

"An essential resource." —PC Magazine

RATED
★★★★★

OVER 650,000 SOLD



NEWTON'S TELECOM DICTIONARY

Covering Telecommunications, Networking,
Information Technology, the Internet,
the Web, Computing, Wireless and Fiber

MORE THAN 21,900 TERMS DEFINED

20th

Updated and Expanded Edition

by Harry Newton

PBooks

M. Honeyman 16037

NEWTON'S TELECOM DICTIONARY

STAY INFORMED

To be alerted by email to news, updates and corrections
send a blank email to newton@news.cmpbooks.com
or go to www.cmpbooks.com/newton

CMPBooks
San Francisco

FE001 nanyewell .M

NEWTON'S TELECOM DICTIONARY

copyright © 2004 Harry Newton
email: Harry@HarryNewton.com
personal web site: www.HarryNewton.com
business web site: www.HarryNewton.com/telecomdictionary.html

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 in the United States by

CMP Books

An imprint of CMP Media LLC
4300 Houston Street, San Francisco, CA 94107
Phone: 415-947-4415; Fax: 415-947-4015
Email: books@cmp.com
www.cmpbooks.com



CMP

United Business Media

For individual or quantity orders

CMP Books

4300 Shattuck Way, Emeryville, CA 94603

Tel: 1-800-500-4875 or 1-408-448-5296

Email: books@cmp.com; Web: www.cmpbooks.com

This book is also sold through www.amazon.com, www.fairfax.com and
www.HarryNewton.com and all fine bookstores worldwide.

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

Distributed in Canada by
Jaguar Book Group, 100 Armstrong Avenue, Georgetown, Ontario M6C 3E7 Canada

Printed in the United States of America

ISBN Number 1-57223-309-0

March 2004

Twentieth Edition

Metz Publishing

Ray Horak, Senior Contributing Editor

Frank Wagon, Project manager

Sue Johnson and Barbara Castorena, Cover Design

Brad Givens, First Layout

Contents

LIGHT AT THE END OF THE TUNNEL

— The telecom recession is finally ending.

Here's where the opportunities are v

THE BEST MONEY SAVING TIPS

— Harry Newton's favorite ways to save on telecom, computing,

airlines and hotels vii

WHY IS IT SO HARD TO BUY?

— How you should orient your precious telecom budget in today's tight times xxi

DISASTER RECOVERY PLANNING

— How to protect your computing and telecom resources xxiii

RULES FOLLOWED IN THIS DICTIONARY

— How to figure our ordering of definitions and our spellings xxv

THE AUTHOR, Harry Newton

— Harry does have a life outside this dictionary xxix

THE CONTRIBUTING EDITOR, Ray Horak

— Ray Horak teaches, consults and lives in Paradise xxxi

THE DICTIONARY

— The Dictionary begins with Numbers, then goes into Letters 1

APPENDICES

— Standards Organizations and Special Telecom Interest Groups 944

— Publications, Computer and Telecom 950

— International Calling Codes 951

— Standard Plugs and Connectors 952

Paired Cable / Pane

Paired Cable A cable in which all conductors are arranged in twisted pairs. This form of cable is the most common for communications.

Pairing A Bluetooth term. The creation and exchange of a link key between two devices. The devices (LocDev and RemDev) use the link key for future authentication when exchanging information. Pairing is also called an association between a LocDev and a RemDev based on a common link key. The link key is also referred to as a bond. Pairing can also establish a link by the user entering a PIN which is authenticated by the device providing the service.

Pairs in Metal Foil PAMF. See SSIP.

PAL 1. Public Access Line. Also called a COCOT, if you live outside of US West territory. A line that is tariffed to be attached to a pay phone. There are two basic flavors, "smart" and "basic" (or dumb). Smart lines may be connected to smart phones, and offer features such as coin signaling. Basic lines may be connected to smart phones, and the phone does all the work. Between the phone and the line, somebody has to have some intelligence. I first heard about this from one of my customers, a pay phone provider that puts up phones around town and pays commissions to the building owners. The service is tariffed by US West as a Public Access Line. (With multiple providers such as this one, anxious to pay you a percentage on a pay phone installed at your location, it's pretty silly to pay Bell for a pay phone).

