabit Ethernet. First marketed

jointly by Xerox, Intel, and Digital Equipment Corporation (DEC), Ethernet uses thin coaxial cable and twisted-pair wire to connect computers and peripheral devices to the network. Attached network computers require installation of an Ethernet network interface card (NIC) in an expansion slot, allowing the computer to communicate with the network. Ethernet employs as its access protocol Carrier Sense Multiple Access with Collision Detection (CSMA/CD). (See also ***CAT-5***, ***CAT-6***, ***Expansion Slot***, ***Network***, and ***NIC***.)

### ETV (Educational Television)

Level: 2

*Definition:* Generally refers to using television for educational purposes. ETV networks are used a great deal in distance learning, medical training, and corporate job training programs—as well as by educational institutions from elementary to university levels. Public television stations carry a full schedule of ETV programming such as news, documentaries, children's programming, special-interest shows, and the arts (including music, dance, and theater).

### EULA (End-User License Agreement)

Level: 1

*Definition:* A legal contract between a software application author or publisher and the user of that application, the EULA is similar in principle to a rental agreement whereby the user agrees to pay for the opportunity of using the software and promises to abide by all restrictions stated in the agreement. There are many ways in which the user can signify acceptance of a EULA, including opening the shrink-wrapped package, breaking the seal on a container or case, sending a notification card back to the owner, running a registration program as part of the installation process, or by simply using the application. With automated user agreement processes, if a user declines to accept the agreement he/she will not be able to install/use the software.

### Eureka (European Research Coordination Agency)

Level: 2

*Definition:* Central organization for the coordination of technical research efforts to support development and potential manufacture of marketable technological products in Europe. Eureka is a consortium of almost 30 countries in Eastern and Western Europe designed to promote cross-border cooperation in major "market-driven" research and development projects. Various projects are self-initiated by industrial groups/organizations, research organizations, scientists, and engineers, and must involve significant financial commitment from participants, as well as the active involvement of at least two different Eureka consortium members. Contacts will be localized to different task groups, and normally will be headed by the prime Eureka participant (for example, DLR for the Eureka-147 initiative). (See also ***Eureka-147***.)

### Eureka-147

Level: 3

*Definition:* Refers to a technical standard developed for digital audio transmission that is being implemented, at present, in many parts of the world. In particular, it is the basis for the digital audio broadcasting (DAB) system being adopted in Canada and Mexico. The technical standard was developed by the Eureka-147 task group, adopted by the European Telecommunications Standards Institute (ETSI), and subsequently recommended as a standard by the International Telecommunications Union Radio Sector (ITU-R). (See also ***ITU***.)

### European Copyright Directive (See *ECD*.)

### European Research Coordination Agency (See *Eureka*.)

### Exchange Server

Level: 3

*Definition:* Microsoft's system for coordinating electronic mail, calendaring, task lists, contact information, and collaborative tasks. Exchange has emerged as an industry leader in the back office operations of many companies and organizations. (See also ***Workgroup Computing***.)

### Expansion Slot

Level: 2

*Definition:* Computer hardware terminology for specific "slots" or locations in a computer where

additional circuit boards or cards (i.e., add-in cards) can be inserted or plugged in to expand the functionality of the computer by adding additional features or functions. Expansion slots vary in number and size by type of computer. Types of cards that are inserted into computer expansion slots include internal telecommunications fax modem, a sound card, or a network interface card.

*Used in a sentence:* "My computer did not have enough expansion slots for me to run a two-monitor setup."



### Expert System

Level: 2

*Definition:* Refers to an artificial intelligence application that uses a knowledge base of human expertise to solve problems. Although expert systems are designed to perform at the level of a human expert, sometimes they perform well above and well below that level. Expert systems are used in applications such as medical diagnosis, equipment repair, investment analysis, estate and insurance planning, route scheduling for delivery vehicles, contract bidding, counseling for self-service customers, production control, and training. (See also ***Agent***, ***AI***, ***Bot***, and ***Spider***.)

### Extended Data Service (See *XDS*.)

### Extensible Business Reporting Language (See *XBRL*.)

### Extensible Markup Language (See *XML*.)

### Extensible Rights Markup Language (See *XrML*.)

### Extranet

Level: 2

*Definition:* Refers to the extension of a corporation's or organization's intranet (internal, private network) out onto the Internet, typically to allow approved customers, suppliers, and off-site workers access to the company's private data and applications from the World Wide Web. (See also ***Disintermediation***, ***E-commerce***, and ***Internet***.)

### Extremely High Frequency (See *EHF*.)

### Extremely Low Frequency (See *ELF*.)

### E-zine (Electronic Magazine)

Level: 2

*Definition:* A regular newsletter or magazine-type publication often offered free of charge and distributed in an electronic format typically via the Internet, but also may be distributed electronically via e-mail or CD-ROMs.

# F



**Facility**
Level: 1
*Definition:* Term used to refer to a physical building location, or the equipment and systems at a location, or both—in which case the term used might be *physical plant and equipment*. A telephone company or cable system's network of lines, switches, nodes, and so on are commonly referred to as its facilities or simply as its plant.

**Facsimilie (See *Fax*.)**

**Fader**
Level: 2
*Definition:* Typically used in audio engineering and video production, a fader (also known as a slider or attenuator) provides users with the ability to perform a gradual change to the amplitude of a signal. Commonly found on traditional audio mixing consoles, faders are also found as a feature of most MIDI software programs.

**Failover**
Level: 1
*Definition:* In general terms, a failover is a strategy for transparently transferring mission-critical operations to a backup system in the event of a primary system outage or failure. For example, if a computer network is equipped with redundant resources the secondary devices can assume the duties of the primary should the primary fail. This can be done manually or automatically depending on the setup, although most robust systems handle the switch to failover seamlessly and automatically. Once the primary system is back online, the failover will switch control back to the main system.

*Used in a sentence:* "After the last power outage we were happy we had installed a failover so that we could deliver uninterrupted service." (See also ***Fault Tolerance***.)

**FAQs (Frequently Asked Questions)**
Level: 1
*Definition:* This refers to a commonly offered special service area for information that is made available to new users or customers that access various web sites and other online services. FAQ portions of a web site or discussion group are attempts to proactively answer many of the most common and fundamental questions asked by consumers or users about a company, a particular topic, or area of concern. For example, a company might encourage stockholders to go the FAQ page on its web site to find details on a pending merger agreement. Software companies might direct users to their web site FAQ page for help on program installations, or to resolve commonly experienced problems when using a particular product or service. A discussion group might use its FAQ to explain the purpose of the group and to attempt to set ground rules for discussion.

*Used in a sentence:* "Whenever I have a computer problem I look at our Help Desk page to see if my problem is addressed in their FAQs."

**Fast Ethernet (See *100base T*.)**

**Fast Packet Switching**
Level: 3
*Definition:* A high-speed transmission technique used for sending information over a wide area network (WAN). Asynchronous transfer mode (ATM) is an application of fast packet switching methods. (See also ***ATM***, ***Packet Switching***, and ***WAN***.)

**FAT (File Allocation Table)**
Level: 3
*Definition:* A separate file table on the storage device, which organizes and keeps track of the content of that storage device. The storage device is normally a hard drive on a computer. When files are stored to the hard drive (or floppy disk),

portions of the same file can be physically placed in different, nonadjacent positions on the disk. The FAT keeps track of these various locations and is necessary to access to this information. If the file allocation table is corrupted it is possible to lose all of the information on the disk. (See also ***Defrag***.)



### Fault Tolerance

Level: 1

*Definition:* Fault tolerance measures the ability of a system to respond to unexpected problems or critical outages, including software and/or hardware failure. A system with high fault tolerance will have sufficient failover implementations in place to make it seem as if nothing out of the ordinary is happening even though massive system failures have occurred. A system with a low fault tolerance is vulnerable to crippling outages and devastating disruptions of service. Fault-tolerant operations often require backup power systems in the event of a main power failure and might include the duplication of entire computer systems in remote locations to protect against vandalism, acts of war, or natural disaster.

*Used in a sentence:* "Our system must not have had a very high fault tolerance because a simple server crash caused the entire system to fail."

### Fax (Facsimile)

Level: 1

*Definition:* An electronic device attached to a phone line that digitizes text, pictures, graphics, or other information printed on paper for transmission over regular telephone lines. Images are received and reassembled by a receiving fax machine, which then prints a facsimile copy of the original document. Typically, fax copies are not of high visual quality, but the value of instant reproduction of printed material anywhere around the globe usually outweighs this disadvantage. (See also ***Fax Modem***.)

### Fax Modem

Level: 1

*Definition:* Fax modems are typically used with personal computers to enable the computer to act as a fax machine to transmit data or text files directly via the telephone system to a regular standalone fax machine or to another computer with fax modem reception capabilities. An internal computer fax modem is a type of electronic circuit board or "card" that can be plugged into an expansion slot in a computer. An external fax modem is a separate device connected to a computer and provides the same functional capabilities. (See also ***Expansion Slot***, ***Fax***, and ***Modem***.)

### Fax over IP (See *FoIP*.)

### FCC (Federal Communications Commission)

Level: 1

*Definition:* Created by an act of Congress in 1934, the FCC is charged with regulating all nonfederal government use of the radio spectrum (including broadcast radio, broadcast television, and wireless telecommunication). It also oversees all interstate telecommunications (wire, satellite, and cable) and all international communications that originate or terminate in the territorial United States. The FCC took over wire communication regulation from the Interstate Commerce Commission. More recently, the FCC has asserted its right to regulate VoIP. The FCC's jurisdiction covers the 50 states, the District of Columbia, and U.S. possessions. The commission consists of five members, all nominated to a specific term by the President of the United States and confirmed by the Senate (with no more than three from the same political party). The authority for the commission is contained within the Communications Act of 1934 as amended (most notably by the Telecommunications Act of 1996). (See also ***RF Spectrum*** and ***VoIP***.)

### FDDI (Fiber Distributed Data Interface)

Level: 3

*Definition:* FDDI is a type of LAN network using optical fiber lines for data transmission and often is part of a backbone network due to its large carrying capacity and high data rate capabilities. FDDI systems operate at 100 Mbps and the advantages include the ability to support a wide range of devices and built-in redundancy network protection. The basic structure for FDDI networks is a

two-ring architecture where the second ring provides an automatic backup system or self-healing redundancy. If any part of one ring is broken, the system switches to the second ring for continued operations. An enhanced version of FDDI, called FDDI-2, supports the transmission of voice and video information as well as data. Another extension of FDDI, called FDDI full duplex technology (FFDT), uses the same network infrastructure but can potentially support data rates up to 200 Mbps. Even with these improvements, FDDI has been surpassed by the higher speeds, lower costs, and widespread use of fast Ethernet and gigabit Ethernet. (See also ***Backbone Network***, ***Fast Ethernet***, ***Gigabit Ethernet***, ***LAN***, and ***Token Ring***.)

### FDDI 2

Level: 3

*Definition:* A version of an FDDI fiber network providing the same 100-Mbps transmission rates but with the ability to carry voice and video as well as data. (See also ***FDDI***.)

### FDMA (Frequency Division Multiple Access)

Level: 3

*Definition:* A modulation and multiplexing technique for dividing a digital communication path into different channels based on an assigned frequency. FDMA enables multiple access to spectrum resources by dividing the spectrum block into multiple smaller-frequency channels. For example, in a cable television system where multiple channels are sent over the same cable line the different channels are assigned different carrier frequencies and then multiplexed for transmission over a single line. Customers are able to receive 40 or more channels of video programming over a 240-MHz bandwidth system, with each 6-MHz video channel carried at a different frequency. (See also ***CDMA***.)

### FEC (Forward Error Correction)

Level: 3

*Definition:* A technique for managing interference or other degradations that produce errors in the digital bit stream of transmitted communication signals. FEC techniques attempt to reduce errors by adding correction techniques in the form of redundant bits at the transmission end of a signal link. The redundant bits are then used at the digital receiving terminal to detect, locate, and correct any transmission errors before final delivery to the local data communications endpoint.

### FED (Field Emission Display)

Level: 3

*Definition:* A type of flat-panel display technology is called field emission display (FED). Prototype FED screens use less power than conventional LCDs, are about half as thick, can be viewed from an angle (unlike most LCDs), and cost about a third less to produce. FED technology and manufacturing techniques are still in development, so there are currently no commercial versions available. (See also ***Flat-panel Display***, ***FPD***, and ***Plasma Display***.)

### Federal Communications Commission (See *FCC*.)

### Federal Information Processing Standards (See *FIPS*.)

### Feedback

Level: 2

*Definition:* A common reference to the return of a communications signal back to its source. Feedback can be unintended or intentional. Interference or crosstalk is unintended feedback in telecommunications channels. Intentional feedback loops are integral (even critical) parts of a system design and are used for a wide variety of purposes. Internal system error-checking tasks often use feedback responses or acknowledgments. In developing interactive video networks, separate feedback loops or upstream channels are used for ordering PPV events or for acting on customer video-on-demand requests.

### FEP (Front-End Processor)

Level: 3

*Definition:* A system design in which a computer specifically for managing setup and maintenance tasks is attached to another, often larger and more powerful, major computer system or network.

The larger computer does most of the processing, with the FEP acting as an interface between the main CPU and other systems such as the bus or memory. An FEP can also be used in a network configuration, where it provides network interface capabilities for a networked device. The front-end processor can be responsible for providing conversion protocols between incoming information and the main processor, error control, or creating instruction data sent from the processor to other parts of the system or network.



### FHSS (Frequency-Hopping Spread Spectrum)

Level: 3

*Definition:* Frequency hopping is a type of radio communications in which the transmitter and receiver are in synchronization from one frequency to another according to a prearranged pattern. This technique improves the reliability of the transmission, although the data transfer rates possible on a wireless data network are considered to be relatively slow (2 Mbps). (See also ***DSSS***.)

### Fiber Connection (See *FICON*.)

### Fiber Distributed Data Interface (See *FDDI*.)

### Fiber Distributed Data Interface 2 (See *FDDI-2*.)

### Fiber to the Curb (See *FTTC*.)

### Fiber to the Home (See *FTTH*.)

### Fiber Optics

Level: 1

*Definition:* Long strands of glass fibers, sometimes bundled by the hundreds, used to form a cable that is capable of transmitting high-speed light signals (light-waves) generated by LEDs or advanced optical lasers. The optical lasers emit light pulses (on/off) to correspond to the binary coding in a digital signal, enabling the high-speed transmission of digital voice, video, text, data, or other digital information over fiber lines. Broadband fiber-optic lines have the highest transmission capacity of any known physical medium, and with wave division multiplexing that allows many wavelengths to be used at once. On a single fiber, aggregate transfer rates are measured in terabits per second. Fiber-optic lines are replacing older copper wiring or coax in upgraded telecom and cable television systems. Fiber has significant capacity advantages, allowing for much higher information transfer rates than copper wire or coaxial cable. In addition, light-waves are immune to typical electromagnetic interference, producing more accurate digital transmissions. Fiber-optic systems typically operate in one of two modes: "single" or "multi." Single-mode systems (SMF) are best used for long-range applications, such as between buildings in campus environments and between cities. Multimode systems (MMF) are more typically used for short-range applications, such as cabling inside a storage subsystem or between servers, switches, storage, and other devices. (See also ***Broadband***, ***Core***, and ***LED***.)

### FICON (Fiber Connectivity)

Level: 3

*Definition:* FICON was first introduced by IBM in 1998 as an input/output (I/O) interface used to connect mainframe computers with storage devices at higher speeds and greater distances than the earlier enterprise systems connection (ESCON). FICON channels increase capacity through the combination of a new architecture and faster physical link rates to make them up to eight times as efficient as ESCON. (See also ***ESCON***.)

### Field

Level: 2

*Definition:* (1) In NTSC television or video, there are two fields in every video frame in the interlaced video signal. Each field is created by scanning the image on a camera's active sensor. The first field contains only half the information (from every other line). The second field contains the lines not in the first field (one line displaced from the first field). (2) In computer database systems,

a field refers to the specific location where certain data can be found in a record or file. (3) *Field* also refers to the area of magnetic influence around magnetic devices, as in *magnetic field*, or the electrical influences around current-carrying devices, as in *electric field*. Similarly, a field is the area of combined influences around electromagnetic devices, such as an antenna that has its own electromagnetic field.

**Field Emission Display (See *FED.*)**

**Field Frequency (Field Rate)**
Level: 3
*Definition:* A measure of the speed at which an interlaced video monitor reproduces or "refreshes" half the picture information (as well as the rate at which it is carried in the video signal and generated in the camera). In interlaced scan systems, flicker can generally be perceived if this frequency is below 40 Hz. Sometimes referred to as "field rate," in the existing analog NTSC television system the field rate is about 60 (actually 59.94) fields per second. The field rate expressed as a number of cycles per second is usually referred to as 60-Hz field rate.

**Field Rate (Frequency) (See *Field Frequency.*)**

**FIFO (First In, First Out)**
Level: 3
*Definition:* A common processing technique in which information is processed in the order in which it is received. In telecommunications systems using a FIFO protocol, the first piece of information received is the first piece processed, transferred, and sent out. Buffer storage areas used to hold information to be processed by a computer can use FIFO to manage this task. (See also ***Buffer***.)

**File**
Level: 1
*Definition:* In computers, a file is a group or block of information, which share some characteristics. A file can be a database collection of names and addresses or a word processing document containing a business letter or other text. Files are created according to an established format or structure enabling them to recognized, manipulated, sorted, or called up for later processing.

**File Allocation Table (See *FAT.*)**

**File Extension**
Level: 1
*Definition:* Refers to the suffix labeling on many software application files to identify the type of file or which software program created the file. For example: hypertext documents (*.htm*), comma-separated files (*.csv*), Microsoft Word files (*.doc*), Excel files (*.xls*), and Powerpoint files (*.ppt*).

**File Server**
Level: 2
*Definition:* A computer network device, typically on a LAN, that stores computer files for access/retrieval by other desktop PCs or other "client" computers connected to the local network. File servers enable any user connected to the network to retrieve files from a single storage facility or group of servers. File server equipment combines data management software along with extensive file storage capacity, which may have a large amount of RAM as well as an array of hard drives to support these network functions. File server capabilities have been supplanted by the widespread use of the Internet and its TCP/IP networking architecture, which allows for almost any computer to work as a file server. The rise of file sharing has extended this functionality to millions of personal computers around the world. (See also ***Client/server***, ***File Sharing***, ***Internet***, ***LAN***, and ***TCP/IP***.)

**File Sharing**
Level: 1
*Definition:* In general terms, file sharing refers to the sharing of computer data or space on a network, allowing multiple users to utilize the same file by being able to read, modify, copy, and/or print it. File sharing users may have different levels of access privilege. Up until the mid 1990s,

most file sharing took place by making files that were stored on a central computer or server available to a predetermined set of users. However, with the quantum leap of high-speed Internet connectivity and high-function peer-to-peer file sharing programs that essentially turned millions of personal computers into mini-servers around the world, combined with the prevalence of music stored in MP3 format, the late 1990s and early 2000s saw a boom in file sharing among tens of millions of users all around the world. Current peer-to-peer file sharing platforms make a specified portion of a user's hard drive available to the rest of the "community" of file sharers (sometimes numbering in the millions). Once distant users find a file or files they want to download, they can initiate a direct connection with their "peer" in order to download their own copy of the file. Many such programs reward users who make more and more files available for sharing. File sharing programs such as Limewire, Kazaa, Morpheus, and iMesh have proliferated to the point of attracting increasing attention from entertainment companies and property rights advocates as they attempt to control the illegal dissemination of copyrighted music, movies, images, and so on (e.g., the Recording Industry of America lawsuits of 2003/2004). However, most experts agree that legal restrictions will lose out to technological innovation and a growing unwillingness among younger computer users today to pay for digital content.

*Used in a sentence:* "I'm interested in file sharing, but I'm worried about giving strangers access to my personal computer." (See also ***MP3***, ***Napster***, and ***Peer to Peer***.)

### File Transfer Protocol (See *FTP*.)

### Filter

Level: 2

*Definition:* An electronic device that allows or permits only a selected range of frequencies to either be passed on through or blocked from entering a system. Types of electronic filters include high-pass, low-pass, band-pass, and notch filters. A high-pass filter only permits high frequencies in a particular signal to pass on through the filter, whereas a low-pass filter performs a similar function but allowing only low frequencies to pass through. A band-pass filter permits a selected range or band of frequencies to pass, and a notch filter allows any frequency to pass except for those within a small, specified range. The term also applies to a feature of information processing whereby only terms or parameters with certain defined characteristics are transmitted or displayed.

### FIPS (Federal Information Processing Standards)

Level: 2

Sets of regulations or protocols overseen by the U.S. Department of Commerce that attempt to standardize the National Information Infrastructure (NII). The National Institute of Standards and Technology (NIST) creates publications that notify information technology industries and nonmilitary governmental agencies about standard ways of encoding data and protocols that allow for transparent interconnection of networks and security issues that will help maintain the integrity of a nationwide network. (See also ***NII***.)

### Firefox

Level: 1

*Definition:* An open-source free-to-the-public web browser for computers running Windows, Linux, and Macintosh operating systems. Developed under the direction of the Mozilla Foundation (an open-source offshoot of the now-defunct Netscape Corporation), Firefox features include a small installation footprint and fast operation, security enhancements, a pop-up blocker, and enhanced bookmark functions. Many experts believe that the fact that Firefox is not integrated into the PC operating system makes it much more secure than current versions of Internet Explorer. According to its developers, within the first 100 days of its initial release in late 2004, more than 25 million copies had been downloaded. (See also ***Browser*** and ***Netscape***.)

### Firewall

Level: 2

*Definition:* A firewall is a hardware or software security measure normally positioned between

an internal computer network and outside access points, including the Internet or other online networks or services. Firewalls are comprised of protective software and hardware to prevent unauthorized access to a private computer network and/or particular segments of the network (such as a home computer). Certain firewalls are designed to prevent network traffic from being sent outside, or into protected areas, where it might intentionally or unintentionally damage the system.

*Used in a sentence:* "I installed a firewall to further defend my home computer from hacker attacks." (See also ***Proxy Server***, ***Virtual Private Network***, and ***Virus***.)

### FireWire

Level: 2

*Definition:* A high-speed serial bus developed by Apple and Texas Instruments that allows for the connection of up to 63 peripheral devices. Also known as the IEEE 1394 standard as well as the high-performance software bus (HPSB), the original specification calls for 100-, 200-, and 400-Mbps transfer rates. IEEE 1394b provides for speeds up to 800, 1,600, and 3,200 Mbps. FireWire supports hot swapping, multiple speeds on the same bus, and isochronous data transfer, which guarantees bandwidth for multimedia operations. It is most commonly used for attaching digital cameras and other video devices to the computer. All Macintosh computers (and many PCs) are now shipped with FireWire capabilities. (See also ***USB***.)

### Firmware

Level: 2

*Definition:* Refers to software that is stored on a chip in a digital device, such as a handheld computer or a digital camera, which is often used to control the internal functions of the device. Firmware maintains essential operational information and preserves critical timing and other settings when the power is turned off. It is not uncommon for firmware to require upgrading, which can usually be done via a software interface. In some cases, users must replace the firmware chip in order to upgrade the software embedded on it.

*Used in a sentence:* "My smart phone manufacturer released a firmware upgrade to make it possible for me to use it as a voice recorder." (See also ***ROM***.)

### First In, First Out

### First Sale Doctrine

Level: 2

*Definition:* A key element of the legal framework to encourage dissemination of copyrighted works, the "first sale" doctrine as now included in the Copyright Act of 1976 permits anyone who has lawfully acquired a copyrighted work to "sell or otherwise dispose of the possession of that copy" without the permission of the copyright owner.

For example, this provision clarifies (and codifies) that libraries have the right (and have always had the right) to lend legally obtained copies to patrons, individuals to sell legally obtained used books to used book stores, and individuals who have lawfully acquired copies of works to give them to friends or family. Essentially, the concept of the copyright owner's exclusive distribution right has been clarified by statute to mean what it has always meant (i.e., that it does not pertain to individual physical copies changing hands individually once sold the first time). Current technologies have put tremendous stress on the first sale doctrine because as more and more copyrighted works exist in digital form, it becomes easier to acquire and distribute (legally or illegally) exact copies through the Internet. (See also ***Digital Rights Management***, ***File Sharing***, and ***Warez***.)

### Fixed Satellite Service (See *FSS*.)

### Flag

Level: 3

*Definition:* As used in computer environments, a flag is an indicator in a software application alerting the control unit, the portion of the CPU that decides what the computer will and will not process, regarding the status of a program instruction or piece of information. Flags can be attached

to information to alert the system that certain conditions were or were not met. For example, when an instruction is processed the flag will tell the program counter to go to the next number. This process tells the CPU that it must fetch the next instruction to process. (See also ***CPU***.)



### Flame

Level: 2

*Definition:* A cyberspace or Internet-related reference usually regarding individuals who participate in online dialogs in open Internet forums that either are not aware, or more likely choose to ignore, certain standards of Internet etiquette. Criticisms and complaints leading to more stridently worded responses tend to have propagating effects, producing higher levels of verbiage to the point of "flame wars." Not a pretty sight. (See also ***Chat***, ***Computer-mediated Communication***, ***E-mail***, ***Forum***, ***News Groups***, and ***Usenet***.)

### Flash

Level: 2

*Definition:* An animation platform developed by Macromedia that delivers smooth, compelling animations and interactive interfaces via the World Wide Web or as standalone applications that can be stored on a hard disk, memory card, CD, or DVD. Flash animations are "vector based," meaning that the relationships among the graphical elements are calculated on relative positions rather than fixed positions. As a result, the animations are resizable and their files are relatively small, making them ideal for Internet file transfer (even over relatively slow modem connections). In order to view the content based on the Flash platform, a small plug-in or add-on program is required for web browsers, although most browsers come with this plug-in already installed. (See also ***Vector Graphics***.)

### Flash Memory

Level: 2

*Definition:* Flash memory is a type of constantly powered nonvolatile computer memory that can be easily erased and reprogrammed. Flash memory is often used to store control coding such as for the basic input/output system (BIOS) in a personal computer. Flash memory is used in many digital devices, including digital cellular phones, digital cameras, LAN switches, PC cards for notebook computers, digital setup boxes, embedded controllers, and other digital devices. USB-ready flash memory devices now support massive amounts of storage (up to 4 Gb), can be configured as bootable devices, and some have been installed with security features to prevent unauthorized access to data. (See also ***BIOS*** and ***Memory Key***.)

### Flat-File Database

Level: 2

*Definition:* A flat file is a file containing records or entries that have no structured or predetermined interrelationship. A flat-file database can be used to manage a simple collection of information, such as an address book or list of phone numbers that can be stored, searched, and sorted. Although flat-file databases are easy to learn and set up, they lack the power and speed of relational databases that structure data in a series of tables that contain specific modules of types of information and can establish meaningful relationships among those pieces of data. (See also ***Relational Database***.)

### Flat-Panel Display

Level: 1

*Definition:* A class of displays that has become wildly popular because of their 3- to 5-inch thickness, flat-panel displays are now widely available for computer systems and television monitors. Innovations in advanced plasma technology have also made possible the development of large, thin high-resolution display screens that are wall mountable and use a 16:9 aspect ratio. (See also ***Backlighting***, ***HDTV***, and ***LCD***.)

### Flicker

Level: 2

*Definition:* The effect caused by the perceptible fading of video screen phosphors on alternating lines of an interlaced frame. The flicker can be remedied by using a faster vertical scan rate as provided by multi-scan monitors, or by using

a long-persistence monitor, where the phosphor dots do not fade as rapidly. For example, when a CRT computer monitor's vertical refresh rate is set to 60 Hz, most will produce a visible flickering effect. Refresh rates of 85 Hz and higher usually eliminate perceptible flicker on most CRTs. LCDs can usually be set at a lower refresh rate (about 75 Hz) to provide for acceptable viewing. (See also ***Interlace Scanning***.)

### Floppy Disk

Level: 1

*Definition:* A form of computer storage medium consisting of a thin, flexible plastic disk with a magnetic oxide coating held inside a protective sleeve on which program applications, data files, or other digitized information are stored. With the popularity of recordable CD and DVD technologies, floppy disks are on the way out. Most PC manufacturers stopped shipping floppy drives as part of their standard configuration in 2004.

### Fly-away

Level: 3

*Definition:* Refers to a class of small, transportable satellite uplink terminal systems used for satellite news gathering operations often in very remote locations, or for immediate coverage of major breaking news stories. Also used for coverage of planned events, fly-away units are self-contained uplink stations that are continually being improved—becoming more compact, lighter in weight, less costly, and producing higher-quality signals. Fly-away systems are intended for any application where a satellite uplink station needs to be quickly deployed for analog or digital transmission, including video, audio, telephone, fax, and computer data networking. (See also ***SNG***.)

### FM (Frequency Modulation)

Level: 3

*Definition:* A technique that changes the frequency of a carrier so that information can be sent over the air and recovered by detecting these changes in frequency. The form of modulation used in the FM radio band (88 to 109 MHz) and in the aural portion of the analog television signal. More precisely, a modulation technique in which the carrier frequency is shifted in frequency by an amount proportional to the value of the base-band input signal. (See also ***AM***.)

### FoIP (Fax over IP)

Level: 2

*Definition:* Similar to VoIP (voice over IP, or Internet telephony), FoIP involves sending the content of a fax over the Internet instead of over a traditional telephone line. Advantages of FoIP include the internetworking of multiple fax machines via the Internet, faster and more efficient transmission, potentially lower costs, and such options as fax to e-mail, e-mail to fax, and other services that are secure, trackable, and billable. (See also ***VoIP***.)

### Footprint (Satellite)

Level: 2

*Definition:* The general geographic area on the earth's surface that is covered by, or is able to receive, a particular satellite signal. Footprint coverage patterns depend on a variety of factors, including onboard satellite power, beam shaping techniques, the orbit of the satellite (low earth orbit, geostationary, elliptical, polar), and if located in geostationary orbit the position of the satellite along the arc. (See Figure F–1.)

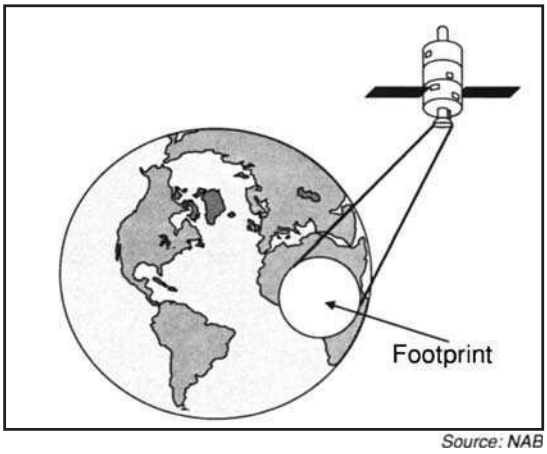



**FIGURE F–1.** Satellite footprint.

**Forward Error Correction (See *FEC*.)**

**Fourier Transform**
Level: 3
*Definition:* A Fourier transform is a mathematical algorithm that is a special way of processing signals using mathematically valid shortcuts to reduce the amount of computing required to transform signals. FT uses a particular methodology to reduce the number of operations in the Fourier transform, thus reducing the amount of computations required and making it faster to perform. One application is encoding and decoding COFDM signals. (See also ***COFDM***.)

**fps (frames per second)**
Level: 2
*Definition:* A measure of the number of video picture frames transmitted or displayed in an established period of time. The existing NTSC television standard specified that to create the illusion of continuity, a video picture frame must be retraced at a rate of 30 frames per second, or 30 Hz. The development of interlaced scanning for television made this practical. Video frames are composed of two fields of picture scan line information and transmitted at two times the frame rate to avoid the perception of any disruptive flicker.

*Used in a sentence:* "We reduced the number of frames per second from 30 to 15 to make the video more compatible with online distribution." (See also ***Field***, ***Flicker***, and ***Interlace Scanning***.)

**Fractal**
Level: 3
*Definition:* A fractal is an element of a type of mathematical modeling that translates the shape of a graphical object into mathematical formulas from which an image can be later constructed or reconstructed. Applications of fractal modeling enable complex graphical designs or computer-generated pictures to be created and stored in a computer as mathematical equations.

**Frame**
Level: 1
*Definition:* A single snapshot of video information that when combined with a series of other frames is traced onto a television as video programming or onto a computer as a video display. Frames consecutively scanned at a certain rate create the illusion of continuity. In computer file environments, the term *frame* indicates data organized as a block of information, which has a beginning and ending flag to signal where the block starts and finishes. A frame can also be used to describe an area of memory in a computer. On the Web, frames refer to a method of displaying information in web browsers so that multiple boxes, each with its own scroll bars, appear on a single screen. Because framed web sites are sometimes awkward to display, and because they are difficult for many to navigate (especially people using adaptive software), they have fallen out of fashion with web site developers. (See also ***Block***, ***Flag***, and ***fps***.)

**Frame Buffer**
Level: 3
*Definition:* A storage area for temporarily holding upcoming frames of video that cannot currently be displayed on a screen for viewing. Also called a frame store, frame buffers are used in both computer and television systems as an interim storage point that provides easy, ready access when required by a scanning device such as an electron gun.

**Frame Grabber**
Level: 3
*Definition:* A device used in video editing systems that removes specified video frames in an NTSC analog video signal or tape and moves them to computer memory storage by first digitizing the selected image.

**Frame Rate**
Level: 2
*Definition:* Pictures, or video, are displayed at a specific speed. How quickly or slowly these frames are made available for viewing is the frame rate. Frame rate for NTSC television video is 29.94 frames per second, and PAL television is broadcast at 25 frames per second. Streaming video applications allow the producers to adjust the frame rate to reduce the size of the digital video file (and thus reduce the bandwidth

required to stream it over the Internet). Frame rates for digital television (DTV) include 24, 30, and 60 frames per second. (See also ***DTV***, ***Frame***, ***NTSC***, and ***PAL***.)

**Frame Relay**
Level: 2
*Definition:* A type of digital data transmission for sending data over public or private leased phone lines. Frame relay systems adhere to a set of transmission standards for LAN and WAN networks and use protocols supporting packetized data switching. Packetized data frames can vary in size and do not contain any error-checking mechanisms. The ITU-T (formerly CCITT) and ANSI organizations have established technical standards for frame relay systems. However, frame relay is being displaced by ATM- and IP-based products. (See also ***ANSI*** and ***Packet Switching***.)

**Frame Store (See *Frame Buffer*.)**

**Frames per second (See *fps*.)**

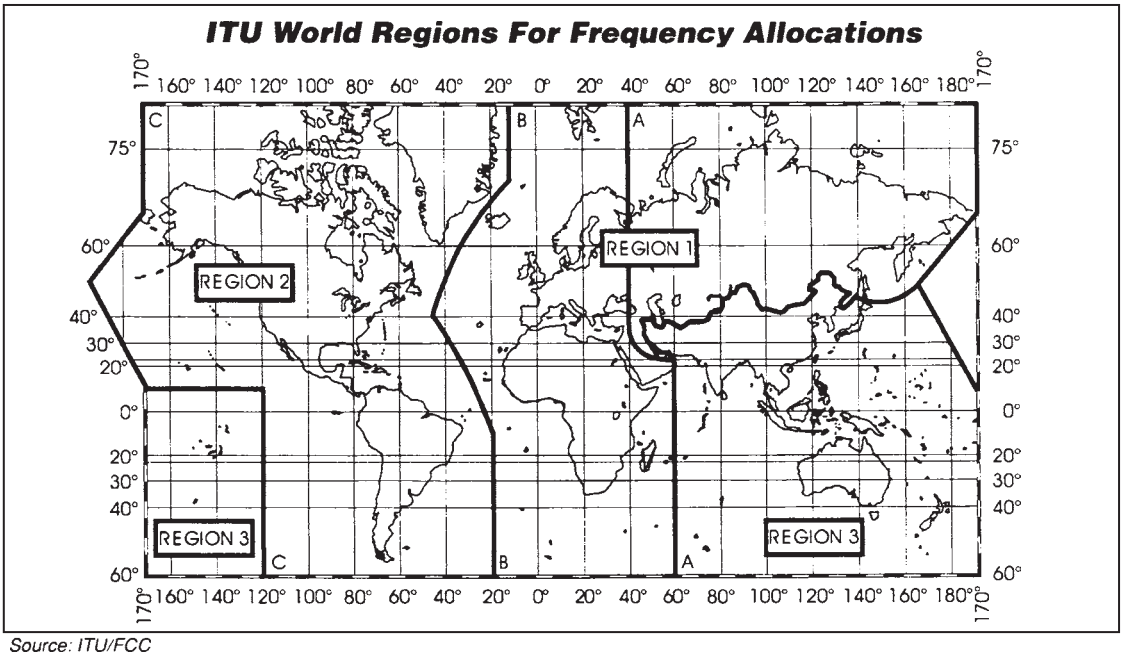
**FreeBSD**
Level: 2
*Definition:* A free open-source operating system similar to UNIX and descended from the original BSD (Berkeley Software Distribution). Free BSD runs on a wide variety of computer processors (including Intel x86, DEC Alpha and ULTRA-Sparc, Itanium, and AMD64) and continues to develop a loyal following. Initial development began in 1993. (See also ***Linux***.)

**Freeware**
Level: 2
*Definition:* A computer industry term for program software that is offered free, usually downloaded from the Internet. Freeware is not the same as shareware, which is also often available for download from the Internet. Shareware is a limited-use promotional product to encourage users to purchase the complete software package. In cases of shareware and freeware, copyrights remain with the originator. (See also ***Shareware***.)

**Frequency**
Level: 2
*Definition:* A measure of the number of times an event occurs in a given period. In less complex communications systems, where a signal stays relatively constant (such as in AM radio), the frequency of this analog signal is the number of times the sine wave of the signal is repeated during a specific interval of time. Typically, this measure of frequency is calculated for one-second intervals, and is expressed in cycles per second or hertz (Hz). In digital electronic systems with instantaneous frequencies requiring rapid shifts among channels, or use of many frequencies simultaneously, the concept of frequency is the number of times a signal changes from positive to negative (or vice versa) per second. (See also ***Spectrum***.)

**Frequency Allocation**
Level: 2
*Definition:* The allocation of spectrum frequencies by the International Telecommunications Union (ITU) divides the world into three regions. This geographic division supports organizational purposes as well as institutes a certain degree of space diversity to reduce/avoid interference. In the United States, the Federal Communications Commission is responsible for assigning licenses for commercial (nongovernmental) applications for domestic use, and for certain other commercial applications in accordance with the specifications of the International Frequency Allocation agreements. Government allocations of frequencies are overseen by the NTIA (National Telecommunications and Information Administration) under the aegis of the Executive branch. Internationally, RF allocations and registrations are overseen by the ITU-T, a division of the International Telecommunications Union (ITU), which incorporates the registration functions of the former International Frequency Registration Board (IFRB). (See Figure F–2 and see also ***FCC***.)

**Frequency Division Multiple Access (See *FDMA*.)**




*Source: ITU/FCC*

**FIGURE F–2.** Frequency allocation.

**Frequency Division Multiplexing (See *FDM* and *FDMA*.)**

**Frequency Hopping**
Level: 3
*Definition:* Refers to an RF transmission technique being used in new cellular and PCS services based on spread spectrum technology. (See also ***Spread Spectrum***.)

**Frequency-Hopping Spread Spectrum (See *FHSS*.)**

**Frequency Modulation (See *FM*.)**

**Frequency Response**
Level: 3
*Definition:* Usually displayed by graph, frequency response refers to the ability of a circuit to pass each frequency. The vertical axis shows the amount of the input frequency that gets through, and the horizontal axis shows the frequency. For example, a high-fidelity amplifier with a frequency response of 20 to 20,000 Hz ±1 dB indicates that the system amplifies all frequencies within that range within 1 dB (plus or minus).

**Frequency Reuse**
Level: 3
*Definition:* A systems engineering/design technique allowing the use the same spectrum frequencies used in a particular communications system without introducing interference or other artifacts. Such reuse is due to the basic design of a particular system. Reuse can be based on geographical separation, as were the original allocations for radio and television stations across the country. In a digital cellular phone system, cells are designed to reuse RF channels within set boundaries. The same frequencies can be used in other cells located not usually adjacent to but not far away, with little potential for interference. Reuse of frequencies is fundamentally what enables cellular systems to handle huge numbers of calls within a limited number of channels.

Frequency reuse schemes also are found in cable, optical broadband, and satellite communications systems.

**Frequency Shift Keying (See *FSK*.)**

**Frequently Asked Question (See *FAQ*.)**

**Front End Processor (See *FEP*.)**

**FSK (Frequency Shift Keying)**
Level: 3
*Definition:* A method of signal modulation where analog information is converted into digital binary (1s and 0s) form for transmission over telephone lines. By shifting the frequency of an audible tone to correspond to digital 1s and 0s, a receiving modem can determine whether a received binary bit is a 1 or a 0. For example, an audible tone of 50 Hz could represent zeros and another tone of 100 Hz would denote ones.

**FSS (Fixed Satellite Service)**
Level: 2
*Definition:* Regulatory terminology for satellites licensed to transmit (and receive) communications to fixed or permanent earth station receivers. The FSS designation distinguishes these satellite services from mobile satellite services (MSS), which are transmitted from satellites to receivers attached to mobile vehicles. (See also ***Satellite***.)

**FTP (File Transfer Protocol)**
Level: 2
*Definition:* A protocol, or set of rules, that determine the way files are transferred between two computers, often via the Internet. This set of rules also designates the way security is handled by requiring remote users to log on to the system and keeping track of those remote users using the system. FTP specifies a particular way for a directory to be accessed and changed. FTP operates in the session, presentation, and application layers of the Open Systems Interconnect (OSI) model.

*Used in a sentence (as a verb):* "I had to FTP my largest files to their server so that they could access them without any trouble." (See also ***OSI***.)

**FTTC (Fiber to the Curb)**
Level: 2
*Definition:* A network topology for fiber-optic-based telephone systems that generally refers to a design to bring fiber capacity to some location just outside residential homes, or at least to a location that is not far from a central office node. Telephone company plans vary, but such FTTC architectures are usually envisioned as a hybrid of fiber and coaxial cable lines, where coax is used to extend from the fiber endpoint to connect with homes. Reasons for hybrid fiber coaxial (HFC) cable designs are economics, and to some extent robustness of coax versus the fragility of fiber inside homes, among others. Some telecommunications providers are now experimenting with installing fiber optics directly to (and in) the home. (See also ***Broadband***, ***Fiber Optics***, and ***FTTH***.)

**FTTH (Fiber to the Home)**
Level: 2
*Definition:* A telecom network topology that would extend fiber-optic cabling directly into residential homes. Once touted as the broadband network of the future, cost, technical capacity, and other considerations have caused the telephone industry to slow down or drop plans for major deployment of FTTH strategies, although some providers are now experimenting with FTTH. (See also ***Broadband*** and ***Fiber Optics***.)

**Full Duplex**
Level: 3
*Definition:* Telephone industry term for complete two-way transmission or communication. Full duplex lines enable users to both send and receive information at the same time, such as in the traditional plain-old telephone service (POTS). Basic two-way interactivity allows users to both talk and listen without any pauses between the two activities.

**Fuzzy Logic**
Level: 2
*Definition:* Originally introduced in the 1960s, fuzzy logic is intended to more closely resemble nonlinear human thinking than the older

traditional binary logic of "on" versus "off" or "yes" versus "no" as represented by Boolean logic. In contrast, fuzzy logic systems are built to blur the boundaries between the two extreme states. As a result, advances in fuzzy logic could produce a revolution in artificial intelligence applications by enabling computers to function more like human brains and less like "dumb" machines. (See also ***AI***, ***Animated GIF***, and ***Boolean Search***.)

# G



### Gain
Level: 2
*Definition:* (1) In RF communications, gain refers to the amount of increase in the strength of a signal after being passed through a signal amplifier. This increase in signal strength is frequently measured in decibels (dB). (2) Gain is also a measure of the amount of signal delivered by an antenna relative or compared to a reference antenna. (3) Less commonly, the ability of sophisticated digital algorithms and signal processors that receive specially modulated signals to increase effectively the desired-to-undesired signal ratio, which results in processing gain. (4) Gain is also used to measure the reflectivity of a projection screen, with a "high-gain" screen reflecting more light at right angles (which makes the image brighter for viewers in the center of the viewing area but dimmer for those looking from a wide angle).

### Gateway
Level: 3
*Definition:* A combination of hardware and software used to interconnect two dissimilar computer systems, thereby allowing the two systems to "talk" to each other. For example, a corporate e-mail system might need a gateway to translate its internal e-mail format to an Internet e-mail format that would then enable transmissions via the Internet. (See also ***Internet***.)

### Gb (See *Gigabit*.)

### GB (See *Gigabyte*.)

### Gbps (Gigabits per second)
Level: 1
*Definition:* Gbps refers to transfer rates of data over a telecommunications medium as a measure of bandwidth (the total information flow over a given time). (See also ***Gigabit*** and ***Mbps***.)

### GCR (Ghost-Canceling Reference Signal)
Level: 3
*Definition:* A reference signal used as a technique to reduce or eliminate the effects of multipath interference that appear as ghosting images in NTSC over-the-air television transmissions. Implementing this technology requires the use of a GCR signal that is inserted in the vertical blanking interval of the transmitted TV signal, as well as special circuitry in a TV set or set-top converter box to process the reference signal and remove the ghosting. (See also ***NTSC*** and ***VBI***.)

### General Public License (See *GPL*.)

### General-Purpose Interface (See *GPI*.)

### Generation
Level: 1
*Definition:* In computer and other electronic communications systems, the term *generation* is used in a number of contexts. Generally, it relates to successive versions of hardware and software products, or to successive copies of software on tape storage media. Computer hardware, software, and other consumer electronic products that have evolved with improvements in design and/or functions are considered new generations of an existing technology. First-generation computers used vacuum tubes and were massive in size. Succeeding generations used transistors, chips, miniaturization, and active matrix LCDs to arrive at today's array of high-powered laptops and personal computers. In software such as audio or videotapes, generations indicate successive copies of an original or creation of a new generation out of older original versions. In duplication, successive generations of tape quickly degrade or lose quality. This is one of the main attractions to digital technologies that do not degrade when copied but pose their own risks

for commercial distributors in terms of illegal copying.

*Used in a sentence:* "We decided to go with next-generation software because it offers so many more features than what we're currently using."

### Geographic Information System (See *GIS*.)

### Geostationary Orbit

Level: 2

*Definition:* A specific earth orbit used for communication satellites in which the satellite remains constantly in the same position relative to a geographical point on the surface of the earth. In this position it appears stationary as seen from earth (geostationary) or traveling at a speed that is synchronous with the daily rotation of the earth on its axis (geosynchronous). The orbit is located approximately 22,300 miles above the equator of the earth. Geostationary satellites allow fixed ground receivers (dishes) to be pointed at the same place in the sky, as the satellite remains in the same location in relation to the movement of the earth. (See also **Clarke Belt**.)

### Ghost Canceling Reference Signal (See *GCR*.)

### GHz (See *Gigahertz*.)

### GIF (Graphics Interface Format)

Level: 2

*Definition:* An established proprietary format used as an interface in converting a graphical image (or picture) into a compressed digital form. This form enables computer processing of the image data. GIF files (most commonly pronounced with a hard "g" like "gift") enable a computer to display the image on a monitor and also print the digital image. GIF compression limits the total number of colors that can be rendered to no more than 256, making it less than ideal for most photographic images (which usually contain millions of colors). GIF is especially suited for compressing line drawings, maps, and other types of images that contain simple color information. JPEG compression is more appropriate for rich-color photographs. (See also ***Animated GIF***, ***JPEG***, ***PNG***, and ***TIFF***.)

### Gigabit (Gb)

Level: 1

*Definition:* One billion digital bits. (See also ***Bit***.)

### Gigabit Ethernet

Level: 2

*Definition:* A more recent version of the computer network Ethernet system protocol, which supports data transfer rates of 1 gigabit or 1,000 megabits per second. The first gigabit Ethernet standard was adopted in 1998, and it has been widely deployed in the more developed parts of the world.

*Used in a sentence:* "Once our company installed gigabit Ethernet we were able to exchange extremely large digital files without hardly any delay." (See also ***CAT-5***, ***CAT-6***, and ***Ethernet***.)

### Gigabit Point of Presence (See *Gigapop*.)

### Gigabits per second (See *Gbps*.)

### Gigabyte (GB)

Level: 1

*Definition:* One billion bytes. (See also ***Byte***.)

### Gigahertz (GHz)

Level: 2

*Definition:* A radio frequency operating at one billion hertz or cycles per second. Also used as a relative measure of the bandwidth capacity of a communication channel. (See also ***Bandwidth*** and ***Hertz***.)

### Gigapop (Gigabit Point of Presence)

Level: 2

*Definition:* A gigabit point of presence is a network access point supporting transfer rates of at least 1 Gbps used to connect to Internet 2, the network collaboration among universities, corporations, and government agencies devoted to developing advanced Internet technologies and applications, such as telemedicine and digital libraries. Gigapops are distributed geographically

across the United States, with one gigapop intended to serve up to 12 participating institutions. There are currently about 30 gigpops in operation in the United States. (See also ***Gbps***, ***Internet***, and ***Internet 2***.)

### GIS (Geographic Information System)

Level: 3

*Definition:* Refers to a segment of the emerging earth-imaging/remote-sensing industry resulting from the development of high-end digital computer data and graphics processing capabilities. GIS companies collect, store, and create massive databases that can be queried, accessed, and manipulated and produce diverse sets of geographical mapping data in electronic form. Systems often integrate RS imaging data and GIS geographical and thematic database information (e.g., vegetation acreage, croplands, watershed drainage areas, transportation, powerline, or underground cabling networks). (See also ***DGPS***, ***GPS***, ***Remote Sensing***, and ***Thermal Mapping***.)

### G.lite

Level: 2

*Definition:* An informal name for a version of ADSL that delivers 1.5 Mbps downstream and 640 kbps upstream and is specifically tailored for the consumer market segment. G.lite does not possess the same distance limitations as traditional DSL and requires only a traditional modem to be installed in the user's home. G.lite delivers "always-on" Internet access at relatively high speeds using existing telephone wiring and allowing concurrent use of normal telephone service. (See also ***ADSL***, ***Downstream***, ***DSL***, ***Modem***, and ***Upstream***.)

### Global Positioning System (See *GPS*.)

### Global Systems for Mobile Communications (See *GSM*.)

### GMT (Greenwich Mean Time)

Level: 2

*Definition:* Historically, the longitudinal line running through Greenwich, England, was designated as the reference point for determining relative time in other time zones around the globe. Twenty-four time zones corresponding to measured longitude degrees corresponding to one-hour increments from the GMT reference. GMT is not often used today in favor of a more precise term, *UTC* (for Coordinated Universal Time). (See also ***UTC***.)

### Gnutella

Level: 2

*Definition:* A software development project that creates and expands peer-to-peer (P2P) file sharing without the use of a central server, Gnutella has spawned a variety of popular applications (including Limewire, Morpheus, and Bearshare). Gnutella works by connecting one peer computer to a predetermined number of other peers (called "nodes"). As each peer participates in this process, theoretically every node on the Gnutella network would be connected to at least several other nodes on the network. As a request or a search is issued on the network, one node sends the request to its list of nodes and each node in that list sends the request to its list of nodes, and so on and so on. Once a result is returned, that node will connect directly with the node that originated the request, making the peer-to-peer file transfer possible. If more than one copy of the same file is found on separate nodes, the searcher can perform a "swarm" download that transfers pieces of the file from different nodes and assembles them on the searcher's machine. This results in dramatically increased download rates. (See also ***BitTorrent***, ***File Sharing***, and ***Peer to Peer***.)

### Google

Level: 1

*Definition:* Founded in 1998, Google has become the most popular search engine and information service on the Internet. Powered by its closely protected PageRank search order algorithm, which plays an important part in how search results are prioritized, Google has displaced search and information services such as Yahoo, Hotbot, AltaVista, and others as the undisputed leader in online searching. Google services also include a tool for searching

for images, for shopping online (froogle.com), news, discussion groups, local searching, online catalogs, academic searching, an online photo storage and organization application, and translation technologies. Google has also reached agreements with five libraries (Harvard and Stanford Universities, the University of Michigan at Ann Arbor, the University of Oxford, and the New York Public Library) to digitize vast portions of their collections. Google "went public" in August of 2004, raising $1.6 billion. (See also ***Directory*** and ***Search Engine***.)



### GPI (General-Purpose Interface)

Level: 3

*Definition:* A function that performs like a Play button in various electronic video processing devices such as character generators, switchers, or video editing units. A GPI trigger allows a user to precisely indicate when in a time sequence a particular action will be performed by the device. An advantage of this type of interface command is to ensure a higher degree of accuracy when performing video editing or inserting text titles in a video segment. (See also ***Keying***.)

### GPL (General Public License)

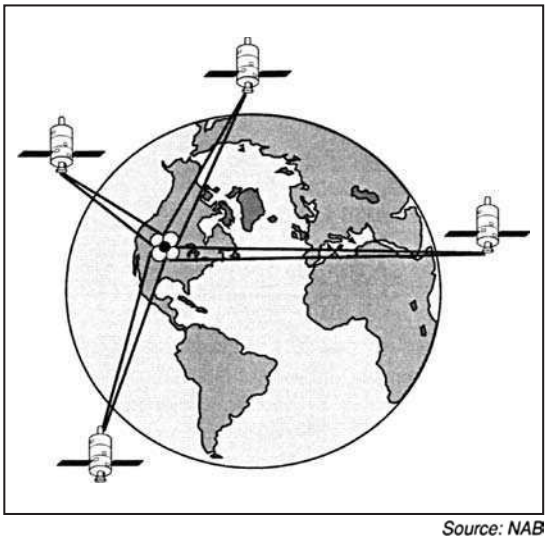
Level: 2

*Definition:* Originally created for the GNU software project, the general public license is one of the main licensing documents under which most open-source software is released. The GPL allows anyone to use, examine, modify, and distribute copies of the software. It also requires that anyone using open-source software code in any applications they create must make the relevant code of their applications available for free public viewing under the GPL, and that any derivative works developed also be licensed under the GPL. (See also ***Copyleft***.)

### GPS (Global Positioning System)

Level: 2

*Definition:* U.S. NavStar fleet of approximately 34 satellites used for precision pinpointing of geographic positions located anywhere on the earth's surface. An intentionally degraded version of the military GPS data is made available for commercial applications. The degraded version of GPS data is enhanced in a technique called Differential GPS to increase accuracy down to 10 meters. Positioning data at this level enables it to be used for a variety of services, such as in-car navigation systems, vehicle and truck fleet tracking purposes, or for potential use in the Intelligent Vehicle Highway Systems (IVHS) for car navigation and directional purposes. Existing GPS receivers can access signals from three satellites. More advanced GPS receivers, at higher costs, are able to pick up signals from four or five satellites and are thus able to create more accurate location information. (See Figure G–1 and see also ***DGPS***.)



Source: NAB

**FIGURE G–1.** Global Positioning System.

### Grade B Contour

Level: 3

*Definition:* Represents the signal coverage area of an analog television station in the United States established according to a set of certain technical criteria. "Grade B" service represents a specific value of ambient median field strength at 30 feet above the ground, which is deemed to be sufficiently strong (in the absence of a man-made noise or interference from other stations) to

provide a picture quality the median (average) observer would classify as "passable" quality, assuming a receiving installation (antenna, transmission line, and TV receiver) considered to be typical for use in outlying or near-fringe areas. A grade B signal contour represents the outer geographic limits within which the median field strength equals or exceeds the grade B value for the designated channel grouping as specified by the FCC. (See also ***Longely-Rice***.)

### Grand Alliance

Level: 3

*Definition:* A consortium including AT&T, David Sarnoff Research Center, General Instrument Corporation, Massachusetts Institute of Technology, Philips Electronics North America Corporation, Thomson Consumer Electronics, and Zenith Electronics Corporation. The Grand Alliance was formed after the initial round of competitive testing of advanced television systems did not show one proponent system to be significantly superior to the others. The group resolved their differences and the Grand Alliance developed the HDTV prototype equipment that was documented by the Advanced Television Systems Committee (ATSC). After laboratory testing was completed, the Grand Alliance system was formally recommended by the FCC's Committee on Advanced Television Systems (ACATS) to the FCC in 1995 for adoption as the United States standard for digital television. (See also ***HDTV***.)

### Granularity

Level: 2

*Definition:* In computing terms, granularity refers to how small the components are in a system and the extent to which that system contains distinctive components that carry out specific functions. A "fine-grained" system will provide greater flexibility in the use of its components. However, such systems usually require more system resources to coordinate and communicate among components. A "coarse-grained" system might have fewer components that function at a higher level. However, these components are less flexible and more difficult to modify.

*Used in a sentence:* "When designing a system with multiple components, it is important to achieve the right balance of granularity to ensure efficiency, flexibility, and stability."

### Graphical User Interface (See *GUI*.)

### Graphics Adapter

Level: 2

*Definition:* A graphics adapter (also called a video graphics adapter or video adapter) is an interface between a computer and a display device, such as a monitor. A graphics adapter converts video information from its original form to one that is acceptable on the display screen. Different graphics adapters are able to support different quantities of different colors and color palettes, as well as different levels of visual resolution. The graphics board must match the output of the video display monitor or it must support higher resolutions or color information than the display being used. For example, a graphics board with color capabilities can be used in conjunction with a black-and-white monitor, but not the reverse. (See also ***AGP*** and ***Graphics Accelerator***.)

### Graphics Interface Format (See *GIF*.)

### Greenwich Mean Time (See *GMT*.)

### Grid Computing

Level: 2

*Definition:* Refers to a distributed computer network (sometimes global) designed to take advantage of the unused processing cycles of numerous computers (sometimes thousands) to solve computationally intensive problems that are often too large for a single computer to handle efficiently. Whereas most early grid computing projects required special software to be written for each project, there is now growing support for grid computing in operating systems (especially Linux) and the emergence of general-purpose applications designed to take advantage of a network of inexpensive computers working together. Grid computing is now sometimes used to refer to "utility computing," or the process of accessing computer power and software applications

much like we access electrical power from utility companies. (See also ***Application Services Provider*** and ***On-demand Computing***.)

