

# Glossary of A/V Terms

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As you read the reviews and features of *The Perfect Vision*, there's a good chance you'll come across a term or two that you don't understand. Not to worry. Here's a comprehensive compendium of the definitions of common audio and video terms to help demystify the technospeak and clarify techy concepts.

**1080i** Pronounced "ten-eighty interlaced" or "ten-eighty eye." HDTV format in which 1080 scanning lines are presented in interlaced format.

**3:2 pulldown** A technique of translating video material originally shot on 24fps film to 30fps video. Also called "inverse telecine."

**3-way speaker** A loudspeaker that divides the frequency spectrum into three parts (bass, midrange, treble) for reproduction through three or more drivers.

**5C** See "Digital Transmission Content Protection."

**5.1 channels** The standard number of channels for encoding film soundtracks. The five channels are left, center, right, surround left, and surround right. The ".1" channel carries frequencies below about 100Hz and is reserved for bass effects.

**5.1-channel ready** An A/V receiver or controller with six discrete inputs that will accept the six discrete outputs from a Dolby Digital or DTS decoder. This feature allows you to add discrete digital decoding to a receiver or controller.

**720p** HDTV format in which the image is composed of 720 scanning lines presented in progressive format.

**A/B comparison** A back-and-forth listening comparison between two audio or video presentations, A and B.

**AC line-conditioner/protector** A device that filters noise from the AC powerline and isolates equipment from voltage spikes and surges. Some AC line-conditioners/protectors also protect equipment from lightning strikes. Home-theater equipment is plugged into the AC line-

conditioner/protector, and the conditioner is plugged into the wall.

**acoustic absorber** Any material that absorbs sound, such as carpet, drapes, and thickly upholstered furniture.

**acoustic diffuser** Any material that scatters sound.

**acoustics** The science of sound behavior. Also refers to a room; i.e., "This room has good acoustics."

**AC-3** The encoding format used to create Dolby Digital, the 5.1-channel discrete digital surround-sound format; see "Dolby Digital."

**active subwoofer** A speaker designed to reproduce only low frequencies and that includes an integral power amplifier to drive the speaker.

**ADC** See "analog-to-digital converter."

**adjacent-channel selectivity** Tuner specification that describes a tuner's ability to reject radio stations adjacent to the desired station.

**Advanced Television System Committee (ATSC)** Group that set the terrestrial transmission and format standards for digital television. Also, the transmitted signals that follow that format.

**alternate-channel selectivity** Tuner specification describing a tuner's ability to reject stations two channels away from the desired station.

**ambience** Spatial aspects of a film soundtrack that create a sense of size and atmosphere, usually reproduced by the surround speakers.

**ampere** Unit of electrical current, abbreviated A.

**analog** An analog signal is one in which the varying voltage is an analog of the acoustical waveform; i.e., it is continuously variable. Contrasted with a digital signal, in which binary ones and zeros represent audio or video information.

**analog-to-digital converter (A/D, ADC)** A circuit that converts an analog signal to a digital signal. **anamorphic** A film or video format in which a widescreen image has been "squeezed" horizontally (either with lenses or by digital manipulation) to fit a standard 4:3 aspect ratio. Correct picture geometry is restored on playback by "unsqueezing" the image into its original aspect ratio. The anamorphic format delivers the correct aspect ratio without sacrificing resolution. Anamorphic DVDs may carry the legend "Anamorphic Widescreen," "16:9 Enhanced" or "Enhanced for Widescreen Televisions."

**ANSI lumens** Measurement of a video display's light output, or the light output from a front projector as reflected from a projection screen.

**aspect ratio** The width-to-height ratio of a visual image. Standard television sets have an aspect ratio of 4:3 (1.33:1). Widescreen television sets have an aspect ratio of 16:9 (1.78:1).

**aspect-ratio control** A feature in some HD-ready televisions that allows you to manually adjust the aspect ratio.

**atmosphere** See "ambience."

**ATSC** See "Advanced Television System Committee."

**A/V** Short for audio/video. Identifies a component or system as one that processes video as well as audio signals.

**AV/C** Audio-Video Control, a simple FireWire-based technology for controlling the components in a home-theater system as a single unit with one remote control.

**A/V input** An input on an A/V receiver or controller that includes both audio and video jacks.

**A/V loop** An A/V input and A/V output pair found on all A/V receivers and controllers. Used to connect a component that records as well as plays back audio and video signals. A DVD recorder is connected to a receiver's or controller's A/V loop.

**A/V preamplifier** Also called by its more descriptive name of an "A/V controller," the A/V preamplifier is a component that performs surround decoding and lets you control the playback volume and select which source you want to watch and listen to.

**A/V preamplifier/tuner** An A/V preamplifier that includes, in the same chassis, an AM and/or FM tuner for receiving radio broadcasts.

**A/V receiver** The central component of a home-theater system; receives signals from source components, selects which signal you watch and listen to, controls the playback volume, performs surround decoding, receives radio broadcasts, and amplifies signals to drive a home-theater loudspeaker system. Also called a "surround receiver."

**baffle** The front surface of a loudspeaker, on which the drivers are mounted.

**balanced cable** A cable that carries a balanced signal on three conductors. Contrast with unbalanced (or "single-ended") cable.

**balanced output** A connector on some A/V products that presents the

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audio signal on three conductors, rather than the two conductors of an unbalanced output. Balanced outputs appear on XLR jacks. Found only on high-end products.

**banana jack** A small tubular connector found on A/V receivers and power amplifiers for connecting speaker cables terminated with banana plugs.

**banana plug** A common speaker-cable termination that fits into a banana jack.

**bandwidth** In audio, the range of frequencies that a device can process or pass; the human ear has a bandwidth of 20Hz–20kHz. In radio and television transmission, the range of frequencies occupied by one channel of information; a television broadcast channel occupies a band of frequencies 6MHz wide. In digital, the maximum bit rate a system is capable of conveying; the bandwidth of a FireWire 400 connection is 400Mbps.

**bass** Sounds in the low audio range, generally 20Hz–200Hz.

**bass extension** The lowest frequency an audio system can reproduce. A measure of how deeply an audio system or loudspeaker will reproduce bass. For example, a small subwoofer may have bass extension to 40Hz. A large subwoofer may have bass extension to 16Hz.

**bass management** A combination of controls and circuits in an A/V receiver or controller that determines how bass frequencies are distributed among the loudspeakers.

