NEWTON's TELECOM DICTIONARY

The Official Dictionary of Telecommunications
Networking and Internet

16th and a Half Updated, Expanded and Much Improved Edition

DISH 1017

NEWTON'S TELECOM DICTIONARY
copyright © 2000 Harry Newton
email: Harry_Newton@TechnologyInvestor.com
personal web site: www.HarryNewton.com

All rights reserved under International and Pan-American Copyright conventions, including the right to reproduce this book or portions thereof in any form whatsoever.

Published by CMP Books
An Imprint of CMP Media Inc.
12 West 21 Street
New York, NY 10010

ISBN 1-57820-053-9

July, 2000

Sixteenth and a Half Edition, Expanded and Updated

For individual orders, and for information on special discounts for quantity orders, please contact:

CMP Books
6600 Silacci Way
Gilroy, CA 95020
Tel: 800-LIBRARY or 408-848-3854
Fax: 408-848-5784
Email: telecom@rushorder.com

Distributed to the book trade in the U.S. and Canada by
Publishers Group West
1700 Fourth St., Berkeley, CA 94710

transmission services, such as DDS and T-1. The signal carrying the binary value alternates between positive and negative. Zero and one values are represented by the signal amplitude at either polarity, while no-value "spaces" are at zero amplitude.

Bipolar Coding The T carrier line coding system that inverts the polarity of alternate "one" bits.

Bipolar Signal A signal having two polarities, both of which are not zero. It must have a two-state or three-state binary coding scheme. It is usually symmetrical with respect to zero amplitude.

Bipolar Violation The presence of two consecutive "one" bits of the same polarity on the T carrier line. See also Bipolar Coding.

Bird A satellite.

Bird Dog Device An electronic tracking device used by law enforcement to track the physical location of a subject.

Birdie A birdie is a lightweight device that you blow through underground cement pipes through which you want to pull cable. Here's how it typically works: First, you use a bore to make an underground hole. Then you fill that hole with hollow concrete cement pipes joined together to form one long underground conduit (i.e. tunnel). Then you go to one end of the tunnel and use a air compressed device to blow a very lightweight "birdie" attached to a lightweight string through the tunnel. Someone at the other end catches the birdie and pulls gently on the string. Attached to the end of the string is strong mule tape. He keeps pulling on it. Attached to the end of the mule tape is the telecommunications cable — fiber or wire — that you really want to instal in the underground conduit. The whole point of this elaborate procedure is that it's far better for the cable to lay it after the pipes are laid than it is during the installation process when the cable could be damaged.

Birthdays January 4, 1847 Thomas Edison born
February 16, 1982 Michael Allen Newton born
February 20, 1980 Claire Elizabeth Newton born
February 23, 1965 Michael Dell (Dell Computer) born
March 3, 1847 Alexander Graham Bell born
March 11, 1933 Ben Rosen (Compaq, SRX, etc.) born
March 15, 1949 Gerry Friesen born
April 6, 1939 John Sculley born
April 27, 1791 Samuel Morse born
May 11, 1948 International Communications Association born
June 10, 1942 Harry Newton born in Sydney, Australia
June 13, 1961 TeleCommunications Association born
June 19, 1924 Ray Noorda (Novell) born
June 27, 1968 Carterfone decision handed down by FCC
July 4, 1943 Susan Newton born in Perth, Australia
August 31, 1962 With President Kennedy's signature the Communications Satellite Act is born
September 2, 1936 Andy Grove (Intel)
September 12, 1948 Communications Managers Association
October 28, 1955 Bill Gates (Microsoft)
November 10, 1946 Ray Horak (Context Corporation)
November 13, 1954 Scott McNealy (Sun Microsystems)
December 10, 1928 William G. McGowan, founder of MCI

Bis 1. The French term for "second" or "encore." It is used by the ITU/ITU to designate the second in a family of related standards. "Ter" designates the third in a family. See V Series.
2. Border Intermediate System
3. Bus Interface Card.

BISDN Also spelled B-ISDN. Broadband ISDN. This is a vaguely defined term. It basically means any circuit capable of transmitting more than one Basic Rate ISDN, i.e. 144 Kbps. One definition I read recently suggested that BISDN is "a set of public network services that are delivered over ATM, including data, voice, and video. BISDN will provide services such as high-definition television (HDTV), multi-lingual TV, voice and image storage and retrieval, video conferencing, high-speed LANs, and multimedia." See B-ISDN for a longer explanation. See also ISDN.

Bistable Trigger Circuit A trigger circuit that has two stable states.