### Ground (Grounding)

Level: 2

*Definition:* (1) An intentional or accidental conducting path between an electrical system or circuit and the earth or some conducting body acting in place of the earth. (2) Within alternating current power systems (AC), the ground is the wire that carries currents away under fault conditions as a means of protecting the operator from electric shock. (3) In an electrical circuit operating at signal voltages, a ground is a common return path that is the zero voltage reference level for the equipment or system. This signal ground does not necessarily have to be connected to a power ground. A setup where the system ground is not actually connected to the earth is sometimes called a "floating ground." (4) A ground conductor, such as a lightning protection system (which is usually quite complex), used to dissipate an electrical strike into the earth.



### Ground Wave (See *GW*.)

### Group 3 Protocol

Level: 2

*Definition:* Refers to the international standard devised by the ITU for sending and receiving faxes over standard phone lines. (See also ***ITU***.)

### Groupware

Level: 2

*Definition:* Network software that allows groups of people to work together on common document files, schedules, CAD/CAM graphics, and so on.

*Used in a sentence:* "We used groupware to coordinate our project with offices in three different locations." (See also ***Exchange Server*** and ***Workgroup Computing***.)

### GSM (Global Systems for Mobile Communications)

Level: 2

*Definition:* A transmission standard developed and adopted in Europe and other global regions for digital mobile cellular phone services, GSM is the most popular mobile phone standard in the world. However, CDMA standards still dominate in North America. Because both the signaling and speech channels are digital, GSM is considered a second-generation (2G) platform. (See also ***CDMA***, ***Cellular Telephone***, ***PCS***, ***3G***, and ***Wireless Network***.)

### GSO (Geostationary Orbit)

Level: 1

*Definition:* Alternative shorthand designation for a satellite in geostationary (GEO) orbit.

### Guard Band

Level: 3

*Definition:* A narrow frequency band, or an unrecorded area on a magnetic tape, used to separate channels and prevent interference among them (crosstalk). Often used with frequency division multiplexing (FDM). (See also ***Frequency Division Multiplexing***.)

### GUI (Graphical User Interface)

Level: 1

*Definition:* PA type of computer interface or front-end overlay developed as a more graphics-oriented, user-friendly format for personal computers. Users are able to access, manipulate, and perform most other tasks using a pointing device (e.g., mouse) to activate commands by clicking on visual representations of functions called icons. GUI front-end overlay programs have replaced text-only menu systems and older keyboard typewritten command functions in personal computer systems. Graphic interface programs such as Windows are more intuitive to users, thus making computers more widely used appliances for performing a range of work and personal/home tasks. (See also ***Icon***.)

### GW (Ground Wave)

Level: 2

*Definition:* An effect found in radio transmissions where radio signals propagate with increased

strength as a result of traveling along the earth's surface. Radio signals with wavelengths longer than line-of-sight waves yet shorter than waves refracted in the ionosphere propagate with a ground wave component. (See also ***Propagation***.)

### Gzip

Level: 3

*Definition:* A form of compression used in UNIX systems similar to pkZip/Unzip. Files compressed with gzip have a *.gz* file extension. (See also ***UNIX***.)

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# H

### HAAT (Height Above Average Terrain)

Level: 2

*Definition:* Measure of elevation calculated from the level of nearby surrounding terrain. This is used most often in antenna tower constructions and the formula for measurement is defined by the FCC.

### Hacker

Level: 1

*Definition:* The term was originally used to describe a serious computer user. Now it is commonly used to refer to a person who gains unauthorized access to a computer system (usually from a remote location) and then tries to take control of some aspect of that computer, make changes to it, or access information contained on it. Many hackers try to break into computers purely for the challenge. Others (also known as "crackers") do intentional harm and/or steal information. One of the most famous hackers of all time, Kevin Mitnick (a.k.a. "Condor"), was arrested in February of 1995 and after four years, five months and 22 days Kevin Mitnick was finally sentenced on 9 August 1999 in U.S. District court to 46 months in prison. He was also ordered to pay $4,125 in restitution. This was a mere fraction of the $1.5 million the government wanted him to pay. (See also ***Buffer Overrun*** and ***Trojan Horse***.)

### Hammering

Level: 2

*Definition:* Originally coined to describe the process of repeatedly recontacting a file transfer server (FTP server) in an attempt to establish a connection, "hammering" generally refers to the automated process of repeatedly attempting to connect to various types of servers (for e-mail, file transfer, chat connections, and so on) that are already busy. Hammering a server tends to slow down the operation of the server, making it more difficult for anyone to establish and run new connections.

*Used in a sentence:* "One user's e-mail program was hammering our server every three seconds so we had to contact that user and ask him to reset his e-mail program because it was bogging down our system." (See also ***FTP***, ***HTTP***, and ***SMTP***.)

### Handheld

Level: 2

*Definition:* A less-often-used term to refer to the range of computing devices that can fit into a user's hand. Originally coined to refer to gadgets such as personal digital assistants (PDAs), the market demand is now shifting away from computing-alone devices and toward "smart phones" and other multipurpose devices. (See also ***Internet Appliance***, ***Palm-Top Computer***, and ***PDA***.)

### Handset

Level: 1

*Definition:* Typically a handheld apparatus or device used in voice communication systems consisting of a receiver and a transmitter enabling users to both talk and listen. The handset is the physical portion of a telephone held by the user. When the handset is lifted from its cradle or hook, a direct current (DC) connection is activated signaling the local switching system at the nearby central office (CO) to activate a dial tone or connect an incoming call and stop the phone from ringing. (See also ***CO*** and ***DC***.)

### Handshaking

Level: 3

*Definition:* In communications systems, this refers to the initial signaling that takes place between the sending device and the receiving device on a network to determine whether the receiver is "busy" or "idle." The confirmation of an open channel is called a handshake, as it can be

compared to physical handshake greetings. In data networks, the handshake greeting also sets the rules for subsequent interaction. Handshake procedures are also used by computers in making contact with peripheral devices such as printers or modems prior to downloading file signals. (See also ***Channel***.)

### Handwriting Recognition

Level: 1

*Definition:* Ideally, a technique developed to eliminate the need for using keyboards to input information into a computer. Handwriting recognition systems today are making steady improvements. They are most commonly used on tablet PCs and palm-top computers and require that the user substitute their usual handwriting characters for specially programmed symbols. Although such systems are becoming more and more popular, many people prefer to use keyboards because they are faster and more efficient in most situations. (See also ***Handheld***, ***Palm-Top Computer***, and ***Tablet PC***.)



### Haptics

Level: 1

*Definition:* Refers to the science of incorporating tactile capabilities (touch) into an interface between humans and computers. Current haptic interfaces (including joysticks, data gloves, body suits, and so on) are designed to work along with visual and auditory interfaces to provide more immersive computing experiences. The haptic device transmits and receives information that produces actual stimulation to some part or parts of the body, such as a vibrating joystick to indicate a collision in a video game. (See also ***Data Glove***.)

### Hard Bounce

Level: 1

*Definition:* Usually refers to what happens to an e-mail message sent to an invalid e-mail address. When such a message is sent, the message takes a hard bounce if the domain name (the name after the @ sign in the e-mail address) or the user name (the name before the @ sign in the e-mail address) is nonexistent.

*Used in a sentence:* "Once I got the hard bounce from the e-mail server I realized I was using a completely wrong e-mail address." (See also ***Soft Bounce***.)

### Hard Drive (or Hard Disk)

Level: 1

*Definition:* A hard drive is permanent memory capacity built into a computer and other devices (such as MP3 players, digital video recorders, and some televisions). Some hard drives are attached as a peripheral storage device to a computer. Hard drives are used to store large quantities of information in digital form and are typically used for more permanent storage. The operating system software and other applications software are usually stored on the hard drive for rapid access. A type of hard drive is a redundant array of independent disks (RAID), which contains multiple storage platters or disks. (See also ***RAID***.)

### Hard Phone

Level: 2

*Definition:* A physical device that looks much like a standard telephone except that it is equipped with technology that allows it to handle VoIP (Voice over Internet Protocol) and other protocols required for Internet telephony. (See also ***Softphone*** and ***VoIP***.)

### Hardware

Level: 1

*Definition:* The physical equipment components of a computer or other electronic communications system, including computer central processing units (CPUs), keyboards, monitors, hard disks, peripheral equipment, printers, servers, switchers, character or graphics generators, CD-ROMs, DVDs, speakers, and so on. Essentially, all physical equipment, components, devices, systems, network plant, or other physical electronic assets. (See also ***Software***.)

### Harmonic Distortion

Level: 2

*Definition:* A distortion or altering of a signal. If a single frequency is put into a device and

other frequencies come out in addition to the input signal, harmonic distortion has occurred. (See also ***Harmonics***.)

### Harmonics

Level: 2

*Definition:* Harmonics are multiples of a base or fundamental frequency. For example, a base frequency of 100 MHz could have harmonics of 200 MHz, 300 MHz, and 400 MHz. Generally the higher the multiple the smaller the energy in the harmonic. In electronic systems they are generally undesired and are produced because electronics are not perfect. However, these imperfections (nonlinearities) can be used to create harmonics if that is desired. (See also ***Harmonic Distortion***.)

### Hashing

Level: 3

*Definition:* Describes the process of using an algorithm to produce "hash values" (also called "digests") that create a mathematical or numerical representation of a piece of digital information either for security purposes or for increasing speed and efficiency of operations such as searching. For example, someone intending to send a secure message might first generate a hash value for the message (i.e., Message processed by Hashing Algorithm = Hash Value). The message and the hash can then be encrypted and sent to the intended recipient, who will then decrypt the message and the hash and, using the same hashing algorithm, generate a hash value that can be compared with the one sent by the sender. If the values are identical there is a strong probability the message was not tampered with. If the hash values are different there is cause for alarm. Hashing can also be used to increase the efficiency of searching for data. By converting strings of text, such as people's names, to numeric values via a hashing algorithm a computer is able to search for those hash-produced numeric values much more quickly than it can search for alphabetic text because the hash value is usually much smaller than the original text. (See also ***Encryption***.)

### HASL (Height Above Mean Sea Level)

Level: 2

*Definition:* Basically, this refers to elevation and is a measurement of how high an object is raised above a reference point, in this case sea level. This measurement is used in Global Positioning System (GPS) activities, providing users positioning data not only in latitude and longitude but in elevation. GPS elevation is measured from an elliptical model of the earth as opposed to normal elevation from sea level. A mathematical equation is used to convert between GPS elevation and normal HASL. (See also ***GPS***.)



### HAVi (Home Audio/Video interoperability)

Level: 2

*Definition:* HAVi is the name of an emerging home networking initiative that provides a software specification for seamless interoperability among home entertainment devices. Developed by eight different consumer electronics companies, HAVi is designed to make possible the "smart home" of the future in which electronic devices such as televisions, radios, telephones, video cameras, sound systems, and household appliances can communicate with one another and run "smart" applications together. For example, a HAVi-powered smart home might be able to display a video image of the person ringing your doorbell on your personal computer or your television (or record those images when you are not home). It might also be able to turn down the volume of your stereo system when you pick up the telephone to talk. Because HAVi is focused on the coordination of audio/video products (rather than just on computers and computer peripherals), some claim it will revolutionize the ways people interact with and use technologies at home. The HAVi standard includes the ability for devices to self-configure once they have been attached to the network, and for other devices to automatically coordinate services with the newcomer devices once they are online. It also includes a standardized application programming interface (API) to facilitate the development of future services and products. (See also ***API*** and ***Smart Home***.)

### HBI (Horizontal Blanking Interval)

Level: 3

*Definition:* A specific interval in television broadcast signals (including NTSC, PAL, and HDTV), which is created at the end of each scanned video line when the video signal is briefly turned off to allow the electron gun generating the television display image to return to the right side of the screen without retracing over the previous video line. Horizontal blanking intervals at times are visible as black portions seen on either side of a television picture. During this interval, a color burst signal is also generated in NTSC and PAL systems establishing a reference for demodulating the color or chrominance portion of the TV signal. (See also ***Interlace Scanning*** and ***VBI***.)



### HDC (High-bandwidth Digital Content)

Level: 3

*Definition:* A proprietary codec developed jointly by Ibiquity Digital Corporation and Coding Technologies that has been adopted for the delivery of HD radio in the United States. (See also ***Codec***, ***HD Radio***, and ***IBOC***.)

### HDCP (High-bandwidth Digital Content Protection)

Level: 3

*Definition:* HDCP is a copy protection scheme developed by Intel to prevent the capturing of video content transmitted digitally from the source to the display. HDCP encrypts the transmission of digital content between the video source (such as a DVD player or set-top box) and a digital display device, such as a monitor, television, or projector. Unique device keys, issued to all authorized devices by Digital Content Protection, are used to authenticate the encrypted transmission between the source and the display. The source and the receiver will continually check to make sure the transmission is operating only between the appropriate devices. HDCP is designed to protect digital signals used in DVI (digital video interface) and HDMI (high-definition multimedia interface), which are not used in most earlier-model HDTV sets. However, as more and more DVI/HDMI-only HDCP compliant sets are put on the market, the plasma screens, projectors, and other display devices will need to be HDCP compliant as well. (See also ***Decryption***, ***DVI***, ***Encryption***, ***HDMI***, and ***HDTV***.)

### HD-DVD (High-Density Digital Versatile Disc)

Level: 2

*Definition:* HD-DVD is an optical disc technology that has been developed to accommodate the large capacity requirements of high-definition television (HDTV). Backed by several major film studios and technology corporations, HD-DVD has a capacity of 15 Gb (single layer) to 30 Gb (dual layer). HD-DVD's main competition comes from Blu-Ray, which boasts higher storage capacity. (See also ***Blu-Ray*** and ***HDTV***.)

### HDMI (High-Definition Multimedia Interface)

Level: 2

*Definition:* The HDMI (high-definition multimedia interface) is an uncompressed, all-digital audio/video interface being used in high-definition television systems. HDMI provides an interface between any audio/video source (such as a set-top box, DVD player, or A/V receiver) and an audio and/or video monitor, such as a digital television (DTV). HDMI supports standard, enhanced, or high-definition video and multichannel digital audio on a single cable, with ample unused bandwidth for future enhancements and developments. (See also ***DVI***, ***HDCP***, and ***HDTV***.)

### HD Radio

Level: 2

*Definition:* A digital form of radio broadcasting that essentially fits into the same spectrum as current analog channels, HD radio is an in-band on-channel (IBOC) digital radio system created by iBiquity for broadcasting via existing FM and AM radio stations. The reception of HD radio requires the purchase of HD radio-capable receivers. (See also ***HDC*** and ***IBOC***.)

### HD-SDI (High-Definition Serial Digital Interface)

Level: 3

*Definition:* A high-definition version of SDI that transmits audio and video over a single

coaxial cable, with a data rate of 1.485 Gbps. (See also ***SDI***.)

### HDSL (High-bit-rate Digital Subscriber Loop)

Level: 2

*Definition:* A telephone industry technique for transporting data at high rates over voice-grade twisted-pair copper wires. Transmitted at speeds up to 2.048 Mbps, HDSL was developed to increase the utility of telephone company T-1 lines and ISDN services. HDSL does not need repeater devices to regenerate signal strength, which helps bring down service costs. HDSL is symmetrical, meaning that an equal amount of bandwidth is available in both directions. (See also ***DSL***, ***ISDN***, and ***T-1***.)

### HDTV (High-Definition Television)

Level: 2

*Definition:* Digital television technology and broadcast transmission standard being implemented in the United States and other countries around the world to provide sharper broadcast pictures, multichannel digital sound, and immunity from interference such as ghosting. An HDTV-compatible TV normally uses a 16:9 aspect ratio (as opposed to the 4:3 ratio of traditional television). The high-resolution images (1920 pixels × 1080 lines or 1280 pixels × 720 lines) provide much higher detail compared to analog television or regular DVDs. HDTV uses MPEG-2 as its compression codec. Like NTSC and PAL, 1920 × 1080 broadcasts use interlacing at 50 or 60 fields per second to reduce bandwidth demands. Progressive scan is used at 24, 25, and 30 frames per second. Alternating scan lines are broadcast 50 or 60 times a second, similar to PAL's 50-Hz and NTSC's 60-Hz interlacing. This format is called 1080i, or 1080i60. In areas traditionally using PAL, 50 Hz 1080i50 is also used. 1080p is currently used for broadcasting with less than 50 fields per second. Progressive scan formats are also used with frame rates up to 60 per second. The 1280 × 720 format only supports progressive scan (with the entire frame refreshed each time) and is thus termed 720p. The two most common HDTV specifications are 1,080-line interlaced scan (1080i) and 720-line progressive scan (720p). 1080i provides 1,080 lines of vertical resolution and 1,920 pixels across each line. 720p provides 720 vertical lines with 1,280 pixels across each line. HDTV also transmits superior sound quality because the audio signal is digitally encoded with Dolby Digital. The FCC has mandated that the current analog TV system be phased out and replaced by a digital version completely by the year 2009. (See also ***Aspect Ratio***, ***Dolby***, ***DTV***, ***Interlace Scanning***, ***MPEG-2***, and ***Progressive Scan***.)



### HDTV-Ready

Level: 1

*Definition:* Also called an HDTV monitor, an HDTV-ready system includes all technology to display an HDTV image but without the HDTV tuner built in. HDTV monitors are usually cheaper than integrated HDTV systems and are best suited for use when the HDTV system, such as with a satellite dish, requires a special tuner. Most HDTV monitors include a tuner that can receive standard analog television signals. Under new FCC rules now being phased in, HDTV monitors with only analog NTSC tuners are not allowed. HDTV displays over a certain size must either have no tuner (i.e., be just a monitor), or, if they have an NTSC tuner, they must also have a built-in ATSC tuner and decoder. (See also ***Integrated HDTV***.)

### Head End

Level: 2

*Definition:* Cable television industry term for the main facility used for generating cable television system signals. Typically, the head end is also where one or more satellite antennas are installed to receive a variety of cable network signals. Head-end equipment typically includes antennas, frequency converters, modulators, and demodulators. (See also ***Cable***.)

### Header

Level: 1

*Definition:* A generic term that most often refers to the portion of an electronic mail message that

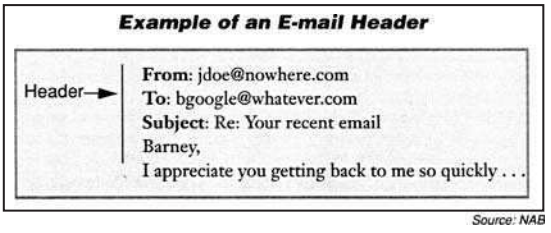


**FIGURE H–1.** Header.

precedes the body of a message and contains, among other things, the sender's name and e-mail address, the date and time the message was sent, and routing information. Header information is essential for tracing the source of an electronic mail message. (See Figure H–1 and see also ***E-mail***.)

**Height Above Average Terrain (See *HAAT*.)**

**Height Above mean Sea Level (See *HASL*.)**

**Hertz (Hz)**
Level: 2
*Definition:* The unit of measurement for the frequency of any vibration, (such as sound waves, water waves, electric voltages, or electromagnetic signals) where 1 Hz represents one cycle per second. Cycles refer to the number of times a complete wave is generated or transmitted in a given period of time. If a signal is made up of very long waves, it will have relatively few cycles per second. In comparison, a signal such as a microwave has a great many repetitions of its wave cycle per second. The electromagnetic spectrum is divided into bands based on the frequency or number of wave cycles per second, and expressed in terms of hertz. For instance, VHF broadcast television operates in a range of 30,000 Hz (30 MHz) to 300 MHz. (See also ***Frequency*** and ***Spectrum***.)

**Hexadecimal**
Level: 2
*Definition:* A numbering system based on 16 different elements (base 16) instead of our common decimal numbering system that uses 10 digits (base 10). Hexadecimal notation systems use numbers 1 through 9 and the letters A through F and are most frequently employed in computer memory addressing systems.

**HF (High Frequency)**
Level: 2
*Definition:* A portion of the radio frequency spectrum that ranges from 3 to 30 MHz and is widely used for international broadcasting. (See also ***Spectrum***.)

**HFC [Hybrid Fiber Coax (Coaxial Cable)]**
Level: 3
*Definition:* Widely deployed by cable television operators since the 1990s, HFC is a telecommunications industry term for a broadband network made up of both optical fiber and coaxial cable that can carry everything from analog television to digital TV to telephone to data. The coaxial portion of the network connects anywhere between 100 and 2,000 homes in a tree-and-branch configuration. Radio frequency amplifiers are used at intervals to overcome cable attenuation and splitting losses. To bridge the two transport mediums, an optical node converts optical signals to electrical and vice versa. Fiber-optic cables complete the network connection to a distant head end or hub. (See also ***Broadband***, ***Coaxial Cable***, ***Fiber Optics***, and ***Head End***.)

**High-bandwidth Digital Content (See *HDC*.)**

**High-bandwidth Digital Content Protection (See *HDCP*.)**

**High-bit-rate Digital Subscriber Loop (See *HDSL*.)**

**High-Definition (HD) Radio (See *HD Radio*.)**

**High-Definition Multimedia Interface (See *HDMI*.)**

**High-Definition Serial Digital Interface (See *HD-SDI*.)**

**High-Definition Television (See *HDTV*.)**

**High-Density Digital Versatile Disc (See *HD-DVD*.)**

**High Frequency (See *HF*.)**

**High-performance Computing**
Level: 2
*Definition:* High-performance computing orchestrates advanced computing, communications, and information technologies (such as supercomputers, high-performance workstations, high-speed networks) with the new generation of large-scale parallel systems (the simultaneous use of multiple computers to run a single program) and applications and systems software to produce the most powerful, efficient computing environments possible. High-performance computing often depends on the development of individual software programs that can be divided into small pieces so that each piece can run simultaneously by separate computer processors. (See also ***Parallel Processing***.)

**High-Power Amplifier (See *HPA*.)**

**Hit**
Level: 1
*Definition:* (1) On the Internet, a hit is a request made when a user visits a web site whether any desired information is found or not. However, each graphic or ad view link to a web page may count as a hit. When a user requests a web page using a URL, a computer server is contacted and it locates the requested page located on the appropriate web server. The requested page is transmitted via the Web to the user's "client" computer system, which downloads the graphical elements and text to build the page. Often the loading of each individual graphic on a page is considered a "hit." As a result, the number of hits has little if any relationship to the number of different users, visitors, or pages viewed, and thus is not considered a reliable measure of web advertising exposure. (2) On digital television systems (DTV), refers to the noticeable disturbances of DTV pictures, such a momentary blocking, caused by RF interference or transmission anomalies.

**Home Audio/Video interoperability (See *HAVi*.)**

**Home Automation**
Level: 2
*Definition:* Refers to trends in automating certain household functions through computerized systems to control lighting, heating, air conditioning (HVAC), security systems, and home entertainment systems including audio and video equipment. Access is managed via a central control unit in a separate box or home computer. The number and scope of tasks to be controlled through automation systems varies by product, manufacturer, and user need. (See also ***Smart Home***.)

**Home Page**
Level: 1
*Definition:* Top-level entry point ("page 1") of a web site for an individual, institution, organization, or possibly a subject area. Home pages often have a "URL" consisting of just the domain name (e.g., *http://www.nab.org*). All other pages on a web site are usually accessible by following jumps or hotspot links from the home page to other sections of the site. (See also ***Domain Name***, ***Hosting***, ***Hotspot***, ***URL***, and ***Web Site***.)

**Honeypot**
Level: 2
*Definition:* Useful in studying attackers' behavior and in drawing attention away from other potential targets, a honeypot is a host or network with known vulnerabilities that is deliberately exposed to a public network. The system administrators of the honeypot system can then monitor attempts to break into the system, learn from them, and fix any similar vulnerabilities in their mission-critical systems (and sometimes catch the hacker in the process). (See also ***Hacker*** and ***Virtual Honeypot***.)

**Horizontal Blanking Interval (See *HBI*.)**

**Host Computer**
Level: 2
*Definition:* Refers to a computer that acts as a source of information or data transmission signal. A host can be almost any type of computer from a centralized mainframe acting as a host to related terminals, to a server that performs as a host for its

client terminals, to a desktop PC that is host to its peripheral equipment or to other PCs. In network architectures, a client station (a user's desktop or PC) is also considered a host because it acts as a source of information to the network in contrast to a device such as a router or network switch that merely redirects data traffic.

### Hosting

Level: 2

*Definition:* Internet service providers (ISPs) typically offer to rent space on their computer web servers to hold the content of a client's web pages, thus allowing quick connections via the Internet. The process of holding and maintaining web sites using special software and hardware is called "hosting." Data is stored on a host computer or a computer on which a client rents space for the delivery of their web pages. Hosting may also include other services in addition to web access. Hosting services can include FTP, Telnet, chat services, e-mail services, database services, audio and video streaming applications, and other new interface technologies that connect to the Internet. Different hosts (ISPs) offer better-quality connections than others, and the software, computers, and prices for ISP hosting depend on the reliability of the network, the range of services required, and the popularity of the web site.

*Used in a sentence:* "We had to sign up with another company because the one that was hosting our web site did not provide adequate technical support." (See also ***Chat Room***, ***Forum***, ***FTP***, ***Host***, ***Internet Service Provider***, ***Newsgroup***, and ***Telnet***.)

### Hot Site

Level: 1

*Definition:* A special emergency computing facility consisting of a fully equipped and fully functional computer center available to a company in the event of disaster to its primary computer system. (See also ***Cold Site***.)

### Hotspot

Level: 1

*Definition:* Refers to the icon, image, or other boxed section on a web page sensitive to mouse clicks for immediately linking or transferring a user to a separate portion of the same site, or even to a separate web site.

### Hot Swapping

Level: 1

*Definition:* Hot swapping is the ability to plug in peripheral devices to a computer and remove them without having to reboot the system. Hot swapping requires the computer's operating system to be able to recognize and communicate with the device, and to run the appropriate software immediately after the device is plugged in (such as a printer, a memory key, a mouse, an MP3 player, and so on).

*Used in a sentence:* "One of the nicest features of modern operating systems is that they allow hot swapping so that I can connect printers, scanners, cameras, and other devices without having to turn the computer off first or without having to reboot the system for the new device to be recognized." (See also ***Firewire*** and ***USB***.)

### HPA (High-Power Amplifier)

Level: 3

*Definition:* A type of amplifier used by satellite earth stations to infuse signal transmissions with the extra power needed to reach satellites in space. HPAs are commonly used with earth stations transmitting to communications satellites in geosynchronous orbit over 22,300 miles above the earth and signals need to be amplified or increased in strength to travel this distance. (See also ***Amplifier*** and ***GEO***.)

### HTML (Hypertext Markup Language)

Level: 2

*Definition:* Refers to a standardized coding language used to create the hypertext documents that make up the World Wide Web. HTML appears like old-fashioned typesetting code where text blocks are bracketed with codes indicating how they should appear to a viewer. HTML allows web page creators to attach navigation tools, multimedia data, and hyperlinks to other home pages, in addition to text information. (See also ***Home Page***, ***Hypertext***, ***Mark-up Language***, and ***World Wide Web***.)

### HTTP (Hypertext Transport Protocol)

Level: 2

*Definition:* The standard file transfer protocol for the World Wide Web on the Internet, HTTP is a request/response protocol between clients and servers. To identify that hypertext transport protocol is used as the method of file transfer at a specific web site, a code is inserted at the beginning of addresses. For example, the address *http://www.nab.org* indicates that web users requesting files from this Internet address will have the home page of the National Association of Broadcasters delivered to their computer via a web server. HTTP differs from other TCP-based protocols such as FTP in that connections are usually terminated once a particular request (or related series of requests) has been completed. (See also ***Client/Server***, ***FTP***, ***TCP/IP***, and ***Web Server***.)

### HTTPd (HTTP daemon)

Level: 2

*Definition:* The name of the collection of programs that run constantly on a web server just waiting for a request to provide web services. (See also ***Client/Server*** and ***HTTP***.)

### HTTP daemon (See *HTTPd*.)

### HTTPS (Secure HTTP)

Level: 3

*Definition:* A secure version of HTTP, developed by Netscape, that provides general transaction security services over the Web. Users can usually identify a web address that is using a secure server by noticing the *s* following *http* in the web site's address (e.g., *https://myweb.du.edu*).

### Hub

Level: 2

*Definition:* A central point on a telecom or other communications network where numbers of circuits, signals, or other lines are interconnected. Hubs can be classified into two major categories: dumb hubs and smart (intelligent) hubs. A dumb hub is a passive device that essentially relies on instructions issued from outside sources. Intelligent hubs process and initiate functions because they are active devices containing their own CPU, or computer logic. In computer networking, a hub can connect many computers to a single network connection.

### Hue

Level: 2

*Definition:* Hue refers to the color value of a particular object and is one of the two attributes of chrominance in video production and transition systems. A color wheel demonstrates that as the value of a color changes it is hue that is the principle changing factor. Intensity of color or different shades of the same color are in reference to white and are related to saturation not basic hues. (See also ***Chrominance*** and ***Saturation***.)

### Hybrid Fiber Coax (Coaxial Cable) (See *HFC*.)

### Hybrid Network

Level: 3

*Definition:* A type of network that is made up of different components working in a coordinated structure to accomplish a designated mission. Hybrids can be in the form of analog equipment attached to a network of digital equipment or public networks connected to private networks. There has been a major shift in telephone industry strategy in upgrading its network of copper plant to a broadband system capable of transporting interactive video-on-demand as well as other new information services. The telcos once endorsed a pure fiber-optic topology, but are now supporting a hybrid fiber coax (HFC) network platform. (See also ***HFC***.)

### HyperCard

Level: 2

*Definition:* A type of software used to arrange computer documents into virtual stacks for storage and retrieval on Apple Macintosh systems. HyperCard is a Macintosh version of hypertext in which a set of stacks consists of cards, each containing its own information. HyperCard contains its own programming language, which allows users to develop further applications and provide linkage between documents on the Internet.

HyperCard was originally released with System 6 in 1987 and was finally withdrawn from sale in March of 2004, although it had not been updated for many years at that time. (See also ***HTML***, ***HTTP***, and ***Stack***.)

### Hyperlink/Link

Level: 1

*Definition:* A reference (link) from some point in one hypertext document to another hypertext document (either on the current web site or on another web site). Links can also refer to different places within a single document. A browser usually displays a hyperlink in some distinguishing way (e.g., in a different color, font, or style such as underlined or blue). When the user clicks on the link the browser will send the page request to the web server, which then accesses that page and delivers the result back to the user. (See also ***Client/Server***, ***HTML***, ***HTTP***, and ***Hypertext***.)



### Hypermedia

Level: 1

*Definition:* Used as another term for "multimedia," but it more precisely refers to the multimedia content delivered via the World Wide Web through Hypertext Mark-up Language (HTML). (See also ***HTML*** and ***Mark-up Language***.)

### Hypertext

Level: 2

*Definition:* A computer software technique allowing users to move directly from one location to another in a document, file, system, or CD-ROM or most commonly to navigate the World Wide Web. Hypertext applications allow users to determine the path to be followed through the document and are used extensively when jumping from web site to web site. Hypertext is a critical part of the HTML programming language used in creating content for the Web. It is also used in creating multimedia applications and can be applied to provide links within or between various computer documents. An example is the "Help" function in many Windows-based computer software packages. (See also ***HTML*** and ***Web***.)

### Hypertext Markup Language (See *HTML*.)

### Hypertext Transport Protocol (See *HTTP*.)

### Hz (hertz) (See *Hertz*.)

# I

### IA (Intelligent Agent)
Level: 2
*Definition:* Computer software programs designed to perform autonomously and with a high degree of built-in flexibility. The degree of "intelligence" varies with the complexity or sophistication of the software. Agents are typically designed as tasking programs, and the sophistication of the software determines the extent or types of tasks the particular agent is able to perform. IAs may be created to perform specific functions or actions such as locating products according to specified criteria, or even make certain types of decisions without human involvement. Agents may operate proactively to initiate a specific communication or transaction or reactively to respond to external events and conditions. Certain agents are able to "learn" from user behaviors, and update their own knowledge base to accommodate this behavior style. (See also ***AI***, ***Bot***, ***ALICE***, and ***Smart Home***.)

### IBOC (In-Band On-Channel)
Level: 3
*Definition:* Refers to a digital audio broadcasting system where digital radio signals are transmitted over the same frequency band as analog AM or FM radio, but employing a separate modulated digital signal. Digital information is "piggybacked" on a normal AM or FM analog signal (using a subcarrier), thus avoiding any complicated extra frequency assignments. IBOC has now been widely deployed throughout the United States. (See also ***HDC*** and ***SDARS***.)

### IC (Integrated Circuit)
Level: 2
*Definition:* An integrated electronic circuit, often called a chip, that performs single or multiple functions on a silicon wafer. (See also ***Chip***, ***Chip Set***, and ***VLSI***.)

### ICANN (Internet Corporation for Assigned Names and Numbers)
Level: 1
*Definition:* Founded in 1998, ICANN is a nonprofit corporation that took over responsibility from the U.S. government for coordinating certain Internet technical functions, including the management of the Internet domain name system. It is ICANN's job to ensure that every address is unique and that all users of the Internet can find all valid addresses. ICANN is currently overseen by a board of directors of 19 individuals from different parts of the world. (See also ***DNS***, ***Domain Name***, and ***IP Address***.)

### ICF (Internet Connection Firewall)
Level: 1
*Definition:* A feature of the Microsoft Windows XP Operating System, ICF functions to keep intruders out of a properly configured personal computer. ICF keeps track of all requests going out from the personal computer and checks to see if the information coming into the computer matches those requests. If the two do not match, ICF blocks the transmission and records the activity for later review. Devices connected to the Internet via a software or hardware router cannot use ICF. (See also ***Firewall*** and ***Hacker***.)

### ICMP (Internet Control Message Protocol)
Level: 3
*Definition:* A function of Internet transmission protocol, which transmits digital error-detection messages back to a message source to notify it of any errors in transmission or processing. Operationally, a host or network gateway server receiving an Internet message will return a message back to the transmitting host server

if an error is detected. However, ICMP cannot perform error checks on its own messages. (See also***TCP/IP***.)

### Icon

Level: 1

*Definition:* In the computer environment, this refers to a small picture used to represent a particular function, utility, software application, command, and so on commonly used in graphical user interface (GUI) software such as Windows. Using a pointing device such as a mouse, a user can point and double click on the icon to initiate whatever function the icon represents. (See also ***GUI***.)



### ICQ

Level: 2

*Definition:* Play on the words "I seek you," it refers to a proprietary instant messaging system originally developed by Mirabilis and later purchased by American Online. Available to anyone connected to the Internet, it is still one of the most popular downloads. ICQ still thrives today, even though it faces stiff competition from Yahoo Instant Messager, AOL Instant Messenger, and MSN Messenger (among others). (See also ***Computer-mediated Communication***, ***Instant Messaging***, and ***IRC***.)

### ICS (Internet Connection Sharing)

Level: 2

*Definition:* Generally refers to the process of configuring and connecting multiple computers to access the Internet through a single Internet connection. The computer through which the connection to the Internet is made is called the "ICS host," and the computers that use that host to get to the Internet are called "ICS clients." ICS also refers to a feature of the Microsoft Windows operating system (98 through XP) that uses software to allow multiple computers to access the Internet through a single Windows machine. ICS in Microsoft Windows cannot be used in an existing network with Windows 2000 Server domain controllers, DNS servers, gateways, DHCP servers, or systems configured for static IP addresses. (See also ***DNS***, ***Gateway***, ***IP***, and ***NAT***.)

### ID (Identifier)

Level: 1

*Definition:* Refers to a unique personal identification code comprised of a set of alphanumeric characters (often 6 to 10 characters) that is used in conjunction with a unique password to gain access as a subscriber to a secure system, such as a portion of an Internet web site. (See ***Authentication***, ***Password***, and ***SSL***.)

### iLife Suite

Level: 1

*Definition:* An expanding set of integrated software applications developed by Apple to bring nearly all aspects of digital media entertainment and development to the masses. As of July of 2005, the iLife Suite included the following applications: iPhoto (for photo manipulation, organization, and display), iMovie (for creating digital movies), iDVD (for authoring DVDs), GarageBand (for doing digital audio production), and iTunes (for purchasing, listening to, and sharing digital audio). (See also ***Apple***, ***Digital Media***, and ***iMac***.)

### IM (See *Instant Messaging*.)

### iMac

Level: 1

*Definition:* Introduced by Apple in 1998 and first recognized for its distinctive style and translucent casing, these personal computers have maintained a small but significant share of the global home, school, and small-office markets. Especially popular among educators, artists, and designers, the iMac provides a viable alternative to the Microsoft-dominated Wintel offerings that proliferate in computing today. (See also ***Apple*** and ***Wintel***.)

### Image Map

Level: 2

*Definition:* In Internet HTML processing, a graphical image containing so-called "hotspots" based on image mapping coding. When a user clicks on a hotspot the browser loads a corresponding document linked by image mapping software. (See also ***Hotspot***.)

### Image Processing

Level: 2

*Definition:* The process of digitizing and manipulating video images, which has been created via digital scanning or captured on tape or disc by digital cameras. Image processing also entails converting or processing visual or graphical images, pictures, motion, text, and so on into digital "machine-readable" formats such as when a picture is scanned into a computer. The scanner converts the picture or image by breaking it down into small pieces represented in digital binary format for storage and later retrieval purposes. (See also ***Digital Camera*** and ***Scanner***.)

### IMAP (Internet Message Access Protocol)

Level: 2

*Definition:* Refers to a protocol, or set of rules, that allows users on a client computer to gain access to and manipulate e-mail that resides on a central server. Users can synchronize their client and their server e-mail boxes as they read e-mail, create and remove folders and messages, search for messages on the server and/or client, and much more. IMAP is one of the most popular enterprise-level e-mail protocols in use today.

*Used in a sentence:* "I set up my e-mail account to use IMAP so that I could manage my single e-mail account using different computers." (See also ***Client/Server*** and ***E-mail***.)

### Impedance (Z)

Level: 2

*Definition:* A measure of the total amount of opposition encountered in an electrical circuit against the flow of alternating current (AC). Impedance is measured in ohms and expressed as (Z) in mathematical formulas. The impedance measure in AC systems is different from DC circuit resistance (also in ohms) due to the inclusion of AC energy storage parameters resulting in a vector-summed quantity, somewhat like the hypotenuse of a triangle. Maximum power transfer occurs when impedances are matched between two devices. Mismatches in impedance cause part of the signal to be reflected, causing distortions in the signals.

### IM Worm

Level: 2

*Definition:* A special type of self-replicating computer virus that spreads through instant-messaging systems. IM worms can identify their next targets by accessing an infected user's buddy list or address book, determining who is online at that moment, and then spreading itself to those specific users' systems. (See also ***Hacker***, ***Instant Messaging***, ***Virus***, and ***Worm***.)

### In-Band On-Channel (See *IBOC*.)

### In-Band Signaling

Level: 3

*Definition:* A type of signaling used in telecommunications networks in which a separate path is established within the voice channel, or band itself, for call setup and teardown. In-band signaling is transmitted within the telephone line for the voice communication signal to detect when a communications pathway is in use and when the connection needs to be terminated (i.e., when someone hangs up the phone).

### Inclined Orbit

Level: 3

*Definition:* A type of satellite orbit used for various applications for remote sensing, new proposed mobile satellite services, and others. (See also ***Elliptical Orbit***.)

### Incremental Backup

Level: 2

*Definition:* Refers to the process of making copies of only the files that have been altered since the last backup procedure rather than making copies of all files in a computer system.

*Used in a sentence:* "Our system administrator makes multiple daily incremental backups of our company database so that we're always protected from system failure and data loss." (See also ***Archive***, ***Data Vaulting***, and ***Data Warehousing***.)

### Indeo

Level: 2

*Definition:* Originally developed by Intel and now owned by Ligos, Indeo is a suite of video

and audio codecs for serverless streaming and CD-ROM games and applications. Indeo is based on DVI, a hardware-only codec for the compression of television-quality video. Indeo's serverless streaming is made possible using progressive download technology. (See also ***Compression*** and ***MJPEG***.)

### Indigo

Level: 3

*Definition:* A set of Microsoft .NET technologies for building and running connected systems using a "service-oriented development" architecture. Built around the idea that various computer applications with various functions "expose" themselves to each other and then communicate (or "message") each other to coordinate and cooperate with each other, Indigo forms the basis for the next generation of what Microsoft calls "advanced web services." Indigo will be an integral part of Windows "Longhorn," Microsoft's next-generation operating system, and is designed to work with Windows XP and Windows Server 2003. Microsoft claims that Indigo will establish the basis for moving beyond Internet servers toward true peer-to-peer communication, where PC users can share data and resources, find other users, and communicate and collaborate with them—all in real time. (See also ***Longhorn***, ***.NET***, and ***Service-oriented Development***.)

### Industrial, Scientific, and Medical (See *ISM*.)

### Information Appliance

Level: 2

*Definition:* A generic term referring to a consumer device that can process information, signals, graphics, animation, video, and audio, and is capable of exchanging such information with other information appliances. Examples of information appliances include smart phones, smart cards, handheld computers, PDAs, and so on. (See also ***Handheld***, ***PDA***, ***Smart Card***, and ***Smart Phone***.)

### Information Superhighway

Level: 1

*Definition:* A relatively dated term referring to the development and converging business environment of digital communications, electronic media, computers, satellites, and related electronic hardware, network infrastructure, and emerging intelligent software systems. The "networked" communications systems environment will provide information and automated operational services to businesses, schools, "smart homes," public and private health entities, research entities, financial entities, and university and government institutions and agencies, among others. The Internet's network of networks is an initial foundation for the electronic information infrastructure of the future. (See also ***Internet***, ***Internet Appliance***, ***Smart Home***, and ***TCP/IP***.)

### Information Technology (See *IT*.)

### Infrared

Level: 2

*Definition:* Part of the spectrum located between electromagnetic radio frequency signals and the visible light spectrum. Infrared signals are commonly used in television remote control devices, some short-distance line-of-sight communication links (for example, between two buildings), and certain fiber-optic systems. Standards for infrared applications are being developed by the Infrared Data Association (IrDA).

### Infrastructure

Level: 2

*Definition:* In computer and communications contexts, infrastructure refers to the installed base and future construction of a broad range of wired and wireless systems, operations, networks, physical plant facilities, equipment, and operating system software enabling widespread connectivity.

*Used in a sentence:* "We realized we needed to upgrade our entire network infrastructure in order to support gigabit Internet connections."

### Ingress Traffic

Level: 2

*Definition:* Describes the flow of computer data that originates outside a local network and then travels inside that network, usually from the Internet. (See also ***Egress Traffic***.)

**Initial Public Offering (IPO)**
Level: 1
*Definition:* The process of bringing private companies to the public market for the first time. IPOs occur when a company registers its stock with the Securities and Exchange Commission and can sell equity ownership in the company to the public. Access is gained to a source of capital that did not previously exist. There are numerous reporting and compliance issues to deal with from the IPO that often involves a considerable expense. The Netscape IPO on 9 August 1995 is generally heralded as the beginning of the 1990s' Internet boom.

**Inmarsat (International Maritime Satellite Organization)**
Level: 3
*Definition:* An international organization set up under treaty agreement to provide international mobile communications, originally for ships at sea, and later for aircraft in flight, and mobile vehicles. The functions of the organization have met with growing competition. The organization was fully privatized in 1999. Inmarsat provides telephony and data services to users world-wide via special digital radios called terminals, providing communications services to a range of governments, aid agencies, media outlets, and businesses needing to communicate in remote regions or where there is no reliable terrestrial network. Services include traditional voice calls, low-level data tracking systems, and high-speed data services.

**Input/Output (See *I/O*.)**

**Install/Uninstall**
Level: 1
*Definition:* Software must be "installed" onto a computer before it can be opened and used. The software installation process involves copying files from the installation disk or downloaded installation file provided by software vendors onto a user's computer system, along with special setup instructions. If a user ever decides to remove installed software from a computer, a specific "uninstall" program is required to be run to delete these files. Uninstall programs thoroughly search a computer's hard disk for all files copied or created during the installation process and from the subsequent use of the particular program. Once the "uninstall" program is installed, files are detected and the uninstall program completes the process by deleting all earmarked software files.

**Instant Messaging (IM)**
Level: 1
*Definition:* A type of Internet message or text communication between two or more users that enables them to hold real-time conversations via text messages. Most instant messaging systems use "presence awareness" technologies that notify a predetermined group of users when someone else in that group has either logged onto or off of the system. Some instant messaging programs have begun to offer video conferencing services, VoIP, and other collaboration services. (See also ***Computer-mediated Communication***, ***ICQ*** and ***VoIP***.)

**Instructional Television Fixed Service (See *ITFS*.)**

**Integrated Circuit (See *IC*.)**

**Integrated HDTV**
Level: 1
*Definition:* An integrated HDTV combines in one package a high-definition monitor with an HDTV tuner that can receive digital over-the-air broadcasts. (See also ***HDTV*** and ***HDTV-ready***.)

**Integrated High-Definition Television (See Integrated *HDTV*.)**

**Integrated Receiver/Decoder (See *IRD*.)**

**Integrated Services Digital Broadcasting (See *ISDB*.)**

**Integrated Services Digital Network (See *ISDN*.)**

**Integrated Voice Data**
Level: 3
*Definition:* A type of telecommunications network, or system, in which voice and data information are combined (integrated) for transmission on the same transmission medium.

**Intellectual Property**
Level: 2
*Definition:* Refers to any intangible property created by human intelligence such as the expression of thoughts or ideas in a fixed medium of expression, distinctive words, phrases, logos, and other symbols use to identify goods or services, inventions and processes, and novel and generally unknown ideas, processes, and technical designs that provide commercial advantage in the marketplace. Intellectual property is that which is generally protected under copyright, patent, trademark, or trade secret laws.



**Intelligent Agent (See *IA.*)**

**Intelsat**
Level: 2
*Definition:* Intelsat is the largest commercial satellite provider in the world. After 37 years as an inter-governmental organization, Intelsat became a private entity in 2001. Its partnership group currently has over 100 members and provides satellite services to more than 600 earth stations in more than 150 countries. Whereas Intelsat's headquarters are in Bermuda, most of its staff and satellite functions are located at the Intelsat Global Services Corporation offices in Washington, D.C.

**Interactive**
Level: 1
*Definition:* Typically refers to communications services, applications, or products offering two-way rather than traditional one-way channels or links. Interactive video, audio products, or services are able to offer a greater range of options or choices to meet consumer/user demands. Examples include electronic shopping, education/entertainment via CD-ROMs and DVDs, Internet access, distance learning networks, video-on-demand movies, PPV sporting events, emerging real-time information services, cable video game networks, and so on. (See also ***Digital Media***.)

**Interactive Television (ITV)**
Level: 2
*Definition:* Interactive television involves the ability of the viewer (or user) to influence program content (such as controlling viewing angles of a sporting match) and/or to transmit information back to the broadcaster or content provider via a "return path" (such as telephone, text message, or cable feed). Interactive television services have been growing slowly over the past five years. However, most systems are still in their early stages. (See also ***VBI***, ***VOD***, and ***WebTV***.)

**Interactive Voice Response (See *IVR.*)**

**Interconnect**
Level: 2
*Definition:* Essentially, to join or connect two or more pathways, systems, or communications mediums, usually at a particular switching point or signal hub facility. The term can be applied to many situations or conditions but usually refers to points of connectivity between networks or systems.

*Used in a sentence:* "Last month we led a successful effort to interconnect our local private networks to each other through a virtual private network running on the Internet." (See also ***Network***.)

**Inter-Exchange (See *IX.*)**

**Inter-Exchange Carrier (IXC)**
Level: 2
*Definition:* Telephone industry lexicon referring to all long-distance carriers such as AT&T, MCI, and Sprint. Prior to the passage of major legislative reform in early 1996, all local telephone companies [called local exchange carriers (LECs)] had to transmit any long-distance calls originating in their areas to an IXC in order to complete a call that crosses LATA boundaries. With the new Telecommunications Act of 1996, this statement

will eventually no longer be true. IXCs now have the right to provide local services, and LECs 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., LECs) 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

chrominance) information is once again separated when the signal is stripped from the modulated signal into its base-band form at the receiving end. The process of interleaving can also refer to interlace scanning where odd and even fields are combined to create a frame of video information. (See also ***Interlace Scanning*** and ***TDM***.)

**Inter Local Access and Transport Area (See *Inter-LATA*.)**

**International Maritime Satellite Organization (See *Inmarsat*.)**

**International Telecommunication Union (See *ITU*.)**

**International Standards Organization (ISO) Latin 1 (See *ISO Latin 1*.)**

**International Standards Organization (ISO) 9001 (See ISO 9001.)**

**Internet**

Level: 1

*Definition:* The Internet is a network of networks linked through the TCP/IP protocol. The Internet is not owned, controlled, or supervised by a single or central authority. It evolved from the government- and university-funded ARPANET of the late 1960s and early 1970s to become the most expansive network on the planet. The Internet connects literally hundreds of thousands of independent networks into a seemingly seamless vast global network, providing links to any computer connected via a standardized IP address. Today's Internet is used for everything from e-mail and instant messaging to web browsing, streaming media delivery, and VoIP telephony.

**Internet Address**

Level: 2

*Definition:* Also known as an IP address, an Internet address is a 32-bit number (not unlike a telephone number) assigned to a sender and to a receiver of transmitted digital data or communications information. The address is actually a number separated into four parts, sometimes called a "dotted quad" (which defines exactly where a certain computer is located). An example IP address: 130.253.1.2. The first number, 130, usually describes the company location. The second number, 253, describes the subnetwork within the company LAN or WAN. The third number, 1, indicates the LAN, and the fourth number, 2 (preceding zeros are never displayed), indicates the actual host. "Static" IP addresses are permanently assigned to a particular device (usually servers, printers, and other devices not likely to change physical location). "Dynamic" IP addresses are temporarily assigned to devices (such as laptop computers over a wireless network or computers dialing into a modem bank), making it possible to support many more devices than there are available IP addresses. The explosive growth of devices connected to the Internet (everything from personal computers to automobiles to household appliances) makes it likely that without a new architecture the number of possible network addresses using the current scheme will soon be used up. A new IP version, IPv6, expands the size of the IP address to 128 bits, which will accommodate a large growth in the number of network addresses. (See also ***Internet*** and ***TCP/IP***.)

**Internet Advertising**

Level: 1

*Definition:* The delivery of commercial information (sometimes solicited, sometimes not) via the Internet. Legitimate forms of Internet advertising include banner ads, sponsored links, and opt-in e-mail campaigns. Illegitimate forms include unsolicited commercial e-mail (spam) and spyware. For companies such as Yahoo and Google, advertising makes up a significant portion of their revenue stream. (See also ***Banner Ad***, ***Opt-in E-mail***, ***Spam***, and ***Spyware***.)

**Internet Appliance**

Level: 2

*Definition:* Any non-PC device that leverages the capabilities of the Internet to extend online content, services, and applications to all types of end users. Today, momentum is building behind the

"smart phone" as the Internet appliance of choice, although there are many other ways to access the Internet besides using a personal computer or a smart phone. (See ***Handheld***, ***PDA***, and ***Smart Phone***.)

**Internet Connection Firewall (See *ICF*.)**

**Internet Connection Sharing (See *ICS*.)**

**Internet Control Message Protocol (See *ICMP*.)**

**Internet Corporation for Assigned Names and Numbers (See *ICANN*.)**

**Internet Over Satellite (See *IoS*.)**

**Internet Protocol (See *IP*.)**

**Internet Service Provider (See *ISP*.)**

**Internet Protocol (IP) Address (See *IP Address*.)**

**Internet Protocol Security (See *IPsec*.)**

**Internet Protocol (IP) Spoofing (See *IP Spoofing*.)**

**Internet Protocol (IP) Telephony (See *IP Telephony*.)**

**Internet Relay Chat (See *IRC*.)**

**Internet Service Provider (See *ISP*.)**

**Internet 2**
Level: 2
*Definition:* Internet 2 is a consortium of more than 200 U.S. universities and partners charged with developing the next-generation high-speed global network technologies. Current Internet 2 installations are running at speeds of more 100 times faster than current Internet configurations. Internet 2 is not a separate network. Rather, it is a group devoted to building a faster, more efficient next-level network system based on today's Internet. These new technologies will drive completely new applications, such as enhanced digital libraries, virtual laboratories, immersive distance-independent education, and more. (See also ***Next-Generation Internet***.)

**Interoperability**
Level: 3
*Definition:* The ability of communications networks, systems, or equipment to work in concert with other systems, equipment, or networks for the seamless exchange or transfer of data or signals. Interoperability enables different systems to perform or function based on use of open system architectures or other protocols that enhance, rather than limit, rapid exchanges of information among the systems. Interoperability goes far beyond merely establishing an electronic connection, as it also means different software applications from different vendors can work together. Because digital signal processing can support platforms that feature connectivity and interoperability, businesses have the creative opportunity to conceive of new services that combine previously distinct capabilities of television, telephone, computers and other digital devices that could be enormously significant.

*Used in a sentence:* "Our new system wasn't working properly because of interoperability problems with several key components."

**Interrupt Request (See *IRQ*.)**

**Intra-LATA (Intra Local Access and Transport Area)**
Level: 2
*Definition:* Telephone industry description for communication links that take place totally within the boundaries of a designated area called a LATA. (See also ***LATA***.)

**Intra Local Access and Transport Area (See *Intra-LATA*.)**

**Intranet**
Level: 2
*Definition:* Intranets are local networks that use the TCP/IP protocol rather than expensive, difficult-to-manage, proprietary legacy systems

for a range of enterprise-wide communications, distribution of information, and management functions. Often intranets allow access only by employees, organization members, or others with special authorization. An intranet site appears to be a traditional web site. However, access from outside the organization is controlled by security firewalls to prevent unauthorized entry. (See also ***Extranet***, ***Firewall***, ***Internet***, and ***TCP/IP***.)

### I/O (Input/Output)

Level: 2

*Definition:* Generally, any information or signal that comes into a system or is produced within, generated by, or transported out of a system. I/O is also a task to be performed or a function of various devices or equipment that moves information into or out of a system. Computer I/O devices include disk drives, modems, or printers that either provide data information or signals to the CPU for processing or to which the CPU sends information for storage or transmission purposes.

### IoS (Internet over Satellite)

Level: 2

*Definition:* Also known as IPoS (IP over satellite), Internet over satellite refers to the process of connecting to the Internet via a satellite (versus via telephone, cable, wireless network, and so on). For some living in remote areas or those out of reach of existing network connections (such as ships), satellite-based Internet connections are their only option for getting online. The technologies for providing broadband Internet access via satellite are still evolving, with current IoS services generally costing significantly more than traditional connection methods. Download speeds of the most expensive offerings can equal current cable modem/DSL data transfer rates (2.5 Mbps). However, the upload speeds are significantly slower, with some systems offering a maximum upload data transfer rate of 256 Kbps.

### IP (Internet Protocol)

Level: 2

*Definition:* The technical format established for the seamless transfer of digital information across the Internet by splitting that information into pieces and routing it from server to server until it reaches its ultimate destination. The use of IP as a transmission protocol standard is becoming more common as the reaches and uses of the Internet continually expand to include activities such as telephony. (See also ***IP Address***, ***IP Multicast***, ***IP Telephony***, ***Protocol***, ***TCP/IP***, and ***VoIP***.)

### IP (Internet Protocol) Address

Level: 2

*Definition*: A unique identifier for each computer or device connected to the Internet that is used to route network traffic based on the IP address of the final destination. IP addresses are written as four groups of up to three numbers separated by periods, such as 130.253.1.2. Each number can be zero to 255. Functioning much like a telephone number (with area code), each IP address consists of a network number and an optional subnetwork number that are used to route the traffic to the proper geographic location. The IP address also includes a host number, which is used to address an individual host/device within the specific network or subnetwork.

*Used in a sentence:* "I had to determine the IP address of our network printer in order to configure it for shared printing within our workgroup." (See also ***DHCP***, ***DNS***, ***IP***, and ***Packet Switching***.)

### IPO (See *Initial Public Offering.*)

### iPod

Level: 1

*Definition:* Weighing just a few ounces and storing thousands of songs, Apple's iPod portable digital music player has come to dominate the mobile music market. Combined with its highly successful iTunes music service, Apple's iPod offers one of the most efficient, easiest-to-use digital music services today, although there are many competitors vying for a share of this growing market (including Dell, Creative, iRiver, Rio, Sony, and others). Current top-of-the-line iPods come with high-capacity storage drives (60 Gb), color screens, and the ability to store and show digital video. (See also ***MP3***.)

### IPsec (IP Security)

Level: 3

*Definition:* Because the Internet was originally designed with almost no security measures in place, IPsec has emerged as a standard for creating secure virtual private networks (VPNs) via the Internet. IPSec acts at the network layer, protecting and authenticating IP packets that are exchanged among participating IPSec devices. IPsec offers two modes of encryption: transport mode and tunnel mode. Transport mode encrypts only the data portion of each packet, leaving the header (which includes information about the source, destination, how the network should handle the packet, and so on) untouched. The more secure tunnel mode encrypts both the header and the data portion. The sending and receiving devices must share a public key (which is generated using Internet key exchange, IKE), which allows for proper encryption and decryption of the packets. (See also ***Encryption***, ***Public Key***, and ***VPN***.)

### IP (Internet Protocol) Spoofing

Level: 2

*Definition:* IP spoofing is a technique whereby an intruder attempts to gain access to another system by altering a packet's IP address to make it appear as though the packet originated from a trusted source, such as another computer on an internal network. This form of attack can be easily thwarted by not exposing internal IP addresses to external users and by examining packets at a firewall or router to ensure they come from the proper network. (See also ***Hacker***, ***Packet***, and ***TCP/IP***.)

