

Video Glossary

2:2 Pulldown - the process of transferring 24 frames per second (fps) film to PAL or SECAM video by repeating each film frame as two video fields resulting in about 4% improvement in video run time performance.

3:2 Pulldown - The process of transferring 24 frames per second film to NTSC video by repeating one film frame for three video fields and the next frame as two fields.

4:1:1 - Component digital video format for one Cb sample and one Cr sample for every four Y samples - 4:1 horizontal downsampling with no vertical downsampling thus equaling a subsampling of chroma by a factor of two compared to luma.

4:2:2 - Component digital video format used by DVD with one Cb sample and one Cr sample for every four Y samples - 2:1 horizontal downsampling and 2:1 vertical downsampling. Every other line is sampled with one set of chroma samples for each two luma samples on a line.

4:4:4 - Component digital video used in high-end video applications.

8/16 Modulation - Form of modulation block code used by DVD to store channel data on a disc.

A

A/A (A/X/A) Roll Editing - Editing from a single source using effects to transition from the source to itself (source "A" to "A") using a picture freeze at the end of one scene to transition to the start of the next scene.

A/B Roll Editing -- Editing from two sources VCRs ("A" and "B") to a third (recording) VCR. Typically a switcher or mixer is used to provide transition effects between sources. Control over the machines and process can be done manually or automatically using an edit controller.

AAC (Advanced Audio Codec) - audio encoding standard for MPEG2

AC-3 - Synonymous with Dolby digital audio encoding system

ADPCM (Adaptive Differential Pulse Code Modulation) - Compression technique which encodes the difference between samples (see **Lossless, Lossy**)

AES (Audio Engineering Society) - Industry standards group

AES/EBU - Digital audio signal transmission standard for professional applications established by Audio Engineering Society and European Broadcast Union. Consumer version is S/P DIF.

AGC (Automatic Gain Control) - Circuitry used to ensure that output signals are maintained at constant levels despite widely varying input signal levels. AGC is typically used to maintain a constant video luminance level by boosting weak (low light) picture signals electronically. Some equipment includes gain controls which are switchable between automatic and manual control.

ALC (Automatic Level Control) - Circuitry used to automatically adjust the audio recording level to compensate for variations in input volume. Some equipment includes level controls which are switchable between automatic and manual control.

Aliasing - Undesirable video display effects caused by too much high frequency video information. (See **Anti-Aliasing**)

AM (Amplitude Modulation) - Amplitude modulation is a process used for some radio (AM broadcast) and television video transmission. A low frequency (program) signal modulates (changes) the amplitude of a high frequency RF carrier signal (causing it to deviate from its nominal base amplitude). The original program signal is recovered (demodulated) at the receiver. This system is extensively used in broadcast radio transmission because it is less prone to signal interference and retains most of the original signal quality. In video, FM is used in order to record high quality signals on videotape.

Analog - A method of representing data using continuously varying electrical voltages. Analog video whether transmitted over cables, read from videotapes or broadcast, is subject to degradation due to noise, distortion and other electronic phenomena. Normal signal levels should be within 0.7-1 volt. (See **Digital**)

Analog Monitor - Video monitor which accepts analog signals. Analog monitors accept several types of inputs: composite video, RGB & sync, Y/C, YUV and any combination of these formats. The signals transmitted to an analog monitor are usually between 0 and 1 V and use 75-ohm coaxial cables.

Angle - Unique view of scene, usually recorded from a specific camera angle.

ANSI (American National Standards Institute) - Industry standards group.

Anti-Aliasing - The process of electronically reducing aliasing, especially letters and genlocked graphic elements.

Aperture - An adjustable opening in a lens which, like the iris in the human eye, controls the amount of light entering a camera. The size of the aperture is controlled by the iris adjustment and is measured in f-stops. A smaller f-stop number corresponds to a larger opening which passes more light. (See **Depth of Field**).

Artifact - Unnatural effect produced by external action or agent which was not present in original video or audio signal. Causes can include transmission errors, analog signal noise, data readout errors, analog signal crosstalk, digital compression and film-to-video transfers. Most DVD artifacts are caused by digital compression. MPEG artifacts include video noise, mosquitoes and blocking.

Aspect Ratio - The ratio between the height and width of the TV picture on the screen. The aspect ratio for a standard TV or monitor is 4 to 3 (4:3). The HDTV video format has an aspect ratio of 16 to 9 (16:9).

ATAPI (Advanced Technology Attachment Packet Interface) - Computer interface for internal peripherals. ATAPI provides the command set for controlling IDE interface connected devices.

ATSC (Advanced Television Systems Committee) - Advisory group that works with the FCC (Federal Communications Commission) to establish advanced broadcast television (ATV) standards in the U.S.

Audio - The "other half" of any video production consisting of frequencies corresponding to a normally audible sound wave (20 Hz to 20,000 Hz), the "soundtrack" of a videotape. Both the Video Equalizer and Sound Effects Mixer offer audio mixing/editing capabilities.

Audio Bandwidth - The range of audio frequencies which directly influence the fidelity of a sound. The higher the audio bandwidth, the better the sound fidelity. The highest practical frequency which the human ear can normally hear is 20 kHz. An audio amplifier which processes all frequencies equally (flat response to 20 kHz) and a reasonably high signal to noise ratio, will faithfully reproduce the audio soundtracks of a video recording.

Audio Dub - VCR feature allowing replacement of the audio signals on a previously recorded tape without disturbing the video signal. When dubbing is not available via the video recorder, audio dubbing can be performed while recording using an audio mixer.

Audio Editing - Similar to video editing. Various portions of audio material are combined and recorded onto the videotape in one continuous form. For example, when a sound track is added to a videotape, various sounds such as background music, sound effects and voice narration, may be introduced in order to highlight particular movie scenes. The Video Equalizer and Sound Effects Mixer offer audio mixing/editing capabilities.

Audio-Follow-Video - During video recording, the video signal is usually accompanied by an audio signal. Sometimes, during video editing, it is often necessary to separate the audio from the video signal. Audio-follow-video mixers allow accompanying audio to "follow" the video when switching video sources or not. The Digital Video Mixer provides either function.

Audio Levels - Proper audio levels are crucial. If the audio level is too high when recording, overload of the input electronics will cause audio distortion. If audio levels are too low, the signal-to-noise ratio deteriorates. Mechanical VU-meters or electronic LED bar graph meters typically indicate either audio level.

Audio Mixing - The blending of two or more audio signals to generate a combined signal which is often used for audio dub. During video processing, audio mixing may be used to insert narration or background music.

Authoring - Process of creating, collecting, formatting and encoding AV content material.

AutoPlay (automatic playback) - Player feature which automatically allows playback of suitably encoded discs.

B

B-Roll - Stock footage acquired for miscellaneous needs.

Backlight -- 1. A light source that illuminates a subject from behind, used to separate the subject from the background and give them depth and dimension. Backlights are often improperly applied or overlooked completely. 2. Also, a switch on some camcorders used to compensate exposure for situations where the brightest light is coming from behind the subject.

Bandwidth - Amount of data carried in a signal or range of frequencies carried by circuit or signal. Sometimes referred to as data rate with digital signals. (See **Audio Bandwidth**, Video **Bandwidth**)

BCA (Burst Cutting Area) - Circular section near the center of a disc where ID and manufacturing codes are placed.

Betamax - Consumer videocassette record/playback tape format using half-inch wide magnetic tape. Developed by Sony, Betamax was the first home VCR format.

Betacam - Portable, professional camera/recorder format developed by Sony. Betacam uses a component video system.

Betacam SP -- A superior performance version of Betacam. SP uses metal particle tape and a wider bandwidth recording system.

Bit - Binary digit or smallest representation of digital data. Eight bits make up one byte.

Bitmap - Image made up of two-dimensional grid of pixels. Each digital video frame of

information is a bitmap while some color information is shared by more than one pixel.

Bit Rate - Volume of data measured in bits over time (similar to data rate).

Bitstream - Encoded digital data that can be processed sequentially and continuously.

Black A Tape - The process of recording a black burst signal across the entire length of a tape. Often done before recording edited footage on the tape to give the tape clean, continuous video and sync and to insure there is no video already on the tape.

Black Burst - A composite color video signal comprised of sync, color burst and black video. It is used to synchronize (genlock) other video sources to the same sync and color information. Black burst generators are used in video studios to "lock" the entire facility to a common signal ("house sync" or "house black").

Black Level - The voltage in a video signal which corresponds to black.

Blanking Level - Also known as the pedestal, it is the voltage level produced at the end of each horizontal picture line which separates the portion of the video signal containing the picture information from the portion containing the synchronizing information. This voltage makes the electron beam "invisible" as it moves to draw the next visible line.