BISUP Broadband ISDN User's Part: A SS7 protocol which defines the signaling messages to control connections and services. See Signaling System 7.

BISYNC (pronounced bye-sink). BISYNChronous Transmission. A half-duplex, character-oriented, synchronous data communications transmission method originated by IBM in 1964. See Synchronous.

Bisynchronous Transmission Also called BISYNC. A data character-oriented communications protocol developed by IBM for synchronous transmission of binary-coded data between two devices. BISYNC uses a specific set of control characters to synchronize the transmission of that binary coded data. See also Binary Synchronous Communication.

Bit Bit is a contraction of the term BInary digiT. It is the smallest unit of information (data) a computer can process, representing either high or low, yes or no, or 1 or 0. It is the basic unit in data communications. A bit can have a value of zero (a space) or one (a mark).

Bit Bucket Slang for throwing out bits — into a wastepaper bucket.

Bit Buffer A section of memory capable of temporarily storing a single BInary uniT (bit) of information. Used to make data transmission accurate or consistent.

Bit Check A bit added to a digital signal and used for error checking, i.e. a parity bit. See also Parity.

Bit Count Integrity A means of determining the integrity of a data packet. The counting of bits is very important. If the receiver can't confirm that it received all of the bits, it can't confirm that the integrity of the received data packet is maintained. Bit count integrity is especially important in the domain of compressed, encrypted data networking.

Bit Depth The number of bits used to represent the color of each pixel in a graphic file or the sound in an audio file. The higher the number, the more information included in the file and the higher the quality of the data. Common graphic bit depths are 4-bit, 8-bit, 16-bit, 24-bit and 32-bit. Common sound bit depths are 8-bit and 16-bit.

Bit Duration The time it takes one bit to pass a point on the transmission medium. Used to measure delay times, especially in high-speed communications. See also Bit Time.

Bit Error A mistake in transmitting a bit. Error rate statistics play a key role in measuring the performance of a network. As errors increase, user payload (especially data) must be retransmitted. The end effect is creation of more (non-revenue) traffic in the network. See Bit Error Rate.

Bit Error Rate BER. The percentage of received bits in error compared to the total number of bits received. Usually expressed as a number to the power of 10. For example, 10 to the fifth power means that one in every 100,000 bits transmitted will be wrong. In transmitting data a high error rate on the transmission medium (i.e. some noise), doesn't mean there'll be lots of problems with the final transmission. It just means there'll have to be lots of re-transmissions — "until one gets it right." These re-transmissions reduce the amount of data transmitted in a unit of time and therefore, increase the

time needed to send that information. If the BER gets too high, it might be worth while to go to a slower transmission rate. Otherwise, you would spend more time retransmitting bad packets than getting good ones through. The theory is that the faster the speed of data transmission the more likelihood of error. This is not always so. But if you are getting lots of errors, the first — and easiest — step is to drop the transmission speed.

Bit Flipper A person who flips bits for a living. In other words, an industrial strength member of the digiterati, which I guess would be a digiteratus. These people are way kewl (that's a NetHead term for cool, or k00l) when it comes to really technical data protocol stuff. See also Digiterati, Nethead and Gearhead.

Bit Interleaving A form of TDM for synchronous protocols, including HDLC, SDLC, BiSync and X.25. Bit interleaving retains the sequence and number of bits, so that correct synchronization is achieved between both ends. See Bit Interleaving/Multiplexing.

Bit Interleaving/Multiplexing In multiplexing, individual bits from different lower speed channel sources are combined one bit at a time/one channel at a time into one continuous higher speed bit stream. Compare with byte interleaving/ multiplexing.

Bit Oriented Used to describe communications protocols in which control information may be coded in fields as small as a single bit.

Bit Oriented Protocol BOP. A data link control protocol that uses specific bit patterns to transfer controlling information. Examples are IBM's Synchronous Data Link Control (SDLC) and the ITU-T High-Level Data Link Control (HDLC). Bit-oriented protocols are normally used for synchronous transmission only. Bit-oriented protocols are code transparent (meaning they work regardless of the character encoding method used), since no encoded characters are used in the control sequence.

Bit Oriented Transmission An efficient transmission protocol that encodes communications control information in fields of bits rather than characters or bytes.

Bit Parity A binary bit appended to an array of bits to make the sum of all the bits always odd or always even. See Parity.

Bit Pattern A group of bits arranged in specified ways to represent numbers, letters or symbols, forming a unique binary number for each character. For example, the 7-bit ASCII code produces 128 different characters, i.e. 2 x 2 x 2 x 2 x 2 x 2 x 2 = 128.