### IP Telephony (See *VoIP*.)

### IRC (Internet Relay Chat)

Level: 2

*Definition:* An Internet program that enables massive multi-user live exchanges or "chat" sessions. There are a number of major IRC servers, which are linked to form these huge chat facilities. Multiple users are able to participate in chat conversations, each using a particular "channel." Anyone can create a channel and there are no limits on the number of people or the number of channels that can simultaneously participate in one of these sessions. Private channels can be created for multi-person "conference calls," and IRC servers can be configured to enable file sharing. (See also ***Chat***, ***Computer-mediated Communication***, and ***File sharing***.)

### IRD (Integrated Receiver/Decoder)

Level: 3

*Definition:* An electronic device used by cable or other video services, such as DBS, to receive and decode video signals. Usually part of the set-top box used for receiving premium channels and pay-per-view services, IRDs receive the scrambled or encrypted cable or satellite signals decode or unscramble them and, in the case of DBS, convert it to analog for customer viewing.

### IRQ (Interrupt Request)

Level: 3

*Definition:* A computer reference to a certain type of signal that is generated by a device connected to the CPU or data bus. The signal is sent to alert the CPU of a request for attention to that device. Examples might be "ready to send," "clear to send," or "ready to receive." Of course, all IRQs (as is true with all computer communications) are sent in binary form. (See also ***Binary*** and ***CPU***.)

### ISDB (Integrated Services Digital Broadcasting)

Level: 3

*Definition:* The digital television (DTV) and digital audio broadcasting format Japan has adopted to allow Japanese radio and television stations to convert to digital. ISDB covers broadcasting by terrestrial, satellite, and cable (and to handheld/mobile devices) for both television and radio. (See also ***DTV*** and ***DVB***.)

### ISDN (Integrated Services Digital Network)

Level: 2

*Definition:* A circuit-switched telephone network system that enables digital transmission using standard copper twisted-pair lines for transmitting high-speed voice, video, data, and videoconferencing signals. Because ISDN is an all-digital

service it requires digital ISDN equipment both at sending and receiving points. ISDN services are divided into two types: basic rate interface (BRI) and primary rate interface (PRI). Both services provide many times the bandwidth available with conventional telephone services. With the advent of DSL and cable modem technologies, ISDN has faded into obscurity in most parts of the world. (See also ***Broadband***, ***Cable Modem***, ***DSL***, ***PRI***, and ***RI***.)

### ISM (Industrial, Scientific, and Medical)

Level: 3

*Definition:* Specific portion of the spectrum ranging from 902 to 928 MHz that has been allocated by the FCC for industrial, scientific, and medical purposes. Certain commercial wireless communication services are being developed for transmission in this band. (See also ***Spectrum***.)

### ISO (International Standards Organization) 9001

Level: 3

*Definition:* Rigorous international quality standard covering design, development, production, installation, and service procedures. ISO 9001 registration is widely recognized as an indication of the integrity of a business's quality processes.

### ISO (International Standards Organization) Latin 1

Level: 2

*Definition:* A standard character set developed by the International Standards Organization for supplementing the ASCII character set to accommodate the unique needs of many European languages. Hypertext Markup Language (HTML), which is used to create web pages, is based on the ISO Latin 1 character set. For example, an *a* with grave accent (à) can be coded *&agrav*] in HTML to ensure that the correct character will show up in all browsers. (See also ***ASCII***, ***HTML***, and ***Unicode***.)

### Isosynchronous

Level: 3

*Definition:* Refers to data transmission schemes in which data can be transmitted at low or high speeds without changing or affecting the integrity of the data. From the Greek "iso" (meaning equal) and "synchronous" (referring to time or period of time). Essentially, the term indicates that a particular type of data can be transmitted without respect to time. It is the opposite of synchronous systems, which have very little tolerance for the range of time (real time versus non real time) in which they need to be transmitted and received. Voice communications are synchronous because the speed of transmission greatly affects the effectiveness, accuracy, or reception quality for phone users (e.g., satellite time delays in overseas calls).

### ISP (Internet Service Provider)

Level: 1

*Definition:* A company that provides individual users or other companies with access to, or a presence on, the Internet. Many ISPs are also Internet access providers, which typically include extra services such as help with design, creation and administration of World Wide Web training, and administration of intranets.

### IT (Information Technology)

Level: 1

*Definition:* A generic term for any technology providing voice, video, graphic, text, data, or other services, or any processes, techniques, systems, or methods for using, manipulating, converting, storing, receiving, or managing information or servicing information needs. IT industries include telecommunications, telephony, radio and television broadcasting, cable television, computing hardware and software systems, telecom/computer networking (including the Internet and online services), information storage/retrieval, satellite communications, among other technological methods for managing information.

### ITFS (Instructional Television Fixed Service)

Level: 3

*Definition:* Refers to a range of microwave frequencies originally allocated by the federal government for use in instructional television services. ITFS frequencies, when not in use, can be leased along with adjacent channels allocated

to operational fixed services (OFS) to provide wireless cable or MMDS services. These services are operating at very high microwave frequencies. Thus, video services are usually limited to a 25-mile radius. (See also ***MMDS*** and ***Wireless Broadband Fixed Access***.)

### ITU (International Telecommunication Union)

Level: 1

*Definition:* Founded in 1865 as the International Telegraph Union, the ITU (now called the International Telecommunication Union) serves as the primary standards-setting organization for telecommunications around the world. Now operating under the auspices of the United Nations, the ITU addressed radio spectrum allocation and regulations and establishes standards for telecommunications devices (such ISDN hardware, modems, and fax machines) as part of its effort to coordinate global telecommunications activities.

### ITV (See *Interactive Television.*)

### IVR (Interactive Voice Response)

Level: 1

*Definition:* Generally refers to automated telephone call-handling systems where the user interacts through the use of a touch-tone telephone or through speech recognition with a computer-based voice signal (either recorded real speech or computer-generated speech). IVR technologies are now widely used to handle everything from customer service to billing inquiries to the administration of automated surveys.



### IX (See *Interference.*)

### IXC (See *Inter-Exchange Carrier.*)

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# J

**Jabber**
Level: 2
*Definition:* Sometimes referred to as the "Linux of instant messaging," Jabber is an open-source platform for developing instant messaging applications. Jabber provides a set of streaming XML protocols and technologies that make it possible for any two entities on the Internet to exchange messages, presence (identifying who is online and where), and other useful information in almost real time. According to the Jabber Software Foundation, the architecture of a Jabber network is similar to e-mail, making it relatively easy for individuals to develop their own instant messaging applications and install and run their own Jabber servers. Jabber also offers the ability to isolate its servers from the public Jabber network, making it possible to develop a closed, more secure instant messaging environment. The Jabber Software Foundation oversees the maintenance of common extensions to ensure interoperability. (See also ***ICQ*** and ***Instant Messaging***.)

**Jack**
Level: 1
*Definition:* In electronics equipment, a jack usually refers to a "female" receptacle that will accept a compatible "male" connector or plug. (See also **PSTN**.)

**Java**
Level: 2
*Definition:* Refers to a platform-independent programming language developed by Sun Microsystems in the early 1990s. Java is an object-oriented, secure, robust, general-purpose programming language that can be used on different operating systems. The language supports programming for the Internet in the form of "applets" and is used in developing small, specialized computing appliances. The Java approach directly challenges the idea that software must be "installed" and remain resident on a computer to be viable and useful. Not to be confused with JavaScript. (See also ***Applet***, ***Cross Platform***, and ***Network Computer***.)

**Java Database Connectivity (See JDBC.)**

**JavaScript**
Level: 2
*Definition:* Netscape's simple cross-platform scripting language that is widely used to orchestrate enhanced interactivity and advanced functionality in web pages (not to be confused with Java). For example, the popular feature of passing a mouse over a graphic or a button on a web site and having it instantly change color is often achieved through the use of JavaScript. Microsoft began supporting JavaScript in its Internet Explorer browser in the late 1990s. JavaScript can be used to validate entries on a web page form, launch new browser windows, and has many uses outside the Web. ActionScript, the programming language used in Marcomedia Flash, bears a strong resemblance to JavaScript. (See also ***ActionScript***, ***Cross Platform***, and ***Open Source***.)

**JBoss**
Level: 3
*Definition:* JBoss is an open-source Java-based application server platform that implements the entire J2EE suite of services. It can be used on any operating system that supports Java. (See also ***Application Server*** and ***J2EE***.)

**JDBC (Java Database Connectivity)**
Level: 3
*Definition:* A Java application programming interface, or API (a set of routines, protocols, and tools), that makes it possible for programs written in the Java programming language to interact with

databases using Structure Query Language (SQL). Because Java can run on almost any platform, and because SQL is a widely adopted standard for accessing databases, Java applications using JDBC can run in almost any server environment and interact with almost any type of database management system. (See also ***ODBC***, ***RDMS***, and ***SQL***.)

### Jitter
Level: 2

*Definition:* Any undesired short duration shift in the intended signal due to a lack of synchronization during transmission. Jitter can be evident in the frequency, phase, amplitude, or timing of an intended signal and can be caused by imperfections in transmission pathway or connection equipment. Jitter can be a common problem for video transmitted on asynchronous networks such as ATM. (See also ***Jitter Buffer***.)

### Jitter Buffer
Level: 2

*Definition:* Used in a voice-over-IP (VoIP) telephone conversation, which sends individual packets of voice data over the Internet to enable a telephone conversation, the jitter buffer collects packets of voice data on the receiver end into a shared data area where they can be stored and sent to the voice processor in evenly spaced intervals. Because packets can arrive at different times or out of sequence, a jitter buffer is necessary to pool the packets and process in sequence to ensure that the call can be made with as little distortion as possible. (See also ***Buffer***, ***Jitter***, ***Packet***, and ***VoIP***.)

### Joint Photographic Experts Group
**(See *JPEG*.)**

### JPEG (Joint Photographic Experts Group)
Level: 2

*Definition:* Refers to a compression standard endorsed by JPEG that applies to individual frames of still video or pictures. The JPEG standard removes or subtracts redundant information from a frame of digital video in order to compress the signal for computer file storage or to transfer the image in a less bandwidth-intensive form. The standard has been approved by the CCITT and ISO standards organizations. JPEG compression tends to work best on images that contain millions of colors (such as typical photographs), whereas GIF compression works best on almost every other type of image. (See also ***Compression***, ***GIF***, and ***Vector Graphics***.)

### J#
Level: 3

*Definition:* Microsoft's implementation of the Java programming language (invented by Sun Microsystems). J# (pronounced "jay sharp") is a cornerstone technology of Microsoft's .NET platform. (See also ***Java*** and ***.Net***.)

### J2EE
Level: 3

*Definition:* A competitor to Microsoft's .NET framework, Sun Microsystem's J2EE (pronounced "jay two double E") provides the ability to develop large-scale web-based applications that are delivered via the Internet. Consisting of several components, including Java Server Pages (which produce HTML documents that can be handled with a standard web browser), Java Beans (which provide the server-side functionality used to run complex applications), and connectivity with databases using JDBC (Java database connectivity)—Java's equivalent of ODBC. (See also ***Client/Server***, ***JBoss***, ***JDBC***, ***.NET***, ***ODBC***, and ***Web Application***.)

### Judder
Level: 2

*Definition:* The appearance of minute jerky movements in motion pictures, either because the consecutive film frames are not pulled precisely to the same position in the projector gate or because frame conversion rates do not match.

### Jukebox
Level: 1

*Definition:* Inspired by the all-in-one mechanical device developed to play a collection of phonograph records, Jukebox now usually refers to a software application that can store, organize,

access, play, and sometimes rip (record to CD) digital music. Most portable digital music players come with a Jukebox application built in. Jukebox can also refer to the system used to manage a collection of optical disks or magnetic tapes, making it possible to switch among them as needed.

*Used in a sentence:* "I used a jukebox program on my digital music player so that I could shuffle the songs into a random play order."

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# K

**k (kilo)**
Level: 1
*Definition:* Refers to quantities measured in 1,000 units. (See also ***Kilohertz***.)

**Ka-band**
Level: 3
*Definition:* Part of the electromagnetic spectrum within the designated K-band that ranges from 33 to 36 GHz and is presently used for microwave and mobile satellite communications. Advanced mobile satellite services designed for Ka-band operations will provide two-way connectivity for a variety of wireless telephony and data communications service by which users around the globe will be able to access these services via relatively small handheld transceivers.

**KB (See *Kilobyte*.)**

**kbps (kilobits per second)**
Level: 2
*Definition:* A standard measure for digital data rate transmission. For example, most telecommunications modems operate at transmission rates up to 56 kbps. (See also ***Bandwidth*** and ***Modem***.)

**Keying**
Level: 3
*Definition:* The embedding or layering of one signal onto another signal. Examples are chroma key and frequency shift keying operations. (See also ***Chroma Key*** and ***FSK***.)

**Key Length**
Level: 2
*Definition:* Refers to the number of bits (binary digits) in an encryption algorithm's key, with longer key lengths usually associated with stron ger encryption (though not always). However, the longer the key the more computing power it takes to encrypt and decrypt messages. (See also ***Encryption*** and ***Public Key***.)

**Key Logger**
Level: 2
*Definition:* A piece of surveillance software installed on a computer, often without the user's knowledge, that logs all of the key strokes entered on that particular computer. Many key-logging programs make it possible to send the log file to another computer. Key loggers can be used by hackers to obtain vital information such as passwords, or they can be used by a corporate network administrator to monitor employee usage of computers. They can also be used by law enforcement to track a user's computer patterns.

*Used in a sentence:* "Little did he know that the company's security officers had installed a key logger to secretly track all of his keyboard inputs on his work computer."

**kHz (See *Kilohertz*.)**

**Kilo (See *k*.)**

**kilobits Per Second (See *kbps*.)**

**Kilobyte (KB)**
Level: 1
*Definition:* Unit of information or computer storage equal to either 1,024 or 1,000 bytes.

**Kilohertz**
Level: 2
*Definition:* A measurement of any vibration, such as an electromagnetic signal frequency, where a radio signal propagated at 1,000 hertz (Hz) (i.e., 1,000 cycles per second) is equal to 1 kilohertz (1 kHz). (See also ***Hertz***.)

**Kilowatt (kW)**
Level: 2
*Definition:* Measure of electrical energy in watts. There are 1,000 watts in 1 kW.

**Kiosk**
Level: 1
*Definition:* Self-contained standalone units that usually sit in a public area, kiosks are now used for everything from providing real-time information services to providing custom photo printing and currency exchange. The term is taken from earlier European outdoor information booths in centralized locations where newspapers, magazines, and other information and public literature was available or exchanged. Electronic kiosks are interactive screen-based devices often utilizing touch-screen technology to provide access to the system's various functions. Some kiosks also serve as places for users to connect their mobile computers to the Internet, and some are being designed to provide short-range wireless capabilities (including Bluetooth). (See also ***Bluetooth***.)

**Knowbot (See *Bot.*)**

**Ku-band**
Level: 3
*Definition:* A portion of the electromagnetic spectrum used for traditional satellite communications and for DBS video services. Domestic Ku-band uplinks are from 14.2 to 14.4 GHz and downlinks from 11.7 to 12.2 GHz. DBS satellites operate uplinks at 17.3 to 17.8 GHz and downlinks at 12.2 to 12.7 GHz. (See also ***DBS***.)

**kW (See *kilowatt.*)**

# L

### Lamport Text Description Language (See *LaTeX*.)

### LAN (Local Area Network)

Level: 2

*Definition:* A private enterprise-wide high-speed computer network for linking file servers, computers, printers, modems, and other peripheral equipment or devices enabling workstations on the network to share information, software, exchange e-mail, or connect with the Internet or other online services. LANs are typically confined within a building or can be extended to a number of centrally located buildings in an office park or university campus. Common LAN architectures include Ethernet and token ring systems.

*Used in a sentence:* "I had to install special software to allow me to access our wireless LAN at work." (See also ***Network***, ***MAN***, and ***WAN***.)

### LAN Emulation

Level: 3

*Definition:* A software-based protocol allowing for transparent connectivity from an Ethernet or token ring LAN to an ATM backbone trunk line. LAN emulation software enables two LANs connected by a high-speed ATM line to perform as if they were a single unified network. The ATM portion functions to provide faster transmission rates over lengthy distances. (See also ***ATM***, ***LAN***, and ***Token Ring***.)

### Land Mobile Communications

Level: 3

*Definition:* Radio technology providing two-way terrestrial communications links for taxis, police, and other fleet dispatch, military, emergency response organizations, and so on. Licensed land mobile communication systems include a base station, standby base stations, supplementary base stations, mobile stations, overlay paging receivers, remote control stations, and so on. (See also ***ESMR*** and ***SMR***.)

### Large-scale Integration (See *LSI*.)

### Laser (Light Amplification by Stimulation of Emission of Radiation)

Level: 3

*Definition:* A device used in fiber optics to generate a coherent beam of light. By turning this light on and off quickly, binary code can be formed by the laser that in turn can be transmitted over the fiber without much loss, which can provide high rates of data communication. Actual implementations are more complex and do not actually turn the laser on and off, but large amounts of data can be modulated onto lasers for transmission over large distances with little loss. Lasers are also used to "burn" CDs and DVDs. (See also ***CD*** and ***DVD***.)

### LATA (Local Access and Transport Area)

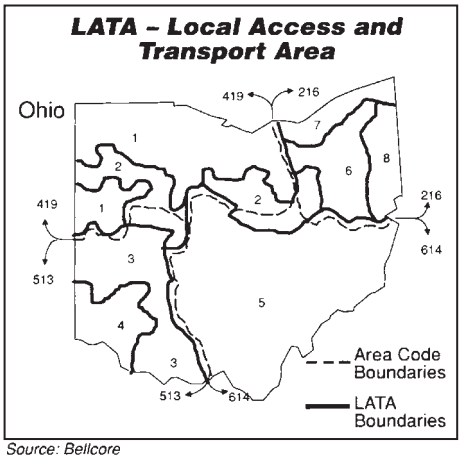
Level: 2

*Definition:* A telephone industry term for a specific localized geographic area in which a local telephone company operates, and in which it is not required to use any other carrier to complete phone calls. LATAs should not be confused with regions for area codes or any other jurisdictional boundaries. LATAs (161 total) were implemented following the divestiture of AT&T in 1984. Rules were established at that time describing how calls would be handled between the revamped AT&T and the seven "Baby Bell" RBOCs. Generally, long-distance charges are incurred when a LATA boundary has been crossed in the process of completing a connection. (See Figure L–1 and see also ***Inter-LATA***, ***Intra-LATA***, and ***RBOC***.)

### LaTeX

Level: 2

*Definition:* A series of high-level macros for the text description language TeX that are used



Source: Bellcore

**FIGURE L–1.** LATA.

to create sophisticated typesetting effects, especially those involved with equations, formulas, and complex references. Latex was developed by Leslie Lamport and is often available on UNIX systems. The MATH capabilities of HTML draws heavily on LaTeX.



### Layer
Level: 3

*Definition:* Refers to the defined segments in the digital open system interface model. (See also ***OSI***.)

### L-band
Level: 3

*Definition:* A portion of the electromagnetic spectrum, between 1 and 2 GHz, used for satellite and microwave communications. Typical U.S. L-band systems operate between 1.5 and 1.8 GHz. Internationally, the band officially ranges from 1.125 to 1.4 GHz, and also may refer to services operating from 890 to 940 MHz. (See also ***DAB***.)

### LCD (Liquid Crystal Display)
Level: 2

*Definition:* A type of visual display technology that uses liquid crystals enclosed within two glass panels. LCDs divide the display screen into very small areas or dots that when electrically charged or stimulated it changes the molecular composition of the crystals so that it reflects external light to create a picture image from an input source. Due to their flat display characteristics, LCDs are often used for laptop computer screens and in many of today's high-definition televisions. (See also ***Active Matrix Display***, ***Flat-Panel Display***, and ***HDTV***.)

### LCoS (Liquid Crystal on Silicon)
Level: 3

*Definition:* An improvement on traditional LCD technologies that use a sandwich of two plates of glass (called "substrates") with a liquid crystal solution between them, liquid crystal on silicon replaces the bottom glass substrate with a silicon surface. LCoS technology is now being released for large-screen televisions and for very tiny displays called "microdisplays." Pixels on LCoS panels can be made smaller than is possible with other display technologies, making them perfect for high-resolution or small-format displays. Other advantages to LCoS displays include excellent color reproduction, excellent contrast ratios, no "screen door" visual effect, and no screen burn-in issues. (See also ***DLP***, ***HDTV***, and ***LCD***.)

### LDAP (Lightweight Directory Access Protocol)
Level: 3

*Definition:* An Internet-compatible protocol for accessing information contained in directories such as organizations, individuals, phone numbers, addresses, access privileges, encryption keys, and so on. One example of an LDAP service is a simple network-accessible database where an organization stores information about its authorized users and what privileges each user has. If that organization has extensive computing facilities running on 25 different servers, rather than create a new employee account on each of those 25 different computers the new employee is entered into LDAP and granted rights to those 25 systems. If the employee leaves the organization, revoking all privileges is as simple as removing one entry in the LDAP directory. (See also ***Single Sign-on*** and ***TCP/IP***.)

### Leased Line
Level: 2
*Definition:* Refers to a type of telephone line used exclusively by an individual or business under a lease arrangement with the phone company. This is not a shared facility commonly found in residential use, but a dedicated line. Many businesses have dedicated leased lines for intra-office communication where offices are located in different geographic areas. This can be less costly than paying for continual long-distance toll call charges.

### LEC (Local Exchange Carrier)
Level: 2
*Definition:* Telephone industry lexicon for a local telephone company. LECs can provide inter-LATA phone services but not intra-LATA services without the use of an IXC. (See also ***Inter-LATA***, ***Intra-LATA***, and ***IXC***.)

### LED (Light-Emitting Diode)
Level: 3
*Definition:* A solid-state device that generates light when an electric current or charge is passed through it. LEDs can be used as light generators for use in fiber-optic lines, although lasers are much more powerful and more commonly used. LEDs are commonly used as information indicators for embedded systems (such as a power on/off indicator), thin and lightweight message displays, calculator and measurement instrument displays, and so on.

### LEO (Low Earth Orbit)
Level: 3
*Definition:* Refers to a type of satellite orbit that is relatively low or close to the earth, ranging between 600 and 6,000 miles above the earth. A number of new wireless mobile communications services are being planned or established using LEO satellites.

### Letterboxing
Level: 2
*Definition:* The process of putting black bars at the top and bottom of a television image to change a 4:3 aspect ratio image to a wider aspect ratio image (such as 16:9).

### LF (Low Frequency)
Level: 3
*Definition:* Portion of the radio frequency spectrum ranging from 30 to 300 kHz. LF spectrum can be used for AM broadcast service (as in Europe) or for aircraft beacons, navigation, information, and weather systems (as in the United States). (See also ***Spectrum***.)

### Light Amplification by Stimulation of Emission of Radiation (See *Laser*.)

### Light-Emitting Diode (See *LED*.)

### Lightweight Directory Access Protocol (See *LDAP*.)

### Lindows (See *Linspire*.)

### Line Doubling
Level: 2
*Definition:* Used to improve television image quality for high-definition television (HDTV) display of a standard-definition signal. Line doubling describes the process of converting the separate fields of a television image into a single frame. Traditional television images are split into two separate versions (fields), with one field displaying the odd-numbered lines of the image and the other field displaying the even-numbered lines of the image. These fields are then displayed in odd/even sequence 30 times a second, in essence tricking the eye into thinking it is seeing one image when it is really seeing half of two images being displayed one right after the other. When the signal is converted with a line doubler into a single frame and displayed 60 times per second, rather than 30, the increase in visual information can improve the quality of the image. High-definition televisions, and sets designed for use with progressive scan DVD players, are designed specifically to take advantage of this additional picture information. (See ***HDTV*** and ***Interlace Scanning***.)

### Line of Sight
Level: 1
*Definition:* Refers to conditions for RF signal propagation that require a clear path or physically

clear line of sight between the transmitter and the receiver. Generally, line of sight requirements apply to transmissions at higher frequencies (such as microwaves) and for reception of weak signals, such as the reception video satellite signals where dish receivers must have an unobstructed, clear line of sight to the satellite.

### Line 21

Level: 3

*Definition:* Also known as EIA 608, line 21 was chosen as a location for data to carry television closed captions in the United States and Canada. Line 21 captions are transmitted in the vertical blanking interval in NTSC broadcasts and are sometimes present in the picture user data in ATSC transmissions. These captions are being phased out with the transition to digital television. (See also ***VBI*** and ***XDS***.)



### Link

Level: 1

*Definition:* A general term used in many communications networks or systems meaning the establishment of a connection. "Link" is also commonly used to refer to satellite communications where transmissions are downlinked and uplinked on specified frequencies. Most recently, "link" often refers to a "hyperlink" to a particular destination on the World Wide Web. (See also ***Downlink***, ***Hyperlink***, and ***Uplink***.)

### Link Budget

Level: 3

*Definition:* A communications link budget is calculated to estimate what types of losses should be expected in a given signal using a specified communications channel or pathway. Losses are calculated for distance and possible line breakage when telephone wire communications links are being established or set up. Link budgets are also performed for satellite communications as part of the design process in order to design additional gain into a system to overcome nominal link losses.

### Link Farming

Level: 2

*Definition:* Designed to increase the chances of being listed prominently in search engine results, link farming involves the creation of sites whose sole purpose is to link to each other (sometimes called free-for-all or "FFA" web sites). For some search engines, such as Google, the number of links to a particular web site factors into the search engine's determination of relevance and prominence for a particular search. Most search engines today, including Google, have implemented measures to counter the effects of link farming. (See also ***Search Engine, Spam*** and ***PageRank***.)

### Linspire (Lindows)

Level: 2

*Definition:* An operating system based on Linux that works hard to emulate (and improve upon) the Microsoft Windows' look, feel, and functionality. Originally called "Lindows" (a cross between "Linux" and "Windows"), Microsoft sued unsuccessfully for trademark infringement. However, the name was changed to Linspire to avoid further Microsoft legal actions. Targeted toward home users, the original goal of Linspire's developers was to create an alternative operating system that could run Windows applications. This strategy has since been abandoned in favor of a system that makes it easier to download, install, and run Linux applications. (See also ***Linux***, ***Operating System***, and ***Windows***.)

### Linux

Level: 2

*Definition:* Developed by enthusiasts and often given away for free, Linux is the fastest growing operating system in the computer world today. Initially developed by Linus Torvalds of Finland, Linux is an open-source development project. The code that makes Linux work is free and open to the public, which makes it easy for anyone with the knowledge and initiative to fix and/or improve upon the Linux system. There are now several commercial vendors of Linux applications. As Linux is becoming more popular as an operating system for desktop PCs, there emerge

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

deliver local television station signals due to their inherent inability to prevent local signals from one market from spilling over into adjacent markets. To enable the DBS industry to compete on an even basis with cable operators (which have gained substantially from the carriage of local TV stations), the local-into-local issue was addressed in passage of the Satellite Home Viewer Improvement Act of 1999. (See also ***Compulsory License*** and ***SHVA/SHVIA***.)

### Local Loop
Level: 2

*Definition:* A telephone industry term for the segment of the phone network that runs from a local central office to a business or residential customer's premise. At a customer premise site, equipment used for communicating over standard voice-grade lines are connected to the switched phone network. Equipment includes phones, PC modems, fax machines, PBXs, or other transmit/receiving devices. (See also ***Broadband*** and ***DSL***.)

### Local Multipoint Distribution System (See *LMDS*.)

### Log-in/Log-on
Level: 1

*Definition:* Computer and online network term for typical entry or access commands to enable a system to identify users requesting access to a computer system. Assigning each user a log-on name and password is used as a security measure to control access to the network by preventing unauthorized access.

*Used in a sentence:* "I couldn't use any of my online banking services until I went through the log-in process and typed in my password on the bank's web site." (See Figure L–2 and see also ***Account***, ***Authentication***, ***Challenge/Response***, ***Log-off/Log-out***, ***Password***, and ***Telnet***.)

### Log-off/Log-out
Level: 1

*Definition:* Typical computer sign-off commands used to notify the system that a user no longer requires access to system assets. These commands


**FIGURE L–2.** Log-in.

basically tell the network that a user is finished working on the system and can remove the user from any listing of active users. For many web-based applications that require a log-in, such as banking systems, it is crucial for users to log off before leaving their computer (especially in public settings), as it is possible for others to gain access simply by sitting down at a computer that has not been properly logged off.

*Used in a sentence:* "It's important to get into the habit of going through the log-off process when you're done with your online banking sessions so that someone else doesn't use your current session to access your account." (See also ***Account***, ***Authentication***, and ***Log-on/Log-in***.)

### Longhorn
Level: 1

*Definition:* Longhorn is the development name for a major wave of technology and platform software from Microsoft that will include new versions of the Windows personal computer operating system, Windows Server, .NET, MSN, Microsoft Office, and other products. Planned for release sometime in 2006, Longhorn promises many improvements and some fundamental changes compared to Windows XP. Longhorn will include an option to implement the new security technologies Microsoft is developing with Intel and AMD. Longhorn will include new anti-virus

components (or application programming interfaces, APIs) that will help developers more easily integrate their products into the operating system. Longhorn will include a more sophisticated error reporting tool that is supposed to reduce the amount of time between the error report and the fix that rectifies the problem (which will be automatically updated through an advanced update engine). Longhorn will also use a new file system (WinFS), which adds relational database capabilities to the file system, theoretically making it easier for users to find information on hard drives with higher and higher storage capacities. Longhorn will require 3D video hardware to render special effects that will make the screen more photorealistic and deep. (See also ***API***, ***Operating System***, ***Palladium***, and ***Windows XP***.)

### Longley-Rice

Level: 3

*Definition:* A technical engineering methodology used for determining whether individual households in a specific geographic area have access to an over-the-air broadcast television signal or signals. The methodology was developed for assessing signal strength received at a particular geographical location. The Longley-Rice technique factors in objects as buildings and land contours in developing an assessment. The issue of signal strength is of increasing importance in crafting public policies that rely on accurate data for making determinations such as the Grade B signal contours for licensed television stations. This technical signal strength measurement contour is being used as the basis for policy rule-makings affecting matters such as broadcast station must-carry status (for cable and more recently DBS services) and related program copyright compulsory license requirements. (See also ***Compulsory License*** and ***Grade B Contour***.)

### Loopback

Level: 3

*Definition:* A type of system diagnostic test that is run to check the sending and receiving capabilities of a communication device or system (used regularly in videoconferencing and computer networks).

### Loss

Level: 2

*Definition:* In RF communications systems, loss is the attenuation of a transmitted signal and is normally expressed or measured in terms of decibels (dB). In digital systems, loss refers to degradation of information due to digital compression. (See also ***Lossless Compression*** and ***Lossy Compression***.)

### Lossless Compression

Level: 2

*Definition:* Types of compression techniques that reduce the amount of information being transmitted but do not lose any of the data. For the compression to be lossless, not one bit of information can be lost. (See also ***Algorithm***, ***Loss***, and ***Lossy Compression***.)

### Lossy Compression

Level: 2

*Definition:* A type of digital data or signal compression algorithm (including audio) that eliminates "redundant" information in a signal as a means of reducing the amount of information that needs to be transmitted or stored. Although the eliminated information cannot be regained exactly, techniques such as interpolation can be used to restore much of the data for full display in an acceptable form. Lossy compression is often used in video and graphics applications. If any information (even one bit) is lost with a particular compression algorithm, it is considered to be a lossy algorithm useful for many but not all applications. (See also ***Algorithm***, ***JPEG***, ***Loss***, and ***Lossless Compression***.)

### Low Earth Orbit (See *LEO*.)

### Low Frequency (See *LF*.)

### Low-Power FM (See *LPFM*.)

### Low-Power Television (See *LPTV*.)

### LPFM (Low-Power FM)

Level: 2

*Definition:* The FCC has adopted rules making it possible to license very small, low-power FM radio stations that transmit signals to community listeners located within a radius of only a few miles. As consolidation has continued in the radio industry, some have argued for the need to reestablish "community radio" via LPFM. (See also ***FM***.)

### LPTV (Low-Power Television)

Level: 2

*Definition:* Television stations licensed by the FCC to operate transmitters at low power (ranging from 10 to 100 watts in the VHF band and at 1,000 watts in the UHF band) and under the rules do not cause interference to any primary television service. Signal coverage is limited, and LPTV stations are primarily used in less populated areas to provide community-oriented and other commercial television services.



### LSI (Large-Scale Integration)

Level: 3

*Definition:* Refers to manufacturing technology producing electronic integrated chips containing thousands of transistors on a single IC silicon wafer. (See also ***VLSI***.)

### Luma (See *Yo.*)

### Luma/Chrominance (Yo/C) Video (See *Yo/C video.*)

### Luminance (Y)

Level: 2

*Definition:* In television broadcasting, luminance expressed as Y in mathematical formulas, refers to a measure of brightness for video signals and digital images. In color television, the luminance carrier contains all picture information necessary for a monochrome receiver.

### Lurker

Level: 2

*Definition:* In the cyberworld, lurker refers to someone who connects to an electronic forum (chat or discussion group) but does not actively participate. This term is usually not pejorative and is often used very casually, such as stating, "Oh, I'm just lurking." However, some online communities (especially those based on filesharing) specifically discourage lurking

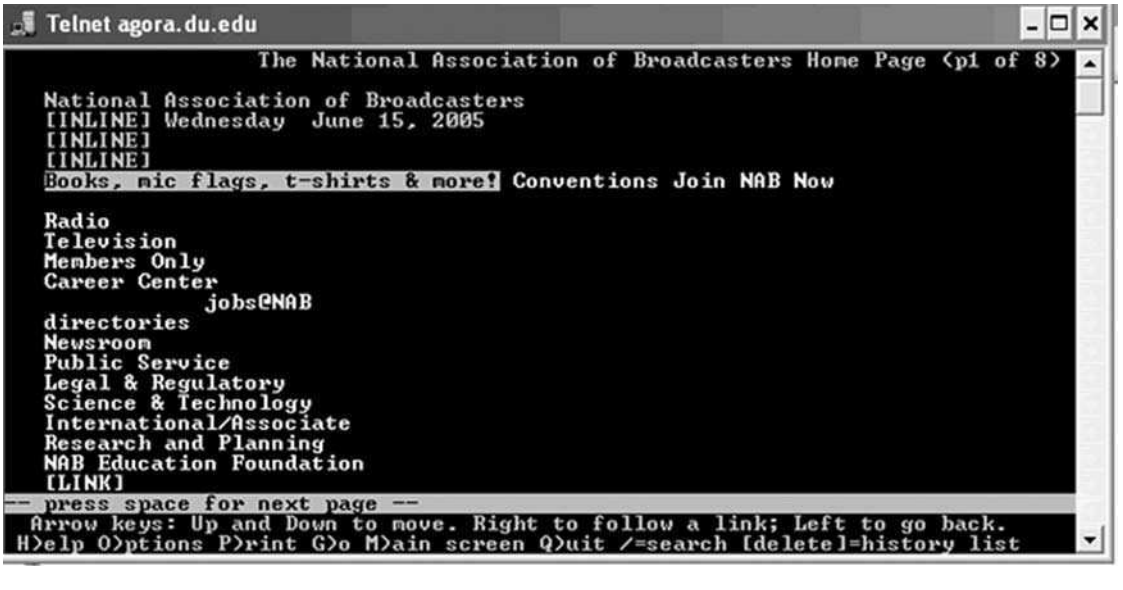



**FIGURE L–3.** Lynx.

(or "freeloading") because they prefer that all members of the community contribute something to the common good. (See also ***Chat Room***, ***Computer-mediated Communication***, ***File Sharing***, ***Newsgroup***, and ***Usenet***.)

### Lynx

Level: 2

*Definition:* Refers to one of the first-ever text-only browser applications that resides on a server or Linux workstations and allows users to surf the Web but only to see text content. Users navigate from page to page by using commands on their keyboards. Lynx is still being actively developed and maintained by a group of volunteers, although the vast majority of Internet users take advantage of the point-and-click graphical interface made possible by browsers installed on personal computers. (See Figure L–3 and see also ***Browser***.)

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# M

### MAC (Media Access Control) Address

Level: 2

*Definition:* Refers to the hardware "address" of a device connected to a network. For example, each network card that makes it possible to connect computers and printers to a computer network has a unique ID serial number of that makes it possible for the devices to communicate with each other. The address is normally assigned to a device, such as a network card, when it is manufactured. The MAC address is transmitted as part of the header of all data packets sent from any computer on a network. (See also ***NIC***.)

### Machine Language

Level: 3

*Definition:* Refers to specific coded languages used by computer hardware to perform internal system functions.

### Macintosh

Level: 1

*Definition:* Refers to the popular line of personal computers produced by Apple Computer. The Macintosh computer was first introduced in 1984 through the now-famous Super Bowl television commercial. The first Macintosh provided users with the world's first personal-computer-based graphical user interface (GUI). Since then, the Macintosh (or "Mac") has maintained a loyal customer base, especially among artists and designers. Apple's development of a wide range of digital media software that is optimized for the Mac platform has continued to expand its user base among digital media professionals. (See also ***Apple***, ***GUI***, ***iLife***, and ***iMac***.)

### Macro

Level: 3

*Definition:* In computers, a macro is a specific group of program instructions written to automate a sequence of operations or keystrokes for use with a software program. Macros are very short programs designed to produce results more rapidly. In a Windows-like environment, a macro often could be invoked or activated by one keystroke or a single click on an icon that is set up to represent the macro function. For example, some users in Microsoft Word set up macros to automate repetitive or complex tasks by "recording" keystrokes and menu selections and then launching that macro from a custom menu selection or a "hot key." Word macros have also been used to spread viruses.

*Used in a sentence:* "I wrote a macro that automatically opens a file, changes the paragraph spacing to double, resets the margins, and saves it to a new location."

### Magnetic Storage

Level: 2

*Definition:* Any data storage medium and related technology (including diskettes, tapes, and hard disks) in which patterns of magnetization are used to represent the values of stored digital bits/bytes of information. (See also ***DAT***, ***Hard Drive***, and ***VHS***.)

### Mailing List

Level: 2

*Definition:* A process of creating a mass-mail system on a computer network. A mailing list uses a software program to maintain a list of mailing list "members" to whom messages are to be sent if a message is sent to the list address. For example, the mailing list address *beamem@lima.nab.org* contains an e-mail list of all consenting members who wish to participate. They can receive e-mail from the list whenever anyone sends a message to the list address, and they can send messages to all other members on the list by sending an e-mail message to the list address. Some mailing

lists are "moderated," which means that messages are initially sent to a single individual, who then screens messages and sends approved ones on to the mailing list members.

*Used in a sentence:* "Our company created an e-mail mailing list so that we could send out a monthly electronic newsletter to all of our employees." (See ***E-mail***, ***Listservs***, and ***Majordomo***.)

### Mail Relay

Level: 2

*Definition:* In general terms, a mail relay is an e-mail server—a computer that passes e-mail from some sender to some recipient. Most systems are configured only to pass mail that comes from or is sent to its own users. An "open" mail relay can pass along e-mail from anywhere to anywhere else, including messages that are neither from nor destined for its own users. Spammers constantly scan for open mail relays they can use to send junk mail. (See also ***E-mail***, ***Open Relay***, ***SMTP***, and ***Spam***.)



### Main Distribution Frame (See *MDF*.)

### Mainframe Computer

Level: 3

*Definition:* Typically used by large organizations for their mission-critical applications, a mainframe is a centralized computer architecture typically with substantial memory, access, and processing speeds used to manage large numbers of application programs and peripheral equipment. Through mainframes other computers or dumb terminals connected to the network are able to access stored programs or utilize peripheral equipment. Mainframes are called upon to perform complex functions that systems with lesser ability to access large numbers of attached devices cannot handle. They also process massive business files such as billing records for banks and phone companies. Mainframes can be configured to operate as many "virtual machines," thus serving many different functions within an organization. (See also ***High-Performance Computing*** and ***Supercomputer***.)

### Majordomo

Level: 3

*Definition:* Similar to an Internet/Web-based listserv system, Majordomo is the name of a free e-mail list server that automatically distributes specific messages to everyone on a particular e-mail list. (See also ***Listservs*** and ***Mailing List***.)

### Major Trading Area (MTA)

Level: 3

*Definition:* Refers to the geographic boundaries that segment the country for telecommunications licensing purposes. Based on Rand McNally's *Commercial Atlas & Marketing Guide*, each MTA is named after one or more cities that form the regional major trading center. MTAs are generally larger than BTAs. The FCC has used MTAs to license a number of services, including broadband and narrowband personal communications services. (See also ***Basic Trading Area***.)

### Malware

Level: 1

*Definition:* An increasingly popular term used to describe software that has been created with the intent to damage a computer or disrupt one's computing experience, such as viruses, Trojan Horses, spyware, worms, and so on.

*Used in a sentence:* "I updated my antivirus software so that it could protect me from the latest versions of various malware." (See also ***Trojan Horse***, ***Spyware***, ***Virus***, and ***Worm***.)

### Mambo

Level: 2

*Definition:* Mambo is one of the most widely used free open-source content management systems available on the Internet today. Originally developed by the Australian-based firm Miro International as an open-source project in 2001, Mambo is outpacing other open-source projects such as PHPNuke and Post-Nuke as a portal and content management solution. Using the MySQL open-source database and PHP open-source application development, Mambo-built web sites are relatively easy to set up and maintain. Mambo features include customizable web site sections,

multiple authors, customizable page layouts, discussion forums, dynamic polling/voting, a newsfeed manager, a random news-flash generator, image library, archive manager, template manager, fully searchable, and so on. (See also ***CMS***, ***MySQL***, ***Open Source***, and ***PHP***.)

### MAN (Metropolitan Area Network)

Level: 2

*Definition:* A high-speed data network able to geographically cover an area up to 50 km. MANs are smaller than a WANs but larger than a LAN, and are typically described as an intra-city network.

### MAPI (Messaging Application Programming Interface)

Level: 2

*Definition:* Built into Microsoft Windows operating systems, MAPI is a standard interface for messaging enabling different mail programs (such as Outlook, Thunderbird, Eudora, and so on) and other mail-aware applications such as word processors and spreadsheets to exchange messages and attachments with each other. (See also ***E-mail***.)

### Mapping

Level: 3

*Definition:* (1) In computer and telecommunications networking, mapping is the process of connecting the protocols in various parts of a network or connecting protocols from one network to another network. (2) In advance graphics systems, mapping is used to describe a process of putting a surface texture quality onto a 3D object (also called texture mapping).

### Mark-up Language

Level: 2

*Definition:* Refers to the process of "marking up" text with encoded information about what should be done with a particular piece of information. Similar to using a yellow highlighter on a textbook, markup languages identify key areas of a document that require special attention. The codes and command sets called "tags" form the syntax of the language. (See Table M–1 and see also ***HTML*** and ***XML***.)

### Mask

Level: 3

*Definition:* A transmission filtering technique designed to prevent undesired frequencies from entering or leaking into a specific RF signal reception or transmission path. In image editing (and similar to an alpha channel), a mask is an image or clip used to define areas of transparency in another image or clip. (See also ***Alpha Channel***.)

### Masking-Pattern Adapted Universal Sub-band Integrated Coding and Multiplexing (See *MUSICAM*.)

**TABLE M–1** Mark-up languages.

| Acronym | Description |
|---|---|
| SGML | A "meta" language used for defining other mark-up languages. SGML allows for the structuring and organization of a document, enforcing a consistency in how the information is handled, and allows for the information within multiple documents to be cross referenced. Using SGML is similar to putting separate pieces of information into a database that can then be referenced, recorded, and manipulated in a variety of ways. |
| XML | Extensible Mark-up Language: A simplified version of SGML, XML is used to organize and manipulate types of textual information on the Web. |
| HTML | Hypertext Mark-up Language: The standard for marking up web pages. |
| DHTML | Dynamic Hyptertext Mark-up Language: Used to add advanced formatting instructions and interactive features to web pages. |
| VRML | Virtual Reality Modeling Language: A 3D modeling language delivered over the Web using a special program, or "player," to display VRML content. |

**Master**
Level: 2
*Definition:* (1) Refers to the original production of any video or audio recording typically on very high-quality tape or servers. In videotape production work, a master tape contains raw footage that is to be edited, processed, or finished for use in television broadcast or other video distribution venues. (2) In data transmission systems, a master is the device that determines the rate of transmission and timing for a data transaction.

**Master Antenna Television (See *MATV.*)**

**Matrix**
Level: 3
*Definition:* In communications systems, a matrix refers to an arrangement of potential connections designed to allow any two points to be connected through a switching system. A simple matrix switch would have just two inputs and two outputs. The inputs would be connected to the outputs via the switch. In computer programming, a matrix is a 2D array.



**MATV (Master Antenna Television)**
Level: 2
*Definition:* A type of main local antenna system usually installed on the roof of an apartment building that is connected to a coaxial cable distribution network serving the residents in the building. MATV systems were typically installed on apartment buildings or other facilities, such as hospitals in urban areas, where residents had difficulty receiving over-the-air signals due to multipath interference. The growth of satellite-delivered cable and DBS services has reduced the need for traditional MATV systems. (See also ***DBS***, ***DTH***, and ***SMATV***.)

**Mb (See *Megabit.*)**

**MB (See *Megabyte.*)**

**MCU (Multipoint Control Unit)**
Level: 3
*Definition:* A bridging or switching device that supports multipoint videoconferencing, an MCU makes it possible to coordinate and connect multiple videoconferencing signals and technologies to produce a videoconference call. The MCU manages the data transmission speeds to match the slowest of those connections involved. (See also ***Videoconferencing***.)

**MD (Mini Disc)**
Level: 2
*Definition:* Developed as a competitor to digital compact cassettes (DCCs) in the early 1990s, mini discs from Sony look like miniature recordable versions of CDs but use a unique magneto-optical recording process and store audio in a compressed format. The original 2.5-inch discs stored 74 minutes of recorded music and could be played only on an MD player. The MD system uses advanced digital error correction and interleaving processes to create a system that is far more resistant to bumps and vibration than typical compact discs. Sony has recently released Hi-MD, an extension of the original MD format. Hi-MD includes an advanced codec and the ability to store any type of digital file, including MP3s.

**MDF (Main Distribution Frame)**
Level: 3
*Definition:* Telephone industry lexicon for a series of electronic blocks used to connect outside telephone lines to lines used inside a customer's business. For a telephone company, the MDF is usually the point of demarcation where it relinquishes servicing responsibilities.

**Media Access Control (MAC) Address (See *MAC Address.*)**

**Media Gateway Control Protocol (See *MGCP.*)**

**Medium**
Level: 1
*Definition:* Generic reference to systems or methods (electronic or otherwise) that transmit, deliver, distribute, convey, store, or make accessible information of any type. (See also ***Digital Media***.)

### Medium Frequency (See *MF.*)

### Megabit (Mb)

Level: 2

*Definition:* A measurement of the rate of digital data transmission over a specified amount of time, usually per second (ps). One (1) megabit equals 1 million bits of digital information. An example is a system that transmits data at 100 Mbps.

### Megabyte (MB)

Level: 2

*Definition:* A measurement of digital data storage capacity where 1 MB equals 1 million bytes of digital information. One common example is 512 MBs of RAM.

### Memory

Level: 2

*Definition:* Internal capacity of a computer or integrated computer system for short- and medium-term retention of digital data in readiness mode for immediate, rapid accessibility by system users. (See also ***RAM*** and ***ROM***.)

### Memory Key

Level: 1

*Definition:* Also called "flash drives" or "flash memory," a memory key is a compact, portable memory device that can be used as an external data storage device. Small enough to fit on a key chain, memory keys range in capacity from 8 Mb to 4 Gb and can even be configured as bootable devices. Most memory keys connect to computers through a USB 2.0 interface, making them a fast, efficient, mobile memory solution. (See also ***Flash Memory*** and ***USB 2.0***.)

### Messaging Application Programming Interface (See *MAPI.*)

### Metadata

Level: 2

*Definition:* In short, metadata are data about data. A set of auxiliary time codes or other summary information related to specific portions of audio, video, data, or text material that comprise components of a work of intellectual property. Metadata may represent data set assets, thumbnail images for quick visualizations, or coding to facilitate accurate, rapid retrieval of specific items embedded within the program material.

*Used in a sentence:* "We wanted to store as much metadata as possible about each of our online catalog items." (See also ***Data Warehousing***.)

### Meta-Searcher

Level: 1

*Definition:* A meta-searcher is a searching service on the Internet that executes a single search simultaneously through multiple search engines and directories and then compiles the results into a single list. For example, the meta-searcher Dogpile sends its queries to a variety of directories and search engines (such as Google, Yahoo, LookSmart, Teoma, Overture, FindWhat, and so on) and then allows the user to either see the results source by source or as a list of the top results from each source (usually eliminating duplicates). Because most search engines and directories today include "sponsored" or paid links in their listings and results, and because most meta-searchers can include these types of links without labeling them as paid links, some Internet researchers shy away from using meta-searchers. However, sometimes a meta-searcher is an effective way of casting as wide of a net as quickly as possible when searching for specific content on the Internet. (See also ***Search Engine***.)

### Meta-Tag

Level: 2

*Definition:* A special background portion of a web page that provides information about the page and the web site of which it is a part. Meta-tags can be used to record information about who composed the web page, what software they used, and how often the page is updated. Perhaps most importantly, meta-tags are used to contain descriptions and key word information that is used by search engines when they are cataloging the web site's content. One of the most important characteristics of an easy-to-find web site is the care that went into formulating and refining the

information contained in the meta-tags. (See also ***Search Engine*** and ***Spider***.)

### Metcalfe's Law

Level: 2

*Definition:* The utility of a network is equal to the square of the sum of its parts. Robert Metcalfe was inventor of the Ethernet networking protocol and founder of 3Com Corporation.

### Metropolitan Area Network (See *MAN*.)

### Metropolitan Statistical Area (See *MSA*.)

### MF (Medium Frequency)

Level: 3

*Definition:* Portion of the radio frequency spectrum ranging from 300 kHz to 3 MHz. AM radio broadcasting services operate in this frequency band. (See also ***Spectrum***.)

### MFJ (Modified Final Judgment)

Level: 3

*Definition:* Juridical name of the court-ordered consent decree establishing the formal guidelines for the divestiture of AT&T in 1984. This MFJ created seven regional spin-off companies from Ma Bell, commonly known as the "Baby Bells," and declared that AT&T could no longer provide local telephone service to customers. (See also ***RBOC***.)

### MFP (Multifunction Peripheral, Multifunction Printer)

Level: 2

*Definition:* Refers to a single device that serves several functions, typically including printing, scanning, faxing, and copying. Popular in small offices and home offices, purchasing one MFP is usually cheaper and less complicated than purchasing all four devices separately. However, users can perform only one task at a time, and if the MFP breaks down all functions are lost at the same time. (See also ***SOHO***.)

### MGCP (Media Gateway Control Protocol)

Level: 3

*Definition:* MGCP is a standard protocol that handles the signaling and session management needed during a multimedia conference. The protocol defines a means of communication between a media gateway, the device that makes it possible to connect traditional telephone networks (circuit-switched) to the Internet (packet-switched), and the media gateway controller. MGCP makes it possible to determine the location and capabilities of each endpoint in the conversation and thus set up, maintain, and terminate calls among those multiple endpoints. (See also ***VoIP***.)

### Microchip

Level: 2

*Definition:* Small integrated circuits embedded on tiny silicon wafers that can be used for various electronic functions. The number of components on a single chip has increased greatly over time, thus significantly increasing capacity. One common use today is the embedding of a microchip just under the surface of the skin of a family pet in order to facilitate identification if the pet becomes lost. (See also ***Integrated Circuit***.)

### Microcomputer

Level: 1

*Definition:* A generic term for standalone computers combining a microprocessor, memory, storage, input device, keyboard, and display monitor. Full-feature desktop computers are much more powerful and run much faster than the first models of IBM PCs (personal computers) and Apple's Macintosh computers, which are examples of original microcomputers. Other microcomputers include video game consoles, handheld computers, smart phones, and so on.

### Microdisplay

Level: 1

*Definition:* Refers to display devices that are so small (usually less than 1 inch diagonally) they must either sit directly in front of the eye or be magnified for them to be appropriate for human use. Microdisplays can be found in projection systems and in near-to-the-eye (NTE) applications, such as in head-mounted displays and camera view finders. Liquid crystal microdisplays

allow the manipulation of light by electronic circuitry, enabling both operation at low voltages and easy production in a wide variety of forms. (See also ***LCD***.)

### Micron (Micrometer)

Level: 2

*Definition:* A metric system measurement; one micron is equal to one millionth of a meter. One micron equals 0.00004 of an inch.

### Micrometer (See *Micron*.)

### Microprocessor

**Level: 2**

*Definition:* A versatile, powerful set of integrated circuits embedded on silicon wafer chips that serve as the central computing power of a system. Intel's Pentium IV processor or Macintosh's G5 are current examples. Microprocessors direct the performance of all logic, control, and memory functions. (See Table M–2 and see also ***CPU***.)

### Microsoft DOS (See *MS-DOS*.)

### Microsoft Passport

Level: 2

*Definition:* Launched in 2001, Passport is Microsoft's attempt to further the integration of online business practices by registering customer information and enabling multiple Passport-powered businesses to access that information for identification, authentication, credit card information, shipping details, and so on. Passport stores customer information in a "wallet" that is then accessible to both the user and to businesses subscribing to Passport services. Passport has come under fire in recent years for exaggerating the level of security it provides, and many hackers have devoted time to (and succeeded in) developing tools to steal Passport information. In 2003, Microsoft acknowledged a flaw in the Passport system that might have exposed personal information such as e-mail accounts and credit card numbers of all of its then 200 million users. Most experts agree that Passport as currently implemented is not secure enough to promote the goals of the e-commerce community. (See also ***Single Sign-on***.)

### Microsoft Windows XP Media Center Edition

Level: 1

*Definition:* Microsoft Windows XP Media Center Edition is a version of Windows XP that allows home computing and entertainment to be joined into one device. A Media Center PC provides integrated home entertainment experiences such as photo viewing and sharing, listening to music, watching television (including digitally recorded TV), and the ability to share digital content to other devices in the home. Because of the complex processes and massive data storage required to drive the media center, the Media Center PC



**TABLE M–2** Microprocessor standards.

| Date | Intel CPU Name | Clock Speed | No. of Transistors (000s) |
|---|---|---|---|
| 1978 | 8086 | 5–10 MHz | 29 |
| 1979 | 8088 | 5–8 MHz | 29 |
| 1982 | 80286 | 8–12 MHz | 134 |
| 1985 | 80386 | 16–33 MHz | 280 |
| 1989 | 80486 | 25–50 MHz | 1,200 |
| 1993 | Pentium (P5) | 60–200 MHz | 3,100 |
| 1995 | Pentium Pro (P6) | 150–200 MHz | 5,500 |
| 1997 | Pentium II | 233–400 MHz | 7,500 |
| 1998 | Pentium III | 400–866 MHz | 14,000 |
| 2000 | Pentium III | 1.5 GHz | 42,000,000 |
| 2005 | Pentium IV | 3.8 GHz | 55,000,000 |

Source: Industry.

must have a high-end processor, large-format storage drives (usually at least 160 Gb), advanced graphics and audio capabilities, CD/DVD drive(s), and networking capabilities. A fully integrated Media Center PC usually also includes a remote control and infrared capability (to integrate with set-top boxes), a TV-tuner card and a hardware encoder to allow for recording of television to the computer's hard disk, and digital audio output. (See also ***PVR*** and ***TiVo***.)

### Microwave

Level: 3

*Definition:* A portion of the electromagnetic radio spectrum between 1 and 200 GHz used for satellite, terrestrial point-to-point communications, and cellular telephone services. Microwave frequencies are also used in kitchen microwave ovens to heat food essentially by vibrating liquid (water primarily) and other molecules at designated microwave frequencies.



### Middleware

Level: 2

*Definition:* General term used to describe software that connects two previously unconnected computer applications or systems. One of the most common examples is the use of software to connect web servers and stored databases.

*Used in a sentence:* "We thought long and hard about what middleware we wanted to use to connect our company databases to the Web." (See also ***Active Server Pages***, ***ColdFusion***, ***Common Gateway Interface***, and ***E-commerce***.)

### MIDI (Musical Instrument Digital Interface)

Level: 2

*Definition:* A software interface system designed specifically to connect electronic musical instruments, such as a digital music synthesizer or keyboard, directly to a computer. MIDI can also be used to control theater lighting and audio processors.

### Million Instructions per second (See *MIPS*.)

### MIME (Multipurpose Internet Mail Extension)

Level: 2

*Definition:* The standard for attaching non-text files to standard Internet mail messages. Non-text files include graphics, spreadsheets, formatted word processing documents, audio sound files, and so on. MIME provides a way of specifying the type of file being sent and the method to convert the file back into its original form. It defines restrictions on content such as allowing for multiple objects in one message, unlimited length of messages, and multiple fonts within a message. MIME standards are specified by Internet document RFC 1341 and are identified with a specific file extension label. (See also ***Attachment*** and ***E-mail Attachment***.)

### Mini Disc (See *MD*.)

### MIPS (Million Instructions per second)

Level: 2

*Definition:* An approximate measure of the rate at which a computer executes or performs software or hardware instructions. Higher MIPS rates are needed to perform complex calculations at reasonable speed but complexity and speed translate into higher costs. For comparison, an early-version personal computer running the Intel 80386 (1985) processor was capable of about 5 MIPS, whereas a common desktop configuration in the year 2005 can deliver more than 10,000 MIPS. (See also ***CPU***.)

### Mirror

Level: 3

*Definition:* Often used to speed up the transfer of information on the Internet, a mirror is an archive site or web site that keeps a copy of some, or all, files at another site to make those files more quickly available to local users and to reduce the load on the source site. Popular web sites receiving hundreds of thousands of visitors daily commonly employ mirrors to ensure that they can deliver all of their web pages as quickly as possible. (See also ***Cache***, ***Internet***, and ***Web Server***.)