**bass reflex** A speaker with a hole or slot in the cabinet that allows sound inside the cabinet to emerge into the listening room. Bass-reflex speakers have deeper bass extension than similarly sized speakers with sealed cabinets, but that bass is generally less tightly controlled.

**below black** Information in a video signal that falls below the technical threshold of black, 7.5 IRE. Some DVD players pass signals that are below black; others do not.

**bi-amping** Using two power amplifiers to drive one loudspeaker. One amplifier typically drives the woofer, while the second drives the midrange and tweeter.

**big screen** A large-screen direct-view television or rear-projection set.

Usually reserved for sets with diagonal dimensions greater than 40 inches.

**binding post** A connection on receivers and power amplifier for attaching loudspeaker cables.

**bipolar speaker** A speaker that produces sound equally from the front and the back. Unlike the dipolar speaker, the bipolar's front and rear sound waves are in phase with each other.

**bit rate** The number of bits per second transmitted by a digital audio or digital video signal. For example, the bit rate of Dolby Digital is 384kbs (384,000 bits per second) or 448kbs. MPEG-2 video encoding produces a digital video signal with a variable bit rate that averages about 3.5Mbps (3.5 million bits per second). Higher bit rates translate to better audio and/or video quality.

**bi-wire** Connecting a loudspeaker to a receiver or power amplifier with two runs of cable to each of the positive and negative terminals. Possible only with speakers featuring two pairs of input terminals. Bi-wiring results in better sound than single-wiring.

**black drop** The black masking area above and below a screen used with a front-projection system.

**black level** Technically, the video level that produces black in a video display. Commonly, "black level" refers to a video display's ability to present the color black as truly black and not as dark gray.

**Blu-ray Disc** New optical disc format that can store 50GB on a dual-layer disc the size of a DVD. Competing with HD DVD to be the high-definition replacement for DVD.

**BNC jack** A type of connector used in high-end consumer and professional A/V equipment. Used primarily for RGB and component-video signals.

**bridging** Amplifier-to-loudspeaker connection method that converts a stereo amplifier into a monoblock power amplifier. One amplifier channel amplifies the positive half of the waveform, the other channel amplifies the negative half. The loudspeaker is connected as the "bridge" between the two amplifier channels.

**brightness** In audio, an excessive amount of treble that adds a shrillness to the sound. In video, the amount of light generated by a video display device.

**brightness signal** More correctly called "luminance" and represented by the letter Y, the brightness component of a video signal contains all the black-and-white information. A complete color-video signal is a combination of luminance and chrominance (color information).

**burn-in** Technically called "differential phosphor aging." Phenomenon that occurs in phosphor-based video displays (CRT and plasma) in which static images displayed on the screen for long periods cause that static image to be permanently superimposed on the screen.

**CableCARD** Credit-card-sized device that inserts into a CableCARD-compliant television and replaces a separate cable box.

**calibration** The act of fine-tuning an audio or video component for correct performance. In an audio system, calibration includes setting the individual channel levels. In video, calibration means setting a video display device to display the correct color, brightness, tint, contrast, and other parameters.

**cathode ray tube** See "CRT." center channel In a multichannel audio system, the audio channel that carries information that will be reproduced by a speaker placed in the center of the viewing room between the left and right speakers. The center channel carries nearly all a film's dialog.

**center-channel mode** A setting on A/V receivers and A/V controllers that configures the receiver or controller for the type of center-channel speaker in the system.

**center-channel speaker** The speaker in a home-theater system located on top of, beneath, or behind the visual image; reproduces center-channel information such as dialog and other sounds associated with onscreen action.

**channel balance** The relative levels or volumes of the different channels in a home-theater system.

**channel separation** A measure of how well sounds in one channel are isolated from other channels. Low channel separation results in sounds from one channel "leaking" into other channels, a phenomenon called "crosstalk." A classic example is front-channel sounds in Dolby Surround leaking into the surround channels. High channel separation results in more precise placement of sounds.

**chrominance (chroma)** The color-carrying portion of a video signal. The chroma signal carries color and hue, but little brightness information.

**Class-A** Mode of amplifier operation in which a transistor or tube amplifies the entire audio signal.

**Class-AB** Mode of amplifier operation that is similar to Class-B except that both tubes or transistors operate when the voltage is near 0V. Distortion is higher at low signal levels than Class-A, but efficiency is higher, though not as high as Class-B.

**Class-B** Mode of amplifier operation in which one tube or transistor amplifies the positive half of an audio signal, and a second tube or transistor amplifies the negative half.

**Class-D** Mode of amplifier operation in which the output transistors are switched fully on or fully off in pulses. The pulse duration determines the signal's amplitude. Also called a "switching" or "digital amplifier."

**coaxial cable** A cable in which an inner conductor is surrounded by a braided conductor that acts as a shield. Coaxial cable is used between a TV antenna and a VCR or TV, between a DBS dish and a DBS receiver, and sometimes between a VCR and a TV set. It is also used to deliver cable-TV signals into the home.

**coaxial digital output** A jack found on most DVD players that provides a digital audio signal on an RCA jack for connection to another component through a coaxial digital interconnect (which is different from the coaxial cable that carries TV signals).

**coloration** A change in sound introduced by a component in an audio system. A loudspeaker that is "colored" doesn't accurately reproduce the signal fed to it. For example, a speaker with coloration may have too much bass and not enough treble.

**color temperature** Measurement, in kelvins, of a video display's reproduction of gray. Too low a color temperature and the color gray has a red cast. Too high a color temperature and the color gray has a blue cast. The ideal color temperature is represented as 6500K.

**color uniformity** The ability of a projection screen to reflect all colors equally at every point on the screen. A screen with poor color uniformity may impart a blue tint to the image on one

# Glossary of A/V Terms (continued)

side of the screen, and a red tint on the other side.

**color wheel** In DLP-based video displays, a device that sequentially passes red, green, and blue light to the DMD chip by means of a spinning wheel with red, green, and blue filter wedges.

**comb filter** A circuit that splits a composite video into separate color and brightness signals.

**component video** A video signal split into three parts: luminance and two color-difference signals (technically known as Y, B-Y, R-Y, or YPbPr). A superior method of connecting video compared to composite video.

**component-video switching** A feature on A/V controllers and receivers that allows you to connect several component-video sources to the controller or receiver, with the controller or receiver sending the selected signal to the video display.

