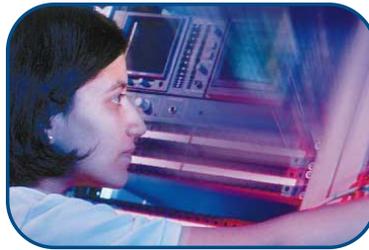


Glossary of Video Terms and Acronyms



COMPUTING

COMMUNICATIONS

VIDEO

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► 1-9

1/4" Phone – A connector used in audio production that is characterized by its single shaft with locking tip.

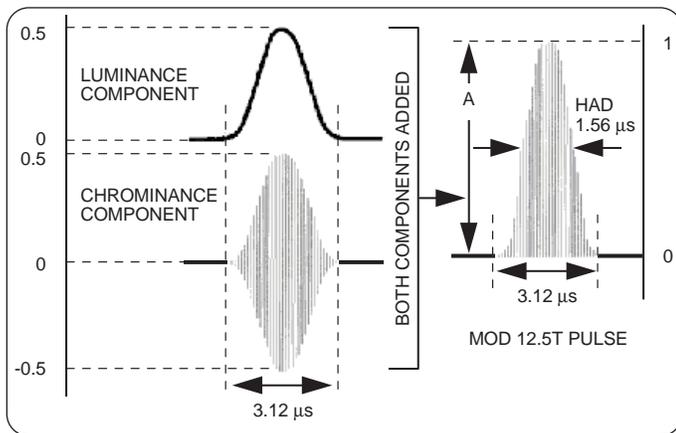
1/8th Mini – A small audio connector used frequently in consumer electronics.

1 CBPS – 1 Coded Bit Per Symbol.

1:1 – Either a perfectly square (9:9) aspect ratio or the field:frame ratio of progressive scanning.

100 Field Per Second – Field rate of some European proposals for a world standard for ATV (Advanced Television).

12.5T Sine-Squared Pulse with 3.579545 MHz Modulation – Conventional chrominance-to-luminance gain and delay measurements are based on analysis of the baseline of a modulated 12.5T pulse. This pulse is made up of a sine-squared luminance pulse and a chrominance packet with a sine-squared envelope as shown in the figure below. This waveform has many advantages. First it allows for the evaluation of both gain and delay differences with a single signal. It also eliminates the need to separately establish a low-frequency amplitude reference with a white bar. Since a low-frequency reference pulse is present along with the high-frequency information, the amplitude of the pulse itself can be normalized. The HAD of 12.5T was chosen in order to occupy the chrominance bandwidth of NTSC as fully as possible and to produce a pulse with sufficient sensitivity to delay distortion.



125M – See SMPTE 125M.

1410 NTSC Test Signal Generator – Discontinued analog circuit based Tektronix test signal generator that is used to generate full field composite analog test signals. Replaced by the Tektronix TSG-170A.

1450 Demodulator – Tektronix high quality demodulator that provides envelope and synchronous demodulation.

1480 Waveform Monitor – Discontinued Tektronix waveform monitor. Replaced by the 1780R.

16 VSB – Vestigial sideband modulation with 16 discrete amplitude levels.

16 QAM – 16 Quadrature Amplitude Modulation.

16x9 – A widescreen television format in which the aspect ratio of the screen is 16 units wide by 9 high as opposed to the 4x3 of normal TV.

1780R Waveform Monitor/Vectorscope – Tektronix microprocessor controlled combination waveform monitor and vectorscope.

1910 Digital Generator/Inserter – Tektronix VITS test signal generator.

2-1/2D (Two and One-Half Dimensions) – This term refers to the kind of dimensionality (i.e., 2D, 3D) that can be created using multiplane animation. Since a layer in such animation can lie in front of one cel (or plane), or in back of another layer, the resulting effect is of a three dimensional world. This is a limited 3D world, however, because the layers are fixed in relation to each other. For this reason, multiplane animation is referred to as 2-1/2 dimensions. It is a very useful technique, however, even for computer graphics, because by ordering the layers in the way a painter does, you can save the computer the need to compare objects that are in different layers (that is, compare them for purposes of hidden surface removal).

2 CBPS – 2 Coded Bits Per Symbol.

2:1 – Either an aspect ratio twice as wide as it is high (18:9) or the field:frame ratio of interlaced scanning.

24 Frames Per Second – International standard for motion picture film shooting and projection, though film shot for television in 625 scanning-line countries is usually shot at 25 frames per second (even if not, it is transferred to television at 25 frames per second). There are moves afoot in the U.S. to increase the film frame rate to 30 for improved temporal resolution. The ImageVision HDEP system and other electronic cinematography systems use 24 frames per second. RCA once proposed an electronic cinematography system with 2625 scanning lines (2475 active), a 2:33:1 aspect ratio, and a frame rate of 23.976023 frames/sec.

25 Frames Per Second – Frame rate of television in all countries not conforming to CCIR system M (NTSC). Also the frame rate of film shot for television in those countries.

25 Hz HDTV Bitstream – A bitstream which contains only Main Profile, High Level (or simpler) video at 25 Hz or 50 Hz frame rates.

25 Hz HDTV IRD – An IRD (Integrated Receiver Decoder) that is capable of decoding and displaying pictures based on a nominal video frame rate of 25 Hz or 50 Hz from MPEG-2 Main Profile, High Level bitstreams, in addition to providing the functionality of a 25 Hz SDTV IRD.

25 Hz SDTV Bitstream – A bitstream which contains only Main Profile, Main Level video at 25 Hz frame rate.

25 Hz SDTV IRD – An IRD (Integrated Receiver Decoder) which is capable of decoding and displaying pictures based on a nominal video frame rate of 25 Hz from MPEG-2 Main Profile, Main Level bitstreams.

29.97 Frames Per Second – Frame rate of NTSC color television, changed from 30 so that the color subcarrier could be interleaved between both the horizontal line frequency and the sound carrier.

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2K – A film image scanned into a computer file at a resolution of 2048 horizontal pixels per line.

2T Pulse – See the discussion on Sine-Squared Pulses.

3-Perf – A concept for saving money on film stock by shooting each 35 mm frame in an area covered by three perforations rather than four. The savings is more than enough to compensate for switching from 24 frames per second to 30. Three-perf naturally accommodates a 1.78:1 (16:9) aspect ratio and can be easily masked to the 1.85:1 common in U.S. movie theaters. It changes the shoot-and-protect concept of using theatrical film on television, however, from one in which the protected area is extended vertically to one in which the shooting area is reduced horizontally.

3.579545 MHz – The frequency of the NTSC color subcarrier.

3:2 Pull Down – a) The technique used to convert 24 frames per second film to 30 frames per second video. Every other film frame is held for three video fields resulting in a sequence of 3 fields, 2 fields, 3 fields, 2 fields, etc. **b)** A frame cadence found in video that has been telecined or converted from film to video. This cadence is produced because the frame rates for film and video are different. During the process of compression, some compression hardware recognizes this cadence and can further compress video because of it. Material which is video to start with gains no extra compression advantage. Material edited after being telecined may not gain a compression advantage.

30 Hz HDTV Bitstream – A bitstream which contains only Main Profile, High Level (or simpler) video at 24000/1001, 24, 30000/1001, 30, 60/1001 or 60 Hz frame rates.

30 Hz HDTV IRD – An IRD (Integrated Receiver Decoder) that is capable of decoding and displaying pictures based on nominal video frame rates of 24000/1001, 24, 30000/1001, 30, 60/1001 or 60 Hz from MPEG-2 Main Profile, High Level bitstreams, in addition to providing the functionality of a 30 Hz SDTV IRD.

30 Hz SDTV Bitstream – A bitstream which contains only Main Profile, Main Level video at 24000/1001, 24, 30000/1001 or 30 Hz frame rate.

30 Hz SDTV IRD – An IRD (Integrated Receiver Decoder) which is capable of decoding and displaying pictures based on a nominal video frame rate of 24000/1001 (approximately 23.98), 24, 3000/1001 (approximately 29.97) or 30 Hz from MPEG-2 Main Profile at Main Level bitstreams.

30 Frames Per Second – Frame rate of NTSC prior to color. Frame rate of the ATSC/SMPTE HDEP standard. A potential new film standard.

3D (Three Dimensional) – Either as in stereoscopic television (NHK has suggested alternating 3DTV transmissions with HDTV), or more often, when referring to ATV, relating to the three dimensions of the spatio-temporal spectrum: horizontal, vertical, and time.

3D Axis (Menu) – The 3D function that moves the image away from the center of rotation. The image can be moved along, or off any of the three axes.

3D Space – Three dimensional space is easily imagined by looking at a corner of a rectangular room. The corner is called the origin. Each edge leaving from the origin (there are three of them) is called an axis. Each axis extends infinitely in two directions (up/down, left/right, and front/back).

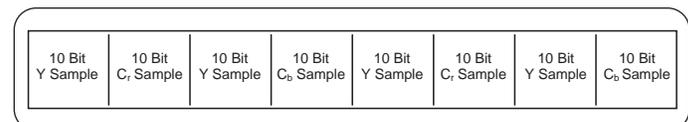
Imagine laying long measuring sticks on each axis. These are used to locate specific points in space. On the Cubicomp, or any other graphics systems, the yardsticks are not infinitely long, and 3D space on these devices is not infinite; it is more like an aquarium.

3XNTSC – A Zenith proposal for an HDEP scheme that would use three times as many scanning lines as NTSC (1575), but would otherwise retain NTS characteristics. It is said to allow easy standards conversion to 525- or 625-scanning line systems and to accept material shot in 1125 scanning lines in a 16:9 aspect ratio without difficulty. 3XNTSC would have 1449 active scanning lines, 2:1 interlace, a 4:3 aspect ratio, and a bandwidth of 37.8 MHz.

4:1:1 – 4:1:1 indicates that Y' has been sampled at 13.5 MHz, while Cb and Cr were each sampled at 3.375 MHz. Thus, for every four samples of Y', there is one sample each of Cb and Cr.

4:2:0 – A sampling system used to digitize the luminance and color difference components (Y, R-Y, B-Y) of a video signal. The four represents the 13.5 MHz sampling frequency of Y, while the R-Y and B-Y are sampled at 6.75 MHz – effectively between every other line only.

4:2:2 – a) A commonly used term for a component digital video format. The details of the format are specified in the CCIR-601 standard document. The numerals 4:2:2 denote the ratio of the sampling frequencies of the single luminance channel to the two color difference channels. For every four luminance samples, there are two samples of each color difference channel. **b)** ITU-R BT.601 digital component waveform sampling standard where the luminance signal is sampled at the rate of 13.5 MHz, and each of the color difference signals, (Cr and Cb) are sampled at the rate of 6.25 MHz each. This results in four samples of the luminance signal for each two samples of the color difference signals. See ITU-R BT.601-2.



4:2:2p (Professional Profile) – 4:2:2p refers to a higher quality, higher bitrate encoding designed for professional video usage. It allows multiple encodings/decodings before transmission or distribution.

4:2:2:4 – Same as 4:2:2 with the addition of a key channel sampled at the same frequency as the luminance.

4:4:4 – A sampling ratio that has equal amounts of the luminance and both chrominance channels.

4:4:4:4 – Same as 4:2:2 with the addition of a key channel, and all channels are sampled at the same frequency as the luminance.

45 Mbps – Nominal data rate of the third level of the hierarchy of ISDN in North America. See also DS3.

4fsc – Composite digital video as used in D2 and D3 VTRs. Stands for four times the frequency of subcarrier, which is the sampling rate used. In NTSC, 4FSC is 14.3 MHz and in PAL it is 17.7 MHz.

4K – A film image scanned into a computer file at a resolution of 4096 horizontal pixels per line. 4K is considered to be a full-resolution scan of 35 mm film.

5-Step Staircase – This signal is commonly used to check luminance gain linearity.

5.1 Channel Audio – An arrangement of five audio channels (left, center, right, left-surround, and right-surround) and one subwoofer channel.

50 Fields Per Second – Field rate of 25 frame-per-second interlaced television.

520A Vectorscope – Discontinued Tektronix vectorscope. It has been replaced by the 1780R.

59.94 Fields Per Second – Field rate of NTSC color television.

60 Fields Per Second – Field rate of the ATSC/SMPTE HDEP standard.

60 Frames Per Second – Frame rate of Showscan and some progressively scanned ATV schemes.

601 – See ITU-R BT.601-2.

75%/100% Bars – See Vectorscopes.

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.

8 PSK (8 Phase Shift Keying) – A variant of QPSK used for satellite links to provide greater data capacity under low-noise conditions.

8 VSB – Vestigial sideband modulation with eight discrete amplitude levels, used in the ATSC digital television transmission standard.

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► A

A – Advanced.

A and B Rolls, Tape – Separation of material into two groups of reels (A rolls and B rolls), with alternate scenes on each reel pair (A reel and B reel) to allow transitions between reels.

A Bus – The top row of the two rows of video source select buttons associated with a given M/E.

A Bus Keyer – A keyer that appears only on top of an “A” bus background video on an M/E.

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 the start of the next scene.

A/B Roll – Creating fades, wipes and other transitions from one video source to another.

A/B Roll Editing – Editing from two source VCRs (“A” and “B”) to a third (recording) VCR. Typically a switcher or mixer, such as the Digital Video 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.

A/D – See A-to-D Converter.

A/V – Audio/Video.

A/V Edit – An edit that records new audio and video tracks. Also called Straight Cut.

A/V Mixer – See Audio/Video Mixer.

A:B:C Notation – The a:b:c notation for sampling ratios, as found in the ITU-R BT.601 specifications, has the following meaning: **a)** 4:2:2 means 2:1 horizontal downsampling, no vertical downsampling. Think four Y samples for every two Cb and 2 Cr samples in a scan line. **b)** 4:1:1 ought to mean 4:1 horizontal downsampling, no vertical. Think four Y samples for every one Cb and one Cr samples in a scan line. It is often misused to mean the same as 4:2:0. **c)** 4:2:0 means 2:1 horizontal and 2:1 vertical downsampling. Think four Y samples for every Cb and Cr samples in a scan line. Not only is this notation not internally consistent, but it is incapable of being extended to represent any unusual sampling ratios, that is different ratios for the Cb and Cr channels.

AAL – ATM Adaptive Layer.

AAL5 – ATM Adaptation Layer 5.

AAU (Audio Access Unit) – See Access Unit.

A-B Rolls – Duplicate rolls of videotape information having identical time code; required to achieve effects of dissolves.

ABC – Television network financially supporting development of ACTV and pioneering the use of digital video transmission.

ABKW – See Audio Breakaway.

Abort – Halts the program and returns control to the operator or operating system.

Absolute Time Code – Absolute time code (ATC) is generally recorded in the subcode or control track region of any digital tape. This is the code that digital tape machines use to locate specific points on a tape for autolocation or other functions. In some machines, it is even used to synchronize the tape to other equipment. ATC is precisely accurate and usually conforms to the IEC standard which is easily converted to the more commercially used SMPTE time code. Unlike SMPTE, ATC always begins at zero at the beginning of a digital tape and increments one frame at a time until recording stops. Some DAT machines have the ability to function without ATC on a tape while others simply will not play a tape without it. These days, almost all machines record it automatically so it will always be on every tape.

Absorption – In acoustics, the opposite of reflection. Sound waves are “absorbed” or soaked up by soft materials they encounter. Studio designers put this fact to work to control the problem of reflections coming back to the engineer’s ear and interfering with the primary audio coming from the monitors. The absorptive capabilities of various materials are rated with an “Absorption Coefficient.”

Absorption Coefficient – **a)** A measurement of the absorptive characteristics of a material in comparison to air. **b)** A measure of the relative amount of sound energy absorbed by the material when a sound strikes its surface.

ABU – Asia-Pacific Broadcasting Union.

AC Bias – The alternating current, usually of frequency several times higher than the highest signal frequency, that is fed to a record head in addition to the signal current. AC bias serves to linearize the recording process and is universally used in analog recording. Generally, a large AC bias is necessary to achieve maximum long-wavelength output and linearity, but a lower value of bias is required to obtain maximum short-wavelength output. The mechanism of AC bias can best be explained in terms of anhysteresis.

AC Coefficient – Any DCT coefficient for which the frequency in one or both dimensions is non-zero.

AC Coupled – **a)** AC coupling is a method of inputting a video signal to a circuit to remove any DC offset, or the overall voltage level that the video signal “rides” on. One way to find the signal is to remove the DC offset by AC coupling, and then do DC restoration to add a known DC offset (one that we selected). Another reason AC coupling is important is that it can remove harmful DC offsets. **b)** A connection that removes the constant voltage (DC component) on which the signal (AC component) is riding. Implemented by passing the signal through a capacitor.

AC Erasure – See Erasure.

AC-3 – Audio Coding algorithm number 3. An audio-coding technique used with ATSC. The audio compression scheme invented by Dolby Laboratories and specified for the ATSC Digital Television Standard. In the world of consumer equipment, it is called Dolby Digital.

ACATS (Advisory Committee on Advanced Television Service) – A group comprised almost exclusively of presidents, chief executive officers,

and chairs of the boards of major broadcasting, CATV, consumer electronics, and entertainment production companies. It is currently supported by a planning subcommittee (with two advisory groups and six working parties), a systems subcommittee (with four working parties), and an implementation subcommittee (with two working parties). ACATS is an entity under the FCC, and is the approving body of advanced TV in the USA., ACATS recommended the ATSC digital TV system to the FCC in November 1995.

ACC – See Automatic Color Correction.

Acceleration – Graphic accelerators function like application-specific microprocessors whose purpose is to work in conjunction with a PC's host microprocessor to display graphics. In general, graphic accelerators control frame memory, color processing, resolution, and display speed. With the advent of the high-speed local buses and higher clock rates, accelerators operate on 32-, 64-, and 128-bit pixel data.

Access Time – a) The time required to receive valid data from a memory device following a read signal. **b)** This is the time it takes from when a disk command is sent until the disk reaches the data sector requested. Access time is a combination of latency, seek time, and the time it takes for the command to be issued. Access time is important in data intensive situations like hard disk recording, multimedia playback, and digital video applications. Lower access times are better. Keeping your drives in good shape with periodic de-fragging, etc. will ensure that your drive is providing the fastest access times it can.

Access Unit (AU) – a) The coded data for a picture or block of sound and any stuffing (null values) that follows it. **b)** A coded representation of a presentation unit. In the case of audio, an access unit is the coded representation of an audio frame. In the case of video, an access unit includes all the coded data for a picture, and any stuffing that follows it, up to but not including the start of the next access unit. If a picture is not preceded by a `group_start_code` or a `sequence_header_code`, the access unit begins with a `picture_start_code`. If a picture is preceded by a `group_start_code` and/or a `sequence_header_code`, the access unit begins with the first byte of the first of these start codes. If it is the last picture preceding a `sequence_end_code` in the bit stream, all bytes between the last byte of the coded picture and the `sequence_end_code` (including the `sequence_end_code`) belong to the access unit.

Account – See Login Account.

Accumulator – One or more registers associated with the Arithmetic and Logic Unit (ALU), which temporarily store sums and other arithmetical and logical results of the ALU.

Accuracy – The closeness of the indicated value to the true value.

ACD/ACD – Application Control Data/Application Communication Data.

Acicular – Needle-shaped, used to describe the shape of oxide particles.

ACLE (Analog Component Link Equipment) – A form of MAC optimized for remote broadcasting links.

Acoustic Echo Canceller – Full-duplex audio technology; used for the elimination of acoustically-coupled return echoes within a teleconference room. Note that all microphones connected to an AEC are active at all times. Consequently, as more microphones are added, the total transmitted

noise level (caused by picking up room ambient noise) increases. See also Tail Time, Echo Suppressor, and Echo Return Loss Enhancement.

Acoustic Shadow – An area in which sound waves are attenuated due to the presence of an acoustic absorber or reflector in the path of the sound waves.

Acoustic Suspension – A type of speaker design using a sealed cabinet. Primarily used for low frequency enclosures, acoustic suspension designs use the air mass within the cabinet as a “spring” to help return the relatively massive speaker to the rest position. This allows heavier, longer throw drivers to be used, but results in a less efficient design requiring more amplifier power.

ACT (Anti-Comet-Tail) – A complex technique of preventing picture highlights from “comet-tailing” due to lack of beam current in the camera tube. (The usually colored trail behind a moving, very bright light/reflection in a picture is called a “comet-tail” since the effect looks similar to an astronomical comet.) The technique involves a special tube and circuitry to drive it. Basically, the charge due to a very bright object is never allowed to build up to an unmanageable level by discharging the target above a preset level during horizontal retrace time when the ACT action is turned on, with an increased beam current.

Active Lines – The total number of scanning lines minus those scanning lines devoted to the vertical blanking interval.

Active Line Time – The duration of a scanning line minus that period devoted to the horizontal blanking interval.

Active Picture – That portion of the ITU-R BT.601 digital picture signal between the SAV and EAV data words.

Active Picture Area – The part of a TV picture that contains actual picture as opposed to sync or other data. Vertically, the active picture area is 487 lines for NTSC and 576 lines for PAL. The inactive area is called blanking.

Active Video – The part of the video waveform that is not specified to be blanking, burst, or sync information. Most of the active video, if not all of it, is visible on the display screen.

Active Window – On a PC, the only window that recognizes input (activity) from the keyboard and mouse; only one window is active at a time.

ActiveMovie – Microsoft's architecture for the control and processing of streams of multimedia data and software that uses this architecture to play digital video and sound. It is intended to supersede Video for Windows.

ACTV (Advanced Compatible Television) – Techniques for ATV transmission developed by the DSRC, with support initially from NBC and RCA/GE Consumer Electronics (now Thomson Consumer Electronics) and with later support from such organizations as ABC and HBO. There are two ACTVs. **a)** ACTV I is a channel-compatible, receiver-compatible system using many different techniques to add widescreen panels and increase horizontal and vertical resolution. Among the techniques are the filling of a Fukinuki hole, time compression, seam-elimination, spatio-temporal filtering, and quadrature modulation of the picture carrier. The last prevents direct compatibility with videotape recorders and with ordinary satellite transmission techniques. **b)** ACTV II is ACTV I plus an augmentation channel to improve resolution and sound.

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Acuity – See Visual Acuity.

Adaptation – Visual process whereby approximate compensation is made for changes in the luminances and colors of stimuli, especially in the case of changes in illuminants.

Adaptation Field – Ancillary program data (especially PCR) which are uncoded and are transmitted at least every 100 ms after the TS header of a data stream (PID) belonging to a program.

Adapter – A device used to achieve compatibility between two items of audio/video equipment.

Adaption Field – Ancillary program data, especially program clock reference (PCR), which are uncoded and are transmitted at least every 100 ms after the TS header of a data stream (packet information, PID) belonging to a program.

Adaptive – Changing according to conditions.

Adaptive Bit Allocation – The allocation of more bits to image areas of high activity which does not lend itself to all types of video compression techniques, especially when interframe sampling is used.

Adaptive Differential Pulse Code Modulation – a) A compression technique that encodes the predictive residual instead of the original waveform signal so that the compression efficiency is improved by a predictive gain. Rather than transmitting PCM samples directly, the difference between the estimate of the next sample and the actual sample is transmitted. This difference is usually small and can thus be encoded in fewer bits than the sample itself. **b)** Differential pulse code modulation that also uses adaptive quantizing; an audio coding algorithm which provides a modest degree of compression together with good quality. **c)** A technique for compressing the transmission requirements of digital signals. ADPCM has been used by ABC between New York and Washington to allow NTSC transmission on a 45 Mbps (DS3) telephone company data transmission circuit. **d)** A pulse code modulation system typically operating at a high sampling rate whereby coding is based on a prior knowledge of the signal to be processed (i.e., greater than, equal to, or less than the previous sample). The system is adaptive in that digital bits of code signify different sizes of signal change depending on the magnitude of the signal.

Adaptive Emphasis – An ATV technique for improving detail of dark parts of the picture by increasing their level. If a complementary de-emphasis is performed at the receiver, noise can be reduced. Dolby B noise reduction (the form of Dolby noise reduction most common in consumer cassette recorders) is a classic example of complementary adaptive emphasis.

Adaptor – A device that allows an ordinary NTSC television to receive pictures from a non-receiver-compatible ATV system.

ADC – See A-to-D Converter.

Added Calibrator – A feature of some waveform monitors which allows an internal 1-volt calibrator signal to be used as a reference for amplitude measurements.

Adder – Device that forms, as output, the sum of two or more numbers presented as inputs.

Additive – Any material in the coating of magnetic tape other than the oxide and the binder resins; for example, plasticizers (materials used to

soften an otherwise hard or brittle binder), lubricants (materials used to lower the coefficient of friction of an otherwise high-friction binder), fungicides (materials used to prevent fungus growth), dispersants (to uniformly distribute the oxide particles), or dyes.