2. Programmable Array Logic.

3. Proprietary Algorithm. A designation for a privately designed and owned intelligence-based electronic method for performing a task (such as voice compression).

4. Phase Alternate Line. PAL is the format for color TV signals used in the United Kingdom, West Germany, Holland, much of the rest of western Europe, several South American countries, some Middle East and Asian countries, several African countries, Australia, New Zealand, and other Pacific island countries. PAL inverts the phase of the color signal 180 degrees on alternate lines, hence the term Phase Alternate Line. It was invented in 1961 and is used in England and many other European countries. With its 625-line scan picture delivered at 25 frames/second (primary power 220 volts), it provides a better image and an improved color transmission compared to the US system which is called NTSC, which uses interlaced scans and 525 horizontal lines per frame at a rate of 30 frames per second. SECAM is used in France and in a modified form in Russia. SECAM uses an 819-line scan picture which provides better resolution than PAL's 625-line and NTSC's 525. All three systems are not compatible. You cannot view an Australian or English videotape on a US TV. Well, at least, you couldn't until recently when a handful of manufacturers started making PAL/NTSC/SECAM Video Cassette Recorder decks which will play and record in all formats. These VCRs are now very popular in both Europe and the US. See NTSC, mPAL-M and PVR.

5. Paradox Application Language. A programming language used in PDP (Programmed Data Processor) computers developed and marketed by Digital Equipment Corporation in the 1970s. See also PDP and PDF-11.

PAL-M A modified version of the phase-alternation-by-line (PAL) television signal standard (525 lines, 50 hertz, 220 volts primary power), used in Brazil. See also NTSC, PAL, SECAM.

Palette In some programs, a palette is a collection of drawing tools, brush widths, line widths and colors. In other programs it is the part of the color lookup table that determines the number and type of colors that will be displayed on the screen.

pali See pseudo Automatic Location Identification.

PalmOS The computer operating system used with the PalmPilot and Palm series of handheld digital personal assistants, as well as other organizers including Handspring and IBM. The system comes with a number of built-in applications including dates, address book, to-do list, memo pad and calculator. In addition, PalmOS interfaces with infrared devices and TCP/IP. Other operating systems for handheld devices include Windows CE and EPOC.

PALS A standard library database interface. An Internet term.

PAM 1. Pulse Amplitude Modulation. Process of representing a continuous analog signal (a voice conversation) with a series of discrete analog samples. This concept is based on the information theory which suggests that the signal can be accurately recreated from a sufficient sample. Why bother? Sampling allows several signals to then be combined on a channel that otherwise would only carry one telephone conversation. PAM was used as part of a method of switching phones calls in several PBXs. It is not a truly "digital" switching system. PAM is the basis of PCM, Pulse Code Modulation. See PCM and T-1.

2. Presence and Availability Management. See PAM Forum.

PAM Forum. The PAM Forum is an independent nonprofit consortium dedicated to establishing and promoting presence and availability management (PAM) as an industry standard. The focus of the PAM Forum is to develop and promote a presence and availability interface specification that enables software vendors and service providers to bring personalized, interoperable communications services to market. PAM-based services enable subscriber control of communications choices and privacy options across multiple devices and networks. www.pamforum.org.

PAMS Perceptual Analysis Measurement System is a speech quality measure developed by British Telecommunications to address the problem of objectively measuring subjective speech clarity. The specification was first issued in 1998. To perform a PAMS measurement, a sample of recorded human speech is input into a system or network. The characteristics of the input signal follow those that are used for MOS testing and are specified in P.830. Though natural speech samples may be used, PAMS is optimized for proprietary artificial-like speech samples. The output signal is recorded as it is received. The input and output signals are then input into the PAMS model. PAMS performs time alignment, band alignment, and equalization to remove the effects of delay, overall systems gain/attenuation, and analog phone filtering. Time alignment is performed in time segments, so for the negative effects of large delay variations (that cause problems for PSQM) a removed PAMS then compares the input and output signal in the time-frequency domain, comparing time-frequency cells within time frames. This comparison is based on human perception factors. The results of the PAMS comparison are scores that range from 0-5, corresponding to the same scale as MOS testing. PAMS produces a listening quality score and a listening effort score that correspond with the ACR opinion scale in P.800 and the opinion scale in P.830. A newer newer technique is called PESQ. See PESQ.