**composite video** A video signal in which the luminance (brightness, or black-and-white) information and the chrominance (color) information are combined into a single signal. Composite video inputs and outputs appear on RCA jacks.

**cone diaphragm** The conically shaped paper, plastic, or metal diaphragm of a loudspeaker that moves back and forth to create sound. Contrast with "dome diaphragm."

**congested** A thickening of the sound that makes instrumental images less separate and distinct. **contrast** The range between white and black in an image.

**controller** Another term for an A/V preamplifier.

**convergence** The integration of various technologies, such as digital video, digital audio, computers, and the Internet.

**crossover** A circuit that splits up the frequency spectrum into two or more parts. Crossovers are found in virtually all loudspeakers, and in some A/V receivers and controllers.

**crossover frequency** The frequency at which the audio spectrum is split. A subwoofer with a crossover frequency of 80Hz filters all information above 80Hz from the signal driving the subwoofer, and all information below

80Hz from the signal driving the main speakers. Also called "cutoff frequency."

**crossover slope** Describes the steepness of a crossover filter. Expressed as "dB/octave." For example, a subwoofer with a crossover frequency of 80Hz and a slope of 6dB/octave would allow audio frequencies at 160Hz (an octave above 80Hz) into the subwoofer, but signals at 160Hz would be reduced in amplitude by 6dB. A slope of 12dB/octave would also allow 160Hz into the subwoofer, but the amplitude would be reduced by 12dB. The most common crossover slopes are 12dB/octave, 18dB/octave, and 24dB/octave. Crossover slopes are also referred to as "first-order" (6dB/octave), "second-order" (12dB/octave), "third-order" (18dB/octave), and "fourth-order" (24dB/octave). The "steeper" slopes (such as 24dB/octave) split the frequency spectrum more sharply and produce less overlap between the two frequency bands, but they also cause phase anomalies.

**crosstalk** See "channel separation."

**CRT (cathode ray tube)** A vacuum tube in which electrons are fired at a screen coated with phosphors that give off light when struck to produce a visible pattern (a picture). Direct-view television sets use a large CRT. Some front-projectors use three small CRTs to project an image.

**current** The flow of electrons in a conductor. For example, a power amplifier "pushes" electrical current through speaker cables and the voice coils in a loudspeaker to make them move back and forth.

**cutoff frequency** See "crossover frequency."

**DAC** See "digital-to-analog converter."

**data compression** See "perceptual coding."

**dB** See "decibel."

**DBS** See "direct broadcast satellite."

**DC (direct current)** Flow of electrons that remains steady in one direction rather than alternating directions. Contrasted with alternating current (AC).

**decibel (dB)** The standard unit for expressing relative power or amplitude levels.

**deinterlacer** A device that converts an interlaced video signal to a progressive signal, and presents those lines to a video display device at twice the frequency of normal NTSC video.

**deinterlacing** Technique of converting an interlaced video image to a progressive video image.

**depth** The impression of instruments, voices, or sounds existing behind one another in three dimensions, as in "soundstage depth."

**dialog intelligibility** The ability to clearly hear and understand the dialog in a movie without strain. Dialog intelligibility is affected by the quality of components in a home-theater system, room acoustics, and how the system is set up.

**diaphragm** The surface of a loudspeaker driver that moves, creating sound.

**diffraction** The bending of sound waves as they pass around an object. Also a re-radiation of sound caused by discontinuities in surfaces near the radiating device, such as the bolts securing drivers to a speaker cabinet.

**diffusion** Scattering of sound. Diffusion reduces the sense of direction of sounds, which benefits sound produced by surround loudspeakers.

**digital** Calculation or representation by discrete units. For example, digital audio and digital video can be represented by a series of binary ones and zeros.

**Digital Light Processing (DLP)** A technology developed by Texas Instruments that reflects light from hundreds of thousands of tiny mirrors on a semiconductor chip to project an image. The chip itself is called a Digital Micromirror Device (DMD).

**digital loudspeaker** Loudspeaker incorporating a digital crossover and power amplifiers. A digital loudspeaker takes in a digital bit-stream, splits up the frequency spectrum with digital signal processing, converts each of those signals to analog, and amplifies them separately. The individual power amplifiers then power each of the loudspeaker's drive units.

**Digital Micromirror Device (DMD)** See "Digital Light Processing."

**digital power amplifier** An amplifier that takes in digital signals

and converts them to analog as part of the amplification process.

**digital signal processing (DSP)** Manipulation of audio or video signals by performing mathematical functions on the digitally encoded signal.

**digital television** See "DTV."

**Digital Theater Systems** See "DTS."

**digital-to-analog converter (DAC, D/A)** A device that converts digital signals to analog signals. CD players, laserdisc players, DBS boxes, and DVD players all contain digital-to-analog converters.

**Digital Transmission Content Protection (DTCP)** An encryption technology that allows transmission of digital video and digital audio between components in a home-theater system, but prohibits those signals from being recorded. Used with FireWire (IEEE1394). Also called 5C to acknowledge the five companies that developed it.

**digital video recorder (DVR)** A device that stores digital video on a hard-disk drive. TiVo and ReplayTV devices are DVRs.

**Digital Visual Interface (DVI)** A wideband digital video interface that can carry uncompressed high-definition video and control signals in the same cable.

**D-ILA (Direct Drive Image Light Amplifier)** A video display technology used in rear-projection televisions and front projectors. D-ILA is JVC's implementation of reflective LCD technology called liquid crystal on silicon (LCoS).

**dipolar speaker** A loudspeaker that produces sound from the rear as well as from the front, with the front and rear sounds out of phase with each other. Dipoles are most often used as surround speakers.

**direct current** See "DC."

**direct broadcast satellite (DBS)** A method of delivering high-quality digital video into consumers' homes via an 18-inch roof-mounted dish. Previously known as digital satellite system (DSS).

**director's cut** A version of a film re-edited by the director for a premium consumer release.



# Glossary of A/V Terms (continued)

## **Direct Stream Digital (DSD)**

A method of digitally encoding music with a very fast sampling rate, but with only 1-bit quantization. Developed by Sony and Philips for Super Audio CD (SACD).

**direct-view** Another name for a conventional television set. Called direct-view because you view the image directly on the front of its picture tube.

**discrete** Separate. A discrete digital surround-sound format contains 5.1 channels of audio information that are completely separate from each other; contrasted with a matrixed surround format such as Dolby Surround, which mixes the channels together for transmission or storage.