Bit Pump A device which pumps out bits at a high rate of speed. Slang for high-speed carrier electronics such as ADSL terminating units, which can achieve speeds of multiple Mbps over standard twisted-pair local loops. "Bit pumps" possess no particular intelligence (e.g., protocol conversion, or error detection and correction); they just pump bits.

Bit Rate The number of bits of data transmitted over a phone line per second. You can usually figure how many characters per second you will be transmitting — in asynchronous communications — if you divide the bit rate by ten. For example, if you are transmitting at 1200 bits per second, you will be transmitting 120 characters per second. In real life, it's never this simple, however. The total bits transmitted will depend on re-transmissions, which depends on the noise of the line, etc. See BAUD RATE.

Bit Robbing A technique to signal in-band in digital facilities, which typically use out of band signaling, e.g. Signaling System 7. In bit robbing, we steal bits from the speech path a few line-signal bits. The remaining bits are adequate to recreate the original electrical analog signal (and ultimately, the original sound). Bit robbing typically uses the least significant bit per channel in every sixth frame for signaling. See Bit Stuffing and Robbed Bit Signaling.

Bit Specifications Number of colors or levels of gray that can be displayed at one time. Controlled by the amount of memory in the computer's graphics controller card. An 8-bit controller can display 256 colors or levels of gray; a 16-bit controller, 64,000 colors: a 24-bit controller, 16.8 million colors.

Bit Stream A continuous stream of data bits transmitted over a communications line with no break or separators between the characters.

Bit Stuffing 1. A process in some synchronous data communications protocols to ensure that the transmission is properly clocked. In HDLC (High-level Data Link Control), for example, each frame of data is both preceded and succeeded by a "flag" of six consecutive "one" bits. The flags signal the beginning and ending of the data frame, and are used by the receiving devices to synchronize on the rate of transmission. In order to avoid confusion, therefore, any set of six consecutive "one" data bits must be broken by a stuffed "zero" bit. This stuffed bit is added by the sender and stripped by the receiver. The idea of inserting the "one" bit is to avoid the data's mimicking the flag, and confusing the receiver. Stuff bits also are used in SONET (Synchronous Optical NETwork) prior to the multiplexing of DS-1s and DS-2s in order to resolve clocking differences prior to the construction of a SONET frame. See Zero Stuffing.

2. A process used in some packet data network protocols in order to fill a packet to the prescribed, fixed size. For example, X.25 requires that all packets in a specific network be of the same size (e.g., 128B, 256B, or 512B, where B = Byte of eight bits). If the amount of data to be transmitted in a packet is not sufficient, stuff bits are added to fill up the packet. Again, the stuff bits are added by the sender, which signals their presence, and are stripped away by the receiver.

Bit Synchronous A SONET term describing the manner in which information streams are mapped into the SONET frame format for unchannelized VT (Virtual Tributary) transport. For instance, multiple VT1.5s can be mapped into a SONET frame, with each VT1.5 carrying a single T-1 signal within the STS-1 SPE (Synchronous Payload Envelope). In the LOH (Line OverHead) of the SONET are included VT pointers which identify the established portions of the SPE in which the beginning byte of each VT1.5 is located. As each VT1.5 works its way through the SONET network, its actual position may change within the various SPEs, thereby requiring that the pointer be reset; this process is very complex and expensive, and results in a small level of delay. Regardless of issues of complexity, cost and (slight) processing delay, it is essential that the timing of the various T-carrier and SONET data be maintained in order that the data arrive at an identifiable and consistent point in time; otherwise, it would be unrecognizeable. As is true with many things in life, timing can be everything. Compare and contrast with Byte Synchronous. See also SONET and VT.

Bit Time The time it takes one bit to pass from transmitter to receiver over a path in a network. See also Propagation Delay.

Bit Transfer Rate The number of bits transferred per unit of time. Usually expressed in Bits Per Second (BPS).

Bit Twiddler A technical person. Twiddle, according to the Random House Dictionary, means "to play or trifle idly with something; fiddle." The expression bit twiddler is used thus,

Model and the SCSA Telephony Application Objects (TAO) Framework. While designed for interoperability, these two layers may be implemented independently of one another. See Signal Computing.

Signal Conditioning The amplification and/or modification of electrical signals to make them more appropriate for transmission over a certain medium — cable, microwave, etc.