PAMA Pulse Address Multiple Access. Where carriers are distinguished by their time and space characteristics simultaneously.

PAMR Public Access Mobile Radio. The European term for what we call *Spacelink Mobile Radio* (SMR) or *Trunked Mobile Radio* (TMR) in the US. The private version for use in fleet applications is called *Private Mobile Radio* (PMR). See SMR and TETRA.

PAN Personal Area Network. A personal area network is a very small wireless local area network that joins your own personal communications devices such as your PDA, your PC and perhaps your phone. For more, see Bluetooth and 802.11.

Pan and Scan When a program or movie which has originally been created for the entire viewing on a 16 by 9 aspect screen is shown on a 4 by 3 aspect television screen by selecting the portion of the picture which contains the action and centering that on the display. This allows for a full screen display on a television screen that captures the action and eliminates only static parts of the original picture. At least that's the theory. It doesn't work too well if one actor one side of the screen is speaking to another actor on the other side of the screen. See also Letterbox.

Pan-European Across all of Europe, including England and the countries on the continent — France, Germany, Italy, etc. — "We'll launch that magazine in a Pan-European edition."

Pan-and-Scan A TV term referring to the translation of widescreen movies for TV broadcast through the introduction of moves and cuts which were never intended in the original. Less than the complete frame is transmitted, and portions of the picture are left out. The technique makes the action visible in a narrower frame such as your TV set. Contrast with Letterboxing.

Pancake Coil A type of inductance having flat spiral windings. An old radio design term.

Panda Eyes The term panda eyes is used in the fiber optic business. Fiber optics are tiny threads of glass that carry pulses of light, and with them, much of the world's telephone, television and computer signals. But, according to the *Wall Street Journal*, "you can get a real education standing in a San Jose, Calif., clean room belonging to JDS Uniphase the leading maker of the lasers, amplifiers and the like used in the world's fiber networks. The room is brightly lit, with a steady hum from all the air-filtering equipment. Workers sit in rows of work stations, each having a sign above the worker's head. One of the stations is labeled 'Panda Eyes.' The job here is to take two fiber-optic strands and, while looking through a microscope, join them together, lengthwise, like the strings in a whole lot. When the two strands are perfectly aligned and viewed head-on under the microscope, they look just like, yes, a pair of panda's eyes. The worker then can move on to the next job."

Pane What Australians call a window in a multi-windowed computer screen. For example, an agent in a call center might see a screen with several panes, one showing the customer's order status, another showing the customer's payment schedule, etc.

Transaction Processing / Transistor

out of the incomplete transaction. This allows you to maintain your database's integrity. You may, however, lose the single transaction you were working on when your network got sick.

Transaction Processing A processing method in which transactions are executed immediately when they are received by the system, rather than at some later time as in batch-processing systems. Airline reservation databases and automatic teller machines are examples of transaction-processing systems.

Transactional Integrity A term that describes how your computing/telecom system handles making sure that the transaction you just made is solid and clean and that the next time you want to get to the results of the transaction you can. "Transactional integrity" becomes critical when you're storing bits and pieces of your transactions on different media, in different places. For example, you might want to store your data on a magnetic hard drive and your associated images on a separate optical drive.

Transborder Data Flow TDF. Transborder data flows are movements of machine-readable data across international boundaries. TDF legislation began in the 1970s and has been put into effect by many countries in an attempt to protect personal privacy of citizens. This term has particular meaning as it relates to electronic commerce or EDI and is becoming more and more relevant with the use of the Internet as a means to conduct global business.

Transceiver 1. Any device that transmits and receives. In sending and receiving information, it often provides data packet collision detection as well.

2. In IEEE 802.3 networks, the attachment hardware connecting the controller interface to the transmission cable. The transceiver contains the carrier-sense logic, the transmit/receive logic, and the collision-detect logic.