**dispersion** The directional pattern over which a loudspeaker distributes its sound.

**DLP** See "Digital Light Processing."

**DMD** See "Digital Light Processing."

**Dolby Digital** A 5.1-channel discrete digital surround-sound format used in movie theaters and consumer formats. One of the surround formats used on DVD.

**Dolby Digital EX** A surround-sound format that matrix-encodes a "back-surround" channel into the left and right surround channels of a 5.1-channel Dolby Digital signal. This back-surround channel is reproduced by one or two loudspeakers located directly behind the listening position. Although Dolby Digital EX is the format's official name, it's often called THX Surround EX because THX was the exclusive licensor of the technology until late 2001. Jointly developed by Lucasfilm THX and Dolby Laboratories.

**Dolby Digital Plus** Higher-quality version of Dolby Digital developed for HD DVD and Blu-ray Disc.

**Dolby Pro Logic** A type of Dolby Surround decoder with improved performance over standard Dolby Surround decoding. Specifically, Pro Logic decoding provides greater channel separation and a center-speaker output. A Dolby Pro Logic decoder takes in a 2-channel, Dolby Surround-encoded audio signal and splits those signals up into left, center, right, and surround channels. Nearly all A/V receivers and A/V controllers include Dolby Pro Logic decoders.

**Dolby Pro Logic II** Introduced in late 2001, Pro Logic II provides superior decoding of two-channel music and film sources compared with Pro Logic.

**Dolby Surround** An encoding format that combines four channels (left, center, right, surround) into two channels for transmission or storage. On playback, a Dolby Pro Logic decoder separates the two channels back into four channels.

**Dolby TrueHD** Lossless audio-encoding system developed for HD DVD and Blu-ray Disc. Dolby TrueHD can deliver high-resolution multichannel audio with perfect bit-for-bit accuracy to the source.

**dome diaphragm** The dome-shaped paper, plastic, silk, or metal diaphragm of a loudspeaker that moves back and forth to create sound. Normally used in tweeters. Contrast with "cone diaphragm."

**Downmix converter** A circuit found in DVD players that converts the 5.1-channel discrete Dolby Digital soundtrack into a 2-channel Dolby Surround-encoded signal. A DVD player's downmix converter lets you hear surround sound from DVD if you don't have a Dolby Digital decoder.

**driver** The actual speaker unit inside a loudspeaker cabinet.

**DSD** See "Direct Stream Digital."

**DSP** See "Digital Signal Processing."

**DSP room correction** A technique of removing room-induced frequency-response peaks and dips with digital signal processing.

**DTCP** See "Digital Transmission Content Protection."

**D-Theater** Copy-protection system proposed for the D-VHS digital videotape format.

**DTS (Digital Theater Systems)** A discrete, digital surround-sound format used in movie theaters and home-theater systems. An alternative to Dolby Digital that uses a higher bit rate. Also called "DTS Digital Surround."

**DTS-ES Discrete** A 6.1-channel surround-sound format that includes a rear surround channel in addition to the conventional 5.1 channels. Called "discrete" because the rear surround

channel is completely separate from the left and right surround channels, unlike DTS ES Matrix, which matrix-encodes the third surround channel into the existing left and right surround channels of a 5.1-channel signal.

**DTS-ES Matrix** A 5.1-channel surround-sound format that includes a rear surround channel that is matrix-encoded into the left and right surround channels of a 5.1-channel signal. Unlike DTS ES Discrete, DTS ES Matrix is not a true 6.1-channel format because the soundtrack is carried in 5.1 channels.

**DTS-HD** Higher quality version of DTS developed for HD DVD and Blu-ray Disc.

**DTS Neo:6 Cinema** A DTS decoding technology for playing back 2-channel film-soundtrack sources (such as television broadcasts and the stereo audio channels from a VCR) through 5.1 or 7.1 loudspeakers.

**DTS Neo:6 Music** A DTS decoding technology for playing back two-channel music sources (such as stereo CDs and FM radio) through 5.1 or 7.1 loudspeakers.

## **DTV (digital television)**

Method of encoding and transmitting video as a stream of ones and zeros, rather than as an analog signal.

**DV** A digital video-interface format used primarily on camcorders. A simplified version of FireWire (IEEE1394).

**DVD** A format that puts MPEG-2-encoded digital video and Dolby Digital (and possibly DTS) surround-sound audio on a disc the size of a CD.

**DVD-Audio** A DVD-format disc containing high-resolution multichannel or 2-channel digital audio.

**DVD-R** A write-once recordable DVD format.

**DVD-RAM** A re-writable DVD recording format that is incompatible with all other recordable DVD formats.

**DVD-RW** A re-writable DVD recording format.

**DVD+R** A write-once recordable DVD format that is incompatible with DVD-R and DVD-RW.

**DVD+RW** A re-writable DVD format that is incompatible with DVD-R and DVD-RW.

**D-VHS** A digital video-recording format that uses a conventional VHS tape shell. D-VHS can store up to four hours of high-definition video on one tape.

**DVI** See "Digital Visual Interface."

**DVR** See "digital video recorder."

**dynamic range** In audio, the difference in volume between loud and soft. In video, the difference in light level between black and white (also called "contrast").

## **Dynamic-range compressor**

A circuit found in some Dolby Digital-equipped receivers and controllers that reduces audio dynamic range. A dynamic range compressor can reduce the volume of peaks, or increase the volume of low-level sounds, or both. Useful for late-night listening when you don't want explosions to disturb other family members, but still want to hear low-level sounds clearly.

**equalizer** A circuit that changes the tonal balance of an audio program. Bass and treble controls are a simple form of equalizer.

**excursion** The amount of back-and-forth movement of a loudspeaker diaphragm.

**false contouring** A picture distortion in digital displays in which dark areas appear as solid blotches. **field** The odd- or even-numbered lines of a frame.

**fill factor** In a digital display device, the ratio of pixel area to non-picture areas between the pixels. The higher the fill factor, the smoother-looking the image.

**FireWire** A wideband digital interface that can carry digital audio, digital video, computer data, and control codes in a single cable composed of three twisted pairs of wires. Officially called IEEE1394 after the Institute of Electrical and Electronics Engineers, the body that developed the interface.

**fixed-pixel display** A video display device that uses an array of fixed pixels to create the image. Examples include LCD, DLP, LCoS, and plasma. Contrast with a CRT-based display that has no fixed pixel structure.