Signal Control Point SCP. Computers that hold databases in which customer-specific information used by the "advanced intelligent network" (AIN) to route calls is stored. The AIN refers to a specific architecture — typically promulgated and created by a local or long distance phone company — that provides core capabilities in which customer-specific information held in databases within the network is used to intelligently process calls. An example of an AIN service is an 800 service that routes calls based on where the calls are coming from. The routing information is stored in the SCP, which is typically tied into the Signaling System 7 network. See SCP. For a full explanation of the Advanced Intelligent Network, see AIN.

Signal Converter The equipment which changes the data signal into a form suitable for the transmission medium, or the reverse. The converter can also work with DC/AC current. The signal converter comprises a modulator and/or demodulator.

Signal generator A test oscillator that can be adjusted to provide a test signal at some desired frequency, voltage, modulation, and waveform.

Signal Ground SGD. In RS-232-C signaling, Signal Ground establishes a common reference level for the voltages of all other signals (such as RXD/TXD), except Frame Ground.

Signal Level The strength of a signal, generally expressed in either absolute units of voltage or power, or in units relative to the strength of the signal at its source.

Signal Processing Signal processing is a combination of computer telephony call control and media processing. Call control means moving telephone calls around — answering them, hanging up on them, transferring them, conferencing them, etc. — all the stuff you do on your office phone every day. Media processing means bringing computer power to bear on the media stream, the actual voice, video or data inside the phone call. You might save it to your hard disk. You might want to have your PC software listen for key words in what you saved, for example, the caller's phone number. You might even want your software to try transcribing the conversation into text you could use in your word processor.
See Call Control, Digital Signal Processing, Media Processing and Native Signal Processing.

Signal Processing Component An SCSA definition. An atomic bundle of signal processing functionality which can be allocated to a single group. It can be capable of supporting the functionality of one or more resources or a simple coder.

Signal Processing Element An SCSA definition. That part of a Signal Processing Component which is associated with a single Resource.

Signal Processing Platform A SCSA definition. This is a software component that supports a specific hardware package. This is typically an executable program and may control one or more instances of the vendor-specific hardware package. Each SPP may support several different types of signal processing functionality clustered into SPCs.

Signal Repeaters A signal repeater does nothing more than receive a signal and retransmit it. Repeaters are used where the original transmission is very weak, or the transmission is being sent over long distances.

Signal Strength Indicator A display on a cellular radio that lets you know before you call about the relative strength of the cellular transmitter in your immediate area. On most cellular radios, the signal strength indicator has five bars, with five the strongest. It's best to call when you have four or five. Three is marginal. Below three, forget it. Go elsewhere and try again.

Signal Switching Point SSP. See SSP. For a full explanation of the Advanced Intelligent Network, see AIN.

Signal To Noise Ratio 1. The ratio of the usable signal being transmitted to the noise or undesired signal. Usually expressed in decibels. This ratio is a measure of the quality of a transmission.
2. The amount of useful information to be found in a given ratio Internet Usenet newsgroup. Often used derogatorily, for example: "the signal-to-noise ratio in this newsgroup is pretty low."

Signal Transfer Point The packet switch in the Common Channel Interoffice Signaling (CCIS) system. The CCIS is a packet switched network operating at 4800 bits per second. CCIS replaces both SF (Single Frequency) and MF (Multi-frequency) by converting dialed digits to data messages. See SCP, STP and Signaling System 7. For a full explanation of the Advanced Intelligent Network, see AIN.

Signals Signal being transmitted are information. They can be spoken words such as a telephone conversation, music, or even computer data. The simplest signal we can send is a sine wave. All sound waves are combinations of simpler sine waves at different amplitudes and frequencies to produce complicated wave forms. Similarly, computer data is a series of ones and zeros which electrically look like a square wave. Square waves, like all other types of waves, can be represented by a combination of sine waves with different frequencies and amplitudes. That a complex wave is the sum of simple sine waves was discovered by the French mathematician Jean Baptiste Joseph Fourier and is called Fourier's Theorem.

Signals Intelligence SIGINT. A federal government term. A category of intelligence information comprising, either individually or in combination, all communications intelligence, electronics intelligence, and foreign instrumentation signals intelligence, however transmitted.