**MJPEG (Motion JPEG)**
Level: 3
*Definition:* A compression algorithm designed primarily for video or still-picture frame-by-frame digital editing. For video, MJPEG functions by encoding each separate frame as an individual JPEG image (as opposed to MPEG, which focuses on the differences between each frame). This process increases the quality of the digital representation but also increases the resultant file size. MJPEG often requires special compression and decompression hardware. (See also ***JPEG*** and ***MPEG***.)

**MMDS (Multichannel Multipoint Distribution Service)**
Level: 3
*Definition:* MMDS and LMDS are referred to under the umbrella term of *broadband wireless fixed access* (as distinct from wireless mobile) *services*. Formerly these providers were referred to as parts of the wireless cable industry, but technical capabilities and new services have enlarged the scope and competitive business aspects of these operations, and hence the updated terminology. In the United States, MMDS operations are transmitted using microwave frequencies in the 2-GHz band. Services are often provided on leased channels on a shared-use basis with ITFS and OFS services, which were originally allocated these frequencies by the FCC. Wireless broadband MMDS and LMDS systems are relatively short-range (25 miles) fixed point-to-multipoint services. System construction and operations are very cost effective for delivering competitive multichannel video services and have produced growing demand for broadband wireless access in many global regions that do not have other multichannel providers such as cable or satellite direct-to-home services. (See also ***Broadband Wireless Access***, ***LMDS***, and ***WiMAX***.)

**Mobile Satellite Service (See *MSS*.)**

**Modem (Modulator/Demodulator)**
Level: 2
*Definition:* A communications device that converts one form of a signal (such as analog to digital) to another (such as digital to analog) that is suitable for transmission over communications circuits, typically over telephone lines. (See also ***V.90***.)

**Modified Final Judgment (See *MFJ*.)**

**Modulation**
Level: 3
*Definition:* A process in which the characteristics of a carrier wave (usually RF) are varied by a base-band signal so that the modulated carrier can be used for transmitting audio, video, or data information. Modulation techniques combine multiple signals into a single transmission form that can be reversed at the receiving point to recover the embedded information. (See also ***AM***, ***Demodulation***, and ***FM***.)

**Modulator/Demodulator (See *Modem*.)**

**Monitor**
Level: 1
*Definition:* A type of video display device. (See also ***CRT***, ***HDTV***, and ***LCD***.)

**Moore's Law**
Level: 1
*Definition:* Named for Gordon Moore, one of the founders of Intel, Moore's law refers to Mr. Moore's oft-quoted observation in 1965 that the number of transistors it was possible to squeeze into one square inch on an integrated circuit was doubling every year and that he expected the trend to continue indefinitely. In reality, this pace of innovation has slowed to once about every 18 months. However, Moore has since revised his prediction to be in agreement with this pace. Although some believe that the laws of physical science will ultimately make such regular and drastic increases in processor power impossible, Moore's law has come to be used as an umbrella term to refer to the apparently limitless development of faster, cheaper, more powerful digital technologies.

**Morphing**
Level: 2
*Definition:* Short for "metamorphosing," it refers to the process of gradually changing or turning

one image into another image. Morphing is a common technique in animation and special effects work. (See also ***Tweening***.)

### Mosaic

Level: 2

*Definition:* The first graphical Internet Web browser that was instrumental in popularizing the Internet as it made navigating the network considerably more manageable for users. The first Netscape browser, which was released in 1994, was based directly on Mosaic, and many of the functions in all graphical browsers today were pioneered with the first version of Mosaic. (See also ***Browser*** and ***Netscape***.)

### Motherboard

Level: 3

*Definition:* The main interconnection circuit board in a computer that provides connectivity among the central processing unit (CPU), memory, all internal and external devices, and peripheral hardware. (See also ***CPU***.)



### Motion-Capture Bodysuit

Level: 3

*Definition:* A set of integrated, body-mounted motion-capture components for producing 3D character animations for television programs, movies, video games, virtual reality sessions, or live performance animation presentations. Non-entertainment applications include sports medicine and physical rehabilitation medical analyses, biomechanical device testing, virtual prototyping, and CAD simulations of human motions for developing a range of commercial products from ergonomic chairs to driver seats in cars. Wireless motion-capture bodysuits use a series of extended range transmitter sensors that emit pulsed magnetic fields to track body position and physical orientation. Sensors are mounted at key body movement points and sensor data travels via cables to a miniature battery-powered electronics unit mounted in a small backpack unit. Sensor data and other signal data from peripheral head-mounted equipment or motion-capture data gloves are transmitted wirelessly to a base station and then to a host computer in real time. (See also ***Datasuit*** and ***Virtual Reality***.)

### Motion JPEG (See *MJPEG*.)

### Moving Picture Experts Group (See *MPEG*.)

### Moving Picture Experts Group 21 (See *MPEG-21*.)

### Mozilla

Level: 2

*Definition:* Coordinated by the Mozilla Foundation, the Mozilla suite of applications includes a free web browser, an e-mail client, an HTML editor, and an IRC client. Spun off from Netscape Corporation, Mozilla was the code name of the original Netscape Navigator project. In 1998, Netscape decided to make the source code for Navigator freely available to the public. Mozilla Firefox, the browser, has begun steadily cutting into Internet Explorer's share of the browser market. (See also ***Browser***, ***Firefox***, ***Mosaic***, ***Netscape***, and ***Open Source***.)

### MPEG (Moving Picture Experts Group)

Level: 2

*Definition:* Refers to an internationally recognized group of professional video experts that has been responsible for developing technical standards for digital video encoding and video compression. MPEG meets under auspices of the International Standards Organization (ISO). *MPEG-1:* The first set of digital standards developed by MPEG that includes a compression scheme for motion video. MPEG-1 compresses moving images using intraframe and interframe coding techniques to produce a VHS-quality video transmitted at a data rate of about 1.5 Mbps. *MPEG-2:* An updated set of digital video compression standards constituting an enhancement of MPEG-1 accomplished through additional coding of video intraframe images using predictive motion techniques, which facilitate greater digital signal compression. *MPEG-3:* Advanced video compression techniques originally targeted for HDTV systems, but now have been incorporated into the MPEG-2 standard. *MPEG-4:* A compression standard used

for low-bit-rate applications such as videophones, multimedia e-mail, and electronic newspapers. MPEG-4 Part 10 is an advanced codec intended for high-efficiency coding of video for DTV, HDTV, and high-definition DVDs. MPEG-7: A system for describing multimedia content.

### MPEG-1, Audio Layer 3 (See *MP3*.)

### MPEG-21 (Moving Picture Experts Group 21)

Level: 2

*Definition:* A comprehensive standard for defining the framework to enable expanded uses of multimedia resources across a wide range of networks and diverse devices, supporting functions such as content creation, content production, content distribution, content consumption and usage, content packaging, intellectual property management and protection, content identification and description, financial management, user privacy, terminals and network resource abstraction, content representation, and event reporting. Whereas earlier MPEG standards were designed primarily to encode and compress digital content, MPEG-21 is designed to also pay attention to the users of digital content—orchestrating the entire digital media creation, transmission, and consumption process. (See also ***MPEG*** and ***REL***.)

### MP3 (MPEG-1, Audio Layer 3)

Level: 2

*Definition:* A digital compression format designed to deliver acceptable quality music while at the same time reducing digital audio files by about 90%. A typical song on a CD taking up about 50 megabytes can be reduced to an MP3 file of fewer than 5 megabytes by optimizing the file based on the sounds people can actually hear. These smaller files can then be listened to using special software (usually available for free) to decode the MP3 content. The files are easily stored on a server and transferred over the Internet, can be used to burn custom CDs, or can be transferred directly into an MP3 player (a small portable device that can store and play thousands of MP3 songs). Since the mid 1990s, MP3 audio files have been a popular format for digital music due to their sound quality and comparatively small size, though competing formats from Microsoft (WMV) and Apple (AAC) have made inroads because of their copy protection capabilities. (See also ***AAC*** and ***File Sharing***.)

### MSA (Metropolitan Statistical Area)

Level: 3

*Definition:* MSAs are governmentally defined standard geographic areas, which are used by the Census Bureau and frequently by market research companies for reporting various types of statistics. Periodically, the U.S. Office of Management and Budget updates its list of cities and towns, which become officially designated metropolitan areas. The most recent OMB list (released in 2005) added the classification of "Metropolitan Division," which describes a county or group of counties within a metropolitan statistical area that has a population of 2.5 million or more.

### MS-DOS (Microsoft DOS)

Level: 2

*Definition:* The standard operating system (OS) for many personal computers (PCs) before the introduction of Windows NT and Windows 95. Unlike earlier versions of Windows (which actually were graphical overlay systems that ran "on-top-of" DOS), Windows 95 and Windows NT, with all their graphical and enhanced features, ran using Microsoft's disk operating system (DOS). Microsoft stopped development of MS-DOS in 2000. (See also ***Command Prompt***, ***Operating System***, and ***Windows***.)

### MSO (Multiple System Operator)

Level: 2

*Definition:* A cable industry term for cable operators that own multiple local cable systems. MSOs are some of the nation's largest communications companies and include Comcast, Time Warner, and Cox Communications. (See also ***Cable***.)

### MSS (Mobile Satellite Service)

Level: 3

*Definition:* International classification for satellites offering communications services to mobile

users generally for links for wireless devices or other related services. Providers offer mobile satellite services transmitted from geostationary satellites.

### MTS (Multichannel Television Sound)

Level: 3

*Definition:* Refers to a technical standard for the transmission of stereo audio signals for NTSC television. MTS was recommended by the EIA and adopted by the FCC in 1984 and is fully compatible with mono or single audio channel television sets. TV stereo signals are multiplexed on FM carrier signals and carried as part of the standard 6-MHz broadcast television signal. MTS stereo was developed by Zenith, with noise reduction by DBX, and includes capabilities for carrying additional audio channels. For example, a bilingual service could be transmitted on the second audio program (SAP) channel, whereas another audio channel, the professional channel (PRO), might be used for commercial audio cue feeds to remote talent and other data services.



### MTS (See *Multichannel Television Sound*.)

### MUD (Multi-User Dungeon, Multi-User Dimension)

Level: 3

*Definition:* An Internet-derived term for a multiplayer role-playing computer game. Although not as popular as they were in the mid 1990s, MUDs are used for entertainment, education, and much more. Typically text based, a distinctive feature of MUDs is that the MUD world can be built gradually and collectively because even after a particular user logs off, the other users in the system can interact with objects in their absence. (See also ***Computer-mediated Communication***.)

### Multicasting

Level: 3

*Definition:* Refers to the transmission of multiple video or audio signals, data, and information to numbers of receiver endpoints simultaneously. Video distribution systems such as DBS, MMDS, or cable television are common users of multicasting techniques to deliver a range of entertainment programming. (See also ***Unicast***.)

### Multichannel

Level: 2

*Definition:* Refers usually to any video delivery system that transmits multiple channels to end users by employing any number of technical approaches, such as frequency division (FDM) or time division multiplexing (TDM). Examples include sound systems with multiple channels (such as Surround Sound), cable television, DBS, MMDS, telephone VDT, or other video broadband networks. (See also ***Broadband***, ***FDM***, and ***TDM***.)

### Multichannel Multipoint Distribution Service (See *MMDS*.)

### Multichannel Television Sound (See *MTS*.)

### Multifunction Peripheral, Multifunction Printer (See *MFP*.)

### Multimedia

Level: 1

*Definition:* Refers to the convergence of previously distinct communication forms (e.g., text, images, video, audio, and so on) that are now capable of being integrated and extended because they all exist in digital form. Multimedia computer systems can handle the full range of communication forms, including audio, still pictures, full-motion video, animation, and graphics, text, or other digitized materials, and multimedia software makes it possible to "author" these various digital media into orchestrated and sometimes highly complex multimedia productions.

*Used in a sentence:* "We used a combination of text, graphics, video, and audio to put together a multimedia history of our company that is delivered on the Web." (See also ***Digital Media***.)

### Multimedia Server

Level: 2

*Definition:* A type of computer server system capable of distributing audio voice/music, video, graphics, text, and data information. (See also ***Server***.)

### Multimode Fiber
Level: 3
*Definition:* A type of optical fiber largely used for shorter distances, such as between proximate devices or within a building. Transfer rates of 1 Gbps are typical, although the maximum speed depends on the system configuration and the actual distance. Multi-mode fiber has a larger center core than single-mode fiber. (See also ***Fiber Optics*** and ***Single Mode***.)

### Multiple System Operator (See *MSO*.)

### Multiplexer (See *MUX*.)

### Multiplexing
Level: 3
*Definition:* Refers to the process of combining two or more signals into a single transmission signal, channel, or data bit stream. Multiplexing is used in land-line and RF communications systems. When signals are multiplexed, operating networks or systems require precise management time and/or frequencies used in transmissions. Such management tasks are often referred to as allocating time and bandwidth resources. Multiplexing techniques increase the efficiency of the transmission system and engineers continue to devise or refine multiplexing techniques to achieve higher levels of system efficiency by carrying increased amounts of signal traffic. Typical techniques include frequency division multiple access (FDMA) and time division multiple access (FDMA). Multiplexing can also describe the process of combining compressed elementary bit streams and program bit streams into multiplexes for transport and transmission. (See also ***CDMA***, ***FDMA***, and ***TDMA***.)

### Multipoint Control Unit (See *MCU*.)

### Multipurpose Internet Mail Extension (See *MIME*.)

### Multi-Sync Monitor
Level: 2
*Definition:* A type of computer monitor system with inherent software enabling it to recognize the type of device to which it is attached and the format of received signals so that it can adapt to these parameters automatically.

### Multitasking
Level: 1
*Definition:* Refers to the ability of a computer system or electronic device to manage more than one task at a time. Most operating systems today support multitasking. Operating systems such as UNIX and OS/2 are considered original multitasking systems.

### Multi-User Dungeon, Multi-User Dimension (See *MUD*.)

### Musical Instrument Digital Interface (See *MIDI*.)

### MUSICAM (Masking-Pattern Adapted Universal Sub-Band Integrated Coding and Multiplexing)
Level: 3
*Definition:* Also known as MP2, MUSICAM is a data compression scheme developed in Europe for transmitting CD-quality digital sound over limited-bandwidth radio channels. The compression scheme separates a digital audio signal into 32 equal sub-bands with bandwidths of 750 Hz, which can transmit at a professional digital sampling rate of 48 kbps. In the compression process, the audio signal is also encoded to take advantage of certain "masking" properties associated with human hearing, such as where a strong signal at a particular audio frequency overshadows a weaker signal at another frequency, causing the human hearing system to not detect the weaker signal. Eliminating these weaker signals in a recording reduces the amount of data needed to digitally represent, without any perceptible degradation to, the restored audio signal. Although the MP3 compression scheme has come to dominate much of the online music environment, MUSICAM is still widely used in digital audio broadcasting. (See also ***AAC***, ***Bandwidth***, ***Compression***, ***DAB***, and ***MP3***.)

### Must-Carry

Level: 2

*Definition:* Refers to rules (upheld in a Supreme Court decision in March of 1997) that require locally franchised cable operators to carry all broadcast television signals (public and commercial) within their local markets. The must-carry rule ensures that cable operators offer to viewers all local broadcast television stations. A similar rule for satellite carriers went into effect in 2000, requiring a satellite carrier to carry all local signals in a market if it carries any one local signal under the statutory copyright license. There are several must-carry issues related to DTV that still need to be resolved. (See also ***DTV***.)

### MUX (Multiplexer)

Level: 3

*Definition:* An electronic device for multiplexing or combining two or more signals into a single signal or data stream. MUX equipment also serves to demultiplex or separate the combined signals at the receiving end. (See also ***Multiplexing***.)

### MySQL

Level: 2

*Definition:* One of the most widely used open-source relational database management systems today, MySQL is most commonly used for web-based applications and embedded applications and can run on the Windows, Mac, and UNIX platforms. Especially popular for developers who want to avoid using high-cost proprietary database systems (such as Oracle or Microsoft's SQLServer), MySQL is compatible with many programming languages and environments. (See also ***RDMS*** and ***SQL***.)

# N

### Nano
Level: 2
*Definition:* A measurement representing one billionth of a quantity expressed as $10^{-9}$ represented as *n* when used as part of a measure of transmission rate. (See also ***Nanosecond*** and ***Nanotechnology***.)

### Nanosat
Level: 3
*Definition:* Term usually applied to a satellite lighter than 22 pounds (10 kg) and intended to replace the large, costly telecommunications satellites in use today. Nanosats are being designed so that they can be positioned in clusters (also called "constellations") in space to provide instant relaying and backup support to provide advanced telecommunications services. (See also ***Picosat***.)

### Nanosecond
Level: 2
*Definition:* A measurement of time in which one-billionth of a second (or .000000001 seconds) is equal to 1 nanosecond (1 n). Memory data access times can be measured in nanoseconds. For example, memory access times for typical 30- and 72-pin SIMM modules range from 60 to 100 nanoseconds.

### Nanotechnology
Level: 2
*Definition:* Produced by a combination of chemistry and engineering, nanotechnology is ushering in an era of technology that can control individual atoms and molecules, making them susceptible to quantum-based phenomena. Some of the goals of those involved in nanotechnology development include the creation of computer chips and other devices that are thousands of times smaller than current approaches permit. Nanotechnology could also be used to build devices such as "nanobots," change the physical properties of existing materials, and influence physiological processes on the molecular level.

### NAPLPS [North American Presentation Level Protocol Standard (or Syntax)]
Level: 3
*Definition:* A protocol developed by AT&T for video-text graphics and screen formats. NAPLPS was established as an ANSI standard as an alternative to more simplistic electronic teletext standards. NAPLPS has a disadvantage in that it takes more time for the information to be transmitted than other text-based transmission systems.

### Napster
Level: 1
*Definition:* Originally launched as an MP3 music file sharing network in 1999 by 19-year-old Shawn Fanning, Napster was shut down in July of 2001 for legal reasons. It was purchased by Roxio (a company known for its CD-burning software) in 2002 and relaunched in 2004 as a proprietary online music service of the same name. The "new" Napster, unlike the original, has invested in digital rights management and copyright protection systems that make the purchase of online music legal and supported by (most) artists. Some use the terms "napster" or "napsterize" to characterize generally the services and acts of sharing files on the Internet. (See also ***DRM***, ***File Sharing***, and ***MP3***.)

### Narrowband
Level: 2
*Definition:* Refers to communications systems where transmission channels, links, or lines have relatively limited capacity for transmitting analog or digital signals compared with other facilities that can transmit or carry a significantly greater

amount of information. In digital systems, the available bandwidth in different communications systems relates directly to how much information can be transmitted at a particular rate of speed. (See also ***Bandwidth*** and ***Broadband***.)

### NAT (Network Address Translation)

Level: 3

*Definition:* A program or piece of hardware that converts the IP address from a private (internal) address to an external public IP address (and visa versa), allowing multiple users on the internal network to share a single external IP address. NAT is used in home networks and corporations to allow multiple PCs to access the Internet via T-1, ADSL, or cable modem, making the internal network appear as one entity to the outside world. Processing addresses through NAT helps maintain security because each outgoing or incoming request must go through the translation process, which makes it possible to qualify or authenticate the request or to match it to a previous request. NAT also minimizes the number of external IP addresses a company needs, allowing the company to use a single IP address in its communication with the outside world. (See ***IP Address*** and ***Network***.)



### National Radio Systems Committee (See *NRSC*.)

### National Television System Committee (See *NTSC*.)

### Natural Language

Level: 1

*Definition:* Referring to the languages people speak every day, "natural language" is distinct from "machine language" or "computer language" that is essential in executing the functions of the machine/computer. For example, a "natural language" search engine will encourage users to type in complete sentences/phrases (including questions) when looking up information versus requiring the user to include "machine language" such as Boolean operators or highly specialized search commands. Such capability is often associated with expert systems or artificial intelligence. Ironically, "natural language" must be translated into machine language for being processed by computers.

*Used in a sentence:* "I like search engines that allow natural language queries so that I don't have to think and talk like a machine just to get the search results I want."

### NC (See *Network Computer*.)

### Near Video on Demand (See *NVOD*.)

### Near-Instantaneous Companding Audio Multiplex (See *NICAM*.)

### Nest

Level: 3

*Definition:* In data systems or software programs, nest refers to placing or embedding one set of instructions within a larger or more generic set of instructions.

### .NET

Level: 3

*Definition:* Pronounced "dot net," a set of technologies brought together through Microsoft Corporation's desire to integrate applications that run on personal digital devices (such as personal computers, smart phones, and palm computers) with a wide range of applications that run via the Internet (or an intranet) regardless of the operating systems involved. According to Microsoft, .NET "is the Microsoft strategy for connecting systems, information, and devices through Web services so people can collaborate and communicate more effectively." .NET architecture is designed to reduce the amount of time it takes to develop new applications. .NET relies on the orchestration of four network protocols: HTTP, XML, SOAP, and UDDI. (See also ***HTTP***, ***SOAP***, ***UDDI***, and ***XML***.)

### Netiquette

Level: 1

*Definition:* Refers to the conventions of politeness and consideration that have emerged on

the Internet, especially in using electronic mail, chat rooms, instant messaging, and posting messages to newsgroups. One of the most important rules of netiquette is to avoid sending messages before thinking about how they will impact the receiver (or how they will make you look if the receiver forwards your message to someone else). Netiquette also dictates that one does not forward to someone else personal/private e-mail without the originator's permission. (See also ***Computer-mediated Communication***, ***E-mail***, ***IRC***, ***Newsgroup***, and ***Usenet***.)

### NetMeeting

Level: 2

*Definition:* A teleconferencing tool developed by Microsoft that supports audio and video conferencing, white board, file transfer, application sharing, e-mail, and more. NetMeeting is built into Microsoft's XP operating system. (See also ***Application Sharing***, ***E-mail***, ***Videoconferencing***, and ***White Board***.)

### Netscape

Level: 2

*Definition:* Original leader and important force in creating Internet navigation "web browser" software and other products for the Web (including JavaScript). The company was founded in 1994 and purchased by America Online (AOL) in 1998. (See also ***Browser***, ***JavaScript***, and ***Mozilla***.)

### Netware

Level: 3

*Definition:* A proprietary computer network operating system used by Novell for LANs (local area networks). Netware is a client/server software system providing communications links between client workstations and servers enabling applications, databases, text files, and other network assets to be accessed in a shared environment. (See also ***Client/Server***.)

### Network

Level: 1

*Definition:* (1) In communications, networks are key foundations for providing services whether it is via broadcasting, computer/data, telephone systems, or other systems. (2) In broadcasting, a network refers to two or more radio or television stations linked for the purpose of sharing programming. Radio or television networks are program distribution networks commonly delivered today via satellite feeds to affiliated stations across the country. Network feeds are established program schedules with national advertising spots already inserted. Networks also may own local stations but are restricted to the same audience caps as other broadcast groups. (3) Data networks can be categorized into classes such as local area networks, metropolitan area networks, or wide area networks. A common characteristic among data networks is the interconnection of two or more computer terminals allowing for communication exchange. (4) Telephony networks are similar to data networks in that they connect two or more receiving stations. In creating public telephony networks, a guiding principle has been "universal service," whereby any residence desiring connection to the telephone network is eligible to receive service, if at all feasible. Over 94% of U.S. households have telephone service.



### Network Address Translation (See *NAT*.)

### Network Computer (NC)

Level: 3

*Definition:* A computer that operates as part of a computer network, but depends almost exclusively on a centralized server for the software and storage space it requires for use. A "thin client" system usually contains a lot of memory (RAM) but has no hard drive storage capacity and runs on a minimal operating system. Thin client systems are designed to reduce support costs, as there are fewer full-function computers involved. They allow companies to centralize support functions so that all software upgrades and maintenance occurs centrally on a server. Distributed-server systems often use a special "boot server" to handle operating system functions, an "application server" to deliver software to the client computers, and a "data server" to store information on the network. (See also ***Application Service Provider***, ***Client/Server***, and ***Java***.)

### Network File System (NFS)

Level: 3

*Definition:* Refers to a virtual disk storage system that uses the same network protocol as the Internet (TCP/IP) to allow computers on any network to share files and disk space in such a way that it appears to the user as a single, seamless file system. For example, this system would make very little distinction among files stored on a user's hard drive, files stored on a company central computer, and files stored on the Internet, giving that user easy access to any and all files they had permission to use. (See also ***CFS***.)

### Network Interface

Level: 2

*Definition:* The point or juncture where a computer workstation is connected to a private LAN network. This also refers to the point where a telephone company connects its line(s) to a residential home or business subscriber's customer premise line and equipment. (See also ***NIC***.)

### Network Interface Card (See *NIC*.)



### Network Layer

Level: 3

*Definition:* Refers to a particular segment of a proposed open system interconnection model used in telecommunications systems. (See also ***OSI***.)

### Network Server

Level: 3

*Definition:* A computer system storing database files, text or data files, utility, or other application software that can be mutually shared by all workstation computers connected to a local area network. (See also ***Web Server***.)

### Neural Network

Level: 2

*Definition:* Pioneered in the 1950s by Stanford professor Berndard Widrow, a neural network is a processing architecture based on models of neuron interconnections of the brain. Fundamentally different from the on/off binary nature of digital computers, a neural network incorporates learning rather than programming and parallel rather than sequential processing into the ways in which it works. Typically, rules are introduced to "train" the network to recognize patterns and learn from examples, making approximate (not definitive) conclusions possible. Functioning neural networks can be simulated on a digital computer and are currently being used for applications involving large quantities of data with significant needs for inference, including character, voice, and image recognition systems; predictive systems (such as stock market and weather); medical imaging; data mining; and aerospace applications.

### Newsgroup

Level: 2

*Definition:* Cyberspace term for the thousands of different discussion areas or groups, which provide open forums for user exchanges on Usenet, some via the Internet others via private online networks. The most comprehensive collection of newsgroup postings (with full public access) comes from Google Groups at *http://groups.google.com*. (See also ***Alias***, ***Anonymous Remailer***, ***Computer-mediated Communication***, ***Forum***, ***Netiquette***, ***Spam***, ***Spoiler***, ***Threaded Discussion***, ***Usenet***, and ***Virtual Community***.)

### Next-Generation Internet (NGI)

Level: 2

*Definition:* An effort separate from, but complimentary to, those working toward Internet 2, NGI was initiated by the Executive Branch of the U.S. government. Funded by Congress, NGI involved several federal agencies, including the Defense Advanced Research Projects Agency (DARPA), the National Institute for Standards and Technology (NIST), the National Aeronautical and Space Association (NASA), the National Science Foundation (NSF), and the Department of Energy (DOE). With efforts are being focused on delivering high-speed network access to as many American citizens as possible as soon as possible, the NGI initiative was concluded in 2002. (See also ***Internet 2***.)

**Next-Generation Secure Computing Base (See *NGSCB*.)**

**NFS (See *Network File System*.)**

**NGI (See *Next-Generation Internet*.)**

**NGSCB (Next Generation Secure Computing Base)**
Level: 2
*Definition:* Next Generation Secure Computing Base (NGSCB), formerly known as Palladium, is Microsoft's broad initiative to produce a more secure runtime environment for Windows and other operating systems that allows a yet-to-be-developed generation of software applications and services to protect the end user from privacy invasion, outside hacking, spam, and other electronic attacks. Announced by Microsoft chairman Bill Gates in 2002 as part of his company's effort to create "trustworthy computing," NGSCB has been both heralded and criticized for its attempts to make personal computing in the twenty-first century more secure. According to Microsoft, NGSCB presents the ability to create secure compartmentalization of data and applications, to provide a secure pathway from the keyboard through the computer, and other capabilities that build upon existing computing and security products. (See also ***DRM*** and ***Hacker***.)

**NIC (Network Interface Card)**
Level: 2
*Definition:* An electronic circuit board, or card, that is installed in personal computers and other devices (such as printers) to provide interface connectivity to a local network. An example of these cards is an Ethernet NIC installed in each PC attached to an Ethernet network. This NIC allows the PC to transmit and receive information via the network. Each NIC has a unique number assigned to it and burned into the card for addressing purposes. When a new NIC is attached to a network, in most cases it broadcasts its address across the network, enabling the other components attached to the network to begin communicating with it. (See also ***IP Address*** and ***Network***.)

**NiCad (Nickel-Cadmium)**
Level: 2
*Definition:* A precursor to today's more commonly used lithium-ion batteries, NiCad (combination of nickel and cadmium) lacks the storage capacity, compactness, and lightweight quality of newer alternatives. Early versions of the NiCad battery suffered from what is called the "memory effect," whereby the charging of an only partially drained NiCad battery would ultimately reduce its charging capacity and overall life. Most NiCad batteries were capable of a total of about only 1,000 recharges, and the metals used to construct them were highly toxic. (See also ***Lithium-Ion*** and ***NiMH***.)

**NICAM (Near-Instantaneous Companding Audio Multiplex)**
Level: 3
*Definition:* A technique or process used for compressing multiple radio frequencies or other signals from analog to digital, providing near CD-quality sound. Currently being used to send one digital stereo sound channel along with two digital mono sound channels, NICAM also has the capability of adding more options. These options include such features as an additional digital mono sound channel as well as data channels ranging from 352 to 704 kbps.

**Nickel Cadmium (See *NiCad*.)**

**Nickel-Metal-Hybrid (NiMH) Battery (See *NiMH Battery*.)**

**Nielsen//NetRatings**
Level: 1
*Definition:* An Internet measurement service collecting data from a panel of thousands of participants while they are actively online using the Internet. Nielsen Media Research, A.C. Nielsen Company, and NetRatings jointly offer the Nielsen//NetRatings audience measurement services. The service provides web site publishers, media buyers, e-commerce companies, Internet marketers, and the financial community with information about how people are using the Internet. The panel reportedly is the largest media

research sample of at-home Internet users currently under measurement. The service employs a technology capable of measuring both Internet use and advertising information to provide timely, comprehensive Internet data to the media, Web/Net, and advertising industries.

### NIER (Non-Ionizing Electromagnetic Radiation)

Level: 3

*Definition:* Electromagnetic signals produce nonionizing radiation that, unlike ionizing radiation, does not alter the molecular structure of objects contacted. Electromagnetic signals do not dislodge electrons from atoms in objects to create ions. Energy with a short enough wavelength to create ions is not considered to be electromagnetic energy. Cosmic and X-rays are examples of ionizing radiation. TV and radio signals are examples of nonionizing radiation. (See also ***RFR***.)

### NiMH (Nickel-Metal-Hybrid) Battery

Level: 1

*Definition:* An overall improvement to the NiCad battery technology, NiMH (nickel-metal-hydride) batteries are significantly lighter than NiCad, are capable of longer charges, are not composed of as many toxic materials, and do not suffer from "the memory effect," whereby the charging of an only partially drained battery ultimately reduces its charging capacity and overall life. (See also ***Lithium-Ion*** and ***NiCad***.)

### NLE (Nonlinear Editing)

Level: 2

*Definition:* In its most general sense, nonlinear editing is a video editing or audio editing system that can perform random access on the digital source material. For a system to be truly nonlinear all source material must be equally accessible at all times.

### Node

Level: 3

*Definition:* A telecommunications term referring to an electronic device that serves as a point of connection into a network. As an active device, it may provide management capabilities or functions to various network segments or components such as computer LANs, routers, switches, or hubs.

### NOI (Notice of Inquiry)

Level: 3

*Definition:* An NOI is issued when a federal agency, such as the Federal Communications Commission, is seeking information on a broad subject or trying to generate ideas regarding the basic direction on a matter or policy. In an NOI, the FCC would ask for input from any/all interested parties regarding a particular issue to be examined. A period of time is usually specified during which interested parties may submit comments. The FCC, or any other agency, cannot adopt final rules in an inquiry proceeding. Rather, it must go to an official rule-making stage by issuing an NPRM to set the stage for adopting rules. (See also ***NPRM***.)

### Noise

Level: 2

*Definition:* Any electrical energy or stray signals in a line or systems that are not part of the intended signal. Noise is caused by innate properties in all electronic components due to their physical characteristics and small random variations in their structures generally associated with their ability to produce heat or increase temperature, and thus add interference or noise in a system. (See also ***Noise Reduction***.)

### Noise Reduction

Level: 2

*Definition:* In general terms, noise reduction is the removal of noise from any signal. Noise reduction is most commonly employed with audio and video signals. For example, analog audio recorded to tape suffered from a clearly audible background "hiss." Dolby noise reduction was developed to minimize this hiss while improving the overall quality of the audio signal. Noise reduction to eliminate tape hiss is not necessary for digital audio signals. Noise is a potential problem for images taken with both digital cameras and conventional film cameras. "Independent noise"

in images appears when the color of a noisy pixel bears no relation to the color of surrounding pixels. Some causes of independent noise include dirty lenses or camera mechanisms, or with digital cameras faulty CCD elements. "Dependent noise," also known as "Gaussian noise," appears with the alteration of every pixel in an image (usually by a small amount). Such noise problems can often be reduced with the application of filters. (See also ***Dolby*** and ***Noise***.)

**Non-Ionizing Electromagnetic Radiation (See *NIER*.)**

**Nonlinear Editing (See *NLE*.)**

**North American Presentation Level Protocol Standard (or Syntax) (See *NAPLPS*.)**

**Notice of Inquiry (See *NOI*.)**

**Notice of Proposed Rule Making (See *NPRM*.)**

**NPRM (Notice of Proposed Rule Making)**
Level: 3
*Definition:* Refers to a procedure under the Administrative Procedures Act in which a formal document serves notice of a specific proposed change to an agency's regulatory rules and regulations. NPRMs allow interested parties, including affected industry representatives, to submit information and written comments regarding any aspect of the pending action, including impacts of the proposed rules on existing or future businesses. Typically, an NPRM is issued when an agency believes it has gathered and evaluated sufficient information to make a ruling and is offering an opportunity for public comment.

**NRSC (National Radio Systems Committee)**
Level: 2
*Definition:* Jointly sponsored by the National Association of Broadcasters (NAB) and the Consumer Electronics Association (CEA), NRSC's purpose is to study and make recommendations for technical standards that relate to radio broadcasting and the reception of radio broadcast signals. Although binding decisions regarding standards rest with the FCC, NRSC recommendations have been adopted by the FCC in most cases. (See also ***FCC***.)

**NTSC (National Television System Committee)**
Level: 2
*Definition:* Refers to the industry committee that developed the existing U.S. standard for analog color television broadcasting established in 1953. NTSC systems have 525 lines, 4:3 aspect ratio, 2:1 interlace scanning, 4.2-MHz luminance bandwidth for monochrome (black and white), and total color bandwidth of 1.5 MHz. The NTSC system is used for both production and delivery of television programs. Transmitted NTSC signals, with its separate sound carrier, occupy a total of 6 MHz of bandwidth, which is the frequency allocation per station for U.S. licensed television stations. The NTSC color system was adopted because it was backward compatible with the installed base of monochromatic (black-and-white) television sets. In the NTSC format, the chrominance portion of the color signal consisting of three primary colors for television (red, green, and blue) are coded in vector form and sent on a secondary video subcarrier, and the monochromatic information is included as part of the luminance signal. Home receivers extract the color information to reproduce full-motion images on set display screens through an interlaced scanning process. The NTSC scanning rate is 60 Hz for 525 lines of television signal information, of which 484 lines normally contain video picture information. (See also ***HDTV*** and ***Interlace Scanning***.)

**NTSC Video Signal**
Level: 2
*Definition:* NTSC television video signals are composed of composite waveforms of horizontal video scan lines containing video picture information, along with a color signal, a reference color burst signal, and horizontal sync or blanking pulse. At the end of each scan line, there is a horizontal blanking pulse that drops the visual

signal level to black, thus masking it from viewers during display. During this horizontal blanking interval (HBI), a reference color burst signal is generated. Such color bursts are needed because NTSC color or chrominance information is transmitted on a subcarrier signal and is modulated (i.e., varied in amplitude and phase) in reference to the color burst signal. (See also ***HBI*** and ***NTSC***.)

### Number Portability

Level: 2

*Definition:* Refers to the ability to retain the same phone number when switching from one type of telecommunications service provider to another.

### NVOD (Near Video on Demand)

Level: 2

*Definition:* Refers to video delivery systems that are not quite instantaneous or actual video-on-demand (VOD) systems. Near VOD systems are offered by cable, MMDS, DBS, and in some telephone video trials. These operations transmit pay-movie services at pre-set start times, typically every 15 minutes. (See also ***VOD***.)

### Nyquist Frequency

Level: 3

*Definition:* This is a fundamental principle applied in converting audio and video analog signals into digital form. Nyquist theorized that there is a minimum number or rate at which samples must be taken of an analog signal in order to convert the signal into digital form and still keep the integrity of the signal. According to the Nyquist theorem, the minimum sampling rate is twice the maximum frequency in the analog signal that is to be sampled. For example, the sampling rate used in digital CDs is 44.8 kHz, so the highest sound frequency that can be reproduced on a CD is 22 kHz. To sample an analog NTSC television picture signal so that no distortions occur, a sampling frequency of 13.5 MHz must be used.

# O

**Object**
Level: 2
*Definition:* A data structure (sometimes called a container) that conforms to specific templates, classes, and rules. For example, an HTML page may contain a video "object" accessed via a hot-link to initiate a streaming video file transfer. Generally, "objects" refer to different types of elements developers may incorporate into documents, databases, programs, or other software, especially pertaining to reusable software routines. (See also ***C++***, ***Mark-up Language***, and ***OOP***.)

**Object Linking and Embedding (See *OLE*.)**

**Object-Oriented Programming (See *OOP*.)**

**OC (Optical Carrier) Layer (See *Optical Carrier Layer*.)**

**OCR (See *Optical Character Recognition*.)**

**OC-3 (Optical Carrier, Level 3)**
Level: 3
*Definition:* Commonly used as a synonym for the 155-Mbps ATM protocol using fiber-optic networks (a fast transmission link to send data). (See also ***ATM*** and ***Fiber Optics***.)

**OC (Optical Carrier) Layer**
Level: 3
*Definition:* Carrier levels used in synchronous optical light-wave networks. (See also ***SONET***.)

**OCR (Optical Character Recognition)**
Level: 2
*Definition:* The process of scanning text documents (which are essentially "images" of text) with an electronic optical laser scanner device that is able to recognize text characters and convert them to digital format (machine-readable) for subsequent computer processing.

**ODBC (Open Database Connectivity)**
Level: 3
*Definition:* Refers to a database access standard designed to make it possible for users to access any data from any application, regardless of which database management system is handling the data. Using ODBC-compliant database management systems allows companies to integrate and combine information contained in many different types of databases. (See also ***Cross Platform*** and ***RDMS***.)

**ODC (On-Demand Computing)**
Level: 2
*Definition:* Also known as "utility computing," on-demand computing is based on the premise that available computer resources should match closely with the specific computing needs of an individual, group, or corporation at any given time. Not unlike the working model of an electrical utility that provides electrical power only when it is needed, on-demand computing is still in its infancy. Most experts agree that large-scale on-demand computing will be difficult to achieve without improved standards, a viable business model, and a reorientation of most information technology services. One of the ultimate advantages of large-scale on-demand computing could be the ability to forego multiyear, multimillion-dollar deployments of systems management products in favor of more efficient, "just-in-time" services. (See also ***Application Service Provider*** and ***Grid Computing***.)

**OEB (See *Open eBook Standard*.)**

**OEM (Original Equipment Manufacturer)**
Level: 1
*Definition:* Any company that is the original maker or manufacturer of a particular equipment

product that is later licensed to be manufactured and marketed by others. In computer retailing, companies will often package video monitors, keyboards, or other equipment manufactured by others along with their CPU hardware equipment. The PC packager or vendor will often put its own logo on this equipment, although they are not the OEM.

### Off-line

Level: 2

*Definition:* Refers to computing or terminal equipment that is not connected to a computer system or network. For microcomputers, off-line can refer to processing that occurs while not connected to the network system. The term *off-line* can also be used to describe an editing technique whereby a finished product cannot be obtained. The advantage of off-line editing is to give the client a quick-and-dirty version of a possible finished product without requiring a large time commitment (which equals money). Digital editing technologies are making off-line editing an obsolete practice because multiple versions can be constructed instantaneously from an original "finished" product.

*Used in a sentence:* "It is often considered impolite these days to neglect to tell others that you will be off-line for an extended period of time."



### Ohm's Law

Level: 3

*Definition:* An established law of physics expressing the relationship among voltage (E), current (I), and resistance (R), where $E = I \times R$. Voltage is expressed in volts, current is expressed in amps (amperes), and resistance is expressed in ohms.

### OLE (Object Linking and Embedding)

Level: 3

*Definition:* Known as "document component technology," OLE was developed by Microsoft to allow separate elements of a document ("objects" such as text, images, sounds, spreadsheets, and so on) to be built by separate programs but then recombined into a single document. Each object can still be edited by its source program (usually by just double clicking on the object), and changes are reflected in the master document. For example, a user could create a spreadsheet in Microsoft Excel and then copy that spreadsheet into Microsoft Word. The user, while in Word, can double click on the embedded spreadsheet and make changes without ever leaving the word processor. If the spreadsheet is updated in Excel, the information contained within the Word document is automatically updated. (See also ***Object***.)

### On Demand

Level: 1

*Definition:* A term referring to the instant retrieval for viewing, listening, or reading of audio, video, or data content for the convenience of consumer users. Video on demand (VOD) has been launched by almost all of the major cable television providers. (See also ***Interactive Television***, ***NVOD***, and ***VOD***.)

### On-Demand Computing (See *ODC*.)

### Online

Level: 1

*Definition:* Generally refers to being connected to the Internet, but the term can also refer to being part of a program chain (such as with online editing as opposed to off-line editing). (See also ***Internet***, ***Off-line***, ***Web***, and ***Web Site***.)

### Online Forum

Level: 2

*Definition:* A virtual site for conducting asynchronous online discussions. A forum is a discussion site or space where Internet users can log in to read and send messages to members within the group. The posted discussion messages are available for all members of the group to read and respond to at their convenience. (See also ***Computer-mediated Communication***, ***Newsgroup***, and ***Usenet***.)

### On-the-fly Page

Level: 2

*Definition:* HTML pages built dynamically (or "on the fly") from a database with user-provided parameters (e.g., a weather page for a given

local city). On-the-fly web pages are created at the request of a user, using pre-programmed criteria. Once the information has been received from the user, software running on the web server builds a customized web page or graphic at the time of request with the latest or appropriate information. (See also ***Active Server Pages***, ***ColdFusion***, ***Common Gateway Interface***, and ***PHP***.)

### OOP (Object-Oriented Programming)

Level: 3

*Definition:* In computer software development, OOP is a structured methodology for creating software applications or tools that relies on taking objects (i.e., reusable segments of software) from previously developed programs and recombining them in ways to create new finished software products. (See also ***Object***.)

### Open Architecture

Level: 3

*Definition:* Refers to computer, telecommunications, or other communications network systems designed with little if any restrictions on the types of inputs, equipment, or software interfaces that can be used with the system. Open architecture systems are nonproprietary although they may involve licensing patented technology to allow competitive products, or compatible software or hardware to be developed. (See also ***Open System*** and ***OSI***.)

### Open Database Connectivity (See *ODBC*.)

### Open eBook Standard (OEB)

Level: 2

*Definition:* Designed to make it possible for electronic publishers to create a single instance of an electronic text that can then be reused in a number of contexts, OEB is a standard for formatting and packaging electronic books that is based on Extensible Markup Language (XML). OEB defines both how text should be marked up for electronic publication and how the different parts of an eBook (such as the cover, table of contents, body text, notes, index, and so on) should be handled together. The Open eBook Forum (*http://www.openebook.org*) is facilitating further developments of the standard. (See also ***Information Appliance***, ***Palm-top Computing***, and ***XML***.)

### OpenGL

Level: 2

*Definition:* An industry-wide standard for developing portable 3D graphics applications developed by Silicon Graphics. First introduced in 1992, OpenGL is a popular platform for producing modeling and simulation environments, computer games, computer-assisted drawing applications, virtual reality tools, data analysis, and geographic mapping applications.

### Open Relay

Level: 2

*Definition:* Refers to an e-mail server (usually running SMTP) configured to process e-mail that does not originate from or go to one of its own users. Open relay servers were once commonplace but are now in decline because they make very attractive vehicles for spammers to send massive amounts of difficult-to-trace e-mails. (See also ***E-mail***, ***Mail Relay***, ***SMTP***, and ***Spam***.)

### Open Source

Level: 2

*Definition:* A method and philosophy for software development, licensing, and distribution. The approach is designed to encourage the use and improvement of software written by volunteers in that anyone can copy the source code, modify it freely, and in many cases sell it. Suggested changes, if approved by a specific open-source community, can be incorporated in the working version of the open-source product. One of the best large-scale examples of an open-source development project is Linux. (See also ***General Public License***, ***Linux***, and ***Mozilla***.)

### Open System

Level: 3

*Definition:* An electronic communications, computer, or telecom system standard where the technical specifications are readily available to equipment manufacturers, program developers, content providers, or others. Open systems enable

third-party vendors to incorporate the standard into their products or systems to make them compatible with a wide array of existing systems, equipment, or devices, or future upgrades of these products. (See also ***Open Architecture*** and ***OSI***.)

**Open System Architecture (See *OSA*.)**

**Open Systems Interconnection (OSI) Model (See *OSI Model*.)**

**Opera**
Level: 1
*Definition:* A free, fast, reliable, full-featured web browser (for both desktop and mobile devices) and e-mail client, Opera was first released by Norwegian company Telenor in 1994. With the recent upsurge of security problems in the Microsoft suite of web products, browsers such as Opera and Firefox have been seen by many as viable alternatives. Opera is available for almost all types of operating systems, and a new version includes voice control and can read highlighted text. (See also ***Browser***, ***Firefox***, and ***Internet Explorer***.)



**Operating System (OS)**
Level: 1
*Definition:* The underlying software system that manages internal computer functions and processes. Computer operating systems, along with basic CPU design, determine which software applications can be processed on the system. (See also ***DOS***, ***Linux***, ***OSX***, ***UNIX***, and ***Windows***.)

**Operating System 2 (See *OS/2*.)**

**Optical Carrier (OC) Layer (See *OC Layer*.)**

**Optical Carrier, Level 3 (See *OC-3*.)**

**Optical Character Recognition (See *OCR*.)**

**Opt-in E-mail**
Level: 1
*Definition:* Refers to e-mail communications (usually promotional) for which the user has given permission to receive. Opt-in opportunities often occur when registering a software product, visiting a web site, signing up for a new service, or joining an online community. Although opt-in strategies have been designed to combat the growing trend of unsolicited commercial e-mail (spam), many users are distrustful of ending up on an e-mail list other than the one upon which they have agreed.

*Used in a sentence:* "I prefer to deal with e-mail marketers that allow for opt-in e-mail so that my clients can receive information about exactly what they want and aren't automatically bombarded with a bunch of online advertising." (See also ***Opt-out E-mail*** and ***Spam***.)

**Opt-out E-mail**
Level: 1
*Definition:* Refers to the opportunity to unsubscribe oneself, usually by clicking on a specified link or filling out an online form, from an e-mail mailing list. Although many online communicators and marketers strive to make it possible for users to remove themselves from unwanted lists, many make it difficult to impossible to halt the sending of future unwanted e-mails from unscrupulous spammers.

*Used in a sentence:* "I don't really like opt-out e-mail because I automatically get signed up to receive all kinds of stuff that doesn't interest me, and it requires me to go to a company's web site and specifically indicate that I no longer wish to receive such e-mail." (See also ***Opt-in E-mail*** and ***Spam***.)

**Original Equipment Manufacturer (See *OEM*.)**

**OS (See *Operating System*.)**

**OSA (Open System Architecture) (See *Open Architecture*.)**

**Oscillator**
Level: 3
*Definition:* An electric device used to create or generate a single radio frequency (RF) signal.

### OSI (Open Systems Interconnection) Model

Level: 3

*Definition:* The International Standards Organization's OSI model is one of the means by which systems can become connected and interoperable. This is made possible by dividing the information infrastructure into seven architectural layers. Standards are developed for each hierarchical layer. The objective of the OSI model is to enable developers to build products for any given layer without worrying about how these products relate to the other layers. For example, an "application" could be a video-on-demand service, or it could be a word processor. The other layers (such as presentation, session, and transport) refer to technical operations. As one moves through the hierarchy, the layers above and below can be ignored from the developer's perspective. Use of the OSI standard means that a developer of an application such as a video-on-demand service does not have to care what type of transport system is used. Likewise, programmers writing a word-processing program do not have to worry about what types of monitors their customers will be using. In the OSI model, also referred to as the "seven-layer model," each layer represents a different class of responsibilities for proper communication within, and between, digital-computer/telecommunications-transmission networks. (See Table O–1.)

### OS/2 (Operating System 2)

Level: 2

*Definition:* A multitasking operating system developed by IBM and Microsoft for use with IBM PCs, specifically the PS/2 model. OS/2 was a competitor to the more widely deployed UNIX multitasking operating system originally developed by AT&T. After 1990, the Microsoft/IBM partnership fell apart, with IBM assuming control over OS/2 projects. However, since the mid 1990s OS/2 has not been able to effectively compete with Microsoft's Windows operating systems.

### Out-of-band Signaling

Level: 3

*Definition:* Refers to use in communications networks where the signaling information is physically or virtually put on a separate channel from the main channel carrying customer information. Out-of-band signaling is used for transmitting network control signals such as for call setup and monitoring, and can be accomplished in two ways. One is by using an exclusively reserved portion of the main channel bandwidth and the other is to use an entirely separate network or line. (See also ***SS7***.)

### Overlay

Level: 3

*Definition:* A computer software technique for reusing portions of system RAM memory by replacing an existing set of instructions not currently needed for system controls or software functions with new instructions. This technique allows programs to work using less system memory. Another overlay example is the first version of Windows, which ran "on top of" the underlying DOS operating system. Once the "front end" or overlay was installed, keyboard keys took on different functions, although these systems



**TABLE O–1** Open Systems Interconnection (OSI) model.

| Layer | Example |
|---|---|
| *Application* | Images displayed on computer screens |
| *Presentation* | Responsible for encryption and compression of information |
| *Session* | Provides the communication dialog rules for telecom lines set up by the *Transport* layer |
| *Transport* | Manages the delivery of information on both ends of the network |
| *Network* | Deals with data transfer and routing of information within and between networks |
| *Data Link* | Concerned with operation of communication lines |
| *Physical* | The part of the system dealing with transmissions over a physical medium |

fundamentally still ran on the DOS operating system. (See also ***RAM***.)

**Overload**

Level: 2

*Definition:* Any situation where a system, channel, circuit, or even individual person is inundated with too much to handle, be it electrical power, current, transmitted signal data, or information. System overloads produce power surges, unacceptable error rate, system delays, traffic gridlock, and systemic breakdowns. Protection techniques for regulating system flow and smoothing out damaging surges, error conditions, and breakdowns are integral parts of an efficient system design.

**Overscan**

Level: 2

*Definition:* In an effort to prevent blank space from being visible on the outside edges of a CRT monitor, overscan is used to fill the screen with more display information than it can handle. This prevents blank space from showing on a cathode ray tube monitor, such as a regular TV set. Monitors and cameras used for video production are set to display the overscan area so that producers and directors can see what will eventually be just off screen. LCD monitors do not have an overscan area because they do not use the same scan technology. Computer monitors usually have a black border around the displayed image, which is called "underscan."

# P

### PABX (Private Automatic Branch Exchange)
Level: 3
*Definition:* Another name for a private telephone switching system (PBX system). (See also ***PBX***.)

### Packet
Level: 2
*Definition:* Digital telecommunications term for a cluster of binary information. Packetized data is used in various networking transmission techniques where digital information is divided into small segments to increase transmission rates and system efficiency. (See also ***TCP/IP***.)

### Packet-Switched Public Data Network (See *PSPDN*.)

### Packet Switching
Level: 3
*Definition:* An effective, efficient method of transmitting digital data through a computer network where digital information is packetized or broken into small clusters with each packet including the addresses of where it originated and where it is being sent. Packet-switched networks transmit individual packets of information by many different routes over the network. Once all of the packets are received at the destination, the data is digitally reassembled for delivery to an end user. Packet switching is the method used to transmit data on the Internet. See also ***Internet***, ***TCP/IP***, and ***VoIP***.)

### Page Hypertext Pre-Processor (See *PHP*.)

### PageRank
Level: 1
*Definition:* An important part of Google's strategy for providing highly relevant search results, PageRank is Google's system for measuring the importance of web pages based on which other web pages link to them. In other words, PageRank relies on the vast link structure of the Web as an indicator of an individual page's value. So, when the web master of one page links to another web master's page, he/she is essentially voting for some recognition of that site's importance. Google's software also analyzes the page that casts the vote, so that pages deemed more "important" carry more weight when they link to other pages. Google factors in the level of importance of sites that come up in search results and ranks those highest in the search list. (See also ***Google***, ***Link Farming***, and ***Search Engine***.)

### Paging
Level: 2
*Definition:* Refers to the wireless communication paging/messaging market for delivering messages and other digital information to mobile users via dedicated hardware. Wireless one-way paging networks can deliver numeric messages entered from a telephone keypad and delivered using various beeper, vibrating, or signaling techniques. Options include sending coded fixed messages such as "call home" or "call school." Alphanumeric paging enables users to receive messages from computers equipped with a modem and special paging software. Messages can be delivered to PCs, PDAs, laptops, or other wireless portable equipment or devices. Newer alphanumeric pagers can deliver up to three lines of text messaging capacity. With the rapid rise in mobile telephone use, the use of paging has declined. Paging is still used by many emergency response units, and paging is still used in locations where mobile telephone technologies do

not work, including buildings such as hospitals located where cellular signals are unable to reach.

### PAL (Phase-Alternating Line)

Level: 2

*Definition:* PAL is the dominant European standard for broadcast television transmission. The standard is incompatible with the NTSC television format. The field frequency is lower than NTSC in that screen images are refreshed at a rate of 50 Hz rather than 60 Hz. PAL signals contain 625 scan lines compared to only 525 in NTSC. Another advantage is that PAL is less prone to phase shifts in color as a result of reversing the (R-Y, red luminance) signal for every other scan line. PAL television signals also have greater bandwidth per channel, having 8 MHz rather than the 6 MHz standard for NTSC channels. Video television programs recorded using the NTSC-M standard are often transcoded to PAL-M for distribution to Brazil. (See also ***NTSC***.)

### PAM (Pulse Amplitude Modulation)

Level: 3

*Definition:* A type of signal modulation technique used in digital communications where a voice signal is digitally encoded using discrete samplings of the amplitude of the signal. The sampling rate adheres to the Nyquist theorem to determine how many digital samples per second are required to reconstruct faithfully the signal at the receiving end. (See also ***Nyquist Sampling***.)



### Pan and Scan

Level: 2

*Definition:* Refers to the process of adapting cinematic content for display on a standard television screen. Because the aspect ratio of a movie screen and a standard television are different, it is necessary to pick and choose the portion of the movie screen that is to be visible when the film is to be on television. This process results in the commonly seen message that preceeds televised movies or video cassettes: "This film has been modified from its original version. It has been formatted to fit your TV." (See also ***Anamorphic DVD*** and ***Letterbox***.)

### Parallel Port

Level: 2

*Definition:* A multi-wire connection receptacle or interface generally used to connect a computer and various peripheral devices such as a laser printer. Data information sent over an 8-bit parallel port would be transmitted to/from the peripheral device in 8-bit increments, which is in contrast to a serial port (which transmits only 1 bit at a time). Parallel ports have been almost completely replaced by USB. (See also ***USB***.)

### Parallel Processing

Level: 3

*Definition:* Refers to the increase of computing capacity through the use of multiple processors within the computer system. Massive parallel processing systems use large numbers of internal processors (thousands) operating at the same time. For parallel processing to work most effectively, it must use software that is specially designed for the task. Operations must be effectively divided up and coordinated to increase processing efficiency.

### Parity Bit

Level: 3

*Definition:* A parity bit is an extra digital bit added at the end of a small 7- or 8-bit grouping as a way of checking the integrity of the digital transmission. Often a parity bit is added to make the bit group either odd or even, depending on the parity method used. At the receiving end, if the total number of bits received is not odd (in an odd parity scheme) the receiver knows a transmission error has occurred. Parity checking information is normally part of an error detection-correction data system where few errors are expected or tolerated due to the sensitivity of the data being transmitted.

### Password

Level: 1

*Definition:* Refers to a unique set of alphanumeric characters (often 6 to 10 characters) used in conjunction with a unique ID code to gain access as a subscriber to a computer account or

to a secure portion of an Internet web site. (See also ***Authentication*** and ***Pass Phrase***.)

**Patch Panel**
Level: 2
*Definition:* Common in video and data systems, a patch panel is a control system where all input and output connections are physically converged or centralized.

**Path**
Level: 2
*Definition:* Usually refers to the location of a computer file on a local computer or on a network server and includes information about the file name, the location of the folder, the location of the disk drive, and the location of the computer (if on a network). For example, a path that reads *LAB16\C:\My Documents\NAB\Tech Terms\draft.doc* refers to a document called *draft.doc* stored in a folder named *Tech Terms* stored in a folder called *My Documents* located on the *C:* drive of a computer called *LAB16*. The term is also used to refer to a signal route through a system or piece of equipment.

**Pathfinding**
Level: 3
*Definition:* Refers to control of a system of interconnected video and/or audio routing switchers, where it may be necessary to automatically establish different routes through the matrices for different system configurations, such as for up or down format conversions.

**Payload**
Level: 2
*Definition:* (1) In a telecommunications system, this refers to the information being transmitted. When data is transmitted, it is placed into frames with a header attached to help direct the information through the network. The payload is the part of the frame that is the actual desired information. (2) In satellite communication markets, the cargo (e.g., spacecraft or satellite) carried by a rocket launched into space is the system payload.

