Television Glossary

16:9
See aspect ratio, and widescreen.

3-2 pulldown processing
Sophisticated video processing common to digital TVs and progressive-scan DVD players. It corrects for artifacts and distortion that occur when film-based material (at 24 frames per second) is converted to video (30 frames per second), then de-interlaced to create a progressive-scan signal. For a more in-depth explanation, see the DVD Player Glossary.

4:3
See aspect ratio.

ALiS
ALiS (Alternate Lighting of Surfaces) is a relatively new type of high-definition plasma panel design. On a conventional plasma TV, all pixels are illuminated at all times. With an ALiS plasma panel, alternate rows of pixels are illuminated so that half the panel's pixels are illuminated at any moment (somewhat similar to interlaced-scanning on a CRT-type TV). ALiS panels offer bright, clear picture quality, reduced power consumption, and extended panel life.

Anamorphic video
Video images that have been "squeezed" to fit a video frame when stored on DVD. These images must be expanded (un-squeezed) by the display device. An increasing number of TVs employ either a screen with 16:9 aspect ratio, or some type of "enhanced-for-widescreen" viewing mode, so that anamorphic and other widescreen material can be viewed in its proper proportions. When anamorphic video is displayed on a typical TV with 4:3 screen size, the images will appear unnaturally tall and narrow.

Artifacts
Unwanted visible effects in the picture created by disturbances in the video transmission or processing. Examples include "dot crawl" or "hanging dots" in analog pictures, or "pixelation" in digital pictures.

Aspect ratio
The ratio of width to height for an image or screen. The North American NTSC television standard uses the squarish 4:3 (1.33:1) ratio. More and more direct-view and projection TVs (especially digital TVs) use the wider 16:9 ratio (1.78:1) to better display widescreen material like anamorphic DVDs and HDTV broadcasts.
ATSC
Advanced Television Standards Committee. Formed to establish technical standards for the U.S. digital television system.

Audio/video inputs
Using a TV's direct A/V inputs to connect a DVD player, VCR, camcorder or other video component provides improved picture and sound quality compared to using the everything-on-one-wire RF antenna-style input. (If your TV is old enough that it only has RF-type inputs, that's reason enough to consider replacing it — DVD players don't normally have an RF output!)

Rear A/V inputs are used for components you normally leave connected to your TV. Front A/V inputs allow you to quickly and easily connect/disconnect a camcorder, second VCR, or video game console.

Audio outputs
Stereo audio jacks that let you connect your TV to your stereo or home theater system. There are two types — fixed, and variable. If you connect a TV's fixed output to your A/V receiver, you'll be able to raise and lower the TV volume via the receiver's volume control. If you connect the TV's variable output to your receiver, you would control TV volume using the TV's remote.

Bitrate
Measured as "bits per second," and used to express the rate at which data is transmitted or processed. The higher the bitrate, the more data that is processed and, typically, the higher the picture resolution. Digital video formats typically have bitrates measured in megabits-per-second (Mbps). (One megabit equals one million bits.) The maximum bitrate for DVD playback is 10 Mbps; for HDTV it's 19.4 Mbps.

Chrominance
The color component of a video signal that includes information about hue (shade) and saturation (intensity).

Comb filter
A comb filter's task is to remove residual chrominance (color) information from the luminance (brightness) signal. Comb filtering enhances fine detail, cleans up image outlines, and eliminates most extraneous colors. Comb filters are not required and not used with...
extraneous colors. Comb filters are not required and not used with S-video or component video connections since those connections carry the chrominance and luminance information separately. There are 4 types of comb filters found in today’s TVs:

- **Glass** - may also be referred to as an "analog" comb filter.
- **2-Line Digital** - compares consecutive scanning lines within one field of video and makes adjustments to reduce cross-color interference.
- **3-Line Digital** - compares 3 scanning lines within a field of video. By comparing more picture information, a 3-line filter further reduces color bleeding and dot crawl.
- **3D Digital** - not only analyzes consecutive scanning lines within a field, but also analyzes the preceding and following fields. Results in improved color purity and a more stable video image, and nearly eliminates dot crawl and color bleeding. Also called **3D Y/C**.