**fixed-pixel scaler** An image scaler that outputs only a single resolution to a fixed-pixel display. A range of output resolutions is unnecessary because the output resolution is facto-

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ry set for the display with which the scaler is used.

**fl** See "foot-lambert."

**flat** A speaker that accurately reproduces the signal fed to it is called "flat" because that is the shape of its frequency-response curve.

**floorstanding speaker** A speaker that sits on the floor rather than on a stand.

**Foley** Sound effects added to a film soundtrack, such as footsteps and doors closing.

**foot-lambert (fl)** A measure of the amount of light from a video display device.

**forward** A description of a sonic presentation in which sounds seem to be projected forward, toward the listener.

**frame** One complete picture in video or film.

**frame rate** The rate at which frames are displayed, expressed in frames per second (fps). The NTSC television frame rate is 29.97fps; movies are shot and displayed at 24fps.

**frequency** Number of repetitions of a repeating cycle per second. Measured in hertz (Hz), or cycles per second. An audio signal with a frequency of 1000Hz (1kHz) undergoes 1000 cycles per second.

**frequency response** A graphical representation showing a device's relative amplitude as a function of frequency.

**front projector** A video display device that projects an image from a distance onto a separate screen.  
**full-range speaker** A speaker that reproduces bass as well as midrange and treble frequencies.  
**gain** See "screen gain."

**grayscale tracking** A measurement of a video display's performance that reveals the display's ability to produce the color gray at the correct color temperature (6500K) at varying brightness levels.

**HAVi (Home Audio/Video interoperability)** A FireWire-based technology for controlling various components of a home-theater system as a single unit with one remote control. This "interoperability" is possible because the FireWire interface

carries control data along with digital audio and video in the same cable.

**harmonic distortion** The production of spurious frequencies at multiples of the original frequency. A circuit amplifying a 1kHz sine wave will create frequencies at 2kHz (second harmonic), 3kHz (third harmonic), and so forth.

**HDCP** See "High-bandwidth Digital Content Protection."

**HD DVD** New optical disc format that can store 30GBG on a dual-layer disc the size of a DVD. Competing with Blu-ray Disc to be the high-definition replacement for DVD.

**HDMI** see "High-Definition Multimedia Interface"

**HDTV (high-definition television)** Refers generally to high-resolution television transmissions and displays, which must exhibit a vertical resolution of 720 or higher to qualify as HDTV.

**hertz (Hz)** The unit of frequency; the number of cycles per second. Kiloherz (kHz) is thousands of cycles per second.

**HiFi** Short for High Fidelity, the high-quality audio format used in some VHS videocassette recorders. A VHS HiFi VCR can provide excellent sound quality. Contrasted with VHS linear tracks, which offer poor sound quality.

**High-bandwidth Digital Content Protection (HDCP)**

An encryption technique that allows transmission of digital video and digital audio between components in a home-theater system, but prohibits those signals from being recorded. Used with the DVI and HDMI interfaces.

**High-Definition Multimedia Interface (HDMI)** Digital interface that can carry HD video, high-resolution digital audio, and control information on a single cable.

**high-definition television** see "HDTV"

**high-density layer** The information layer in a Super Audio CD that contains high-resolution digital audio.  
**high-pass filter** A circuit that allows high frequencies to pass, but blocks low frequencies. Also called a "low-cut filter." High-pass filters are often found in A/V receivers and A/V controllers to keep bass out of the main speakers when using a subwoofer.

**high-resolution digital audio**

Generally regarded as digital audio with a sampling rate greater than 48kHz and a word length longer than 16 bits.

**home theater** The combination of high-quality audio and video in your home.

**Home THX** A set of patents, technologies, and playback standards for reproducing film soundtracks in the home as the producer intended. THX doesn't compete with surround formats such as Dolby Pro Logic or Dolby Digital, but instead builds on them.

**horizontal resolution** A number that specifies the amount of fine detail a video display can show (or a video format can contain) in each horizontal scanning line. In analog formats such as VHS videotape and CRT-based television sets, horizontal resolution is expressed in TV Lines (TVL). In digital formats and fixed-pixel display devices, horizontal resolution is expressed in the number of pixels per horizontal line of video. For example, VHS has a horizontal resolution of 240 TVL, DVD has a horizontal resolution of 720 pixels, and HDTV's maximum horizontal resolution is 1920 pixels. Technically, horizontal resolution is specified as the number of pixels or TVL per picture height. This requirement prevents widescreen formats from having an apparently higher horizontal resolution than 4:3 formats.

**Hz** See "hertz."

**IC (integrated circuit)** Many A/V products use ICs for processing and amplifying audio signals; higher-quality units use discrete transistors instead.

**IEEE1394** See "FireWire."

**i.LINK** Sony's name for their implementation of IEEE1394 (FireWire)  
**impedance** Resistance to the flow of an alternating electrical current.

**infrared (IR)** The wavelength of light used by remote controls to send commands to components.

**interconnect** A cable that carries line-level audio signals.

**interlaced scanning** The technique used in NTSC video in which the odd-numbered scanning lines of the video picture are displayed in one pass from the top of the screen to the bottom, and the even-num-

bered scanning lines are displayed on the second pass, to form a complete image. Contrast with "progressive scanning."

**interpolation** Filling in missing information with a "best-guess" estimate.

**in-wall speaker** A speaker mounted inside a wall.

**inverse telecine** See "3:2 pull-down."

**IRE (Institute of Radio Engineers)** The measure of brightness in video images. Black is usually defined as 7.5 IRE; white as 100 IRE, with all other brightness levels falling between these two values.

**IR repeater** A pair of devices, called an "IR sensor" and "IR flasher," that together relay IR commands from a remote control to components hidden from the remote control's direct line of sight.

**kbps (kilobits per second)** Thousands of bits per second; a measure of bit rate.

**keystoning** A picture distortion in front projectors in which the top or bottom of the picture is narrower than the opposite edge. Arises from non-perpendicular placement of the projector with respect to the screen.

**laserdisc** A format for storing analog video signals on a 12-inch double-sided disc.

**LCD (liquid crystal display)** A technology for displaying images. Light is projected through an array of crystals that either pass or block light, according to the signal driving the panel.