Additive Color System – Color specification system in which primary colors are added together to create a desired color. An example is the red/green/blue (RGB) system. Additive systems are generally associated with light emitting devices (CRTs).

Additive Mix – A mix wherein the instantaneous video output signal is equal to the weighted sum of the input video signals. Unless otherwise specified, “mix” is taken to mean “additive mix.”

Address – Number that indicates the position of a word in the memory.

Address Bus – Set of wires (typically 32) used to transmit addresses, usually from the microprocessor to a memory or I/O device.

Address Decoding – Process of selecting a specific address or field of addresses to enable unique devices.

Address Dial – See SCSI Address Dial.

Addressing Modes – Various methods of specifying an address as part of an instruction. See Direct Addressing, Indirect Addressing, Immediate Addressing and Indexed Addressing.

Adhesion – The degree to which the coating adheres to the base film. Anchorage may be checked by measuring the force required to separate the coating from the base film by means of a specially designed plow blade or, more simply, by determining whether the coating can be peeled from the base film by means of ordinary pressure-sensitive adhesive tape.

Adjacent Channel – A television transmission channel immediately adjacent to an existing channel. For example, channel 3 is adjacent to channels 2 and 4. There are three exceptions to what might otherwise be considered adjacent channels: there is a small gap between channels 4 and 5, there is a large gap between channels 6 and 7, and there is an enormous gap between channels 13 and 14. Adjacent channels figure into ATV in two ways. **a)** First, it is currently illegal to broadcast on adjacent channels in a single location. Some ATV proponents feel that augmentation channels might someday be allowed to be placed in adjacent channels. If half-size (3 MHz) or smaller augmentation channels are used, all current broadcasters could then be allowed an augmentation channel. Some proponents feel the use of a low-power digital augmentation channel will allow adjacent channels to be used without interference. **b)** Second, some ATV proposals require that the augmentation channel be adjacent to the transmission channel or require a larger than normal transmission channel, thus occupying a channel and one of its adjacent channels.

Administrator – See System Administrator and Network Administrator.

ADPCM – See Adaptive Differential Pulse Code Modulation.

ADSL – See Asymmetrical Digital Subscriber Line.

ADSR (Attack, Decay, Sustain and Release) – These are the four parameters found on a basic synthesizer envelope generator. An envelope generator is sometimes called a transient generator and is traditionally used to control the loudness envelope of sounds, though some modern designs allow for far greater flexibility. The Attack, Decay, and Release

parameters are rate or time controls. Sustain is a level control. When a key is pressed, the envelope generator will begin to rise to its full level at the rate set by the attack parameter; upon reaching peak level it will begin to fall at the rate set by the decay parameters to the level set by the sustain control. The envelope will remain at the sustain level as long as the key is held down. Whenever a key is released, it will return to zero at the rate set by the release parameters.

ADTV (Advanced Definition Television) – A term sometimes used for both EDTV and HDTV.

Advanced Encoder – A device that changes RGB or DAV into NTSE using some form or forms of pre-filtering to reduce or eliminate NTSC artifacts. Some advanced encoders also offer image enhancement, gamma correction, and the like.

Advanced Television Systems Committee (ATSC) – The US-based organization that is defining the high definition television standard for the United States. A sort of NTSE for ATV. It is comprised of three technology groups and a number of smaller committees. T1 Group is studying receiver-compatible improved NTSC. T2 Group is studying non-receiver-compatible 525 scanning line production, distribution, and display systems. T3 Group is studying HDTV.

Advanced TV – Although sometimes used interchangeably, advanced and high-definition television (HDTV) are not one and the same. Advanced television (ATV) would distribute wide-screen television signals with resolution substantially better than current systems. It requires changes to current emission regulations, including transmission standards. In addition, ATV would offer at least two-channel, CD-quality audio.

AEA (American Electronics Association) – An organization of manufacturers more associated with computers and communications than is the EIA. The AEA has established an ATV Task Force, the members of which include: AT&T, Apple Computer, Hewlett-Packard, IBM, and Motorola.

AEC – See Acoustic Echo Cancellor.

AES (Audio Engineering Society) – The official association of technical personnel, scientists, engineers, and executives in the audio field. Of potential interest in electronic production are the following: SC-2, Subcommittee on Digital Audio; SC-3, Subcommittee on the Preservation and Restoration of Audio Recording; and SC4, Subcommittee on Acoustics.

AES/EBU – a) Informal name for a digital audio standard established jointly by the Audio Engineering Society and European Broadcasting Union organizations. **b)** The serial transmission format standardized for professional digital audio signals (AES3-1992 AES Recommended Practice for Digital Audio Engineering – Serial Transmission Format for Two-Channel Linearly Represented Digital Audio Data). **c)** A specification using time-division multiplex for data, and balanced line drivers to transmit two channels of digital audio data on a single twisted-pair cable using 3-pin (XLR) connectors. Peak-to-peak values are between 3 and 1-V with driver and cable impedance specified as 110 ohms.

AES/EBU Digital Audio – Specification titled “AES recommended practice for digital audio engineering – Serial transmission format for two channel linearity represented digital audio data.” AES/EBU digital audio standard that is the result of cooperation between the US based AES and the European based EBU.

AES3 – See AES/EBU Digital Audio.

AF – See Adaptation Field.

AFC – See Automatic Frequency Control.

AFC/Direct – See Waveform Monitors.

AFI – Authority and Format Identifier.

AFL (After Fade Listen) – Used in mixing boards to override the normal monitoring path in order to monitor a specific signal at a predefined point in the mixer. Unlike PFL, the AFL signal definition is taken after the fader of a channel or group buss such that the level of the fader will affect the level heard in the AFL monitor circuit. AFL is sometimes also taken after the pan pot which also allows the engineer to monitor the signal with the pan position as it is in the mix. AFL is a handy way to monitor a small group of related instruments by themselves with all of their eq, level, and pan information reproduced as it is in the overall mix. An AFL circuit that includes pan information is often called “solo” or “solo in place” depending upon who builds the mixer.

AFNOR (Association Francaise de Normalisation) – French standards body.

A-Frame Edit – A video edit which starts on the first frame of the 5 video frame (4 film frame) sequence created when 24-frame film is transferred to 30 frame. The A-frame is the only frame in the sequence where a film frame is completely reproduced on one complete video frame. Here is the full sequence. (The letters correspond to the film frames.) A-frame = video fields 1&2, B-frame = video fields 1&2&1, C-frame = video fields 2&1, D-frame = video fields 2&1&2.

Aftertouch – MIDI data sent when pressure is applied to a keyboard after the key has been struck, and while it is being held down or sustained. Aftertouch is often routed to control vibrato, volume, and other parameters. There are two types: the most common is Channel Aftertouch which looks at the keys being held, and transmits only the highest aftertouch value among them. Less common is Polyphonic Aftertouch, which allows each key being held to transmit a separate, independent aftertouch value. While polyphonic aftertouch can be extremely expressive, it can also be difficult for the unskilled to control, and can result in the transmission of a great deal of unnecessary MIDI data, eating bandwidth and slowing MIDI response time.

AFV – See Audio Follow Video.

AGC – See Automatic Gain Control.

AI – Amplitude Imbalance.

AIFF – See Audio Interchange File Format.

Air Tally – The ability of a switcher console to indicate to an operator which video sources and keys are on-air at any given time. Ampex switchers have “true” air tally in that they sense actual presence of sources.

ALC – See Automatic Level Control.

Algorithm – a) A set of rules or processes for solving a problem in a finite number of steps. In audio, video, and data coding, the step-by-step procedure (often including repetition) which provides suitable compression and/or encryption for the specific application. When used for compression, this mathematical process results in a significant reduction in the number

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of bits required for transmission and may be either lossless or lossy.

b) Step-by-step procedure for the solution to a problem. First the problem is stated and then an algorithm is devised for its solution.

Alias, Aliasing – Something other than what it appears to be. Stairsteps on what should be a smooth diagonal line are an example of spatial alias. Wagon wheels appearing to move backwards are an example of temporal alias. Aliases are caused by sampling and can be reduced or eliminated by pre-filtering, which can appear to be a blurring effect. Defects in the picture typically caused by insufficient sampling (violation of the Nyquist sampling rate) in the analog-to-digital conversion process or poor filtering of digital video. Defects are typically seen as jaggies on diagonal lines and twinkling or brightening in picture detail. Examples are: Temporal Aliasing – such as rotating wagon wheel spokes appearing to rotate in the reverse direction. Raster Scan Aliasing – such as sparkling or pulsing effects in sharp horizontal lines. Stair-Stepping – stepped or jagged edges in diagonal lines or the diagonal parts of a letter.

Alignment – Most commonly, Head Alignment, but also used to describe the process of adjusting a recorder's Bias and Equalization for optimum results from a specific tape.

Alpha – See Alpha Channel and Alpha Mix.

Alpha Channel – The alpha channel is used to specify an alpha value for each color pixel. The alpha value is used to control the blending, on a pixel-by-pixel basis, of two images. Alpha typically has a normalized value of 0 to 1. In a computer environment, the alpha values can be stored in additional bit planes of frame-buffer memory. When you hear about 32-bit frame buffers, what this really means is that there are 24 bits of color, 8 each for red, green, and blue, along with an 8-bit alpha channel. Also see Alpha Mix.

$\text{new pixel} = (\text{alpha}(\text{pixel A color}) + 1 - \text{alpha}(\text{pixel B color}))$

Alpha Mix – A way of combining two images. How the mixing is performed is provided by the alpha channel. The little box that appears over the left-hand shoulder of a news anchor is put there by an alpha mixer. Wherever the pixels of the little box appear in the frame buffer, an alpha number of "1" is put in the alpha channel. Wherever they don't appear, an alpha number of "0" is placed. When the alpha mixer sees a "1" coming from the alpha channel, it displays the little box. Whenever it sees a "0," it displays the news anchor. Of course, it doesn't matter if a "1" or a "0" is used, but you get the point.

Alphanumeric – Set of all alphabetic and numeric characters.

ALU – See Arithmetic and Logic Unit.

AM – A form of modulation where the level of the baseband information affects the level of the carrier. See Amplitude Modulation.

A-MAC – A MAC (Multiplexed Analog Component) with audio and data frequency multiplexed before modulation. See also MAC.

Ambient Lighting – Light that emanates from no particular source, coming from all directions with equal intensity.

Ambient Sound – A representative sample of background audio (such as a refrigerator hum or crowd murmur) particular to a shooting location. Ambient sound is gathered in the course of a production to aid the sound

editor in making cuts or filling in spaces between dialog. Also called Room Tone.

American Television and Communications – See ATC.

A-Mode Edit – An editing method where the footage is assembled in the final scene order. Scene 1, scene 2, etc.

Amplitude – The height of a waveform above or below the zero line.

Amplitude Modulation – a) The process used for some radio (AM broadcast, in North American audio service broadcast over 535 kHz-1705 kHz) 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. **b)** The process by which the amplitude of a high-frequency carrier is varied in proportion to the signal of interest. In the PAL television system, AM is used to encode the color information and to transmit the picture. Several different forms of AM are differentiated by various methods of sideband filtering and carrier suppression. Double sideband suppressed carrier is used to encode the PAL color information, while the signal is transmitted with a large-carrier vestigial sideband scheme.

Amplitude Non-Uniformity – A term used in connection with magnetic tape testing and refers to the reproduced peak-to-peak voltage and its variation from what was recorded.

Amplitude Versus Frequency Response – Refer to the Frequency Response discussion.

AM-VSB (Amplitude Modulation with Vestigial Sideband) – The form of modulation used in broadcast and cable television transmission. It is more efficient than dual-sideband amplitude modulation and is easier to implement than single-sideband amplitude modulation.

Analog – a) A continuous electrical signal that carries information in the form of variable physical values, such as amplitude or frequency modulation. **b)** A signal which moves through a continuous range of settings or levels. **c)** An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing the binary digits 0 and 1. **d)** A signal that is an analogy of a physical process and is continuously variable, rather than discrete. See also Digitization.

Analog Components – Video signals in which a continuously variable voltage or current (rather than a set of digital numbers) represents a pixel.

Analog Interface – An interface between a display controller and a display in which pixel colors are determined by the voltage levels on three output lines (RGB). Theoretically, an unlimited number of colors can be supported by this method (24 bits per pixel allows 16,777,216 colors). The voltage level on any line varies between zero volts (for black) to about 700 millivolts (for maximum brightness).

Analog Monitor – A video monitor which accepts analog signals. Several types of inputs are accepted by analog monitors: composite video, RGB & sync, Y/C, YUV and any combination of these formats. The signals transmit

ted to an analog monitor are usually between 0 and 1 V and use 75-ohm coaxial cables.

Analog Recording – The common form of magnetic recording where the recorded waveform signal maintains the shape of the original waveform signal.

Anamorphic Squeeze – A change in picture geometry to compress one direction (usually horizontal) more than the other. Anamorphic squeeze lenses made CinemaScope possible. Occasionally, when widescreen movies are transferred to video, an anamorphic squeeze will be used (usually only in credits) to allow the smaller aspect ratio of television to accommodate the larger movie aspect ratio. Some ATV proponents have suggested a gentle anamorphic squeeze as a technique to assist in aspect ratio accommodation.

Anamorphic Video – Found on a large number of DVDs, anamorphic video squeezes a 1.78:1 picture shape into a 1.33:1 image area. If you view an anamorphic video image on a 1.33 set, the characters will look tall and thin. This format is designed for the 1.78 aspect ratio TV sets where the horizontal is stretched back out to the full width of the set. Unsqueezing an anamorphic image on a 1.33 set is accomplished by squeezing the vertical size. The advantage of the anamorphic video system is 33% more vertical information in a widescreen picture.

Anchor Frame – A video frame that is used for prediction. I-frames and P-frames are generally used as anchor frames, but B-frames are never anchor frames.

Anchor Point – A bit-stream location that serves as a random access point. MPEG I-frames are the most common anchor points.

Anchorage – For recording tape, the degree to which the magnetic tape oxide coating adheres to the base film.

Anechoic – Literally, without echoes. Anechoic refers to the absence of audio reflections. The closest thing to this situation in nature is the great outdoors, but even here there are reflections from the ground, various objects, etc. It is almost impossible to create a truly anechoic environment, as there is no such thing as a perfect sound absorber. At high frequencies, it is possible to create near-anechoic conditions, but the lower the frequency, the harder that is.

Anechoic Chamber – A room which has totally sound absorbent walls, so that no reflected waves can exist and only the direct waves are heard.

Anhysteresis – The process whereby a material is magnetized by applying a unidirectional field upon which is superimposed an alternating field of gradually decreasing amplitude. One form of this process is analogous to the recoding process using AC Bias.

Animation – Animation is the process of fooling the human eye into perceiving a moving object by presenting the eye with a rapid succession of still pictures. Each still is called a frame. On the Cubicomp, animation consists of moving objects which, in themselves, stay unchanged.

Animation Path – The motion of an object as it flies through space is called its animation or motion path.

Anisotropy – Directional dependence of magnetic properties, leading to the existence of easy or preferred directions of magnetization. Anisotropy of a particle may be related to its shape, to its crystalline structure, or to the

existence of strains within it. Shape anisotropy is the dominant form in acicular particles.

ANRS, Super ANRS – A noise-reduction system used by JVC. ANRS operates on principles similar to those used by the Dolby system. Therefore, there is a degree of compatibility between recordings made with either system.

ANSI (American National Standards Institute) – ANSI is a voluntary and privately funded business standards group in the USA. ANSI seeks to promote and to facilitate consensus standards nationally, and is internationally engaged as the sole US member of the ISO. The members of ANSI consist of about 1,300 American and international companies, 30 government agencies and some 250 organizations of trade, labor, professionals, consumers, etc.

ANSI 4.40 – See AES/EBU Digital Audio.

Anti-Alias Filter – A filter (typically a lowpass filter) used to bandwidth-limit the signal to less than half the sampling rate before sampling.

Anti-Aliased Fonts – Computer-generated fonts that have been digitally rounded for smooth edges.

Anti-Aliasing – The process of reducing aliasing effects. Aliasing occurs because a raster system is “discrete,” i.e., made up of pixels that have finite size. Representing a line with black and white pixels results in “jaggies,” or “aliases.” These are particularly disturbing during animation. To correct them, “anti-aliasing” techniques are used. These tech

AM-VSB (Amplitude Modulation with Vestigial Sideband) – The form of modulation used in broadcast and cable television transmission. It is more efficient than dual-sideband amplitude modulation and is easier to implement than single-sideband amplitude modulation.

AOE – Applications and Operational Environments.

A-Only Edit – Audio-Only Edit.

AP – See Active Picture.

Aperture – **a)** 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 that passes more light. **b)** As applied to ATV, the finite size and shape of the point of the electron beam in a camera or picture tube. As the beam does not come to an infinitesimal point, it affects the area around it, reducing resolution.

Aperture Correction – **a)** Signal processing that compensates for a loss of detail caused by the aperture. It is a form of image enhancement adding artificial sharpness and has been used for many years. **b)** Electrical compensation for the distortion introduced by the (limiting) size of a scanning aperture. **c)** The properties of the camera lens, optical beam-splitting installation, and camera tube all contribute to a reduced signal at higher spatial frequencies generally falling off as an approximate $(\sin x)/X$ function. Additionally, it is obvious in a scanning system that the frequency response falls off as the effective wavelength of the detail to be resolved in the image approaches the dimension of the scanning aperture and becomes zero when the effective wavelength equals the dimension of the scanning aperture. Aperture correction normally introduced in all video cameras restores the depth of modulation to the waveform at higher fre-

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quencies with the objective of flat response to 400 TV lines (in NTSC) for a subjective improvement in image quality.

Aperture Delay – In ADCs, aperture delay is the time from an edge of the input clock of the ADC until the time the part actually takes the sample. The smaller this number, the better.

Aperture Jitter – The uncertainty in the aperture delay. This means the aperture delay time changes a little bit over time, and that little bit of change is the aperture jitter.

Aperture, Camera – The available maximum dimensions of the optical image on the active surface of the photo-sensor, within which good quality image information is being recorded. The camera aperture determines the maximum usable scene information captured and introduced into the system, and available for subsequent processing and display. These dimensions are usually defined by standards. (Note: Not to be confused with lens aperture, which defines the luminous flux transmission of the optical path.)

Aperture, Clean – The concept of a clean aperture in a digital system defines an inner picture area (within the production aperture) within which the picture information is subjectively uncontaminated by all edge transient distortions (SMPTE 260M). Filtrations for bandwidth limitation, multiple digital blanking, cascaded spatial filtering, etc., introduce transient disturbances at the picture boundaries, both horizontally and vertically. It is not possible to impose any bounds on the number of cascaded digital processes that might be encountered in the practical post-production system. Hence, the clean aperture is defined to represent an acceptable (and practical) worst-case level of production.

Aperture, Display – The available maximum dimensions (mapped back into the camera aperture) for the system's ability to display good quality image information. The information available for display is usually cropped from the total captured by the cascade of tolerances that may be incorporated in the system, and also by intentional design features that may be introduced in the display.

Aperture, Production – A production aperture for a studio digital device defines an active picture area produced by signal sources such as cameras, telecines, digital video tape recorders, and computer-generated pictures. It is recommended that all of this video information be carefully produced, stored, and properly processed by subsequent digital equipment. In particular, digital blanking in all studio equipment should rigorously conform to this specified production aperture (SMPTE 260M). The width of the analog active horizontal line is measured at the 50% points of the analog video signal. However, the analog blanking may differ from equipment to equipment, and the digital blanking may not always coincide with the analog blanking.

Aperture, Safe Action – As defined by a test pattern, a safe action aperture indicates the safe action image area within which all significant action must take place, and the safe title image area, within which the most important information must be confined, to ensure visibility of the information on the majority of home television receivers. SMPTE RP 27.3 defines these areas for 35 mm and 16 mm film and for 2x2-inch slides.

API (Application Program Interface) – **a)** The software used within an application program to activate various functions and services performed by the operating system. **b)** The Windows operating system refers to API

functions as those which open and close windows, interpret mouse movement, read the keyboard, etc. These control-type functions are called "hooks" to the operating system.

APL (Average Picture Level) – The average signal level (with respect to blanking) during active picture time, expressed as a percentage of the difference between the blanking and reference white levels.

Application – An application runs in a module, communicating with the host, and provides facilities to the user over and above those provided directly by the host. An application may process the transport stream.

Application Window – The workspace (window) available to an application. The size can be adjusted by the user and limited only by the size of the monitor's display.

APS (Advanced Photo System) – A new photographic system conceived by Kodak and developed jointly with Canon, Fuji, Minolta, and Nikon. The APS was launched in April 1996. APS also represents the file format used to store data on the new film's magnetic coating.

Apt-X100 – The apt-X100 is a proprietary audio compression algorithm from APT, Ltd., which features an adaptive differential PCM (ADPCM) algorithm in four sub-bands. The algorithm provides a fixed 4:1 compression with low delay and bandwidths ranging from 7.5 kHz to 22.5 kHz and output bit rates from 64 to 384 kbit/s, depending on the sampling rate.

APU (Audio Presentation Unit 13818-1) – A 13818-1 audio frame.

Architecture – Logical structure of a computer system.

Archive – **a)** Off-line storage of video/audio onto backup tapes, floppy disks, optical disks, etc. **b)** A collection of several files bundled into one file by a program (such as ar, tar, bar, or cpio) for shipment or archiving. This method is very reliable and can contain large amounts of data.

Arithmetic and Logic Unit (ALU) – One of three essential components of a microprocessor. The other two are the registers and the control block. The ALU performs various forms of addition, subtraction, and logic operations, such as ANDing the contents of two registers or masking the contents of a register.

Arithmetic Coding – Perhaps the major drawback to each of the Huffman encoding techniques is their poor performance when processing texts where one symbol has a probability of occurrence approaching unity. Although the entropy associated with such symbols is extremely low, each symbol must still be encoded as a discrete value. Arithmetic coding removes this restriction by representing messages as intervals of the real numbers between 0 and 1. Initially, the range of values for coding a text is the entire interval (0, 1). As encoding proceeds, this range narrows while the number of bits required to represent it expands. Frequently occurring characters reduce the range less than characters occurring infrequently, and thus add fewer bits to the length of an encoded message.

ARP – Address Resolution Protocol.

ARS – See Automatic Route Selection.

Artifacts – **a)** Artifacts can range from noise and snow, to spots. Anything that is visually wrong with the picture is an artifact. Artifacts however do not include picture errors caused by improperly adjusted displays. Artifacts are visual errors caused by the signal being sent to the display. **b)** A defect

or distortion of the image, introduced along the sequence from origination and image capture to final display. Artifacts may arise from the overload of channel capacity by excess signal bandwidth. Artifacts may also result from: sampling effects in temporal, spatial, or frequency domains; processing by the transfer functions; compromises any inadequacies in the system employed; cascading of minor defects; basically any other departure of the total system from "complete transparency." **c)** Visible (or audible) consequences of various television processes. Artifacts are usually referred to only when they are considered defects. Artifact elimination is often more apparent than quality increases such as resolution enhancement.

d) Interference or other unwanted "noise" in video such as flickering, changes in color, and macroblocking. Some artifacts, such as macroblocking, can be remedied in video compression and some cannot. The quality of the finished product is, in large part, no better than the source material. See also Filter Artifacts, Impairments, and NTSC Artifacts.

ASCII (American Standard Code for Information Interchange) –

a) Character code used for representing information as binary data in most computer systems. **b)** A standard code for transmitting data, consisting of 128 letters, numerals, symbols, and special codes, each of which is represented by a unique binary number.

ASI – Asynchronous Serial Interface.

ASIC (Application Specific Integrated Circuit) – An integrated circuit designed for special, rather than general, applications.

ASN.1 – Abstract Syntax Notation 1.

ASPEC (Adaptive Spectral Perceptual Entrophy Coding) – An algorithm developed by Fraunhofer Institut, AT&T, Thomas Brandt, and the CNET. The ASPEC algorithm was later used for developing the MPEG audio Layer 3 specification.

Aspect Ratio – The ratio of the width of the picture to the height. For most current TVs, this ratio is 4:3. For HDTV, the ratio will be 16:9. The aspect ratio, along with the number of vertical scan lines that make up the image, determines what sample rate should be used to digitize the video signal.