Blanking Interval (Horizontal & Vertical) - The horizontal-blanking interval is the time between the end of one scanning line and the beginning of the next. The vertical blanking interval is the time between the end of one video field and the beginning of the next. Blanking occurs when a monitor's electron beam is positioned to start a new line or a new field. The blanking interval is used to instantaneously reduce the beam's amplitude so that the return trace is invisible. (See **Vertical Interval Switching**)

Block - In MPEG video, an 8x8 matrix of pixels representing a small portion of luma or chroma. In MPEG2, a macroblock of six blocks.

Blocking - Blocky appearance of compressed video when compression ratio is high enough that pixel averaging becomes visible.

BNC connector -- A type of connector used on some VCRs, video and RF equipment providing twist-lock capability.

B Picture/B Frame - One of three MPEG video picture types. B Pictures are bi-directionally predicted based on previous and following picture.

Border - The boundary between two merged video pictures, as created with chroma key or wipe effects.

BPS (bits per second) - Unit of data rate.

Brightness - Intensity of image independent of color along the black to white axis.

Burst - Short segment of color subcarrier in composite video signal which is inserted to regenerate the color subcarrier.

B-Y, R-Y - Color difference video signals carrying blue and red color information where brightness (Y) has been subtracted from the blue and red RGB signals to create color-differenced signals.

Byte - Unit of data comprising eight bits.

C

Camcorder - Combination camera and video tape recorder in a single device. Camcorders permit easy and rapid photography and recording simultaneously. Camcorders are available in most home video formats: 8mm, Hi-8, VHS, VHS-C, S-VHS, etc.

Camera Supply - Most video cameras use an external DC voltage supply which is derived either from a battery belt worn by the camera operator, from a battery within the video recorder itself, or from the mains power supply (after voltage conversion).

Candlepower - The unit measure of incident light.

Caption - Text representation of the audio which is usually intended for the hearing impaired. Also provides additional text to identify person speaking and off-screen sounds.

CATV - Acronym for cable TV, derived from the older term, community antenna television.

CAV (Constant Angular Velocity) - Keeping the rotation of a disc at a constant speed as the pickup head travels over a longer surface area out from the center of the disc.

Cb, Cr - components of digital color difference video signals carrying blue and red color information (same as B-Y, R-Y).

CBR (Constant Bit Rate) - Data compressed into a data stream with a fixed data rate.

CCD (Charge Coupled Device) - A semiconductor device (IC) that converts optical

images to electronic signals. CCDs are the most commonly found type of image sensor in consumer camcorders and video cameras.

CCIR (Comite Consultatif International Des Radiocommunications) - A European committee situated in Paris responsible for creating and approving professional standards related to audio and video.

CCTV (Closed Circuit TV) - A video system used in many commercial installations for specific purposes such as security, medical and educational.

CD (Compact Disc) - optical digital storage format developed by Philips and Sony.

Cell - In DVD video a unit of video from a fraction of a second to hours. Cells permit video to be grouped for sharing content among titles, interleaving for multiple angles.

CGMS (Copy Guard Management System) - Method of preventing copies or number of sequential copies from being produced.

Character Generator - Device that electronically generates text which can be superimposed over a video signal. Text is usually entered via a keyboard, allowing selection of various fonts, sizes, colors, styles and background colors, then stored as multiple pages for retrieval.

Chapter - Division of a title.

Chroma - The color information contained in a video signal, consisting of hue (phase angle) and saturation (amplitude) of the color subcarrier signal.

Chroma Corrector - A device used to correct problems related to the chroma of the video signal, as well as color balance and color noise.

Chroma Noise - Noise which manifests itself in a video picture as colored snow.

Chroma Key - The process of overlaying one video signal over another by replacing a range of colors with the second signal. Typically, the first (foreground) picture is photographed with a person or object against a special, single-color background (the key-color). The second picture is inserted in place of the key-color. The most common example is in broadcast weather segments where pictures of weather maps are inserted "behind" the talent. The Digital Video Mixer incorporates this feature.

Chrominance & Chrominance Level - The color portion of a video signal separate from the luminance component, representing the saturation and tint at a particular point of the image. Black, gray and white have no chrominance, but any colored signal has both chrominance and luminance. The higher the chrominance level, the stronger the color (e.g., a strong signal produces red, and a weak signal, pink). Color saturation level can be changed using a color processor such as the Video Equalizer.

Clamping Area - Area near the center of a disc where the drive grips the disc to spin it.

Closed Captioning - Text captions on video which are normally not visible unless enabled by the TV set for the hearing impaired.

Clipping - The electronic process of shearing off the peaks of either the white or black excursions of a video signal for limiting purposes. Sometimes, clipping is performed prior to modulation, and sometimes to limit the signal, so it will not exceed a predetermined level.

CLV (Constant Linear Velocity) - rotating a disc where the head moves across the surface at a constant velocity which requires varying rotational speeds as the head moves from the inner and outer portions of the disc. This allows data to remain constant thus optimizing storage on the disc.

Coaxial Cable - The standard cable consisting of a central inner conductor and a cylindrical outer conductor. Used for many video connections, especially by CATV companies.

Codec (coder/decoder) - Circuitry or software to encode and decode signal.

Color Bars - An electronically generated video pattern consisting of eight equal width colors, used to establish a proper color reference before recording and playback and for adjustment purposes.

Color Burst - The portion of a color video signal which contains a short sample of the color subcarrier used to add color to a signal. It is used as a color synchronization signal to establish a reference for the color information following it and is used by a color monitor to decode the color portion of a video signal. The color burst acts as both amplitude and phase reference for color hue and intensity. The color oscillator of a color television receiver is phase locked to the color burst.

Color Correction - A process in which the coloring in a television image is altered or corrected by electronic means. (See **Chroma Corrector**)

Color Decoder - A device which divides a video signal into its basic color components. In TV and video, color decoding is used to derive signals required by a video monitor from the composite or Y/C signals.

Color Phase - The phase of the chroma signal as compared to the color burst, is one of the factors that determines a video signal's color balance.

Color Processing - A way to alter a video signal to affect the colors. The Video

Equalizer is suited to this task. (See **Chroma Corrector**)

Color Temperature - A method for specifying the overall color of a light source, measured in degrees Kelvin (deg.K). Higher numbers indicate bluer light, lower numbers indicate a warmer light.

- Daylight = 5000-5500 deg.K
- Fluorescent = approx. 4100 deg.K
- Indoor incandescent = 2800 deg.K

Color Subcarrier -- The 3.58 MHz/NTSC (4.43 MHz/PAL) signal added to a black and white television signal to add color information. The subcarrier frequency is too high to be detected by black and white televisions ensuring compatibility. Color sets employ special circuitry which detects and decodes the color component for display.

Colorization - Special effect (also called paint) which colors a monochrome or color image with artificial colors. This feature is found on both the Digital Video Mixer and Video Equalizer.

Communication Protocol - A specific software based protocol or language for linking several devices together. Communication protocols are used between computers and VCRs or edit controllers to allow bi-directional "conversation" between the units. (See RS-232/RS-422)

Component Video - Most home video signals consist of combined (composite) video signals, composed of luminance (brightness) information, chrominance (color) information and sync information. To get maximum video quality, professional equipment (Betacam and MII) and some consumer equipment (S-VHS and Hi-8) keep the video components separate.

Component video comes in several varieties: RGB (red, green, blue), YUV (luminance, sync, and red/blue) and Y/C (luminance and chrominance), used by S-Video (S-VHS and Hi-8) systems.

Composite Sync - A signal consisting of horizontal sync pulses, vertical sync pulses and equalizing pulses only.

Composite Video - A video signal in which the luminance (brightness), chrominance (color), blanking pulses, sync pulses and color burst information have been combined using one of the coding standards. (NTSC, PAL, SECAM)

Compression -- 1. The process of electronically processing a video picture to make it use less storage or to allow more video to be sent down a transmission channel. 2. The process of removing picture data to decrease the size of a video image.

Contrast -- 1. The degree to which the various luminance values in a picture are mapped to very dark and very light values. A high-contrast picture is dominated by

black and white and few values between. A low contrast picture has a lot of middle tones without many very dark or very light areas. 2. A control on a television or monitor which adjusts the white level of the picture.

Control Area - Lead-in area on disc, which contains ECC (error correction code) block, repeated 192 times containing information about the disc.

Control-L -- Sony's wired edit control protocol, also called LANC (Local Application Control), which allows two-way communication between a camcorder or VCR and an edit controller such as the Thumbs Up. Control-L allows the controller to control the deck (fast forward, play, etc.) and also allows the controller to read the tape position (tape counter) information from the deck.