**PayPal**
Level: 1
*Definition:* Founded in 1998, Paypal is an online payment service that allows users to forgo the need to submit credit card information or send checks in order to purchase goods and services online. Particularly popular with online auction customers, Paypal was purchased by Ebay in 2002. Paypal also processes electronic payments for a variety of online vendors and corporate users.

**Pay Per View (See *PPV*.)**

**PBX (Private Branch Exchange)**
Level: 3
*Definition:* A privately owned digital telephone switch located at a business customer's premises. PBXs store information about each line, including where it is routed and the types of additional services available to the line (e.g., call waiting, voice mail). A PBX is also the device that communicates with the local telephone company and other PBXs to establish connectivity between active telephones. Every piece of information stored in a PBX is programmed through a system access terminal (SAT), which acts as a server to the PBX. Most modern PBXs support VoIP. (See also ***PABX*** and ***VoIP***.)

**PC (Personal Computer)**
Level: 1
*Definition:* Generally refers to computers used at home or at work that are standalone units that may or may not be connected to a computer network. More generically, the term *PC* has come to refer to computers once called IBM-compatible computers, meaning that they operated using IBM's original Intel-chip-based disk operating system (DOS). The "other" class of personal computers is Apple's Macintosh system, which contains a completely different operating system. Macs are not PCs. (See also ***Macintosh*** and ***Microcomputer***.)

**PCM (Pulse Code Modulation)**
Level: 3
*Definition:* A type of digital modulating technique used in encoding data onto a signal carrier.

In PCM systems, individual digital samples are assigned a numerical value, which is converted to a binary code that represents the amplitude level of the sample. The codes are sent to a receiving location one bit at a time. A variant is differential pulse code modulation (DPCM), which operates in a similar way except that only the difference in the values between two adjacent samples is encoded and sent instead of having to send the absolute value of each sample. DPCM is more efficient by saving some time in transmission. (See also ***PAM***.)

### PCMCIA (Personal Computer Memory Card International Association)

Level: 2

*Definition:* Professional association responsible for setting technical standards for the small add-in memory and modem cards used most often with laptop computers and other portable wireless devices. PCMCIA cards can be used for expanded capabilities such as cellular modems, flash memory cards, USB ports, and additional memory.

### PCS (Personal Communications Service)

Level: 3

*Definition:* Any of several types of digital wireless, voice, and/or data communications systems that operate in the 1,900-MHz range in North America and the 900-MHz range in Europe. PCS licenses are most often used to provide services similar to advanced cellular mobile or paging services. Some "world phones" are designed to handle both the North American and the European frequencies. PCS includes such digital cellular technologies as GSM 1900, CDMA, and TDMA IS-136 and is considered a "second-generation" wireless technology. (See also ***CDMA***, ***GSM***, ***TDMA***, and ***3G***.)

### PDA (Personal Digital Assistant)

Level: 2

*Definition:* A prominent but fading class of small wireless communicators and other devices ranging from palm-top computers and electronic organizers to wireless Internet appliances. PDAs are often used to manage task loads and personal productivity functions. Included are storage of contact address lists and phone numbers, performing calculator functions, establishing Internet connections via a wireless modem for retrieval of e-mail, and web browsing. Whereas PDA sales are slipping, multifunction "smart phone" sales are dramatically increasing. (See Figure P–1 and see also ***Handheld***, ***Information Appliance***, ***Internet Appliance***, and ***Smart Phone***.)


**FIGURE P–1.** PDA.

### PDF (See Portable Document Format.)

### PEAP (Protected Extensible Authentication Protocol)

Level: 3

*Definition:* A protocol developed jointly by Microsoft, RSA Security, and Cisco for creating a "secure tunnel" through which encrypted authentication information (such as passwords) can be sent, allowing appropriate users access to the wireless network but making it more difficult for unwanted users to gain unauthorized access. One of the most vulnerable aspects of a wireless network is the ease with which unwanted users can gain access because the authentication system is weak (or nonexistent). PEAP is designed to make the authentication process as secure as possible. For PEAP to work, the client computer must

obtain a digital certificate from the designated server. Once the certificate is obtained, the secure connection can be established. (See also ***Authentication***, ***Digital Certificate***, and ***Wireless LAN***.)

### Peer-to-Peer (P2P)

Level: 2

*Definition:* Often abbreviated as P2P, peer-to-peer computing has revolutionized the ways in which millions of people around the world use their personal computers. Differing from a client/server architecture, where one computer is dedicated to serving others (server) and the other computers largely make network requests (clients), a true peer-to-peer system grants all computers on the network an equal measure of both server and client capabilities. P2P networks are most commonly used for file sharing of all types by making portions of P2P systems' hard drives available to everyone else on the network. P2P networking has revolutionized the ways many people use the Internet, encouraging millions of users to access other's systems and opening up their own systems to access by others. Most P2P systems provide the ability to restrict which parts of a user's hard drive others can access. However, P2P systems have become notorious for spreading viruses and illegal and copyrighted content. Some P2P systems get slower as more and more users connect with them. However, newer systems are designed to take advantage of multiple simultaneous connections or unused bandwidth to increase performance. (See also ***BitTorrent***, ***File Sharing***, ***Grid Computing***, ***Gnutella***, and ***Kazaa***.)

### PEL (Picture Element) (See *Pixel*.)

### Perigee

Level: 3

*Definition:* In satellite communications, the point in an elliptical orbit closest to the center of the earth and when the satellite is at its fastest speed in the orbit. (See also ***Elliptical Orbit***.)

### Peripheral

Level: 2

*Definition:* Any computer-system-related equipment that is not actually contained within a computer but is connected to the system via cabling or other connection devices to provide auxiliary services. Peripheral equipment includes printers, external hard drives, audio speakers, scanners, or a desktop video camera for video conferencing.

### PERL (Practical Extraction and Report Language)

Level: 3

*Definition:* An open-source programming language originally developed for UNIX systems, Perl is now one of the most common languages for writing common gateway interface (CGI) programs. Perl has powerful text-manipulation functions and combines features and purposes of many different command languages. Perl has served as a workhorse language for programming World Wide Web electronic forms and generally as an effective tool for orchestrating the interactions among systems, databases, and users. (See also ***Common Gateway Interface***, ***E-commerce***, and ***Open Source***.)

### Permanent Virtual Circuit (See *PVC*.)

### Personal Communication Service (See *PCS*.)

### Personal Computer (See *PC*.)

### Personal Computer Memory Card International Association (See *PCMCIA*.)

### Personal Digital Assistant (See *PDA*.)

### Personal Identification Number (See *PIN*.)

### Personal Video Recorder (PVR) (See *DVR*.)

### Pervasive Computing

Level: 1

*Definition:* Sometimes referred to as "ubiquitous computing," pervasive computing is a somewhat utopian concept that predicts the proliferation of computing devices (especially wireless) in everything from clothing to furniture to construction materials to food products and beyond. The goal

of pervasive computing is to unobtrusively connect as much as possible in as many places as possible and to make those connections available to as many people as possible. As advances are made in micro-electronics, miniaturization, interfaces, and wireless technologies, embedded and mobile systems are indeed already proliferating with no end in sight. Critics of pervasive computing point out that the benefits of super connectivity also create new vulnerabilities and complexities. (See also ***Smart Home***.)

### P-frame

Level: 3

*Definition:* Short for "predicted frame," a p-frame is one of the approaches used by MPEG compression to reduce the data size of motion video. The least efficient way to digitize a video signal is to digitize every pixel on every frame over and over again (called "uncompressed"). MPEG compression analyzes the video signal and looks for patterns that can help it reduce the overall file size. As MPEG examines the video frame by frame it chooses when to digitize the entire frame (called an "intraframe") and when to digitize only the information that has changed since the previous frame (called the "predicted frame"). For example, if a scene is filmed at night and most of the background is black and a character is running across a field, the digital information about where that background is black will carry over from frame to frame but the pixels portraying the movement of the character will have to be redrawn on every frame. MPEG also uses something called a "bidirectional frame" (B-frame), which examines both the frame before it and the frame after it to determine what to change in the existing frame. (See also ***Compression*** and ***MPEG***.)

### Pharming

Level: 2

*Definition:* Also called "domain spoofing," pharming is a technique employed to reroute traffic on the Internet and trick users into thinking that they are entering private information into a trusted site when they are actually being redirected to another (untrusted) site. For example, pharming has become popular in attempts to get users to provide sensitive banking information, such as log-ins, passwords, account numbers, and so on. Criminals conduct a pharming scam by "poisoning" a local DNS server through changing the server address that is mapped to a particular domain name. For example, such an attack might involve changing the DNS listing for a legitimate banking web site that is hosted in the United States to a fraudulent one that is located somewhere else in the world. While the user types in the web address as usual, the corrupted DNS listing connects the unsuspecting user to the legitimate-looking fraudulent site, which can then capture all of the information entered by the user. (See also ***DNS*** and ***Phishing***.)

### Phase-Alternating Line (See *PAL*.)

### Phased Array

Level: 3

*Definition:* A type of RF electronics transmission technology that operates over a range of different spectrum frequencies simultaneously to diminish or eliminate signal interference. System antennas (such as onboard a satellite) remain relatively fixed in place, but can be electronically steered to receive or transmit in a variety of directions. Phased-array antennas are key technical components in the new mobile satellite systems being launched, which will enable narrowband phone transmissions from subscribers using small handheld transmitters similar to existing mobile cell phones.

### Phase Modulation (See *PM*.)

### Phase-Shift Keying (See *PSK*.)

### Phishing

Level: 2

*Definition:* Rising at an alarming rate, phishing attacks involve attempts to use e-mail to trick users into revealing vital personal information. Phishing usually involves the use of fake e-mail addresses and fraudulent web sites designed to fool recipients into divulging personal financial data such as credit card numbers, account user names and passwords, Social Security numbers,

and so on. For example, a user might receive an e-mail from a credit card company indicating that a "suspicious" charge has been noted by their security division. The e-mail might then provide a link to a web site (with an official-looking URL) and instruct them to click on the link and log in using their account number and password or Social Security number. They can then take that information and perpetrate any number of crimes, including identity theft, monetary theft, impersonation, and so on. As a general rule, no legitimate commercial or governmental entity ever asks for any personal information via e-mail. (See also ***Pharming*** and ***Social Engineering***.)

### PhotoCD
Level: 2
*Definition:* A standard developed by Kodak for storing digital photographic images on CD-ROM for later use on a computer web site, or to send as an attachment to an e-mail.

### Photodetector
Level: 3
*Definition:* A receiver used in optical fiber systems that changes light-wave pulses into electronic signals. There are different types of photodetectors used in various optical communication systems. (See also ***APD*** and ***PIN Diode***.)

### Photonics
Level: 3
*Definition:* A technology based on interactions between electrons and photons that uses light particles (photons) to transmit data over glass filaments in fiber lines.

### PHP (Hypertext Pre-Processor)
Level: 2
*Definition:* PHP is an open-source server-side scripting language used to allow web pages to interact with databases to create dynamic content. PHP scripts, or commands, are embedded in the web page's HTML code and are executed on the web server to generate dynamic HTML pages (e.g., search results from a database). Because PHP is executed on the server side before the page is displayed to the user, the PHP commands are invisible and therefore cannot be viewed or copied. An HTML page containing PHP script is typically given a file name suffix of *.php*, *.php4*, or *.phtml*. PHP is increasing in popularity because it is free, fast, and compatible with many database platforms. (See also ***ASP***, ***Client/Server***, ***ColdFusion***, ***JSP***, and ***Web Application***.)

### Physical Layer
Level: 3
*Definition:* Refers to the first layer in the Open System Interconnection model. (See also ***OSI***.)

### PICT (Picture Format File)
Level: 2
*Definition:* Primarily a Macintosh computing format, PICT is a type of picture or graphics compression file format used in transferring pictures from one application program to another. PICT works well for black-and-white pictures and pictures with large areas containing a single color. PICT is a low-resolution format generally used for viewing on a computer monitor only and is rarely suitable for print.

### Picture Element (PEL) (See *Pixel*.)

### Picture (PICT) File Format (See *PICT*.)

### Picture-In-Picture (See *PIP*.)

### PIN (Personal Identification Number)
Level: 1
*Definition:* Refers to a password (a minimal level of security) required to authenticate users or customers when attempting to access automated teller machines, computer networks, or secure web sites. (See also ***Authentication*** and ***Password***.)

### Pincushioning
Level: 2
*Definition:* A type of CRT video display distortion seen on computer monitors or television sets in which the outer edges of the picture appear to curve inward. This is the opposite of barreling distortion, where the edges appear to be bulging outward. Such distortions result from imperfections in the video scanning process in

the monitor equipment. (See also ***Barreling Distortion*** and ***CRT***.)

### PIN Diode (Positive Intrinsic Negative Diode)

Level: 2

*Definition:* A type of semiconductor device used at times as a light-wave detector in fiber-optic transmissions to receive optical signals and convert the optical light-wave signals into electrical signals. A PIN diode is also used in microwave transmission systems as a modulator and as a type of switching mechanism. PIN diodes are made up of intrinsic layers of untreated material sandwiched between positively and negatively treated layers.

### PIP (Picture In Picture)

Level: 1

*Definition:* Television set technology enabling viewers to see two or more different pictures or signals in the same screen. Typically one televised picture is displayed in a smaller size than the other.

### Pixel (Picture Element)

Level: 1

*Definition:* In video broadcast and production, and digital television and computer monitors, a pixel is the smallest unit on a color or monochrome picture screen. Pixels are actively turned on and off, or varied in intensity, to create a desired visual image or effect. Also called a pel, the numbers of pixels available in a display system are used to express the quality of visual resolution in both television sets and computer monitors. Higher picture resolution requires more pixels. (See also ***HDTV***.)

### PKI (Public-Key Infrastructure)

Level: 3

*Definition:* PKI is a set of policies, processes, and technologies used to administer certificates and public/private key pairs, including the ability to issue, maintain, and revoke public-key certificates. Because public-key cryptography relies on the existence of both a private and a public key, PKI must be used to manage the authenticity and the ownership of private keys. (See also ***Encryption*** and ***Public-key Cryptography***.)

### Plain-Old Telephone Service (See *POTS*.)

### Plain-Text File

Level: 1

*Definition:* Also referred to as ASCII text, a plain-text file is a computer file containing non-encoded text letters and numbers that have not been formatted in any way. Plain text is generally considered the universal format of computer information, meaning that the ability to read plain text is automatically built into every computer produced. For example, a Microsoft Word file contains formatting information and other encoding that alters the source text with extra instructions. If that Word file is saved as a plain-text file, all of the Word formatting is stripped out, leaving only the letters and numbers but also making it readable and usable by almost every text editor and word processor in existence. (See also ***ASCII***.)

### Plasma Display

Level: 2

*Definition:* The basic idea of a plasma display is to illuminate tiny colored fluorescent lights to form an image. The display consists of two transparent glass panels with a thin layer of pixels (which act like tiny light bulbs) sandwiched between. Each pixel is composed of one green, one red, and one blue gas-filled cell. Ionization of the gases (plasma) in the cells is facilitated through a grid of tiny electrodes that applies an electric current to the individual cells. The TV image is created when the plasma emits high-frequency UV rays, stimulating the cells' phosphors and causing them to glow. Just like a CRT television, the plasma display varies the intensities of the different lights to produce a full range of colors. (See also ***HDTV*** and ***LCD***.)

### Platform

Level: 2

*Definition:* In the converging mega-media, telecom, computer, and consumer electronics worlds, the term *platform* is used in many contexts.

Any distinct hardware system, software environment, or network architectural strategy can be a platform. In computer environments, a platform generally refers to the underlying operating system, which determines the basic operating protocol or language. Computers running on the same technical platform can easily share software packages, whereas incompatible platforms are now requiring middleware to manage basic protocol conversion differences.

*Used in a sentence:* "Our graphic artists were unwilling to switch to a PC platform because they felt that the PC hardware and software were ill-suited to their daily work." (See also ***Middleware*** and ***Operating System***.)

### Playback Head

Level: 2

*Definition:* The electronic converter device in a videocassette or audiotape system that reconfigures the magnetic tape information into video pictures or sound.

### Plotter

Level: 3

*Definition:* A device commonly used by engineers and architects (where precision is crucial) which uses one or more colored pens that can be raised, lowered, and moved over the printing medium (usually paper) to draw graphics or text. Plotters can produce smooth, continuous lines, whereas standard printers can only print dots very close together to simulate lines.

### Plug and Play

Level: 2

*Definition:* True plug and play refers to the general ability of users of a computer system to "plug" new devices into the computer and immediately "play" with them (meaning that they are automatically configured and activated without having to restart the computer). Microsoft's version of plug and play, which was introduced with Windows 95, was developed in the same spirit. However, it was also designed to initiate the installation of software drivers for devices that were not supported by the system by default.

### Plug-in

Level: 1

*Definition:* Sometimes called a "helper application," a plug-in is used to provide additional instructions to a parent application. For example, a web browser such as Internet Explorer or Mozilla Firefox commonly uses plug-ins to work with special files created in Flash, RealAudio, RealVideo, Acrobat, and others to display content created for those plug-ins. Whereas most browsers come with common plug-ins already installed, most other plug-ins can usually be downloaded for free. (See also ***Acrobat***, ***Browser***, ***Flash***, and ***Portable Document Format***.)

### PM (Phase Modulation)

Level: 3

*Definition:* A type of signal modulation process where the phase of a sine wave (carrier wave) is shifted in phase to represent a change in the value of the information so that a radio signal is able to carry information. (See also ***AM*** and ***FM***.)

### PNG (Portable Network Graphics)

Level: 2

*Definition:* Pronounced "ping," refers to a patent-free image format that is becoming more and more widely used to display graphics on the Web. PNG is widely considered a potential replacement for the widely popular GIF image format. PNG provides more color depth than GIF and supports alpha channel transparency and 48-bit colors. The most recent versions of most browsers support PNG. (See also ***GIF***.)

### Podcasting

Level: 2

*Definition:* Initially associated with Apple's iPod digital music player technology, "podcasting" has now come to refer generally to any software and hardware combination that permits the downloading and playing of files in user-defined time frames. Similar in concept to a DVR, podcasting is more specifically associated with subscription services where subscribers specify the exact programs they wish to record and that program is automatically recorded and transferred to their portable player (typically using RSS).

Podcasting enables content producers (both amateur and professional) to create syndicated "radio shows" to which users can subscribe using "podcatching" software (a type of content aggregator) that periodically checks for and downloads new content automatically. (See also ***DVR***, ***iPod***, and ***RSS***.)

### Point to Multipoint
Level: 2
*Definition:* Refers to any transmission mode distributed from one main source to many points within a broad geographic area. Broadcast audio and video as well as DBS satellite services are examples of point-to-multipoint services. (See also ***Point to Point***.)

### Point to Point
Level: 2
*Definition:* Refers to any transmission mode or delivery system that distributes a signal from one specific source to another specific receiving endpoint. Telephone calls are point-to-point communications.

### Point-to-Point Protocol (PPP)
Level: 3
*Definition:* A transmission standard for computing systems that enables delivery of Internet data in the standard TCP/IP format using a digital telephone modem. PPP is an updated version of the Serial Line Internet Protocol and is most commonly used to create dial-up connections to the Internet, although some broadband providers use it as well. (See also ***Internet***, ***SLIP***, and ***TCP/IP***.)

### Point of Presence (See *POP*.)

### Point-to-Point over Ethernet (See *PPPoE*.)

### Point-to-Point Protocol (See *PPP*.)

### Polarity
Level: 2
*Definition:* (1) Refers to the direction in which an electric current flows. Polarity is either positive or negative. (2) Polarity is also used to describe one relationship between light and dark areas in a television signal. Polarity is stated as black negative or black positive.

### Polarization
Level: 3
*Definition:* A technical characteristic of a wave when transmitted or radiated from an antenna. Polarization is used to describe a characteristic of terrestrial transmission antennas and satellite transponder antennas. Antennas can create signals that are best received with other antennas that have the same polarity vector. Typical designations are Horizontal, Vertical, and Circular (right and left). These designations are based on vector mathematics, but unless one is designing antennas the point is that the transmitting and receive antennas should always have the same polarity.

### Polar Orbit
Level: 2
*Definition:* A type of communications satellite orbit designed specifically to cover the polar regions of the earth as opposed to other orbits. (See Figure P–2 and see also ***Elliptical Orbit***.)

### POP (Point of Presence)
Level: 3
*Definition:* Refers to any location where a service provider has a physical connection point for local subscribers to attach to or dial into a network.

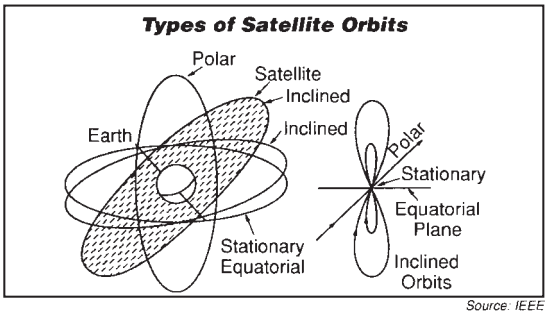



**FIGURE P–2.** Polar orbit.

**POPS (Populations)**
Level: 2
*Definition:* A wireless industry slag term used to convey the potential customer base in a given service area. Instead of saying potential "customers" or potential subscribers, many cellular companies describe the user base in terms of "POPS."

**Populations (See *POPS*.)**

**Pop-Under**
Level: 2
*Definition:* Usually describes a type of web-based advertising whereby a web page is accessed and an advertisement "pops" into a new window "under" the page currently being viewed. To see the pop-under window, the user must either close the window that prompted it or click directly on the pop-under window. (See also ***Pop-Up***.)

**Pop-Up**
Level: 1
*Definition:* The appearance of a new, usually smaller, browser window that is activated when a web page is loaded or when a user clicks on a link. Pop-ups are widely used by online advertisers and have come to be considered by many a nuisance. Most browsers (and many custom toolbars and security programs) allow users to specify that they want pop-ups to be blocked from appearing on any of the web pages they are accessing. (See also ***Pop-Under***.)

**Port**
Level: 2
*Definition:* In computer/electronic domains, a port is any interface or input connector point on a computer or other electronic communications device where peripheral or ancillary equipment can be linked or attached. A port is also the point of access into a network, computer, or other electronic device such as a plug or jack for attaching telecommunications connections or other peripheral equipment.

**Port Probe**
Level: 2
*Definition:* A technique used by hackers to find "open doors" in other people's systems, a port probe consists of a scan to determine if a particular computer has any open vulnerable ports that might be used for malicious purposes. Because a port on a computer is used as a means of communicating with other computers, ports are considered one of the most vulnerable aspects of a networked computer system. Hackers can run automated port probes that scan thousands and thousands of computers. Sometimes just knowing what port is open will tell someone what program is using it, making it much easier for the hacker to exploit any vulnerabilities. Most firewall systems alert users when their ports are being probed. Although a port probe in and of itself does not represent a breach of security, most ISPs prohibit using their systems to conduct activities such as port probes and should be notified whenever it can be determined that their servers are being used in such a manner. (See also ***Hacker***.)

**Port Replicator**
Level: 2
*Definition:* Similar in use to a docking station, a port replicator makes it easy for mobile computer users to connect peripheral devices such as a printer and a monitor to their laptop. For example, users who work in two different office locations could connect a printer, monitor, and an external hard drive to a port replicator in each location. Then, when they show up for work all they have to do is connect the port replicator to the back of their laptop. They are then instantly connected to all of their peripheral devices at once. Port replicators differ from a docking station because they do not usually provide as many expansion slots for additional devices. (See also ***Docking Station***.)

**Portable Document Format (PDF)**
Level: 1
*Definition:* The file format for Adobe Systems' Acrobat software, PDF presents documents in a manner that is independent of the original application software, hardware, and operating system used to create those documents. A PDF document can contain any combination of text, graphics, and images in a device-independent and resolution-independent format. These documents

can be one page or thousands of pages, and can be very simple or extremely complex (with a rich use of fonts, graphics, color, and images). PDF is a popular format for distributing precisely formatted text documents via the Internet. (See also ***Acrobat***, ***Cross Platform***, and ***Plug-in***.)

### Portable Media Center

Level: 1

*Definition:* Refers to a growing range of handheld portable media devices designed to play digital music files, listen to the radio, view digital images, play digital video (sometimes including recorded television), and in some cases receive over-the-air television broadcasts. Many systems are configured to run a version of Microsoft's Media Center Edition operating system designed specifically for mobile devices called Windows Mobile. Portable systems typically have a small LCD color monitor, a built-in hard drive (of at least 20 Gb), and appropriate software to handle a wide range of audio and video files.

### Portable Network Graphics (PNG) File Format (See *PNG file format.*)

### Positive Intrinsic Negative Diode (See *PIN.*)



### Post

Level: 1

*Definition:* To send a message by e-mail to one or more recipients or to post a message to a bulletin board to be received by anyone interested in that specific topic. An individual instance of a "post" is called a "posting."

*Used in a sentence:* "She was reluctant to post a response because she knew it would be difficult to explain her position to everyone involved." (See also ***Newsgroup*** and ***E-mail***.)

### Post House

Level: 2

*Definition:* A postproduction firm usually hired to edit already shot video or film footage into a finished product. The common video industry maxim "Fix it in post" comes into play because poorly shot film can be enhanced or altered with graphics, computer animation, color correction, editing, or many other post house techniques. (See also ***Postproduction***.)

### Postproduction

Level: 2

*Definition:* A term referring to the period in the production process after the film, video, or audio has been recorded but requires polishing, editing, and so on to create a finished product. (See also ***Post House***.)

### POTS (Plain-Old Telephone Service)

Level: 2

*Definition:* Standard residential telephone service providing regular dial-tone service.

### PPP (See Point-to-Point Protocol.)

### PPPoE (Point-to-Point Over Ethernet)

Level: 2

*Definition:* A protocol commonly used in apartment complexes, hotels, and small businesses that want to provide shared Internet access via a DSL line, cable modem, or wireless device, PPPoE includes the ability to track individual usage for billing purposes. (See also ***Cable Modem*** and ***DSL***.)

### PPV (Pay Per View)

Level: 2

*Definition:* A type of pay television service that charges for each programming event offered to cable DBS, MMDS, or other multichannel video subscriber. PPV services are usually made available in addressable pay-TV systems where individual customers can decide to order a specific event such as a boxing card or special music concert. PPV services are unlike other subscription services, which are provided under a flat monthly rate.

### Practical Extraction and Report Language (See *Perl.*)

### Pre-boot Execution Environment (See *PXE.*)

**Pre-production**
Level: 2
*Definition:* Refers to the background research, development, and setup time that occur prior to any actual recording of film, video, or audio material.

**Presence**
Level: 2
*Definition:* Generally refers to the ability to detect whether or not a user is signed in to a system and available for interaction (as in instant messaging). For example, on many UNIX systems it is possible to see who is logged in, what programs they are running on the server, and how long (if at all) their connection has been idle. In instant messaging contexts, "presence" indicates that an instant messaging user is actually signed in to a specific IM application and available for possible communication. Some vendors are experimenting with ways of using presence in VoIP communication as well.

*Used in a sentence:* "She established her presence by logging into her instant messaging application, making her available to everyone else who was logged in at that time." (See also ***Instant Messaging*** and ***VoIP***.)

**Presentation Layer (See *OSI*.)**

**PRI (Primary Rate Interface)**
Level: 3
*Definition:* A type of high-speed ISDN telecommunications service that provides 23 "bearer" channels, each transmitting at 64 kbps, and one separate data channel transmitting at 16 kbps. PRI systems have much more bandwidth availability than the ISDN basic-rate interface facilities. (See also ***BRI*** and ***ISDN***.)

**Primary Color**
Level: 2
*Definition:* In the strictest sense, a primary color is one that cannot be created by mixing other colors. It is the mixing of primary colors, either through addition or subtraction, that produces other colors. (See also ***CMYK***, ***Primary Color***, and ***RGB***.)

**Primary Rate Interface (See *PRI*.)**

**PRN (See *Pseudo-Random Noise*.)**

**Printer**
Level: 1
*Definition:* A computer peripheral device usually connected to a computer to create hard copies of text or graphics or other spreadsheet or database files. The quality of printers has increased dramatically from dot matrix printers, where text was inked onto a page with tiny dot-like markings. More common today are ink jet and laser printers that perform at much higher per-page rates with substantially higher image quality (including color).

**Private Network**
Level: 2
*Definition:* Refers to any type of voice or data network designed for inter-office, inter-organization, or generally not-for-the-public communications. Outside parties are not authorized to access the network, and setup and maintenance of the network is the responsibility of the individual company or organization. (See also ***Intranet***, ***LAN***, and ***Virtual Private Network***.)

**Privatization**
Level: 2
*Definition:* Refers to the shift of national industrial, communications, or other economic businesses from state-run control to the private sector by transferring public agencies or industries previously under the control of government authority and removing the protective structural supports by making the industry a fully commercial enterprise. De-nationalizing or deregulating an industry, business, or organization by making a transition from the public to the private sector makes the new business subject to competitive market forces. The privatizing of national industries may be accompanied by offering the public the opportunity to purchase shares in the new business or company via an initial public offering (IPO).

**Private Automatic Branch Exchange (See *PABX*.)**

**Private Branch Exchange (See *PBX*.)**

**PRN (Pseudo-Random Noise)**
Level: 3
*Definition:* A type of communications signal interference, or noise, which seems to follow no particular pattern and thus at first appears to be random. But the particular noise pattern eventually does repeat itself after a length of time and is therefore considered pseudo-random noise.

**Processor**
Level: 1
*Definition:* The central intelligence of a computer dedicated to handling information. The central processor is responsible for reading and writing data and instructions. It contains the control unit, the arithmetic and logic unit, as well as the clock responsible for timing functions within the computer. Interrupt signals are sent to the processor to allow initiation of tasks or functions. (See also ***CPU***.)

**Product Activation**
Level: 2
*Definition:* In general terms, product activation usually involves the submission of a serial number or activation number for software that has been downloaded from the Internet or installed from a CD. Product activation also refers to a technology created by Microsoft to prevent "casual copying" and "softlifting" of Microsoft software (specifically Windows XP and, in the future, other Microsoft products). For Microsoft, product activation involves several dimensions, including the requirement of inputting an Installation ID consisting of two different pieces of information: the product ID and a hardware hash (a numeric value based on information gathered from the computer system derived through a mathematical formula). The product ID is unique to each installation of Windows and is created from the product key used during installation. The product ID can be found by viewing the Properties of My Computer (e.g., 55274-OEM-0011903-00102). The hardware hash is an 8-byte value created by running 10 different pieces of information from the PC's hardware components through a one-way mathematical transformation, meaning that the resultant hash value cannot be backward calculated to determine the original values (thus compromising the user's privacy). Microsoft's product activation technology also runs every time a computer is started up, double checking to make sure the version of XP running on that particular computer is licensed for that particular computer. (See also ***Piracy***.)

**Program**
Level: 1
*Definition:* Programs exist in both analog and digital forms. An example of an analog program is a television show. An example of a digital program is a set of instructions given to the CPU of a computer or an automated telephone system to perform certain tasks or functions. Whether in analog or digital form, programs can be stored on magnetic devices such as tape or discs, or in the case of audio or video programs can be converted to digital and stored for archiving, later editing, or reused as clips or materials in other programs, among other applications. (See also ***Software***.)

**Program and System Information Protocol (See *PSIP*.)**

**Programmable Read-Only Memory (See *PROM*.)**

**Progressive Scanning**
Level: 3
*Definition:* A type of video scanning most commonly associated with computer monitors but now increasingly used in HDTV monitors. With progressive scanning an entire frame of video information is displayed by progressively sweeping a beam across every video line from top to bottom. Progressive scanning is used by some HDTV systems, offering higher picture quality and fewer interlace artifacts as 720 or 1,080 horizontal lines are scanned progressively or in succession in a vertical frame repeated many times a second. For example, 720p/60 is the most-used HDTV progressive format, using 720 lines of vertical resolution scanning at 60 frames per second. (See also ***HDTV*** and ***Interlace Scanning***.)

### PROM (Programmable Read-Only Memory)

Level: 3

*Definition:* A type of computer memory storage that can be programmed only by special routines. Once programmed with permanent data, it becomes a read-only (ROM) memory device. PROM allows changes to be made without having to create or install new read-only memory (ROM) capacity. PROM allows for some reprogramming but differs from RAM in that it retains the installed information while RAM is erased when the system is shut off. (See also ***RAM*** and ***ROM***.)

### Propagation

Level: 3

*Definition:* To disseminate or spread electromagnetic signals over or through a medium. For example, radio waves are propagated over the air and can be propagated through water. The nonionizing radiation of signal waves outward from an antenna is referred to as propagation. Theoretically, radio energy radiates out from an antenna uniformly in all directions, forming an omnidirectional coverage pattern. In practice, however, refraction (bending), reflection (bouncing), absorption, and interference will impact the distance and direction of a radio wave. There are three basic wave types: direct waves, ground waves, and sky waves. Waves at certain frequencies travel in a straight line to the horizon and are then reflected off into space. Others tend to travel along the curvature of the earth, whereas still others propagate into space only to be bounced off the ionosphere and returned to earth. All of these characteristics can be advantages or disadvantages that can be managed to some degree by good engineering. (See Figure P–3.)

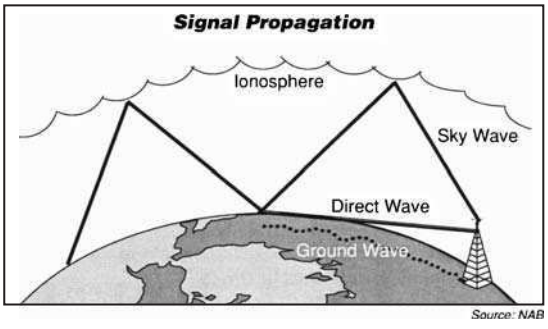



**FIGURE P–3.** Propagation.

### Protected Extensible Authentication Protocol (See *PEAP*.)

### Protocol

Level: 2

*Definition:* A protocol is a set of formal rules used to handle the communication of data between different types of computers. Protocols are also used to deliver different types of computer services. Some of the most widely used protocols are outlined in Table P–1. (See also ***FTP*** and ***TCP/IP***.)

### Proximity Operator

Level: 1

*Definition:* Proximity operators are used in some search tools to locate one word or phrase within a certain distance (in terms of the number of words or in the same sentence or paragraph) of another word of phrase. For example, one might search for "*tech* NEAR *terms*." Whereas proximity operators were once a crucial strategy used by skilled searchers, search engines such as Google include proximity operations by default. (See also ***Search Engine***.)

### Proxy Server

Level: 3

*Definition:* Usually a World Wide Web server that accepts requests in the place of a primary server with the intention of either improving network performance or securing an "inside" network from the "outside" world. Proxy servers typically run on a secure internal machine, providing access to the outside world for people inside the security barrier (firewall). The proxy web server may be used to provide a gateway between a local area network and the Internet, whereby all outward web requests from the local network pass through the proxy server and similarly all information retrieved comes back in via the proxy server and is passed back to the client. Using the options or preferences, web browsers can be configured to point to the proxy server.

**TABLE P–1** Common Internet Communications Protocols.

| Internet Protocol | Description |
|---|---|
| TCP/IP | Transmission Control Protocol/Internet Protocol: The standardized technical format used for Internet systems, services, applications, and so on. |
| SMTP | Simple Mail Transfer Protocol: Used to transmit e-mail across the Internet. |
| HTTP | Hyptertext Transfer Protocol: Used to transmit web pages across the Internet. |
| FTP | File Transfer Protocol: Used to transfer computer files across the Internet. |
| NNTP | Network News Transfer Protocol (which runs Usenet): Used to send and distribute postings to Internet newsgroups. |

Proxy servers are also used to speed up the transmission of information on the Web by storing the most frequently requested content in an easy-to-access location and delivering it quickly without a lengthy search and access process. (See also ***Cache***, ***Mirror***, and ***Web Server***.)

### PSC (Public Service Commission)

Level: 2

*Definition:* PSCs, also known as public utility commissions (PUCs), are established in every state to oversee state-authorized utility rates, tariffs, service rules, and regulations affecting operations within the jurisdiction of a state. Contact individual state PSCs or PUCs for relevant information.

### Pseudo-Random Noise (See *PRN*.)



### PSIP (Program and System Information Protocol)

Level: 3

*Definition:* PSIP is the part of the ATSC digital television standard that provides a means of transporting DTV system information and electronic program guide data. It can contain broadcaster information (such as call letters and channel number). It can carry up to 16 days of programming information, content ratings, define virtual channels, conditional access information, and more. (See also ***ATSC*** and ***DTV***.)

### PSK (Phase-Shift Keying)

Level: 3

*Definition:* This is a type of signal modulation where a change or shift is made in the phase of a wave signal. Essentially, when the signal, represented as a sine wave, is shifted so that it is at a peak point instead of a trough, it is considered 180 degrees out of phase. PSK systems allow changes in the phase of a signal to represent when a digital bit should be a 1 or a 0. A phase shift of 180 degrees, or lack of this shift, indicates to a digital PSK receiver whether the data bit is a 1 (on) or a 0 (off). (See also ***Modulation***.)

### PSPDN (Packet Switched Public Data Network)

Level: 3

*Definition:* Packet switched public data network dedicated to an X.25 system. (See also ***Public Network*** and ***X.25***.)

### PSTN (Public Switched Telephone Network)

Level: 2

*Definition:* Refers to the standard public telephone network available to anyone wanting to subscribe. The difference between public and private switched networks is in the configuration of the services. Private services are provided to businesses or preferred customers and include special dialing options, but these services are conveyed over the standard telephone system. (See also ***POTS*** and ***VPN***.)

### P2P (See Peer to Peer.)

### Public Domain

Level: 2

*Definition:* Works of authorship or inventions that can be used by the public without the consent of the author or inventor. Generally, this applies when the term of protection has expired, or the

creator failed to comply with the formalities necessary to obtain protection of the work. Public domain applies to work no longer protected by copyright. For example, musical compositions come into the public domain after an artist has been dead for more than fifty years. (See also ***Copyright*** and ***File Sharing***.)

### Public-Key Cryptography
Level: 3

*Definition:* Refers to the system of securing information on computer networks that uses a "private key" to encrypt a digital message and then uses a "public key" to decrypt the message. Each person's public key is published, whereas the private key is kept secret. Messages are encrypted using the intended recipient's public key and can only be decrypted using that person's private key. One of the most popular forms of public-key cryptography is Phil Zimmerman's Pretty Good Privacy (PGP), which is an encryption system so strong that it was initially considered (and was regulated) under the munitions category. (See also ***Algorithm***, ***Encryption***, ***PGP***, and ***PKI***.)

### Public-Key Infrastructure (See *PKI*.)

### Public Network
Level: 2

*Definition:* Any voice, data, or other related telecommunications network operating for public use such as the nation's public switched telephone network (PSTN), which includes local and long-distance telephone and data networks available to residential homes and in public locations. (See also ***PSTN***.)

### Public Service Commission (See *PSC*.)

### Public Switched Telephone Network (See *PSTN*.)

### Public Utilities Commission (See *PUC*.)

### PUC (Public Utilities Commission)
Level: 2

*Definition:* A state regulatory body that oversees telecommunications laws as they apply within the individual state jurisdiction. State PUC authority may include local telephone companies, cellular and cable services, and any other communications media confined within the boundaries of the state. Once a service becomes interstate, regulatory responsibility moves to the federal level and the FCC.

### Pulse Amplitude Modulation (See *PAM*.)

### Pulse Code Modulation (See *PCM*.)

### Pulse Width Modulation (See *PWM*.)

### Push Technology
Level: 2

*Definition:* Refers to a media distribution model where content is sent to users (i.e., viewers, listeners, online users, and so on) in a set sequence transmitted by a server system or other media distribution source. Push technology or push media contrasts with "pull technology," where a user must request each specific item individually. One of the first successful implementers of Internet push technology was PointCast, which delivered news, information, and advertisements to online users and was displayed automatically much like a screen saver program. Although various companies continue to develop variations of push technology, most Internet-based communication still conforms to the "pull" model.



### PVC (Permanent Virtual Circuit)
Level: 3

*Definition:* A pathway for data or phone service that is permanently set up for communication between two parties. It is virtual in the respect that it is not a direct line from one place to the other and was not intended for that specific purpose. (See also ***Virtual Circuit***.)

### PVR (See *Personal Video Recorder*.)

### PWM (Pulse Width Modulation)
Level: 3

*Definition:* Another form of digital signal modulation whereby after a wave has been digitally sampled, the variations in the samples are coded

into established signal widths in the transmitted carrier wave. This method is not used very often. (See also ***PAM*** and ***PCM***.)

### PXE (Pre-boot Execution Environment)

Level: 3

*Definition:* Part of Intel Corporation's Wired for Management (WfM) initiative, PXE enables a workstation on a network to boot directly from a server (prior to booting from its own internal components), making it possible to load software such as operating systems, program updates, and diagnostic programs directly from the server each time the workstation is turned on. This centralized approach can greatly simplify the management of many workstations, especially in large organizations with many computers. (See also ***Boot***, ***WfM***, ***Remote Wakeup***, and ***Thin Client***.)

### Python

Level: 3

*Definition:* Comparable to languages such as Perl and Java, Python is an interpreted object-oriented programming language that continues to grow in popularity. Python itself is copyrighted, but the source code is available via open source and can be developed and resold commercially. (See also ***Java***, ***Object Oriented***, and ***Perl***.)

# Q

**QA (Quality Assurance)**
Level: 1
*Definition:* Systematic procedures in production or manufacturing to ensure standardization of product quality to meet or exceed preestablished targets or standards.

**QAM (Quadrature Amplitude Modulation)**
Level: 3
*Definition:* A sophisticated modulation scheme that uses variations in signal amplitude and phase of a carrier to produce different states of data-encoded symbols. An example of QAM is a modem that operates at high speeds. (See also ***Modem***.)

**QoS (Quality of Service)**
Level: 3
*Definition:* Refers to the goal of providing network services (especially bandwidth) in a dependable and predictable way. For example, initiatives to design next-generation Internet technologies are paying close attention to QoS in everything they develop.

**QPSK (Quadature Phase-Shift Keying)**
Level: 3
*Definition:* QPSK is a digital frequency modulation technique used for sending data over coaxial cable networks. Because it is both relatively easy to implement and fairly resistant to noise, QPSK is used primarily for sending data from the cable subscriber upstream to the Internet.

**Quadrature Amplitude Modulation (See *QAM*.)**

**Quadature Phase-Shift Keying (See *QPSK*.)**

**Quality**
Level: 1
*Definition:* Degree or grade of excellence usually defined in terms of performance and the ability to meet certain standards. In communications systems, quality usually applies to technical performance and/or the ability of equipment, systems, software, networks, or other systems to achieve or meet stated levels of performance quality.

**Quality Assurance (See *QA*.)**

**Quality of Service (See *QoS*.)**

**Quantization**
Level: 3
*Definition:* Refers to the process of taking discrete digital samplings of analog signals and quantizing these samples into numerical quantities that can be converted to binary digital form. If an error occurs while a sample is being quantized, when the signal is reconverted back from digital to analog it will appear as interference or distortion in the signal. An example of this distortion is a hissing noise heard in phone conversations, which could be an indication the signal was not properly quantized. Analog signals (including audio voice, music, and video) are quantized using some encoding scheme when being converted to digital form. The amount of sampling (i.e., sampling frequency or sampling resolution) determines how faithful to the original the signal will be when decoded and restored back into analog form. (See also ***Sampling*** and ***Sampling Frequency***.)

**Query String**
Level: 2
*Definition:* An instruction given to a server by a web browser, a query string is everything in a web address that comes after the question mark symbol "?" (e.g., *http://slashdot.org/search.pl?query=bill+gates*). Creators of dynamic database-driven web sites can use queries to help generate various pages in their site. However, query strings that are

not encrypted can sometimes represent a security threat to the web server hosting the page. For this reason, many web servers encrypt the query string so that the information in the query cannot be recorded or captured and so that hackers cannot use the query string to determine ways to hack into the web server's database.

### Queuing

Level: 2

*Definition:* A management process for handling information in an organized, methodical fashion. In computer systems, queuing is the act of stacking instructions, tasks, or jobs so that whenever resources or devices become available information can be processed in a sequential order. Some systems have the ability to prioritize queue entries to process higher-order tasks sooner. Queuing systems (such as those running on printers) operate on FIFO principles, with earliest entries processed first. (See also ***FIFO***.)

### QuickTime

Level: 2

*Definition:* A multimedia development, storage, and playback technology developed by Apple that integrates video, animation, audio, immersive virtual reality, and panoramic images into a compressed format that is easy to include in other documents or in web pages. QuickTime is a popular format for distributing short videos (1 to 10 minutes) via the Internet. Viewing a QuickTime file via a web browser requires the QuickTime player, which can be downloaded for free. There also exists a QuickTime Development Kit that enables the creation of QuickTime content. (See also ***Digital Media*** and ***Plug-in***.)



### QuickTime VR

Level: 2

*Definition:* Developed by Apple as an enhancement to its QuickTime video technology, QuickTime VR provides the ability to create interactive content design and immersive imaging on the Internet. For example, QuickTime VR could be used to take multiple images of a product taken from multiple angles, such as a laptop computer, and "stitch" them together making a single 3D image. Then, using the QuickTime viewer the web user can smoothly rotate the image of the laptop from left to right, top to bottom, in order to see all sides of the product. QuickTime VR is also popular for virtual tours, whereby the producer of the tour uses a fixed-position camera to take a series of pictures of an area, such as a room or a campus location, and then "stitch" them together to make a seamless navigable image. (See also ***QuickTime*** and ***Virtual Reality***.)

### QWERTY Keyboard

Level: 1

*Definition:* Pronounced "kwer-tee," this keyboard is the de facto standard for English language typed text. The design layout was developed in the 1860s as part of the design for early typewriters. Contrary to popular belief, the QWERTY key arrangement was not designed to slow typists down. Rather, it was designed to prevent jamming of the typewriter strike arms by separating commonly juxtaposed letters. (See also ***Dvorak Keyboard***.)

# R

### Radio
Level: 1
*Definition:* In a most general sense, radio is wireless transmission and reception by means of electromagnetic waves. At various frequencies radio not only supports the systems of audio and video broadcasting in the modern world today but provides the basis for wireless telephony, radar, satellite navigation systems, and emergency response systems. These different uses of radio conform to different uses of the radio spectrum, with audible signals encoded in electromagnetic waves in the approximate frequency range from 3 kilohertz to 300,000 megahertz. (See also ***RF*** and ***Spectrum***.)

### Radio Broadcast Data System (See *RBDS*.)

### Radio Data System (See *RDS*.)

### Radio Frequency (See *RF*.)

### Radio Frequency Interference (See *RFI*.)

### Radio Frequency Radiation (See *RFR*.)

### RADIUS (Remote Authentication Dial-In User Service)
Level: 3
*Definition:* Used to authenticate dial-in users attempting to access the Internet, RADIUS provides a client/server protocol and software that enables authentication to be processed through a central server. RADIUS allows a company or organization to maintain user profiles in a central database that all remote servers can share, thus providing better security and allowing a company to set up policies and procedures that can be applied at a single administered network point. RADIUS also tracks usage for billing purposes and for keeping network statistics. (See also ***Authentication***, ***Dial-up***, and ***ISP***.)

### RAID (Redundant Array of Independent Drives)
Level: 3
*Definition:* A computer storage device containing several hard disk drives in a single housing offering redundant data protection in the event of hardware failure. RAID systems provide high-speed disk access and some error detection and correction capabilities. Data can be stored simultaneously on more than one disk drive, providing system redundancy. Five levels of security protection are available in RAID systems, with capabilities to recover from almost any realistic failure scenario. (See also ***Hard Drive***.)

### RAM (Random-Access Memory)
Level: 1
*Definition:* The primary memory capacity in a computer and used only for temporary storage. RAM has read/write capabilities and requires a constant power supply to remain intact, and thus power surges or other interruptions require the installation of backup protection procedures. Once a computer is turned off or shut down for any reason, all information in RAM is lost. To prevent loss problems, information of high value (i.e., cannot be replaced easily) should be saved permanently on a hard disk, burned to CD, and/or placed on some other more permanent storage medium.

### Random-Access Memory (See *RAM*.)

### Rate
Level: 2
*Definition:* A measurement of quantity with respect to some other fixed quantity, typically a

fixed amount of time. (See also ***Bit Rate*** and ***Field Frequency***.)

### RBDS (Radio Broadcast Data System)

Level: 3

*Definition:* Based on the RDS (radio data system) standard, RBDS is the U.S. radio industry technical standard for transmitting a range of digital information and data to "smart" radio receivers using existing FM station subcarriers centered at 57 kHz and 92 kHz. RBDS receivers have features including emergency alert messaging, tuning of stations by format, and digital LEDs that can display station logos, call signs, song titles, artist names, or other station-generated text. "Smart radio" components can also be hooked up directly to home PCs for reception of stereo radio and a variety of text and other data from local radio stations. Satellite radio systems XM and Sirius take advantage of RBDS capabilities to display program and other information in their proprietary radio receivers. (See also ***RDS*** and ***Subcarrier***.)

### RBOC (Regional Bell Operating Company)

Level: 2

*Definition:* The seven regional telephone companies originally created as a result of the divestiture of AT&T in 1984. The original "Baby Bells" were Ameritech, Bell Atlantic, BellSouth Telecommunications, Nynex, Pacific Telesis, Southwestern Bell Telephone, and U.S. West (now Qwest). The RBOCs provided local telephone services through their combined 22 local exchange carrier (LEC) subsidiaries. Passage of the landmark 1996 Telecommunications Act significantly broadened the scope and business markets the RBOCs were eligible to enter, including local and long-distance service (pending specific FCC approval), equipment manufacturing, and broadband video. Mergers and buyouts have reduced the number of former Baby Bells from seven to four: Bell Atlantic (merged with Nynex and is acquiring major independent GTE), BellSouth, SBC (merged/acquired Pacific Telesis and Ameritech), and Qwest (acquired U.S. West). Further mergers and acquisitions remain possible.



### RCA Connector

Level: 2

*Definition:* Refers to a standardized coaxial plug on the end of cables and corresponding standardized sockets on electronic equipment for connecting consumer-grade audio and video components.

### R-DAT (Rotating-head Digital Audio Recorder)

Level: 2

*Definition:* Professional-quality digital audiotape recorder system. (See also ***DAT***.)

### RDS (Radio Data System)

Level: 3

*Definition:* European-developed RF data system for incorporating data transmission signals on FM radio subcarriers. The technical standard for RDS receivers became a foundation for development of the U.S. RBDS system. (See also ***RBDS***.)

### Read-only

Level: 1

*Definition:* A computer file that has been "locked" by its creator or an authorized party so that the information in the file can be accessed and read by any number of computer users, but the content of the file cannot be changed or manipulated in any way by unauthorized users. It also describes a type of dynamic computer memory designed to deliver computer instructions but not intended to be modified by users.

*Used in a sentence:* "The files I copied from my archive CD to my hard drive were read-only until I went into the file properties and made them editable." (See also ***ROM***.)

### Read-Only Memory (See *ROM*.)

### Really Simple Syndication, Rich Site Summary (See *RSS*.)

### RealMedia

Level: 2

*Definition:* Developed as a proprietary codec by RealNetworks, RealMedia was one of the first

codecs for delivering streaming content over the Internet. Like other codecs, RealMedia (comprised of RealVideo, RealAudio, and other file formats created by Real) uses compression algorithms for eliminating data that can be considered extraneous or not as important as other information. RealMedia and Windows Media are two of the most widely used technologies for streaming video today. (See also ***Streaming Media***.)

**RealNetworks (See *Streaming Medium*.)**

**Real Time**
Level: 1
*Definition:* Used in reference to telephone and video signals, usually this means a system where there is no perceived delay in the transmission and/or reception of a signal. Phone conversations (including VoIP) are in real time, as are live news broadcasts.

**Reboot**
Level: 1
*Definition:* Computer term meaning to turn on the system or to reset the computer (i.e., reset the internal pointers and counters, clear out instructions, and so on). A "cold boot" refers to restarting a computer that has been completely powered down (turned off). A "warm boot" (boot-up) means restarting a computer without physically turning off the electricity but by selecting Restart from the Shut Down menu. Such rebooting may be necessary when the system freezes for unknown reasons or experiences a general protection fault (GPF) for undetermined reasons. (See also ***Cold Boot*** and ***Warm Boot***.)

**Receiver**
Level: 1
*Definition:* A receiver is any electronic device that accepts a transmission signal and is opposite of a transmitter. Some devices perform both functions and are referred to as transceivers. Electronic receivers can range from small handheld PCS or cellular flip-phones to massive radioastronomy satellite dishes.

**Record Head**
Level: 2
*Definition:* An electromagnetic device that magnetizes the surface of a tape or disc in the process of recording an analog or digital signal.

**Recycle Bin**
Level: 1
*Definition:* A special folder on computers using a Microsoft Windows operating system (similar to the trash can on an Apple computer), the recycle bin is a temporary storage location for files that have been deleted by the user of the system. If a file is deleted accidentally it can be recovered from the recycle bin unless the recycle bin has been emptied (in which case the file cannot be recovered).

**Red-Green-Blue (See *RGB*.)**

**Reduced Instruction Set Computing (See *RISC*.)**

**Redundancy**
Level: 2
*Definition:* Refers especially to digital encoding procedures that identify parts of an analog voice, audio music, or video signal that can be eliminated without losing critical or important information contained in the signal. Redundant parts of a signal are usually those that are precisely repetitive of signal parts that were already encoded in a prior digital data frame. Although redundant material is left out or eliminated in compression schemes aimed at saving transmission time or storage space, quite often the original signal is restored as faithfully as possible through expanding or filling in the missing parts through interpolation techniques for actual viewing or listening. It also refers to maintaining redundant hardware and/or software installations to maintain system viability and archived information. (See also ***Companding***, ***Compression***, and ***Replication***.)

**Redundant Array of Independent Drives (See *RAID*.)**

### Reengineering
Level: 2
*Definition:* Refers to activities where a system, piece of equipment, product manufacturing process, or even software is redesigned with the intent of improving quality, adding functions or features, and increasing productivity, speed, or efficiency.

### Refresh Rate
Level: 2
*Definition:* Expressed in hertz, the refresh rate describes the maximum number of frames that can be displayed on a monitor every second. Applying largely to CRTs, higher refresh rates typically produce less "flicker," especially with larger monitors. (See also ***CRT***.)

### Regional Bell Operating Company (See *RBOC*.)

### Registered Jack (See *RJ*.)

### Registry
Level: 2
*Definition:* Refers to the main collection of configuration information on a computer running the Windows operating system. Settings such as user preferences, unique user configurations, hardware and software settings, configurations for peripherals such as monitors and printers, and a wide variety of other information are stored in the registry. Many technical support specialists consider the Windows Registry to be a very powerful and convenient way of controlling the operations of the machine. However, it can also be something of an Achilles heel. If errors are made in the registry, or if the registry becomes corrupted, the entire machine can be disabled. (See also ***Microsoft Windows***.)

### REL (Rights Expression Language)
Level: 3
*Definition:* A general term used to refer to the specifications of rights management technologies that attempt to control access to content, monitor assignment of fees, and track other information about the exchange of online information. Examples of standards that implement various rights expression language include MPEG 21, Creative Commons, and Open Digital Rights Language (ODRL). RELs do not themselves act upon digital content. Rather, they must be part of the systems that implement the rights management they express. (See also ***DRM*** and ***MPEG-21***.)

### Relational Database
Level: 2
*Definition:* A data storage and retrieval system specifically designed to increase the effective utility of stored data by enabling examinations of the relationships among pieces of information. A relational database management system stores information in the form of tables and then links or "relates" those tables to one another in order to provide answers to database "queries." Relational database systems were first conceived in the early 1970s, but were not implemented until the mid 1980s when technology advances made the concept practicable.

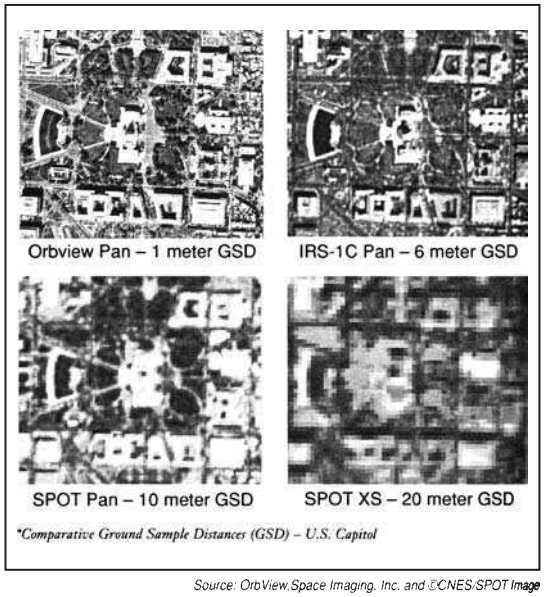
*Used in a sentence:* "We decided to use a relational database to store our customer information to make it easier to forecast trends in customer purchasing behavior." (See also ***Data Mining***, ***Data Warehousing***, and ***RDMS***.)

### Relay
Level: 2
*Definition:* In general, a device that enables input power to control a local source of power. It can be an electronic device or switch that closes electromagnetic contacts, allowing one or more circuits to be completed. A relay is typically used to isolate high power or voltage from electrical control circuits.

### Remote Authentication Dial-In User Service (See *RADIUS*.)

### Remote Sensing
Level: 2
*Definition:* In simple terms, remote sensing is the process of using sophisticated sensors and related instruments onboard satellites and aircraft to detect and record ground-based

geographical data. The launch of high-resolution commercial imaging satellites in the 1990s, which had previously been prohibited by governments (particularly the United States) for national security reasons, has driven the expansion of the remote sensing industry. U.S. government licensing now allows the commercial market to launch high-resolution multi-spectral imaging satellites with detection capacities down from the once standard 30-meter level to 1-meter or less. Remote sensing applications include agricultural/environmental analyses (soil, vegetation, irrigation, moisture differentiations), disaster assessments (flooding, oil on water discriminations, fire/heat, smoke penetrations), geological mapping, shoreline discriminations, city planning (mapping with virtual images of major construction projects inserted), and news-gathering information from world conflict zones, among others. (See Figure R–1 and see also ***GIS*** and ***Thermal Mapping***.)