:1	:9	Description
1.0	9	Square photographic formats, including Instamatic 126
1.33	12	Existing television, old movies, Pocket Instamatic 110
1.44	13	IMAX film
1.5	13.5	35mm still photographs, proposed for theatrical release
1.61	14.5	Faroudja HDTV proposal
1.67	15	Original NHK proposal, theatrical projection outside the U.S.
1.78	16	ATSC/SMPTE HDEP standard, optimized for shoot and protect
1.85	17	Theatrical projection in the U.S.
2.0	18	Most forms of VistaVision
2.2	20	Some widescreen movie formats
2.35	21	CinemaScope and similar movie formats
2.6	23	Cinerama
2.7	24	Dimension-150, Ultra-Panavision
2.77	25	Dynavision widescreen 3D film format
4.0	36	Polyvision

Aspect Ratio Accommodation – Techniques by means of which something shot in one aspect ratio can be presented in another. The five currently used or proposed techniques are compared in the following table. It is also possible to combine techniques. Current ATV aspect ratio debates concentrate on the problems of presenting widescreen images to existing TV sets; the same problems (in an opposite direction) will occur when current aspect ratio images are presented on widescreen TV sets. In movie theaters, these problems are usually solved with movable drapes.

	Blanking Adjust	Pan and Truncation	Anamorphic Scan	Shoot and Squeeze	Protect
Maintain Director's Intent	Y	N	N	N	Y
Uses Full Screen (No Burn)	N	Y	Y	Y	Y
Displays All Action	Y	N	N	Y	Y
Maintains Picture Geometry	Y	Y	Y	N	Y
Automatic Conversion Possible	Y	Y	N	Y	Y
Full Production Freedom	Y	Y	Y	Y	N

Asperities – Small projecting imperfections on the surface of the tape coating that limit and cause variations in head-to-tape contact.

Assembled Edit – Electronic edit that replaces all previously recorded material with new audio and video and a new control track, starting at the

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edit point. Inserting a new control track allows for a constant speed reference throughout the entire tape.

Assembler Program – Translates assembly language statements (mnemonics) into machine language.

Assembly Language – Machine-oriented language. A program is normally written as a series of statements using mnemonic symbols that suggest the definition of the instruction. It is then translated into machine language by an assembler program.

ASVP – Application-Specific Virtual Prototype.

Asymmetric Compression – Compression in which the encoding and decoding require different processing power (the encoding is normally more demanding).

Asymmetrical Digital Subscriber Line – Bellcore's term for one-way T-1 to the home over the plain old, single twisted pair wiring already going to homes. ADSL is designed to carry video to the home. ADSL, like ISDN, uses adaptive digital filtering, which is a way of adjusting itself to overcome noise and other problems on the line. According to Northern Telecom, initial ADSL field trials and business cases have focused on ADSL's potential for video-on-demand service, in competition with cable pay-per-view and neighborhood video rental stores. But ADSL offers a wide range of other applications, including education and health care. Once telephone companies are able to deliver megabits to the home, Northern Telecom expects an explosion in potential applications including work-at-home access to corporate LANs, interactive services such as home shopping and home banking and even multi-party video gaming, interactive travelogues, and remote medical diagnosis. Multimedia retrieval will also become possible, enabling the home user to browse through libraries of text, audio, and image data – or simply subscribe to CD-quality music services. In the field of education, ADSL could make it possible to provide a low-cost "scholar's workstation" – little more than a keyboard, mouse and screen – to every student, providing access to unlimited computer processing resources from their home. For a more modern version of ADSL, see DMT, which stands for Discrete Multi-Tone.

Asynchronous – **a)** A transmission procedure that is not synchronized by a clock. **b)** Any circuit or system that is not synchronized by a common clock signal.

Asynchronous Data Streaming – Streaming of data only without any timing requirements. See Asynchronous Data Streaming, Synchronous Data Streaming.

Asynchronous Transfer Mode (ATM) – **a)** A digital transmission system using packets of 53 bytes for transmission. ATM may be used for LANs and WANs. ATM is a switching/transmission technique where data is transmitted in small, 53-byte fixed sized cells (5-byte header, 48-byte payload). The cells lend themselves both to the time-division-multiplexing characteristics of the transmission media, and the packet switching characteristics desired of data networks. At each switching node, the ATM header identifies a virtual path or virtual circuit that the cell contains data for, enabling the switch to forward the cell to the correct next-hop trunk. The virtual path is set up through the involved switches when two endpoints wish to communicate. This type of switching can be implemented in hardware, almost essential when trunk speeds range from 45 Mb/s to 1 Gb/s. The ATM

Forum, a worldwide organization, aimed at promoting ATM within the industry and the end-user community was formed in October 1991 and currently includes more than 500 companies representing all sectors of the communications and computer industries, as well as a number of government agencies, research organizations, and users. **b)** A digital signal protocol for efficient transport of both constant-rate and bursty information in broadband digital networks.

AT&T – Consumer electronics manufacturer and long-distance telephone, television, and data carrier. Its Bell Labs has worked on the development of ATV systems.

ATC – Adaptive Transform Coding.

ATC (American Television and Communications) – Time Inc.'s CATV multiple-system operator (MSO), a co-proposer with HBO of C-HDTV and a supporter of ACTV.

ATEL – Advanced Television Evaluation Laboratory)

A-Time (Absolute Time) – Elapsed time, referenced to the program start (00:00:00), on a DVD. A-time is measured in minutes, seconds, and frames.

ATM – See Asynchronous Transfer Mode.

A-to-D Converter (ADC) – **a)** A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal. An ADC for digitizing video must be capable of sampling at 10 to 150 million samples per second (MSPS). **b)** Converts analog voltages and currents to the digital representation used by computer systems. This enables the computer to sense real-world signals.

ATRAC (Adaptive Transform Acoustic Coding) – An algorithm that splits an audio signal into three non-uniform sub-bands.

ATRP – Advanced Television Research Program.

ATSC – See Advanced Television Systems Committee.

Attack – In audio terms, the beginning of a sound. What type of attack a sound has is determined by how long it takes for the volume of the sound to go from silence to maximum level. It is critical to consider the attack time of sounds when applying processing Compression, gating, and other types of processors as they may destroy a sound's attack, changing the character and quality of the audio. Reverbs can also be affected by attack time; careful use of a reverb's predelay parameter will allow you to optimize the reverb for different types of attacks.

ATTC (Advanced Television Test Center) – Created by seven broadcasting organizations to test different broadcast ATV systems. See also Cable Labs.

ATT-C (AT&T Communications) – The Long distance arm of AT&T.

Attenuation – A decrease in the level of a signal is referred to as attenuation. In some cases, this is unintentional, as in the attenuation caused by using wire for signal transmission. Attenuators (circuits which attenuate a signal) may also be used to lower the level of a signal in an audio system to prevent overload and distortion.

ATV – See Advanced TV.

AU – See Access Unit.

Audio – a) Signals consisting of frequencies corresponding to a normally audible sound wave ranging between the frequencies of 20 Hz to 20 kHz.

b) A DC signal with varying amounts of ripple. It is sometimes possible to see the ripple on the DC signal to convey information of widely variable degrees of usefulness. **c)** The sound portion of a program.

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

Audio Breakaway (ABKW) – The ability to independently select audio sources regardless of which video source is selected, even though the audio is normally associated with a particular video (as opposed to follow).

Audio Coding Mode – In general, this is often used to show an audio coding method such as linear PCM, AC-3, or MPEG audio, etc., but in some contexts it refers to the channel constitution in AC-3 tracks and the speaker layout.

Audio Dub – Process which allows for the replacement of an audio signal on a previously recorded tape without disturbing the video signal.

Audio Editing – Portions of the audio material are combined and recorded onto the videotape. Examples include creating a sound track that includes signals such as background music, voice narration, or sound effects.

Audio Follow Video (AFV) – Audio selections made simultaneously upon selection of associated video sources (as opposed to audio breakaway).

Audio Graphic Conferencing – AGC.

Audio Levels – The level of the audio signal in either voltage or current. Audio levels are measured and indicated by mechanical VU-meters or electronic LED bar graph meters. It is important to maintain the proper audio level. If the audio level is too high when recording, overload of the input electronics and audio distortion will result. When audio levels are low, the signal-to-noise ratio is compromised.

Audio Matrix – That portion of the switcher electronics used to switch audio sources. Usually this matrix is controlled by AFV selections on the primary matrix, ABKW selections on an aux audio bus, or by an external editor or computer control.

Audio Mixer – A component that combines more than one sound input for composite output.

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.

Audio Modulation – A carrier is modified with audio information and is mixed with the video information for transmission.

Audio Modulation Decoders – Converts sound carrier elements of the video waveform into left and right audio channels for stereo monitoring.

Audio Modulation Monitors – Displays sound carrier elements of the video waveform.

Audio On ISDN – Through use of the MPEG audio specification, the ISDN (Integrated Services Digital Network) may be tuned into an audio transmis-

sion media. Data compression techniques like MPEG Layer II allow a tailored mix of cost and quality, and are now thought of implicitly when talking audio on ISDN.

Audio Signals – XLR connectors provide dual-channel audio signals. The left channel can be set to click as a means of easily distinguishing the left channel from the right channel in audio tests.

Audio Subcarrier – A specific frequency that is modulated with audio data before being mixed with the video data and transmitted.

Audio/Video Mixer – A single electronic component that consists of an audio mixer and a video mixer, switcher, or special effects generator. Also called an A/V Mixer.

Audio-Follow-Video – During video recording or editing, the video signal is usually accompanied by its associated audio signal. While editing video, it is sometimes necessary to separate the audio and video signals. Audio-follow-video mixers allow the audio to, or not to, follow the video when switching video signals.

Auditory Masking – Auditory masking is used in MPEG and Dolby Digital compression, and is coded based on the range of frequency that human ears can detect.

Augmentation Channel – A transmission channel carrying information that can augment that being transmitted in an ordinary transmission channel such that a special television set that can receive both channels can get a better picture than those available from the main channel alone. Some ATV schemes require the augmentation channel to be adjacent to the main channel. Others can theoretically accept a non-adjacent augmentation channel, though, at the time of this writing, the acceptability of non-adjacent channels has not been proven to everyone's satisfaction.

Authoring – The encoding of material from various sources, all the conversion processes of the encoded data, incorporating the required control structures and other signals for playback sequences in the DVD-video format. The final product of authoring is a DLT tape with DVD image files in DDP format.

Authoring Platform – Computer hardware and software used to create material for use on a multimedia system. The video quality of the authoring platform has to be high enough that the playback equipment is the limiting factor.

Auto Assembly – a) Process of assembling an edited videotape on a computerized editing system under the control of an edit decision list (EDL). A computer automatically conforms source footage into an edited video program under the direction of a list of preprogrammed edit instructions. **b)** An edit in which an off-line edit decision list is loaded into an on-line edit computer and all the edits are assembled automatically with little or no human intervention.

Automated Measurement Set – Device that automatically performs tests on audio and video signals and generates pass/fail results by testing the signals against predetermined parameters.

Automatic – In recorders, refers to either electrical or mechanical automatic bias switching devices.

Automatic Color Correction (ACC) – A circuit found in many consumer viewing devices that attempts to compensate for the "Never Twice the Same Color" broadcast problems. This circuit can go far beyond the Auto

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Tint function in that it changes color saturation as well as type of color. In most cases where ACC is present, it cannot be defeated. Adjusting the color and tint controls, using the SMPTE Color Bar pattern and the blue filter will result in a gross misadjustment of color level on the set. The color level may have to be reduced by as much as half the value calibrated with the SMPTE Color Bar pattern.

Automatic Focus – A feature on most consumer and industrial video cameras and camcorders that automatically makes minor focal length adjustments, thus freeing the videographer from focusing concerns.

Automatic Frequency Control (AFC) – Automatic frequency control. Commonly used to lock onto and track a desired frequency.

Automatic Gain Control (AGC) – **a)** Circuitry used to ensure that output signals are maintained at constant levels in the face of 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 that are switchable between automatic and manual control. **b)** Electronic circuitry that compensates for either audio or video input level changes by boosting or lowering incoming signals to match a preset level. Using AGC, changing input levels can output at a single constant setting. **c)** A feature on most video cameras and camcorders that, when engaged, boosts the signal to its optimum output level. Automatic gain control (AGC) is available for video, and less frequently audio use.

Automatic Iris – A feature on most video cameras and camcorders that automatically creates the lens aperture that allows the imaging device to perform under optimum conditions.

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

Automatic Picture Stop – The disc player will automatically take the program from the play mode to a still frame mode according to information programmed in the vertical interval of the disc's video.

Automatic Route Selection – An important part of an automatic least-cost routing system.

Automatic Shut-Off – A device (usually a mechanical switch) incorporated into most tape recorders that automatically stops the machine when the tape runs out or breaks.

Auto-Pan – A feature exclusive to AVC series switchers causing a positioned pattern to center itself as it grows in size.

Autotiming – Capability of some digital video equipment to automatically adjust input video timing to match a reference video input. Eliminates the need for manual timing adjustments.

Auto-Transition – **a)** The ability to electronically simulate a fader motion over an operator-specified duration. **b)** An automatic transition where the motion of the switcher lever arm is electronically simulated when the AUTO TRANS pushbutton is pressed. The duration of the transition in television frames or seconds is indicated by the rate display LED.

Auxiliary Bus – A bus which has the same video sources as the switcher but whose crosspoints may be remotely controlled, independently of the switcher console.

Auxiliary Channel (AUX) – In a video editing system, a channel reserved for connection to an external audio and/or video device.

AVI (Audio Video Interleaved) – The Video for Windows file format for digital video and audio. An AVI (.avi) file is a RIFF file format used with applications that capture, edit and playback audio/video sequences. AVI files contain multiple streams of different types of data. Most AVI sequences will use both audio and video data streams. Specialized AVI sequences might include control track as an additional data stream. See Video for Windows.

A-Vision – An ATV system proponent.

AWGN – Additive White Gaussian Noise.

Axis – An imaginary line through the video image used as a reference point for rotation and movement. The three axes are H (horizontal), Y (vertical), and A (depth).

Azimuth – The angle of a tape head's recoding gap relative to the tape.

Azimuth Alignment – Alignment of the recoding and reproducing gaps so that their center lines lie parallel with each other and at right angles to the direction of head/tape motion. Misalignment of the gaps causes a loss in output at short wavelengths. For example, using a track width of 50 mils, a misalignment of only 0.05 degrees will cause a 3 dB loss at a wavelength of 0.1 mil.

Azimuth Loss – High frequency losses caused by head misalignment.

▶ **B**

B Bus – The bottom row of the two rows of video source select buttons associated with a given mixed effect (M/E).

Baby Bell – A term commonly used for one of the seven regional holding companies established when AT&T divested itself of its local telephone companies. The Baby Bells are: American, Bell Atlantic, Bell South, Nynex, Pacific Telesis, Southwestern Bell, and US West.

Back Focus – A physical repositioning of the CCD, the camera element that translates light into electronic pulses for recording on videotape. The effect is to lengthen or shorten the distance between the lens and the CCD.

Back Haul – Long distance digital data transport service such as Sonet, SDH, or Telecos.

Back Hauler – Company that provides back haul services.

Back Light – A switch on some camcorders used to compensate exposure for situations where the brightest light is coming from behind the subject. This term is also used to refer to a light source that illuminates a subject from behind, used to separate the subject from the background and give them depth and dimension.

Back Porch – **a)** The portion of the video signal that lies between the trailing edge of the horizontal sync pulse and the start of the active picture time. Burst is located on the back porch. **b)** The back porch of a horizontal synchronizing pulse is that area from the uppermost tip of the positive-going right-hand edge of a sync pulse to the start of active video. The back porch of a color video sync pulse includes the 8 to 9 cycles of reference color burst. The back porch is at blanking level.

Back Porch Tilt – The slope of the back porch from its normal horizontal position. Positive or negative refer respectively to upward or downward tilt to the right.

Back Time – Calculation of a tape in-point by finding the out-point and subtracting the duration of the edit.

Back Up – To copy a certain set of files and directories from your hard disk to a tape or other non-volatile storage media.

Backcoating – A conductive additional coating used on the reverse side of magnetic tape to control mechanical handling and minimize static generation.

Background – May be thought of as the deepest layer of video in a given picture. This video source is generally selected on a bus row, and buses are frequently referred to as the background source.

Background Generator – A video generator that produces a solid-color output which can be adjusted for hue, chroma, and luminance using the controls in the MATTE/BKGD control group.

Background Transition – A transition between signals selected on the Preset Background and Program Background buses, or between an “A” bus and “B” bus on an M/E.

Background Video (BGD) – **a)** Video that forms a background scene into which a key may be inserted. Background video comes from the Preset

Background and/or Program Background bus or from an N/E “A” or “B” bus. **b)** A solid-color video output generated by the color Background generator within the switcher for use as background video.

Backhaul – In television, the circuits (usually satellite or telephone) used to transmit or “haul” a signal back from a remote site (such as a sports stadium) to a network headquarters, TV station, or other central location for processing before being distributed.

Backplane – The circuit board that other boards in a system plug into. Usually contains the system buses. Sometimes called a Motherboard.

Back-Timing – Timing of a program from the end to the beginning. A reversal of clock-order so that remaining time or time left to the end of the program can be easily seen.

Backup Tape – A tape that contains a copy of a set of files and directories that are on your hard disk. A full backup tape contains a copy of all files and directories, including IRIX, which are on your hard disk.

Backward Compatibility – A new coding standard is backward compatible with an existing coding standard if existing decoders (designed to operate with the existing coding standard) are able to continue to operate by decoding all or part of a bit stream produced according to the new coding standard.

Backward Motion Vector – A motion vector that is used for motion compensation from a reference picture at a later time in display order.

Baffles – Sound absorbing panels used to prevent sound waves from entering or leaving a certain space.

Balanced Line – A line using two conductors to carry the signal, neither of which is connected to ground.

Bandpass Filter – Circuit that passes a selected range of frequencies.

Bandwidth – The range of frequencies over which signal amplitude remains constant (within some limits) as it is passed through a system. More specific definitions include: **a)** The difference between the upper and lower limits of a frequency, often measured in megahertz (MHz). **b)** The complete range of frequencies over which a circuit or electronic system can function with less than a 3 dB signal loss. **c)** The information carrying capability of a particular television channel. **d)** A measure of information capacity in the frequency domain. The greater the bandwidth of a transmission channel, the more information it can carry. **e)** In television, bandwidth is usually expressed in MHz.

Bandwidth Efficient – Phrase sometimes used to describe techniques to carry the maximum amount of picture information within a prescribed bandwidth; also, name applied to one MIT ATV proposal that would transmit only the spatio-temporal resolution necessary for a particular scene. For example, it would transmit no more than 24 frames per second when showing a movie shot at that rate.

Bandwidth Limiting – A reduction in the effective bandwidth of a signal, usually to facilitate recording, transmission, broadcast, display, etc. The reduction is usually accomplished through the action of an algorithm,

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which may involve simple lowpass filtering, more complex processing such as interleaving or quadrature modulation, or complete resampling. The term bandwidth limiting is normally applied in analog systems, although it also has a comparable meaning in digital systems.

Bandwidth, Monitor – Monitor bandwidth is proportional to the speed at which a monitor must be turned on and off to illuminate each pixel in a complete frame and is proportional to the total number of pixels displayed. For example, a monitor with a resolution of 1000 X 1000 pixels which is refreshed at 60 times a second, requires a minimum theoretical bandwidth of over 45 MHz. Once overhead is considered for scanning and small spot size, the bandwidth could be as much as 100 MHz.

Barn Doors – Two- or four-leafed metal blinders mounted onto lights to control brightness or direction.

Base – See Radix.

Base Bandwidth – The amount of bandwidth required by an unmodulated signal, such as video or audio. In general, the higher the quality of the signal, the greater the base bandwidth it requires.

Base Film – For magnetic tapes, the plastic substrate that supports the coating. The base film of most precision magnetic tape is made of polyester.

Base Film Thickness – The thickness of the polyester material used for magnetic tape, varying from 0.24 mil in C120 cassette tape to 1.5 mil for audio mastering tape and instrumentation tape.

Baseband – **a)** Refers to the composite video signal as it exists before modulating the picture carrier. Not modulated. Composite video distributed throughout a studio and used for recording is at baseband. **b)** Video and audio signals are considered to be “prime,” or baseband. Video and audio can be broken down into more basic elements, but those elements no longer constitute the desired signal as a single element. Baseband video and audio signals are often AM or FM modulated onto a carrier frequency, so that more than one set of “prime” signals can be transmitted or recorded at the same time.

Baseline IRD – An IRD (Integrated Receiver Decoder) which provides the minimum functionality to decode transmitted bitstreams. It is not required to have the ability to decode Partial Transport Streams (TS) as may be received from a digital interface connected to a digital bitstream storage device such as a digital VCR.

Baseline Restorer – An information processing unit intended to remove the DC and low-order frequency distortion terms that result from use of record/reproduce transfer function which cannot pass DC in conjunction with a binary code that requires low-frequency response to DC (i.e., zero frequency) for accurate recovery of such a code.

Baseline Shift – A form of low-frequency distortion resulting in a shift in the DC level of the signal.

BASIC – An easy-to-learn, easy-to-use language, which is available on most microcomputer systems.

Basic Cable Service – Package of programming on cable systems eligible for regulation by local franchising authorities under 1992 Cable Act, including all local broadcast signals and PEG (public, educational, and government) access channels.

BAT (Bouquet Association Table) – a) The BAT provides information regarding bouquets (collections of services marketed as a single entity). **b)** Table describing a bouquet of programs offered by a broadcaster. DVB only.

Batch Capture – Combining your video capture card with deck control so that you can define your in and out points first, then capture only the footage you want.

Baud – A unit of signaling speed equal to the number of signal events per second. Baud is equivalent to bit per second in cases where each signal event represents exactly one bit. Often the term baud rate is used informally to mean baud, referring to the specified maximum rate of data transmission along an interconnection. Typically, the baud settings of two devices must match if the devices are to communicate with each other.

Baud Rate – a) The speed (calculated as bits per second) at which the computer sends information to a serial device, such as a modem or terminal. **b)** Measure of data flow: the number of signal elements per second. When each element carries one bit, the baud rate is numerically equal to bits per second (BPS). For example, teletypes transmit at 110 baud. Each character is 11 bits, and the TTY transmits 10 characters per second. **c)** The rate at which data is transmitted. The baud rates must match if two devices are to communicate with each other.

BB – See Baseband.

BBC – See British Broadcasting Corporation.

BC – Broadcast Channel.

BCD (Binary Coded Decimal) – A 4-bit representation of the 10 decimal digits “0” through “9.” Six of the sixteen possible codes are unused. Two BDC digits are usually packed into one byte.

BDR – See Border.

Bearding – An overloading condition in which highly saturated or white areas of a television picture appear to flow irregularly into darker areas.

Beats – Variation in the amplitude of a mixture of two signals of close frequency as a result of constructive and destructive interference.

Bel – A measure of voltage, current, or power gain. One bel is defined as a tenfold increase in power. If an amplifier increases a signal’s power by 10 times, its power gain is 1 bel or 10 decibels (dB). If power is increased by 100 times, the power gain is 2 bels or 20 decibels. 3 dB is considered a doubling.

Bell Labs – Originally Bell Telephone Laboratories, the research arm of the Bell System. When AT&T divested itself of its regional telephone companies, Bell Labs was split. One division, still called Bell Labs, belongs to AT&T and is a proponent of a particular ATV system (SLSC). The other division, called Bellcore for short, belongs to the Bell regional holding companies (RHCs) and is, among many other R&D projects, investigating mechanisms for reducing the bit rate of digital video transmission, which may be applicable to ATV. Bellcore has formed a joint venture with NHK for HDTV research.

Bellcore – See Bell Labs.

Benchmark – Method used to measure performance of a computer in a well-defined situation.

BEP – Bit Error Probability.

BER – See Bit Error Rate.

BETACAM® SP – A superior performance version of BETACAM, that uses metal particle tape and a wider bandwidth recording system. The interconnect standard is the same as BETACAM, and there is also limited tape interchangeability with standard BETACAM.

BETACAM® SX – A digital tape recording format developed by Sony which used a constrained version of MPEG-2 compression at the 4:2:2 profile, Main Level (422P@ML) using 1/2-inch tape cassettes.

BETACAM®, BETACAM® Format – A camera/recorder system and related equipment originally developed by Sony, the name may also be used for just the recorder or for the interconnect format. BETACAM uses a version of the (Y, R-Y, B-Y) component set.

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

Bezel – The frame that covers the edge of the picture tube in some TV sets and can therefore hide edge information transmitted in an ATV system (such as ACTV) not meant for the viewer to see. See also Overscanning.

Bézier Spline – A type of smooth curve or surface bound to its control points, always passing through its first and last control point.

B-Frame (Bidirectional Frame) – The frame in an MPEG sequence created by comparing the difference between the current frame and the frames before and after it.

BG (Also BKG and BKGND) – See Background.

BH Loop Tracer – See BH Meter.

BH Meter – A device for measuring the intrinsic hysteresis loop of a sample of magnetic material. Usually, the sample is magnetized in a 60 Hz field supplied by a solenoid and the intrinsic flux is detected by integrating the emf produced in an opposing pair of search coils, one of which surrounds the sample. The hysteresis loop may be displayed on an oscilloscope by feeding the X and Y plates with voltages proportional to the magnetizing coil current and the integrated search coil emf respectively.