**LCD projector** A projector using three LCD panels and a light source.

**LCoS (liquid crystal on silicon)** A technology for displaying images. Used in rear-projection televisions and front projectors. Similar to LCD, but in LCoS, light is selectively reflected from pixels in the LCoS panel. (By contrast, LCD is a "transmissive" technology in which light passes through the pixels rather than being reflected by them.)

**letterbox** A video image that results from displaying an image of widescreen aspect ratio on a television set of standard aspect ratio. The picture is presented between black

# Glossary of A/V Terms (continued)

bars above and below the image. Contrast with "windowbox."

**LFE** See "Low Frequency Effects." linear tracks The audio tracks recorded on VHS tape as thin stripes along the tape edge. Recorded and played back by a stationary head. The slow tape speed of VHS results in poor sound quality. Different from HiFi tracks, in which the audio is recorded along with the video by the spinning video head for higher audio quality.

**line level** An audio signal with an amplitude of approximately 1V to 2V. Audio components interface at line level through interconnects. Contrasted with "speaker level," the much more powerful signal that drives speakers.

**liquid crystal display**  
See "LCD."

**liquid crystal on silicon**  
See "LCoS."

**LNB (Low-Noise Blocking Converter)** A device inside a DBS dish that picks up the transmitted digital video signal.

**localization** The ability to detect the directionality of sounds.

**low-cut filter** A circuit that removes bass frequencies from an audio signal. Also called a "high-pass filter."

**Low Frequency Effects (LFE)**  
A separate channel in the Dolby Digital format reserved for low-bass effects, such as explosions. The LFE channel is the ".1" channel in a 5.1-channel format.

**low-noise blocking converter**  
See "LNB."

**low-pass filter** A circuit that removes midrange and treble frequencies from an audio signal. Also called a "high-cut filter."

**loudspeaker** A device that converts an electrical audio signal into sound. The loudspeaker is the last component of the audio playback chain.

**luminance** The black-and-white, or brightness, component of a video signal. Represented by the letter Y. masking The blacked-out areas to the sides of a front-projection screen.

**matrix** A method of encoding multiple audio channels into two channels for transmission or storage.

**Mbps (mega bits per second)** Million bits per second. A unit of measure for expressing bit rates. For example, MPEG-2 video encoding has a variable bit rate that averages 3.5Mbps.

**microdisplay** A rear-projection video display based on a fixed-pixel technology such as DLP, LCoS, or LCD.

**midrange** Audio frequencies in the middle of the audible spectrum, such as the human voice. Generally the range of frequencies from about 200Hz to 2kHz. Also: a driver in a loudspeaker that reproduces the range of frequencies in the middle of the audible spectrum.

**millisecond (ms)** One-thousandth (0.001) of a second.

**modular A/V controller** An A/V controller built with interchangeable modules for upgrading to future technologies.

**monoblock** A power amplifier with only one channel.

**motorized masking** A projection screen in which a motor-driven black drop moves into position over the screen to create different aspect ratios.

**motorized screen** A projection screen that retracts by motor drive into a housing when not in use.

**motion artifacts** Visible defects in a displayed image resulting from motion of objects within the image.

**MP3** A perceptual coding format that reduces the number of bits required to represent a digital audio signal. Shorthand for MPEG-1 Audio Level 3.

**MPEG (Motion Picture Experts Group)** The body that develops data-compression standards for audio and video. Pronounced "em-peg."

**MPEG-1 video compression**  
A video encoding method that reduces the bit rate needed to represent the video signal to 1.4Mbps. Provides poor picture quality.

**MPEG-2 video compression**  
A much-higher-quality encoding technique than MPEG-1. Used in DBS and DVD.

**MPEG-4 video compression**  
Also called Advanced Video Coding (AVC). A video compression algorithm

that produces higher-quality pictures at standard MPEG-2 bit rates, and high-definition pictures at bit rates of 7–10Mbps. Adopted for use in HD DVD and Blu-ray Disc as well as in the next generation of satellite transmission.

**MTS (Multichannel Television Sound)** The method of broadcasting stereo audio over conventional television channels.

**multichannel power amplifier**  
A power amplifier with more than two channels, usually five or six.

**multichannel sound** Sound reproduction using more than two channels feeding more than two loudspeakers.

**multipath** In FM-radio or television transmission, interference caused by the signal traveling two or more paths to travel between transmitter and receiver. Multipath is caused by mountains or buildings that reflect the radio or TV signals; the receiving antenna picks up the directly broadcast signal along with the signal after it has been delayed by the reflections. Multipath introduces audible distortion in FM tuners, and in television transmission is seen as "ghosting" in the picture. Multipath can cause HDTV receivers to pick up no usable signal.

**multiroom** A feature on some A/V products that lets you listen to two different sources in two different rooms.

**notch filter** A circuit found in inexpensive television sets in place of a comb filter; separates the brightness and color portions from a composite-video signal.

**NTSC (National Television System Committee)** The body that set the American color TV standard in 1953. NTSC has become a descriptive name for television and video signals that conform to this standard. Jokingly referred to as "Never Twice the Same Color."

**panning** The side-to-side movement of sounds and images from one location to another. Originally a camera term.

**pan&scan** A method of converting a widescreen presentation to an image within a 4:3 aspect ratio without black bars at the top and bottom of the picture. The camera moves back and forth (panning and scanning) in each scene to show only the most important parts of the image.

Results in the left and/or right edges of the image being cut off.

**passive subwoofer** A speaker for reproducing bass frequencies that must be powered by a separate power amplifier. Contrasted with "active" or "powered" subwoofers, which contain built-in amplifiers.

**PCM** See "Pulse Code Modulation."

**peak** A short-term, high-level audio signal.

**perceptual coding** A method of reducing the number of bits needed to encode an audio or video signal by ignoring information unlikely to be heard or seen. Also called "lossy compression."

**phantom center-channel mode** A setting on A/V receivers or A/V controllers invoked when no center-channel speaker is used.

**phantom image** The creation of an apparent sound source between two speakers.

**phase** In a periodic wave, the fraction of a period that has elapsed. Describes the time relationship between two signals.

**phase adjustment** A control provided on some subwoofers that lets you delay the sound of the subwoofer slightly so that its output is in phase (has the same time relationship) with the output of the front speakers.

**pixel** The smallest element in a displayed video image. Image resolution is measured in pixels; the greater the number of pixels, the higher the resolution.