**Component video**
The three-jack component video connection splits the video signal into three parts (one brightness and two color signals). Component video has increased bandwidth for color information, resulting in a more accurate picture with clearer color reproduction and less bleeding. A growing number of TVs include component video jacks to provide the best possible picture quality (better than S-video or composite video) when connected to a compatible DVD player.

Special **wide-bandwidth** component video connections are capable of carrying wider bandwidth video signals, like progressive-scan DVD and digital television. All **HDTV-ready** TVs include at least one set of wide-bandwidth connections for connecting a separate HDTV tuner (or progressive-scan DVD player).

**Composite video**
A single video signal that contains **luminance** (brightness) and **chrominance** (color) information. A composite signal is better than an RF signal, but not as good as S-video or component video. A composite video jack is usually a single RCA-type.

**Contrast ratio**
Measures the difference between the brightest whites and the darkest blacks a display can show. The higher the contrast ratio, the greater the ability of a display to show subtle color details and tolerate ambient room light. Contrast ratio is an important spec for **front projectors**, as well as flat-panel plasma and LCD TVs.

**CRT (Cathode-Ray Tube)**
A CRT ("picture tube") is a specialized vacuum tube in which images are created when an electron beam scans back and forth across the back side of a phosphor-coated screen. Each time the beam makes a pass across the screen, it lights up a horizontal line of phosphor dots on the inside of the glass tube. By rapidly drawing hundreds of these lines from the top to the bottom of the screen, images are created.

The regular "direct-view" TVs that most people watch have a single large picture tube, while CRT-based rear-projection and front-projection TVs use three CRTs: one each for red, green, and blue.

**De-interlacing (also called line-doubling)**
The process of converting an interlaced-scan video signal (where each frame is split into two sequential fields) to a progressive-scan signal (where each frame remains whole). De-interlacers are found in digital TVs and progressive-scan DVD players. More advanced de-interlacers include a feature called **3-2 pulldown processing**.
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For TVs, de-interlacing is often referred to as "line-doubling" or "upconversion."

**Digital audio output**
A connection found on HDTVs and HDTV tuners for sending the Dolby Digital audio of HDTV broadcasts to an A/V receiver with Dolby Digital decoding. The two most common types of digital output are **coaxial** and Toslink **optical**.

**Direct-view TV**
The conventional and most common type of TV, which uses a single large (up to 40”) **CRT** to display images. Other TV types include **rear-projection** and **front-projection**.

**DLP (Digital Light Processing)**
A projection TV technology developed by Texas Instruments, based on their Digital Micromirror Device (DMD) microchip. Each DMD chip has hundreds of thousands of tiny swiveling mirrors which are used to create the image. DLP technology is used in both front- and rear-projection systems.

There are two basic types of DLP projector: "single-chip" projectors use a single DMD chip along with a spinning color wheel, while much more expensive "3-chip" projectors dedicate a chip to each basic color: red, green, and blue.

**Dolby® Digital**
A discrete multichannel digital audio format that is the official audio standard for HDTV (and DVD). Dolby Digital is normally associated with 5.1-channel surround sound. Though this channel configuration is common, it is only one of several possible variations — a "Dolby Digital" soundtrack can mean anything from 1 to 5.1 channels.

**Downconvert**
A term used to describe the format conversion from a higher resolution input signal number to a lower display number, such as 1080i input to 480i display. Some HDTV tuners are able to downconvert digital HDTV signals for display on a regular analog TV.

**DTV (Digital Television)**
The new American digital broadcast TV standard, which began operation in late 1998, and will eventually replace the 60-year-old analog **NTSC** system. DTV comes in two basic flavors: widescreen, near-film-quality **HDTV** (High-Definition Television) with Dolby Digital audio, and medium-quality **SDTV** (Standard-Definition TV).

**DVI (Digital Visual Interface)**
A multi-pin computer-style connection intended to carry high-resolution video signals from digital set-top boxes (HDTV-capable DIRECTV, DISHNetwork, and cable boxes, plus a few DVD players) to HDTV monitors with a compatible connector. The signals are encrypted with High-bandwidth Digital Content Protection (HDCP) to prevent recording.

**EDTV (Enhanced-Definition Television)**
A designation applied to televisions that can not only display signals in 480-line progressive (480p) mode, but which can also accept 480p signals from video sources such as progressive-scan DVD players. 480p picture quality is superior to standard analog TV (480i), but not as sharp as true HDTV (1080i or 720p).