Bi O-L – Bi-Phase Level (Code). Also called Manchester (Code).

Bias – A steady-state signal applied to the tape (usually by a high-frequency oscillation of 50 to 100,000 Hz or more) to minimize distortion and noise and increase frequency response and efficiency in recording. Every tape formulation has slightly different bias requirements.

Bias Adj. – The control which regulates the amount of bias mixed in with the signal to be recorded.

Bias Cal. – A control which calibrates the VU meter on a recorder so it reads 0 VU in the bias position of the output selector switch when bias is properly set.

Bias Switch – Switch used on a cassette recorder to change the amount of bias current required for different types of tapes.

Bidirectional – a) Indicates that signal flow may be in either direction. Common bidirectional buses are three-state or open collector TTL. **b)** In open reel or cassette recorders, the ability to play (and, in some cases,

record) both stereo track pairs on a tape by reversing the tape's direction of motion without removing and replacing the tape reels or cassette.

Bidirectional Prediction – A form of compression in which the codec uses information not only from frames that have already been decompressed, but also from frames yet to come. The codec looks in two directions: ahead as well as back. This helps avoid large spikes in data rate caused by scene changes or fast movement, improving image quality. Compare with Unidirectional Prediction.

Big Endian – A process which starts with the high-order byte and ends with the low-order byte. Motorola 68000 processors used the big endian format.

Bi-Level Keyer – A keyer where two levels of hole cutting are independently adjustable. The top level, or insert, cuts a hole and fills with the key video. In a luminance key, the second level forms the border of the key; in a chroma key, the second level forms the shadow. The second level has adjustable luminance allowing borders to be varied from black to white and shadows to be varied in density. This is the type of keying provided on all Ampex switchers.

BIM – Broadcast Interface Module.

Binary – A base-2 numbering system using the digits 0 and 1 (as opposed to 10 digits, 0-9 in the decimal system). In computer systems, the binary digits are represented by two different voltages or currents, one corresponding to 0 and the other corresponding to 1. All computer programs are executed in binary form. Binary representation requires a greater number of digits than the base-10 decimal system more commonly used. For example, the base-10 number 254 is 11111110 in binary. The result of a binary multiplication contains the sum of digits of the original numbers:

$$\begin{array}{l} \text{in binary:} \quad 10101111 \times 11010100 = 1001000011101100 \\ \text{in decimal:} \quad 175 \times 212 = 37,100 \end{array}$$

From right to left, the digits represent 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768. Each digit is known as a bit. This example multiplies two 8-bit numbers to produce a 16-bit result, a very common process in digital television equipment.

Binary File – An executable file that contains a relocatable machine code program; in other words, a program ready to be run.

Binary Search – Technique in which the search interval is divided by two at every iteration.

Binaural Effect – The human ability to localize the direction from which a sound comes due to the fact that people have two ears.

Binder – On recording tape, the binder is usually composed of organic resins used to bond the oxide particles to the base material. The actual composition of the binder is considered proprietary information by each magnetic tape manufacturer. The binder is required to be flexible and still maintain the ability to resist flaking or shedding binder material during extended-wear passes.

Bi-Phase Sync – Bi-phase is an older synchronization technology used in the film industry. Typically, the clock was derived from a box that hung off of large film mag recorders. This box emitted a pulse that provided sync. Working with pulses alone, bi-phase sync did not provide location information, making it a rather limited solution.

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B-ISDN (Broadband Integrated Services Digital Network) – A mechanism by means of which telephone companies will be able to carry television signals (and, probably ATV signals) digitally, probably via optical fibers. ISDN systems are considered broadband if they carry at least 45 Mbps, the DS3 rate, currently used for delivery of broadcast television signals. If and when B-ISDN reaches homes it will be a powerful competitor to other delivery mechanisms, potentially able to perform a computer-television function.

Bit (Binary Digit) – **a)** Contraction of binary digit. A single digit in a binary number. **b)** A binary representation of 1 or 0. One of the quantized levels of a pixel. **c)** An instruction in a data transmission, usually part of a word (byte) with high status = 1, and low status = 0.

Bit Bucket – Any device capable of storing digital data, whether it be video, audio, or other types of data.

Bit Budget – The total amount of bits available on the media being used. In DVD, the bit budget of a single sided/single layer DVD5 disk is actually 4.7 GB.

Bit Density – See Packing Density.

Bit Depth – The number of levels that a pixel might have, such as 256 with an 8-bit depth or 1024 with a 10-bit depth.

Bit Error – The incorrect interpretation of a binary bit by a message processing unit.

Bit Error Rate (BER) – **a)** This term is used in High Density Digital Recording (HDDR), or High Density Recording (HDR), or other such names and refers to the number of errors a specific magnetic tape may contain, and is expressed in errors per data bits, such as one in 10^6 or one error in one million data bits. **b)** The average probability of a digital recording system reproducing a bit in error. Note: IEEE 100 defines error rate as “the ratio of the number of characters of a message incorrectly received to the number of characters of the message received.” Bit error rates typical of current digital tape recording are: digital video tape, about 10^6 ; digital instrumentation tape, about 10^9 ; digital computer tape, about 10^{12} .

Bit Packing Density – The number of bits recorded per track length unit, usually expressed in terms of kilobits per inch (KBPI) or bits per millimeter (BPMM).

Bit Parallel – Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE125M, EBU 3267-E, and ITU-R BT.656 (CCIR 656).

Bit Plane – Video RAM containing formatted graphics data for VGA and SVGA systems where four or more bit planes can be addressed in parallel. A bit plane is sometimes called a map.

Bit Rate – **a)** The rate at which the compressed bit stream is delivered from the storage medium to the input of a decoder. The digital equivalent of bandwidth. **b)** The speed at which bits are transmitted, usually expressed in bit per second (IEEE 100). Video information, in a digitized image for example, is transferred, recorded, and reproduced through the production process at some rate (bits/s) appropriate to the nature and capabilities of the origination, the channel, and the receptor. **c)** The amount of data transported in a given amount of time, usually defined in Mega (million) bits per second (Mbps). Bit rate is one means used to define the

amount of compression used on a video signal. Uncompressed D1 has a bit rate of 270 Mbps. MPEG-1 has a bit rate of 1.2 Mbps.

Bit Rate Reduction – **a)** Schemes for compressing high bit rate signals into channels with much lower bit rates. **b)** A reduction in the real-time transmission rate in digital format, usually to facilitate recording, transmission, broadcast, display, etc., or even to comply with fixed limitations. Various algorithms appropriate for video signals may be employed from arbitrary resampling to more complex processing with the objective of reducing the transmission of redundant information in the image and possibly eliminating image content that will not be obvious in the final specified display. Bit rate reduction is also appropriate and employed in audio records, either associated with video or standing alone.

Bit Rate, Real-Time – When the information is obtained from a continuously varying source, and the information is being transmitted continuously without buffering, it is exchanged at the real-time bit rate. Within the production sequence, it is actually only the image capture (i.e., camera and its recording system) that is required to be in real-time. The balance of production, including post-production operations, can be at a fraction of real-time if a more desirable result is achieved. (Subsequent to production, the final display must, of course, also be in real-time.)

Bit Rate, Recording – The bit rate required of a recorder mated to a video camera or functioning in the origination, post-production, or distribution is generally greater than the concurrent bit rate, real-time because of the error correction designed into the recording format. This “overhead” may increase the bit rate, sometimes by as much as one-third, and frequently sets a practical limit in systems design. Examples in the following table are intended only to clarify the definition. They indicate the range of some systems currently considered and a first estimate of their challenges.

Probable Recording Rate, Mbits/s (1, 2)

Bits Per Pixel	Maximum Levels Defined	CCIR		CCIR	
		Rec 601-2 (3)	4:2:2	Rec 709 (3)	4:4:4
8 (3)	256	227 (4)	340	1290	1940
10	1024	284	426	1610	2420
12	4096	340	510	1940	2910

(1) All systems postulated employ field rates of 60 or 59.94 Mbits/s, component encoding and 2:1 interlace. Progressive scan systems at the same frame rates would have double these bit rates.

(2) Estimates for gross data recording rates assume the same ratio of overhead to data bits in component format recording as that in the D-1 standard.

(3) CCIR Recommendations 601-2 and 709 document 8-bit and 10-bit sampling, based upon sampling frequencies that are integral multiples of 2.25 MHz (i.e., 13.5 MHz for Rec 601-2).

(4) The D-1 standard recording format is defined by SMPTE 224M and its related SMPTE Recommended Practices and Engineering Guidelines.

Bit Serial – Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fiber optics. This standard is covered under ITU-R BT.656 (CCIR 656).

Bit Slip – The condition in a message processing unit where the bit-rate clock has gained (or lost) more than 180 degrees phasing with respect to synchronism with the binary message bits.

Bit Slippage – a) Occurs when word framing is lost in a serial signal so that the relative value of a bit is incorrect. This is generally reset at the next serial signal, TRS-ID for composite and EAV/SAV for component.

b) The erroneous reading of a serial bit stream when the recovered clock phase drifts enough to miss a bit. **c)** A phenomenon which occurs in parallel digital data buses when one or more bits gets out of time in relation to the rest. The result is erroneous data. Differing cable lengths is the most common cause.

Bit Stream (also Bitstream) – a) A continuous series of bits transmitted on a line. **b)** A binary signal without regard to grouping according to character.

Bit Synchronizer – An information processing unit intended to extract the binary message and associated bit-rate clock included in a PCM signal.

BitBLT (Bit Block Transfer) – The transfer of blocks of screen data (rather than a byte at a time) from one place to another in memory. The microprocessor tells the graphic chip what block to move and where to put it. The graphics chip carries out this operation, freeing the microprocessor to work on the next operation.

BITC – See Burn In Time Code.

Bitmap – a) A bitmap is the digital representation of an image in terms of pixel values. Storing an image as a bitmap is the most space-consuming method of storing an image. **b)** An image consisting of an array of pixels that can be displayed on a computer monitor.

Bits Per Pixel – The number of bits used to represent the color information of a pixel.

Bits/s – Bits Per Second.

Bit-Slice – Method that implements n-bits of the CPU on each of several chips, or slices, usually $n = 4$. A bit-slice processor chip implements a complete data path across the CPU. A 32-bit processor could be constructed by using eight 4-bit CPU slices.

Black (BLK) – A black video output generated within the switcher and selected by the Black push-buttons on the crosspoint buses and by the Fade to Black push-button in the downstream mixer.

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 ensure there is no video already on the tape.

Black And White – Monochrome or luminance information. Monochrome means one color. In the color television system, the black and white portion of the picture has to be one “color” gray, D6500, 6500° K as defined by x and y values in the 1939 CIE color coordinate system. The black and white signal in the S or Component video path is separate from the color information.

Black Box – A term used to describe a piece of equipment dedicated to one specific function, usually involving a form of digital video magic.

Black Burst – Also called “color black,” “house sync,” or “house black.” Black burst is a composite video signal consisting of all horizontal and vertical synchronization information, burst, and usually setup. Typically used as the house reference synchronization signal in television facilities.

Black Compression – a) The reduction in gain applied to a picture signal at those levels corresponding to dark areas in a picture with respect to the gain at that level corresponding to the midrange light value in the picture.

b) Amplitude compression of the signals corresponding to the black regions of the picture, thus modifying the tonal gradient.

Black Level – a) This voltage defines the picture’s black level. Video that dips below this level such as sync pulses are called blacker than black.

b) Strictly interpreted, denotes the light level at which a video signal representing picture black is reproduced on your TV screen. In terms of light output from a TV set, black areas of the picture should be represented by an absence of light. Something that is black or below black in the video signal shouldn’t produce any light from the display. **c)** Some TV sets actually use Black Level as a control name. It is a far better description of the function than the most commonly found name for it, Brightness.

Black Level Setup – Refer to the Setup discussion.

Black Level, Monitor – The luminance produced on the monitor display by a signal at reference black level. Since the monitor brightness control should be adjusted to align CRT beam cutoff with reference black level signal, this provides zero excitation light from the CRT (only room ambient light reflected from the CRT faceplate). Monitor black level is normally set by use of a PLUGE signal to adjust CRT beam cutoff subjectively.

Black Level, Reference – The video signal level which is intended to produce monitor black level in the reproduced image. In systems with a setup level, i.e., the 7.5 IRE setup in a 525/59.94/2:1/NTSC composite video documented by ANSI/EIA TIA 250-C and SMPTE 170M, reference black is at the setup level. In systems with no setup level, reference black is at blanking level.

Black Peak – The maximum excursion of the picture signal black direction at the time of observation.

Black, Absolute – a) Optical black is no light. An absolute black can only be produced in a scene via a light-trap, “a black hole.” **b)** A capped lens on the camera is the equivalent of an absolute scene black and should produce reference black level video signal from a properly adjusted studio camera.

Black, Projection – The luminance level in a projected image that is correlated with subjective scene black has two sources: in photographic and other light-modulating systems there will be luminance from whatever transmitted light passes through the maximum modulating density representing scene black, additional luminance may be produced by nominating light (flare, room illumination, stray light, etc.).

Black, Subjective, Monitor – The luminance level which produces the perception of black on the monitor display. This subject has not been explored extensively, but Bartleson and Novick present evidence that it is relative to the high-light or white level, such that the luminance ratio to produce subjective black on a monitor is higher than that in a televised scene. They propose a luminance ratio of 100:1 for subjective white to

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black on TV monitors in a control room “dimly lighted.” This luminance ratio specification has been formalized in SMPTE RP 166.

Black, Subjective, Scene – That fraction of the high-light luminance required in a scene reproduced on a television display to convey the perception of black. The luminance of subjective black on a CRT has been studied by Lowry and Jarvis, who measured luminances on the original scenes, and compared the subjective appearance on a CRT display, as evaluated by viewing audiences. They found that the perception of black depends on a great many factors both in the reproduced scene and in the viewing conditions such as average scene reflection, luminance of areas adjacent to the display, etc. In most situation, luminance levels of 1/40 to 1/60 of the highlight luminance produce the perception of black even though the scene luminance range may reach 200:1 or more. It follows, then, that a scene element that is perceived as black may not necessarily be at reference-black level in a video signal.

Blacker-than-Black – The amplitude region of the composite video signal below reference-black level in the direction of the synchronizing pulses.

Blanking – A video signal level below which no light should be emitted from a TV screen (the level at which the screen is blanked); also, that portion of the time that a video signal is transmitted when it is at or below blanking. These time portions can be divided into a horizontal blanking interval (HBI) and a vertical blanking interval (VBI). Since no picture information is carried in either blanking interval in an NTSC signal, various ATV schemes propose using them for carrying augmentation information, such as higher quality sound or widescreen panel information. Potentially conflicting with those schemes are other schemes that already use the blanking intervals for descrambling codes, test transmission, time code, and test and reference signals. Reducing the duration of the blanking intervals to allow more picture information to be transmitted potentially conflicts with the demands of the scanning circuitry of older TV sets. Sometimes this conflict is said to be resolved by bezel coverage and overscanning.

Blanking (Picture) – The portion of the composite video signal whose instantaneous amplitude makes the vertical and horizontal retrace invisible.

Blanking Adjustment – A technique proposed in some ATV schemes to increase the VBI (and, sometimes, decrease the HBI) to deal with wide aspect ratios. See also Burn.

Blanking Interval – The horizontal blanking interval is the time between the end of one horizontal 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.

Blanking Level – **a)** Refers to the 0 IRE level which exists before and after horizontal sync and during the vertical interval. This voltage level allows the electron beam to be turned off while it is being repositioned (retracing) across the face of the CRT into the position needed to start tracing the next visible line. **b)** The level of the front and back porches of the composite video signal. **c)** The level of a composite picture signal which separates the range containing picture information from the range

containing synchronizing information. Note: This term should be used for controls performing this function (IEEE 100).

Blanking Panel – A piece of black plastic attached to the front plastic panel of the Indigo chassis that covers either the top or middle drive slot. The blanking panel is removed after installing a drive in the slot that it was covering.

Blanking Processor (Sync Proc) – A circuit on the video module which strips blanking sync and burst from the program output of the switcher and replaces it with blanking and sync from a reference source. This process ensures that sync and blanking do not contain any unwanted timing shifts, and the record VPR is always receiving constant relationships of sync, blanking, and burst.

Blanking Stuffing – An ATV technique that adds information to blanking areas that is supposed to be invisible to ordinary sets but can be used by an ATV set for increased resolution and/or widescreen panels.

Blast Filter – A dense mesh screen on a microphone, which minimizes overload caused by loud, close sounds.

Bleeding Whites – An overloading condition in which white areas appear to flow irregularly into black areas.

Blink – A modification to a key to cause it to flash on and off. The speed at which a key blinks.

Blitting – The process of using BitBLT to copy video data such as a bitmap from one area in memory to another.

Block – An 8-row by 8-column matrix of pels, or 64 DCT coefficients (source, quantized or dequantized). A block is the entity on which the DCT operates. Please note, that the term “block” is used for both the actual picture information, and the corresponding DCT coefficients. A block represents luminance or chrominance information.

Block Matching – A method of motion estimation. A search for the picture area that best matches a specific macro block of preceding and/or subsequent pictures.

Blockiness – An artifact that refers to the tile-like appearance of a compressed image where the 8x8 blocks have become visible due to a (too) hard compression.

Blocking – **a)** Occurs in a multistage routing system when a destination requests a source and finds that source unavailable. In a tie line system, this means that a destination requests a tie line and receives a tie line busy message, indicating that all tie lines are in use. **b)** Distortion of the received image characterized by the appearance of an underlying block encoding structure.

Blooming – This effect is sometimes called whiter-than-white. Blooming occurs when the white voltage level is exceeded and screen objects become fuzzy and large.

BLT (Block Transfer) – The process of moving blocks of data from one place to another rather than a byte at a time in order to save processor time and to expedite screen display in operations such as vertical rolling of video.

Blue Aging – A tendency for blue phosphors to age more rapidly than red or green. See also Phosphor Aging.

Blur – A state of reduced resolution. Blur can be a picture defect, as when a photograph is indistinct because it was shot out of focus or the camera was moved during exposure. Blur can also be a picture improvement, as when an unnaturally jagged-edged diagonal line or jerky motion is blurred to smoothness.

Blurring/Smearing – In a single frame (spatial example), reducing the number of pixels per horizontal line, causes a blurring or smearing effect. In multiple frames (temporal example), the causes become more complicated. They may include reduction of bandwidth, degree of image movement, algorithm type, and motion prediction/compensation techniques.

B-MAC – A MAC (Multiplexed Analog Component) with audio and data time multiplexed before modulation, which forms the basis for the HDB-MAC ATV scheme, currently used for satellite transmission and scrambling in the United States. See also MAC.

BMP – A bitmapped graphic file format for Windows which stores images as a grid of dots or pixels. The BMP file defines the size of the image, the number of color planes, and the palette used.

BNC – A cable connector used extensively in television and is an abbreviation that has several different meanings depending on who you ask. Four common meanings for BNC are: **B**aby **N** Connector, **B**ayonet **N**eill **C**oncelman Connector, **B**ritish **N**aval **C**onconnector, **B**ritish **N**ational **C**onconnector.

Board – The audio console control in radio and television.

Board Fade – A radio term, used to designate the process of gradually fading the volume of sound by means of a master fading control on the board.

Board Tester – Product programmed to automatically stimulate the circuits on a PC board and check the responses. Electrical failures can be detected and diagnosed to facilitate board repair.

BOC (Bell Operating Company) – A local telephone company formerly owned by AT&T.

Boolean – In digital picture manipulation, a method of working on polygonal objects.

Boolean Logic – Named after George Boole, who defined binary arithmetic and logical operations such as AND, OR, NOT, and XOR.

Boom – A mechanical cantilevering device used to hold a microphone closer to a set by positioning it above the set while keeping it out of view of the cameras.

Boot – To start up the system by turning on the workstation and monitor; the system is fully booted when you see a prompt or the login screen. Short for Bootstrap.

Boot Up – To start up. Most computers contain a system operating program that they load into memory from disk after power up or restart. The process of reading and running that program is called boot up.

Bootstrap – Program used to initialize the computer. Usually clears memory, sets up I/O devices, and loads the operating system.

Border – **a**) The boundary between two merged video pictures, as created with chroma key or wipe effects. **b**) May be thought of as the frame which surrounds a given pattern or key. In the case of a key, the border is on or two lines side, adjustable anywhere from black to white, and may be sym-

metrical about the key or to the right and bottom (drop shadow). An outline is a special key border where the insert video appears in the border area and the background video fills the hole where the insert would normally be. In the case of a pattern, the border is adjustable in width and color. A pattern border may be hard colored, soft colored (halo), or soft with no color. AVC switchers can also do half halo borders, hard on one side and soft on the other.

Border (Key) – A title (caption, super) enhancement option which produces a black or white border or dropshadow around a key or changes the key into a matte filled outline in the shape of the key. The Border, Dropshadow, and Outline push-buttons select these optional modes. If the Border option is not installed, these push-buttons do not function.

Border (Menu) – A function that uses ADO 100's internal key to place a border around the image and adjust width and color (saturation, luminance, and hue).

Border (Wipe) – The boundary area between the "A" video and "B" video when doing a wipe, to which hard, soft, halo, or 1/2 halo edges and matte color can be added.

Border Luminance – The brightness of a border.

Border Modify – A feature exclusive to AVC series switchers, allowing key borders to be extended to the right and bottom up to 14 lines deep. Several special key effects can be accomplished with this including delayed and decayed keys.

Border Modify (Key) – An enhancement to the basic key border function allowing up to 14 lines of dropshadow or reinserted insert video in a decaying mode. This uses a patented circuit which increases the creative possibilities.

Bottom Field – One of two fields that comprise a frame of interlaced video. Each line of a bottom field is spatially located immediately below the corresponding line of the top field.

Bounce – **a**) An unnatural sudden variation in the brightness of the picture. **b**) Oscillations and noise generated when a mechanical switch is opened or closed. See Debounce.

Boundary Representation Modeling – This modeling technique defines a world in terms of its edges. The primary components of a boundary rep world are vertices and polygons. PictureMaker is a boundary rep system.

Bounding Box – A relatively simple object, usually a rectangle or box with the overall dimensions, or bounds, of a more complex object. A bounding is used in place of that exact, more complex, modeled shape to represent it in an animation preview, or to predict the inclusion of that object in the scene. This reduces the calculation/production time and expense when previewing computer animation sequences to check continuity, positions, and timing.

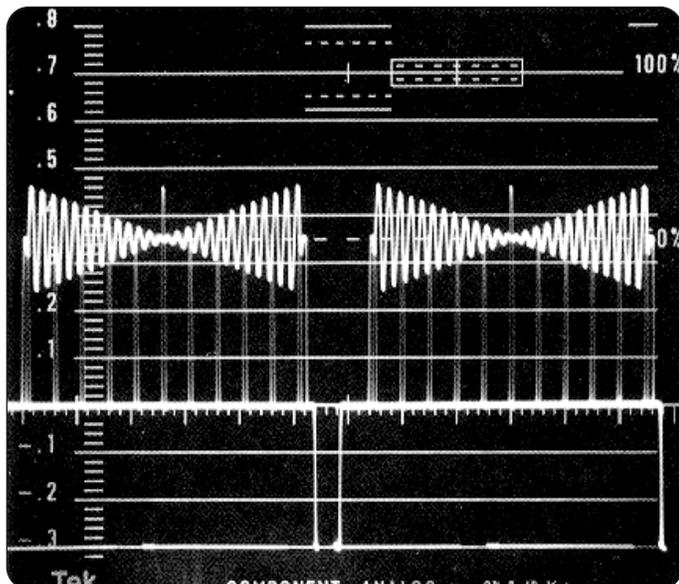
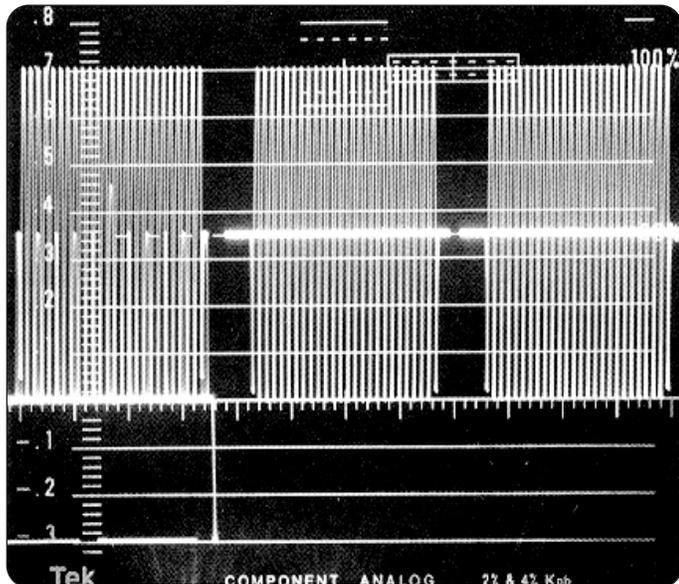
Bouquet – **a**) A group of transport streams in which programs are identified by a combination of network ID and PID (part of DVB-SI). **b**) A collection of services marketed as a single entity.