Signaling In any telephone system — inside an office or across the country — some form of signaling mechanism is required to set up and tear down the calls. When you call from your office desk across the country to someone else's desk, many forms of different signaling are used. There's the signaling between your office desk phone and your office phone system. There's the signaling between your office phone system and your local telephone company central office. And there's the signaling between your local central office and the central office you're trying to reach across the country. All forms of these signaling may be different. Simple examples of signalings are ringing of your phone (someone is calling), dial tone (it's OK to dial), ringing (hopefully someone will answer), etc.
Originally, telephone systems such as POTS (Plain Old Telephone Service) used in-band signaling to carry signals. With in-band signaling, signals such as DTMF tones (touchtones), are carried in the same circuit as the talk path. Newer signaling (i.e. most of it today) is carried as out-of-band signaling, which uses uses a separate data network. This is much more efficient. For example, voice circuits need not be allocated for calls that do not complete. Also, this approach allows additional quantities of information to be transferred to

FQDN Fully Qualified Domain Name. An Internet term. The FQDN is the full site name of an Internet computer system, rather than just its hostname. For example, the system lisa at Widener University has a FQDN of lisa.cs.widener.edu.

FR See Flat Rate Service.

FR-1 A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test. This designation has been replaced by VW-1.

Fractal A word coined in 1975 by Benoit B. Mandlebrot from the Latin fractus ("to break"). One fractal creator called fractals a shape with the property of "self-similarity."

Fractal Compression An asymmetrical compression technique that shrinks an image into extremely small resolution-independent files by storing it as a mathematical equation as opposed to storing it as pixels. The process starts with the identification of patterns within an image and results in collection of shapes that resemble each other but that have different sizes and locations within an image. Each shape-pattern is summarized and reproduced by a formula that starts with the largest shape and repeatedly displaces and shrinks it. These patterns are stored as equations and the image is reconstructed by iterating the mathematical model. Fractal compression can store as many as 60,000 images on one CD-ROM. One disadvantage of fractal compression is that it is time consuming, taking as long as four minutes to convert a 1.3 MB TIFF file to a 228 KB file. See Fractals.

Fractal Geometry The underlying mathematics behind fractal image compression, discovered by two Georgia Tech mathematicians, Michael Barneley and Alan Sloan.

Fractal Image Format FIF. A compression technique that uses on-board ASIC chips to look for patterns. Exact matches are rare and the process works on finding close matches using a function known as an affine map.

Fractals Along with raster and vector graphics, fractals are a way of defining graphics in a computer. Fractal graphics translate the natural curves of an object into mathematical formulas, from which the image can later be constructed. See Fractal Compression.

Fractional Services A British term. Bandwidth available from carriers in increments of 64Kbit/s such as Mercury's Switchband. See Fractional T-1 for the North American definition.

Fractional T-1 FT-1. Fractional T-1 refers to any data transmission rate between 56/64 Kbps (DS0 rate) and 1.544 Mbps (T-1). Fractional T-1 is a four-wire (two copper pairs) digital circuit that's not as fast as a T-1. Fractional T-1 is popular because it's typically provided by a LEC (Local Exchange Carrier) or IXC (IntereXchange Carrier) at less cost than a full T-1, and in support of applications that don't require the level of bandwidth provided by a full T-1. While FT-1 is less costly than a full T-1, it is more costly on a channel-by-channel basis, as you would expect. Users love FT-1, but carriers hate it. FT-1 costs the carriers just as much to provision as does as full T-1, they just turn down some of the channels. FT-1 is typically used for LAN interconnection, videoconferencing, high-speed mainframe connection and computer imaging.

Fractional T-3 A telephone company service in which portions of a T-3 (44.7364 Mbps) transmission service are leased to provide a service similar to a T-1 (1.544 Mbps) or T-2 (3.152 Mbps) channel, but normally at a lower cost.

FRAD Frame Relay Access Device, also sometimes referred to as a Frame Relay Assembler/Disassembler. Analogous to a PAD (Packet Assembler/Disassembler) in the X.25 world, a FRAD is responsible for framing data with header and trailer information prior to presentation of the frame to a Frame Relay switch. On the receiving end of the communication, the FRAD serves to strip away the Frame Relay control information in order that the target device is presented with the data packaged in its original form. On the receiving end, the FRAD also generally is responsible for detecting errors in the payload data created during the process of network switching and transmission; error correction generally is accomplished through a process of retransmission. A FRAD may be a stand-alone device, although the function generally is embedded in a router.

Fragment The pieces of a frame left on an FDDI ring, caused by a station stripping a frame from the ring.

Fragmentation 1. In messaging it is the process in which an IP (Internet Protocol) datagram is broken into smaller pieces to fit the requirements of a given physical network. The reverse process is termed "reassembly."

2. ATM and SMDS networks routinely perform a process of Segmentation and Reassembly (SAR), segmenting the native PDU into 48-octet payloads which are carried in 53-octet cells. The process is reversed on the receiving end.