3. A device to connect workstations to standard thick Ethernet-style (IEEE 802.3).

Transceiver Cable In local area networks, a cable that connects a network device such as a computer to a physical medium such as an Ethernet network. A transceiver cable is also called drop cable because it runs from a network node to a transceiver (a transmit/receiver) attached to the trunk cable. See Transceiver.

Transcoder A device that combines two 1.544 megabit per second bit streams into a single 1.544 megabit per second bit stream to enable transmission of 44 or 48 voice conversations over a DS-1 medium.

Transcoding A procedure for modifying a stream of data carried so that it may be carried via a different type of network. For example, transcoding allows H.320 video encoding, carried via circuit switched TDM systems to be converted to H.323 so that it can connect with and be transmitted across packet switched ethernet LAN.

Transcriptionist A person who listens to a tape recording and types the words he hears. The word, transcriptionist, derives from the verb to transcribe. The most common employment of transcribers is in the medical industry, where busy doctors talk into tape recorders telling good and bad news of their patients. And even busier transcriptionists type those words into the patient's medical records, or whatever.

Transducer A device which converts one form of energy into another. The diaphragm in the telephone receiver and the carbon microphone in the transmitter are transducers. They change variations in sound pressure (your voice) to variations in electricity, and vice versa. Another transducer is the interface between a computer, which produces electron-based signals, and a fiber-optic transmission medium, which handles photon-based signals.

Transfer A telephone system feature which provides the ability to move a call from one extension to another. It is probably the most commonly used and misused feature on a PBX. Before you buy a PBX, check out how easy it is to transfer a call. If you have a single line phone, you should simply hit the touch hook, hear a dial tone and then dial the chosen extension number and hang up. This sounds easy in principle, but many people find it difficult since they associate the touch hook with hanging up the phone. Some companies have gotten around this by putting a "hook flash" button on the phone itself. Such a button is like having an outdial button which just makes the exact short tone you make when you quickly hit the hook flash button. An even better solution is an electronic phone with a button specially marked "transfer," or a button next to a screen which lights up "transfer." Failing to efficiently transfer a call is the easiest way to give your customers the wrong impression of your firm. Think of how many times have you called a company only to be told it wasn't the fellow's job and he will transfer the call, but "If we get cut off, Transfer using Hold, Transfer using Conference, and Transfer with and without Announcement."

Transfer Callback A phone system feature. After a specified number of rings, an

unanswered transferred call will return to the telephone which originally made the transfer.

Transfer Delay A characteristic of system performance that expresses the time delay in processing information through a data transmission system.

Transfer Impedance A measure of shield effectiveness.

Transfer Mode A fundamental element of a communications protocol, transfer mode refers to the functioning arrangement between transmitting and receiving devices across a network. There are two basic transfer modes: connection-oriented and connectionless. Connection-oriented network protocols require that a call be set up before the data transmission begins, and that the call subsequently be torn down. Further, all data are considered to be part of a data stream. Examples of connection-oriented protocols include circuit-switched voice and data, ISDN, X.25 and ATM.

Connectionless protocols, on the other hand, do not depend on such a process. Rather, the transmitting device gains access to the transmission medium and begins to transmit data address to the receiver, without setting up a logical connection across the physical network. LANs (e.g. Ethernet and Token Ring) make use of connectionless protocols, as does SMDS, which actually is an extension of the LAN concept across a MAN (Metropolitan Area Network). For more detail, see Connection Oriented and Connectionless Mode Transmission.

Transfer Protocols Protocols are all of the packaging "that surround actual user data to tell the network devices where to send the data, who it comes from, and how to tell if it arrived. Transfer protocols are designed for the efficient moving of larger chunks of user data.

Transfer Rate The speed of data transfer — in bits, bytes or characters per second — between devices.

Transfer Switch Usually a switch which reverses two input-output combinations.