Control-M -- Panasonic's wired edit control protocol. Similar to Control-L in function but not compatible. Also called Panasonic 5-pin edit control . (See **Control-L**)

Control-S - Sony wired transport control protocol which duplicates a VCR's infrared remote transport control (play, stop, pause, fast forward and rewind). Unlike Control-L, Control-S does not allow the controller to read tape counter information.

Control-T - Similar to Control-L but allows multiple units to be controlled. Not used in current equipment.

Control Track - The magnetized portion along the length of a videotape on which sync control information is placed. The control track contains a pulse for each video field and is used to synchronize the tape and the video signal.

Crossfade - The audio equivalent of the video dissolve where one sound track is gradually faded out while a second sound track simultaneously replaces the original one.

Crosstalk - The interference between two audio or two video signals caused by unwanted stray signals. In video, crosstalk between input channels can be classified into two basic categories: luminance/sync crosstalk; and color (chroma) crosstalk. When video crosstalk is too high, ghost images from one source appear over the other. In audio, poor grounding connections or improperly shielded cables, typically between left and right channels or between different inputs, can cause signal leakage.

D

D1/D2/D3 - Digital video recording and playback formats. The D1 system uses component video while the D2 and D3 systems use composite video. By using fully digitized video in recording and playback, many problems such as generation loss and distortion are minimized or eliminated. The digital formats use mainly a 19mm wide magnetic tape (3/4").

DAC (Digital-to-Analog Converter) - Converts digital data to analog data.

DAT (Digital Audio Tape) - A consumer digital audio recording and playback system developed by Sony, with a signal quality capability surpassing that of the CD.

Data Area - Physical area on a disc between the lead-in and lead-out areas for storing data.

Data Rate - Volume of data or rate at which data can be conveyed. Usually expressed as bits per second (KBPS = thousand, MBPS = million, GBps = billion).

dB (Decibel) - A unit for expressing the ratio of two amounts of electric or acoustic signal power, used for measuring audio and video signals. Technically, this is equal to 20 times the common logarithm of the voltage or current ratio.

Decode -- To separate a composite video signal into its component parts.

Definition - The aggregate of fine details available on-screen. The higher the image definition, the greater the number of details that can be discerned. During video recording and subsequent playback, several factors can conspire to cause a loss of definition. Among these are the limited frequency response of magnetic tapes and signal losses associated with electronic circuitry employed in the recording process. These losses occur because fine details appear in the highest frequency region of a video signal and this portion is usually the first casualty of signal degradation. Each additional generation of a videotape results in fewer and fewer fine details as losses are accumulated.

Delay Correction -- When an electronic signal travels through electronic circuitry or even through long coaxial cable runs, delay problems may occur. This is manifested as a displaced image and special electronic circuitry is needed to correct it.

Demodulator - An electronic circuit which separates the audio and video signals from the RF carrier frequency.

Depth of Field - The range of objects in front of a camera lens which are in focus. Smaller f-stops provide greater depth of field, i.e., more of the scene, near to far, will be in focus.

Digital - A method of representing data using binary numbers. An analog signal is converted to digital by the use of an analog-to-digital (A/D) converter chip by taking samples of the signal at a fixed time interval (sampling frequency). Assigning a binary number to these samples, this digital stream is then recorded onto magnetic tape. Upon playback, a digital-to-analog (D/A) converter chip reads the binary data and reconstructs the original analog signal. This process virtually eliminates generation loss as every digital-to-digital copy is theoretically an exact duplicate of the original allowing multi-generational dubs to be made without degradation. In actuality of course, digital

systems are not perfect and specialized hardware/software is used to correct all but the most severe data loss. Digital signals are virtually immune to noise, distortion, crosstalk, and other quality problems. In addition, digitally based equipment often offers advantages in cost, features, performance and reliability when compared to analog equipment.

Digitize - Process of converting analog to digital information.

DIN (Deutsche Industrie Norme) - An international connector standard. DIN connectors carry both audio and video signals and are common on equipment in Europe.

Directory - Area on a disc which indicates where files are stored on the disc so they can be located.

Disc Key - Data used to encrypt/decrypt title data on the disc.

Disc Menu - main menu on a disc from which titles are selected. Sometimes called system menu or title selection menu.

Dissolve -- A process whereby one video signal is gradually faded out while a second image simultaneously replaces the original one.

Distortion - In video, distortion usually refers to changes in the luminance or chrominance portions of a signal. It may contort the picture and produce improper contrast, faulty luminance levels, twisted images, erroneous colors and snow. In audio, distortion refers to any undesired changes in the waveform of a signal caused by the introduction of spurious elements. The most common audio distortions are harmonic distortion, intermodulation distortion, crossover distortion, transient distortion and phase distortion.

Distribution Amplifier -- A device which splits (distributes) one audio and/or video source to several audio/video device inputs. Typically, distribution amplifiers are used in duplication studios where many tape copies must be generated from one source or in multiple display setups where many monitors must carry the same picture, etc.

Dolby™ -- A compression/expansion (companding) noise reduction system developed by Ray Dolby, widely used in consumer, professional and broadcast audio applications. Signal-to-noise ratio improvement is accomplished by processing a signal before recording and reverse-processing the signal upon playback. **Dolby Digital** - Coding system used to encode audio. **Dolby Pro Logic** - Technique of extracting audio channels from a matrix-encoded audio signal. **Dolby Surround** - Standard for matrix encoding surround-sound channels by applying defined mathematical functions for combining left, right channels as well as center and surround channels.

Dropout - A momentary partial or complete loss of picture and/or sound caused by such things as dust, dirt on the videotape or heads, crumpled videotape or flaws in the oxide layer of magnetic tape. Uncompensated dropout produces white or black streaks in the picture.

DSK (Downstream Keying) - An effect available in some special effects generators and video mixers in which one video signal is keyed on top of another video signal. The lightest portions of the DSK signal replace the source video leaving the dark areas showing the original video image. Optionally, the DSK signal can be inverted so the dark portions are keyed rather than the lightest portions allowing a solid color to be added to the keyed portions. The DSK input is most commonly a video camera or character generator. The DSK signal must be genlocked to the other signals.

DSP (Digital Signal Processor) - Programmable digital circuit that performs digital data manipulation tasks such as decoding.

DTS (Digital Theatre Sound) - Audio coding system developed for use in theatres.

Dub - A duplicate copy made from one recording medium to another.

Duplication - reproduction of discs with professional service organizations for volumes of copies.

DVD (Digital Video/Versatile Disc) - Audio, video, data storage solution.

DVD-A (audio) - DVD storing multi-channel audio content using Meridian Lossless Packing (MLP) as the data compression standard.

DVD Forum - International standards organization that established the DVD format standards and testing procedures/facilities that ensures all products carrying the DVD logo meets the standards. The standards have been based on delivering consumer with the best technology for each application. Organization currently has more than 300 members including leading drive, media and software producers as well as computer manufacturers and Hollywood organizations.

DVD-R (record) - Write-once technology in two versions - **DVD-R (A)** - Professional authoring solution for preparing DVD content for replication. **DVD-R (G)** - General or consumer DVD writing hardware and media for individuals to write data to the disc once for archiving and universal playback.

DVD-RW (rerecordable) - Rerecordable DVD Forum standard initially designed for content developers to stream data to a disc (similar to tape operation) for testing and evaluation. Also used for personal video storage. Technology provides no error correction or defect management. Media can be overwritten about 1,000 times.

DVD-RAM (rewritable) - Initial DVD Forum rewritable standard for randomly storing and accessing all forms of digital data using standard hard drive drag-and-drop techniques. Contains comprehensive error correction code and defect management technology to ensure data is properly stored to and read from disc. Data can be overwritten in excess of 100,000 times. Media provides data life in excess of 30 years.

DVD-ROM (read only memory) - Duplicated disc that can be played on all DVD players and drives.

DVD-V (Video) - Compressed and encoded digital video data stored on disc and played back.

DVE™ (Digital Video Effects) - These effects are found in special effects generators which employ digital signal processing to create two or three-dimensional wipe effects. DVE generators are getting less expensive and the kind of effects they create getting more popular. The Digital Video Mixer includes such effects.

DVI (Digital Video Interface) -- Multimedia standard for computer-generated text and graphics merged in video production.

Dynamic Range - Difference between the lowest and highest sound in an audio signal.

Dye sublimation - Disc technology that uses high-powered laser to burn readable marks into disc's organic dye laser.

E

8 mm - A compact videocassette record/playback tape format which uses eight millimeter wide magnetic tape. A worldwide standard established in 1983 allowing high quality video and audio recording. Flexibility, lightweight cameras and reduced tape storage requirements are among the format's advantages.