**Electronic program guide (EPG)**
Provides an on-screen listing of available channels and program data for an extended time period (typically 36 hours or more).
In interlaced-scan video, each complete frame is split into 2 sequential fields, each of which contains half the scanning lines of the frame. One field contains the odd scanning lines, and the other field the even lines.

Flat-panel TV
Any ultra-thin, relatively lightweight TV — especially those which can be wall-mounted. Current flat-panel TVs use either plasma or LCD technology.

Frame
A complete, individual picture in a movie film. In a video signal, a frame contains all of the picture’s scanning lines. The frame rate of a progressive-scan format is twice that of an interlaced-scan format.

Frame rate
The rate at which frames are displayed. The frame rate for movies is 24 frames per second (24 fps). In regular NTSC video, the frame rate is 30 fps. The frame rate of a progressive-scan format is twice that of an interlaced-scan format — example: the frame rate for 480i DVD is 30 fps (or 60 interlaced fields per second); for progressive-scan DVD at 480p, it's 60 fps.

Front-projection TV
A 2-piece display system consisting of a separate front projector (typically placed on a table or ceiling-mounted) and screen. Front-projection systems can display images up to 20 feet across, or larger. Traditionally, CRT projectors were found only in high-end home theaters, but compact digital projectors using DLP or LCD technology have lowered the cost of front-projection systems considerably.

Gain
Measures the light-reflecting ability of a projection screen. The higher the number, the greater the amount of light reflected back to the viewer(s).

HDCP (High-Bandwidth Digital Content Protection)
HDCP encryption is used with high-resolution signals over DVI and HDMI connections and on D-Theater D-VHS recordings to prevent unauthorized duplication of copyrighted material.

HDMI (High-Definition Multimedia Interface)
Similar to DVI (but using much smaller connectors), the multi-pin HDMI interface transfers uncompressed digital video with HDCP copy protection and multichannel audio. Using an adapter, HDMI is backward-compatible with most current DVI connections.

HDTV (High-Definition Television)
Often mistakenly used as a generic description of all digital television, HDTV specifically refers to the highest-resolution formats of the 18 total DTV formats. Although there isn't 100% agreement among manufacturers, retailers, journalists, etc., true HDTV is generally considered to be 1,080-line interlaced (1080i) or 720-line progressive (720p).

HDTV-ready
Term used to describe TVs which can display digital high-definition TV formats when connected to a separate HDTV tuner. These TVs generally have built-in tuners for receiving regular NTSC broadcasts, but not digital. An HDTV-ready TV may also be referred to as an "HDTV monitor."

IEEE 1394 (also FireWire or i.LINK)
First conceived by Apple Computer (as FireWire®), then developed by the IEEE (Institute of Electrical and Electronics Engineers), this high-speed 2-way connection allows easy transfer of digital data between consumer electronics gear and computers. Found on some...
between consumer electronics gear and computers. Digital flat-panel displays can be found on some HDTV-capable TVs, tuners, and recorders.

**Interlaced scan**

In a television display, interlaced scan refers to the process of re-assembling a picture from a series of video signals. The "standard" NTSC system uses 525 scanning lines to create a picture (frame). The frame/picture is made up of two fields: The first field has 262.5 odd lines (1,3,5,...) and the second field has 262.5 even lines (2,4,6,...). The odd lines are scanned (drawn on the screen) in 1/60th of a second, and the even lines follow in the next 1/60th of a second. This presents an entire frame/picture of 525 lines in 1/30th of a second.

Analog NTSC video uses interlaced scanning, as do several digital television formats. Formats that include an "i" (1080i, 480i) use interlaced scanning. See also progressive scan.

**Keystone correction**

"Keystoning" is a form of video image distortion that occurs with front projectors if the centerline of the projector's lens is not perpendicular to the screen. Keystoning results in an image which is shaped like a trapezoid rather than a rectangle — the top of the picture is wider than the bottom, or the left side is taller than the right, or vice versa. Most front projectors include "keystone correction" to correct this distortion. Some models have vertical keystone correction, while others include both vertical and horizontal correction. Although keystone correction allows greater mounting flexibility, it is a form of processing which usually has a slight softening and dimming effect on the picture.