**plasma display panel (PDP)**  
Fixed-pixel video display device in which an electrical charge ionizes gas inside a glass-matrix array, causing phosphors on the glass to emit light. Current plasma panels range in size from 42 to 71 inches, and are about three inches thick.

**port** Opening in a loudspeaker cabinet that channels bass from inside the enclosure to outside the enclosure. Also called a "vent."

**power amplifier** An audio component that boosts a line-level signal to a powerful signal that can drive loudspeakers.

**power handling** A measure of how much amplifier power, in watts, a speaker can take before it is damaged.



# Glossary of A/V Terms (continued)

**power output** A measure of a power amplifier's ability, in watts, to deliver electrical voltage and current to a speaker.

**power supply** Circuitry found in every audio and video component that converts 60Hz alternating current from the wall outlet into direct current that supplies the device's circuitry.

**power transformer** Device in a power supply that reduces the incoming voltage from 120V to a lower value.

**progressive scanning** A method of creating an image on a video monitor by displaying the scanning lines sequentially from top to bottom. Contrast with "interlaced scanning."

**pulse code modulation (PCM)** A method of representing an audio signal as a series of digital samples.

**quantization** Assigning a series of discrete numerical values to an analog waveform. In digital audio, the analog waveform's amplitude is converted to a number (quantized) each time a sample is taken.

**quantization error** Difference between the actual analog value and the number representing that analog value. Quantization error occurs when the analog value falls between two quantization steps; the quantizer assigns the closest number. Quantization error introduces noise and distortion in digital audio, often heard as a roughness at low signal levels, particularly during reverberation decay.

**quantization word length** The number of bits created by the A/D converter at each sample point. Compact Disc records quantization words 16 bits in length.

**radiation pattern** The way in which a speaker disperses sound.

**RCA jack** A connector found on audio and video products. Signals transmitted via RCA jacks include line-level audio, composite video, and component video.

**rear-projection TV (RPTV)** A video display device that projects an image onto a screen mounted at the front of the cabinet. The image can be generated by various technologies, including CRT, DLP, LCD, and LCoS.

**re-equalization** A Home THX technology that reduces the amount of treble on playback so that you hear a more natural-sounding reproduction when a film soundtrack is played back in the home.

**resistance** A measure of how strongly a circuit impedes the flow of a direct current.

**resolution** The quality of an audio component that reveals low-level musical information; the amount of fine detail in a video display or video source.

**RGB** A video transmission format similar to component video; separates color video images into red, green, and blue parts. Carried on three cables.

**RGBHV** RGB video transmission format with the horizontal (H) and vertical (V) synchronization signals carried on separate cables. Carried on five cables.

**RG-6 coaxial cable** A higher-quality version of RG-59.

**RG-59 coaxial cable** A type of cable that carries television or cable-TV signals.

**RPTV** See "rear-projection TV."

**SACD** See "Super Audio CD."

**sampling** The process of converting an analog audio signal into digital form by taking periodic "snapshots" of the audio signal at some regular interval. Each snapshot (sample) is assigned a number that represents the analog signal's amplitude at the moment the sample was taken.

**sampling frequency** The rate at which samples are taken when converting analog audio to digital audio. Expressed in samples per second, or, more commonly, in hertz; i.e., the CD format's sampling frequency is 44.1kHz.

**satellite speaker** A small loudspeaker with limited bass output, designed to be used with a subwoofer.

**scaler** Video processing device that changes the resolution of the input signal to a different resolution.

**scan line** One sweep of a beam of electrons from left to right across a CRT display; also, one horizontal line of picture information in a video sig-

nal. In the NTSC system, each video frame is composed of 525 scanning lines (of which 480 are visible).

**scan rate** The frequency with which a video display device "paints" scan lines. NTSC video has a scan rate of 15,734 lines per second (525 lines per frame multiplied by 29.97 frames per second), or 15.734kHz.

**screen** The front of a direct-view television's CRT picture tube, the front of a rear-projection TV onto which an image is projected, or a separate material onto which a front projector projects a video image.

**screen gain** A measure of a screen's reflectivity compared with a reference material. Screen gains of more than 1.0 are possible because some screens focus their reflected light over a narrow viewing area.

**SDI (serial digital interface)** A digital video interface that carries standard-definition video signals, but not high-definition, mostly in very high-end and professional video equipment. HD SDI carries high-definition video.

**selectivity** Tuner specification describing the tuner's ability to reject unwanted stations. Good selectivity is important to those who live in cities, where stations are closely spaced on the broadcast spectrum.

**SED** See "Surface-conduction Electron-emitter Display."

**sensitivity** A measure of how much sound a speaker produces for a given amount of input power. Speaker sensitivity is measured by driving a speaker with 1W of power and measuring the sound-pressure level from a distance of 1 meter.

**set-top box (STB)** A device that receives and decodes digital television signals. A set-top box can also include a satellite receiver and/or a hard-disk-based digital video recorder (DVR).

**shielded loudspeaker** A loudspeaker lined with metal to contain magnetic energy inside the speaker. Shielded loudspeakers are used in home theater because the speaker's magnetic energy can distort a video monitor's picture.

**sibilance** s, sh, and ch sounds in spoken word or singing.

**signal-to-noise ratio (S/N)** Numerical value expressing in decibels the difference in level between an audio component's noise floor and some reference signal level.

**single-chip DLP** A DLP-based video display in which a single DMD creates the image. A single-chip device projects the three primary colors of red, green, and blue sequentially. Contrast with three-chip products in which the three colors are projected simultaneously.

**soundfield** See "soundstage." sound-pressure level (SPL) A measure of loudness. Expressed in decibels (dB SPL).

**soundstage** The impression of soundspace existing in three dimensions in front of and/or around the listener.

**source components** A/V components that provide audio and video signals to the rest of a home-theater system. Digital video recorders, DBS dishes and receivers, and DVD players are source components.

**source switching** Function performed by an A/V receiver or A/V controller that selects which source component's signals are fed to the speakers and video monitor.

**spade lug** A speaker termination with a flat area that fits around a binding post.

**S/PDIF (Sony/Philips Digital Interface Format)** Standardized method of transmitting digital audio from one component to another.

**SPL** See "sound-pressure level." speaker See "loudspeaker."

**SPL meter** A device for measuring the sound pressure level created by an audio source.

**spring clips** Cheap speaker terminations found in budget A/V receivers.

**STB** See "set-top box."

**subwoofer** A speaker designed to reproduce low-bass frequencies.

**Super Audio CD (SACD)** Disc format that can deliver high-resolution multichannel or 2-channel digital audio.

**Surface-conduction Electron-emitter Display (SED)** Display technology developed by Canon and

# Glossary of A/V Terms (continued)

Toshiba that delivers a CRT-quality picture in a flat-panel form-factor.