EBU (European Broadcast Union)

Edge Enhancing -- (See Enhancing)

Edit Control - A connection on a VCR or camcorder which allows direct communication with external edit control devices. (e.g., LANC (Control-L) and NEW (Panasonic) 5-pin). Thumbs Up works with both of these control formats and with machines lacking direct control.

Edit Point - The location in a video where a production event occurs. (e.g., dissolve or wipe from one scene to another)

EDL (Edit Decision List) - A list of a video production's edit points. An EDL is a record of all original videotape scene location time references, corresponding to a production's transition events. EDLs are usually generated by computerized editing equipment and saved for later use and modification.

EIA RS-170A - The timing specification standard for NTSC broadcast video equipment. The Digital Video Mixer meets RS-170A.

Encode - The process of combining analog or digital video signals, e.g., red, green and blue, into one composite signal.

Encoder - Circuit or software which encodes and compresses audio and/or video signals.

Enhancing - Improving a video image by boosting the high frequency content lost during recording. There are several types of enhancement. The most common accentuates edges between light and dark images.

F

Fade -- The act of dissolving a video picture to either a color, pattern or titles. Fading a video image is often used as an artistic tool in video productions, most commonly seen as a fade to black. In audio, there is a decrease in the sound level until it is no longer audible. Audio fading is often used in conjunction with video fading causing the sound and image to fade simultaneously. (See Audio-Follow-Video)

Field -- One-half of a complete television picture consisting of one complete vertical scan of the video image containing 262.5 line for NTSC and 312.5 lines for PAL. Two fields make up a complete television picture frame. (See Interlacing)

File - Data stored on a disc in groups of sectors.

Fill Lights - Fill lights, commonly referred to as "scoops," provide a soft-edged field of light used to provide additional subject illumination to reduce harsh shadows or areas not highlighted by the key light.

Film Chain - Projectors, multiplexors and cameras, connected for the purpose of transferring film to video.

Firewire - Apple Computer's name for IEEE 1394 standard for digital data transmission.

Flicker - A strobing picture artifact, similar to an old-time movie effect, mainly related to vertical syncs and video field display rates. Some flicker normally exists due to interlacing, but is more apparent in 50 Hz systems (PAL) and when converting film (24 fps) to video (30 fps). Flicker may also be a problem when static computer images are

transferred to video.

Flip - Special effect in which the picture is either horizontally or vertically reversed.

Flying Erase Head - Facilitates smooth, seamless edits whenever the camcorder recording begins. Without a flying erase head, a video "glitch" may occur at scene transitions. The erase head is mounted on the spinning (flying) video head drum.

FM (Frequency Modulation) - Frequency modulation is a process used for radio (FM broadcast) and television audio transmission and videotape recording. A low frequency (program) signal modulates (changes) the frequency of a high frequency RF carrier signal (causing it to deviate from its nominal base frequency). The original program signal is recovered (demodulated) at the receiver. This system is extensively used in broadcast radio transmission because it is less prone to signal interference and retains most of the original signal quality. In video, FM is used in order to record high quality signals on videotape.

Format - A variety of formats are used to record video on media. They vary media type (8mm, 1/2 inch, 3/4 inch, 1 inch tape; CD, DVD), signal form: (composite, Y/C, component), data storage type (analog or digital) and signal standard (PAL, NTSC, SECAM).

Fps (frames per second) - Measure of rate at which pictures are shown from motion video.

Frame - A complete video image consisting of 2 fields. Also used to describe the total visible area of a video image.

Frame Rate - frequency of discrete images usually measured in fps (25 for PAL/SECAM, 30 for NTSC).

Frame Synchronizer - A digital electronic device which synchronizes two or more video signals. The frame synchronizer uses one of its inputs as a reference and genlocks the other video signals to the reference's sync and color burst signals. By delaying the other signals so that each line and field starts at the same time, two or more video images can be blended, wiped and otherwise processed together. (A TBC takes this a step further by synchronizing both signals to a stable reference, eliminating time base errors from both sources.) The Digital Video Mixer includes a frame synchronizer and dual TBCs.

Freeze (Frame) - Special effect in which the picture is held as a still image. It is possible to freeze either one field or a whole frame. Freezing one field provides a more stable image if the subject is moving, however, the resolution of the video image is half that of a full frame freeze. Digital freeze frame is one special effect that could be created with a special effects generator or a TBC. The Digital Video Mixer includes this feature.

Frequency Response - A measure of the quality of reproduction of various frequencies (audio and video) by a circuit or device. If the frequency response of a video processor is adequate, there is no deterioration in image quality at the bandwidth extremes. For video, the NTSC broadcast bandwidth is 4.2 MHz and the PAL broadcast bandwidth is 5.5 MHz. For audio, full bandwidth implies a frequency response extending from 20 Hz to 20,000 Hz or higher.

G

GB (Gigabyte) -- (1,073,741,824 or 2⁽³⁰⁾) bytes

GBps - Gigabytes per second or billions of bytes per second.

Generation - The number of duplication steps between an original recording and a given copy. A second-generation duplicate is a copy of the original master and a third generation duplicate is a copy of a copy of the original master, etc.

Generation Loss - When an analog master videotape is duplicated, the second-generation copy is usually inferior in some way to the master. This degradation appears as loss of detail, improper colors, sync loss, etc. Limited frequency response of audio/video magnetic tape and imperfections in electronic circuitry are the main causes of generation loss. Higher performance formats (such as 1-inch) exhibit much less generation loss than more basic formats. Digital formats make generation loss negligible because each copy is essentially an exact duplicate of the original. Video enhancing equipment can minimize generation loss. Some video processors pre-enhance the video signal to overcome generation loss.

Genlock - A method of synchronization involving the generation of a video signal synchronized with another signal. Because they are synchronized, a genlocked signal can be mixed with the original signal, allowing dissolves, wipes, and other transition effects. Genlock and frame synchronization differ in that genlock is the generation of a new signal synchronized to a video signal that is already present while frame synchronization takes two already-generated signals and synchronizes them. Genlocking two VCRs requires the use of a time base corrector (TBC).

Ghosting - A weak, secondary, ghost-like duplicate video image in a video signal caused by the undesired mixing of the primary signal and a delayed version of the same signal.

Group Delay - A phenomenon involving timing differences between video signal components. For example, a long cable run may introduce a substantial delay between the transmission of the color and brightness video information resulting in shadows.

H

Harmonic Distortion - When any signal is passed through an electronic circuit, the signal may be changed in many ways. In video, the image may become blurred, noisy or contain shadows. In audio, odd harmonics (third, fifth, etc.) produce harsh and

unpleasant sounding audio.

HDTV (High Definition Television) - A television format for producing high-resolution video. Typically, these systems provide about 1125 lines of horizontal resolution (compared to 525 for NTSC and 625 for PAL) and an aspect ratio of 16:9, for image quality approaching 35mm film photography.

Helical Scan - A method of recording video information diagonally on a tape, used in home and professional VCRs. High speed rotating video heads scan these diagonal video tracks, giving an effective tape speed much higher than the actual tape speed allowing more information to be recorded on a given length of magnetic tape.

HI-8 - An improved version of the 8mm-tape format capable of recording better picture resolution (definition). A higher-density tape is required which provides a wider luminance bandwidth, resulting in sharper picture quality (over 400 horizontal lines vs. 240 for standard 8mm) and improved signal-to-noise ratio. Camcorders using this format are very small, light and provide a picture quality similar to S-VHS.

HI-FI (High Fidelity) - Most commonly used to refer to the high quality audio tracks recorded by many VCRs. These tracks provide audio quality approaching that of a CD. However, because they are combined with the video signal before recording, audio dubs using them are impossible without re-recording the video.

Hiss - The most common audible noise component in audio recording, stemming from a combination of circuit and tape noise. Several noise reduction systems are available, such as Dolby, DBX, DNR (Dynamic Noise Reduction), DNL (Dynamic Noise Limiter), to help alleviate such problems.

Horizontal Resolution - Rating of the fine detail (definition) of a TV picture, measured in scan lines. The more lines, the higher the resolution and the better the picture. A standard VHS format VCR produces 240 lines of horizontal resolution, while over 400 lines are possible with S-VHS, S-VHS-C, and Hi-8 camcorders.

Horizontal Sync - The sync pulse signal produced at the beginning of each video scan line which keeps a video monitor's horizontal scan rate in step with the transmission of each new line. (See **Blanking Level**)

Hue - Often used synonymously with the term tint. It is the dominant wavelength which distinguishes a color such as red, yellow, etc. Most commonly, video hue is influenced by: 1. A camera's white balance, 2. Scene lighting. Video color processors such as the Video Equalizer are the main tools used to adjust and correct hue problems.