**LCD (Liquid Crystal Display)**

Liquid Crystal Display technology is one of the methods used to create flat-panel TVs. Light isn't created by the liquid crystals; a light source (bulb) behind the panel shines light through the display. The display consists of two polarizing transparent panels and a liquid crystal solution sandwiched in between. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. Each crystal acts like a shutter, either allowing light to pass through or blocking the light. The pattern of transparent and dark crystals forms the image.

LCD technology is used in direct-view, rear-projection, and front-projection TVs, and is fundamentally different from the CRT technology used in conventional TVs.

**LCOS (Liquid Crystal On Silicon)**

A projection TV display technology.

LCOS technology is used in rear-projection, and front-projection TVs.

**Letterboxed video**

A method for displaying the entire picture as seen in a movie theater. The resulting image width is much greater than its height. On a TV screen with standard aspect ratio (4:3), letterboxed videos appear with horizontal black bars above and below the image.

**Light output**

Measures the amount of light produced by a front projector. Expressed in "lumens" or "ANSI lumens," with a higher number indicating greater light output.

**Lumen**

The unit of measure for light output of a projector. Different manufacturers may rate their projectors' light output differently. "Peak lumens" is measured by illuminating an area of about 10% of the screen size in the center of the display. This measurement
ignores the reduction in brightness at the sides and corners of the screen.

The more conservative "ANSI lumens" (American National Standards Institute) specification is made by dividing the screen into 9 blocks, taking a reading in the center of each, and averaging the readings. This number is usually 20-25% lower than the peak lumen measurement.

**Luminance**
The brightness or black-and-white component of a color video signal. Determines the level of picture detail.

**MHz (Megahertz)**
Equal to one million Hz. Video signal bandwidth is typically expressed in megahertz.

**MPEG-2**
The video compression standard used for digital television, DVD, and small-dish satellite TV. This adaptive, variable bitrate process is able to allocate more bits for complex scenes involving a lot of motion, while reducing the bits in static scenes. MPEG stands for Moving Picture Experts Group.

**MTS (Multichannel Television Sound)**
The method of broadcasting stereo sound over ordinary analog TV channels. MTS reception capability is built into virtually all stereo TVs and HiFi VCRs.

**NTSC**
Stands for National Television System Committee, which established our North American 525-line analog broadcast TV standard about 60 years ago. Although it is referred to as a "525-line" standard, we're only able to see 480 lines on a TV display. The new DTV digital broadcast standard will eventually replace NTSC.

**Pan-and-scan**
The process of transferring a movie or other source material to videocassette, DVD, or broadcast so that it fits the 4:3 aspect ratio of the NTSC system, as well as most current TVs. This results in a significant amount of lost picture information, particularly in the width of the image.

At the beginning of a movie on videocassette, you'll usually see a disclaimer about the movie having been "...formatted to fit your TV." That means it's been converted to pan-and-scan.

**Picture-in-picture (PIP)**
There are two basic types: 1-tuner picture-in-picture models require that you connect a VCR or other video component to provide the source for your second picture. 2-tuner picture-in-picture models have two built-in TV tuners, so you can watch two shows at once using only the TV.

**Pixel**
Short for "picture element." The smallest bit of data in a video image. The smaller the size of the pixels in an image, the greater the resolution.

**Plasma**
Gas-plasma technology is one of the methods used to create flat-panel TVs. Besides enabling thin, lightweight TVs that can be hung on the wall, plasma offers other advantages. The display consists of two transparent glass panels with a thin layer of pixels sandwiched in between (think of this layer as containing around one million tiny fluorescent bulbs — the pixels). Each pixel is composed of three gas-filled cells or sub-pixels (one each for red, green and blue). A grid of tiny electrodes sends an electric current to the individual
grid of tiny electrodes applies an electric current to the individual cells, causing the gas to ionize. This ionized gas (plasma) emits high-frequency UV rays which stimulate the cells’ phosphors, causing them to glow, which creates the TV image.

**Progressive scan**
Some digital television broadcast formats (720p, 480p), and some higher-end DVD players, use a type of video signal known as progressive scan. Instead of splitting each video frame into two sequential fields like standard interlaced NTSC video, progressive-scan video displays the entire frame in a single sweep. So, where standard NTSC video displays 30 frames (60 fields) per second, progressive scan displays 60 full frames per second.