3. A condition that affects data stored on a disk. Adding and deleting records in a file, creates what is sometimes called the Swiss cheese effect. The operating system stores the data for an individual file in many different physical locations on the disk, leaving large holes between records. Fragmented files slow system performance because it takes time to locate all parts of a file.

Frame 1. A frame is a packet. It's a generic term specific to a number of data communications protocols. A frame of data is a logical unit of data, which commonly is a fragment of a much larger set of data, such as a file of text or image information. As the larger file is prepared for transmission, it is fragmented into smaller data units. Each fragment of data is packaged into a frame format, which comprises a header, payload, and trailer. The header prepends (prepend means added to the front of) the payload and includes a beginning flag, or set of framing bits, which are used for purposes of both frame delineation (beginning of the frame) and synchronization of the receiving device with the speed of transmission across the transmission link. Also included in the header are control information (frame number), and address information (e.g., originating and terminating addresses). Following the header is the payload, which is the data unit (fragment) being transmitted. Appending the payload is the trailer, which comprises data bits used for error detection and correction, and a final set of framing bits, or ending flag, for purposes of frame delineation (ending of the frame). This frame format, in the broader generic sense, also is known as a data packet. Frame, therefore, is a term specific to certain bit-oriented data transmission protocols such as SDLC (Synchronous Data Link Control) and HDLC (High-level Data Link Control), with the latter being a generic derivative of SDLC. In the case of SDLC, a frame is very similar to a block, which would be employed in a character-oriented protocol such as IBM's BSC (Binary Synchronous Communications), also known as Bisync. See also BSC, HDLC, Packet, and SDLC.

2. In TV video, a frame is a single, complete picture in video or film recording. A video frame consists of two interlaced fields of either 525 lines (NTSC) or 625 lines (PAL/SECAM), running at 30 frames per second (NTSC) or 25 frames per second (PAL/SEACAM). 24 frames are sent in moving picture films and a variable number, typically between 8 and 30, sent

in videoconferencing systems, depending on the transmission bandwidth available. Up to about 12 frames a second looks "jerky."
3. One complete cycle of events in time division multiplexing. The frame usually includes a sequence of time slots for the various sub channels as well as extra bits for control, calibration, etc. T-Carrier makes use of such a framing convention for packaging data. Channelized T-1, for instance, frames 24 time slots with a framing bit which precedes each set of sampled data.
4. A unit of data in a Frame Relay environment. The frame includes a payload of variable length, plus header and trailer information specific to the operation of a Frame Relay network service.
5. A metal framework, such as a relay rack, on which equipment is mounted. A distribution frame. A rectangular steel bar framework having "verticals and horizontals" which is used to place semipermanent wire cross connections to permanent equipment. Found in telephone rooms and central offices. See Distribution Frame.

Frame Alignment The extent to which the frame of the receiving equipment is correctly phased (synchronized) with respect to that of the received signal.

Frame Alignment Errors A frame alignment error occurs when a packet is received but not properly framed (that is, not a multiple of 8 bits).

Frame Alignment Sequence See Frame Alignment Signal.

Frame Alignment Signal FAS. Frame Alignment Signal or Frame Alignment Sequence.
The distinctive signal inserted in every frame or once in n frames that always occupies the same relative position within the frame and is used to establish and maintain frame alignment, i.e. synchronization. See Frame Alignment Errors.

Frame Buffer A section of memory used to store an image to be displayed on screen as well as parts of the image that lie outside the limits of the display. Some systems have frame buffers that will hold several frames, in which case they should be called "frames buffers." But they're not.

Frame Check Sequence Bits added to the end of a frame for error detection. Similar to a block check character (BCC). In bit-oriented protocols, a frame check sequence is a 16-bit field added to the end of a frame that contains transmission error-checking information. In a token ring LAN, the FCS is a 32-bit field which follows the data field in every token ring packet. This field contains a value which is calculated by the source computer. The receiving computer performs the same calculation. If the receiving computer's calculation does not match the result sent by the source computer, the packet is judged corrupt and discarded. An FCS calculation is made for each packet. This calculation is done by plugging the numbers (1's and 0's) from three fields in the packet (destination address, source address, and data) into a polynomial equation. The result is a 32-bit number (again 1's and 0's) that can be checked at the destination computer. This corruption detection method is accurate to one packet in 4 billion. See Frame Check Sequence Errors.

Frame Check Sequence Errors Errors that occur when a packet is involved in a collision or a corrupted by noise.

Frame Dropping The process of dropping video frames to accommodate the transmission speed available.