Hz (hertz) - frequency measurement unit of cycles or repetitions per second.

I

IEEE (International Electrical and Electronic Engineers) - Electronics industry

standard body

IEEE 1394 - Standard for digital data transmission between external audio/video devices. Also known as Firewire (Apple) and iLink (Sony).

Image stabilization - A camcorder feature which takes out minor picture shakiness, either optically or electronically.

Impedance Matching - A video signal occupies a wide spectrum of frequencies, from nearly DC (0 Hz) to 6 MHz. If the output impedance of either the video source, cable or input impedance of the receiving equipment are not properly matched, a series of problems may arise. Loss of high frequency detail and color information as well as image instability, oscillations, snow, ghost images and component heat-up may result. Proper connections and cable types provide correct the impedances.

Insert editing -- Camcorder/VCR feature which allows a user to insert new audio/video segments into the middle of a previously recorded tape. Some camcorders insert both audio and video simultaneously; others can insert audio and/or video separately.

Interframe - occurrence between multiple video frames.

Interlace - video scanning of alternating lines of video onto a screen - even lines are scanned onto the screen (top to bottom) and then alternate lines are added to produce a complete picture.

Interlacing - A system developed for television which divides each video frame into two fields. This is done by first drawing one field consisting of an image's odd scan lines (1, 3, 5...525) and then drawing the remaining even scan lines (2, 4, 6...), interweaving both fields. Interlacing reduces the perception of screen flicker. Interlacing can cause annoying effects with images such as computer-generated text and graphics when transferred to video.

Intraframe - Occurrence within a single video frame.

I Picture/I Frame - Intra picture which is encoded independent of other pictures to provide a reference point for dependent P Pictures and B Pictures.

J

Jitter -- Small, rapid variations in a waveform or image due most often to mechanical disturbances. (See **TBC**)

JPEG (Joint Photographic Experts Group) - JPEG is a digital compression standard for still video images that allows the image to occupy less memory or disk space. Like the MPEG standard, it includes options for trading off between storage space and image

quality.

K

KB (kilobyte) - 1024 or 2(10) bytes.

Kbps - thousand bits per second.

Key Light - The term used to describe a subject's main source of illumination. When shooting outdoors, the key light is the sun.

Key Picture/Key Frame - Video picture containing the entire content of the image (intraframe encoding) rather than difference between it and other images (interframe encoding). Also known as **Delta Picture**.

kHz (kilohertz) - one thousand hertz or cycles.

L

LANC - See **Control-L**

Lavaliere Microphone -- Small microphone worn around the neck or clipped to clothing.

Layer - Plane of disc where information is recorded. Each substrate of a disc contains one or two layers.

LCD (Liquid Crystal Display) - A screen for displaying text/graphics based on a technology called liquid crystal, where minute currents change the reflectiveness or transparency of the screen. The advantages of LCD screens are: very small power consumption (can be easily battery driven) and low price of mass-produced units. Its disadvantages presently include narrow viewing angle, somewhat slower response time, invisibility in the dark unless the display is backlit, difficulties displaying true colors and resolution limitations.

Lead In - 1.2mm or wider physical area of a disc that precedes data area. Area contains sync control sectors and control data.

Lead Out - Single layer or PTP dual layer discs have a physical area 1mm or wider at the outside of the disc following the data area.

Legacy - Often refers to earlier stored data or earlier/present systems/technology. Also describes hybrid disc which can be played on DVD and CD players.

Letterbox - Video process where black horizontal mattes are added to the top and bottom of the image area to create a display frame.

Level - Specify parameters such as resolution, bit rate and frame rate.

Linear Editing - Editing using media like tape, in which material must be accessed in order (e.g., to access scene 5 from the beginning of the tape, one must proceed from scene 1 through scene 4). (See NONLINEAR EDITING)

Line Compensation -- Use of a video line amplifier to pre-compensate for high frequency video signal transmission losses resulting from long distance cable runs (several hundred meters) by boosting those signal frequencies most effected. Without such compensation, deterioration is manifested as loss of fine details and color distortion.

Linear PCM - Coded representation of data which is not compressed. Values are spread evenly across the range from highest to lowest rather than as with nonlinear (companded). PCM allocates more values to more important frequency ranges.

Lines of Horizontal Resolution - common measurement of resolution in analog video systems measured in half cycles per picture height. Each cycle is a pair of lines - black and white. Measurement is viewed as test pattern to determine where black and white lines blur into grey. Resolution of VHS is typically 240 lines. DVD is typically 50-540 lines.

Load Resistance -- The impedance or resistance (load) that a cable places on a signal being transmitted through it. In the case of a high frequency signal, signal-to-cable matching is essential to prevent signal deterioration. A specific load resistance should terminate the cable, usually 50 or 75 ohms. Improper cable loading results in signal distortion, ghost images, color loss and other adverse phenomena. Most video inputs have the proper termination built in.

Looping - A term used to describe the chaining of a video signal through several video devices (distribution amplifiers, VCRs, monitors, etc.). A VCR may be hooked up to a distribution amplifier which is supplied with a video-input connector and a loop output connector. When a signal is fed to the distribution amplifier, it is also fed unprocessed to the loop output connector (parallel connection) on the distribution amplifier. In turn, the same signal is fed to another device which is attached to the first one and so on. Thus a very large number of VCRs or other video devices can be looped together for multiple processing.

Lossless Compression - Compression technique that enables original data to be recreated without loss.

Lossy Compression - compression technique that provides very high compression ratios by removing data while preserving significant information. Lossy compression

includes coding techniques which limited data loss to that which is least likely to be seen by the human eye.

LTC (Longitudinal Time Code) -- SMPTE (Society of Motion Picture and Television Engineers) time code standard usually recorded onto the linear audio track of a VCR or audiotape machine.

Luma (Y) - Brightness component of color video image (referred to as monochrome, grayscale, black and white)

Luminance - The degree of brightness (black and white portion of the video signal) at any given point in the video image. A video signal is comprised of luminance, chrominance (color information) and sync. If luminance is high, the picture is bright and if low the picture is dark. Changing the chrominance does not affect the brightness of the picture.

Luminance Noise - Noise which manifests itself in a video picture as white snow, typically caused by one of the following situations: Low signal level due to poor lighting conditions. poor video signal processing, low quality videotapes, excessively long video cables used without pre-compensation, dirt on the video recorder heads which interferes with reading and writing or over-enhancement of the video signal

Lux - A measurement of light intensity, which is used in photography for the comparison of camera sensitivities. (1 Footcandle = 10.76 Lux)

M

Master - original "gold" disc or tape used to produce copies.

Mastering - Replication of tapes or disc in large volumes.

Matrix Switcher - A device which uses an array of electronic switches to route a number of audio/video signals to one or more outputs in almost any combination. Production quality matrix switchers perform vertical interval switching for interference free switching. Matrix switchers may be operated with RS-232 or RS-422 controls, enhancing flexibility.

MB (megabyte) - 1,048,576 or 2⁽²⁰⁾ bytes

Mbps - million bits per second

MHz (megahertz) - one million or 10⁽⁸⁾ hertz

MII - Portable, professional video component camera/recorder format, utilizing 1/2" metal particle videotape.

Microphone Preamplifier - A microphone is a device which converts sound waves to electrical impulses (transducer). Microphones typically generate very low signal levels

requiring low noise, high fidelity, pre-amplification to boost the output signal to a level compatible with audio amplifier circuitry. Good microphone preamplifiers provide precise matching of microphone impedance and low noise electronic components.

Microphone Impedance - In order to obtain the highest quality output signal from a microphone, a preamplifier input should provide a load (impedance) which exactly matches a microphone's output impedance. Microphone output impedances vary from 150 ohms to several megohms.

Moire - A distracting wavy effect produced when converging lines in a video image are nearly parallel to a monitor's scanning lines.

Monitor - A display that gets its signal directly from a camera or VCR, as opposed to a television, which relies on RF signals, such as those from cable television or broadcast. A monitor uses composite (RCA-style), S-Video (Y/C) and/or BNC video jacks. (See ANALOG MONITOR)

Mosaic - Special effect in which the picture is divided up into tiles.

Mosquitoes - fuzzy dots which appear around sharp edges following video compression, also known as Gibbs Effect.

Motion compensation - Process of analyzing previous and future frames to identify blocks which have not changed. This computation intensive work can cause visual artifacts when errors occur.

MPEG (Motion/JPEG) - MPEG also refers to the Motion Picture Expert Group which developed the MPEG series of audio and video compression standards. It is a digital compression standard for moving video images that allows the images to occupy less memory or disk space. Like the JPEG standard, it includes options for trading off between storage space and image quality.