Transfer Time A power backup term. Transfer time can refer to either the speed at which an off-line UPS transfers from utility power to battery power, or to the speed with which an on-line UPS switches from the inverter to utility power in the event of an inverter failure. In either case the time involved must be shorter than the length of time that the computer's switching power supply has enough energy to maintain adequate output voltage. This hold-up time may range from eight to 16 milliseconds, depending on the point in the power supply's recharging cycle that the power outage occurs, and the amount of energy storage capacitance within the power supply. A transfer time of 4ms is most desirable, however, it should be noted that an oversensitive unit may make unnecessary power transfers.

Transformer Transformers are devices that change electrical current from one voltage to another. A step-up transformer increases the voltage and a step-down transformer decreases voltage. The power of an electric current must be conserved so just as voltage is increased, current is decreased. Transformers work by feeding an alternating current into a primary coil. The primary coil induces a magnetic field in a secondary coil which is connected to an energy using load. The difference between the number of coils in the primary coil versus the secondary coil determines whether the voltage will be stepped up or down. One reason for using a transformer is that commercial power is typically 120 or 240 volts while many phone systems (and other computer-type "things") work best on 48, 24 or lower voltage.

Transformer Exciting Network See TEN.

Transhybrid Loss The transmission loss between opposite ports of a hybrid network, that is between the two ports of the four-wire connection.

Transient Any high-speed, short duration increase or decrease in impedance that is superimposed on a circuit. Transients can interrupt or halt data exchange on a network. See HIT.

Transient Mobile Unit A mobile unit communicating through a foreign base station.

Transistor The transistor was invented in 1947 by John Bardeen, Walter H. Brattain and William Shockley of Bell Laboratories. The first transistor comprised a paper chip, two slivers of gold, and a piece of germanium on a crystal plate. Here is an explanation of how a transistor works, taken from "Signals, The Science of Telecommunications" by John Pierce and Michael Noll:

"To understand how a transistor works, we must look at the laws of quantum mechanics. We commonly picture an atom as a positive nucleus surrounded by orbiting electrons ... Vacuum tubes rely on the ability of electrons to travel freely with any energy through a vacuum. Transistors rely on the free travel of electrons through crystalline solids called semiconductors ... Semiconductors (such as silicon or gallium arsenide) differ from pure ones

NEWTON'S TELECOM DICTIONARY

20th Updated and Expanded Edition

Covering Telecommunications, Networking, Information Technology, the Internet,
Computing, Fiber Optics, Wireless, RFID and Technology Investing

"A must-read." —Interactive Week

"A page-turner that invites use." —IEEE

"A fixture on the desks of many who deal with the technical world." —New York Times

"The one reference book we can't do without... comprehensive and reliable." —Telemanagement

PLUS 4 BONUS Sections

- **THE BEST MONEY-SAVING TIPS**
Harry Newton's favorite ways to save on telecom, computing, airlines and hotels.
- **LIGHT AT THE END OF THE TUNNEL**
The telecom recession is finally ending. Here's where the opportunities are.
- **WHY IS IT SO HARD TO BUY?**
How you should orient your precious telecom budget in today's tight times.
- **DISASTER RECOVERY PLANNING**
How to protect your computing and telecom resources.



Harry Newton

Harry Newton has spent 33 years studying, writing, lecturing and investing in telecommunications and technology. He founded key telecom magazines—LAN (now Network), Teleconnect, Call Center, Computer Telephony and Technology Investor. He also founded the trade shows, Computer Telephony Conference and Exhibition (CT Expo) and Call Center Demo. He sold his telecom publishing group in September, 1997 to concentrate on writing.

Newton has an MBA from the Harvard Business School and an Economics degree from the University of Sydney, Australia, where he was born. He is not an engineer, but wishes he were. He wrote this dictionary to teach himself his first loves—telecom and technology. In this dictionary, Newton explains complex technology in non-technical, business language. He believes it's critical to understand what the technology does, what its benefits are and the key tips to using and installing it. That's what this dictionary does.

Most dictionaries are updated every ten to twenty years. Not this one. Newton updates this dictionary every day and issues a new, expanded, improved and updated edition every year. This edition is current as early 2004.

CMPBooks

www.cmpbooks.com

an imprint of CMP Media LLC

US \$34.95 • CAN \$48.95 • UK £25.99

ISBN 1-57820-309-0



9 781578 203093