Bowtie Test Signal – The bowtie test signal actually consists of three signals, each being fed to a different channel of the CAV system and is used to evaluate the relative amplitudes and relative timing on some CAV waveform monitors such as the WFM300A. The figure below shows the three

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waveforms in the parade mode. The first signal is a 500 kHz sinewave packet which is fed to video channel 1. The other two signals are identical 502 kHz. The three sinewave packets are generated to be precisely in phase at their centers. Because of their 2 kHz offset, the color difference channels become increasingly out of phase with the luminance channel on either side of center. If the three signals are properly timed, their sum results in the bowtie waveform shown below.



Box House – A slang term for a mail-order business for audio and video components. Box houses frequently offer little or no consumer support or equipment repair.

BPF – See Bandpass Filter.

BPI – Bits per linear inch down a recorded track.

B-Picture (Bidirectionally Predictive-Coded Picture) – An MPEG picture that is coded using motion compensated prediction from past and/or future reference pictures. Motion vectors pointing forwards and backwards are used, and they may point at either I-pictures or P-pictures. The B-pictures provide the highest compression, but demand knowledge of several pictures. Consequently, B-pictures give a higher delay and call for a larger picture memory. B-pictures are never used as a reference in a prediction. When B-pictures are part of a sequence, the pictures are not sent in chronological order owing to the fact that future P-pictures and/or I-pictures are needed (and therefore must be decoded) for the decoding of B-pictures. The P- and I-pictures have to be sent earlier than the actual point of time to which they relate.

BPS – Bits Per Second.

BPSK – Binary Phase Shift Keying.

BR – Radiocommunication Bureau.

BRA – Basic Rate Access.

Branch – See Jump.

Break Elongation – The relative elongation of a specimen of magnetic tape or base film at the instant of breaking when it has been stretched at a given rate.

Breakdown – A written accounting of the shooting schedule and production resources.

Breakpoint – **a)** A break in the smoothness of a curve. **b)** Software or hardware device that stops the program and saves the current machine status, under user-specified conditions.

Breakup – Disturbance in the picture or sound signal caused by loss of sync or by videotape damage.

Breathing – Amplitude variations similar to “bounce” but at a slow, regular rate.

Breezeway – The portion of the video signal which lies between the trailing edge of the horizontal sync pulse and start of burst. The Breezeway is part of the back porch. Also refer to the Horizontal Timing discussion.

Bridge – Bridges are devices that connect similar and dissimilar LANs at the data link layer (OSI layer 2), regardless of the physical layer protocols or media being used. Bridges require that the networks have consistent addressing schemes and packet frame sizes. Current introductions have been termed learning bridges since they are capable of updating node address (tracking) tables as well as overseeing the transmission of data between two Ethernet LANs.

Brightness – **a)** Overall DC voltage level of the video signal. The brightness control is an adjustment of setup (black level, black reference).

b) Attribute of a visual sensation according to which an area appears to emit more or less light. The subjective counterpart of objective luminance.

c) The value of a pixel along the black-white axis.

Brightness Signal – Same as the luminance signal (Y). This signal carries information about the amount of light at each point in the image.

Broad Pulses – Another name for the vertical synchronizing pulses in the center of the vertical interval. These pulses are long enough to be distinguished from all others and are the part of the signal actually detected by vertical sync separators.

Broadband – **a)** A response that is the same over a wide range of frequencies. **b)** Capable of handling frequencies greater than those required for high-grade voice communications (higher than 3 to 4 kilohertz).

Broadcast Quality – A nebulous term used to describe the output of a manufacturer's product no matter how bad it looks.

Broadcast Television – Conventional terrestrial television broadcasting, the most technically constrained delivery mechanism for ATV, faced with federal regulations and such potential problems as multipath distortion and co-channel interference.

Broadcaster (Service Provider) – An organization which assembles a sequence of events or programs to be delivered to the viewer based upon a schedule.

B-Roll – Off the shelf video sequences for various needs.

Router – Routers are bridge/router hybrid devices that offer the best capabilities of both devices in one unit. Routers are actually bridges capable of intelligent routing and therefore are used as generic components to integrate workgroup networks. The bridge function filters information that remains internal to the network and is capable of supporting multiple higher-level protocols at once. The router component maps out the optimal paths for the movement of data from one point on the network to another. Since the router can handle the functions of both bridges and routers, as well as bypass the need for the translation across application protocols with gateways, the device offers significant cost reductions in network development and integration.

Brown Stain – A non-magnetic substance that forms on that area of a magnetic head's surface over which tape passes. Its origin is not well understood but it is known to occur primarily in the presence of low humidity.

Browse – To scan a database or a list of files, either for a particular item or for anything that seems to be of interest. Browsing implies observing rather than changing information.

Browse Station – A viewing station that provides browsing of stored images or video. Browse stations are internal and connected via ethernet.

BRR – See Bit Rate Reduction.

Bruch Blanking – A 4-field burst blanking sequence employed in PAL signals to ensure that burst phase is the same at the end of each vertical interval.

BS – Bandwidth of the frequency slot allocated to a service.

BSI – British Standards Institution.

BSLBF – Bit String, Left Bit First.

B-Spline – A type of smooth curve (or surface) bound to its control points.

BSS – Broadcast Satellite Services.

BTA – Japan's Broadcast Technology Association. A national standards-making organization comprising manufacturers and broadcasters, not unlike SMPTE. A proponent of an ATV system.

BTS (Broadcast Television Systems) – A joint venture of Bosch Fernseh and Philips established to sell television production equipment. BTS offers the first multi-standard HDTV camera.

Buckling – Deformation of the circular form of a tape pack which may be caused by a combination of improper winding tension, adverse storage conditions and/or poor reel hub configuration.

Buffer – **a)** An IC that is used to restore the logic drive level. **b)** A circuit or component that isolates one electrical circuit from another. **c)** A digital storage device used to compensate for a difference in the rate of flow of information or the time of occurrence of events when transmitting information from one device to another. **d)** In telecommunications, a protective material used in cabling optical fiber to cover and protect the fiber. The buffer material has no optical function.

Buffer Control – The feedback algorithms used by the encoder to avoid overflow of the video-rate buffer. The video-rate buffer is a FIFO which holds the coded video prior to output into the channel.

Bug – An error in a computer program. Eliminating errors is known as debugging.

Built-In Reference Tones – Refers to adjustment tones which are available within the recorder for adjusting record level and bias.

Bulk Eraser – A device used to erase an entire tape at one time. Bulk erasers are usually more effective than recorders' erase heads.

Bumping Up – Transferring a program recorded on a lower quality videotape to a higher quality videotape (e.g., from Hi-8 to Betacam). Bumping up to a higher format allows footage to be preserved on a more stable tape format and makes it possible to edit in a higher-end editing environment.

Burn – An image or pattern appearing so regularly on the screen of a picture tube that it ages the phosphors and remains as a ghost image even when other images are supposed to be shown. On computer terminals, the areas occupied by characters are frequently burned, particularly in the upper left corner. In television transmission centers, color bars are sometimes burned onto monitors. There is some concern that some ATV schemes will burn a widescreen pattern on ordinary TV sets due to increased vertical blanking or will burn a non-widescreen pattern on ATV sets due to reception of non-ATV signals. In production, refers to long-term or permanent image retention of camera pickup tubes when subjected to excessive highlights.

Burn In Time Code – A time code that is displayed on the monitor along with the video it pertains to. Burn In Time Code can either be Vertical Interval Time Code (VITC) or Longitudinal Time Code (LTC).

Burned-In Image – An image which persists in a fixed position in the output signal of a camera tube after the camera has been turned to a different scene.

Burned-In Time Code – Time code numbers that are superimposed on the picture.

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Burn-In – Component testing method used to screen out early failures by running the circuit for a specified length of time.

Burst – A small reference packet of the subcarrier sine wave, typically 8 or 9 cycles, which is sent on every line of video. Since the carrier is suppressed, this phase and frequency reference is required for synchronous demodulation of the color information in the receiver. Refer to the Horizontal Timing discussion.

Burst Gate – This signal tells the receiver valid color ready for use.

Bus – a) Any row of video crosspoints that allow selection of various sources to be selected, and the associated row of buttons for such selection. Buses are usually associated with a given M/E or the DSK although they may be independent as in aux buses. Also, any row of video or key source selections which may or may not be selected by push buttons on a bus row. For example, key video selections on Ampex switchers appear on buses which are accessed and selected by keypads. Due to the fact that there is no associated row of buttons, this arrangement is called a “phantom bus.” **b)** A parallel data path in a computer.

Bus Address – A code number sent out to activate a particular device on a shared serial or parallel bus interface. Also, the identification number of a device.

Bus Conflict – Conflict that occurs when two or more device outputs of opposite logic states are placed on a three-state bus at the same time.

Bus Controller – Generates bus commands and control signals.

Bus Driver – An IC that is added to a bus to provide sufficient drive between the CPU and the other devices that are tied to the bus. These are necessary because of capacitive loading, which slows down the data rate and prevents proper time sequencing of microprocessor operation and/or to overcome resistive loading when fan-out requirements increase.

Bus Keyer – A keyer that does a key on top of the bus video before the signal gets to the M/E. On the 4100, these are packaged as “dual bus keyers” and are the modules between the bus rows and the M/Es. On the AVC, bus keyers are integral with the M/E module, with controls in a similar location.

Bus Row – Any row of video source select buttons allowing immediate selection of switcher video sources.

Bus Termination – Method of preventing reflections at the end of a bus. Necessary only in high-speed systems.

Buss – In video switching equipment, a wire carrying line-level signals (anything greater than mike level).

Button – On a mouse, a button is a switch that you press with a finger. In a window on your screen, a button is a labeled rectangle that you click using the cursor and mouse.

BW – See Bandwidth.

BWF (Broadcast WAV Format) – Broadcast WAV Format is an audio file format based on Microsoft's WAV Format that carries PCM or MPEG encoded audio. BWF adds the metadata, such as a description, originator, date, and coding history, needed for interchange between broadcasters.

B-Y – One of the color difference signals used in the NTSC system, obtained by subtracting luminance from the blue camera signal. This is the signal that drives the horizontal axis of a vectorscope. The human visual system has much less acuity for spatial variation of color than for brightness. Rather than conveying RGB, it is advantageous to convey luma in one channel, and color information that has had luma removed in the two other channels. In an analog system, the two color channels can have less bandwidth, typically one-third that of luma. In a digital system each of the two color channels can have considerably less data rate (or data capacity) than luma. Green dominates the luma channel: about 59% of the luma signal comprises green information. Therefore, it is sensible, and advantageous for signal-to-noise reasons, to base the two color channels on blue and red. The simplest way to remove luma from each of these is to subtract it to form the difference between a primary color and luma. Hence, the basic video color-difference pair is (B-Y), (R-Y) [pronounced “B minus Y, R minus Y”]. The (B-Y) signal reaches its extreme values at blue (R = 0, G = 0, B = 1; Y = 0.114; B-Y = +0.886) and at yellow (R = 1, G = 1, B = 0; Y = 0.886; B-Y = -0.886). Similarly, the extreme of (R-Y), + -0.701, occur at red and cyan. These are inconvenient values for both digital and analog systems. The color spaces YPbPr, YCbCr, Photo YCC, and YUV are simply scaled versions of (Y, B-Y, R-Y) that place the extreme of the color difference channels at more convenient values.

Byte – a) A complete set of quantized levels containing all of the bits. Bytes consisting of 8 to 10 bits per sample are typical. **b)** Group of eight bits. Can be used to represent a character. Microcomputer instructions require one, two, or three bytes. A word can be one or more bytes. **c)** A group of adjacent binary digits operated upon as a unit, capable of holding one character in the local character set, and usually shorter than a computer word (frequently connotes a group of eight bits). Current usage within the context of electronic production concerns is tending to define a byte as eight bits to have a consistent data unit for measuring memory capacities, etc. **d)** 8 bits. The combination of 8 bits into 1 byte allows each byte to represent 256 possible values. See Megabyte, Gigabyte, Terabyte.

1 byte = 8 bits = 256 discrete values (brightness, color, etc.)

1 kilobyte = 1,024 bytes (not 1000 bytes)

1 megabyte = 1,048,576 bytes (not one million bytes)

1 gigabyte = 1,073,741,824 bytes (not one billion bytes)

1 terabyte = 1,099,511,627,776 bytes (not one trillion bytes)

Byte Aligned – A bit in a coded bit stream is byte-aligned if its position is a multiple of 8-bits from the first bit in the stream.

▶ C

C/N – Ratio of RF or IF signal power to noise power.

CA (Conditional Access) – Information describing, or indicating whether the program is scrambled.

Cable Equalization – The process of altering the frequency response of a video amplifier to compensate for high-frequency losses in coaxial cable.

Cable Television – System that transmits original programming and programming of broadcast television stations, to consumers over a wired network.

Calibrated Delay Fixture – This fixture is another way of measuring Chrominance to Luminance delay. The fixture allows the delay to be incrementally adjusted until there is only one peak in the baseline, indicating all the delay errors have been dialed out. The delay value can be read from the fixture while the gain can be calculated from the remaining peaks.

Call – Jump to a subroutine. A jump to a specified address is performed, but the contents of the program counter are saved (usually in the stack) so that the calling program flow can resume when the subroutine is finished.

Camcorder – The combination of camera and video tape recorder in one device. Camcorders permit easy and rapid photography and recording simultaneously. Camcorders are available in most home video formats: 8 mm, Hi-8, VHS, VHS-C, S-VHS, etc.

Camera Analysis – The measurement and evaluation of the spectral sensitivities of the three color channels of a television camera. The camera and matrixing are identified and measured.

Camera Analysis, Ideal – For optimum image quality, both objective and perceived, the spectral sensitivities of the three color channels of a television camera should be matched to the primary colors of the R, G, B color space. Note: Some practice still exists matching the color channels of the camera to the display phosphors. This reduces the color gamut and carries unnecessary noise penalties. The practice is deprecated.

Camera Chain – Television camera and associated equipment, consisting of power supply and sync generator.

Camera Control Unit – Remote control device for video cameras usually placed in the editing suite. Controls usually include video levels, color balancing, and iris control.

Camera Match – Shot-to-shot picture fidelity. Improperly matched cameras may exhibit differences in level, balance, colorimetry, or defects that will cause the picture quality to change from shot to shot. These differences may present problems during editing, as the editor attempts to minimize differences.

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).

Camera Tube – See Pickup Tube.

Candlepower – The unit measure of incident light.

Canned – In the can, old movie term still used occasionally to mean finished.

Capstan – The driven spindle or shaft in a tape recorder, sometimes the motor shaft itself, which rotates against the tape (which is backed up by a rubber pressure or pinchroller), pulling it through the machine at constant speed during recording and playback modes of operation.

Capstan Idler – A rubber wheel which presses the magnetic tape against the capstan so that the capstan can move the tape.

Caption – See Title.

Capture – The process of digitizing the analog video signal. See Digitize.

Card Guides – Narrow metal tracks at the top and bottom of the chassis into which you slide printed circuit boards.

Cardioid – The quasi-heart-shaped sensitivity pattern of most unidirectional microphones. Hypercardioid and supercardioid microphones have basically similar patterns, but with longer, narrower areas of sensitivity at the front, and slightly increased rear sensitivity.

Carrier – A signal which is modulated with data to be transmitted.

Carry Flag – Flag bit in the microprocessor's status register, which is used to indicate the overflow of an operation by the arithmetic logic unit.

Cartridge – A plastic container that holds tape for easy loading into a matching recorder or player.

CAS – See Conditional Access System.

Cassette – A tape cartridge in which the tape passes from one hub to another.

CAT (Conditional Access Table) – Provides information on the conditional access systems used. Packets having PID codes of 1 and that contain information about the scrambling system. See ECM and EMM.

Cathode-Ray Tube – An electron tube assembly containing an electron gun arranged to direct a beam upon a fluorescent screen. Scanning by the beam can produce light at all points in the scanned raster.

CATV (Community Access Television) – Acronym for cable TV, derived from the older term, community antenna television. Also can stand for Community Access TV.

CAV (Component Analog Video) – Analog video signal format in which the picture information is conveyed in three signals. Refer to the definition for Analog Components. CAV formats include: RGB; Y, R-Y, B-Y; Y, I, Q.

C_B – Scaled version of the B-Y signal.

CBC – See Canadian Broadcasting Corporation.

CBPS – Coded Bits Per Symbol.

CBR – See Constant Bit Rate.

CC – See Closed Captioning.

CCD – See Charge Coupled Device.

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CCETT (Centre Commun d'Etudes de Telecommunications et de Telediffusion, France) – The CCETT is one of the three licensors of the MPEG Layer II coding algorithm. The audio coding technique, originally developed for DAB under EUREKA 147 jointly with IRT and Philips, was selected by ISO/MPEG as Layer II of the MPEG-1 standard.

CCIR (Comite Consultatif Internationale des Radiocommunications) – International Radio Consultative Committee, an international standards committee that has been absorbed by the parent body, the ITU. A permanent organization within the ITU with the duty to study technical and operating questions relating specifically to radio communications and to make recommendations on them. The CCIR does not prepare regulations; it draws up recommendations and reports, produced by experts from both public and private entities, which provide guidance on the best operational methods and techniques. The CCIR is expected to base its recommendations upon 150 and IEC international standards, but when no relevant one exists, the CCIR has been known to initiate standardization. These recommendations and reports provide a basis for international standardization of telecommunications.

CCIR-468 – Specifies the standard for weighted and unweighted noise measurements. The weighted standard specifies the weighting filter and quasi-peak detector. The unweighted standard specifies a 22 Hz to 22 kHz bandwidth limiting filter and RMS detector.

CCIR-500 – Method for the Subjective Assessment of the Quality of Television Pictures. CCIR-500 is a detailed review of the recommendations for conducting subjective analysis of image quality. The problems of defining perceived image quality are reviewed, and the evaluation procedures for interval scaling, ordinal scaling, and ratio scaling are described – along with the applications for which each is best employed.

CCIR-601 – See ITU-R BT.601.

CCIR-656 – The physical parallel and serial interconnect scheme for ITU-R BT.601-2-601. CCIR 656 defines the parallel connector pinouts as well as the blanking, sync, and multiplexing schemes used in both parallel and serial interfaces. Reflects definitions in EBU Tech 3267 (for 625 line signals) and in SMPTE 125M (parallel 525) and SMPTE 259M (serial 525).

CCIR-6601 – Consultative Committee International Radio. A standard that corresponds to the 4:2:2 format.

CCIR-709 – The recommendation considers that the HDTV studio standard must be harmonized with those of current and developing television systems and with those of existing motion-picture film. In a review of current systems, a consensus was identified in specifications for opto/electronic conversion, picture characteristics, picture scanning characteristics, and signal format (both analog and digital representations). Work is underway in the editing of national and CCIR-related documents to determine whether these consensus values may be affirmed in the next review of the individual documents. The values in Rec 709 are considered interim, and CCIR notes that continuing work is expected to define target parameters for future improved image rendition.

CCIR-801 – At present, the first results on studies related to Study Programme 18U/11 have been collected. It must be recognized that these studies must be intensified in close cooperation with such organizations as the IEC and ISO to take fully into account the requirements for implementa-

tion of HDTV for media other than broadcasting, i.e., cinema, printing, medical applications, scientific work, and video conferencing. In addition, the transmission of HDTV signals via new digital transmission channels or networks has to be considered and taken into account.

CCITT (Comite Consultatif Internationale Telegraphique et Telephonique) – A committee of the International Telecommunications Union responsible for making technical recommendations about telephone and data communication systems for PTTs and suppliers. Plenary sessions are held every four years to adopt new standards.

CCITT 0.33 – Recommendation 0.33 of the CCITT Specification for Measuring Equipment, Volume IV, Series O Recommendations-1988. This defines the automatic test sequences that are used to check on the different parameters that are important to signal quality. Recommendation 0.33 has defined sequences for both monaural and stereo audio testing. Also called EBU Recommendation R27.

CCK – See Composite Chroma Key.

CCTV – See Closed Circuit TV.

CCU – See Camera Control Unit.

CD – Committee Draft.

CD (Compact Disc) – A 4.75" disc used to store optical, machine-readable, digital data that can be accessed with a laser-based reader such as a CD player.

CD-DA (Compact Disc-Digital Audio) – Standard music CDs. CD-DA became CD-ROMs when people realized that you could store 650 Mb of computer data on a 12-cm optical disc. CD-ROM drives are simply another kind of digital storage media for computers, albeit read-only. They are peripherals just like hard disks and floppy drives. (Incidentally, the convention is that when referring to magnetic media, it is spelled disk. Optical media like CDs, laserdisc, and all the other formats are spelled disc.)

CCDI (Copper Data Distributed Interface) – A high-speed data interface, like FDDI but using copper. See FDDI.

CD-I – See Compact Disc Interactive.

CD-ROM – See Compact Disc Read Only Memory.

CDTV – See Conventional Definition Television.

CD-XA – CD-XA is a CD-ROM extension being designed to support digital audio and still images. Announced in August 1988 by Microsoft, Philips, and Sony, the CD-ROM XA (for Extended Architecture) format incorporates audio from the CD-I format. It is consistent with ISO 9660, (the volume and the structure of CD-ROM), is an application extension. CD-XA defines another way of formatting sectors on a CD-ROM, including headers in the sectors that describe the type (audio, video, data) and some additional info (markers, resolution in case of a video or audio sector, file numbers, etc.). The data written on a CD-XA can still be in ISO9660 file system format and therefore be readable by MSCDEX and UNIX CD-ROM file system translators. A CD-I player can also read CD-XA discs even if its file system only resembles ISO9660 and isn't fully compatible. However, when a disc is inserted in a CD-I player, the player tries to load an executable application from the CD-XA, normally some 68000 application in the /CDI directory. Its name is stored in the disc's primary volume descriptor. CD-XA bridge discs,

like Kodak's Photo CDs, do have such an application, ordinary CD-XA discs don't. A CD-DA drive is a CD-ROM drive but with some of the compressed audio capabilities found in a CD-I player (called ADPCM). This allows interleaving of audio and other data so that an XA drive can play audio and display pictures (or other things) simultaneously. There is special hardware in an XA drive controller to handle the audio playback. This format came from a desire to inject some of the features of CD-I back into the professional market.

CED (Capacitance Electronic Disk) – Technology used by RCA in their Videodisk product.

Cel – Refers to a transparent sheet of glass or acetate on which a “layer” or “level” of artwork is painted. Since the sheet is clear where there is no artwork, several sheets can be superimposed, allowing “automatic hidden-surface removal,” or simply, the “painter’s algorithm.”

Celanar – Trade name for polyester produced by Celanese.

Cell Compression – Cell is a compression technique developed by Sun Microsystems. The compression algorithms, the bit stream definition, and the decompression algorithms are open; that is, Sun will tell anybody who is interested about them. Cell compression is similar to MPEG and H.261 in that there is a lot of room for value-add on the compressor end. Getting the highest quality image from a given bit count at a reasonable amount of computation is an art. In addition the bit-stream completely defines the compression format and defines what the decoder must do and there is less art in the decoder. There are two flavors of Cell: the original called Cell or CellA, and a newer flavor called CellB.

CellB – A video coding scheme based on quadtree decomposition of each image.

CELP – See Code-Excited Linear Prediction.

CEN (Comite Europeen de Normalisation) – European committee for standardization.

CENELEC (Comite Europeen de Normalisation Electrotechnique) – European committee for electrotechnical standardization.

Central Processing Unit – Computer module in charge of fetching, decoding, and executing instructions. It incorporates a control unit, an ALU, and related facilities (registers, clocks, drivers).

Centralized Network – A network where a central server controls services and information; the server is maintained by one or more individuals called network administrators. On a centralized network that uses NIS, this server is called the NIS master, and all other systems on the network are called NIS clients. See also Network Administrator, NIS, NIS Client, NIS Domain, and NIS Master.

Ceramic Microphone – See Piezoelectric Microphone.

Certified Tape – Tape that is electrically tested on a specified number of tracks and is certified by the supplier to have less than a certain total number of permanent errors.

Certifier – Equipment that evaluates the ability of magnetic tape to record and reproduce. The equipment normally counts and charts each error on the tape, including level and duration of dropouts. In the Certify Mode, it

stops on error to allow for visually inspecting the tape to see if the error cause is correctable or permanent.