MPEG1 - Codec developed for VideoCD, video games, video-on-demand and tape. It has a low data rate (15MB per second)

MPEG-1 Level 2 - Codec developed for two channel (stereo) audio compression using Dolby Surround sound format.

MPEG-2 - Codec for DVD, HDTV broadcast, cable TV, digital satellite systems (5-20MB per second).

MPEG-3 - Codec which has been merged into MPEG-2.

MPEG-4 - Codec developed for interactive video and commonly used in Internet video conferencing.

MPEG-7 - Codec developed for video databases.

Multimedia - A somewhat ambiguous term that describes the ability to combine audio, video and other information with graphics, control, storage and other features of computer-based systems. Applications include presentation, editing, interactive learning, games and conferencing. Current multimedia systems also use mass storage computer devices such as CD-ROM.

Multiplexing - contains multiple signals, data streams in a single signal or stream.

Multi-Scan monitor - A monitor (also referred to as multi-sync or multi-frequency) which synchronizes to different video signal sync frequencies, allowing its use with various computer video outputs. (See ANALOG MONITOR)

Multi-Standard - A monitor which synchronizes to different video signal standards such as NTSC and PAL. (See Analog Monitor)

Mux -- Multiplex

Mux Rate - Combined rate of all packetized elementary streams (PES) of a program.

N

NAB (National Association of Broadcasters) - trade association

NAMM (National Association of Musical Merchants) - trade association

Negative Effect -- Special effect in which either blacks and whites are reversed or colors are inverted. For example, red becomes a blue-green, green becomes purple, etc. The Video Equalizer and Digital Video Mixer includes a negative effect which can be used to generate electronic color slides from color negatives. An electronic color filter can be used for fine adjustment of the hues.

Noise - A general term used in electronics to indicate any unwanted electrical signal, unrelated to the original signal. Video noise is generally manifested as snow, graininess, ghost images or picture static induced by external sources such as the national power-line grid, electric motors, fluorescent lamps, etc. In audio, noise is generally manifested as hiss and static.

Noise Gate - A device used to modify a signal's noise characteristics. In video, noise gates provide optimal automatic suppression of snow (signal noise level). In audio, a noise gate provides a settable signal level threshold below which all sound is removed.

Noise Reduction - An electronic process used to reduce noise levels in audio and video. In video, the most effective noise reduction is accomplished by digitizing the video signal and carrying out a computerized pixel by pixel analysis of the data. In audio, the most effective systems employ an encode/decode scheme, performed before

and after recording, such as the Dolby audio noise reduction system. Noise reduction can be performed on an existing audio signal using systems such as DNR (dynamic noise reduction) but are less effective because they also affect the audio signal.

Nonlinearity -- The amount by which a measured video signal output differs from a standard video signal output. The greater this deviation, the greater the video signal distortion and possibility of luminance and chrominance problems.

Nonlinear Editing - The process of editing using rapid retrieval (random access) computer controlled media such as hard disks, CD-ROMs and laser discs. Its main advantages are: allows you to reorganize clips or make changes to sections without having to redo the entire production and very fast random access to any point on the hard disk (typically 20-40 ms)

NTSC (National Television Standards Committee) -- Standard of color TV broadcasting used mainly in the United States, Canada, Mexico and Japan, featuring 525 lines per frame and 30 frames per second. (See **PAL** and **SECAM**)

O

OSTA (optical Storage Trade Association) - unofficial standards/marketing group formed to promote optical storage sales.

Overlay - Keyed insertion of one image into another. Overlay is used for example, to superimpose computer generated text on a video image, for titling purposes. In video, the overlay procedure requires synchronized sources for proper operation.

Overscan - Video images generally exceed the size of the physical screen. The edge of the picture may or may not be displayed, to allow variations in television sets. The extra area is called the overscan area. Video productions are planned so critical action only occurs in the center safe title area. Professional monitors are capable of displaying the entire video image including the overscan area.

P

Pack - Grouping of MPEG packets in program stream. Each DVD sector (2048 bytes) contains one pack.

Packet - Low level unit of MPEG data storage containing contiguous bytes of data in single elementary stream such as video, audio, control. Packets are contained in a pack.

PAL (Phase Alternate Line) - The European color TV broadcasting standard featuring 625 lines per frame and 25 frames per second. (See **NTSC** and **SECAM**)

Panasonic 5-pin edit control - Panasonic's wired edit control protocol. See **Control-M**.

Parental Management - DVD feature which prohibits encoded programs to be viewed depending upon parental level set on the player.

Part of Title or Chapter - Division of title representing a scene numbered from 1-99.

PCI (Presentation Control Information) - Data stream containing details of timing and presentation of program.

PCM (Pulse Code Modulation) - Uncompressed digitally coded representation of analog/audio signal. Waveform is regularly sampled and coded form pulses are generated to represent the amplitude.

Pedestal - The pedestal is a small DC voltage step within the video signal indicating a picture's black-level and is used as the reference in a standard video signal for white level and all gray levels.

PEL - abbreviation for pixel

Phase Change - rewritable optical disc technology using physical effects where laser heats recording material to reversibly change area from amorphous to crystalline state and back. Continuous heating just above melting point creates crystalline state for erasure. High heat followed by rapid cooling produces amorphous state or data mark.

Phase Error - A change in the color subcarrier signal which moves its timing out of phase, i.e., it occurs at a different instant from the original signal. Since color information is encoded in a video signal as a relation between the color subcarrier and the color burst phase, a deviation in the color subcarrier phase results in a change in the image's hue.

Picture Sharpness - The fine details in a video picture. A picture appears sharp when it contains fine details and has good contrast. Picture sharpness is easily lost during the recording/playback process. Advanced video enhancement equipment is used to improve picture sharpness, especially contrast, and can precompensate for potential losses which might alter an image during processing.

Picture Stop - DVD-V function where code indicates video playback should stop and still image should be displayed.

PIP (Picture In Picture) - A digital special effect in which one video image is inserted within another allowing several images to share a single screen.

Pixel - Smallest picture element of an image (one sample of each color component). Single dot in the array which makes up a picture.

Playback - The process whereby a videotape is displayed on a monitor. During playback, use of a video processor such as the Video Equalizer can be used to alter, enhance, correct or restore a signal.

Post-Production - All production work done after the raw video footage and audio elements have been captured. Editing, titling, special effects insertion, image enhancement, audio mixing and other production work is done during post-production.

Posterization - Special effect in which the picture is reduced to a small number of colors or luminance levels removing any fine gradations of color and brightness resulting in an oil painting effect. Both the Video Equalizer and Digital Video Mixer includes this effect.

Pre-Enhancement - In many situations, video losses can be anticipated, allowing signal pre-compensation in a way that partially corrects for the losses. (See **Line Compensation**)

Premastering - Process of preparing data in the final format to create a DVD disc for mastering. Includes creating DVD control and navigation data, multiplexing data streams together, generating error-correction codes and performing channel modulation. Often includes encoding video, audio and subpictures.

Presentation Data - DVD-V information such as video, menus and audio presented to the viewer.

Preview Bus - A processor function allowing the operator to select any incoming video source for viewing prior to actual use. Typically, each signal can be previewed on its own monitor. This is an effective method to check work before going "on the air." The Digital Video Mixer includes a separate preview output which can be used to preview all four of its video-input signals on-screen simultaneously.

Primary Colors -The basic colors used in TV and video systems of red, green and blue.

Program Bus - Similar to the preview bus except the resulting output is the final signal which goes "on the air."

Progressive Scan - Video scanning system which displays all lines of a frame in a single path.

R

RAM (Random Access Memory) - often refers to computer internal memory chips which buffer data during transfer and processing to ensure smooth data stream.

Raster - pattern of parallel horizontal scanning lines, traced by a video monitor's electron beam, producing a video image.

RCA connector - A type of connector used on consumer VCRs and camcorders to carry composite video and audio signals.

RC (Rewriteable Consumer) Time Code - time code system, on 8mm and Hi-8 formats. The code can be added either before or after video recording without affecting

the video or audio.

Real Time Counter - display showing hours-minutes-seconds of tape that has been recorded (elapsed time), or how much tape remains.

Reference Picture (Reference Frame) - Encoded frame which is used as a reference point to build dependent frames. In MPEG-2, I Pictures and P Pictures are used as references.

Regional Code - Code identifying one of six world regions for restricting DVD playback. Seventh code is for universal playback.

Regional Management - Mandatory feature of DVD-V to restrict the playback of a disc to a specific geographic region. All players and DVD-ROM drives include a single regional code and each disc can specify in which region(s) it is allowed to be played. Drive and player codes can be changed by the user by following the user manual directions if desired. Universal playback coded discs can be played in all regions.

Replication - High volume reproduction of media - CD and DVD for broader distribution.