Frame Duration The sum of all the unit time intervals of a frame. The time from the start of one frame until the start of the next frame.

Frame DS1 The DS1 frame comprises 193 bit positions. The first bit is the frame overhead bit, while the remaining 192 bits are available for data (payload) and are divided into 24 blocks (channels) of 8 bits each.

Frame Error An invalid frame identified by the Frame Check Sum (FCS). See also Frame Errors.

Frame Error Rate FER. The ratio of errored data frames to the total number of frames transmitted. If the FER gets too high, it might be worth while stepping down to slower baud rate. Otherwise, you would spend more time retransmitting bad frames than getting good ones through. In other words, throughput would suffer. The theory is that the faster the speed of data transmission the more likelihood of error. This is not always so. But if you are getting lots of errors, the first — and easiest — step is to drop the transmission speed. Frame Error Rate is thus a measure of transmission quality. It is generally shown as a negative exponent, (e.g., 10 to the minus 2 power (10^-2) means one out of 100 frames are in error.) The FER is directly related to the Bit Error Rate (BER). See also Bit Error Rate.

Frame Errors In the 12-bit, D4 frame word, an error is counted when the 12-bit frame word received does not conform to the standard 12-bit frame word pattern.

Frame Flag Sequence The unique bit pattern "01111110" used as the opening and closing delimiter for the link layer frames.

Frame Frequency A video term. The number of times per second a frame is scanned.

Frame Grab To capture a video frame and temporarily store it for later manipulation by a graphics input device.

Frame Grabber A PC board used to capture and digitize a single frame of NTSC video and store it on a hard disk. Also known as Frame Storer. See Video Capture Board.

Frame Ground FGD. Frame Ground is connected to the equipment chassis and thus provides a protective ground. Frame Ground is usually connected to an external ground such as the ground pin of an AC power plug.

Frame Header Address information required for transmission of a packet across a communications link.

Frame Length X.25 packets are fixed in length. ATM cells are fixed in length. Frame Relay frames (packets in the generic sense) are variable in length, which is due to their intended use for LAN internetworking. LAN frames (packets in the generic sense) are variable in length.

Frame Multiplexing The process of handling traffic from multiple simultaneous inputs by sending the frames out one at a time in accordance with a specific set of rules. Instead of multiplexing traffic from a lower-speed connection into a higher speed connection based on a specific time duration for each low-speed channel, frame multiplexing using the length of a given frame as the measurement.

Frame Rate The number of images displayed per second in a video or animation file. The Frame Rate is highly significant is determining the quality of the image, with a high frame rate creating the illusion of full fluidity of motion. 30 frames per second (30 fps) is considered to be full-motion, broadcast quality. On the other end of the scale, 2fps is most annoying. At 30 fps, the brain processes the images, filling in the blanks due to the "Phi Phenomenon." See PHI Phenomenon.

Frame Relay Frame relay, technically speaking, is an access standard defined by the ITU-T in the I.122 recommendation, "Framework for Providing Additional Packet Mode Bearer Services." Frame relay services, as delivered by the telecommunications carriers, employ a form of packet switch-

P6 Intel's successor to the Pentium processor. The P6 is now called the Pentium Pro.

P7 Protocol The protocol used between a UA (User Agent) and a MS (Message Store). Defined in the 1988 X.400 standard.

P22 Format An enchanted version of the P2 format that appeared in the 1988 X.400 standard.

P2T Pulse to Tone & Rotary Dial Recognition products.

P35 Format The EDI (Electronic Data Interchange) message header enhancement to X.400 that enables EDI-specific addressing, routing and handling of EDI messaging. Defined in 1990 in the X.435 standard.

P802.11 P802.11 is a series of evolving standards in the wireless Local Area Network arena. The IEEE Program P802.11 Standards Working Group aims to define universal protocols for wireless LANs in the 900 MHz, 2.4 GHz and infrared frequency bands. Main components in the 802.11 standard are twofold: 1. The physical specifications for medium-dependent protocols. There are different physical specifications for each frequency band supported in 802.11. 2. The Medium Access Control (MAC) specifications for ad-hoc wireless networks and wireless network infrastructures. A single medium-independent MAC protocol provides a unified network interface between different wireless PHYs (Physical Specifications) and wired networks.

PA 1. Public Address. Loud speaker system, sometimes used for paging.
2. Pooling Administrator. See Number Pooling.