Source: OrbView,Space Imaging, Inc. and ©CNES/SPOT Image

**FIGURE R–1.** Remote sensing.

### Remote Wake-Up
Level: 2

*Definition:* The process of using a remote computer to prompt a computer in another location to turn on or "wake up." This is part of Intel's Wired for Management initiative (WfM). Workers used to have to leave their computers on to allow for off-hours system maintenance. Remote wake-up can be used by system administrators to turn computers on during off hours in order to perform maintenance on a computer in a remote location. (See also ***WfM*** and ***PXE***.)

### Repeater
Level: 3

*Definition:* An electronic device or system used to amplify signals so that losses in quality and strength over long distances are less likely to impair the reception of an acceptable-quality signal. Repeaters can be used in both analog and digital transmission systems, as well as in microwave, broadcast, cable television, and many other communication distribution networks.

### Repetitive Strain Syndrome (RSI)
Level: 1

*Definition:* A condition experienced by a growing number of people who engage in the repetitive physical movements that cause trauma to soft tissue and nerves. Thousands of computer users now suffer from RSI conditions such as carpal tunnel syndrome in the wrists because of excessive use of the keyboard and mouse. (See also ***Ergonomics***.)

### Replication
Level: 2

*Definition:* Creating and maintaining a duplicate copy of a database or file system on a different computer, typically a server. The term usually implies the intelligent copying of parts of the source database that have changed since the last replication with the destination. Replication allows many users to work on their own local copy of a database, and then their individual changes are later reconciled with any changes that anyone else made to the parts of the database they were working on from their own computers. (See also ***Archive***, ***Data Warehousing***, ***Fault Tolerance***, ***Incremental Backup***, and ***RDMS***.)

### Request for Comment (See *RFC.*)

### Resistor

Level: 3

*Definition:* A component used in a circuit that provides intended impedance or opposition to the flow of an electrical current. Measured in ohms, the amount of resistance is dependent on the design of the resistor, which can be color coded to indicate the amount of resistance in the device. Resistors are one of the essential building blocks needed to make electronic circuits work as they regulate and manage electrical power supply to fragile component parts or highly sensitive systems such as computer networks.

### Resolution

Level: 1

*Definition:* In printing and television and other video display systems such as television sets or computer monitors, the quality of picture resolution is a function of the relative amount of image material in a signal or output and the size and/or number of pixels (or dots) used in a particular television set, computer monitor, or printer. Video resolution is often stated as the number of horizontal (H) times the number of vertical (V) pixels available for display. For example, the resolution in the NTSC television broadcasting system is approximately 330 (horizontal) × 343 (vertical). Digital HDTV broadcasts have a resolution up to 1,920 (horizontal) × 1,080 (vertical). Printer resolution is usually measured in dpi (dots per inch). (See also ***HDTV*** and ***NTSC***.)



### Resource Locking

Level: 2

*Definition:* Resource locking is required to protect data in a database that is available to many users at the same time. If multiple users try to edit data in or save data to the same database at the same time, the database runs the risk of becoming corrupted. Resource locking coordinates the process of ensuring data integrity when there are multiple edits and multiple saves by multiple users to a single database. (See also ***RDMS***.)

### Retransmission Consent

Level: 2

*Definition:* The requirement that cable operators, satellite carriers, and other multichannel video program distributors obtain permission to retransmit the signals of television and radio stations. Local broadcasters have two options for signal carriage by cable systems and satellite carriers: (1) they may negotiate a retransmission consent agreement with a cable operator or satellite carrier or (2) they may elect to be carried under must-carry provisions. (See also ***Must-carry***.)

### RF (Radio Frequency) Spectrum

Level: 2

*Definition:* A portion of the electromagnetic frequency spectrum useful for communication purposes generally considered to range from 3 kHz to 300 GHz. (See also ***Radio***.)

### RFC (Request For Comment)

Level: 2

*Definition:* The content of an RFC may range from standards to specifications to research results or proposals to potential governmental regulations.

### RFI (Radio Frequency Interference)

Level: 3

*Definition:* RFI is any energy that intrudes and distorts the intended processing of a signal. This interfering energy can be caused by natural sources, such as lightning discharges, or more commonly from any electrical or electronic device that causes changes in a current flow (ranging from ordinary light switches to complex computers). RFI can be a result of defective high-voltage power line equipment due to leakage arcs across the insulators or other structures. RFI is particularly troublesome in computer environments, and the FCC has established classes for types of computers. Office computers have to meet Class A requirements for frequency leakage, which is higher than for Class B computers, such as those sold for home use. (See also ***Interference***.)

### RFR (Radio Frequency Radiation)

Level: 3

*Definition:* Nonionizing electromagnetic energy. (See also ***NIER*** and ***RF***.)

**RGB (Red-Green-Blue)**
Level: 2
*Definition:* Represents the primary colors used as the standard in computer monitors and CRT, LCD, plasma television monitors, and the entire color television system (including cameras). All variations of colors displayed are based on various values of red, green, and blue. For example, in CRTs, three electron guns (with one devoted to each color) are used to produce broadcast television, pictures, or computer images. (See also ***CRT***, ***LCD***, ***Monitor***, and ***Plasma***.)

**Rich Text Format (RTF)**
Level: 2
*Definition:* A Microsoft document format designed to facilitate the exchange of documents between Word and other document preparation programs. For example, in some cases it might be necessary to save a Microsoft Word document in RTF so that it can be loaded into another software program.

**Rights Expression Language (See *REL*.)**

**Ring Network (See *Token Ring*.)**

**Ripping**
Level: 1
*Definition:* Importing media files from a CD or DVD onto a computer, typically music or movies. These files are usually converted into compressed formats including MP3, AAC and DivX. (See also ***AAC***, ***DivX***, and ***MP3***.)

*Used in a sentence:* "I ripped my favorite CDs so I could listen to them on my iPod."

**RISC (Reduced Instruction Set Computing)**
Level: 3
*Definition:* A type of hardware/software interface system developed for use in high-end computer systems to increase throughput data rates and to effectively handle the huge amount of instructions being sent to and from PC central processors. Larger, more complex sets of computing instructions have been added along with succeeding generations of microprocessors. These instructions, called microcode, are used to initiate all internal tasks needed to perform computer operations. RISC microcomputer chips were developed to optimize execution speeds of smaller sets of instructions, resulting in a reduced instruction set for commands. In turn, this reduces the time to move selected commands from storage to activation.

**RJ (Registered Jack)**
Level: 3
*Definition:* (1) Signifies a set of electronic connector specifications set by the FCC as industry standards. (2) *RJ – 11:* A six-wire conductor that is a standard telephone jack. Two wires are used each for sending, receiving, and signaling. (3) *RJ – 45:* An eight-wire conductor that is a standard data jack that looks like a standard telephone jack only slightly larger.

**Roaming**
Level: 1
*Definition:* Operation of a wireless communications device outside a customer's primary location of operation. Wireless units operating as roamers include cellular or PCS phones, messaging devices, data receivers, and more recently equipment such as a laptop computer equipped with built-in receivers for wireless Internet access. By operating out of a customer's designated local area, customers often must pay special roaming charges.

**ROM (Read-Only Memory)**
Level: 2
*Definition:* In computers, read-only memory is storage capacity that can be read but not written on, altered, or deleted by the user. ROM typically contains the fundamental software necessary to control the microprocessor enabling the operating system to be loaded. ROM is also used to control special-purpose processors in the computer. Most ROM chips are able to receive "soft" upgrades from the manufacturer without having to replace the entire chip. (See also ***CD-ROM***, ***RAM***, and ***Read-only***.)

**Rotating-head Digital Audio Recorder (See *R-DAT*.)**

### Round-robin DNS

Level: 3

*Definition:* Refers to a method of managing Internet server congestion by simultaneously spreading connection loads across multiple servers that contain identical content. For example, if a company has one domain name and 10 identical home pages on 10 separate servers, when several users from different locations attempt to access the home page at the same time their requests are directed toward an available server on a rigid rotating basis. Specifically, the first user is directed toward the first server, the seventh user to the seventh server, and the eleventh user would be directed back to the first server. (See also ***Domain Name***, ***Internet***, ***Load Balancing***, and ***Web Hosting***.)

### Round-robin Domain Name System (See *Round-robin DNS*.)

### Router

Level: 2

*Definition:* A device that makes decisions about which of several paths network (or Internet) traffic will follow by using a routing protocol to gain information about the network, and algorithms to choose the best route based on decision criteria known as "routing metrics." Routers are generally component parts of electronic telecom and computer networks. Routers may be a form of technical bridge to assist in connecting local area networks that operate under different technical protocols or standards. A device combining functions of a bridge with a router is called a brouter. (See also ***Bridge***, ***Brouter***, and ***Routing***.)

### Routing

Level: 2

*Definition:* A term used in data and phone networks that refers to determining a signal pathway and directing information (voice or data) through that path. (See also ***Router***.)

### RSI (See *Repetitive Strain Syndrome*.)

### RSS (Really Simple Syndication, Rich Site Summary)

Level: 2

*Definition:* RSS is an XML format for distributing news headlines and other information on the Web. First started by Netscape, RSS is frequently used to allow a web site or computer program to efficiently gather information from one site to automatically display it on another. For example, a personal web site might use RSS to pull information from a news site to display a quick summary of the current news. Primarily used by news web sites and blogs, RSS content typically includes news stories, headlines, content from discussion lists, or corporate announcements. RSS "feeds" can be read with a web browser or special RSS reader called a "content aggregator." (See also ***Blog*** and ***XML***.)

### RS-232

Level: 2

*Definition:* A common computer environment technical standard established by the Electronic Industries Association for serial data interface connections among various equipment. RS-232 connections have been largely supplanted by the more flexible, higher-capacity, and more widely supported USB. (See also ***Serial Port*** and ***USB***.)

### RTF (See *Rich Text Format*.)

### Runtime Error

Level: 2

*Definition:* As opposed to a compile-time error, which occurs when a computer program is being created, a runtime error refers to a problem that emerges when the program is executing. Runtime errors are usually caused by bugs or other problems in the software program.

# S

### Safari
Level: 1
*Definition:* The default web browser installed with the Macintosh OS X operating system, Safari includes most of the features of other full-function web browsers such as Internet Explorer and Firefox. Safari also includes a Google search box and a tabbed interface to help organize the viewing of multiple pages.

### Sampling
Level: 2
*Definition:* In digital communications fields, sampling is a critical part of the process for converting analog signals to digital. Sampling refers to the process of obtaining or taking small discrete samples of an analog signal, such as an audio recording, at a mathematically determined rate. This allows the digital signal to be faithfully reproduced when it is converted back to analog for listening. CDs are digital recordings that have been sampled at a relatively high rate to ensure faithful reproduction for listeners. There has to be some finite number of samples taken of the analog signal because representing every instant of sound is not feasible. However, if an analog signal at the end of the conversion process is to represent the original at all, a mathematical law comes into play. The amount of times a signal needs to be sampled (i.e., the sampling frequency) must be at least twice the highest sound frequency in the original signal. Another part of the sampling process is to compare the samples to an established numerical scale representing the range of sound frequencies. Again, not every instant of sound can be represented, so the samples are quantified (or said to be quantized) to the nearest numerical value. (See also ***Nyquist Frequency*** and ***Quantization***.)

### Sampling Frequency (Sampling Rate)
Level: 2
*Definition:* The rate at which analog signals are sampled (within a specific time period) when converting a signal into a digital format. To achieve an accurate, faithful reproduction of an audio or video signal after converting a digital signal back to analog for listening or viewing, there is a technical minimum rate at which an analog signal must be sampled. This minimum sampling rate or sampling frequency is determined by mathematical formula set forth in Nyquist sampling. (See also ***Nyquist Frequency***.)

### Sampling Rate (See *Sampling Frequency*.)

### SAP (Service Access Point; Systems, Applications, and Products)
Level: 2
*Definition:* (1) *Service access point:* The point in a network where a user can access any services provided by the network (2) *Systems, applications, and products:* Specialized software designed to make business practices more efficient by optimizing supply chains, managing strategic relationships, reducing time to market, sharing virtual information, and so on. SAP solutions are widely used in very large corporations to coordinate their computing infrastructure, including companies such as Volvo, Dell Computer, Volkswagen, Dow Corning, and Eastman Kodak. (See also ***Client/Server***, ***E-commerce***, and ***ERP***.)

### Satellite
Level: 1
*Definition:* Generally, a satellite is any object in relatively permanent orbit around a planet or other celestial body. In earth-based communications, orbiting satellites are complex electronic systems for receiving and transmitting radio frequency signals for a vast range of applications or services. In addition to transmitting traditional domestic and international voice, video, and data traffic, satellites are used to gather information

such as a weather data, remote sensing images, and surveillance data. They can also act as an orbiting tracking and data relay station (TDRSS) for other satellites. (See also ***DBS*** and ***Picosat***.)

**Satellite Digital Audio Radio Service (See *SDARS*.)**

**Satellite Home Viewer Act/Satellite Home Viewer Improvement Act (See *SHVA/SHVIA*.)**

**Satellite Master Antenna Television (See *SMATV*.)**

**Satellite News Gathering (See *SNG*.)**

**Satellite Radio**
Level: 2
*Definition:* Refers to an increasingly popular subscription radio service sent via satellite to cars, homes, and public locations for subscribers who have special radios that can receive the satellite signal. There are two satellite radio services in the United States (XM and Sirius). Worldspace covers Africa and parts of Asia and Europe. Typical satellite radio service includes more than 100 channels of programming, most of which are commercial free. Satellite radio can function any place where there is line of sight between the antenna and the satellite, allowing users to follow a single channel regardless of their location (whether they are moving or in a fixed position). (See also ***Sirius*** and ***XM***.)

**Sat Phone**
Level: 2
*Definition:* A shorthand reference to a small handheld telephone that communicates directly with orbiting satellites. Typically about the size of a small laptop computer (with attached handset), satellite phones enable mobile users to connect to telephone networks when out of the range of traditional mobile telephone service areas. Use is intended for transmitting voice, data, and fax communications, or when the traditional telephone network is not functioning. Satellite phone service covers approximately 98% of the globe, and is thus ideal for use in remote rural areas, on boats, or in other locations not served by wireless networks. (See also ***Satellite***.)

**Saturation**
Level: 2
*Definition:* (1) In video color schemes, saturation refers to the percentage of white in any particular color. 100% saturation produces a deep, intense color with no white light present. 0% saturation produces no color (i.e., all white light). (2) In communication market business usage, saturation refers to market penetration and/or adoption rate of a product, service, concept, or idea that can be effectuated through promotion and marketing saturation campaigns.

**S-band**
Level: 3
*Definition:* An upper part of the electromagnetic radio spectrum from 2310 to 2360 MHz. A portion of the band was allocated by the FCC for U.S. satellite digital audio services (SDARS), and complementary terrestrial digital audio services. (See also ***SDARS*** and ***Spectrum***.)

**SCA (Subsidiary Communications Authorization)**
Level: 3
*Definition:* SCAs were originally authorizations granted by the FCC to FM radio stations in order to use a station's FM subcarrier(s) for transmitting a variety of commercial services such as Muzak audio services. The FCC deregulated subcarrier services in the 1980s, but the SCA moniker still lingers as a shorthand reference to radio subcarrier services. FM subcarriers are part of an FM base-band signal (from 53 to 99 kHz) and are being used for a growing range of digital data-casting business applications. Such applications include wireless paging and messaging, stock quote, and other text or data services, and Muzak and other subscription audio services for professional doctors or other businesses.

**Scalability**
Level: 2
*Definition:* Refers generally to the ability to increase or decrease the size and/or volume of a

system while maintaining full functionality and reliability. If as a system grows in size it begins to fail because of that increase in size, that system would be labeled "unscalable" or as a system that "doesn't scale well."

*Used in a sentence:* "We really tested the scalability of our solution when we expanded the number of users from 100 to 10,000."

### Scan Line

Level: 2

*Definition:* The number of horizontal rows or lines of picture in a video image. For example, a CRT television picture consists of horizontal rows or lines of picture elements that are traced or "drawn" onto the screen by a scanning beam from an electron gun. The electron gun charges particles of phosphor that coat the inside of a tube or screen, thereby causing the phosphor particles to glow to create video pictures. In the NTSC television format, up to 484 scan lines are drawn to create each individual picture frame. The definition or clarity of a television system is primarily determined by the number of scanning lines. Current system standards use 525 (NTSC) and 625 (PAL) lines (with 480 and 625 active lines actually transmitted). HDTV systems have 720 or 1,080 active scan lines, with commensurate quality improvements in picture clarity and detail.

### Scanning

Level: 2

Definition: (1) In television or video, this refers to the process of tracing over the scan lines of a television or computer monitor with an electronic beam to create video pictures. (2) The process of copying and converting a document or picture to an electronic signal. Two types of scanning exist when displaying information on a screen. Television broadcasting uses a process called interlace scanning, whereas most computer systems progressively scan an image. (See also ***Interlace Scanning***, ***Progressive Scanning***, ***Scan Line***.)

### SCC (See *Specialized Common Carrier.*)

### SCMS (Serial Copy Management System)

Level: 2

*Definition:* A security copy protection device designed to limit the copying of digital audiotapes intended primarily for personal or home use.

### SCPC (Single Channel Per Carrier)

Level: 3

*Definition:* Transmission system often used in satellite communications, especially audio radio networks or other relatively narrowband communications, whereby the transmission is sustained on a single channel at the same frequency and bandwidth.

### Scrambling

Level: 2

*Definition:* Term used to describe the modification of a broadcast signal so that it cannot be processed without a special receiver. Scrambling has been most commonly used in telecommunications, video entertainment, and military communications, among others, in which signals are deliberately distorted using various techniques to protect privacy, prevent piracy or theft, or for reasons of national security. Essentially, scrambling is to prevent unauthorized persons from receiving or gaining access to communication signals. In simple video scrambling systems used by cable, DBS, MMDS, or other pay-TV services, operators deliberately transmit an out-of-phase signal. Subscribers must have a special decoding device at the receiving end to restore the signal to regular phase for viewing. More sophisticated digital encryption techniques use algorithms of increasing complexity to prevent unauthorized access. (See also ***Cable Television***, ***DBS***, and ***Satellite***.)

### Screen Real Estate

Level: 2

*Definition:* A term becoming commonly used to refer to the area or amount of free space available to computer users for the display of desired information that is not taken up by pre-set windows, scrollbars, banner advertising, sidebars, or other framed information on the computer screen.

*Used in a sentence:* "We realized we just didn't have enough screen real estate to display both a large photo of our facility and a large photo of our company president all in one screen."

### Screen Saver

Level: 1

*Definition:* Originally developed to prevent an unchanging image on a computer monitor from "burning" into the phosphor of the screen and thus damaging the monitor. With improved monitor technology this purpose is no longer as necessary. Currently, screen savers either blacken out a computer monitor display or display some sort of changing pattern, animation, or other dynamic content. Screen savers are activated if a computer goes untouched for a certain period of time, typically between five to ten minutes. With current display technology the burn-in risk to monitors has been minimized and most screen savers act as a form of personalized entertainment. Screen savers can also be activated by a user to prevent others from viewing computer screen content when the PC is unattended. In high-security work areas, computers often require users to enter a password to remove the screen saver in order to resume work.

### Script Kiddie

Level: 2

*Definition:* A derogatory label in the hacker world, a script kiddie is usually considered a wannabe hacker who is willing to use hacker tools (such as scripts) that were created by someone else as they attempt to scan for weaknesses in other people's systems and break into them. Script kiddies can be just as dangerous (or more) as mature hackers because their efforts are often accompanied by a lack of understanding of the tools and can produce wildly unpredictable consequences. (See also ***Hacker***.)

### SCSI (Small Computer Systems Interface)

Level: 3

*Definition:* Pronounced "scuzzy," SCSI is a type of computer "bus" originally designed by Apple for its Macintosh system. During the 1990s it grew to become an industry standard available on Intel-based PCs. However, with the advent of ATA/IDE interfaces for hard disks and USB for peripheral devices, SCSI has been relegated to use largely in high-performance workstations, servers, and high-end peripherals. SCSI peripherals are linked serially to a single interface, allowing up to seven peripherals to be controlled from a single SCSI card without involving the CPU. SCSI bus lines must terminate at an SCSI peripheral or a self-terminator needs to be added to close the connection. (See also ***USB***.)

### SDARS (Satellite Digital Audio Radio Service)

Level: 2

*Definition:* A satellite-based digital audio radio service becoming popularized by two companies: Sirius and XM. Operating in the 2.3-GHz S-band, from 2,320 to 2,345 MHz, SDARS provides CD-quality audio and is capable of carrying more than 150 channels of content. Terrestrial repeaters are used to provide service in "shadow" areas where sufficient satellite signals are not available. Traditional radio receivers are not capable of handling SDARS transmissions, so users must purchase special equipment. Sirius and XM radio, both of which offer subscription-only services, have negotiated deals with various auto makers to include their systems in factory installations. SDARS is also being supported by a growing array of SDARS-capable portable music players that can be retrofitted to existing car stereo systems or carried as standalone devices. (See also ***XM***.)

### SDI (Serial Digital Interface)

Level: 2

*Definition:* The standard for transmitting digital video over coaxial cable, SDI can support transfer rates of 270 megabits per second (with a speed of 540 Mbps theoretically possible). Along with a digital video signal, an SDI can contain up to four independent digital audio signals as well.

### SDTV (Standard Definition Television)

Level: 2

*Definition:* Acronym that describes a set of digital television formats with roughly the same vertical resolution (480 lines) and 720 (704 transmitted) horizontal pixel resolution that is almost

double the horizontal resolution of the existing NTSC television standard. Both wide screen and standard aspect ratios for SDTV are included in the Advanced Television Systems Committee standard for digital television. (See also ***EDTV***, ***HDTV***, and ***NTSC***.)

### Sea Launch

Level: 3

*Definition:* The first ocean-going mobile spaceport platform for launching communications satellites into orbit. Sea Launch's self-propelled platform and accompanying command ship have launched a total of 16 rockets (as of April 2005). Sea Launch is an international partnership, with consortium members including a Boeing Co. subsidiary with a 40% ownership stake; RSC Energia, the Russian rocket manufacturer; Europe's largest shipbuilder, Kvaerner Maritime of Norway; and SDO Yuzhnoe/PO Yuzhmash (Ukraine). Sea Launch's equatorial sea-based liftoffs can take full advantage of the earth's faster spin rate at the equator for launching heavy satellite payloads. At the north and south poles the earth's rotational speed is zero, but as the distance from each pole increases the planet's rotational speed also steadily increases. At the equator, the surface of the earth is moving at a rotational speed of more than 1,000 mph, providing an additional boost for rocket launches. Due to the earth's rapid eastward spin at the equator, Sea Launch payloads can be as much as 30% heavier than if launched from other land-based facilities. In addition, space vehicles fired from the equator travel shorter distances into orbit, so less fuel is required. The 200-foot-tall Russian Zenit-3SL rockets used by Sea Launch can manage some of the largest satellites in the world. The launch pad, called the Odyssey, is a converted sea-based oil rig with steel columns that can be filled with 15 tons of water to partially submerge the platform to stabilize it even in heavy seas. The Sea Launch command ship serves as the rocket assembly site as well as providing remote mission control functions for launches. Due to a World Bank investment agreement, the consortium is prohibited from making military launches. (See also ***Satellite***.)

### Search and Replace

Level: 1

*Definition:* A process supported by most word processors, text editors, and some software editing tools, search and replace involves looking for a specified string of text and replacing all matching occurrences with another string of text. For example, search and replace might be used to correct a proper name that has been misspelled exactly the same way throughout a long document. It might also be used in a code editor to replace one string of code with another. Although search and replace can often save editing time, doing a "global" search and replace across several documents can also inadvertently introduce errors when working on computer code that cannot be undone.

### Search Engine

Level: 1

*Definition:* A remotely accessible program available on the Internet that enables users to perform keyword searches for information located across the Internet. There are several types of search engines. Some search engines maintain a directory of web sites that have been provided to them by users attempting to get their web sites listed in the directory (such as Yahoo). Other search engines are designed to generate their lists automatically by using powerful computers to perform automated searches by "crawling" over all located web sites, extracting specific textual information that is subsequently stored in a searchable database (e.g., Google) for access by the user. (See also ***Bot***, ***Google***, ***Portal***, and ***Spider***.)

### Search Engine Spam

Level: 2

*Definition:* Refers to techniques used by some to generate web pages that are created deliberately to trick a search engine into offering inappropriate, redundant, or poor-quality search results. For example, some Internet marketing firms create bogus link pages or pages with keywords that are unrelated to the site in the hopes that search engines such as Google will direct users to their client's pages. Other search engine spam techniques include redirects (immediately routing

users to a web page they did not request to see), unnecessary mirroring (creating many sites with duplicate content), keyword stuffing (repeating terms over and over again at the bottom of a page or with invisible text), link farms, cloaking, and many more. (See also ***Cloaking***, ***Link Farm***, and ***Mirror***.)

### SECAM [Sequential Couleur Avec Memoire (Sequential Color with Memory)]

Level: 3

*Definition:* A European television standard pioneered by the French and primarily used in France and Russia. SECAM has 625 video scan lines and operates at a frame rate of 25 Hz. The SECAM system used in France utilizes a technique called "positive video modulation," where the change in luminance is reflected positively rather than negatively as in the NTSC television system. Confusing some matters further, different standards for modulation for SECAM vary from country to country. SECAM signals are similar to the European PAL system in that they use the same amount of bandwidth per channel (8 MHz) and interleaved color difference signals. (See also ***PAL***.)

### Secondary Colors

Level: 3

*Definition:* Secondary colors (cyan, yellow, and magenta) represent colors that are halfway between the primary values of red, green, and blue. Cyan is a mix of green and blue, red and green creates yellow, and magenta is a combination of red and blue. (See also ***Primary Color*** and ***RGB***.)

### Sector

Level: 3

*Definition:* In computer environments, a sector is a portion of computer hard disk or floppy disk. Hard disks are divided into tracks and sectors, with a sector being a portion of a track. (See also ***Hard Disk***.)

### Secure HTTP (See *HTTPS*.)

### Secure Server

Level: 2

*Definition:* Refers to a computer network server system using fairly sophisticated encryption to enable users to submit and receive sensitive information such as credit card numbers in a protected environment. Most web servers use some form of encryption to protect consumers, but these encrypted messages/codes can be "cracked" by serious hackers.

*Used in a sentence:* "We hosted all of our business processes on a secure server to prevent transaction information from being intercepted by unauthorized outsiders." (See also ***Encryption***, ***Hacker***, ***HTTPS***, and ***SSL***.)

### Secure Sockets Layer (See *SSL*.)

### Seek Time

Level: 2

*Definition:* Refers to the time, measured in milliseconds (ms), it takes for a disk drive to move its head(s) from one track to another. The seek time is one of the most important factors determining the speed at which data can be written to or read from a hard drive. By 2004, the average seek time of most hard drives was about 9 ms. (See also ***Hard Drive***.)

### Segue

Level: 2

*Definition:* From the root word *seguire*, meaning to follow, or to continue without a break. A term used often in video and audio broadcasting, where to segue means to make a smooth transition from one piece of video or audio segment to another, such as the break between a television program and a commercial. In this type of segue, the television program fades to black as the commercial is cued to its starting point (creating a seamless transition).

### Self-diagnostic

Level: 2

*Definition:* The ability for a computer, telecommunications, or other electronics-based system to perform standard internal diagnostic checks for system errors or abnormalities.

**Sequential Couleur Avec Memoire (Sequential Color with Memory) (SECAM) Standard (See *SECAM*.)**

**Serial Copy Management System (See *SCMS*.)**

**Serial Digital Interface (See *SDI*.)**

**Serial Interface Port (See *RS-232*.)**

**Server**
Level: 1
*Definition:* A type of computer providing specific types of services to "client" computers or terminals connected to a network. Servers come in many forms: application servers, web servers, file servers, mail servers, database servers, streaming servers, and so on. What distinguishes a server from other computers in a network is that the servers are charged with processing requests made by other computers. A server can operate as a standalone system, or it can run as a separate process on any type of computer that is carrying out other, non-server functions. (See also ***Active Server Pages***, ***Apache Web Server***, ***Client/Server***, ***Exchange Server***, ***Hosting***, ***Proxy Server***, ***Secure Server***, ***SSL***, and ***Web Server***.)

**Service Access Point; Systems, Applications, and Products (See *SAP*.)**

**Service-oriented Development**
Level: 3
*Definition:* A phrase recently coined to contrast with object-oriented developing, service-oriented development involves an overarching approach to the development of web services created to be loosely coupled and designed to support change. As opposed to object-oriented components that are often highly interdependent and can sometimes break when one or several components are modified, service-oriented development integrates services that can be programmed in any language using any development tool and can run on different platforms. Service orientation involves the techniques of creating services to build connected systems. Whereas an object-oriented architecture might stress the creation of one particular service, a broader service orientation addresses the same issues but on a more global scale. (See also ***.NET*** and ***Object Oriented***.)

**Servomechanism**
Level: 3
*Definition:* Refers to an automatic control system in which the electronic mechanical device output is intermittently (in high-tolerance manufacturing systems, constantly) compared with the input through a feedback loop. From the comparison task and any resulting difference in input versus output quantities or parameters, the servomechanism system or device uses the information to recognize when to initiate the next function or control sequence.

**Session Initiation Protocol (SIP) for Instant Messaging and Presence Leveraging (See *SIMPLE*.)**

**Session Layer**
Level: 3
*Definition:* A structural layer within the digital Open Systems Integration model. (See also ***OSI***.)

**Set-top Box**
Level: 2
*Definition:* In general terms, a set-top box is a hardware device that mediates signals between a television and a variety of input sources, including cable, satellite, telephone line, or roof-top antenna. Set-top converter boxes used in cable television systems or other video distribution services such as DBS or DTH essentially function to unscramble and/or decode digital video signals that have been encrypted for transmission. Cable pay-per-view services, as well as premium movie and other channels, require decoding that is handled in the set-top box. (See also ***Cable Television***, ***DBS***, and ***IRD***.)

**Shareware**
Level: 2
*Definition:* Refers to computer software made available on a "try-before-buy" basis. Generally,

shareware software does not contain all features or functionality of a complete program package and is intended as a marketing tool to encourage users to purchase a complete package. Major sources of shareware are files that can be downloaded from the Internet. Shareware differs from freeware in that shareware programs must be purchased to obtain full functionality and features whereas freeware is really free to any user who downloads it. However, for both shareware and freeware software, in most cases, the copyright remains with the originator. (See also ***Freeware***.)

### Shockwave

Level: 2

*Definition:* A program from Macromedia for viewing files on the Internet created with Macromedia Director software. Shockwave provides users with fully interactive multimedia capabilities, dynamic animations, graphics, text, and audio directly from a web browser, provided the Shockwave plug-in is installed (which is freely available on the Internet). Because of the rapid rise in popular use of Flash (also made by Macromedia), Shockwave has fallen out of favor among most web content developers. (See also ***Flash*** and ***Plug-in***.)

### Shopping Cart

Level: 2

*Definition:* Web software used by online retailers to enable consumers to specify items they would like to purchase, review their selections, and then proceed to "check out" to provide credit card information to pay for the items purchased. (See also ***E-commerce***.)



### Short Message Service (See *SMS*.)

### Shortwave (See *HF*.)

### Shredder

Level: 1

*Definition:* As a computer term, a shredder is a piece of software designed to scramble or "shred" the content of a digital file or folder so that the content of the file can never be recovered. Shredding software works by overwriting stored files and folders with random bits. Because "deleting" a file does not actually erase that file, shredders are needed to wipe traces of files and folders from a hard disk or other storage device. The more "passes" a shredder takes at overwriting a file or folder with random bit patterns, the more likely that file or folder cannot be recovered with current computer forensic tools. Some government agencies require that the content of hard drives and other storage media be shredded before computers are transferred to other departments, sold, recycled, or thrown away because sensitive data can be recovered from those machines. One such specification is known as Department of Defense specification DOD-5220.22, which requires overwriting the drive sectors three times with specific, different characters for each pass with a total of seven passes to render the data completely unrecoverable.

### SHVA/SHVIA (Satellite Home Viewer Act/Satellite Home Viewer Improvement Act)

Level: 3

*Definition:* Acronyms for the Satellite Home Viewer Act (SHVA, pronounced "shiva") and subsequent legislation enacted in late 1999: The Satellite Home Viewer Improvement Act (SHVIA). The legislation regulates the transmission of broadcast television station signals to home dish receivers, including the provision of local television station signals to subscribers in the stations' local markets. (See also ***Local into Local***, ***Must-carry***, and ***Retransmission Consent***.)

### Sideband

Level: 3

*Definition:* Simply, a sideband is a place in a transmitted signal where the information is carried. The energy resulting from the modulation of a carrier wave frequency produces a set of sideband frequencies, which are created or produced both above and below the main frequency. Most, but not all, RF signal modulation systems create sidebands because in some systems one sideband is filtered out before transmission.

**Sidetone**
Level: 2
*Definition:* A sidetone in a regular telephone voice conversation allows the speaker to hear himself or herself through the receiving end of the handset. Because most mobile phones do not include a sidetone, many users talk louder than they would on a normal telephone.

***.sigfile***
Level: 2
*Definition:* An Internet term used to describe the signature an Internet user puts at the end of all transmissions. Some Internet users have gone into great detail using many-line and even multi-page *.sigfiles*.

**Signal**
Level: 1
*Definition:* Relates to analog or digital information in electronic form as it is processed or transported.

**Signal Acquisition**
Level: 3
*Definition:* Refers to a series of technical procedures completed by ground station operations in the satellite communications field for synchronizing and locking electronic tracking equipment onto the pilot signal(s) being transmitted from a communications satellite. Satellite acquisition operations are used for installing DTH dishes for consumers, maintaining station-keeping operations for geostationary communications satellites, and tracking deep space probes to the outer planets.

**Signaling**
Level: 2
*Definition:* The process of contacting a device, system, or part of a network in searching for the correct address or destination for a transmitted signal, message, page, or other communications link. In effect, via signaling the sender is trying to gain the attention of the receiver system.

**Signaling System 7 (See *SS7*.)**

**Signal-to-Noise (S/N) Ratio (See *S/N*.)**

**Signal-to-Noise Ratio (See *SNR*.)**

**SIMM (Single In-line Memory Module)**
Level: 2
*Definition:* An older form of personal computer RAM (memory), a SIMM is a narrow printed circuit board that holds memory chips and plugs into a SIMM socket on the motherboard or memory board. The first SIMM format that became popular on personal computers was 3.5 inches long and used 30 pins. A larger 4.25-inch format with 72 pins came later, which would hold from 1 to 64 MB of memory. SIMMs have evolved into dual modules (DIMMs, dual in-line memory modules) with 168 pins, which doubles the number of circuits to/from the module. DIMMs can be added one at a time on a PC motherboard, whereas SIMMs are generally used in pairs and in groups of four for older computers. (See also ***RAM***.)

**SIMPLE [Session Initiation Protocol (SIP) for Instant Messaging and Presence Leveraging Extension]**
Level: 2
*Definition:* Originally developed for voice over IP (VoIP), SIMPLE is a protocol that helps drive everything from instant messaging to web conferencing to live video and more. Because SIMPLE is backed by such industry leaders as Microsoft, IBM, Sun, Novell, and others, many expect it to evolve into a new standard for instant messaging and presence protocol. (See also ***IM***, ***Presence***, and ***VoIP***.)

**Simple Mail Transfer Protocol (See *SMTP*.)**

**Simple Network Management Protocol (See *SNMP*.)**

**Simple Object Access Protocol (See *SOAP*.)**

**Simplex**
Level: 2
*Definition:* Refers to any communications system where transmitting channels or paths can be used

in only one direction at a time. Information can either be transmitted or received, but not both simultaneously. (See also ***Duplex***.)

**Single Channel Per Carrier (See *SCPC*.)**

**Single In-Line Memory Module (See *SIMM*.)**

**Single Mode**
Level: 3
*Definition:* A type of optical fiber communication that focuses a beam of light through a smaller medium than multi-mode fiber. The fixed, concentrated beam of light can send more information over longer distances than multi-mode. (See also ***Multimode Fiber***.)

**Single Point of Failure (See *SPOF*.)**

**Single Sign-on**
Level: 2
*Definition:* Refers to the ability to log in to one application or server and be authenticated on other applications or servers without having to log in again. In many e-commerce applications, the single sign-on centralizes consumer financial information on one server. This makes the process more convenient and more secure for customers because they will not usually have to reenter sensitive information (such as credit card information) as they conduct repeat business. Microsoft's Passport single sign-on service is one example of such a web-based implementation that allows users to register financial information once and then every time they sign on be automatically approved to process purchases without having to input credit card information.

*Used in a sentence:* "We felt it was important to develop single sign-on capabilities for our web services so that our customers didn't have to log in separately to each of their various activities on our web site." (See also ***Authentication***, ***LDAP***, and ***Microsoft Passport***.)

**Site**
Level: 1
*Definition:* On the Internet, site refers to a location on the World Wide Web specified by a domain name and unique IP address. A domain is Internet nomenclature for the "owner" of a particular web address or site on the Internet. The domain or site on the Internet for the National Association of Broadcasters is *www.nab.org*. Domain names are structured in a standard way. Here, *nab* is the domain name and the extension *.org* denotes a nonprofit organization. (See also ***DNS***, ***Domain***, ***Dot.com***, and ***InterNIC***.)

**Site License**
Level: 1
*Definition:* Refers to the process of granting paid access to software and services throughout an institution, organization, or company. Typically, vendors offer site licenses at rates far lower when compared to purchasing many copies "off the shelf." (See also ***Application Service Provider*** and ***Network Computer***.)

**Site Map**
Level: 1
*Definition:* A site map is a hierarchical/categorical listing of what pages exist within a web site. Especially important for large web sites, site maps can prove to be an invaluable way to find information when simple browsing or search functions fail to produce desired results. Similar to a table of contents for a book, site maps are also important for those with disabilities, and can serve as a solid starting point for surfing a web site using adaptive software. Site maps can also make it easier for search engine spiders to locate all of the pages of a web site for indexing. (See also ***Spider***.)

**Skunkworks**
Level: 1
*Definition:* Refers to a process used in some companies to jumpstart innovations by forming a small group of talented people outside normal organizational and management strictures to tackle a technology challenge with the understanding that if the concept they develop is proved to be viable it will reenter the mainstream design and development processes within the company. Skunkworks are designed to encourage "out-of-the-box" thinking. According to some, the term comes from Big Barnsmell's Skonk Works, where the bootleg Kickapoo Joy Juice was brewed in the comic strip *Li'l Abner* by Al Capp.

### Slack Space

Level: 2

*Definition:* Refers to the unused space in the cluster on a computer's hard drive. Because many file systems used fixed cluster sizes on hard drives, significant space on the disk remains unused when the data stored in a cluster requires less storage space than the actual size of the cluster (not unlike the extra space you have if you pack a single pair of socks in a shoe box). The smaller the cluster sizes, the smaller the likelihood that significant disk space will be wasted (as slack space). (See also ***Hard Drive***.)

### Slamming

Level: 2

*Definition:* Aggressive type of competitive (bordering on "guerrilla") marketing tactic among the nation's long-distance telephone companies to sign up customers for their services. Slamming occurs whenever a customer's long-distance service is switched from one long-distance company to another company without the express permission of a customer authorizing the change, and thus in violation of FCC rules. Often customers tacitly agree to changing companies by not responding to a promotional inquiry by one company that requires a negative response (e.g., No, do not change my LD provider). Another tactic is to switch customers if they accept a low promotional "teaser" rate for service for a limited amount of time, usually accompanied by minimal or waived charges for making the switch.

### Slave

Level: 2

*Definition:* In general terms, a "slave" is a device whose functioning depends on another device.

### Slot

Level: 2

*Definition:* In general, a slot usually refers to a connecting point on any communications system or network bus. In a computer, expansion slots are used to insert circuit add-in cards to allow the computer to connect with various peripheral devices. Expansion slots are intended to extend or expand the functionality of a computer. Examples of electronic devices that can be attached to expansion slots are audio sound cards or network interface cards (NICs). (See also ***Bus***, ***Expansion Slot***, and ***NIC***.)

### Small Computer Systems Interface (See *SCSI*.)

### Small Office/Home Office (See *SOHO*.)

### Smart Appliance

Level: 2

*Definition:* A largely over-hyped feature of an emerging breed of household and office appliances that include a microprocessor, application logic, and the ability to communicate to the user or to other devices via a network (usually the Internet). The intent is to develop home/office appliance systems that allow these units to evaluate conditions and then communicate status condition with the consumer or other appliances. An oft-cited example is refrigerators that keep track of the food they contain and efficiently communicate this information to consumers. The market viability of such products has yet to be proven. (See also ***Information Appliance*** and ***Smart Home***.)

### Smart Card

Level: 2

*Definition:* Similar in size and shape to common credit cards, smart cards come with an integrated circuit that can be programmed to perform many different functions, such as identification, access control (such as authorization cards for pay television), purchasing, exchange value, prepaid services (such as gift cards or public transportation tickets), and selected information access. Although most smart cards require "contact" with a card reader, there are emerging types of smart cards called "contactless" that must merely pass within 10 cm of a reader in order to be processed. (See also ***Authentication*** and ***PIN***.)

### Smart Home

Level: 2

*Definition:* Still something of a utopian vision of a home that is powered by a fully integrated network of appliances, audio/visual systems, computers, automated lighting systems,

surveillance systems, automobile systems, and environmental controls. Although there are various vendors developing integration products for the home, the most viable applications of such technology seem appropriate for either the handicapped or the very wealthy. (See also ***DVR*** and ***HLT***.)

### Smart Phone

Level: 2

*Definition:* Refers to the recent trend of developing mobile phones that include other personal information management (PIM) functions such as a calendar, e-mail application, instant messaging, digital camera, and other information tools. The smart phone trend is one of the principle reasons behind the decline of personal digital assistants (PDAs). As mobile phones and PDAs are being effectively combined, fewer consumers and fewer manufacturers are showing interest in further development of PDA-only devices.

### SMATV (Satellite Master Antenna Television)

Level: 3

*Definition:* Essentially a private cable television system, SMATV is a type of satellite-delivered pay-TV service where satellite cable network and other video programming is distributed throughout an apartment complex, other building complex, or any other multi-user facility such as a hospital. SMATV services often distribute cable and pay-per-view programming and combine these signals with local broadcasting channels for a package of signals to end users.



### SMR (Specialized Mobile Radio)

Level: 2

*Definition:* SMRs are private, two-way radio systems providing land mobile wireless communications to eligible persons on a commercial basis. Typically refers to analog wireless mobile services that provide dispatch services to taxi cab fleets, construction firms, and other mobile workforce users. In the past, SMRs were trunked radio systems providing relatively localized services with several users sharing a few channels. (See also ***ESMR***.)

### SMS (Short Message Service)

Level: 1

*Definition:* SMS is a form of mobile-phone-based text messaging allowing messages of up to 160 characters to be sent and received via the network operator's message center to a mobile phone, or from the Internet (using a so-called "SMS gateway"). If the phone is powered off or out of range, messages are stored in the network and are delivered at the next opportunity. (See also ***Text Messaging***.)

### SMTP (Simple Mail Transfer Protocol) (See *Internet Protocol*.)

### SMTPE (Society of Motion Picture and Television Engineers)

Level: 2

*Definition:* A global organization, based in the United States, that sets standards for base-band visual communications. This includes film as well as video standards. SMPTE also refers to a common standard for measurement of intermodulation distortion (IM) and a reference code for the identification of film or video frames. SMPTE code is often used for the synchronization of two or more audio playback devices. For example, an SMPTE time code of 00:04:35:11 identifies a frame four minutes, 35 seconds, and 11 frames into the video.

### Snail Mail

Level: 1

*Definition:* A term, not always used in the most complimentary sense, referring to mail delivered the old-fashioned way via the postal service. The term has arisen due to the ability to send messages instantaneously via electronic mail systems and thus regular postal service mail is considered by e-mail users to be comparatively slow.

### SneakerNet

Level: 1

*Definition:* A computer industry reference (wrapped in irony) to the physical act of carrying digital media from one location to another compared to using electronic means such as

local area networks, which at times is easier, quicker, and/or more reliable. Computer users within a corporate facility might burn information from one computer onto a CD and then walk it over to another computer to facilitate the file transfer.

### SNG (Satellite News Gathering)

Level: 2

*Definition:* A broadcast news operation originating out of electronic news gathering (ENG) in which satellite news-gathering vehicles or trucks are dispatched to remote sites for immediate news taping or live broadcasting of breaking news events. SNG vans or trucks are usually equipped with single or multiple satellite dish antennas used for uplinking and downlinking video news footage to and/or from a variety of sources. SNG operations are used by local television stations, the national TV networks, cable news operations such as CNN, and international news organizations such as the BBC. Private video services use SNG vehicles for taping video segments (from covering local sports or concert events) that are then transmitted to a main satellite telecommunications operations center (TOC) for worldwide distribution. CONUS Communications, a subsidiary of Hubbard Broadcasting, was the first major SNG service developed in the early 1980s and led to the adoption of SNG operations by the major networks. (See also ***Satellite***.)

### Sniffer

Level: 3

*Definition:* Refers to a computer program or a hardware device used to monitor data traveling over a computer network. A sniffer can be used by network managers to make sure their network is running properly, and it can be used by hackers or data criminals to obtain sensitive data such as user names and passwords that would allow access to private portions of the network. Because sniffers are almost impossible to detect, and they can be installed almost anywhere network cables exist, they are one of the most common tools used to break into secure computer environments. (See also ***Hacker***.)

### SNMP (Simple Network Management Protocol)

Level: 3

*Definition:* A software monitoring and management tool for computer networks. SNMP provides a set of rules for exchanges among devices on various networks, such as routers, hubs, and switches. SNMP-compatible devices run software that makes it possible for them to send, receive, and act upon SNMP messages. (See also ***LAN*** and ***TCP/IP***.)

### SNR (See *Signal-to-Noise Ratio*.)

### S/N (Signal-to-Noise) Ratio

Level: 2

*Definition:* A measure of the amount of "noise" in a distribution line or transmitted signal compared to the strength of the intended signal. The ratio (also often represented as SNR) is derived by dividing the signal level by the amount of interference or noise in the system, and is usually expressed in decibels (dB). If the S/N ratio is negative, very likely a signal cannot be retrieved or extracted from the surrounding noise except by using very sophisticated communications systems such as spread spectrum. (See also ***Interference***.)

### SOAP (Simple Object Access Protocol)

Level: 3

*Definition:* SOAP is a simplified communications protocol (also called "lightweight") for the exchange of information in a decentralized, distributed network environment. Based on XML, SOAP defines a way of constructing messages so that they can be exchanged over a variety of underlying protocols (such as HTTP or SMTP). The framework has been designed to be independent of any particular programming model or platform. (See ***HTTP***, ***Protocol***, ***SMTP***, ***Web Application***, and ***XML***.)

### Social Engineering

Level: 1

*Definition:* Refers to a practice used by hackers to exploit weaknesses in people to gain access to computer systems rather than attempting to

directly exploit weaknesses in a computer system. An act of social engineering usually entails taking advantage of people's desire to be helpful and tricking someone to divulge important information (such as account numbers, Social Security numbers, account passwords, and so on) that can then be used to gain access to a computer system or harm the individual in some way. For example, an employee at a retail store might receive a telephone call from someone who claims to be from information technology division at the "head office." The caller then persuades the employee that there is a problem with his or her account on the company intranet that needs to be fixed and asks the employee to provide log-in and password information. As a general rule, it is best to never divulge account/password information to anyone (over the phone or otherwise). (See also ***Hacker*** and ***Phishing***.)

### Society of Motion Picture and Television Engineers (See *SMTPE*.)

### Soft Bounce

Level: 2

*Definition:* Refers to what happens to an e-mail message that makes it as far as that the other person's e-mail server but is at that point deemed undeliverable, such as when a person's inbox is "full." A soft bounce usually confirms the existence of a person's e-mail account on that system and is usually seen as a temporary problem that can be easily remedied.

*Used in a sentence:* "My message to Joe came back with a soft bounce because his e-mail inbox was full." (See also ***Hard Bounce***.)



### Soft Phone

Level: 2

*Definition:* Refers to a personal computer-based system that enables the user to handle telephone calls via specialized software, a microphone and speakers, and access to the Internet (using voice over IP, VoIP). Calls can be dialed using the numeric keys on the keyboard, or the software might include a visual display designed to mimic the interface of a telephone. (See also ***Hard Phone*** and ***VoIP***.)

### Software

Level: 1

*Definition: Software* typically refers to a specific set of computer instructions or programs written for executing a specified computer application. More recently the term *software* is being applied generically to refer to any non-hardware system, including program applications; internal operating systems; user interfaces; and digitally mediated products such as movies, audio recordings, electronic video games, and so on. Essentially, software is anything created or produced as intellectual property. (See also ***Intellectual Property*** and ***Wetware***.)

### SOHO (Small Office/Home Office)

Level: 2

*Definition:* Shorthand moniker for the small-office/home-office segment of the business equipment market typically used in the promotion, marketing, and sale of computer and related telecommunications equipment, software, and services designed specifically for the smaller business office.

### Solar Fade

Level: 3

*Definition:*Used mainly to refer to the problem of solar interference when the downlink signals from geostationary satellites are aligned in such a way that they are subjected to signal noise from the sun. Because of the precise alignments required among the sun, the satellite, and the downlink station, solar fade happens at most only once a day for any given satellite and at most during only a few days of the year. (See also ***Geostationary Satellite***.)

### SONET (Synchronous Optical Network)

Level: 3

*Definition:* A technical standard widely used in the United States and Canada for optical fiber communications networks implemented as telephone protocols for transmitting digital information over synchronous optical networks. High-speed SONET architectures and transmission protocols are designed to take advantage of the huge bandwidth transmitting capacity available

with broadband fiber-optic networks. SONET systems can currently transfer data at 51.84 Mbps or higher, and multiplexed rates reach up to 2.4 Gbps depending on the grade of the optical switching interface. (See also ***Interface***.)

### Source Code
Level: 2
*Definition:* The "raw" or "uncompiled" code written by computer programmers that is the basic source of software program applications that is eventually compiled, released, or used as functioning computer programs. "Source code" is also used to refer to the HTML code used to generate web pages. (See also ***HTML***.)

### Spam
Level: 1
*Definition:* A cyber term for the broad distribution of unsolicited bulk e-mail or cyber junk mail. Several states, including Virginia and Washington, have enacted laws to restrict spamming activities, and laws are being proposed or considered in dozens of other states. To prevent reception of such mail, an individual web user might post an e-mail address to defeat automated scanners looking for the @ sign in an e-mail address (e.g., for example, enter your user name and then use [at] instead of @ in the address). Listserv vendors are able to add software filters to prevent spamming messages from being passed along, but these are often an insufficient defense against serious spammers. Filling in web site forms requesting a personal e-mail address could make a user a clear target for spammers. Also using an anonymous FTP is another way to inadvertently become part of a spammer's mailing list. As a first line of defense, web users should provide personal information only to the web sites of reputable companies or organizations. (See also ***E-mail***, ***Newsgroup***, and ***Usenet***.)

### SPARCstation
Level: 2
*Definition:* Refers to a family of workstations manufactured by Sun Microsystems based on the SPARC (Scalable Processor Architecture) system. These systems are typically used for high-end computer graphics, complex computer modeling, and simulations. (See also ***Workstation***.)

### Specialized Common Carrier (SCC)
Level: 3
*Definition:* Refers to companies (other than telephone companies) that provide point-to-point communication service on a common carrier basis. For example, a specialized common carrier might connect points on a telephone network that normally cannot be connected using standard wire-line or fiber optics because of rugged terrain/inaccessibility.

### Specialized Mobile Radio (See *SMR*.)

### Spectrum
Level: 2
*Definition:* Spectrum refers to a continuous range of signal frequencies making up the visible spectrum of light and colors (and invisible frequencies of radiant energy, including the portion referred to as the electromagnetic spectrum) used for communications services. The electromagnetic spectrum has been used for communications due to its characteristics of linking magnetic and electric fields, and favorable propagation properties. Advances in technology continue to expand the range of "usable" spectrum for communication, scientific, and other applications. The Federal Communications Commission authorizes allocations of spectrum frequencies for commercial purposes, and government allocations are authorized by the National Telecommunication and Information Administration (NTIA). (See Figure S–1 and see also ***Allocation***.)

### Speech Recognition (Voice Activation)
Level: 2
*Definition:* A developing field of electronics and advanced computer software enabling electronic devices to discern different vocal patterns and process selected voice commands. Computer-based speech recognition systems are programmed to analyze or recognize relatively simple vocal patterns and tones that correspond to selected pre-programmed commands that initiate desired user tasks. (See also ***Voice Activation/Recognition***.)

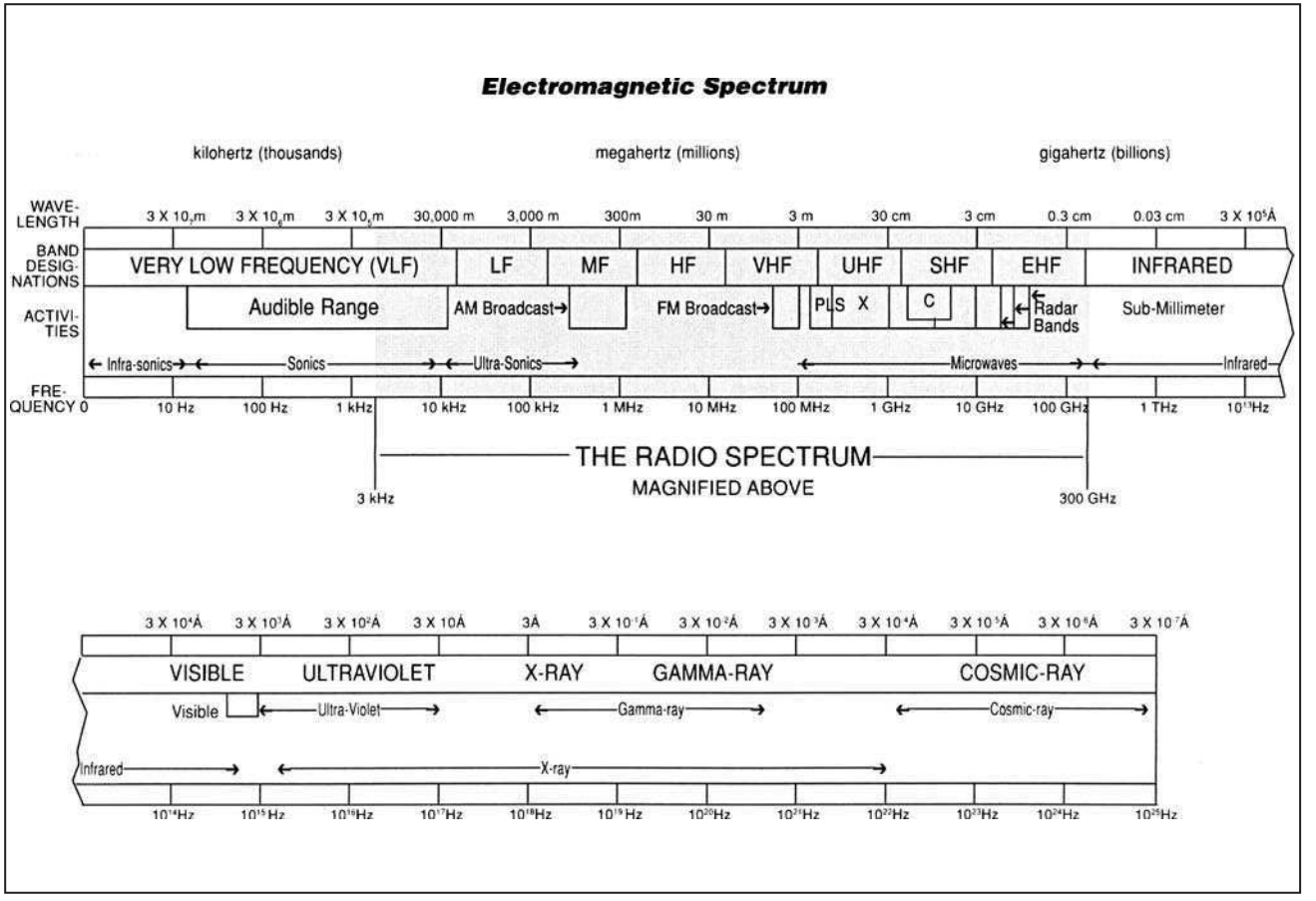



**FIGURE S–1.** Spectrum.

### Spider
Level: 2
*Definition:* Also referred to as a "robot" or a "crawler," a spider is a program that automatically explores the Web for specific document information to retrieve and then stores the information in a searchable database. Other web pages linked to a "found" document also are "crawled" over and their content is recorded. Some of the most popular search engines on the Internet use spiders to seek specified information, including Google, Alta Vista, Ask Jeeves, and Teoma. (See also ***Bot*** and ***Search Engine***.)

### Spim
Level: 2
*Definition:* Combination word that refers to "spam over instant messaging," spim refers to the process of sending unsolicited commercial messages to users of an instant messaging system. "Spimmers" often harvest the Internet for a large list of instant messaging addresses that are then used to send the spim. Many experts feel that instant messaging represents the next logical means for spammers to intrude on the computing lives of the average user. In March of 2005 the United States made its first criminal arrest in a spimming case, where an 18-year-old was accused of sending pornographic and mortgage refinance messages to more than 1.5 million instant messaging users. (See also ***Instant Messaging*** and ***Spam***.)