CES (Consumer Electronics Show) – A semi-annual event sponsored by the Consumer Electronics Group of EIA, at which IDTV and HDTV schemes have been demonstrated.

CG – See Character Generator.

Channel – **a)** An independent signal path. Stereo recorders have two such channels. Quadraphonic ones have four. **b)** A digital medium that stores or transports a digital television stream. **c)** A term mainly used to describe the configuration of audio tracks. For Dolby Digital there are six channels (left, center, right, left rear, right rear and low frequency effects). For linear PCM and MPEG audio, there are eight channels. All DVD players are required to have a two-channel downmix output, which is a stereo version produced from the intrinsic channels on the disc if there are more than two channels on the disc.

Channel Code – A modulation technique that converts raw data into a signal that can be recorded or transmitted by radio or cable.

Channel Coding – **a)** Describes the way in which the 1's and 0's of the data stream are represented on the transmission path. **b)** Refers to any processing to use a particular communication channel or medium. Examples are forward error correction coding and prioritization of different parts of the coded video bit stream.

Channel Stuffing – Techniques for adding information to an NTSC channel without increasing its bandwidth or eliminating its receiver-compatibility.

Channel-Compatible – An ATV transmission scheme that will fit within the confines of a standard, 6 MHz NTSC transmission channel. A higher level of channel-compatibility demands NTSC-like AM-VSB transmission so that the ATV channel will not cause any interference to other channels that would not otherwise be caused by an NTSC channel. Channel-compatible ATV schemes need not necessarily also be receiver-compatible.

CHAP – Challenge Handshake Authentication Protocol.

Chapter – A chapter in a video disc is a section divider. Chapters are subsets of the video disc. In the DVD format, a chapter is a division of a title.

Chapter Stop – Programming that allows a viewer to jump immediately to a particular part of a title. A book with chapters is the common metaphor for a DVD.

Character Generator (CG) – **a)** A computer used to electronically generate text and sometimes graphics for video titles or captions 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. **b)** An electronic device that generates video letters for use as captions in television productions. The output of the character generator is often used as an external key input to the switcher. **c)** Circuit that forms the letters or numbers on a display or printer.

Characteristic – An aspect or parameter of a particular television system that is different from another system's, but not necessarily a defect. Characteristics include aspect ratio, colorimetry, resolution, and sound bandwidth.

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Charge Coupled Device (CCD) – a) A semiconductor device that converts optical images to electronic signals. CCDs are the most commonly found type of image sensor in consumer camcorders and video cameras. **b)** Serial storage technology that uses MOS capacitors. **c)** A solid-state image sensor that converts light energy to electricity.

C-HDTV (Cable HDTV) – A seemingly impossible concept calling for channel-compatible ATV transmission of 850 lines of both static and dynamic horizontal and vertical resolution, among other characteristics. Its feasibility is being studied at ATRP.

Check Box – Used to select from a list of related items. An “x” marks the selected options in the corresponding box. (Select as many items as desired – one, none, or all.)

Checkerboard – Automatic assembly process where all edits from mounted reels are made, and edits for unmounted reels are skipped. Example: Reels 5, 29, and 44 are mounted on VTRs. The editing system looks at the list and assembles all edits that have reel numbers 5, 29, and 44 assigned to them, inserting these events at the exact spot on the master tape where they belong.

Checksum – a) An error-detecting scheme which is the sum of the data values transmitted. The receiver computes the sum of the received data values and compares it to the transmitted sum. If they are equal, the transmission was error-free. **b)** Method used to verify the integrity of data loaded into the computer. **c)** A simple check value of a block of data, calculated by adding all the bytes in a block. It is easily fooled by typical errors in data transmission systems, so that for most applications, a more sophisticated system such as CRC is preferred.

Chip – Common name for all ICs.

Chip Chart – A black and white test chart. It contains “chips” in varying intensities, that make up a gray scale. It is used to check the gray scale taking characteristics of a camera, including the parameter of gamma.

Chip Enable (CE) – See Chip Select.

Chip Select (CS) – Usually enables three-state drivers on the chip's output lines. Most LSI chips have one or more chip selects. The CS line is used to select one chip among many.

Choose – Choose means make a choice to select an action that will take place, i.e., press the left mouse button to bring up a pop-up menu, move the cursor to highlight the command that you want to run, then release the button.

Chroma – a) The depth or saturation of color. The saturation control adjusts the amplitude of color of the switcher's matte and background outputs. **b)** The (M) NTSC or (B, D, G, H, I) PAL video signal contains two pieces that make up what you see on the screen: the black and white (luma) part, and the color part. Chroma is the color part. Chroma can be further broken down into two properties of color: hue and saturation. Chroma can also be described as a matrix, block, or single pel representing one of the two color difference signals related to the primary colors in the manner defined in the bit stream. The symbols used for the color difference signals are Cr and Cb.

Chroma Bandpass – In an (M) NTSC or (B, D, G, H, I) PAL video signal, the luma (black and white) and the chroma (color) information are com-

bined together. To decode an NTSC or PAL video signal, the luma and chroma must be separated. The chroma bandpass filter removes the luma from the video signal, leaving the chroma relatively intact. This works fairly well except in certain images where the luma information and chroma information overlap, meaning chroma and luminance information occupy the same frequency space. Depending on the filtering technique used, it can be difficult for the filter to separate the chroma from the luminance information. This results in some luminance information being interpreted as chroma and some chroma information being interpreted as luminance. The effects of this improper separation of luminance and chroma are especially noticeable when the television scene contains objects with thin, closely spaced black and white lines. As the camera moves across this object, a rainbow of colors will appear in the object indicating the improper separation of the luminance and chroma information.

Chroma Burst – See Color Burst.

Chroma Comp – A deliberate distortion of colors usually used to achieve unusual matching. By detecting the quadrant the color is in (by normally deciding whether R-Y and B-Y are positive or negative), the amplitude of R-Y, B-Y just for colors in that quadrant can be changed; hence, the hue and saturation can be changed for those colors without affecting others.

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 Crawl – An NTSC artifact also sometimes referred to as moving dots; a crawling of the edges of saturated colors in an NTSC picture. Chroma Crawl is a form of cross-luminance, a result of a television set decoding color information as high-detail luminance information (dots). Most ATV schemes seek to eliminate or reduce chroma crawl, possibly because it is so immediately apparent.

Chroma Demodulation – The process of removing the color video information from a composite video signal where chrominance information is modulated on a color subcarrier. The phase reference of the subcarrier, is color burst which is a phase-coherent sample of the color subcarrier.

Chroma Demodulator – Refer to the NTSC Composite Receiver Model at the end of this glossary when studying this definition. After the (M) NTSC or (B, D, G, H, I) PAL video signal makes its way through the Y/C separator, by either the chroma bandpass, chroma trap, or comb filter method, the colors are then decoded by the chroma demodulator. Using the recovered color subcarrier, the chroma demodulators take the chroma output of the Y/C separator and recovers two color difference signals (typically I and Q or U and V).

Chroma Flutter – A rapid coherent variation in the chroma saturation.

Chroma Format – Defines the number of chrominance blocks in a macro-block.

Chroma Key (CK) – a) A method of combining two video images. The most common example of chroma keying is the news weather person standing in front of a weather map. The details of the process are, a camera is pointed at the weather person who is standing in front of a bright blue or green background. The weather person and bright-blue or green background image is fed into a computing device along with the image of the weather map. Wherever the computing device sees the bright-blue or green background, it displays the weather map. Wherever the computing

device does not see bright blue or green, it shows the weather person.

b) A process for controlling the overlay of one video image over another, the areas of overlay being defined by a specific color or chrominance in one of the images. More versatility is available when working in the digital mode than in the analog since the color to define the effective mask can be more precisely specified. Effective use of chroma key frequently required high definition in the color image and, therefore, full bandwidth R, G, B is preferred. Linear key provides an alternate method for control of the overlay. **c)** Chroma keying is the process of controlling the overlay of one video image over another. The overlay is defined by a specific color or chrominance in one of the images.

Chroma Noise – Noise that manifests itself in a video picture as colored snow.

Chroma Nulling – A process of generating a matte color 180 degrees out of phase with a background color and summing them, hence removing all color.

Chroma Resolution – The amount of color detail available in a television system, separate from any brightness detail. In almost all television schemes, chroma resolution is lower than luminance resolution, matching visual acuity. Horizontal chroma resolution is only about 12 percent of luminance resolution in NTSC; in advanced schemes it is usually 50 percent. See also Resolution.

Chroma Simulcast – A type of scalability (which is a subset of SNR scalability) where the enhancement layer(s) contain only coded refinement data for the DC coefficients and all the data for the AC coefficients of the chroma components.

Chroma Trap – In an (M) NTSC or (B, D, G, H, I) PAL video signal, the luma (black and white) and the chroma (color) information are combined together. To decode the video signal, the luma and chroma must be separated. The chroma trap is a method of doing this.

Chrominance – **a)** The data that represents one of the two color-difference signals Cr and Cb. **b)** Chrominance refers to the color information in a television picture. Chrominance can be further broken down into two properties of color: hue and saturation. See Chroma.

Chrominance Frequency Response – Describes the frequency response of the chrominance channel.

Chrominance Luminance Delay Inequality – When a test signal having defined chrominance and luminance components is applied to the sending end of a television facility, chrominance-luminance delay inequality appears (at the receiving end) as the change in relative timing of the chrominance component relative to the luminance component of the test signal.

Chrominance Luminance Gain Inequality – When a test signal having defined chrominance and luminance components is applied to the sending end of a television facility, chrominance-luminance gain inequality appears (at the receiving end) as the change in amplitude of the color component relative to the luminance component (of the test signal).

Chrominance Nonlinear Gain – This distortion is present if chrominance gain is affected by chrominance amplitude. Chrominance nonlinear gain distortion is expressed in IRE or percent. It should be measured at different APL (Average Picture Level) and typically the worst error is quoted. Picture

effects include incorrect color saturation due to nonlinear gain in relatively high amplitude chrominance signals. The modulated pedestal test signal is used to test for this distortion.

Chrominance Nonlinear Phase – This distortion is present if a signal's chrominance phase is affected by chrominance amplitude. These phase errors are a result of the system's inability to uniformly process all amplitudes of high-frequency chrominance information. Chrominance nonlinear phase distortion is expressed in degrees of shift of subcarrier phase. This parameter should be measured at different APL (Average Picture Level); the worst result is quoted as the amount of distortion. Chrominance nonlinear phase distortion will cause picture hue to shift as color saturation increases. A modulated pedestal signal is used to measure this distortion. The modulated pedestal signal consists of three chrominance packets with the same phase and luminance level but each chrominance packet has increasing amplitudes of 20, 40, and 80 IRE.

Chrominance Signal – The high-frequency portion of the video signal which is obtained by quadrature amplitude modulation (QAM) of a 4.43 MHz (PAL) or 3.579545 MHz (NTSC) subcarrier with R-Y and B-Y information.

Chrominance Subsampling – Reduction of the amount of color information by either rejecting chrominance samples or by averaging adjacent chrominance samples.

Chrominance to Burst Phase – The difference between the expected phase and the actual phase of the chrominance portion of the video signal relative to burst phase.

Chrominance to Luminance Delay Distortion – The difference between the time it takes for the chrominance portion of the signal to pass through a system and the time it takes for the luminance portion to pass through. The amount of distortion is expressed in units of time, typically nanoseconds. The number is positive for delayed chrominance and negative for advanced chrominance. This distortion manifests itself in the picture as smearing or bleeding of the color particularly at the edges of objects in the picture. It may also cause poor reproduction of sharp luminance transitions. Any signal containing a 12.5T sine-squared pulse with 3.579545 MHz modulation can be used to measure chrominance-to-luminance delay distortions. Many combination signals such as FCC Composite and NTC-7 Composite contain this pulse.

Chrominance to Luminance Gain Distortion – The difference between the gain of the chrominance components and the gain of the luminance components as they pass through the system. The amount of distortion can be expressed in IRE, percent, or dB. The number given is negative for low chrominance and positive for high chrominance. This distortion most commonly appears as attenuation or peaking of the chrominance information that shows up in the picture as incorrect color saturation. Any signal containing a 12.5T sine-squared pulse with 3.579545 MHz modulation can be used to measure chrominance-to-luminance gain distortions. Many combination signals such as FCC Composite and NTC-7 Composite contain this pulse.

Chrominance to Luminance Intermodulation – This distortion is also known as crosstalk or cross-modulation. Splice is present when luminance amplitude is affected by the superimposed chrominance. The luminance

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change may be caused by clipping of high-amplitude chrominance peaks, quadrature distortion or crosstalk. The modulated pedestal is used to test for this distortion. Distortions can be expressed as: IRE with the pedestal level normalized to 50 IRE, as a percentage of the pedestal level, as a percentage of the measured white bar amplitude, as a percentage of 714 mV. These definitions will yield different results under some conditions so it is very important to standardize on a single method of making intermodulation measurements. Picture effects include unwarranted brightness variations due to color saturation changes affecting the luminance.

Chromium Dioxide (CrO₂) – A modern magnetic particle oxide of the high energy type used in magnetic recording tape. Chromium dioxide is a highly acicular particle with the crystal structure of rutile. Tapes made of CrO₂ exhibit a coercivity of 425 to 475 oersteds.

CI – Common Interface.

CIE (Commission Internationale de l'Éclairage) – French acronym for the International Illumination Commission. An international standardization organization that created the chromaticity diagrams (color charts) used to define the colorimetry of all television systems. The CIE is concerned with methods of measurement plus recommended practices and standards concerning the properties and applications of light.

CIE 1931 Standard Colorimetric System (XYZ) – A system for determining the tristimulus values of any spectral power distribution using the set of reference color stimuli X, Y, Z, and the three CIE color matching functions x(λ), y(λ), z(λ), adopted by the CIE in 1931.

CIELab Color Space – Three-dimensional, approximately uniform color space produced by plotting in rectangular coordinates L*, a*, b* quantities defined by the following equations. X, Y, Z describe the color stimulus considered, and X_n, Y_n, Z_n describe a specified white achromatic stimulus (i.e., white reference). Equal distances in the color space represent approximately equal color differences.

$$\left. \begin{aligned} L^* &= 116 (Y/Y_n)^{1/3} - 16 & Y/Y_n \\ a^* &= 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}] & X/X_n \\ b^* &= 200 \{(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}\} & Z/Z_n \end{aligned} \right\} > 0.008 856$$

CIEluv Color Space – Three-dimensional, approximately uniform color space produced by plotting in rectangular coordinated L*, u*, v* quantities defined by the following equations. Y, u', v' describe the color stimulus considered, and Y_n, u'_n, v'_n describe a specified white achromatic stimulus (white reference). The coordinates of the associated chromaticity diagram are u' and v'. L* is the approximate correlation of lightness, u* and v* are used to calculate an approximate correlate of chroma. Equal distances in the color space represent approximately equal color differences.

$$\left. \begin{aligned} L^* &= 116 (Y/Y_n)^{1/3} - 16 & Y/Y_n &> 0.008 856 \\ u^* &= 13 L^* (u' - u'_n) \\ v^* &= 13 L^* (v' - v'_n) \end{aligned} \right\}$$

CIF – See Common Image Format, Common Interchange Format, Common Interface Format, or Common Intermediate Format.

Cinching – Longitudinal slippage between the layers of tape in a tape pack when the roll is accelerated or decelerated.

CinemaScope – The first modern widescreen movie format, achieving a 2.35:1 aspect ratio through the use of a 2:1 anamorphic squeeze.

CinePak – CinePak is a compression scheme dedicated to PC environments, based on a vector quantization algorithm. CinePak is a highly asymmetrical algorithm, i.e., the encoding takes much more processing power than the decoding process. The CinePak algorithm is developed by Radius, and is licensed by a range of companies. Both Microsoft™ Windows 95 and Apple's QuickTime have built in CinePak, for instance.

CK – See Chroma Key.

Clamp – **a)** A device which functions during the horizontal blanking or sync interval to fix the level of the picture signal at some predetermined reference level at the beginning of each scanning line. **b)** Also known as a DC-restoration circuit, or it can also refer to a switch used within the DC-restoration circuit. When used in the context of DC restoration, it is usually used as "clamping." When used in its switch context, it is referred to as just "clamp."

Clamper – A device which functions during the horizontal blanking or sync interval to fix the level of the picture signal at some predetermined reference level at the beginning of each scanning line.

Clamping – **a)** The process that establishes a fixed level for the picture signal at the beginning of each scanning line. **b)** The process whereby a video signal is referenced or "clamped" to a DC level to prevent pumping or bouncing under different picture levels. Without clamping, a dark picture would bounce if a white object appeared. Changes in APL would cause annoying pulsations in the video. Clamping is usually done at zero DC level on the breezeway of the back porch of horizontal sync. This is the most stable portion of a TV picture.

Clean Rooms – Rooms whose cleanliness is measured by the number of particles of a given size per cubic foot of room volume. For example, a class 100,000 clean room may have no more than 100,000 particles one-half micron or larger per cubic foot. Similarly, for class 10,000 and class 100 rooms. In addition, a class 10,000 room may have no more than 65 five-micron particles per cubic foot, while class 100,000 may have no more than 700."

Clear – Set a circuit to a known state, usually zero.

Clear Channel – AM radio station allowed to dominate its frequency with up to 50 kW of power; their signals are generally protected for distance of up to 750 miles at night.

Click – To hold the mouse still, then press and immediately release a mouse button.

Click and Drag – A computer term for the user operation of clicking on an item and dragging it to a new location.

Cliff Effect – An RF characteristic that causes DTV reception to change dramatically with a small change in power. At the fringes of reception, current analog TV pictures degrade by becoming "snowy." With DTV, relatively small changes in received power in weak signal areas will cause the DTV picture to change from perfect to nothing and hence the name, cliff effect.

Clip – **a)** A video file. **b)** In keying, the trigger point or range of a key source signal at which the key or insert takes place. **c)** The control that sets this action. to produce a key signal from a video signal, a clip control on the keyer control panel is used to set a threshold level to which the video signal is compared. **d)** In digital picture manipulators, a manual

selection that blanks portions of a manipulated image that leave one side of the screen and “wraps” around to enter the other side of the screen.

e) In desktop editing, a pointer to a piece of digitized video or audio that serves as source material for editing.

Clip (Insert Adjust) – To produce a key signal from a video signal, a clip insert control on the front panel is used to set a threshold level to which the video signal is compared. In luminance keying, any video (brightness) level above the clip level will insert the key; any level below the clip level will turn the key off. The clip level is adjusted to produce an optimum key free of noise and tearing. In the Key Invert mode, this clip relationship is reversed, allowing video below the clip level to be keyed in. This is used for keying from dark graphics on a light background.

Clip Level – The level that determines at what luminance a key will cut its hole. On AVC switchers, these are the insert and border adjust controls. On 4100 series, the corresponding controls are foreground and background. See Bi-Level Keyer.

Clip Sheet – A nonlinear editing term for the location of individual audio/video clips (or scenes). Also known as clip bin.

Clipping – **a)** An electronic limit usually imposed in cameras to avoid overly bright or dark signals. When improperly applied, can result in loss of picture information in very bright or very dark areas. Also used in switchers to set the cutoff point for mixing video signals. **b)** 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.

Clipping Logic – Circuitry used to prevent illegal color conversion. Some colors can be legal in one color space but not in another. To ensure a converted color is legal in one color format after being converted (transcoded) from another, the clipping logic clips the information until a legal color is represented.

Clock – Reference timing source in a system. A clock provides regular pulses that trigger or synchronize events.

Clock Doubling – Many processor chips double the frequency of the clock for central processing operations while maintaining the original frequency for other operations. This improves the computer’s processing speed without requiring expensive peripheral chips like high-speed DRAM.

Clock Frequency – The master frequency of periodic pulses that are used to synchronize the operation of equipment.

Clock Jitter – **a)** Timing uncertainty of the data cell edges in a digital signal. **b)** Undesirable random changes in clock phase.

Clock Phase Deviation – See Clock Skew.

Clock Recovery – The reconstruction of timing information from digital data.

Clock Skew – A fixed deviation from proper clock phase that commonly appears in D1 digital video equipment. Some digital distribution amplifiers handle improperly phased clocks by reclocking the output to fall within D1 specifications.

Close Miking – Placing a mike close to the sound source in order to pick up mainly direct sound and avoid picking up reverberant sound.

Closed Captioning – Service that provides decoded text information transmitted with the audio and video signal and displays it at the bottom of the display. See (M) NTSC EIA-608 specification. Transmitted on line 21 of NTSC/525 transmissions, contains subtitling information only. CC has no support for block graphics or multiple pages but it can support 8-colors and the use of an italic typeface. Frequently found on pre-recorded VHS cassettes and LDs, also used in broadcast. Also found on PAL/625 pre-recorded VHS cassettes in a modified version.

Closed Circuit – The method of transmission of programs or other material that limits its target audience to a specific group rather than the general public.

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

Closed GOP – A group of pictures in which the last pictures do not need data from the next GOP for bidirectional coding. Closed GOP is used to make a splice point in a bit stream.

Closed-Loop – Circuit operating with feedback, whose inputs are a function of its outputs.

Closed-Loop Drive – A tape transport mechanism in which the tape’s speed and tension are controlled by contact with a capstan at each end of the head assembly.

Closeup – A camera shot that is tightly framed, with its figure or subject filling the screen. Often qualified as medium closeup or extreme closeup.

CLUT – See Color Lookup Table.

C-MAC – A MAC (Multiplexed Analog Component) with audio and data time multiplexed after modulation, specified for some European DBS. See also MAC.

CMTT – French acronym for the Mixed Telephone and Television Committee, an international standardization committee concerned with such issues as B-ISDN.

CMYK – The designation for the subtractive color system used in pigment printers. CMYK refers to the colors that make up the system – Cyan, Magenta, Yellow, and black. In the CMYK subtractive color system, cyan, magenta, yellow, and black pigments or inks are applied to a white surface to filter that color light information from the white surface to create the final color. Black is used because cyan, magenta, and yellow cannot be combined to create a true black; rather it is a muddy brown.

CMYK Color Space – A subtractive color space with cyan, magenta, and yellow as primary color set with an optional addition of black (K). For such a color set, subtractive color mixture applies. The CMYK values used represent the amount of colorant placed onto the background medium. They include the effects of dot gain.

CNR (Carrier-to-Noise Ratio) – Indicates how far the noise level is down on carrier level.

Coating – The magnetic layer of a magnetic tape, consisting of oxide particles held in a binder that is applied to the base film.

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Coating Resistance – The electrical resistance of the coating measured between two parallel electrodes spaced a known distance apart along the length of tape.

Coating Thickness – The thickness of the magnetic coating applied to the base film of a mag tape. Modern tape coatings range in thickness from 170 to 650 microinches. Coating thickness is normally optimized for the intended application. In general, thin coatings give good resolution at the expense of reduced output at long wavelengths; thick coatings give a high output at long wavelengths at the expense of degraded resolution.

Coaxial Cable – a) A transmission line with a concentric pair of signal carrying conductors. There is an inner conductor and an outer conductor metallic sheath. The sheath aids in preventing external radiation from affecting the signal on the inner conductor and minimizes signal radiation from the transmission line. **b)** A large cable composed of fine foil wires that is used to carry high bandwidth signals such as cable TV or cable modem data streams.

Cobalt Doped Oxide – A type of coating used on magnetic recording tape. This is normally a gamma ferric oxide particle which has been doped with cobalt to achieve a higher coercivity. Modern forms of this oxide are acicular and have been used to make tapes with coercivities in excess of 1000 oersteds.

Co-Channel Interference – Interference caused by two or more television broadcast stations using the same transmission channel in different cities. It is a form of interference that affects only broadcast television.

Code – a) In computers, the machine language itself, or the process of converting from one language to another. **b)** A plan for representing each of a finite number of values or symbols as a particular arrangement or sequence of discrete conditions or events. To encode is to express given information by means of a code. **c)** A system of rules defining a one-to-one correspondence between information and its representation by characters, symbols, or signal elements.

CODEC (Coding/Decoding) – a) The algorithm used to capture analog video or audio onto your hard drive. **b)** Used to implement the physical combination of the coding and decoding circuits. **c)** A device for converting signals from analog to coded digital and then back again for use in digital transmission schemes. Most codecs employ proprietary coding algorithms for data compression. See Coder-Decoder.

Coded Order – The order in which the pictures are stored and decoded. This order is not necessarily the same as the display order.

Coded Orthogonal Frequency-Division Multiplex – A modified form of OFDM. A modulation scheme used for digital transmission that is employed by the European DVB system. It uses a very large number of carriers (hundreds or thousands), each carrying data at a very low rate. The system is relatively insensitive to doppler frequency shifts, and can use multipath signals constructively. It is, therefore, particularly suited for mobile reception and for single-frequency networks.