PABX Private Automatic Branch eXchange. Originally, PBX was the word for a switch inside a private business (as against one serving the public). PBX means a Private Branch Exchange. Such a "PBX" was typically a manual device, requiring operator assistance to complete a call. Then the PBX went "modern" (i.e. automatic) and no operator was needed any longer to complete outgoing calls. You could dial "9." Thus it became a "PABX." Now all PABXs are modern. And a PABX is now commonly referred to as a "PBX.

PAC Personal Activity Center. A combination IBM PC clone, alarm clock, answering machine, speakerphone, fax machine, modem, compact-disk player and AM/FM radio all rolled into one unit sitting on your desk.

Pac Bell Pacific Bell, the California Bell Operating Company (BOC) which, along with Nevada Bell, formed Pacific Telesis (PacTel). PacTel was one of the seven original Regional Bell Operating Companies (RBOCs) formed in 1984 by the Modified Final Judgement (MFJ). As PacTel was acquired by SBC Corporation (Southwestern Bell) in 1996, Pac Bell is now a subsidiary of SBC.

Pacific Telesis One of the seven, now-independent Regional Holding Companies formed at the Divestiture of AT&T of 1983. It holds Pacific Bell, Nevada Bell and several non-regulated subsidiaries. In 1996, SBC Corporation bought Pacific Telesis.

Pacing Controlled rate of flow dictated by the receiving component, to prevent congestion. A method of flow control in IBM's SNA. See Pacing Group.

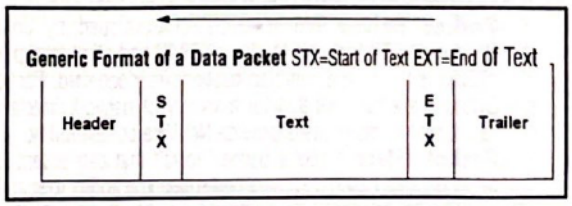
Pacing Algorithm The mathematical rules established to control the rate at which calls are placed by an automatic dialing machine, also called a predictive dialer. See Predictive Dialer.

Pacing Control SNA term for flow control. See Pacing Group.

Pacing Group In IBM's SNA, the number of data units (Path Information Units, or PIUs) that can be sent before a response is received. An IBM term for window.

Pack To compress data items so they take up less space. A process used by many database programs to remove records marked for deletion.

Packet 1. Generic term for a bundle of data, usually in binary form, organized in a specific way for transmission. The specific native protocol of the data network may term the packet as a packet, block, frame or cell. A packet consists of the data to be transmitted and certain control information. The three principal elements of a packet include: 1. Header — control information such as synchronizing bits, address of the destination or target device, address of originating device, length of packet, etc. 2. Text or payload — the data to be transmitted. The payload may be fixed in length (e.g., X.25 packets and ATM cells), or variable in length (e.g., Ethernet and Frame Relay frames). 3. Trailer — end of packet, and error detection and correction bits. See also Block, Cell and Frame.



2. Specific packaging of data in a packet-switched network, such as X.25, Frame Relay or ATM. A true packet-switched network such as X.25 involves packets of a specific and fixed length. In a public packet switched network, such packet payloads originally were specified as being either 128B or 256B, where B=Byte. In later versions of the standards, that packet size was increased to a maximum of 4,096B, although the packet payload size generally does not exceed either 512B or 1024B. The larger packet size traditionally is used in airline reservation systems and other applications where relatively large sets of data routinely are transmitted. A X.25 packet prepends the payload with header information including a flag of eight bits; the flag denotes the beginning of the packet and also serves to assist the network nodes (packet switches) in synchronizing on the rate of transmission. An address field of eight bits also prepends the payload, with four bits identifying the target device and four bits identifying the transmitting device. Control data of eight-to-sixteen bits comprise the last element of the header; included in control data is the packet number in order that the network nodes might identify and correct for lost or errored packets. Appending the payload is a trailer consisting of a Cyclic Redundancy Check (CRC), which is used by all packet nodes for purposes of error detection and correction. See ATM, CRC, Frame Relay, Packet Assembler/Disassembler (PAD), X.25.

Packet Assembler/Disassembler PAD. A hardware/software combination that forms the interface between a X.25 network such as PDN and an asynchronous device such as a PC. The PAD generates call request, call clear, and other information packets in addition to the ones that contain user data. The PAD is responsible for packetizing the data from the transmitting device before it is forwarded through the packet network. On the receiving end of the transmission, the PAD strips away the control information contained in the header and trailer in order to get at the original text or payload, in effect disassembling the packets and reconstituting the original set of data in its native or original form. The PAD may be in the form of a standalone DCE device on the customer premise and supporting one or more terminals, or in the form