Displaying progressive-scan video requires more bandwidth (there’s twice as much vertical information) and a faster horizontal scan frequency than interlaced video. Progressive-scan picture quality is more filmlike, with more fine detail and less flicker. For progressive-scan viewing, you’ll need a TV that’s HDTV-ready.

**QAM (Quadrature Amplitude Modulation)**
A digital modulation format used for downstream transmission in cable TV systems — commonly used for cable HDTV.

**Rear-projection TV**
Typically referred to as "big-screen" TVs, these large-cabinet TVs generally have screens measuring at least 40". Until recently, all rear-projection TVs used three CRTs, which projected images against a mirror inside the cabinet, so that the images were then reflected onto the built-in screen. Newer rear-projection technologies include LCD, and DLP.

**Resolution**
The sharpness of a video image, signal or display, generally described either in terms of "lines of resolution," or pixels. The resolution you see depends on two factors: the resolution of your display and the resolution of the video signal. Since video images are always rectangle-shaped, there is both horizontal resolution and vertical resolution to consider.

- **Vertical resolution:** The number of horizontal lines (or pixels) that can be resolved from the top of an image to the bottom. (Think of hundreds of horizontal lines or dots stacked on top of one another.) The vertical resolution of the analog NTSC TV standard is 525 lines. But, some lines are used to carry other data like closed-captioning text, test signals, etc., so we end up with about 480 lines in the final image, regardless of the source. So, all of the typical NTSC sources — VHS VCRs, cable and over-the-air broadcast TV (analog), non-HD digital satellite TV, DVD players, camcorders, etc. — have vertical resolution of 480 lines. DTV (Digital Television) signals have vertical resolution that ranges from 480 lines for SDTV, to 720 or 1080 lines for true HDTV.

- **Horizontal resolution:** The number of vertical lines (or pixels) that can be resolved from one side of an image to the other. Horizontal resolution is a trickier concept, because while the vertical resolution of all analog (NTSC) video sources is the same (480 lines), the horizontal resolution varies according to the source. Some examples for typical sources: VHS VCRs (240 lines), analog TV broadcasts (330 lines), non-HD digital satellite TV (up to 380 lines), and DVD players (540 lines). DTV signals have horizontal resolution that ranges from 640 lines for SDTV, to 1280 lines (for 720p HDTV) or 1920 lines (for 1080i HDTV).
Scaler
Circuitry that converts a video signal to a resolution other than its original format. Scaling can involve upconversion or downconversion, and may also include a conversion between progressive- and interlaced-scan formats. A scaler can be built into a TV, HDTV tuner, or DVD player, or may be a standalone component.

SDTV (Standard-Definition Television)
A digital television system that is similar to current standards in picture resolution and aspect ratio. The picture and sound will be clearer than NTSC, and its digital base will allow more than one program to be broadcast over the same bandwidth at the same time. Typical SDTV resolution is 480i or 480p.

Set-top box (STB)
Also called converter boxes, these receivers convert broadcasts (either analog cable, digital cable, or HDTV) for display on a television. HDTV-ready TVs (those without a built-in HDTV tuner) must be connected to a compatible HDTV tuner set-top box in order to receive digital television programs.

S-video
Found on nearly all of the TVs we sell, this 4-pin connector usually provides a sharper, higher resolution picture by transmitting the chrominance and luminance portions of a video signal separately. The signals can then be processed separately, reducing interference. Direct S-video connections generally outperform composite connections when hooking up high-performance video components like DVD players, DBS receivers, and S-VHS and Hi8 recorders and camcorders.

Upconversion
The term used to describe the conversion of a lower apparent resolution to a higher one. This process increases the number of pixels and/or frame rate and/or scanning format used to represent an image by interpolating existing pixels to create new ones at closer spacing. As an example, Sony TVs with Digital Reality Creation™ can upconvert 480i video sources to 960i. Often referred to as "line-doubling."

Widescreen
When used to describe a TV, widescreen generally refers to an aspect ratio of 16:9, which is the optimum ratio for viewing anamorphic DVDs and HDTV broadcasts.