Coded Representation – A data element as represented in its encoded form.

Code-Excited Linear Prediction – Audio encoding method for low-bit rate codecs.

Coder-Decoder – Used to implement the physical combination of the coding and decoding circuits.

Coding – Representing each level of a video or audio signal as a number, usually in binary form.

Coding Parameters – The set of user-definable parameters that characterize a coded video bit stream. Bit streams are characterized by coding parameters. Decoders are characterized by the bit streams that they are capable of decoding.

Coefficient – a) A number (often a constant) that expresses some property of a physical system in a quantitative way. **b)** A number specifying the amplitude of a particular frequency in a transform.

Coefficient of Friction – The tangential force required to maintain (dynamic coefficient) or initiate (static coefficient) motion between two surfaces divided by the normal force pressing the two surfaces together.

Coefficient of Hygroscopic Expansion – The relative increase in the linear dimension of a tape or base material per percent increase in relative humidity measured in a given humidity range.

Coefficient of Thermal Expansion – The relative increase in the linear dimension of a tape or base material per degree rise in temperature (usually Fahrenheit) measured in a given temperature range.

Coercivity – Measured in oersteds, the measurement of a magnetic characteristic. The demagnetizing force required to reduce the magnetic induction in a magnetic material to zero from its saturated condition.

COFDM (Coded Orthogonal Frequency Domain Multiplex) – Up to 6875 single carriers 1 kHz apart are QAM modulated with up to 64 states. “Coded” means that the data to be modulated has error control. Orthogonality means that the spectra of the individual carriers do not influence each other as a spectral maximum always coincides with a spectrum zero of the adjacent carriers. A single-frequency network is used for the actual transmission.

Collision – The result of two devices trying to use a shared transmission medium simultaneously. The interference ruins both signals, requiring both devices to retransmit the data lost due to collision.

Color Back Porch – Refer to the Horizontal Timing discussion.

Color Background Generator – a) A circuit that generates a full-field solid color for use as a background in a video picture. **b)** A device that produces a full-frame color, normally used as a background for various graphics effects, the output of which is selectable on the last button of all switcher buses.

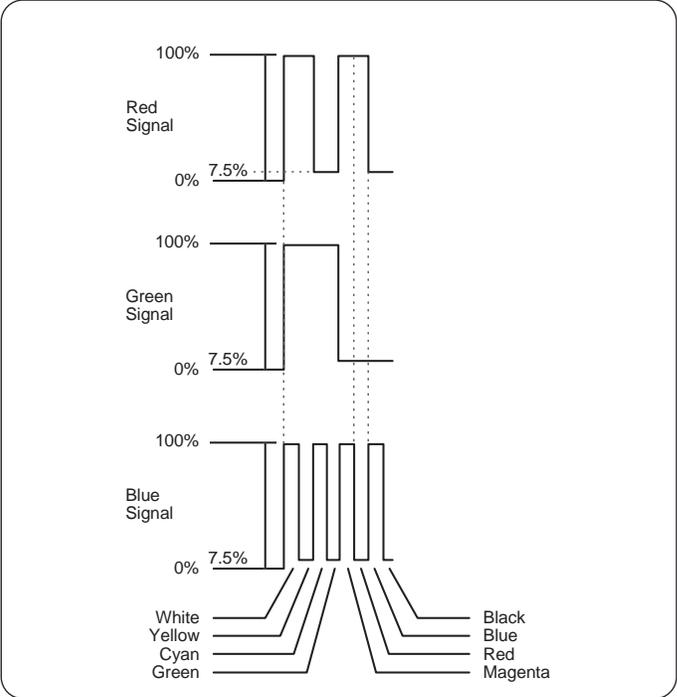
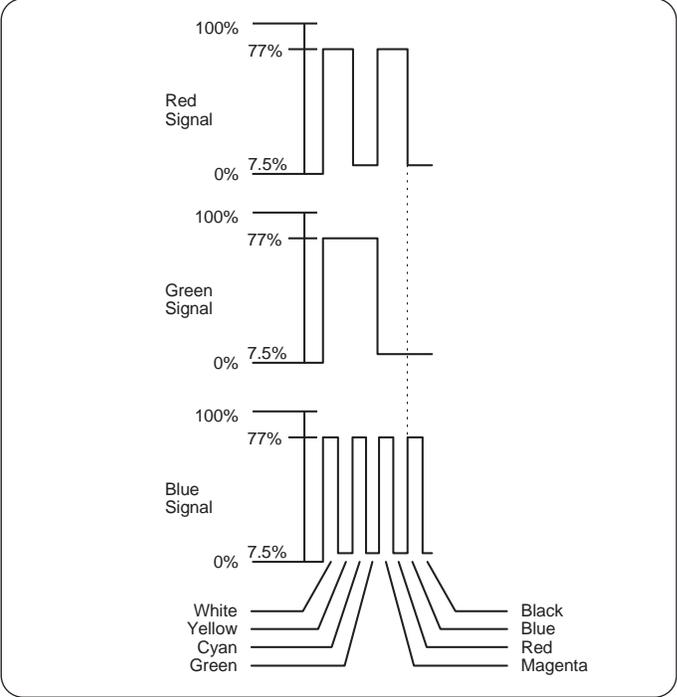
Color Balance – Adjustment of color in the camera to meet a desired standard, i.e., color bar, sponsor’s product, flesh tones. Also may be referred to as “white balance.”

Color Bar Test Signal – Originally designed to test early color camera encoders, it is commonly (albeit incorrectly) used as a standard test signal. The saturated color bars and luminance gray bar are usually used to check monitors for color accuracy. The saturated color bars are a poor test of any nonlinear circuit or system and at best, show video continuity. Testing a video system using color bars is analogous to testing an audio system using a simple set of monotonal frequencies. Many color TV test signals

have been developed to accurately assess video processing equipment such as ADCs, compressors, etc.

Color Bars – A video test signal widely used for system and monitor setup. The test signal, typically containing eight basic colors: white, yellow, cyan, green, magenta, red, blue, and black, is used to check chrominance functions of color TV systems. There are two basic types of NTSC color bar signals in common use. The terms “75% bars” and “100% bars” are generally used to distinguish between the two types. While this terminology is widely used, there is often confusion about exactly which parameters the 75% versus 100% notation refer to. **a) RGB Amplitudes:** The 75%/100% nomenclature specifically refers to the maximum amplitudes reached by the Red, Green, and Blue signals when they form the six primary and secondary colors required for color bars. For 75% bars, the maximum amplitude of the RGB signals is 75% of the peak white level. For 100% bars, the RGB signals can extend up to 100% of peak white. Refer to the following two figures. **b) Saturation:** Both 75% and 100% amplitude color bars are 100% saturated. In the RGB format, colors are saturated if at least one of the primaries is at zero. Note: In the two associated figures that the zero signal level is at setup (7.5 IRE) for NTSC. **c) The Composite Signal** – In the composite signal, both chrominance and luminance amplitudes vary according to the 75%/100% distinction. However, the ratio between chrominance and luminance amplitudes remains constant in order to maintain 100% saturation. **d) White Bar Levels** – Color bar signals can also have different white bar levels, typically either 75% or 100%. This parameter is completely independent of the 75%/100% amplitude distinction and either white level may be associated with either type of bars. **e) Effects of Setup** – Because of setup, the 75% signal level for NTSC is at 77 IRE. The maximum available signal amplitude is 100 – 7.5 or 92.5 IRE. 75% of

92.5 IRE is 69.4 IRE, which when added to the 7.5 IRE pedestal yields a level of approximately 77 IRE.



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Color Black – A composite video signal that produces a black screen when viewed on a television receiver.

Color Burst – **a)** The portion of a color video signal that resides on the backporch between the breezeway and the start of active video that contains a 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. **b)** A nine-cycle-NTSC burst of color subcarrier which is imposed on blanking after sync. Color burst serves as the reference for establishing the picture color.

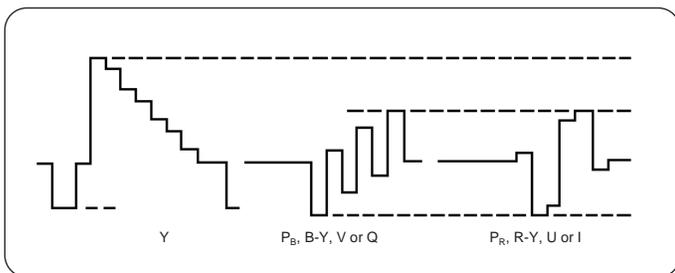
Color Coordinate Transformation – Computation of the tristimulus values of colors in terms of one set of primaries from the tristimulus values of the same colors in another set of primaries. Note: This computation may be performed electrically in a color television system.

Color Correction – **a)** A process by which the coloring in a television image is altered or corrected electronically. Care must be taken to ensure that the modified video does not exceed the limits of subsequent processing or transmission systems. **b)** The adjustment of a color reproduction process to improve the perceived-color conformity of the reproduction to the original.

Color Decoder – A device that 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.a. signals. See Chroma Demodulators.

Color Demodulator – See Chroma Demodulators.

Color Difference Signals – Signals used by color television systems to convey color information (not luminance) in such a way that the signals go to zero when there is no color in the picture. Color difference signal formats include: R-Y and B-Y; I and Q; U and V; P_R and P_B . The figure below shows general color difference waveforms along with the Y signal. The color difference signals must first be converted in their RGB form before they can recreate the picture. Refer to the RGB discussion to view what the RGB version of the color bar signal looks like. The color difference signals in the figure are centered around 0 volts, but this is only true for the SMPTE/EBU N10 standard. The NTSC and M11 color difference standards have the most negative portions of the color difference signals riding on a voltage of 0 volts or close to it.



Color Edging – Spurious colors appearing along the edges of color pictures, but that do not have a color relationship to the picture.

Color Encoder – Performs the reverse function of the chroma demodulator in that it combines the two color difference signals into the single chroma signal.

Color Frame – **a)** In NTSC color television, it takes four fields to complete a color frame. In PAL, it takes eight fields. **b)** Polarity of the video frame. Color frame must alternate polarity with each frame to keep the video signal in phase.

Color Frame Timed – See the Color Framed discussion.

Color Framed – Two signals are said to be color framed at a switcher or router when their field 1, line 10 events (field 1, line 7 in PAL) occur at the same time at the input to the switcher or router. To prevent picture distortions when changing signals at a switcher or router, the signals must be color framed.

Color Gamut – In a system employing three color primaries to encode image color, each primary can be located on a CIE chromaticity diagram and these points connected as a plane figure. If the apexes are then connected with an appropriate value on the white point axis, a so-called figure is produced enclosing the color gamut for that system. (On the CIE chromaticity diagrams, the points in x, y, z space approximate an inverted tetrahedron. In u, v, w space, they become a somewhat irregular four-cornered solid.) Colors within the color gamut solid volume can be reproduced by the system as metameric matches. Colors outside the color gamut solid volume cannot be matched. Note: The area of the cross-section from the color gamut solid is a function of the luminance. Although it is advantageous to have the widest possible color gamut for the ability to provide metameric matches for the largest number of colors, the required transformations from origination colorimetry to colorimetry matched to available display primaries, for example, may require large matrix coefficients and, therefore, a signal-to-noise penalty. The choice of color gamut is a compromise between color rendition and signal-to-noise.

Color Key – See Chroma Key.

Color Killer – Circuitry which disables the receiver's color decoder if the video does not contain color information.

Color Lookup Table (CLUT) – The CLUT is a compression scheme where pixel values in the bitmap represent an index into a color table where the table colors have more bits-per-pixel than the pixel values. In a system where each pixel value is eight bits, there are 256 possible values in the lookup table. This may seem a constraint but, since multiple lookup tables can be referenced, there can be many tables with varying 256 color schemes. CLUTs work best for graphics where colors do not have to be natural.

Color Map – A color map is just a numbered list of colors. Each color is specified in terms of its red, green, and blue components.

Color Map Animation – In normal animation, the images representing separate frames are written on separate pieces of artwork. In computer color map animation, many images can be written into a frame buffer, each with a different color number. By "cycling" white, for example, through the color map, so that only one image at a time is visible, the illusion of animation can be achieved very quickly. PictureMaker's wireframe test mode works this way.

Color Mapping – Color mapping is distinguished by the following: **a)** Each pixel contains a color number (or address) referring to a position in a color map. Each pixel has “n” bits, so there are “2 to the n” color map addresses. **b)** A hardware device called the color map defines the actual RGB values for each color.

Color Masking – A method of correcting color errors which are fundamental in any three primary color additive reproducing system, by electrically changing the R, G, and B signals with a matrix or masking amplifier which mixes (usually subtracts) the signals in a very precise predetermined amount. The form is generally as follows:

$$\begin{array}{ll} R \text{ out} = R \text{ in} + a(G-R) + b(R-B) & a, b, c, d, e, \text{ and } f \text{ are} \\ G \text{ out} = G \text{ in} + c(G-R) + d(B-G) & \text{referred to as the masking} \\ B \text{ out} = B \text{ in} + e(R-B) + f(B-G) & \text{or correction coefficients} \end{array}$$

Color Match, Corresponding – A corresponding color is defined as the stimulus that, under some different condition of adaptation, evokes the same color appearance as another stimulus when it was seen under the original state of adaptation. Color match, corresponding is a subjective judgment.

Color Match, Metameric – a) Color images are metameric matches when their spectrally different color stimuli have identical tristimulus values. The requirements for such a metameric match can be calculated for a specified viewing condition (and for viewing conditions other than those specified, the chromaticity will not be judged to correspond). **b)** The corresponding color chosen for the metameric match will not provide a spectrophotometric match. In practical applications, spectrophotometric matches are of only academic interest, and metameric matches are sought. **c)** Color match, metameric, resulting from calculations based upon colorimetry, produces a visual match as evaluated by the CIE description of human observers.

Color Model – Any of several means of specifying colors according to their individual components. See RGB, YUV.

Color Modulator – See Color Encoder.

Color Palette – A component of a digital video system that provides a means of establishing colors (foreground and background) using a color lookup table to translate a limited set of pixel values into a range of displayable colors by converting the colors to RGB format.

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 Plane – In planar modes, the display memory is separated into four independent planes of memory, with each plane dedicated to controlling one color component (red, green, blue, and intensity). Each pixel of the display occupies one bit position in each plane. In character modes and packed-pixel modes, the data is organized differently.

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 Purity – Describes how close a color is to the mathematical representation of the color.

Color Saturation – The attribute of color perception determining the degree of its difference from the achromatic color perception most resembling it. An achromatic color perception is defined as one not possessing a hue/color. In other words, how much “color” is in an object.

bling it. An achromatic color perception is defined as one not possessing a hue/color. In other words, how much “color” is in an object.

Color Space – The mathematical representation of a color. **a)** Regardless of the color space used, RGB, YIQ, YUV, a color will appear the same on the screen. What is different is how the color is represented in the color space. In the HLS color space, colors are represented based on a three-dimensional polar coordinate system where as in the RGB color space, colors are represented by a Cartesian coordinate system. **b)** Many ways have been devised to organize all of a system's possible colors. Many of these methods have two things in common: a color is specified in terms of three numbers, and by using the numbers as axes in a 3D space of some sort, a color solid can be defined to represent the system. Two spaces are popular for computer graphics: RGB and HSV.

Color Space, Reference – Geometric representation of colors in space, usually of three dimensions. There are three reference spaces recognized by ISO 8613: CMYK color space; CIE Luv color space; and R, G, B color space.

Color Subcarrier – The signal used to modulate the color information in the color encoder and demodulate the color information in the color decoder. For (M) NTSC the frequency of the color subcarrier is about 3.579545 MHz and for (B, D, G, H, I) PAL it's about 4.43 MHz.

Color Temperature – Used to indicate the amount and color of light being given off by an object and is based on the concept of a “black body.” A black body is one which absorbs all incident light rays and reflects none (therefore, a theoretical concept only). If the black body is heated, it begins to emit visible light rays, first dull red, then red, then through orange to “white heat.” It can be likened to the heating of metal. If a metal object is heated enough, the metal body will emit the array of colors mentioned above until the object achieves a bluish-white light. The amount of light being emitted by the body can then be correlated to the amount of “heat” it would take to get the body that hot and that heat can be expressed in terms of degrees Kelvin. Objects that give off light equivalent to daylight have a Kelvin temperature of about 6,500 degrees Kelvin. Colors with a bluish tint, have a color temperature of about 9,000 degrees Kelvin.

Color, Additive – Over a wide range of conditions of observation, many colors can be matched completely by additive mixtures in suitable amounts of three fixed primary colors. The choice of three primary colors, though very wide, is not entirely arbitrary. Any set that is such that none of the primaries can be matched by a mixture of the other two can be used. It follows that the primary color vectors so defined are linearly independent. Therefore, transformations of a metameric match from one color space to another can be predicted via a matrix calculation. The limitations of color gamut apply to each space. The additive color generalization forms the basis of most image capture, and of most self-luminous displays (i.e., CRTs, etc.).

Color, Primary – a) The colors of three reference lights by whose additive mixture nearly all other colors may be produced. **b)** The primaries are chosen to be narrow-band areas or monochromatic points directed toward green, red, and blue within the Cartesian coordinates of three-dimensional color space, such as the CIE x, y, z color space. These primary color points together with the white point define the colorimetry of the standardized system. **c)** Suitable matrix transformations provide metameric conversions,

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constrained by the practical filters, sensors, phosphors, etc. employed in order to achieve conformance to the defined primary colors of the specified system. Similar matrix transformations compensate for the viewing conditions such as a white point of the display different from the white point of the original scene. **d)** Choosing and defining primary colors requires a balance between a wide color gamut reproducing the largest number of observable surface colors and the signal-to-noise penalties of colorimetric transformations requiring larger matrix coefficients as the color gamut is extended. **e)** There is no technical requirement that primary colors should be chosen identical with filter or phosphor dominant wavelengths. The matrix coefficients, however, increase in magnitude as the available display primaries occupy a smaller and smaller portion of the color gamut. (Thus, spectral color primaries, desirable for improved colorimetry, become impractical for CRT displays.) **f)** Although a number of primary color sets are theoretically interesting, CCIR, with international consensus, has established the current technology and practice internationally that is based (within measurement tolerances) upon the following: Red – $x = 0.640$, $y = 0.330$; Green – $x = 0.300$, $y = 0.600$; Blue – $x = 0.150$, $y = 0.060$. **g)** SMPTE offers guidance for further studies in improving color rendition by extending the color gamut. With regard to color gamut, it is felt that the system should embrace a gamut at least as large as that represented by the following primaries: Red – $x = 0.670$, $y = 0.330$; Green – $x = 0.210$, $y = 0.710$; Blue – $x = 0.150$, $y = 0.060$.

Color, Subjective – Subtractive colorimetry achieves metameric matching by removing portions of the spectrum from white light. The subtractive counterparts to the additive color primaries are those which when removed from white leave the red, green, and blue accordingly cyan, magenta, and yellow. Combinations of these subtractive colors in various add mixtures provide metameric matches to many colors. Subtractive color principles are employed in all hard-copy color images and in light-valve systems such as color transparencies, LCD panel display, motion-picture films, etc.

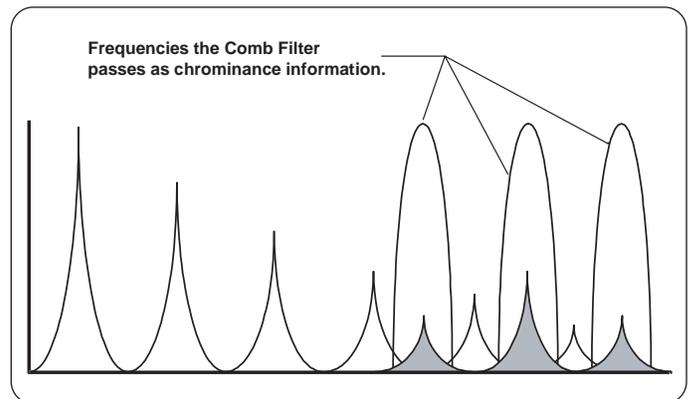
Colorimetry – a) Characteristics of color reproduction including the range of colors that a television system can reproduce. Some ATV schemes call for substantially different colorimetry (with a greater range) than NTSC's.

b) The techniques for the measurement of color and for the interpretation of the results of such computations. Note: The measurement of color is made possible by the properties of the eye, and is based upon a set of conventions.

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.

Color-Matching Functions – a) The tristimulus values of monochromatic stimuli of equal radiant power. The three values of a set of color-matching functions at a given wavelength are called color-coefficients. The color-matching functions may be used to calculate the tristimulus values of a color stimulus from the color stimulus function. **b)** The tristimulus value per unit wavelength interval and unit spectral radiant flux. **c)** A set of three simultaneous equations used to transform a color specification from one set of matching stimuli to another. Note: Color-matching functions adopted by the CIE are tabulated as functions of wavelength throughout the spectrum and are given in Section 13.5 of ANSI/IES RP16-1986.

Comb Filter – A filter that can be used to separate luminance from chrominance in the NTSC or PAL composite video systems. The figure below shows a signal amplitude over frequency representation of the luminance and chrominance information that makes up the composite video signal. The peaks in gray are the chroma information at the color carrier frequency. Note how the chroma information falls between the luminance information that is in white. The comb filter is able to pass just energy found in the chroma frequency areas and not the luminance energy. This selective bandpass profile looks like the teeth of a comb and thus the name comb filter. The comb filter has superior filtering capability when compared to the chroma trap because the chroma trap acts more like a notch filter.



Combination Tone – A tone perceived by the ear which is equal in frequency to the sum or difference of the frequencies of two loud tones that differ by more than 50 Hz.

Combinational Logic – Circuit arrangement in which the output state is determined only by the present states of two or more inputs. Also called Combinatorial Logic.

Combiner – In digital picture manipulators, a device that controls the way in which two or more channels work together. Under software control, it determines the priority of channels (which picture appears in front and which in back) and the types of transitions that can take place between them.

Combo Box – In Microsoft™ Windows, a combination of a text and a list box. You can either type the desired value or select it from the list.

Command Buttons – In Microsoft™ Windows, “button-shaped” symbols that are “pressed” (“clicked on”/chosen) to perform the indicated action.

Comment Field – Field within an instruction that is reserved for comments. Ignored by the compiler or the assembler when the program is converted to machine code.

Common Carrier – Telecommunication company that provides communications transmission services to the public.

Common Data Rate (CDR) – In the search for a single worldwide standard for HDTV, one proposal is to establish a common data rate, to be independent of line structure, frame rate, and sync/blanking.

Common Image Format (CIF) – The standardization of the structure of the samples that represent the picture information of a single frame in digital HDTV, independent of frame rate and sync/blank structure. The uncompressed bit rates for transmitting CIF at 29.97 frames/sec is 36.45 Mbit/sec.

Common Interchange Format (CIF) – A 352 x 240 pixel format for 30 fps video conferencing.

Common Interface Format (CIF) – This video format was developed to easily allow video phone calls between countries. The CIF format has a resolution of 352 x 288 active pixels and a refresh rate of 29.97 frames per second.

Common Intermediate Format (CIF) – Picture format.

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 bidirectional “conversation” between the units. See RS-232/RS-422.

Compact Cassette – A small (4 x 2-1/2 x 1/2”) tape cartridge developed by Philips, containing tape about 1/7” wide, running at 1-7/8 ips. Recordings are bidirectional, with both stereo tracks adjacent for compatibility with monophonic cassette recorders; whose heads scan both stereo tracks at once.

Compact Disc Interactive – CD-I means Compact Disc Interactive. It is meant to provide a standard platform for mass consumer interactive multimedia applications. So it is more akin to CD-DA, in that it is a full specification for both the data/code and standalone playback hardware: a CD-I player has a CPU, RAM, ROM, OS, and audio/video/(MPEG) decoders built into it. Portable players add an LCD screen and speakers/phone jacks. It has limited motion video and still image compression capabilities. It was announced in 1986, and was in beta test by spring 1989. This is a consumer electronics format that uses the optical disc in combination with a computer to provide a home entertainment system that delivers music, graphics, text, animation, and video in the living room. Unlike a CD-ROM drive, a CD-I player is a standalone system that requires no external computer. It plugs directly into a TV and stereo system and comes with a remote control to allow the user to interact with software programs sold on discs. It looks and feels much like a CD player except that you get images as well as music out of it and you can actively control what happens. In fact, it is a CD-DA player and all of your standard music CDs will play on a CD-I player; there is just no video in that case. For a CD-I disk, there may be as few as 1 or as many as 99 data tracks. The sector size in the data tracks of a CD-I disk is approximately 2 kbytes. Sectors are randomly accessible, and, in the case of CD-I, sectors can be multiplexed in up to 16 channels for audio and 32 channels for all other data types. For audio, these channels are equivalent to having 16 parallel audio data channels instantly accessible during the playing of a disk. Some useful references about CD-I are: “Discovering CD-I” available for \$45 from Microware Systems Corp.; “Introducing CD-I” ISBN 0-201-62748-5; “The CD-I Production Handbook” ISBN 0-201-62750-7; “The CD-I Design Handbook” ISBN 0-201-62749-3.