Resolution - measure of the ability to reproduce detail. Generally, referred to as horizontal resolution and determined by the number of horizontal lines which are clearly discernible on a test pattern. Resolution specifications are not well standardized, especially in connection with monitors. Using the rule of thumb of 80 lines per MHz of bandwidth, VHS and 8mm typically achieves 240 lines of resolution, S-VHS and Hi-8 achieve 400, broadcast achieves 330. (See **Definition**)

Remote Socket - A VCR or video camera socket which when connected, permits remote control of the unit. Remotes may be wired or wireless (infrared) and allow such control as play, pause, record, fast forward and rewind. (See **Edit Control**)

RF (Radio Frequency) - term used to describe the radio signal band of the electromagnetic spectrum (3 MHz to 300 GHz). RF connectors, such as those used for the cable TV or antenna inputs on a monitor. Carries modulated television signals.

RF Distribution - process of supplying an RF signal to several devices simultaneously.

RF Modulation -- process of combining a video signal with an RF source for transmission to a television or VCR.

RGB (Red/Green/Blue) - basic components of a color video signal. Using a color encoder, with sync information, a complete composite video signal comprising luminance, chrominance and sync can be generated from RGB. (See **Component, Composite**)

RS-232/RS-422 -- Computer communication standards used in video for the control of video equipment. Computer controlled VCRs, edit controllers, switchers and other

studio equipment can commonly be found in professional video studios.

RPM (revolutions per minute) - refers to the rotational speed of a disc or disk.

R-Y, B-Y - General term for color-difference video signals carrying red and blue color information. Brightness (Y) is subtracted from the red and blue RGB signals to create R-Y and B-Y color difference signals.

S

Safe Title Area - center 80% of the overscan video image area or area which will display legible titles regardless of how a TV monitor is adjusted.

Sample - Single digital measurement of analog information or "snap shot" in time of the analog waveform.

Sample Rate - Number of times a digital sample is taken measured in samples per second or Hertz. The more samples taken the better a digital signal can represent the original signal. Sampling theory is that sampling frequency must be more often than twice the signal frequency to reproduce the signal without aliasing.

Sample Size - Number of bits used to store a sample (resolution). The more bits per sample, the better the reproduction of the original analog information. Audio sample size determines the dynamic range.

Sampling - Process of converting analog data into digital representation by measuring the value of the analog signal at regular intervals and encoding the numeric values in digital form. Sample is based on quantization levels and can be adjusted for different digital systems.

Saturation - Intensity of color.

Scan Line - Single horizontal line traced by scanning system of video display unit. NTSC video has 525 lines - 480 contain actual picture data. PAL and SECAM video has 625 lines with about 576 containing picture data.

Scanning Velocity - Speed at which laser pickup head travels along spiral track of disc.

SCART - audio/video connector used in consumer equipment, especially in Europe. The SCART connector's 21 pins carry two audio in and out channels, in and out video channels, RGB signals, ground and some additional control signals. Only one SCART-to-SCART cable is needed to connect two VCRs or VCR to a monitor.

SCSI - (Small Computer Systems Interface) - electronic interface and command set for attaching and controlling internal and external peripherals to a computer.

SECAM (Sequential Couleur A'memorie, Sequential Color With Memory) - video standard used in European and surrounding countries. In countries using the SECAM standard, most video production is done using PAL and converted to SECAM prior to transmission. (See **NTSC** and **PAL**)

Sector - Logical or physical group of bytes recorded on disc (smallest addressable unit).

SEG (Special Effects Generator) - Device designed to generate special effects. The simplest devices process a single video signal, change its color, generate sepia tones, invert the picture to a negative, posterize the image and fade or break up the image into various patterns. More sophisticated equipment uses several video sources, computer-generated graphics and sophisticated animation with digital effects.

Serial Port - computer I/O (input/output) port through which the computer communicates with the external world. The standard serial port uses RS-232 or RS-422 protocols.

Sepia Tone - process used in photography to generate a brownish tone in pictures giving them an "antique" appearance. The same idea has been electronically adapted for video production where a black and white image can be colored in sepia.

Shotgun Microphone - Long, highly directional microphone designed to pick up sounds directly in front of the microphone, rejecting sound from other directions. Named for its appearance.

Signal-to-Noise Ratio (S/N) - ratio in decibels (dB), of an audio or video signal, between the signal's maximum peak-to-peak signal voltage and the measured voltage of what remains when the signal is removed, (i.e., the ratio of the signal to that of the noise). In video, the higher the ratio, the less snow is visible. In audio, the higher the ratio, the cleaner the sound. Audio s/n ratios vary tremendously from compact discs/camcorder AFM Hi-Fi tracks (typically 90 dB) to VCR linear tracks (typically 40 dB).

SMPTE - Society of Motion Picture and Television Engineers. (See **VITC**)

SMPTE-VITC - SMPTE's vertical interval time code (VITC) format standard. The term VITC, used alone, usually refers to SMPTE-VITC.

Snow - general term used to describe interference in a video image. It manifests as random colored or black and white dots. (See **Luminance Noise**)

Solarization - Special effect in which the lightest and darkest values of a picture are made dark while the middle tones become light.

Special Effects - Artistic effects added to a video production to enhance the production by creating drama, enhancing the mood or furthering the story. Special

effects may vary from the limited addition of patterns or the mixing of several video images together, to sophisticated digital effects such as picture compression, page flipping and three-dimensional effects..

Split Screen - electronic process which allows the viewing of two video images, side by side or above and below, on-screen simultaneously.

Stamping - process of replicating optical discs (CD and DVD) by injecting liquid plastic into mold containing a master or stamper of the data to be reproduced for mass distribution.

Stereo Mixing - Simultaneous processing of both left and right audio channels.

Stream - Continuous flow of data - digitally encoded - to be processed sequentially. Often referred to as bit stream or data stream.

Strobe - Special effect in which a frame is periodically held for a finite time until another frame is held.

Subpicture - graphic bitmap overlays used in DVD-V to create subtitles, menu highlights, effects, etc.

Substrate - Clear polycarbonate plastic disc onto which data layers are deposited or stamped.

Subtitle - Text copy of the audio in a video program used for foreign languages. Not to be confused with subpictures relating to captions for the hearing impaired.

Surround Sound - Multichannel audio using speakers in front and behind the listener to create an envelope of sound and simulate directional audio sources.

Superimpose - place in front of video, e.g., placing text over a video signal.

S-VHS (Super VHS) - improved version of the VHS tape format capable of recording better picture resolution (definition). A higher-density tape is required which provides a wider luminance bandwidth, resulting in sharper picture quality (> 400 horizontal lines vs. 240 for standard VHS) and improved signal-to-noise ratio.

S-VHS-c (Super VHS-C) - improved version of the VHS-C tape format capable of recording better picture resolution (definition).

S-Video (Separated Video) - a system of plugs and jacks used to interconnect camcorders, VCRs and TV monitors, which keeps the chrominance (color) and luminance (brightness) information separate. Also called Y/C connectors (luminance/chrominance), greatly improves picture quality by keeping any signal interaction (degradation) to a minimum.

Switcher - General term for a device used to select different signals (audio, video or RF) from various sources.

Sync (Synchronization) - A term used to describe the precise alignment of two signals or functions. In video, sync is an essential element for maintaining the proper clocking of video signals. The sync signal is used by a monitor to know where and when to draw the on-screen video image. The horizontal sync signal is a short pulse generated at the beginning of each video line which tells the video monitor when to draw each new line. The vertical sync signal is a short pulse generated at the beginning of each video frame which tells the video monitor when to start a new field. Sync signals reside in the part of a video signal in which no visual picture information is transmitted. During this blanking period or horizontal or vertical interval, the electronic beam is blanked and retraces back to the other side of the screen to start a new line or new field. Since this is done during the blanking period, it is invisible to the viewer. Both horizontal and vertical sync are required in order to maintain a stable on-screen picture. Many video-processing devices provide sync restoration and correction circuitry. Sometimes, a TBC is required to recover or restore sync. (See **Genlock**)

Sync Restoration - process which replaces distorted and missing sync information by checking incoming sync, analyzing the frequencies involved and generating new fully restored sync.

Synchro-edit - Wired control protocol which activates/deactivates a VCR's record pause function. Many non-compatible versions of this protocol exist.

Sync Stripping - process which separates sync from the rest of the video signal for timing correction, clamping and other purposes.

Syntax - rules governing the formation of an orderly system of information. In MPEG encoding, syntax defines how data is used by the decoder.

System Menu - Main menu on DVD that contains titles for selection. Similar to disc and title selection menu.

T

Talent - term used to refer to on-camera subjects in a video production.