### Splicing
Level: 2
*Definition:* Used in communications, splicing refers to the process of connecting two wires, fibers, and pieces of video or audiotape. Splicing is done to repair or extend a communications line to cover a longer distance, or in the case of magnetic tape splicing is done for a variety of repair, editing, or other purposes.

### SPOF (Single Point Of Failure)
Level: 2
*Definition:* Refers to the "Achilles heal" of a system. When that single component fails, it brings down the entire system. Most mission-critical computing systems are now designed with modular components and redundancy to minimize the risk of such failures.

### Spoiler
Level: 2
*Definition:* Refers to a remark usually contained within an e-mail message or an online forum posting that reveals important plot elements from books or movies, thus denying the reader the proper suspense when reading the book or watching the movie. Generally, a spoiler can be any remark that telegraphs the solution of a problem or puzzle, thus denying readers the pleasure of working out the correct answer themselves. (See also ***E-mail***, ***Newsgroup***, and ***Usenet***.)

### Spooler
Level: 2
*Definition:* Typically refers to a program that controls the order of print jobs sent to a central printer. The spooler controls the queuing of print jobs, allowing many users to send documents to a printer simultaneously. (See also ***Queuing***.)

### Spot Beam
Level: 3
*Definition:* A satellite-transmitted signal or beam that is relatively narrow or tightly focused in order to concentrate satellite power to a limited geographic area. Spot beams are being used in commercial satellite services, such as DBS services in Latin America, to direct services to certain broad areas to serve local language requirements. Very narrow spot beams or pencil beams are feasible and may be used for DBS or other satellite-based services to serve certain geographically clustered populations narrowly based in certain geographic locations such as Chinese populations in San Francisco or Vancouver.

### Spreadsheet
Level: 1
*Definition:* A category or type of computer-based software application originally developed for business accounting purposes but now often used to aid in decision making (e.g., "what if" queries)

and all types of record-keeping tasks. Spreadsheet software essentially organizes information into grid-like tables containing information that can be expressed in text or numerical values. Spreadsheet tables consist of labeled columns and rows that make up a grid of individual "cells" that contain the actual information or data values. Often there are many different subsets of data within the same spreadsheet file, often called a worksheet. Users can define types of cell data and the relationships between cells by using basic mathematical formulas that automatically update summary data once new information is entered in a primary cell. Today the dominant spreadsheet software is Microsoft's Excel. Most contemporary spreadsheet applications also provide sophisticated data management functions, graphical charting based on table data, powerful statistical analysis capabilities, and integrated web functionality making spreadsheet files easily transported via the Internet. (See Figure S–2.)

### Spread Spectrum

Level: 3

*Definition:* Spread spectrum is a digital transmission technique based on quick transference of signals from one frequency to another frequency in a pseudorandom manner. The so-called frequency-hopping technique is used to minimize potential loss of information due to normal interference effects that would be encountered on any single transmission frequency path. Such frequency shifting techniques require that only a small portion of the information be transferred over a frequency channel at a given time. At the receiving end, special decoders collect the bits of digital information from the various frequency channels and reassemble them into the original transmitted signal. The technology was first used for military communications to prevent deliberate jamming or interference. Essentially, the technology takes the information-bearing signal and disperses it over a wide range of

***Example of a Spreadsheet Table***

**Personal Accounts**

| Savings/Checking | Interest* | Yield* | Balance | | Performance (% Change) | |
|---|---|---|---|---|---|---|
| Savings Account – Bank A | 3.45% | | 3,510.00 | | | |
| Certificates of Deposit (CDs) | 4.60% | | 2,530.00 | | | |
| Money Market (MM) | 4.10% | | 2,300.00 | | | |
| **Equity Holdings** | | | | **YTD** | **1Yr** | **3 Yrs*** |
| Fund A | | | 1,000.00 | 9.88 | 11.97 | 19.48 |
| Fund B | | | 1,500.00 | 10.32 | 17.08 | 20.61 |
| Stock Co. A | | 1.52% | 600.00 | 3.16 | 4.85 | 12.11 |
| Stock Co. B | | 4.31% | 1,400.00 | 4.04 | 6.03 | 12.39 |
| Stock Co. C | | | 2,200.00 | 9.65 | 12.44 | 17.89 |
| **TOTAL** | As of: | 9/01/98 | $15,040.00 | | | |

* *Average Annual Return*

*Source: NAB*

**FIGURE S–2.** Spreadsheet.

frequencies so that noise impulses and other interference will affect only a portion of the total information transmitted. Any disruptions can be filtered out and/or corrected through digital encoding/decoding techniques. If the transmission protocol uses a set of narrowband digital signal channels that are frequency-hopped through a series of available frequency segments, this approach is known as a type of code-division-multiple-access (CDMA). In CDMA, the information is spread throughout a bandwidth much wider than the actual bandwidth of the data alone. Each data bit is encoded with a binary sequence of tracking bits. Any receiver can recover the original information by using the same digital sequence to decode the data. (See also ***CDMA***.)

### Spyware

Level: 1

*Definition:* A wide range of software usually installed without the knowledge of the user and designed to collect information from the user's system and send that information via the Internet back to the source of the spyware program. Sometimes bundled as a component of free software, spyware can consume significant amounts of a computer's system resources and thus negatively affect computer performance. Spyware can be used to do everything from monitoring keystrokes on a keyboard to scanning for specific files or types of files on users' hard drives to gathering information generated by other programs on the computer (such as cookies and system logs). Sometimes legal notices of a company's use of spyware is included in the legal disclaimers and notices that appear when installing the application, but such information is often difficult to find and difficult to understand for most users. It is not uncommon to find literally hundreds of instances of spyware running on a computer that is routinely used to download free software or share files over the Internet. Within the last few years there have been a number of strategies devised to combat the proliferation of spyware, most notably the development of anti-spyware software (such as Ad-Aware, Spy Sweeper, and Microsoft's recently released AntiSpyWare). Just as it is with anti-virus software, it is crucial to keep anti-spyware software up to date or it will not be able to detect the most recent versions of spyware applications. Some experts recommend that users routinely update and run several different anti-spyware programs because no single program has yet been created that can identify and eradicate all existing types of spyware. (See also ***Trojan Horse*** and ***Virus***.)

### SQL (Structured Query Language)

Level: 2

*Definition:* An industry-standard language for creating, updating, and searching a relational database management system using a series of queries. IBM developed SQL in the 1970s for use in its System R products. SQL statements are used to perform tasks such as update data in a database or retrieve data from a database. Some common relational database management systems that use SQL are Oracle, Sybase, Microsoft SQL Server, Access, and Ingres. Although most database systems use SQL, most of them also have their own additional proprietary extensions that are primarily used only on their system. (See also ***Data Warehousing***, ***RDMS***, and ***Relational Database***.)

### SQL (Structured Query Language) Server

Level: 2

*Definition:* Pronounced "sequel server," generally refers to any server-based database management system (DBMS) that processes structured query language (SQL) requests. When the term is capitalized, it is used to refer to either the Microsoft or the Sybase version of their enterprise-level DBMS systems (Microsoft SQL Server or Sybase SQL Server). (See also ***DBMS***, ***RDBMS***, and ***SQL***.)

### SSL (Secure Sockets Layer)

Level: 2

*Definition:* Refers to a protocol designed by Netscape Communications Corporation to provide encrypted (secure) communications on the Internet. SSL is commonly used to enable e-commerce customers to put personal information such as a credit card number into an electronic form on a web site and have the information securely delivered to a web site

server without the possibility of any illegal interception of the data. (See also ***Authentication***, ***E-commerce***, ***HTTPS***, and ***ID***.)

### SS7 (Signaling System 7) Protocol

Level: 3

*Definition:* SS7 is the international high-speed signaling backbone used for the public-switched telephone network. SS7 is an out-of-band signaling system that provides fast call setup by means of high-speed, circuit-switched connections and transaction capabilities that deal with remote database interactions. SS7 makes such enhanced telephony features as caller ID, call forwarding, and call waiting widely available. SS7 also plays a key role in the deployment of ISDN. The SS7 protocol consists of four basic sub-protocols: Integrated Services Digital Network (ISDN), Message Transfer Part (MTP), Signaling Connection Control Part (SCCP), and Transaction Capabilities Application Part (TCAP).

### Stack

Level: 3

*Definition:* Refers to a computer stack, which is an ordered sequence of instructions, where the last instruction placed on the top of the stack is usually the first out. A stack is often referred to as a buffered or queued memory where commands, data, or instructions are temporarily stored while other functions are being executed.

### Standard Definition Television (See *SDTV*.)

### Standards Setting

Level: 3

*Definition:* Technical standards are established or set by professionally authorized industry organizations and/or national or international standards-setting bodies. There are more than 250 official technical standards-writing bodies working with, or under the auspices of, the major standards-setting bodies chartered or recognized as policy-neutral in their deliberations and recommendations of a new standard. Formal standards are established typically after lengthy series of procedural meetings, committee, subcommittee, and working group examinations, and completion of research and evaluations. The work often involves laboratory and field testing, followed by a subsequent formal recommendation based on test results and analysis. As the globalization of business and trade accelerates, technical standards-setting activities are becoming more complex and have increasing impacts on economic business interests. As a result, pressures on and within standards-setting organizations are mounting as the particular interests of companies, industries, or national governments are enveloped in technical criteria and issues under consideration. (See Table S–1.)

**TABLE S–1** Selected technical standards-setting bodies.

| | |
|---|---|
| ANSI | American National Standards Institute |
| ATSC | Advanced Television Systems Committee |
| CCITT | International Telegraph and Telephone Consultative Committee |
| CEA | Consumer Electronics Association |
| CSA | Canadian Standards Association |
| DIN | German Standards Institute (Deutsche Institut fur Normung) |
| DOC | Canadian Federal Government Department of Communications |
| ECMA | European Computer Manufacturers Association |
| EIA | Electronics Industry Association |
| FCC | Federal Communications Commission (U.S.) |
| GED | Global Engineering Documents |
| ICEA | Insulated Cable Engineers Association |
| IEEE | Institute of Electronic and Electrical Engineers |
| ISO | International Organization for Standards |
| ITU | International Telecommunications Union |
| NRSC | National Radio Systems Committee (U.S.) |
| NTSC | National Television Systems Committee (U.S.) |
| SMTPE | Society of Motion Picture and Television Engineers |
| VESA | Video Electronics Standards Association |

### Star Topology

Level: 3

*Definition:* A computer network architecture that has a central point or hub through which all

data transfers must pass (a type of hub-and-spoke approach to computer networking).

### Station

Level: 2

*Definition:* In the broadcasting industry, a station refers both to the business operations and the physical plant of a radio or television broadcasting facility. In telecom and computer environments, a station is another name for a telephone or computer unit connected to a larger LAN or WAN network. (See also ***Workstation***.)

### Steganography

Level: 2

*Definition:* Coming from the greek words *steganós* (covered) and *graptos* (writing), steganography is the art and science of conveying information in such a way that its presence is unnoticed. In the computer world, steganography usually involves the embedding of digital information within the unused portions of other types of digital files. For example, a steganographer could embed a digital text message inside a digital image file that could be discerned only by someone with the special software needed to extract the message from the bits that make up the image. Steganography is sometimes compared with encryption. However, the use of encryption is relatively easy to detect, whereas the use of steganography is purposely difficult to notice. There are many free steganography programs available on the Internet today. (See also ***Encryption***.)

### Stereo

Level: 2

*Definition:* The transmission and/or reception of two separate audio channels, instead of only a single or monophonic audio signal, in a stereo receiver system. In stereophonic broadcasting, a second channel is transmitted that contains what is called the "stereo difference information" signal. Monophonic radio receivers have the ability to receive the first audio channel that is the sum of the two signals of audio information, but the second channel is ignored. Stereo receivers are able to receive and process the two separate signals for playback on left and right speakers.

### STL (Studio Transmitter Link)

Level: 3

*Definition:* A specific link (by means of copper cables, fiber-optic cables, or microwave) often used by a television or radio station that is set up between the station's studio and its main transmitter tower site. Television station transmitters are often located miles from a station's studio in order to provide better coverage of the service area from the transmitter. Television STLs are used for analog video and audio signals, and for digital bit streaming for DTV. (See also ***Bit Stream*** and ***DTV***.)

### Storage

Level: 1

*Definition:* A broad term referring to any electronic process that retains or stores information. A range of approaches exist for different data, voice, video, or other information formats. Storage facilities can be electronic, magnetic, or optical. Computer RAM storage is electronic, and storage on a computer hard drive or a floppy disc is magnetic. Tape storage frequently used for data backups or audio and video recordings are also magnetic formats. Optical storage is used for many archiving storage tasks, but also for CDs and DVDs. In both voice and computer data networking, temporary storage responsibility is typically allocated to an electronic buffer storage area. (See also ***Buffer***.)

### Streaming Media

Level: 2

*Definition:* Playing sound or video in real time as it is downloaded over the Internet as opposed to waiting for the entire file to download, storing it in a local file, and then playing it after all of the data is transferred. A plug-in to a web browser or a media player decompresses and plays the data as it is transferred to your computer over the Web. Streaming audio or video avoids the delay entailed in downloading an entire file. Streaming requires a fast connection and a computer

powerful enough to execute the decompression algorithm in real time. (See also ***Plug-in*** and ***Windows Media Technologies***.)

### Strong Password

Level: 1

*Definition:* A strong password is one that is at least eight characters, includes a combination of letters (upper- and lowercase), numbers, and symbols and does not use words or combinations of words that appear in common dictionaries. One technique for creating strong passwords is to use a prompt (a sentence that is easy for the user to remember but almost impossible for an intruder to guess) and then use only the first character of each word and any numbers included. For example, a sentence such as this would be relatively easy to remember: "Armstrong moonwalked on July 20, 1969." It would produce a password of *Amo72069*. Some systems support longer passwords (including spaces), which would make it possible for users to employ complete sentences, but most today do not. (See also ***Authentication*** and ***Password***.)

### Structured Query Language (See *SQL*.)

### Studio Transmitter Link (See *STL*.)

### Stylus

Level: 1

*Definition:* A pen-like device that emits an electrical signal that is used in some computer systems to write on a special graphics tablet. Pen-based computing and personal digital assistant (PDA) systems are often used for graphical drawings or for use as a pointing device similar to a mouse in making selections in menu-driven program systems.

### Subcarrier

Level: 3

*Definition:* A subcarrier is part of a main transmitted RF signal and is used as a means of carrying information that is separate from the main information modulated onto a signal. To create a subcarrier, the information is inserted or embedded (by modulating it) onto a frequency that is relatively low compared to the carrier signal, but high relative to the digital rate of the information to be carried. Then the in-between carrier frequency is modulated onto the main carrier, which makes it a subcarrier. This commonly used process enables multiple sets of information to be carried in a manner that allows different information signals to be separated into their original information forms at the receiver.

### Subnet

Level: 3

*Definition:* Refers to a portion of a particular computer network, which may be a physically independent network segment but shares the same network address with other portions of the network. Such network "segments" are distinguished by a subnet number. Subnets are related to a particular network in the same way a specific network is related to the wider Internet. The Internet is a network of networks and a particular network can be considered a network of subnets. (See also ***Internet*** and ***IP Address***.)

### Subscriber Line

Level: 2

*Definition:* Refers to any phone line leased from the telephone company, including regular phone lines in homes or offices. In these cases, as a subscriber line, the account number is the area code plus the seven-digit telephone number. At the central office, this number is then dedicated to a specific telephone instrument at a specific location.

### Subsidiary Communications Authorization (See *SCA*.)

### Supercomputer

Level: 2

*Definition:* A broad term for a computer that performs at or near the currently fastest operational rate. Such computers are typically used for number crunching, including scientific simulations, animated graphics, analysis of geological data, structural analysis, physics, chemistry, electronic design, nuclear energy research, and weather forecasting. The primary difference between a

supercomputer and a mainframe is that a supercomputer channels all of its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently. (See also ***High-Performance Computing*** and ***Mainframe Computer***.)

**Super VHS (See *S-VHS*.)**

**Super Video Graphics Adapter (See *SVGA*.)**

**Surround Sound**
Level: 2
*Definition:* A stereo audio technique originated as a motion picture process to present a realistic sound environment in theaters. The original surround sound technique involved four separate audio channels and speaker units. Over time, theater sound systems developed into a speaker array in which three systems (left, center, and right channels) are typically located behind the movie screen and a U-shaped array of "surround" loudspeakers are placed in the rear of the theater. So-called "5:1" surround sound includes five discrete audio channels (three in front: right, center-mono, and left), two rear channels, and one dedicated to low-frequency effects.

**SVGA (Super Video Graphics Adapter)**
Level: 1
*Definition:* A term used to describe computer monitor resolutions higher than VGA (640 × 480 pixels). SVGA computer graphics cards first had a resolution of 800 × 600 (480,000 pixels), but the term is also used to describe contemporary monitor resolutions of 1600 × 1200 (with 4:3 aspect ratio) or higher. (See also ***Graphics Adapter***.)

**S-VHS (Super VHS)**
Level: 2
*Definition:* An upgraded version of VHS format videotape that utilizes a greater amount of video signal bandwidth to increase the amount of information able to be stored on the tape. Developed by JVC, the greater bandwidth available on S-VHS tapes produces better image resolution. S-VHS approaches broadcast quality with a possible resolution of about 400 video scan lines (NTSC TV has 483 active video lines) compared to VHS format of only about 230 lines of resolution. VHS tape players cannot play S-VHS tapes, although S-VHS decks are backward compatible to accommodate VHS format tapes. (See also ***VHS***.)

**S-video**
Level: 2
*Definition:* On computer equipment or a video monitor, there can be an S-video input that provides a plug interface for an S-VHS videotape player. S-VHS offers over 400 scan lines of horizontal resolution in comparison to the 230 lines offered with standard VHS. S-video is sometimes referred to as Y/C video because it separates the luminance (Y) and chrominance (C) information into separate video outputs. This process eliminates some color distortion when the signal is scanned, and provides higher resolution. (See also ***S-VHS***.)

**Switch**
Level: 2
*Definition:* An electronic matrix device for establishing and completing, or closing, connections in an electrical or electronic circuit. These circuits can operate through electrical, mechanical, or optical means. The user establishes information to be transported, such as voice, video, or data. The switch enables the user to route this information through a network to an end user. The user sending the information determines the end user's address. A video switch, or "switcher," is a device used in production facilities to determine which video source will be displayed during a broadcast or in postproduction. (See also ***Switched Network***.)

**Switched Network**
Level: 2
*Definition:* A telecommunications network able to transfer or switch calls from any point on the network to any other point or points depending on the communications format and services available to these terminals. (See also ***PSTN***.)

### Synchronous Transmission

Level: 3

*Definition:* In synchronous data transmission networks, digital bits of information are sent at expected time intervals, thus eliminating any need to transmit timing bits to establish a timing structure for the data stream. Information is transmitted at an established rate and the sender and receiver must have precisely synchronized clock functions. In asynchronous systems, a separate process is needed to periodically synchronize the two ends of the transmission channel. (See also ***Asynchronous***.)

### Synchronous Optical Network (See *SONET*.)

### SYNDEX (Syndicated Exclusivity)

Level: 3

*Definition:* FCC rule requiring cable system operators carrying "distant signals" (i.e., television broadcast signals of nonlocal, out-of-market stations) to black out syndicated programming for which a local broadcast station owns the exclusive rights. Congress, in legislation signed into law in 1999 as the Satellite Home Viewer Improvement Act (SHVIA), directed the FCC to apply the same rule to DBS satellite retransmission of superstation signals. (See also ***SHVA/SHVIA***.)

### Syndicated Exclusivity (See *SYNDEX*.)

### Sysadmin

Level: 2

*Definition:* Short for "system administrator," the term refers to the individual in charge of a computer system (usually a network server or cluster of servers). Activities performed by a system administrator include monitoring security configurations, managing allocation of user names and passwords, monitoring disk space and other resource use, performing backups, and setting up new hardware and software. (See also ***SYSOP***.)

### SYSOP (Systems Operator)

Level: 2

*Definition:* An abbreviation for a person responsible for operating a computer system or network and/or a private bulletin board system on the computer network. Sometimes used to describe the moderator of an electronic newsgroup. (See also ***Sysadmin***.)

### Systems Operator (See *SYSOP*.)

### Systems Administration (Administrator) (See *Sysadmin*.)

# T

### TA (Terminal Adapter)
Level: 3
*Definition:* A small electronic adapter unit used to convert ISDN lines to standard phone lines, or vice versa. (See also ***ISDN***.)

### Table
Level: 2
*Definition:* Refers to information arranged in rows and columns, most typically in relational databases and spreadsheet software applications. Can also be used to refer to HTML tables used to organize information and page objects on a web page. (See also ***Flat-File Database***, ***HTML***, and ***Relational Database***.)

### Tablet PC (Tablet Personal Computer)
Level: 1
*Definition:* Refers both to the piece of hardware that makes up the device and the operating system Microsoft has developed to run this type of device. A tablet PC is a personal computer with a screen that can be written on with a special pen and held like one might hold a clipboard. The pen can be used to "click" or "select" objects on the screen (including keys on a visual keyboard), and most tablet PCs also include software applications that can record handwriting and convert handwriting to text. Tablet PCs bring with them most of the same advantages and disadvantages found with traditional laptop computers. However, their predisposition to being "untethered" and carried around has been hampered by short battery life. Some laptop manufacturers have produced laptops that mimic tablet PCs by making it possible for the laptop screen to swivel around and fold flat (face up) on top of the keyboard. (See also ***Digital Ink***.)

### Tagged Image File Format (See *TIFF*.)

### Tandem Office
Level: 3
*Definition:* A type of central office that serves as a relay to forward a call from one central office switch to the next. A tandem office only connects to other local central offices (COs) or inter-exchange carrier offices (IXCs). It does not provide a direct connection to customer premise equipment. (See also ***CO***, ***CPE***, and ***IXC***.)

### Tariff
Level: 2
*Definition:* In telephone and other common carrier communications, such as satellites, a tariff is an established schedule of fees charged for access or use of certain equipment or services. Tariffs have to be approved by the Federal Communications Commission (FCC) before they can be put into effect.

### TBC (Time-Base Corrector)
Level: 3
*Definition:* An electronic timing or clocking device used with video production and transmission operations to correct inconsistent timing in various signals. Time-base correctors are used to synchronize signals or reestablish synchronization in connections with analog videotape recorders. Due to the rise in computer-based video applications, video capture board cards are being made to provide a time-base corrector function. (See also ***Video Capture Board***.)

### T-Carrier
Level: 3
*Definition:* Telephone industry transmission standards for digital circuits using time division multiplexing techniques to carry multiple voice-grade channels. T-carrier classes refer to the number of voice channels that can be carried simultaneously.

### TCP/IP (Transmission Control Protocol/Internet Protocol)

Level: 2

*Definition:* TCP/IP (sometimes called the Internet Protocol Suite) is the primary set of communications protocols that make the Internet function. The Internet Protocol (IP) is the standard set of rules used for transporting data on the Internet from one node to another. TCP, or Transmission Control Protocol, is a common convention used for verifying that the data being transmitted using the IP has been transported correctly to a designated address or location. (See also ***FTP***, ***HTTP***, ***Internet***, ***IP Address***, ***Node***, ***Protocol***, and ***SMTP***.)

### TDM (Time Division Multiplexing)

Level: 3

*Definition:* A multiplexing technique to allocate parts of a digital signal to certain specified time slots enabling a number of different signals to be transmitted simultaneously. TDM is used by telephone and satellite carriers to transmit multiple voice, video, or data signals on a single line or channel. Digital bits are assigned to time slots in a single transmission stream so that voice, data, video, or other information is interspersed as time-coded signals and transmitted simultaneously. Demuxing (de-multiplexing) is done at the receiving end to restore individual signals to their original form.

### TDMA (Time Division Multiple Access)

Level: 3

*Definition:* A digital communications multiplexing system used in various digital radio communications systems (e.g., satellites, cellular, PCS) that divides data signals into time segments for efficient transmission of multiple signals over finite spectrum resources. TDMA protocols boost carrying capacity and enable operators to provide other enhanced services. Alternative technical protocols include FDMA, CDMA, and GSM.

### Technobabble

Level: 2

*Definition:* Slang for "technical jargon," technobabble is characterized by excessive use of specialized acronyms, proprietary terms, and other phrases not widely known to the general public (much of which is contained within this book).

### Telco

Level: 1

*Definition:* A commonly used U.S. abbreviation for telephone company(ies) that usually refers to companies providing local telephone services such as the RBOCs and their subsidiaries or local exchange carriers (LECs).

### Telecommunications

Level: 1

*Definition:* An umbrella term that traditionally has referred to types of wire-line-based telephony or telegraphy communications. In recent years, the term has become much broader, encompassing computer data networks, online networks, video and audio systems, and most other forms of communication via electronic means.

### Telecommunications Act of 1996

Level: 2

*Definition:* Major U.S. telecommunications reform legislation updating, revising, and deregulating many provisions of the Communications Act of 1934, and addressing many new areas of advancing technology, was signed into law in early 1996. Encapsulated briefly in the following are major provisions of the act.

- Local telephone companies are permitted to provide long-distance telephone services with entry into the market to be determined on a case-by-case basis by the FCC.
- Long-distance telephone companies are permitted to offer competitive local phone services.
- The allowable reach of any single over-the-air television broadcasting entity has been raised to a maximum of 35% of the total U.S. viewing population.
- Radio national ownership limits were eliminated and local radio multiple ownership opportunities expanded.
- Cable rates have been deregulated in small markets, and will be determined largely according

to what the market will bear. Competition will be allowed in three years.

- Cross-ownership rules between cable and telecommunications companies have been eased.
- Allocation of spectrum for ATV services will be provided to existing television broadcasters.
- Prohibitions have been imposed against transmitting indecent materials via online systems, including the Internet, without restricting access to minors.

### Telecommunications Network
**(See *TELNET*.)**

### Telecommuting
Level: 1

*Definition:* A growing workforce concept for working on job tasks remotely (usually from home) as a result of the growing availability of telecommunications technology and computer technology for home installation. Office workers from laboratory scientist to sales force personnel are able to do office work at home on a part-time to full-time basis. Network systems and software access technology are becoming widely available, enabling telecommuters to connect directly to main office LAN networks. Communications via e-mail, audio, and more often video calling allow for interaction with colleagues in the office or those telecommuting from their own remote home sites either via the office LAN network or dial-up lines from across the country. As traffic in major cities increases drive times to and from offices, telecommuting becomes an increasingly attractive corporate benefit option for attracting and retaining high-level knowledge workers as employees. (See also ***VPN***.)

### Teleconference
Level: 1

*Definition:* A live telephone or network-based audio conferencing call between two or more users. If video communications are involved, the more accurate reference is "videoconference." (See also ***Videoconferencing***.)

### Telephony
Level: 1

*Definition:* Relates to the process of transmitting voice communications using a range of methods or means, including wire, satellite, microwave, fiber, or other medium.

### Teleport
Level: 3

*Definition:* A major satellite uplinking and downlinking facility that is often operated as a private business to provide telecom, data, video, and other communications connections typically in major urban metropolitan areas. Teleports are centralized locations for the installation of many satellite antennas that cannot be located at business premises for a variety of zoning, economic, physical space, safety, or other reasons. Often they offer clients convenient interconnection services via microwave, land line, cable, and fiber lines in addition to satellite facility support services.

### Telepresence
Level: 2

*Definition:* Sometimes referred to as "being there without being there," telepresence is the ability to connect to or transmit information that supports the aspects of the experience of being in that remote location. For example, a telepresence connection might be used to connect musical performers on different continents for a live, real-time music performance. Such an interface would typically involve high bandwidth video and audio feeds combined with software and hardware making it possible for the participants to communicate with everyone else who is participating, no matter where they actually are. The degree to which telepresence is achieved usually depends on the quantity and quality of sensory involvements included for all involved.

### Teletext
Level: 2

*Definition:* Refers to transmitting text-based services as part of a standard television broadcast signal by inserting the information in the vertical blanking interval. Closed captioning is a

form of teletext information transmitted to users. (See also ***VBI***.)

### Television Personal Computer/Personal Computer Television (See *TVPC/PCTV*.)

### TELNET (Telecommunications Network)

Level: 3

*Definition:* Refers to the process of connecting one computer directly to another computer on the Internet (also known as a "remote log-in"). When users are initiating a remote log-in, or "telnet session", they are literally establishing a long-distance connection with another computer on the Internet. These connections usually require authentication (user name and password). Telnet capabilities are built into Windows operating systems. (See also ***Authentication***, ***Log-in***, ***Password***, and ***PIN***.)

### Telstar

Level: 2

*Definition:* The first privately built and operated commercial U.S. domestic satellite (domsat) launched in 1962. Telstar was a joint venture between NASA and AT&T and the first active relay satellite for public telephone communications.

### Template

Level: 2

*Definition:* An established pattern that acts as a guide by which materials, products, and documents are identically created. As applied in computer networking, a template is a technical protocol for all computers or devices in the network.

### Terabit

Level: 2

*Definition:* One trillion digital bits, expressed as $10^{12}$ or 1,000,000,000,000 bits. (See also ***Bit***.)

### Teraflop

Level: 2

*Definition:* A measurement of computer processing speed where a "flop" refers to a single floating-point instruction. A computer able to process one teraflop would process $10^{12}$, or a trillion instructions per second.

### Terminal

Level: 2

*Definition:* Forming the end, extremity, or terminus of a computer or telecommunications network. A terminal is an endpoint device or connecting device in a network that can receive, manipulate, and send information. A typical terminal consists of a monitor and a keyboard, provided they are connected to a network. (See also ***Network***.)

### Terminal Adapter (See *TA*.)

### Terminal Emulation

Level: 3

*Definition:* A computer software program enabling a computer to act like a terminal to interconnect other computers to the network and to communicate with a server. (See also ***vt100***.)

### Terminator

Level: 3

*Definition:* A computer device placed at an endpoint in a computer network to indicate a terminus to avoid possible feedback looping. Terminator devices must have the same resistance (measured in ohms) as the transport medium, usually a 50- or 75-ohm coaxial cable.

### Terrestrial

Level: 2

*Definition:* A descriptive term referring to ground- or earth-based communications networks, equipment, or facilities, and to communication distribution systems such as broadcasting and microwave operations that propagate over the surface of the earth.

### Text File

Level: 1

*Definition:* A text file is a stripped word processing file or document reduced to simple text characters only. In text file form, a document can be transferred via the Internet or other online services, as well as copied into any

word processing program. Text file formatting does not recognize apostrophes or other non-text characters.

*Used in a sentence:* "I converted the letter to a text file so that I could just copy and paste the content directly into my e-mail message." (See also ***ASCII*** and ***Plain Text***.)

### Text Messaging

Level: 1

*Definition:* The exchange of short text messages, usually between two mobile phones. Text messaging has become a communications mode of choice for many mobile phone users because it is not as obtrusive as a telephone conversation (a text messaging conversation can be conducted in contexts where it is not appropriate to be talking on the phone), and they provide near-instant feedback that can be saved, recorded, and reused later. Because text messages are short, and because most mobile phones are not equipped with full QWERTY keyboards, text messaging has evolved its own system of abbreviations, word substations, and slang. For example, TTFN stands for "Ta-ta for now" and RUHOME for "Are you home?" (See also ***SMS***.)

### TFT (Thin Film Transistor)

Level: 2

*Definition:* A type of transistor circuit used in active matrix LCDs (liquid crystal displays) to produce displays up to 14 inches in diagonal screen size. TFTs are used to turn LCD display elements on or off, and sometimes are called TFT-LCDs or active matrix LCDs. TFT LCD technology is now commonly used in HDTV monitors, computer monitors, mobile devices, and more. (See also ***LCD***.)

### Thermal Mapping

Level: 3

*Definition:* A remote sensing technique that uses satellite-based sensors to measure emitted electromagnetic radiation in spectrum bands that are not within the visible light portion of the spectrum. Essentially, the detectors are able to measure the relative coolness or warmth of earth features and then assign color tones to these values in processing the data. Thermal mapping can be useful for geologic mapping (minerals), vegetation classification, vegetation stress detection, soil moisture content, wildfire management, thermal pollution, and ocean current studies. (See also ***GIS*** and ***Remote Sensing***.)

### Thin Client (See *Network computer*.)

### Thin Film Transistor (See *TFT*.)

### Thinnet

Level: 3

*Definition:* Also known as 10Base2, Thinnet refers to a sometimes used physical transmission medium for Ethernet LAN systems consisting of a relatively thin 50-ohm coaxial cable having a transfer rate capacity of 10 Mbps. (See also ***Ethernet***.)

### Threaded Discussion

Level: 2

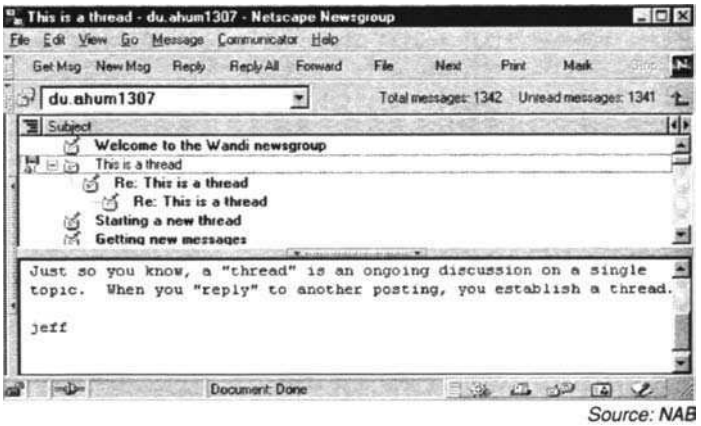
*Definition:* Refers to a more or less continuous chain of messages sent via e-mail or posted to a discussion group that are all related to the same topic. Typically, when a threaded discussion is being displayed, each reply to the original message is indented to indicate that it is a direct response to the message listed above it. Once someone posts a new topic, the potential for a new thread is created. If no one replies directly to that new topic, it is known as a "dead thread." (See Figure T–1 and see also ***Computer-mediated Communication***, ***Forum***, ***Newsgroup***, and ***Usenet***.)

### Throughput

Level: 2

*Definition:* A reference to network system transmission or computing capacity that indicates how much information can be transported or processed at any given time. Systems are judged to some extent on the maximum expected throughput of the system, or the maximum amount of data that may be transferred at any given time.

*Used in a sentence:* "By upgrading our infrastructure we significantly increased our network's throughput."



Source: NAB

**FIGURE T–1.** Threaded discussion.

### Tie Line

Level: 3

*Definition:* A telephone industry term for lines used as a dedicated connection between two switching systems. Also called tie trunks, tie lines allow two PBX systems to be connected without having to access any outside network lines. Tie lines usually have a per-month cost charged to a subscriber.

### TIFF (Tagged Image File Format)

Level: 2

*Definition:* TIFF is a common computer raster (bitmap) graphical format used for storing and exchanging high-quality (32-bit) digital images. TIFF files are labeled with the *.tif* or *.tiff* extension and are commonly used when scanning photographs or creating other high-quality images that are meant to be transportable to other image editing programs. TIFF files are most useful when they are uncompressed because they remain fully editable and resizable without the distortions that result from making such drastic changes to files in other formats (such as JPEG). When they are uncompressed, TIFF files tend to be quite large. (See also ***Compression*** and ***JPEG***.)

### Tilde ("~")

Level: 1

*Definition:* Located in the upper left of most computer keyboards, the tilde (pronounced "tilda") has been most commonly used to refer to a UNIX user's home directory. For example, *http://www.host.com/~someuser* is a generic form for a user's home web space, located in his or her *www* directory. When the web server sees a URL like this, it knows to look in that user name's home directory for a *www* directory and a default home page. In UNIX, the tilde is considered a wildcard that substitutes for the path of a user's home directory. For example, typing the command *ls* ~ in UNIX will display the content of the current user's home directory. (See also ***Wildcard***.)

### Time-Base Corrector (See *TBC.*)

### Time Code

Level: 2

*Definition:* In video and television productions, a time code stamp is inserted onto each individual frame of video to be used as a reference guide to assist in locating sections or segments of video. Television signals carry time codes in the vertical blanking interval. (See also ***SMPTE***, ***Time Code Generator***, and ***VBI***.)

### Time Code Generator

Level: 2

*Definition:* Electronic device for inserting time codes onto videotapes or other recording materials. A time code is almost always inserted onto

a blank video- or audiotape prior to recording a program, or can be generated during the taping of the program. A VCR tape can be fast-forwarded to any point, but if the time code generator is set to 0:00:00 the tape will be imprinted at that point as the beginning start time. Manual time code generation is not necessary when using digital video source because time code information is automatically recorded as part of the video frame information. (See also ***Time Code***.)

### Time Division Multiple Access (See *TDMA*.)

### Time Division Multiplexing (TDM)

Level: 3

*Definition:* A digital communication multiplexing technique based on precision time sequencing. (See also ***TDMA***.)

### Time Shift

Level: 2

*Definition:* Originally introduced to the masses via the VCR, the term refers to a program, usually audio or video, or an event that users can view at a time other than when it is broadcast or transmitted (at the user's convenience). Similar to on-demand services where users can "time shift" a program to their convenience by storing the program in a digital video recorder for use at a later time. New Internet programs allow users to make their own program guide, which allows them to time shift programs at their convenience. In traditional TV or radio, the station was in control. With the Internet and with time-shifting technologies, the user, visitor, viewer, or listener can schedule programs in any order, at any time. This results in time-shifting programs for convenience. (See also ***DVR***, ***TiVo***, and ***VCR***.)

### TiVo

Level: 1

*Definition:* One of the first successful commercial digital video recorders, the first TiVo hit the market in 1999 with its first video recorder (with a 10-Gb hard drive). TiVo was quick to build a loyal following because of its pricing scheme and innovative implementations, such as "learning" about its users' preferences and automatically recording programs a user might like. Some users are concerned about TiVo's ability to collect data about its use from units via the telephone line, but TiVo is adamant that it aggregates all data and does not identify individual uses by name. The term *TiVo* has achieved generic term status because it is commonly used to refer to DVR capabilities and technologies (e.g., "tivo-like") or used as a verb when digitally recording television (e.g., "Please tivo the game for me tonight."). (See also ***DVR*** and ***Time Shift***.)

### Token Ring

Level: 3

*Definition:* A type of LAN where a nominal perfunctory (i.e., token) frame of digital data must be received by an attached computer terminal or workstation before the workstation can begin transmitting information over the ring network. Token ring has been almost completely usurped by the 10Base-T cabling standard for Ethernet, although a few legacy systems might still utilize a token ring design. (See also ***10Base-T*** and ***Ethernet***.)

### Toll Office

Level: 3

*Definition:* Class of telephone central office that is the bridge between local and long-distance switching. If a caller dials a phone number requiring an area code, the local telephone central office determines that the call needs to be sent to another area, thus switching the call to a toll office (and incurring a toll charge) for hook-up with a long-distance company or operator.

### Tomcat

Level: 3

*Definition:* An open-source implementation of a Java-based web application technology created to run Servlets and JavaServer Pages (JSP) in web applications. (See also ***Java***, ***Open Source***, ***Servlet***, and ***Web Application***.)

### T-1 Connection

Level: 2

*Definition:* Commonly used to connect local networks to the Internet, T-1 (also known as DS1)

is a high-speed network connection capable of carrying digital traffic at 1.544 Mbps. (See also ***Broadband***.)

### Topology
Level: 2
*Definition:* Refers to the configuration, architecture, or physical layout of a telecommunications, cable, or other land-line system. Some common network topologies are a ring and star. (See also ***Star Topology***.)

### Touchpad
Level: 1
*Definition:* Similar in function to a mouse, a touchpad is a stationary computer "pointing device" used primarily on laptop computers to enable the user to move the pointer around the screen. Touchpads are typically small, flat surfaces positioned just below a laptop's keyboard. The touchpad enables users to press and slide a finger over the pad in order to direct and move the on-screen pointer. In certain units, the equivalent of mouse clicks can be achieved by gently tapping the pad. Some users find touchpads difficult to manage compared to a traditional mouse. (See also ***Trackball***.)

### Touch Screen
Level: 1
*Definition:* A type of video monitor designed to receive user input data by light touches to the screen surface. Touch screens are often used in menu-driven video information kiosk systems where users are able to obtain information by moving through various menus by touching appropriate segments or places indicated on the screen. They are also used on tablet PCs, smart phones, PDAs, and a variety of other devices. (See also ***PDA***, ***Smart Phone***, and ***Tablet PC***.)

### TP (See *Twisted Pair*.)

### Trackball
Level: 1
*Definition:* A trackball works like a traditional mouse lying on its back. To move the pointer on the computer screen, users rotate the ball with their thumb, fingers, or palm. One of the most convenient characteristics of trackballs is that they can be used on any surface, including a user's lap. (See also ***Touchpad***.)

### Traffic
Level: 2
*Definition:* A measure of the amount of signal information transmitted over a wired or wireless telecommunications network or system at a given point in time. (See also ***Traffic Engineering***.)

### Traffic Engineering
Level: 3
*Definition:* Network engineering functions involving the design of telecommunications networks to manage traffic or throughput demand under various conditions, including various techniques or capabilities to route information in the most efficient manner. Determinations are made regarding upgrading strategies or rerouting of traffic using backbone technologies such as ATM. Using ATM solutions, system storage buffers can be installed in major nodes to temporarily hold information until pathways are cleared, or data is rerouted to another less crowded part of the network. (See also ***ATM***.)

### Transaction Authority Markup Language (XAML)
Level: 2
*Definition:* A computer language designed to support multi-phase online business transactions that require certain conditions to be met before the final transaction takes place. For example, if a particular web-based service (such as a purchase) depends on a shipping company's confirmation of being able to ship the product by a certain date to validate the transaction, XAML can be used to interact with all of the web services involved, coordinate the priority of phases as they are completed, and finalize, cancel, compensate, or find alternative actions.

### Transceiver
Level: 2
*Definition:* An electronic device combining two functions (transmitting and receiving) in the same

equipment. Cellular phones, and some new PDAs such as Motorola's Envoy, are examples of mobile transceivers able to both send and receive messaging, paging, and voice signals.

### Transcoding

Level: 2

*Definition:* In a general sense, transcoding refers to the process of adapting or translating content in one medium or format to work in another medium or format (e.g., the conversion of Word to PDF, the conversion of Quicktime video to MPEG video, or the conversion of content intended for a PC-based web browser to content intended for a smart phone).

### Transformer

Level: 2

*Definition:* An electromagnetic device for changing the voltage of an AC power supply by physically isolating different currents in a system and converting time-varying signals from one level to another. Transformers are widely used in electronics and basically operate by using separate coils of wire wound around a magnetic core to induce generation of an electric current. One coil is considered primary and the other secondary, with the amount of electric signal induced by the flow of current into the secondary unit determined by engineering design. Large utility power transformers can be 20 feet tall, whereas RF signal transformers can be smaller than one-half square inch.

### Transistor

Level: 2

*Definition:* A semiconductor device (regarded as type of current amplifier) in which the output current can be controlled by the signal applied to it from one or more input terminals. They may be standalone discrete components, or in modern equipment they are produced as part of an integrated circuit, with many thousands on one silicon chip. Transistors are commonly used in computing system motherboards and microprocessors. (See also ***CPU***, ***Integrated Circuit***, ***Microprocessor***, and ***Motherboard***.)

### Translator

Level: 3

*Definition:* Used to extend the range of a broadcast station, a translator is a relay system that picks up distant broadcast signals, converts the signals to another channel to avoid interference, and retransmits them into areas the original signal could not reach.

### Transmission

Level: 2

*Definition:* The act of sending or transporting electronic signals from one point or terminus to another via a range of mediums and techniques. Signal transmissions are carried over physical wire, cable, optical glass or plastic fiber, or other physical lines, or transported via radio-frequency-based systems using a wide range of electromagnetic spectrum resources for broadcasting, microwave, MMDS, wireless cellular, PCS, satellite, and other wireless mobile services.

### Transmission Control Protocol/Internet Protocol (See *TCP/IP*.)

### Transmitter

Level: 1

*Definition:* In broadcasting, a transmitter is an electronic device that with the aid of an antenna propagates an electromagnetic signal such as radio, television, or other telecommunication.

### Transparent Mode

Level: 3

*Definition:* Refers to certain parts of the addressing, grouping, and transmission of signal information, which cannot be seen by users. The Open Systems Interconnect (OSI) model describes seven levels of functionality in a network. The layers range from a user's transmit command to reception of the information on a receiver's computer screen. In the OSI model, only the *Application* (first) layer can be observed or viewed by a user. All other levels are considered to be in transparent mode because the functions are performed out of viewing sight without further user input. (See also ***Clear Channel*** and ***OSI***.)

### 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 downlinking 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 prespecified 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 × 256 × 256),

more than the human eye can detect. Also called 24-bit color or RGB color.

### Trunk Line

Level: 3

*Definition:* A central transport line connecting a number of auxiliary network lines used in telecommunications, cable television, computer, and data systems. In business telephony and computer systems, trunk lines are "dedicated lines" commonly used for inter-office communications when direct access is required. Such trunk lines can only be used to communicate from office to office. Use of an area code or prefix is usually unnecessary. The number of transmissions at any given time is limited to the number of trunk lines available unless calls are multiplexed, allowing multiple calls to be carried on a single line. (See also ***Multiplexing*** and ***VPN***.)

### T-3 Connection

Level: 3

*Definition:* Refers specifically to a type of network connection capable of carrying digital traffic at 45 Mbps. Due to their relatively large bandwidth capacity, T-3 lines are often used for transmitting compressed video signals. (See also ***Broadband***.)

### Tuner

Level: 2

*Definition:* An electronic device used for selecting a certain band of frequencies for reception and/or demodulation. Radio and television sets are designed to receive multiple signals but set tuners can receive only one signal at a time. Frequency tuners adjust the reception frequency according to input from a viewer/listener via infrared remote control devices or a mechanical knob on the radio receiver or TV set.

### Turing Test

Level: 2

*Definition:* A method described by English mathematician Alan Turing in his 1950 paper "Computing Machinery and Intelligence," the Turing test examines a computer's ability to engage in human-like conversation, thereby measuring its degree of intelligence or sentience. Turing's basic idea was that the tester would interact with both a human and with a "computing machine" by asking it questions. If the tester could not determine which was the human and which was the machine, the machine would be deemed "intelligent." Each year the Loebner prize is awarded to determine the best Turing test competitors. Although each year the group has awarded an annual prize for the computer system that seems the "most human," no award has ever been given for passing the Turing test. (See also ***ALICE*** and ***Artificial Intelligence***.)

### Turnkey

Level: 2

*Definition:* A turnkey system is designed to perform certain specified functions for a client/customer and is purchased as a package where equipment and software is completely installed, checked out, and ready to run before the buyer takes custody of the system. A turnkey computer system is in contrast to a consumer purchasing a PC, several pieces of software, external devices, and so on and then fashioning a workable home computer system. Turnkey means delivering a complete, up-and-running system, and if it does not work properly in any way the vendor is responsible for fixing it.

### TV (Television)

Level: 1

*Definition:* Television is a telecommunications system capable of transmitting and receiving broadcast audio and video signals. There are several transmission mechanisms for television, including VHF frequency broadcasts, UHF frequency broadcasts, digital TV broadcasts, cable television, Internet-delivered television, and more. Over-the-air television in the United States is free (via advertiser support), whereas most other forms of television are subscription based. Up until recently, television was considered to be a service delivered only to traditional television receivers. However, the recent influx of multimedia computers and handheld devices has begun reshaping the landscape of television by delivering television content to a wide range of devices through a wide variety of transmission media. Just as computers are taking

on some of the characteristics of traditional televisions, so too are televisions now behaving more and more like computers. (See also ***EDTV***, ***HDTV***, ***NTSC***, ***PCTV***, ***SDTV***, and ***TVPC***.)

### TVPC/PCTV (Television Personal Computer/Personal Computer Television)

Level: 2

*Definition:* A TVPC is the hypothetical merging of current/future television sets with some level of computer functionality. Such units permit users to intermingle television viewing along with such activities as Internet surfing or computer game playing. Coming from the opposite direction, PCTVs are viewed as hybrid electronic products in which PCs include functions of a traditional television set. Such hybrid units have PCTV tuner cards, along with port connections for an outdoor antenna, satellite dish, or coaxial cable feed. Hybrid PCTVs receive and display transmitted television signals as well as provide traditional PC functionality. (See also ***Flat-Panel Display*** and ***Television***.)

### Tweening

Level: 2

*Definition:* Short for "in-betweening," it refers to the process of creating progressive frames between two images to make it look as if the first image is moving across the screen or gradually "morphing" into the second image. Tweening allows animators to draw only two images and then let the computer do the work to fill in the blanks between, which makes for much more efficient, smooth animation. (See also ***Morphing***.)

### Twisted Pair (TP)

Level: 2

*Definition:* A standard pair of copper wires used by the telephone industry for voice telephone or data network transmissions. Twisted-pair lines are almost universally installed as residential phone lines in the United States, thus telephone companies have an enormous installed base of copper wire facilities that physically or financially cannot be easily or quickly replaced to provide new upgraded interactive or other broadband services. Twisted-pair lines are grouped into a larger casing of 25 to 50 pairs, and individual wire pairs are twisted together to negate any magnetic interference caused by an adjacent wire pair.

### Two-Way

Level: 2

*Definition:* Also referred to as "full-duplex" communications, two-way communications facilities, whether wired or wireless (i.e., RF based), provide the capability to perform simultaneous interactivity where a receiver and sender can respond immediately to each other.

# U

### UBR (Unspecified Bit Rate)

Level: 3

*Definition:* A type of traffic on an ATM network that is not considered time critical, UBR data is transferred with an unspecified bit rate using whatever bandwidth is available at any given time. In this sense, UBR transmissions are similar to IP service. UBR traffic is given a "best effort" priority in an ATM network. (See also ***ABR***, ***CBR***, and ***VBR***.)

### UDDI (Universal Description, Discovery, and Integration)

Level: 3

*Definition:* UDDI is an open framework for describing or listing services on the Internet. Based on the W3C's XML standard and closely integrated with SOAP, UDDI provides three types of listings: White Pages, which include address, contact, and other known identifiers; Yellow Pages, which include industrial categorizations based on standard taxonomies; and Green pages, which include information about the technical means to access services offered by a particular company. (See also ***SOAP*** and ***XML***.)

### UHF (Ultra High Frequency)

Level: 2

*Definition:* The portion of the radio frequency spectrum ranging between 300 MHz and 3 GHz. The UHF band is used for transmission of television broadcast channels 14 through 67. Previously allocated television channels 68 through 83 have been reassigned for use as cellular telephone services, except for a few special cases. TV channels 52 through 69 are to be auctioned for other uses once the conversion to digital TV has been completed. UHF is also used for two-way radio communication and for cordless telephones. (See also ***DTV*** and ***Spectrum***.)

### UI (See *User Interface.*)

### Ultra Extended Graphics Array (See *UXGA.*)

### Ultra High Frequency (See *UHF.*)

### Underscanning

Level: 3

*Definition:* The process of decreasing the horizontal and vertical size of an image permitting the view of the entire video picture, including sync and blanking. Many professional TV monitors have an underscan button or switch to allow for viewing the entire TV picture. On a television screen, underscanning allows viewing of skew and tracking that would not be visible in normal (overscanned) mode. Underscanning is also helpful when aligning test charts to be certain they touch all four corners of the raster. Likewise, when checking the alignment of multiplexer images from a film chain underscan allows proper framing of the projected image going into the video camera. Underscanning is also useful on a computer monitor, where a user might want to make sure that all display information around the fringe will be shown (such as the Start button in the Windows operating system). (See also ***Overscan***.)

### UNI (User Network Interface)

Level: 3

*Definition:* A telephone industry protocol used to define the point at which the private subscriber and the public network meet. This protocol includes such items as signaling, addressing, and traffic management.

### Unicast

Level: 3

*Definition:* A one-to-one client/server connection during which the client receives a specific stream from the server, with no other client having access to that particular stream. Each client has

its own connection to the server and thus a separate content stream must be generated for each client requesting content from the server. (See also ***Client/Server***, ***Multicasting***, and ***Streaming Media***.)

### Unicode

Level: 2

*Definition:* A standard for representing characters as numbers, unicode can be used to represent more than 65,000 unique characters, which makes it suitable for languages such as Chinese, Japanese, and Greek. Unicode is much more flexible than ASCII, so it is generally assumed that as the computing world becomes more global unicode will replace ASCII as the "universal language" of computing. (See also ***ASCII*** and ***Plain Text***.)

### Uniform Resource Locator (See *URL*.)

### Uninterruptible Power Supply (See *UPS*.)

### Unique User

Level: 1

*Definition:* The number of different individuals who visit a web site or page within a specific period of time. (See also ***Hit***.)

### Universal Description, Discovery, and Integration (See *UDDI*.)

### Universal Remote

Level: 1

*Definition:* A "universal" remote is a consumer remote control unit that can be programmed to operate a variety of electronic systems or devices, including televisions, VCRs, stereos, DVD players, and other electronics equipment produced by a wide range of manufacturers.

### Universal Serial Bus (See *USB/USB2*.)

### UNIX

Level: 2

*Definition:* Created in the late 1960s and early 1970s, UNIX is a multi-tasking multi-user operating system that is still a popular operating system for multi-user installations. Many Internet servers run on UNIX systems (nearly all of the Internet's servers ran on UNIX in the early days of the Internet). UNIX is based on a collection of small, easily understood utilities that allow users to connect them in many different ways (and in ways the creators of UNIX did not predict), building procedures and sophisticated tasks to suit special needs. This "UNIX philosophy" is often contrasted with the more tightly controlled programming environments (such as Microsoft Windows, IBM mainframe, and Macintosh operating systems) in which users can only perform tasks the system designers could predict. UNIX was originally used only via a command-prompt interface, but recent versions of overlay tools such as NextStep and X Windows have provided users with a GUI UNIX interface. (See also ***Case Sensitivity***, ***Command Prompt***, ***GUI***, ***Linux***, and ***Open Source***.)

### Unspecified Bit Rate (See *UBR*.)

### Upconverter

Level: 2

*Definition:* A device that converts the digital data on a DVD so that it can be viewed directly on a high-definition television (HDTV) receiver with its higher resolution and wider display (16:9). The upconverter, performing the operation without intermediate conversion to an analog signal, digitally enlarges each frame to HD resolution. Although DVD players can produce 16:9 images without an upconverter, some players include an integrated scaler to up-convert the standard-definition DVD video to high-definition video. This up-conversion process can generally improve the perceived picture quality of standard-definition video. (See also ***Anamorphic DVD***, ***Downconverter***, and ***HDTV***.)

### Uplink

Level: 2

*Definition:* The ability and process of transmitting communication signals to satellite space segments from a ground-based earth station facility. Uplink frequencies differ for various types of communication services and are separate from

the frequencies used to downlink signals from the same satellite. To permit frequency reuse to increase spectrum efficiency, domestic C-band and Ku-band satellites are assigned orbital arc positions in geostationary orbit spaced 2 degrees apart, and high-power DBS satellites are spaced 9 degrees apart.

### Upload

Level: 2

*Definition:* To transmit a file from one source to another source, usually from one computer to another (especially from a client to a server). (See also ***Client/Server*** and ***FTP***.)

### UPS (Uninterruptible Power Supply)

Level: 1

*Definition:* Refers to a battery-powered device designed to provide constant power to mission-critical computing systems during interruptions in electrical service.

### Upstream

Level: 1

*Definition:* Communication from the client to the server or from the customer to the central office.

*Used in a sentence:* "I was surprised that with my Internet satellite connection the transfer speeds upstream were so much slower than those coming downstream." (See also ***Downstream***.)

### Uptime

Level: 1

*Definition:* Refers to the amount of uninterrupted time a computer, system, or network is operational; that is, running, available, and working correctly. Uptime is the time between failures. Hardware equipment specifications often promote and state an average uptime, with longer average uptimes suggesting more reliable equipment.

### URL (Uniform Resource Locator)

Level: 1

*Definition:* Also known as a "web address," a URL provides a standardized way of locating files, documents, or network services on the World Wide Web. URLs consists of four parts: the protocol type, the machine name, the directory path, and the file name. For example: *http://www.matisse.net/seminars.html*.

*Used in a sentence:* "We made the decision to print our company's URL on our business cards so that we could promote our new web presence." (See Figure U–1 and see also ***HTTP***.)

### USB/USB2 (Universal Serial Bus)

Level: 2

*Definition:* USB brought a new level of "plug-and-play" ability to computers by allowing users to connect external devices such as printers, scanners, cameras, and external drives to a PC via a USB connection. This approach greatly reduces the need to install special cards into dedicated computer slots that then require users to reconfigure the computer system. Personal computers equipped with USB allow computer peripherals to be automatically configured as soon as they are physically attached, without the need to reboot or run a special setup or installation program. USB also allows users to connect multiple devices (up to 127) to run simultaneously on a single computer. USB has been available in the Macintosh environment for many years, and made its way into the PC world with the introduction of Windows 95. USB version 1 provides a transfer rate of 1/5 Mbps. USB 2, released in 2000, is backward compatible with USB1 devices and interfaces. It provides a transfer rate of 45 Mbps, which is fast enough to support every major class of computer peripheral (external drives, digital cameras, printers, and so on) except for monitors/displays and high-end digital video systems. (See also ***FireWire***, ***Plug and Play***, and ***Install/Uninstall***.)