**surround decoder** A circuit or component that converts a surround-encoded audio signal into multiple audio signals that can then be amplified. A Dolby Digital decoder takes in an encoded Dolby Digital signal and outputs a 5.1-channel (left, center, right, left surround, right surround, subwoofer) audio signal.

**surround decorrelation** A THX technology that makes the sound in the monophonic left and right surround channels in a Dolby Surround signal slightly different.

**surround delay** A technique of delaying the signal to the surround channels to increase the apparent separation between the front and surround channels.

**surround mode** A setting on A/V receivers and A/V controllers that determines what surround decoding or signal processing is performed on the audio signal.

**surround receiver**  
See "A/V receiver."

**surround sound** An audio recording and playback format that uses more than two channels, and is reproduced with two or more loudspeakers located behind the listener in addition to the loudspeakers in front.

**surround speakers** Speakers located beside or behind the listener that reproduce the surround channels of surround-sound-encoded audio programs.

**S-VHS** A variant of the VHS tape format that provides better picture quality by storing the video signal with a wider bandwidth, and by keeping the video signal's brightness and color information separate.

**S-video** A video connection method that keeps the video signal's brightness and color information separate. Uses a 4-pin DIN connector.

**SXRD (Silicon X-tal Reflective Display)** Sony's trade name for its video display technology based on LCoS. "X-tal" is cute shorthand for "crystal."

**system matching** The art of combining components to create the most musical system for a given budget.

**terminations** The fittings on the end of a cable: RCA plugs, spade lugs, banana plugs, etc.

**THD** See "Total Harmonic Distortion."

**three-chip DLP** A DLP-based video display in which the image is created by three separate DMDs, one each for the three primary colors of red, green, and blue. Three-chip devices project the three colors simultaneously. All LCD and LCoS displays use three panels. Contrast with single-chip DLP in which the three primary colors are projected sequentially.

**throw distance** The distance between a front projector and the screen.

**THX** A set of patents, technologies, and technical/acoustic performance criteria for film-sound reproduction in movie theaters; see also "Home THX."

**THX-certified** An A/V product that correctly implements the THX technologies and meets stringent technical performance criteria for film-sound reproduction.

**THX Surround EX** Original name for Dolby Digital EX.

**timbre** The tonal quality or characteristic of a sound.

**timbre matching** A THX technology that ensures sounds arriving from the listener's sides have the same timbres as sounds arriving from the front, in order to ensure smooth panning of sounds.

**time shifting** Recording a television or DBS program for later playback.

**tonal balance** Relative levels of bass, midrange, and treble in an audio component or audio presentation.

**TosLink** A fiber-optic-based connection for carrying digital audio. Many DVD players have a TosLink digital output.

**Total Harmonic Distortion (THD)** A measure of all the harmonic distortion components (i.e., second harmonic, third harmonic, etc.) produced by an audio device, expressed as a percentage of the fundamental signal. Called "total" because it is the sum of all the individual harmonic-distortion components created by the component.

**transcoder** A device that converts video from one format to another, such as VGA to component video.

**transient** A short-lived sound, often at high level. The sound of a snare drum is an example of a musical transient.

**transistor** Device made from solid semiconductor material that can amplify audio signals.

**treble** High audio frequencies, generally the range from 3kHz to 20kHz.

**tweeter** A speaker driver designed to reproduce treble signals.

**2-way speaker** A loudspeaker that splits the frequency spectrum into two parts (bass and treble) for reproduction by two or more drivers.

**unbalanced connection** Connection method in which the audio signal is carried on two conductors, called signal and ground. Contrast with balanced connection, in which the audio signal is carried on three conductors.

**upconvert** Changing a video signal from one scanning rate to a signal with a higher scanning rate. HD-ready televisions upconvert 480i signals to a higher scanning rate for display.

**user interface** The "look" and "feel" of the controls and displays on a home-theater product.

**vertical resolution** The number of scanning lines presented by a video display from the top of the image to the bottom; the number of scanning lines in a video signal. NTSC video has a vertical resolution of 480 lines; HDTV has a vertical resolution of 720 or 1080 lines.

**video display** A device that converts a video signal into a visual image.

**video monitor** A video display with video input and output jacks but no television tuner.

**video upconverter** Device or circuit within a device that converts a lower-resolution video signal to a high-resolution video signal.

**voice coil** Coil of wire inside a loudspeaker driver through which current from the power amplifier flows.

**volt** Unit of electromotive force. One volt is defined as the differ-

ence in potential required to make one ampere of current flow through one ohm of resistance; see also "voltage."

**voltage** Analogous to electrical pressure. Voltage exists between two points when one point has an excess of electrons in relation to the other point. A battery is a good example: the negative terminal has an excess of electrons in relation to the positive terminal. If you connect a piece of wire between a battery's positive and negative terminals, voltage pushes current through the wire. Current flow is the electron charge in motion through the conductor. One volt across 1 ohm of resistance produces a current of 1 ampere.

**watt** The unit of electrical power, defined as the power dissipated by 1 ampere of current flowing through 1 ohm of resistance.

**wavelength** The distance between successive cycles of a periodic wave.

**widescreen** A video display or projected image with an aspect ratio wider than 1.33. Widescreen TVs have an aspect ratio of 1.78, also expressed as "16:9."

**windowbox** A video image that results from displaying an image of standard (1.33) aspect ratio on a television set of widescreen (1.78) aspect ratio. The picture is presented between black bars to the left and right sides of the image. Contrast with "letterbox."

**XLR jack and plug** 3-pin connector that usually carries a balanced audio signal. Can also carry a 2-channel digital audio signal.

**YCbCr** The technical term for digital component video. The letter "Y" represents the luminance (brightness) portion of the component-video signal, and "Cb" and "Cr" are the color-difference signals.

**YPbPr** The technical term for analog component video. The letter "Y" represents the luminance (brightness) portion of the component-video signal, and "Pb" and "Pr" are the color-difference signals.

**zone plate** A special video test pattern that's useful for assessing a video display's comb filter, as well as the 3:2 pulldown performance of progressive-scan DVD players and image scalers within video displays.