Tally Lamp - signal lamp or LED installed on a video camera which informs performers and crewmembers that the camera is currently live.

TBC (Time Base Corrector) - device used to rectify any problems with a video signal's sync pulses by generating a new clean time base and synchronizing any other incoming video to this reference.

Telecine - term used to describe a device used to convert film to video. In advanced telecine machines, the movie film is digitally sampled and converted to video, frame by frame in real-time. Frame rate is the biggest problem encountered in film-to-video

conversion. Movie film has a frame rate of 18, 24 or 30 fps (frames per second) contrasting with the 30 and 25 fps video frame rates of NTSC and PAL respectively. (See **Flicker**)

Tele-Prompter - device for displaying large, readable text on a partially transparent screen for video production. The tele-prompter uses a monitor mounted under the camera lens, facing up, and a mirrored glass which reflects the monitor's image toward the talent. Since the camera shoots through the mirrored glass and the mirrored glass is transparent to the camera, the talent can look directly into the camera lens as they read the script from the glass.

Termination Switch - switch that connects and disconnects a load resistance to a video input, used to terminate the line. In order for a video signal to be correctly transmitted without loss, proper end of line impedance is essential. A 50 or 75 ohm resistor is usually employed to accomplish this. When the termination switch is off, the unterminated video signal is looped to the next device where the signal can be transmitted in parallel. The final device in the chain must be terminated using the termination switch.

Test Pattern - chart with special patterns, placed in front of a television camera to generate a known reference signal that can be used to adjust the camera and all the equipment downstream from the camera.

Time Code - digital code number recorded onto a videotape for editing purposes. When decoded, the time code identifies every frame of a videotape using digits reading hours:minutes:seconds and frames. Each individual video frame is assigned a unique address, a must for accurate editing. The three time code systems used for video are VITC, LTC and RC (consumer).

Titling - addition of text, symbols and graphic elements to a video image. Titles may be added to a video scene during shooting or in post-production. Sophisticated titling devices allow the user to prepare text and graphics in various sizes, fonts and colors to be triggered later, one-by-one, at appropriate places within a production. Many video cameras include basic titlers or permit externally generated titles to be mixed with the video image during shooting.

Track - Continuous spiral channel of data recorded on a disc.

Tracking - angle and speed at which the tape passes the video heads. Due to small differences in head-to-tape alignment between VCRs, it is sometimes necessary to adjust the tracking control on a VCR when playing a tape-recorded on another deck.

Transcoder - device used to convert from one component system to another or one video standard to another. (e.g., PAL to SECAM)

Transfer Rate - speed at which data is transmitted from device to host computer or similar device. Measured in bits or bytes per second.

Tristimulus - Three-valued signal which matches nearly all colors of visible light.

U

UDF (Universal Disc Format) - Developed by the Optical Storage Technology Association (OSTA) it provides a practical subset of the ISO/IEC 13346 recordable, random access file system and volume structure format. UDF implementation on optical drives ensured that media written on one platform could be read on any other platform.

Underscan - opposite of overscan. In underscan, a video or computer image is reduced so that all four edges are visible on-screen, leaving it surrounded by black borders. Underscan is used to show what is happening in the blanking period and at the beginning and end of scan lines and frames. Underscanning can uncover latent image problems for identification and correction.

User Data - Data written to a disc from data created by the user. User data can be word, document, audio or video data. This data is independent of the disc's formatting and error-correction data.

V

VBI (Vertical Blanking Interval) - Scan lines in TV signal which contain no picture information. Lines are added to enable electron scanning beam to return to the top and contain auxiliary information such as closed captions or VITC.

VBR (Variable Bit Rate) - Data which can be read and processed at a volume that varies with time. Data compression technique which produces data stream between fixed minimum and maximum rates. Constant level of compression is maintained with the requisite bandwidth increasing and decreasing depending upon the complexity of the data being encoded.

Vertical Interval Switching - Randomly switching from one video signal to another, will often result in a jump in the picture upon playback. The problem is compounded when the tape is copied. To avoid this problem, switching is best performed on synchronized signals during the vertical blanking retrace period, known also as the vertical interval. This allows complete replacement of one whole frame by a second whole frame resulting in a very smooth on-screen switch.

VHS (Video Home System) - Consumer videocassette record/playback tape format using half-inch wide magnetic tape.

VHS Hi-Fi - improved stereo audio recording/playback system found on some camcorders and VCRs. Because the audio tracks are mixed and recorded with the video signal, audio only dubbing of these tracks is not possible.

VHS-C (VHS-Compact) - miniature version of the VHS tape format utilizing smaller cassettes that may also be played on standard VHS machines by using an adapter cartridge.

Video Bandwidth - range between the lowest and highest signal frequency of a given video signal. In general, the higher the video bandwidth, the better the quality of the

picture. Video bandwidths used in studio work typically vary between 3 and 12 MHz. Consumer VCRs are generally capable of 3-5.5 MHz.

Video Camera - camera which contains an electronic image sensor rather than photographic film. The lens focuses an image on an electronic tube or CCD chip. A camera has electronic circuitry which generates color and sync pulses. Most portable consumer cameras are equipped with a full complement of audio circuitry, e.g., microphone, audio amplifier and additional audio electronics. To obtain better quality images, a professional camera has three tubes or a triple CCD system, one for each basic color. Most professional cameras have a genlock input, which allows the camera to be synchronized to an external source. Some cameras also include basic character generators for titling purposes.

Video CD - CD writing based on MPEG-1 audio/video. Playback quality is similar to VHS tape and is common home video storage/playback format in mainland China.

Video Editing -- procedure for combining selected portions of video footage in order to create a new, combined version. A variety of editing consoles are available. During video editing, special effects such as wipes, dissolves, inserts, etc. can be added. Professional editing is done using time code recorded on every frame of the magnetic tape allowing single frame accuracy. Audio editing is often carried out simultaneously with video editing.

Video Enhancing -- general term used to describe a device used to correct video image problems.

Video Gain -- nominal composite video signal level is 1 volt. At this level, a fully saturated image is transmitted and boosting the signal offers no advantage. Most video equipment is designed to output the same 1-volt level video signal. In cases where the signal level has been reduced, such as after a long cable run, an amplifier with video gain may be employed to restore the proper level.

Video Manager (VMG) - Disc or title selection menu.

Video Mixer -- device used to combine video signals from two or more sources. Inputs are synchronized, then mixed along with various special effects patterns and shapes. A video mixer usually generates sync signals allowing genlocking of additional video sources to the first source.

Video Printer -- special device used to capture a single frame of video to create a hard copy print.

Video Projector -- display device which projects a video or computer image onto a large screen. The classic video projector has three primary color video tubes which converge on-screen to create the full color image. Single tube projectors eliminate convergence problems but compared to three tube systems, project a relatively lower quality image.

Video Wall -- large array of several monitors, placed close to one another in the shape of a video screen or "wall." Each monitor is fed only part of the original video image by

using a video-wall-generating unit. This device is a digitally-based processor which converts the original analog video signal to digital, rescans, resamples and generates several individual analog video outputs for driving each array monitor separately. When viewed from a distance, the effect can be very dramatic.

VITC (Vertical Interval Time Code) -- popular method for recording time code onto videotape. A time code address for each video frame is inserted in the vertical interval (the vertical blanking retrace period) of the video signal, where it is invisible on-screen yet easily retrieved, even when a helical scanning VCR is in pause mode. The most common form of VITC is SMPTE-VITC.

VTS (Video Title Set) - Set of one - 10 files holding contents of the title.

VOB (Video Object) - Small physical unit of DVD data storage.

VSDA (Video Software Dealers Association) - trade association

W

WEVA (Wedding and Event Videography Association) - trade organization

White Balance - electronic process used in camcorders and video cameras to calibrate the picture for accurate color display in different lighting conditions. (i.e., sunlight vs. indoor incandescent) Pointing the camera at a white object for reference should perform White balancing prior to any recording, typically.

Widescreen - Video image wider than the standard 4:3 aspect ratio. Used in conjunction with DVD or HDTV it usually refers to 16:9 aspect ratio.

Wipe -- Special effect in which two pictures from different video sources are displayed on one screen. Special effects generators provide numerous wipe patterns varying from simple horizontal and vertical wipes to multi-shaped, multi-colored arrangements.

Y

Y - Luma video brightness component that is independent of color.

Y/C (Luminance and Chrominance) -- term used to describe the separation of video signal components used in systems such as Hi-8 and S-VHS.

YUV -- video system employing luminance and two chroma components directly related to the red and blue components. This professional component video system is used in studios and requires special equipment. Interface devices are used to link the various component systems, i.e., RGB, Y/C, YUV and YIQ (a system similar to YUV).