### Usenet

Level: 2

*Definition:* Usenet, which emerged in the pre-Internet era (late 1970s), is an array of global networks running on the Internet connected via Usenet server machines to exchange news or information in informal groups individuals join or leave as they choose. It is a global online system consisting of tens of thousands of topical discussion groups (i.e., newsgroups) and

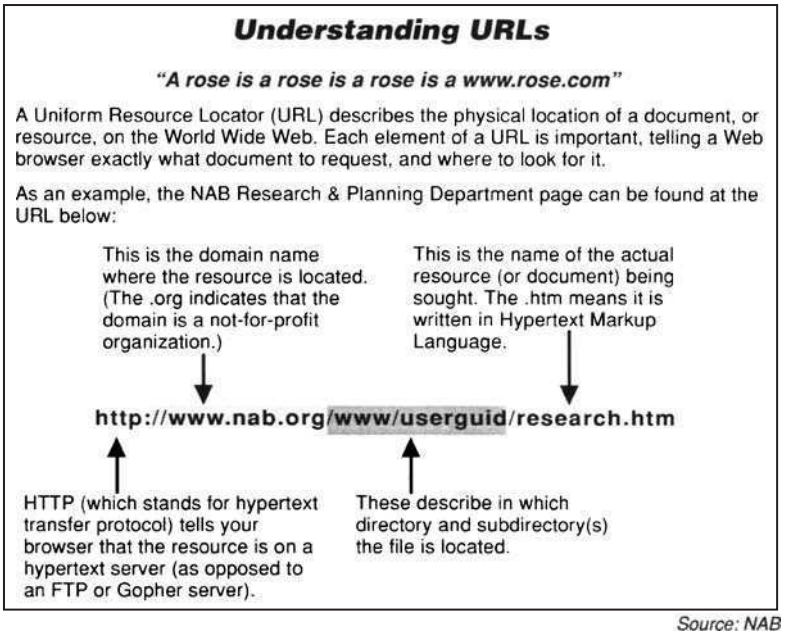



**FIGURE U–1.** URL.

is completely decentralized. Similar to bulletin board systems, groups tend to be focused on specific areas of interest—with topics ranging from dedicated fans of a particular television show to scientists studying nuclear particle physics. Usenet operates via a "post and pass along" protocol called Network News Transfer Protocol (NNTP), which quickly takes individual messages that have been posted to individual servers and passes them along to dozens or hundreds or thousands of servers at a time. Via this method, a copy of a message posted to a group such as *rec.arts.startrek* can exist on millions of news servers around the world in just a few minutes. Participating in Usenet requires the use of a "news reader." There are many free news readers available, and most e-mail programs (including Microsoft Outlook Express) include the ability to read newsgroups. Many ISPs provide access to Usenet, but for users whose ISP does not there is Google Groups (*http://groups.google.com*), which provides a web-based interface for searching, reading, and posting on Usenet. (See also ***Discussion Group***, ***Newsgroup***, and ***Threaded Discussion***.)



### User ID (User Identification)

Level: 1

*Definition:* A type of security password often used in business and other computer networks to allow access to the system. Users are assigned a unique combination of letters/numbers as an identifier to preclude easy access by unauthorized users.

### User Interface (UI)

Level: 1

*Definition:* Refers to the part or parts of any computer system a user employs or uses to interact with the system to direct or command it to perform some task. Recent user interface systems, for example, can be combinations of hardware (monitor) and software (Windows, or other graphical interface program) that provide a user-friendly working environment, allowing most computer functions to be transparent to the user. (See also ***GUI***.)

### User Friendly

Level: 1

*Definition:* A term generally referring to how easy a particular software or hardware design is for

use by an average individual. Apple's Macintosh computer became very popular based on its ability to be highly user friendly. First-time users could quickly feel comfortable using a Macintosh with very little training due to its intuitive graphical interface that allowed users to follow along logically and perform many common functions, such as opening software files to installing new software applications.

### User Session

Level: 1

*Definition:* The period of time a user interacts with an application, a user session begins when the user accesses the application. With web-based applications, session management is used to determine how much inactive time can pass (i.e., how long the user can go without doing anything) before the session is terminated. Session management is important for secure applications because they can prevent one authenticated user from leaving his/her browser window open and leave his/her desk for three hours, thus making it possible for someone else to just sit down and start interacting with the system. A user session can also end when the user quits the application, making it impossible for someone else to start up the application and assume the identity of the other person.

### User Network Interface (See *UNI*.)

### UTC (Coordinated Universal Time)

Level: 2

*Definition:* A more precise term for Greenwich Mean Time. UTC is the standard time by which all clocks and time zones are referenced. (See also ***GMT***.)

### UXGA (Ultra Extended Graphics Array)

Level: 2

*Definition:* A computer display specification capable of displaying 1,600 x 1,200 resolution, or approximately 1.9 million pixels. UXGA resolution is popular on some large-screen laptops and is available with most high-end graphics cards.

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# V

**Value-Added Network (VAN)**
Level: 2
*Definition:* A general reference describing a network system that when installed or operational adds business, productivity, technical efficiency, or some other intrinsic value to an information network. Basic data transmission networks used by business or public users, such as those providing e-mail or Internet services, are considered value-added networks.

**VAN (See *Value-Added Network*.)**

**Vaporware**
Level: 2
*Definition:* A derogatory term that refers to the tendency on the part of some software development companies to announce the existence of computer software applications before they functionally exist, or to announce release dates for software and then continually delay release of the product. *Wired* magazine gives out "Vaporware of the Year" awards annually.

*Used in a sentence:* "We had high hopes for the new software that promised to solve most of our problems, but it turned out to be just vaporware–never released to the public."

**Variable Bit Rate (See *VBR*.)**

**VBI (Vertical Blanking Interval)**
Level: 2
*Definition:* Refers to the portion of a CRT display signal that corresponds to the time it takes for the electron beam in a television set to travel vertically back to the top of the screen in order to begin scanning or tracing a new video field onto the tube screen. Because anything sent during the VBI does not show on screen, the vertical blanking interval can be used to carry data such as test signals, time code, closed captioning information, teletext, copy-protection indicators, content ratings for V-chip use, and other digital data. Part of the NTSC standard, VBI is still used even though TV sets are migrating to displays that do not use CRTs and electron guns. (See Figure V–1.)

**VBR (Variable Bit Rate)**
Level: 3
*Definition:* A quality of service (QoS) class defined by the ATM Forum for ATM networks, VBR is subdivided into a real-time (RT) class and non real-time (NRT) class. VBR (RT) is used for connections in which there is a fixed timing relationship between samples, such as with VoIP or videoconferencing. VBR (NRT) is used for connections in which there is no fixed timing relationship between samples but that still need a guaranteed quality of service. Transfer rates with VBR vary between a throughput capacity (i.e., a peak rate) and a sustained rate. However, data is not sent at a constant rate (as with CBR). (See also ***ABR***, ***CBR***, and ***UBR***.)

**VC (See *Virtual Channel*.)**

**V-chip**
Level: 1
*Definition:* Refers to the system that reads information encoded in a rated television program and blocks programs from the set based on the rating selected by the user (presumably the parent). Pursuant to FCC rules, half of all new television models 13 inches or larger manufactured after July 1, 1999, and all sets 13 inches or larger manufactured after January 1, 2000, must have V-chip technology. The V-chip is programmed to recognize the following ratings: TV-Y (for anyone), TV-Y7 (directed to children age 7 and above), TV-G (general audience), TV-PG (parental guidance suggested), TV-14 (suitable only for children age 14 and above), and TV-MA (suitable only for those age 17 and older). (See also ***Filtering***.)

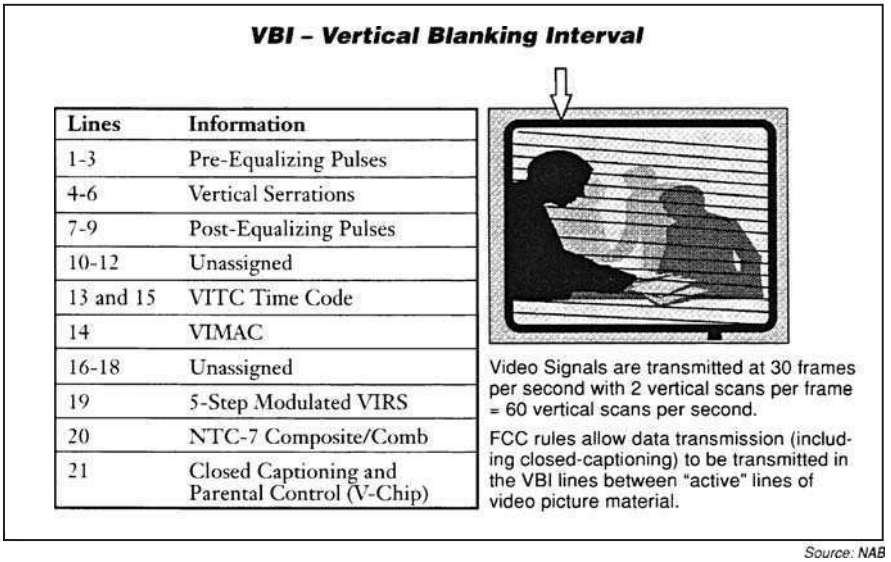


**FIGURE V–1.** Vertical blanking unit.

### VCR (Video Cassette Recorder)

Level: 1

*Definition:* Consumer electronics equipment with magnetic recording and playback capabilities and used for recording off-air programming and for viewing home videotapes or videotape rentals. VCRs were common video electronic appliances with household penetration rates exceeding that of cable television, although with the introduction of low-cost DVD players (and now DVD recorders), combined with the shift in entertainment media distribution away from VHS and toward DVD, VHS consumption (both tapes and players) is declining dramatically. (See also ***DVD*** and ***VHS***.)

### Vector Graphics

Level: 2

*Definition:* A way of creating and rendering images by way of mathematical descriptions that determine the position, length, and direction in which lines are drawn as opposed to a painting program that stores images only as a collection of dots (or bitmaps). The advantage of vector graphics software is that it makes it possible to change any element in a picture image at any time, as each part of the image is stored as an independent object and need simply be "recalculated." Vector images can be resized, stretched, and redrawn in many different ways. On the other hand, a bitmap must be changed one point or dot at a time, and changes are much more difficult to reverse or undo. Most sophisticated graphical programs use vector graphics technology due its flexibility and the image quality produced by the software. (See also ***Flash***.)

### Vectorscope

Level: 3

*Definition:* A device that measures the hue and saturation levels of color signals for broadcast television. A vectorscope allows technical personnel to know whether to adjust the colors of the video signal being broadcast by a television station or network.

### Vertical Blanking Interval (See *VBI*.)

### Very High Frequency (See *VHF*.)

### Very Large-Scale Integration (See *VLSI*.)

### Very Small Aperture Terminal (See *VSAT*.)

### Vestigial Sideband (See *VSB*.)

### VHF (Very High Frequency)

Level: 2

*Definition:* A portion of the electromagnetic spectrum from 30 to 300 MHz used for television broadcasting of channels 2 through 14, and for FM radio broadcasting. (See also ***Spectrum***.)

### VHS (Video Home System)

Level: 2

*Definition:* Introduced by JVC in 1976, until recently VHS has been the most popular consumer-oriented entertainment format for video content. VCR players use half-inch VHS magnetic tapes to record up to six hours of NTSC television. Image resolution of VHS playback is less than typical TV set display quality, which led to super VHS (S-VHS) as an improved recording system that offers image quality that is essentially comparable to NTSC television on typical sets. However, with the dramatic rise in popularity of prerecorded DVD content, and with the continued decline in price of DVD recorders, the video home system appears to be on its way out. (See also ***DVD***, ***DVR***, and ***VCR***.)

### Video

Level: 1

*Definition:* An umbrella term referring to the electronic signals representing moving pictures, video is usually used to refer to television programming received via television broadcast stations. However, video encompasses a broad range of applications, services, industries, and business. Among others: VHS and DVD recording and playback; video rentals of movies and related entertainment material; videotape and DVD information for education, training, and reference works; CD-ROM and DVD-based videos; video games in a range of formats; business video productions; business videoconferencing; and/or desktop video allowing some degree of motion video to be transmitted with audio signals for computer-based interactive conference meetings.

### Video Bit Stream

Level: 3

*Definition:* Refers to the flow or transmission of a digital video bit stream signal through any distribution channel. Network distribution of broadcast-quality compressed video typically takes place using MPEG-2 at less than 10 Mbps for SDTV and less than 45 Mpbs for HDTV. These rates can be further reduced using advanced video codecs. (See also ***Bit Stream***, ***Codec***, ***HDTV***, and ***SDTV***.)

### Video Capture

Level: 2

*Definition:* Refers to the process or action of using special hardware and software to capture video signals for conversion into digital formats that can be saved on computer hard disks for later manipulation with video graphics or editing software.

### Video Capture Card

Level: 2

*Definition:* A computer expansion card used to digitally transfer video signals from an external source so that it can be retransmitted, edited, or combined with other digital media.

### Video Cassette Recorder (See *VCR*.)

### Video Codec

Level: 3

*Definition:* A device or software module that enables the storage and transmission of compressed digital video. Digital video codecs are used in DVD (MPEG-2), in emerging satellite and terrestrial broadcast systems, and on the Internet. (See also ***Codec***, ***MPEG-2***, and ***Video Compression***.)

### Video Compression

Level: 2

*Definition:* Refers to a growing range of sophisticated methods or techniques for reducing the amount of video material in a signal to save on transmission requirements (i.e., bandwidth, speed) or storage requirements (e.g., disk, memory capacity). Video compression is especially critical for digitized video materials such as television programs, movies, and films, and particularly for HDTV broadcasting transmissions. Digital compression technologies include those that reduce

the "redundancies" in digitized video signals so that more information can be squeezed or transmitted through a channel or pipeline more efficiently. Full-motion video such as NTSC television, HDTV, or multiple channels of feature films distributed over a cable system, telephone fiber-optic networks, or satellite UTH/DBS services require enormous bandwidth capacity for transmission. Compression techniques are being developed or refined that will reduce spectrum and wire-line bandwidth requirements but at the same time do not lose motion quality. (See also ***Compression***, ***MPEG***, and ***Video Codec***.)

**Videoconferencing**
Level: 2
*Definition:* A developing interactive video communications business where video and audio software and hardware enable multiple sites to interactively see and hear exchanges, participate in meeting discussions, or ask questions following business presentations. Technical standards for videoconferencing operations have been adopted by the CCITT. (See also ***Application Sharing*** and ***Whiteboard***.)

**Video Home System (See *VHS*.)**

**Video On Demand (See *VOD*.)**

**Video RAM (See *VRAM*.)**

**Video Server**
Level: 2
*Definition:* A computer, or "host," dedicated to delivering video via the Internet or via an intranet. For example, video servers are widely used by news organizations to provide online access to short clips of broadcast news stories, by entertainment companies to deliver short clips such as movie trailers and music videos, and by educational institutions to deliver video-based course material.

**Videotape Recorder (See *VTR*.)**

**Video Terminal 100 (See *vt100*.)**

**Viewer**
Level: 2
*Definition:* A program, sometimes called a "player," to allow a file to be read (or played) but not changed. Viewers are often freely distributed even when the editor application is not. This allows users to create files with the editor and make the viewer available to other users so that they can see the files. Examples include the Microsoft Word and Adobe Acrobat viewers.

*Used in a sentence:* "I was not able to see the 3D images I downloaded from the Internet until I installed the applicable viewer application." (See also ***Acrobat***, ***PDF***, and ***Plug-in***.)

**Virtual**
Level: 1
*Definition:* Giving the appearance of reality through apparent or imitative functions or actions. The development of digital technology, artificial intelligence software, innovative graphical animation electronic systems, and high-power computing have combined to allow product developers, Internet users, multimedia creators, and many others to embark on the creation of virtual universes, virtual reality systems, virtual software, and interfaces, to name a few promising fields.

**Virtual Channel (VC)**
Level: 3
*Definition:* A term used in telecommunications or computer networks using asynchronous transfer mode (ATM) technology to define the portion of a network path a data packet of a fixed size must travel to get from sender to receiver. Analogous to broadband technology, where one transmission pathway can encompass a number of carrier frequencies or channels, a VC is contained within a virtual path. The pathway and channels are termed virtual because they are established for only one transaction and channel number is assigned arbitrarily by the computer. During actual transmission, the packet will be shifted or hopped from channel to channel as it passes through a switch. (See also ***ATM***, ***Switch*** and ***Virtual Path***.)

### Virtual Circuit

Level: 3

*Definition:* A telecommunications link that appears to a user to be a dedicated point-to-point circuit, but is not. Such circuits are set up on a per-call basis and are usually disconnected after each use. There are two types of "virtual" circuits: switched circuits (prompt the telecom system to create a virtual point-to-point service connection each time it is accessed for the transmission of information) and permanent circuits (predetermined paths or routes set up prior to any transmission occurring).

### Virtual Community

Level: 2

*Definition:* A community of individuals who work together, or communicate together, by the use of networks or the Internet. Communities can form from those who visit a specific web site regularly, belong to the same associations and organizations, often listen to the same radio stations, watch the same television programs, or those who subscribe to e-mail lists or post to discussion groups. Typically, virtual communities provide an interactive experience among users who tend to form like interests and bonds and may start to communicate with others. (See also ***Computer-Mediated Communication***, ***Forum***, ***Newsgroup***, ***Threaded Discussion***, and ***Usenet***.)

### Virtual Honeypot

Level: 2

*Definition:* A software program that mimics a real, functioning network and appears to users on the outside to be indistinguishable from a real system. A virtual honeypot is designed to attract hackers or other intruders who are trying to gain access to the system. The virtual honeypot allows system administrators to observe these attacks and, because the systems are not real, there is no threat to actual data or system integrity. (See also ***Honeypot***.)

### Virtual Path (VP)

Level: 3

*Definition:* In telecommunications networks, virtual paths are collections of virtual channels (VCs). VPs are links, or routes, set up from sender to receiver for the purpose of transmitting selected information. This connection is termed virtual, as the pathway is not a permanently hardwired circuit. VPs are established solely for the singular transfer of particular signal information. Multiple virtual paths can coexist on a transmission line. (See also ***ATM*** and ***Virtual Channel***.)

### Virtual Private Network (VPN)

Level: 2

*Definition:* Refers to the use of software and hardware to create a private secure environment within a public non-secure environment. Typically used on the Internet to conduct secure business-to-business transactions or internal network communications. VPNs use encryption in the lower protocol layers to provide a secure connection through an otherwise non-secure network such as the Internet. VPNs are generally cheaper than real telephone private networks using private lines, but for security they rely on having the same encryption system at both ends. Routers may perform the encryption security by firewall software.

*Used in a sentence:* "Our company installed a virtual private network so that we could make secure connections to the corporate computers from home or when we're on the road." (See also ***Encryption***, ***Firewall***, and ***Protocol***.)

### Virtual Reality (VR)

Level: 2

*Definition:* In general terms, VR is the use of computers to create (or recreate) environments. Virtual reality applications use sophisticated video, audio, sensory, and other computer-based or generated experiences to create a convincing "virtual" environment for a user. Sometimes using special hardware, such as head-mounted displays and/or sensory gloves or body suits, VR environments are often designed to transport the user into another experiential dimension. (See also ***Data Glove*** and ***Datasuit***.)

### Virtual Reality Modeling Language

**(See *VRML*.)**

### Virtual Set

Level: 2

*Definition:* Used in television news programs such as weather reporting, or other programming such as talk shows, where the foreground or background is not a physical set but a graphical image overlaid or mapped into the on-air signal (via chroma key) and appears to viewers like an actual physical set. In weather reporting, the weather map is a visual graphics file that appears to viewers as if the weathercaster is standing in front of the map during the report. Most virtual sets use a blue backdrop, a high-end graphical computer system to store virtual set files, and a high-end monitor to display the virtual set for the weathercaster during on-air broadcasts. (See also ***Chroma Key***.)

### Virtual Space

Level: 2

*Definition:* Refers to the creation of an illusion of 2D or 3D space created by the use of microprocessors, computer memory, and telecommunications networks. The extensive environments that can be created with flight simulators and virtual reality systems are examples of virtual space.

### Virtual Walkthrough

Level: 2

*Definition:* A software-based technique using virtual reality applications enabling a user to appear to "walk through" a physical environment that has been created using digital media. Virtual walkthroughs (also called "virtual tours") are increasingly popular with online property listings. Virtual walkthroughs are also used to preview architectural designs before being built.

*Used in a sentence:* "We used new virtual walkthrough technology to make it possible for potential buyers to navigate through the house and get a sense of how the rooms relate to each other."

### Virus

Level: 1

*Definition:* A malicious computer program designed to inflict some harm (lost information, corrupted computer programs, computer system damage, erroneous messages, and so on) on an infected computer system. Viruses require some type of assistance to spread. Typically they move via the exchange of storage devices, via the downloading of computer files, or via electronic mail. Not all viruses are destructive, but most are time consuming and costly to remove. General rules for avoiding viruses include installing up-to-date anti-virus software, not inserting storage devices of unknown origin (especially if they have been used in public computing facilities), staying clear of Warez web sites, and not opening e-mail attachments that contain attached files that end in *.exe*. Even taking all of these precautions does not protect users from the expanding reach of virus technology. New strains of computer viruses, though not yet highly functional or malicious, can infect users who simply view a digitally compressed image or through engaging in instant messaging or text conversations. Viruses are also beginning to spread to mobile phones and handheld computing devices that are network enabled. (See also ***Anti-Virus Software*** and ***Warez***.)

### Visible Light

Level: 2

*Definition:* The portion of the electromagnetic spectrum visible to the human eye. Visible light has wavelengths of 400 to 700 nanometers (nm).

### Vista

Level: 1

*Definition:* Microsoft's successor to its Windows XP operating system, previously called Longhorn. (See ***Longhorn***.)

### VLSI (Very Large-Scale Integration)

Level: 3

*Definition:* Manufacturing technology allowing the placement of hundreds of thousands of electronic transistors on a single semiconductor. VLSI manufacturing typically refers to integrated circuit (IC) designs with 100,000 or more transistors.

### V.90

Level: 2

*Definition:* The technical interface standard adopted by computer industry manufacturers that

enables computer users to connect a modem to other computers at the digital bit rate of 56 kbps. This standard is most commonly used to connect dial-up users to an Internet service provider. (See also ***Modem***.)

**VOD (Video On Demand)**
Level: 2
*Definition:* A system whereby users can request and obtain video content by either streaming the video over the network to the individual user or by downloading the content to a set-top box or personal computer for later viewing. VOD has become widely available in the United States, especially for subscribers to digital cable systems, though the range of VOD content is necessarily limited by system capacity. Some systems enable users to pause, fast forward, fast rewind, slow forward, slow rewind, jump to previous/future frame, and so on.

**Voice Activation/Recognition (See *Speech Recognition*.)**

**Voice Grade**
Level: 3
*Definition:* A telephone communications channel with the ability to transmit and receive voice conversation that falls in the audio frequency range of 300 to 3,000 Hz (3 kHz).

**Voice Internet Protocol (See *VoIP*.)**

**Voice Mail**
Level: 1
*Definition:* A centralized system for recording, accessing, and distributing telephone messages. In many respects mimicking the functions of a telephone answering machine, voice mail services are available with almost all modern landline and mobile telephone services. Voice mail owners can access, listen to, save, or delete messages from any phone, anywhere, at any time using a special user-defined access code. Some extended voice mail features include forwarding messages to other users on the same system, sending single messages to multiple voice mailboxes, storing messages for future delivery, adding comments to stored voice mail messages, and including different greetings for specified callers.

**Voice Response Unit (See *VRU*.)**

**VoIP (Voice Internet Protocol)**
Level: 2
*Definition:* VoIP (pronounced "voyp") describes a growing set of products and services related to the use of Internet protocols for voice-based communication. In general terms, VoIP involves the transmission of voice information in digital form in discrete packets rather than in the traditional circuit-committed protocols of the public switched telephone network (PSTN). VoIP not only avoids the tolls charged by ordinary telephone service providers (including taxes and regulatory fees) but makes possible a new range of capabilities and services that are difficult, expensive, or not possible to deploy on a traditional telephone network. For example, the blending of e-mail and voice mail, the ability to click on phone numbers in a computer database to initiate a call, ring lists that can ring any combination of phones at the same time, and so on. However, some VoIP services do not work during power outages and the service provider may not offer backup power. It may be difficult for some Internet voice services to seamlessly connect with the 911 dispatch center or identify the location of Internet voice 911 callers. (See also ***IP***.)

**VP (See *Virtual Path*.)**

**VPN (See *Virtual Private Network*.)**

**VR (See *Virtual Reality*.)**

**VRAM (Video RAM)**
Level: 2
*Definition:* Memory used for transferring video or graphical images to a display monitor after moving the image out of buffer storage. VRAM resources can transfer data in and out of memory simultaneously, speeding up video screen imaging or drawing. Simultaneous I/O using VRAM is known as "dual porting" and is made possible because VRAM contains two separate data paths

compared to traditional RAM, which has only one data path. VRAM plays an important part in graphics display of today's most sophisticated video game console systems.

### VRML (Virtual Reality Modeling Language)

Level: 3

*Definition:* Developed in the mid 1990s, VRML (pronounced "V-R-M-L" or "vermal") is a language for describing 3D vector graphics and possible Internet user interactions with them. Developers can use VRML to build a sequence of visual images into web environments with which a user can interact by viewing, moving, rotating, and otherwise interacting with an apparently 3D scene. Although there have been several commercial spin-offs that have all been shut down—such as Microsoft's Chromeffects effort (1998), Adobe's Atmosphere title (2004), and Intel and Macromedia's joint venture to promote Shockwave 3D on the Web, among others—some feel that the days of the truly viable 3D Web are just around the corner.

### VRU (Voice Response Unit)

Level: 3

*Definition:* Electronic hardware able to recognize human voice and convert analog voice signals into digital binary form. VRU applications are used to record dictation or to perform certain voice-activated commands. VRUs can use remote touch-tone telephones as input devices that then act as an interface unit for a computer system. Capabilities exist to convert data into a synthesized voice signal for purposes of audibly relaying information to a distant telephone caller, or to communicate with visually impaired users. (See also ***Voice Recognition***.)

### VSAT (Very Small Aperture Terminal)

Level: 3

*Definition:* Popular for its quick setup and wide range of uses, VSAT systems provide two-way communication with satellites. VSAT services are delivered through the use of either C-band or Ku-band geostationary satellites for video, voice, fax, and data transmissions. VSAT antenna typically range from 1 to 3 meters in diameter and are capable of downstream transfer rates of up to 20 Mbps. Although upstream rates are much slower (usually less than 100 Kbps), VSAT is becoming a popular way of delivering Internet service to areas not served by wire lines. VSATs are capable of receiving point-to-point or point-to-multipoint services depending on users needs. Many businesses are part of large VSAT networks to receive sales instructions or transmit daily receipts to central locations, manage credit card processing, and so on. VSAT is also used for distance education and for remote monitoring. Most VSAT systems rely on a large central hub for interconnectivity, although the use of mesh (hubless) VSAT networks can provide direct communication among VSAT terminals. They can also be configured as both one-way (receive only) and two-way (interactive) terminals.

### VSB (Vestigial Sideband)

Level: 3

*Definition:* A type of RF transmission technique in which a typically generated double-sideband AM signal is technically filtered so that the energy of the sidebands is redirected into one sideband. The enhanced sideband becomes the carrier signal and only a small portion of the other, complementary, sideband is transmitted.

### VTR (Videotape Recorder)

Level: 2

*Definition:* A video recording and playback tape deck, usually of professional quality. VTRs are now being replaced by other recording media for some applications, but they are still very widely deployed.

# W

### W (See *Watt*.)

### WAI (Web Accessibility Initiative)

Level: 1

*Definition:* An effort launched by the World Wide Web Consortium in 1997 to raise awareness of, and develop technologies for, people with disabilities using the Internet. Because there are literally millions of people around the world with some form of disability or disabilities that make it difficult or impossible for them to use and participate in the development of the Internet, web accessibility has become a priority for those who oversee Internet development. Those involved in the Web Accessibility Initiative coordinate with various organizations around the world to improve the accessibility of the Web, paying special attention to the development of accessible technologies, creating accessibility guidelines and tools, promoting education and outreach, and conducting research and development. (See also ***Accessible Content***.)

### WAN (Wide Area Network)

Level: 3

*Definition:* An extended communications network allowing data or other signals to be transmitted from a corporate or business LAN via the public telephone switched network or through a private alternative telecom service carrier to another business LAN at some distant location. WANs are different from LANs in that signals are transported through an outside public or private telecom carrier, whereas LANs are usually restricted to a single business or building. A common WAN application is to use a telephone RBOC or ALT carrier to interconnect to LANs located in two separate cities, such as Chicago and Indianapolis.

### Warez

Level: 2

*Definition:* Refers to web sites maintained by hackers and software pirates who distribute everything from unlicensed software to illegally obtained system passwords to codes to break into cellular phones and telecommunications systems. In addition, warez sites are infamous for spreading computer viruses. Such sites provide Internet users with free access to copyrighted software and video games, or pirated software can be downloaded for a fraction of the original cost. Whereas they are a burgeoning business in Asia in particular, many warez piracy sites are actually hosted on U.S.-based Internet servers and are legally difficult, if not impossible, to shut down. (See also ***Encryption Container***, ***Hacker***, and ***Virus***.)

### Warm Boot

Level: 3

*Definition:* Refers to the process of restarting a computer without turning off the power to the system (on IBM-compatible machines this is executed by pressing Ctrl + Alt + Del on the keyboard). Some computer errors cannot be reset by a warm boot and require that power to the system be shut down and then turned back on (known as a "cold boot"). (See also ***Boot*** and ***Cold Boot***.)

### Watermarking

Level: 1

*Definition:* The process of inserting bits of information into a digital file (e.g., document, image, audio file, and so on) to indicate ownership and

copyright of that digital object. Watermarking can be used to authenticate an "original" iteration of a digital file. It can also be used to track illegal copying of digital files. (See also ***Digital Rights Management***.)

### WATS (Wide Area Telecommunications Service)

Level: 3

*Definition:* Discounted toll rate services offered by all long-distance and local phone companies. Out-WATS allows users to dial out at a discounted rate, whereas In-WATS allows companies leasing 800-lines for consumer marketing or information services to receive volume discounts.

### Watt

Level: 2

*Definition:* The power dissipated by a current of 1 amp flowing across a resistance of 1 ohm, or as 1 joule per second. Electric devices or equipment will indicate power requirements in watts. Watts can be converted to amps by dividing the wattage by the voltage.

### Waveform Monitor

Level: 3

*Definition:* A special type of oscilloscope used in television applications to measure and display the base-band video signal. For example, waveform monitors assist with the calibration of television cameras, making it possible to ensure that multiple cameras used at the same location produce the same results. Waveform monitors can also be used in film-to-tape transfers to help with color correction.

### Wavelength

Level: 3

*Definition:* Refers to the distance between points of equal phase in a continuous periodic cycle measured at any instant in time. For example, in a sinusoidal wave a wavelength might be measured from peak to peak, or trough to trough. The wavelength of any wave is related to its frequency such that the product of the frequency and the wavelength always equals the speed of propagation of the wave. The speed for electromagnetic waves equals the speed of light in the medium through which the wave is passing.

### WCDMA (Wideband Code Division Multiple Access)

Level: 2

*Definition:* A technology for wideband digital radio communications of Internet, multimedia, video, and other capacity-demanding applications known as "3G." Supporting transfer rates up to 2 Mbps, WCDMA has been selected for the third generation of mobile telephone systems in Europe, Japan, and the United States. (See also ***CDMA*** and ***3G***.)

### Wearable Computer

Level: 2

*Definition:* The term refers to a computer that is always with the user, is comfortable and easy to keep and use, and is as unobtrusive as clothing. Current concepts of wearable computers range from today's virtual reality headsets and mini-pagers to a predicted near-future when computer devices will be embedded in all types of wearables, such as clothing, eyeglasses, belts, and jewelry. For example, Bluetooth technology has ushered in lines of wireless jewelry that blinks when the wearer's mobile phone is ringing. (See also ***Information Appliance*** and ***Palm-Top Computing***.)

### Web

Level: 1

*Definition:* Common lexicon for the World Wide Web, the portion of the Internet that runs via a network of servers and clients that communicate using the Hypertext Transfer Protocol (HTTP) and is accessed via a web browser. Web sites offer a home page and other attached web page files created using HTML. Often web pages contain hypertext links to other pages on the same site, or to other sites with related information or documents. The Internet and Web are accessible via personal computers using a wide variety of connection technologies. (See also ***Browser***, ***HTML***, ***HTTP***, ***Hypertext***, ***Internet***, and ***Modem***.)

### Web Accessibility Initiative (See *WAI*.)

### Webmaster
Level: 2
*Definition:* An Internet-related reference usually meaning the administrator responsible for a particular web site or the person in charge of the management and design of the site.

### Web Page
Level: 1
*Definition:* A document written in HTML and transferred over the World Wide Web using the Hypertext Transfer Protocol (HTTP). Companies, individuals, organizations, government offices, agencies, and basically anyone else who wants to create their own web pages to convey information for private, semi-private (e.g., internal corporate), or public consumption. Accessed via a web browser, web pages contain basic information and reference materials, and often provide hyperlinks or automatic transfers to other web pages or web sites of related interest or on related topics or issues. (See also ***Browser***, ***HTTP***, ***Internet***, and ***Web***.)

### Web Server
Level: 2
*Definition:* A computer configured to communicate using the Hypertext Transfer Protocol (HTTP), connected to the Internet, and capable of receiving, processing, and transmitting HTTP requests. A web server fulfills requests from users who type in the URL of a particular web site by delivering the text and graphics to the user-computer's address. Web servers can also be configured to handle interactive requests such as product orders, search requests, and credit card validations. (See also ***Active Server Pages***, ***Browser***, ***Common Gateway Interface***, ***E-commerce***, ***Internet***, and ***URL***.)

### Web Site
Level: 1
*Definition:* Refers to any address/location on the World Wide Web. The site can range from a single web home page to a series of directories to other pages containing series of documents all linked under the initial web site address.

### WebTV
Level: 2
*Definition:* Now owned by Microsoft, WebTV was one of the first entries in the much-publicized convergence of the World Wide Web with television. From a functional standpoint, WebTV delivers computer-like functionality via a set-top box, wireless keyboard, and television monitor. MSN TV 2, released in 2004, supports high-speed, always-on Internet connections, home networking, and messaging on a TV while still functioning as a TV-based web and e-mail terminal (with wireless keyboard). (See also ***ITV***.)

### WEP (Wired Equivalent Privacy)
Level: 2
*Definition:* WEP is a relatively weak (40-bit) form of data encryption defined as part of the 802.11 standard and is used to prevent intruder access to wireless networks and to prevent eavesdropping on those networks. WEP encryption requires the administrator to define a set of respective keys for each wireless network user based on a key string passed through the WEP encryption algorithm. Access is denied by anyone who does not have an appropriate key. (See also ***802.11x***, ***Encryption***, and ***WPA***.)

### WfM (Wired for Management)
Level: 2
*Definition:* Developed by Intel, WfM is an open industry specification to help ensure a consistent level of built-in management features in Intel-architecture PCs. Such features include monitoring, updating, and configuring computers through remote connections. (See also ***PXE*** and ***Remote Wake-up***.)

### What You See Is What You Get (See *WYSIWYG*.)

### Whiteboard
Level: 2
*Definition:* Refers to the feature of many video-conferencing systems that makes it possible for conference participants to work on a common

display area that allows for writing or drawing that is then shown on all of the participants' monitors at the same time. (See also ***Application Sharing*** and ***Videoconferencing***.)

**Wide Area Network (See *WAN*.)**

**Wide Area Telecommunications Service (See *WATS*.)**

**Wideband**
Level: 3
*Definition:* Refers to telecommunications facilities, whether wired or wireless, where a channel has a bandwidth greater than that used for voice-grade telephone services (4 kHz). Wideband video channels offer much greater capacity than typical 6-MHz channels used for NTSC television broadcasting, although compression techniques are being used to squeeze multiple video channels (4 to 5) in the same spectrum used for a single analog television channels. Compression makes the advantages of wideband facilities such as satellite transponders (36 to 72 MHz) or fiber-optic lines even greater for transmitting multiple NTSC or even HDTV video services.

**Wideband Code Division Multiple Access (See *WCDMA*.)**

**Widescreen**
Level: 2
*Definition:* In television and film, widescreen is an image with a greater aspect ratio than traditional NTSC television and 35-mm film (approximately 4:3). HDTV uses an aspect ratio of 16:9, whereas other ratios for film include 1.85:1 and 2.35:1 (such as with Panavision).

**Wi-Fi Protected Access (See *WPA*.)**

**Wiki**
Level: 2
*Definition:* First created in 1995, Wiki is a server-side application that allows any user with a web browser and an Internet connection to freely create web pages and to edit any other Wiki-driven web pages. Wiki also refers to a web site that is driven by the Wiki software. One of the largest Wiki projects on the Internet today is the Wikipedia, a collection of user-contributed, and user-edited, encyclopedic submissions that totals almost 500,000 articles in English and has versions in many other languages.

*Used in a sentence:* "My company set up a Wiki so that everyone could read, edit, and add to our company history." (See *wikipedia.org* and see also ***Client/Server***.)

**Wildcard Character**
Level: 1
*Definition:* A special computer keyboard character, or sequence of characters, used to represents one or more other characters. Usage in the computer and Internet worlds is similar to a joker in a deck of playing cards that can be made a "wild card" to act as any other card in the deck. Wildcard-enabled systems allow computer users to search for all files with names that contain similar qualities. For example, in Microsoft Windows a user could search for all Microsoft Word files that begin with the letter *s* by searching for *s*.doc*. The asterisk is used as the wildcard to represent all other character sequences following the initial *s* letter). The technique can be very useful if a user cannot remember a specific file name or would like to see an entire grouping of files that were created to share some part of their name.

**WiMAX**
Level: 2
*Definition:* An implementation of the IEEE 802.16 standard, WiMAX is a wireless technology that provides high-throughput broadband connections over long distances (compared to previous wireless technologies). Providing network connectivity speeds of up to 75 Mbps, WiMAX can be used for a number of applications, including "last mile" broadband connections and hotspots for direct high-speed connections (or the connections of 802.11x wireless access points). One WiMAX connection can support dozens of businesses with T-1–type connectivity or hundreds of homes with DSL-level connectivity. (See also ***Broadband Wireless Access*** and ***802.11x***.)

### WIMP (Windows, Icons, Menus, and Pointing Device)

Level: 1

*Definition:* Acronym that refers to the dominant paradigm of today's desktop computing hardware and software that involves software that functions via a set of visual interfaces, such as application windows, clickable icons, and drop-down menus that are all accessible via a pointing device such as a mouse, touchpad, trackball, and so on. First made famous by the Macintosh computer, and subsequently imitated by Microsoft's Windows operating systems, WIMP is just one of many existing and possible future human/computer interfaces. (See also ***GUI*** and ***HCI***.)

### Windows

Level: 1

*Definition:* The world's most popular set of closed-source, proprietary operating systems for IBM-compatible personal computers and servers, Windows is produced by the world's largest software maker (Microsoft). The first version of Windows (version 1.0) was released in 1985, but Microsoft's graphical interface did not gain significant market share until the release of version 3.1 in 1992. As of June of 2005 the range of Windows operating system products includes Windows Mobile (for handheld devices), Windows XP (Home, XP Tablet, and Media Center editions), and Windows 2003 Server. Windows operating systems are recognizable for their use of application "windows" within a graphical user interface, with commands that are accessible via drop-down menus or key commands. Windows is optimized to work with pointing devices (such as a mouse, stylus, or touchpad), and as an operating system, creates a "shell" within which other programs run. (See also ***Longhorn*** and ***Operating System***.)

### Windows, Icons, Menus, and Pointing Device (See *WIMP*.)

### Windows Media Technologies

Level: 2

*Definition:* A suite of software technologies (including applications, file formats, and rights management) focused on the creation and distribution of audio and video content. Technologies of Windows Media include the Windows Media Player, the Windows Media Encoder, Windows Media Services, the Advanced Streaming Format (ASF), Windows Media Audio (WMA) format, Windows Media Video (WMV) format, and a developer's kit for creating Windows Media content. As more and more audio and visual content is being distributed via the Internet, technologies such as Windows Media are playing larger and larger roles in people's daily media experiences. (See also ***Streaming Media***.)

### Winsock

Level: 3

*Definition:* Winsock is a programming interface and the supporting program that handles information requests for Internet applications on computers using the Microsoft Windows operating system. In other words, it is the software that allows a personal computer to function on the Internet. Winsock is built on a particular convention for connecting with and exchanging data between two program processes within the same computer or across a network. Winsock runs between an application program such as a Mozilla Firefox browser and the protocols (TCP/IP) that connect the user's computer to the Internet. Winsock has been supported by every version of Microsoft Windows operating systems since MS Windows version 3.0. (See also ***Operating System*** and ***TCP/IP***.)

### Wintel

Level: 2

*Definition:* Refers to all machines running a Microsoft Windows operating system and using an Intel computer processor (a combination of "W"indows and "Intel"). Although Wintel configurations accounted for the lion's share of new computer purchases in the mid 1990s, Wintel market share began to decline after its high of approximately 87% of all personal computers sold in 1997. Competition is increasing for both Microsoft and Intel, as alternative operating systems (such as Linux) and competing chip makers (such as AMD) are grabbing larger and

larger pieces of this expanding market. (See also ***Windows***.)

### Wipe
Level: 2
*Definition:* A video-production-related term referring to an extended transition between two different scenes. Wipes are created in the mix-effects nit of a video production switcher. They can be selected from different types of patterns, from a simple vertical or horizontal split to circles and stars or more complicated effects. Wipe transitions may also be created with software using a computer-based nonlinear editor.

### Wired Equivalent Privacy (See *WEP*.)

### Wired for Management (See *WfM*.)

### Wireless Communications
Level: 2
*Definition:* Encompasses two broad, fast-growing categories of spectrum-frequency-based and increasingly digital instead of older analog-based communications services. One category includes mobile wireless communications services, including cellular and PCS telephony, ESMR, paging, messaging, and satellite mobile phone/data services. Many services are providing links to the expanding range of wireless Internet appliances, including PDAs, laptop computers, and 3G mobile handset phones. A second broad industry sector in the wireless communications market is the equally dynamic wireless broadband fixed access market. Providers offer point-to-multipoint services from a stationary antenna base, or series of bases, and include MMDS, LMDs, and other data services. (See also ***Cellular Telephone***, ***Datacasting***, ***LMDS***, ***MMDS***, and ***PCS***.)

### Wireless Internet Access
Level: 2
*Definition:* Describes the means by which a computer or handheld device can connect to the Internet via a wireless access point that is usually connected by wire to a LAN and then to an Internet provider. Most notebook computers now come with built-in wireless capabilities, and many public places, businesses, schools, and a growing number of homes have installed wireless Internet access technologies. (See also ***802.11x*** and ***Wireless LAN***.)

### Wireless LAN (Wireless Local Area Network)
Level: 2
*Definition:* A type of wireless campus-wide or private business-park digital data network used for creating local area connections among computers. Most wireless LANs are also configured to provide Internet connection, e-mail delivery, file transfers, and other application services. (See also ***Wireless Internet Access***.)

### Wireless Local Area Network (See *Wireless LAN*.)

### WMT (See *Windows Media Technologies*.)

### Workgroup Computing
Level: 2
*Definition:* Refers to software tools and technologies designed to support groups of people working together on a project, often at different sites, and connected through a computer network. Workgroup computing typically involves e-mail, the sharing of data files, coordinated scheduling, and workflow management. (See also ***Groupware***.)

### Workstation
Level: 2
*Definition:* A personal computer that may operate in a standalone environment or as part of a computer network. *Workstation* sometimes refers to a computing system that is more powerful than a simple personal computer. Such systems are commonly used for 3D modeling and animation, computer-aided design, and digital audio production.

### World Wide Web (See *Web*.)

### Worm
Level: 2
*Definition:* A worm is a self-replicating program designed to copy itself from one machine

to another ad infinitum. although not all worms are malicious by design, because they spread without human intervention the simple act of copying themselves (sometimes thousands of times) and spreading (sometimes to tens of thousands of computers) can consume so many network resources that system problems can occur. Some worms, such as the Blaster worm, were designed not only to self-replicate and spread but to allow a remote user to access and control an infected system. (See also ***Virus***.)

### WPA (WiFi Protected Access)

Level: 2

*Definition:* Designed to improve on the weakness of the Wired Equivalent Protection (WEP) standard, WPA is a wireless security standard that includes dynamically generated keys, increases in the size and number of keys in use, and a secure message verification system to make it more difficult for intruders and eavesdroppers to succeed. (See also ***802.11x*** and ***WEP***.)

### WWW (World Wide Web) (See *Web*.)

### WYSIWYG (What You See is What You Get)

Level: 2

*Definition:* This euphemistic computer term is often used in word processing or other text and graphic documents suggesting that what is displayed on the computer screen is what should be produced in hardcopy when printed. If this were only true, many computer users would be delighted. Essentially, page layout, size, typeface, and other publishing functions should be able to be viewed prior to printing. Older word processing applications would alter typeface styles (holding, italics, underlining) but did not display the results on the screen. Newer applications show most text alterations and allow viewing of the formatted page, including graphic insertions, and thus WYSIWYG is indeed much closer to what you might get when a document is printed. (See also ***GUI***.)

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# X-Y-Z

### XAML (See *Transaction Authority Markup Language*.)

### X-band
Level: 3
*Definition:* The portion of the electromagnetic spectrum ranging from about 7 to 8 GHz. Frequencies in this band are used primarily for military satellite communications.

### XBRL (Extensible Business Reporting Language)
Level: 3
*Definition:* Designed to facilitate network-based information sharing among public and private companies and industry analysts, XBRL is an XML specification for publishing financial information of corporations and organizations. It can be used to facilitate the preparation, sharing, and analysis of information such as financial reports, annual reports, financial statements, and audit schedules. (See also ***XML***.)

### XDS (Extended Data Service)
Level: 3
*Definition:* Taking advantage of "text channels" that have been typically used for closed captioning in NTSC video, extended data services provide information about the current program, TV station, and network. Unlike the caption and text data carried via line 21, XDS information is sent via packets rather than continuous streams of data. For example, it is possible to send a "time-of-day" packet that can be used to set the clocks in VCRs and TVs. Other XDS packets include name, length, and start time of current show; type of show (based on a set of category codes); program content advisory (V-chip information); network name; station name and number; national weather service warning codes, and so on. (See also ***Closed Captioning***, ***Line 21***, ***NTSC***, and ***V-chip***.)

### XM (XM Satellite Radio Incorporated)
Level: 2
*Definition:* A reference to XM Satellite Radio, one of the two major satellite radio companies in the United States. XM and its competitor, Sirius, operate their SDARS services using S-band spectrum frequencies. XM provides fee-based radio services, which include music, sports, talk radio, information services, and more. These require special radio sets in order to be received. XM also makes most of its content available over the Internet (also for a fee). (See also ***Satellite Radio*** and ***SDARS***.)

### XML (Extensible Markup Language)
Level: 2
*Definition:* One of the most important languages used on the Internet today, XML is a text markup language for the interchange of structured data. It allows designers of web pages to create customized tags or to follow established XML standards (or "document type definitions") that enable the definition, transmission, validation, and interpretation of data between applications and between organizations. XML is intended to deliver information, not just pages. Whereas HTML describes the content of a web page only in terms of how it is to be displayed, XML describes the content in terms of what the data is that is being included in the page. In other words, XML provides a way of structuring and identifying data (not unlike a simple database) by using tags that specify the type of information contained within. For example, if everyone in the world used the same XML tags for "first name," "last name," "city," "state," "zip," and "country," computer applications could search, find, combine, process, and publish global contact lists or extract pieces of that contact information and place it within other documents without human intervention. XML, a trademark of the World Wide Web Consortium, is one of the key technologies used

in Microsoft .NET. (See also ***HTML*** and ***Markup Language***.)

**XM Satellite Radio Incorporated (See *XM*.)**

**XrML (Extensible Rights Markup Language)**
Level: 3
*Definition:* XrML provides a universal method of specifying rights and issuing conditions (licenses) associated with the use and protection of digital content. For example, XrML can be used to enable a simple business model such as "play a video" under two specific conditions, such as a fixed time period and a specific user name. It can also be used for much more complex scenarios, such as the requirement of verifying a user's subscription status, checking for the most recent version of a file, or allowing the loaning of a digital work. (See also ***REL*** and ***XML***.)

**XSS (Cross-Site Scripting)**
Level: 3
*Definition:* Cross-site scripting is a technique used by hackers to take advantage of security weaknesses in some dynamically generated web pages (pages that allow users to input data) that can allow the hacker to change user settings, steal account information, redirect the user to sites that launch malicious code, expose secure connections, and so on. However, an even simpler form of an XSS attack requires users only to click on a link that contains the malicious scripting information. Cross-site scripting vulnerabilities are not associated with any particular browser or web server platform. The simplest way for a developer to avoid XSS is to add code to a web application that checks for and ignores certain command tags. (See also ***Hacker***.)

**Y (Luminance) and Yo (Luma)**
Level: 3
*Definition:* A measure of the intensity or brightness of light. In monochrome television systems, luminance is represented by the symbol Y. When this parameter is gamma-corrected it is referred to as "luma" and is represented by the symbol Y'. In color television systems, Y' is derived from the weighted sum of the gamma-corrected primary color signals, using defined weighting coefficients. Luma is the part of the video signal that carries the information determining how bright a displayed video signal should be.

**Yo/C (Luma/Chrominance) Video**
Level: 3
*Definition:* In television video, the luma (or brightness) information in a video frame is denoted by *Yo*, and the chrominance or color part of the signal is denoted by a *C*. In the industry and other video production environments, Yo/C video is used simply as way of noting the luma and chrominance in a video signal. This term is often used in discussing super VHS (S-VHS) and is known as S-video.

**YoUV Color System**
Level: 3
*Definition:* A color encoding scheme for video pictures in which luma and two scaled chrominance signals are separately transmitted. This can be the format of an intermediate step in encoding a signal into NTSC or PAL.

**Z (Impedance)**
Level: 3
*Definition:* Symbol used in electrical engineering and electronics to represent impedance. (See also ***Impedance***.)

**Zeroconf (Zero Configuration) Networking**
Level: 2
*Definition:* Because connecting a computer to the Internet is relatively complicated and involves a significant amount of setup time and expertise, zeroconf has been developed to make it easier to connect computers and other devices (such as printers) to a network without requiring extensive administration and configuration. Because it does not rely on existing infrastructures, zeroconf is typically used to form a quick ad hoc network, such as in a conference setting or an impromptu meeting. It not only helps the computer or device connect to the network but helps it find other computers and other devices on the network. Zeroconf is not only used for temporary setups. It is used in

Apple's Mac OS X (known as Rendezvous) for discovering printers and HTTP servers. Many network printers and network storage devices available today implement some form of zeroconf-compatible networking.

### Zero Configuration Networking (See *Zeroconf*.)

### Zip/Unzip

Level: 2

*Definition:* Generically refers to the process of copying one or more large-size computer files and compressing them into a single, smaller or "zipped" file. Because "zipped" files are much more compact than the originals, it makes them easier to transport, especially on disk and/or over the Internet. (See also ***Compression***.)

### Zombie

Level: 2

*Definition:* Refers to hackers' use of other people's personal computers to either conceal their online activities or to launch attacks on other computers. Once a computer has been turned into a "zombie" (i.e., once it has been "infected" with the software that allows the hacker to do his/her bidding), it can be used as a repository for illegal software, become a clandestine meeting place for hackers to conduct secret meetings, be used to send pornographic or other undesirable e-mail or spam, serve as the launching point for a denial of service (DoS) attack, and so on—all without the knowledge of the zombie computer's owner. Zombie attacks can be defended against by keeping the operating system patches up to date, by running firewall software that analyzes the computer's attempts to connect to other computers, and by not leaving a computer on and connected to the Internet during long periods of inactivity. (See also ***Denial of Service***, ***Hacker***, and ***Trojan Horse***.)

### Zoom

Level: 2

*Definition:* A function of high-quality 35-mm camera lenses, digital camera lenses, and video camera recorder lenses (camcorders) allowing users to record close-up video images. Zooming works by changing the focal length, allowing the field of view of the camera to be changed from wide shot to close-up without physically moving the camera. Some consumer digital cameras and camcorders have a "digital zoom" function, which simply enlarges the center portion of the image to make it appear closer. However, this approach results in a loss of image resolution.

### Zulu Time

Level: 2

*Definition:* Used as another reference for standardized Greenwich Mean Time or today's Coordinated Universal Time. (See also ***GMT*** and ***UTC***.)

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# Numbered Terms

**10Base-T**
Level: 2
*Definition:* Refers to the standard digital Ethernet LAN system commonly used for data networks transmitting at a maximum of 10 Mbps. The "10" in 10Base-T refers to the maximum throughput of the network. x"Base-T" denotes the transmission medium, where *T* refers to twisted-pair (telco standard RJ-45) copper data/phone lines. Other Ethernet media include 10Base-F for fiber and 10Base-2 for coaxial cable. (See also ***100Base-T***.)

**100Base-T**
Level: 2
*Definition:* A version of a digital Ethernet LAN system called Fast Ethernet, which has ten times the capacity of a regular 10Base-T Ethernet system. A 100Base-T system has a transmission capacity of 100 Mbps over twisted-pair Category 5 (CAT-5) lines. (See also ***CAT-5***.)

**1080i**
Level: 2
*Definition:* A form of high-definition television consisting of 1,080 vertical pixels and, assuming a 16:9 aspect ratio, 1,920 horizontal pixels. 1080i uses interlacing (or non-progressive scan), and comes in a field rate of either 50 or 60 Hz (with 1080i60 being most commonly used in North American and Japan). (See also ***Aspect Ratio***, ***HDTV***, ***Interlace Scanning***, ***Progressive Scanning***, and ***720p***.)

**24Frames per second (24 fps)**
Level: 2
*Definition:* In the world of professional film, this refers to the number of individual frames of film displayed per second. (See also ***Frame Rate***.)

**24/7**
Level: 1
*Definition:* Increasingly popular slang for activities, organizations, e-commerce businesses, and so on that are operating continuously around-the-clock, 24 hours a day, 7 days a week.
*Used in a sentence:* "Our technical support lines are open 24/7."

**2B + D**
Level: 3
*Definition:* A type of ISDN service offered by telephone companies that uses two bearer (B) channels and one data (D) channel, denoted as 2B + D. (See also ***B-channel*** and ***BRI***.)

**3G**
Level: 2
*Definition:* Short for "third-generation wireless," 3G is intended to provide universal, high-speed, high-bandwidth (up to 4 Mbps) wireless services supporting a variety of advanced applications such as video and multimedia. Particular focus is on development of potential mobile services and wireless broadband systems for Internet access. 3G will work over wireless air interfaces such as

GSM, TDMA, and CDMA. Its first significant deployments were in late 2004, but some analysts do not foresee mass deployment until 2007. (See also ***CDMA***, ***GSM***, and ***TDMA***.)

### 4:2:2 (Color Subsampling)

Level: 3

*Definition:* Represents the sampling rate of digital video signals. A digital video signal has three components: Y (luminance), R-Y (a color value which is the luminance deducted from the color red), and B-Y (the value of the luminance deducted from the color blue). 4:2:2 represents these three components. Y, R-Y, and B-Y are also know as "YUV." During the process of digitizing a video signal, these three components are assigned a numeric sampling value. Groups of four video pixels within each of the three components are looked at and samples are taken for recording. With a 4:2:2 sampled video signal, all four of the luminance pixels are sampled (two of the R-Y pixels are sampled and two B-Y pixels are sampled). Other subsampling ratios include 4:2:0, 4:1:1, and 4:4:4.

### 56-k Line

Level: 2

*Definition:* A standard narrowband line leased from a local phone company, which has a full digital carrying capacity of 64 kilobits per second (kbps), but the line typically carries voice or data traffic at a rate of only 56 kbps. The remaining 8 kilobits are dedicated to carrying phone system signaling information. As a result, a 56-k line is not considered a so-called "clear channel."

### 720p

Level: 2

*Definition:* A form of high-definition television consisting of 720 vertical pixels and, assuming a 16:9 aspect ratio, 1,280 horizontal pixels. Progressive scanning (non-interlaced) works well for displaying motion, as opposed to 1080i (which provides more image detail but does not handle motion as smoothly). There are five 720p frame rates in common use: 24, 25, 30, 50, and 60. (See also ***Aspect ratio***, ***HDTV***, ***Interlace Scanning***, ***Progressive Scanning***, and ***1080i***.)

### 8 VSB

Level: 3

*Definition:* A digital data transmission technique used by television broadcasting stations in the United States, Canada, and several other countries. Using this technique, eight discrete amplitude levels of information are transmitted over the so-called vestigial sidebands (VSBs) of the main television carrier signal. VSB is an analog modulation technique developed to reduce the amount of spectrum needed to transmit information through cable TV or terrestrial broadcasting. (See also ***Vestigial Sideband***.)

### 802.11x

Level: 2

*Definition:* Refers to a family of wireless networking protocols that were first approved in 1997. *802.11:* Managing the communication between a wireless device and a base station (or between two wireless devices), the original 802.11 allowed for transfer rates of 1 to 2 megabits per second (Mbps) in the 2.4-Ghz band using either frequency-hopping spread spectrum (FHSS) or direct sequence spread spectrum (DSSS). *802.11a:* Emerged in 1999, making transfer rates of up to 54 Mbps possible using orthogonal frequency division multiplexing (OFDM). *802.11b:* Also known as "Wi-Fi," emerged at the same time as 802.11a. Because it is significantly less expensive to deploy, it has been the most widely adopted wireless networking technology in homes and businesses all around the world (even though it is much slower than 802.11a). 802.11b transmits in the 2.4-Ghz frequency range. This range is unregulated, meaning that radio transmitters built into other products may use the same frequency and interfere with the 802.11b network. These products include some cordless telephones, microwave ovens, garage door openers, and baby monitors. *802.11g:* Allows for transfer rates of up to 54 Mbps, with compatible products appearing in the market in 2002. 802.11g is backward compatible with 802.11b, meaning that 802.11g access points will work with 802.11b wireless network adapters, and vice versa.