Compact Disc Read Only Memory – a) CD-ROM means “Compact Disc Read Only Memory.” A CD-ROM is physically identical to a Digital Audio

Compact Disc used in a CD player, but the bits recorded on it are interpreted as computer data instead of music. You need to buy a CD-ROM Drive and attach it to your computer in order to use CD-ROMs. A CD-ROM has several advantages over other forms of data storage, and a few disadvantages. A CD-ROM can hold about 650 megabytes of data, the equivalent of thousands of floppy discs. CD-ROMs are not damaged by magnetic fields or the x-rays in airport scanners. The data on a CD-ROM can be accessed much faster than a tape, but CD-ROMs are 10 to 20 times slower than hard discs. **b)** A flat metallic disk that contains information that you can view and copy onto your own hard disk; you cannot change or add to its information.

Companding – See Compressing-Expanding.

Comparator – A circuit that responds to the relative amplitudes of two inputs, A and B, by providing a binary output, Z, that indicates $A > B$ or $A < B$. The comparator has two inputs, X, Y, and one output, Z. A comparator “compares” A to B. If A is larger than B, the output of the comparator is a “1.” If A is smaller than B, the output is a “0.” If $A = B$, the output Z may be undefined and oscillate between “1” and “0” wildly until that condition is removed – it may be a “1,” or it may be a “0.” It depends on how the comparator was designed. The comparator implements the following mathematical function.

If $A - B > 0$, then $Z = 1$

If $A - B < 0$, then $Z = 0$

Compatibility – A complex concept regarding how well ATV schemes work with existing television receivers, transmission channels, home video equipment, and professional production equipment. See also Channel-Compatible, Receiver-Compatible.

A. ATV Receiver Compatibility Levels

Level 5 – ATV signal is displayed as ATV on an NTSC TV set

Level 4 – ATV signal appears as highest quality NTSC on an NTSC TV set

Level 3 – ATV signal appears as reduced quality NTSC on an NTSC TV set

Level 2 – ATV signal requires inexpensive adapter for an NTSC TV set

Level 1 – ATV signal requires expensive adaptor for an NTSC TV set

Level 0 – ATV signal cannot be displayed on an NTSC TV set

B. Compatible ATV Transmission Schemes

- Receiver-compatible and channel-compatible single 6 MHz channel

- Receiver-compatible channel plus augmentation channel

- Necessarily adjacent augmentation channel

- Not necessarily adjacent augmentation channel

- Non-receiver-compatible channel plus simulcast channel

Compatible Video Consortium – An organization established by Cox Enterprises and Tribune Broadcasting, which together own 14 television stations, 24 CATV systems, and two production companies. The CVC, which is open to other organizations, was created to support ATV research and is currently supporting Del Ray’s HD-NTSC system.

Compiler – Translation program that converts high-level program instructions into a set of binary instructions (machine code) for execution. Each

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high-level language requires a compiler or an interpreter. A compiler translates the complete program, which is then executed.

Complement – Process of changing each 1 to a 0 and each 0 to a 1.

Complex Surface – Consists of two or more simple surfaces attached or connected together using specific operations.

Component – **a)** A matrix, block or single pel from one of the three matrices (luminance and two chrominance) that make up a picture. **b)** A television system in which chrominance and luminance are distributed separately; one of the signals of such a television system; or one of the signals that comprise an ATV system (e.g., the widescreen panels component).

Component (Elementary Stream) – One or more entities which together make up an event, e.g., video, audio, teletext.

Component Analog – The unencoded output of a camera, videotape recorder, etc., consisting of three primary color signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats, these three components have been translated into a luminance signal and two color difference signals, for example, Y, B-Y, R-Y.

Component Color – Structure of a video signal wherein the R', G', and B' signals are kept separate from each other or wherein luminance and two band-limited color-difference signals are kept separate from one another. The separation may be achieved by separate channels, or by time-division multiplexing, or by a combination of both.

Component Digital – A digital representation of a component analog signal set, most often Y, B-Y, R-Y. The encoding parameters are specified by CCIR 601. The parallel interface is specified by ITU-r BT.601-2 656 and SMPTE 125M (1991).

Component Digital Post Production – A method of post production that records and processes video completely in the component digital domain. Analog sources are converted only once to the component digital format and then remain in that format throughout the post production process.

Component Gain Balance – Refers to ensuring that each of the three signals that make up the CAV information are amplified equally. Unequal amplification will cause picture lightness or color distortions.

Component Video – Video which exists in the form of three separate signals, all of which are required in order to completely specify the color picture with sound. 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. All Videonics video products support the S-Video (Y/C) component format in addition to standard composite video.

Composite – A television system in which chrominance and luminance are combined into a single signal, as they are in NTSC; any single signal comprised of several components.

Composite Analog – An encoded video signal, such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

Composite Blanking – The complete television blanking signal composed of both line rate and field rate blanking signals. See Line Blanking and Field Blanking.

Composite Chroma Key – **a)** Also known as encoded chroma key. A chroma key which is developed from a composite video source, i.e., off of tape, rather than the components, i.e., RGB, R-Y, B-Y. **b)** A chroma key wherein the keying signal is derived from a composite video signal, as opposed to an RGB chroma key. See Chroma Key.

Composite Color – Structure of a video signal wherein the luminance and two band-limited color-difference signals are simultaneously present in the channel. The format may be achieved by frequency-division multiplexing, quadrature modulation, etc. It is common to strive for integrity by suitable separation of the frequencies, or since scanned video signals are highly periodic, by choosing frequencies such that the chrominance information is interleaved within spectral regions of the luminance signal wherein a minimum of luminance information resides.

Composite Color Signal – A signal consisting of combined luminance and chrominance information using frequency-domain multiplexing. For example, NTSC and PAL video signals.

Composite Digital – A digitally encoded video signal, such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

Composite Image – An image that contains elements selected from two or more separately originated images.

Composite Sync – Horizontal and vertical sync pulses combined. Often referred to simply as "sync." Sync is used by source and monitoring equipment.

Composite Video – **a)** A single video signal containing all of the necessary information to reproduce a color picture. Created by adding quadrature amplitude modulated R-Y and B-Y to the luminance signal. A video signal that contains horizontal, vertical and color synchronizing information. **b)** A complete video including all synchronizing pulses; may have all values of chroma, hue and luminance; may also be many sources layered.

Compositing – Layering multiple pictures on top of each other. A cutout or matte holds back the background and allows the foreground picture to appear to be in the original picture. Used primarily for special effects.

Composition – Framing or makeup of a video shot.

Compress – **a)** The process of converting video and audio data into a more compact form for storage or transmission. **b)** A digital picture manipulator effect where the picture is squeezed (made proportionally smaller).

Compressed Serial Digital Interface (CSDI) – A way of compressing digital video for use on SDI-based equipment proposed by Panasonic. Now incorporated into Serial Digital Transport Interface.

Compressing-Expanding – Analog compression is used at one point in the communications path to reduce the amplitude range of the signals, followed by an expander to produce a complementary increase in the amplitude range.

Compression – a) The process of electronically processing a digital video picture to make it use less storage or to allow more video to be sent down a transmission channel. **b)** The process of removing picture data to decrease the size of a video image. **c)** The reduction in the volume of data from any given process so that more data can be stored in a smaller space. There are a variety of compression schemes that can be applied to data of which MPEG-1 and MPEG-2 are called lossy since the data produced by compression is not totally recoverable. There are other compression schemes that are totally recoverable, but the degree of compression is much more limited.

Compression (Amplitude) – a) Data Transmission – A process in which the effective gain applied to a signal is varied as a function of the signal magnitude, the effective gain being greater for small rather than for large signals. **b) Video** – The reduction in amplitude gain at one level of a picture signal with respect to the gain at another level of the same signal. Note: The gain referred to in the definition is for a signal amplitude small in comparison with the total peak-to-peak picture signal involved. A quantitative evaluation of this effect can be obtained by a measurement of differential gain. **c) Production** – A transfer function (as in gamma correction) or other nonlinear adjustment imposed upon signal amplitude values.

Compression (Bit Rate) – Compression is used in the digital environment to describe initial digital quantization employing transforms and algorithms encoding data into a representation that requires fewer bits or lower data rates or processing of an existing digital bit stream to convey the intended information in fewer bits or lower data rate. Compression (bit rate) may be reversible compression, lossless, or it may be irreversible compression, lossy.

Compression Artifacts – Compacting of a digital signal, particularly when a high compression ratio is used, may result in small errors in the decompressed signal. These errors are known as “artifacts,” or unwanted defects. The artifacts may resemble noise (or edge “busyness”) or may cause parts of the picture, particularly fast moving portions, to be displayed with the movement distorted or missing.

Compression Factor – Ratio of input bit rate to output (compressed) bit rate. Like Compression Ratio.

Compression Ratio – A value that indicates by what factor an image file has been reduced after compression. If a 1 MB image file is compressed to 500 KB, the compression ratio would be a factor of 2. The higher the ratio the greater the compression.

Compression, Lossless – Lossless compression requires that the reproduced reconstructed bit stream be an exact replica of the original bit stream. The useful algorithms recognize redundancy and inefficiencies in the encoding and are most effective when designed for the statistical properties of the bit stream. Lossless compression of image signal requires that the decoded images match the source images exactly. Because of differences in the statistical distributions in the bit streams, different techniques have thus been found effective for lossless compression of either arbitrary computer data, pictures, or sound.

Compression, Lossy – Bit-rate reduction of an image signal by powerful algorithms that compress beyond what is achievable in lossless compression, or quasi-lossless compression. It accepts loss of information and

introduction of artifacts which can be ignored as unimportant when viewed in direct comparison with the original. Advantage is taken of the subtended viewing angle for the intended display, the perceptual characteristics of human vision, the statistics of image populations, and the objectives of the display. The lost information cannot be regenerated from the compressed bit stream.

Compression, Quasi-Lossless – Bit-rate reduction of an image signal, by an algorithm recognizing the high degree of correlation ascertainable in specific images. The reproduced image does not replicate the original when viewed in direct comparison, but the losses are not obvious or recognizable under the intended display conditions. The algorithm may apply transform coding, predictive techniques, and other modeling of the image signal, plus some form of entropy encoding. While the image appears unaltered to normal human vision, it may show losses and artifacts when analyzed in other systems (i.e., chroma key, computerized image analysis, etc.). The lost information cannot be regenerated from the compressed bit stream.

Compressionist – One who controls the compression process to produce results better than would be normally expected from an automated system.

Compressor – An analog device that reduces the dynamic range of a signal by either reducing the level of loud signals or increasing the level of soft signals when the combined level of all the frequencies contained in the input is above or below a certain threshold level.

Computer – General purpose computing system incorporating a CPU, memory, I/O facilities, and power supply.

Computer Television – Name of a Time Inc. pay-TV company that predated HBO; also an unrealized concept created by Paul Klein, the company’s founder, that would allow viewers access to a vast selection of television programming with no temporal restrictions, in the same way that telephone subscribers can call any number at any time. B-ISDN might offer the key to the transmission problem of computer television; the random-access library-storage problems remain.

Concatenation – Linking together (of systems). Although the effect on quality resulting from a signal passing through many systems has always been a concern, the use of a series of compressed digital video systems is, as yet, not well known. The matter is complicated by virtually all digital compression systems differing in some way from each other, hence the need to be aware of concatenation. For broadcast, the current NTSC and PAL analog compression systems will, more and more, operate alongside digital MPEG compression systems used for transmission and, possibly, in the studio. Even the same brand and model of encoder may encode the same signal in a different manner. See also Mole Technology.

Condenser Mike – A microphone which converts sound pressure level variations into variations in capacitance and then into electrical voltage.

Condition Code – Refers to a limited group of program conditions, such as carry, borrow, overflow, etc., that are pertinent to the execution of instructions. The codes are contained in a condition code register. Same as Flag Register.

Conditional Access System (CA) – A system to control subscriber access to services, programs, and events, e.g., Videoguard, Eurocrypt.

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Conditional Jump or Call – Instruction that, when reached in a program, will cause the computer either to continue with the next instruction in the original sequence or to transfer control to another instruction, depending on a predetermined condition.

Conductive Coatings – Coatings that are specially treated to reduce the coating resistance, and thus prevent the accumulation of static electrical charge. Untreated, non-conductive coatings may become highly charged, causing transport, noise, and dust-attraction problems.

Confidence Test – A test to make sure a particular device (such as the keyboard, mouse, or a drive) is set up and working properly.

CONFIG.SYS – A file that provides the system with information regarding application requirements. This information may include peripherals that are connected and require special drivers (such as a mouse). Other information that might be specified is the number of files that can be open simultaneously, or the number of disk drives that can be accessed.

Configuration File – A system file that you change to customize the way your system behaves. Such files are sometimes referred to as customization files.

Connector – Hardware at the end of a cable that lets you fasten the cable to an outlet, port, or another connector.

Console Window – The window that appears each time you log in. IRIX reports all status and error messages to this window.

Constant – A fixed value.

Constant Bit Rate (CBR) – **a)** Operation where the bit rate is constant from start to finish of the compressed bit stream. **b)** A variety of MPEG video compression where the amount of compression does not change. **c)** CBR traffic requires guaranteed levels of service and throughput in delay-sensitive applications such as audio and video that are digitized and represented by a continuous bit stream.

Constant Bit Rate Coded Video – A compressed video bit stream with a constant average bit rate.

Constant Luminance Principle – A rule of composite color television that any change in color not accompanied by a change in brightness should not have any effect on the brightness of the image displayed on a picture tube. The constant luminance principle is generally violated by existing NTSC encoders and decoders. See also Gamma.

Constant Shading – The simplest shading type is constant. The color of a constant shaded polygon's interior pixels is always the same, regardless of the polygon's orientation with respect to the viewer and light sources. Constant shading is useful for creating light sources, for example. With all other shading types, a polygon changes its shade as it moves.

Constellation Diagram – Way of representing the I and Q components of QAM or QPSK modulation. The position of the points in the constellation diagram provides information about distortions in the QAM or QPSK modulator as well as about distortions after the transmission of digitally coded signals.

Constructive Solid Geometry (CSG) – This way of modeling builds a world by combining "primitive" solids such as cubes, spheres, and cones. The operations that combine these primitives are typically union, intersec-

tion, and difference. These are called Boolean operations. A CSG database is called a CSG tree. In the tree, branch points indicate the operations that take place on the solids that flow into the branch point.

Content – The program content will consist of the sum total of the essence (video, audio, data, graphics, etc.) and the metadata. Content can include television programming, data, and executable software.

Content-Based Image Coding – The analysis of an image to recognize the objects of the scene (e.g., a house, a person, a car, a face, ...). The objects, once recognized, are coded as parameters to a general object model (of the house, person, car, face, ...) which is then synthesized (i.e., rendered) by the decoder using computer graphic techniques.

Contour Enhancement – A general term usually intended to include both aperture correction and edge enhancement.

Contouring – Video picture defect due to quantizing at too coarse a level. The visual effect of this defect is that pictures take on a layered look somewhat like a geographical contoured map.

Contrast – Contrast describes the difference between the white and black levels in a video waveform. If there is a large difference between the white and black picture levels, the image has high contrast. If there is a small difference between the white and black portions of the picture, the picture has low contrast and takes on a gray appearance.

Contrast Ratio – **a)** Related to gamma law and is a measurement of the maximum range of light to dark objects that a television system can reproduce. **b)** The comparison of the brightest part of the screen to the darkest part of the screen, expressed as a ratio. The maximum contrast ratio for television production is 30 x 1.

Contribution – A form of signal transmission where the destination is not the ultimate viewer and where processing (such as electronic matting) is likely to be applied to the signal before it reaches the ultimate viewer. Contribution demands higher signal quality than does distribution because of the processing.

Contribution Quality – The level of quality of a television signal from the network to its affiliates. For digital television, this is approximately 45 Mbps.

Control Block – Circuits that perform the control functions of the CPU. They are responsible for decoding instructions and then generating the internal control signals that perform the operations requested.

Control Bus – Set of control lines in a computer system. Provides the synchronization and control information necessary to run the system.

Control Menu Box – Located on the upper left corner of all application windows, document windows, and dialog boxes, it sizes (maximize, minimize, or restore) or exits the window.

Control Processor Unit/Central Processing Unit (CPU) – **a)** Circuits used to generate or alter control signals. **b)** A card in the frame which controls overall switcher operation.

Control Program – Sequence of instructions that guide the CPU through the various operations it must perform. This program is stored permanently in ROM where it can be accessed by the CPU during operation. Usually this ROM is located within the microprocessor chip. Same as Microprogram or Microcode.

Control Room – The enclosed room where the electronic control system for radio and television are located and where the director and technical director sit.

Control Signal – A signal used to cause an alteration or transition of video signals.

Control Track – **a)** The magnetized portion along the length of a video-tape 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. **b)** A synchronizing signal on the edge of the tape which provides a reference for tracking control and tape speed. Control tracks that have heavy dropouts are improperly recorded and may cause tracking defects or picture jumps. **c)** A signal recorded on video tape to allow the tape to play back at a precise speed in any VTR. Analogous to the sprocket holes on film.

Control Track Editor – Type of editing system that uses frame pulses on the videotape control track for reference.

Control-L (LANC) – 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 that duplicates a VCR's infra-red 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.

Conventional Definition Television (CDTV) – This term is used to signify the analog NTSC television system as defined in ITU-R Recommendation 470. See also Standard Definition Television and ITU-R Recommendation 1125.

Convergence – The act of adjusting or the state of having adjusted, the Red, Green, and Blue color gun deflection such that the electron beams are all hitting the same color triad at the same time.

Conversion, Frame-Rate – Standardized image systems now exist in the following frame rates per second: 24, 25, 29.97, 30, and 60. In transcoding from one system to another, frame rate conversion algorithms perform this conversion. The algorithm may be as simple as to drop or add frames or fields, or it may process the information to generate predictive frames employing information from the original sequence. In interlace systems, the algorithm may be applied independently to each field.

Convolutional Coding – The data stream to be transmitted via satellite (DVB-S) is loaded bit by bit into shift registers. The data which is split and delayed as it is shifted through different registers is combined in several paths. This means that double the data rate (two paths) is usually obtained.

Puncturing follows to reduce the data rate: the time sequence of the bits is predefined by this coding and is represented by the trellis diagram.

Coordination System – See Reference.

COR – Technical Corrigendum.

CORBA – Common Object Request Broker Architecture.

Core – Small magnetic toruses of ferrite that are used to store a bit of information. These can be strung on wires so that large memory arrays can be formed. The main advantage of core memory is that it is nonvolatile.

Coring – A system for reducing the noise content of circuits by removing low-amplitude noise riding on the baseline of the signals. Both aperture correction and enhancement can be cored. It involves preventing any boosting of very low level edge transitions. The threshold point is the coring control. The more the coring is increased, the more the extra noise added by the enhanced (or aperture corrector), high frequency boosting is reduced. Of course, the fine detail enhancement is also reduced or eliminated. Too high levels of coring can cause a "plastic picture" effect.

Co-Sited Sampling – Co-sited sampling ensures that the luminance and the chrominance digital information is simultaneous, minimizing chroma/luma delay. This sampling technique is applied to color difference component video signals: Y, Cr, and Cb. The color difference signals, Cr and Cb, are sampled at a sub-multiple of Y, the luminance frequency – 4:2:2, for example. With co-sited sampling, the two color difference signals are sampled at the same instant, as well as one of the luminance samples.

Co-Siting – Relates to SMPTE 125M component digital video, in which the luminance component (Y) is sampled four times for every two samples of the two chrominance components (Cb and Cr). Co-siting refers to delaying transmission of the Cr component to occur at the same time as the second sample of luminance data. This produces a sampling order as follows: Y1/Cb1, Y2/Cr1, Y3/Cr3, Y4/Cb3, and so on. Co-siting reduces required bus width from 30 bits to 20 bits.

CPE – Common Phase Error.

CPS – Characters Per Second.

CPU – See Central Processing Unit.

CPU Board – The printed circuit board within a workstation chassis that contains the central processing unit(s). When you open the front metal panel of the Indigo chassis, it is the board on the left.

CPV – A proprietary and relatively old format designed for 30 fps video over packet-based networks. It is still being used in closed video systems where 30 fps is required, such as in security applications.

C_R – Scaled version of the R-Y signal.

Crawl – **a)** Titles that move slowly up the screen, mounted on a revolving drum. **b)** An appearance of motion in an image where there should be none. See also Chroma Crawl and Line Crawl.

CRC – See Cyclic Redundancy Check.

Credits – Listing of actors, singers, directors, etc., in title preceding or directly following the program.

Crispening – A means of increasing picture sharpness by generating and applying a second time derivative of the original signal.

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Crop – Term used for the action of moving left, right, top, and bottom boundaries of a key.

Cropping – A digital process which removes areas of a picture (frame) by replacing video pixels with opaque pixels of background colors. Cropping may be used to eliminate unwanted picture areas such as edges or as quasi-masking in preparation for keying.

Cross Color – Spurious signals resulting from high frequency luminance information being interpreted as color information in decoding a composite signal. Typical video examples are “rainbow” on venetian blinds and striped shirts for example.

Cross Luminance – Spurious signals occurring in the Y channel as a result of composite chroma signals being interpreted as luminance, such as “dot crawl” or “busy edges” on colored areas.

Cross Modulation – See Chrominance-to-Luminance Intermodulation.

Cross-Assembler – Assembler that runs on a processor whose assembly language is different from the language being assembled.

Cross-Color – An artifact observed in composite systems employing quadrature modulation and frequency interleaving. Cross-color results from the multiplicities of line-scan harmonics in the baseband signal, which provide families of frequencies surrounding each of the main harmonic peaks. These families become even more complex if there is movement in the scene luminance signals between scans. Since the interstices are, therefore, not completely empty, some of the information on the luminance signal is subsequently decoded as color information. A typical visible effect is a moiré pattern.

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. See Mix.

Crosshatch – A test pattern consisting of vertical and horizontal lines used for converging color monitors and cameras.

Cross-Luminance – An artifact observed in composite systems employing quadrature modulation and frequency interleaving. As the analog of cross-color, cross-luminance results in some of the information carried by the chrominance signal (on color subcarrier) being subsequently interpreted as fine detail luminance information. A typical visible effect is chroma crawl and visible subcarrier.

Crossover Network – A device which divides a signal into two or more frequency bands before low-frequency outputs of a crossover network. The level of each output at this frequency is 3 dB down from the flat section of the crossover’s frequency response curve.

Cross-Play – By cross-play capability is meant the ability to record and reproduce on the same or a different machine; record at one speed and reproduce at the same or a different speed; accomplish the foregoing singly or in any combination without readjustment for tape or transport type.

Crosspoint – **a)** The electronic circuit used to switch video, usually on a bus. **b)** An electronic switch, usually controlled by a push-button on the panel, or remotely by computer that allows video or audio to pass when the switch is closed.

Cross-Sectional Modeling – This type of modeling is also a boundary representation method available in PictureMaker. The artist can define an object’s cross-section, and then extrude in the longitudinal direction after selecting an outline to define the cross-section changes in scale as it traverses the longitudinal axis.

Crosstalk – The interference between two audio or two video signals caused by unwanted stray signals. **a)** 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. **b)** In audio, signal leakage, typically between left and right channels or between different inputs, can be caused by poor grounding connections or improperly shielded cables. See Chrominance-to-Luminance Intermodulation.

Crosstalk Noise – The signal-to-crosstalk noise ratio is the ratio, in decibels, of the nominal amplitude of the luminance signal (100 IRE units) to the peak-to-peak amplitude of the interfering waveform.

CRT (Cathode Ray Tube) – There are three forms of display CRTs in color television: tri-color (a color picture tube), monochrome (black and white), and single color (red, green, or blue, used in projection television systems). Many widescreen ATV schemes would require a different shape CRT, particularly for direct-view systems.

CRT Terminal – Computer terminal using a CRT display and a keyboard, usually connected to the computer by a serial link.

CSA – Common Scrambling Algorithm.

CSDI – See Compressed Serial Digital Interface.

CSELT (Centro Studi e Laboratori Telecomunicazioni S.p.A.) – CSELT situated in Torino, Italy, is the research company owned by STET (Societa Finanziaria Telefonica per Azioni), the largest telecommunications company in Italy. CSELT has contributed to standards under ITU, ISO, and ETSI and has participated in various research programs. In order to influence the production of standards, CSELT participates in groups such as DAVIC, the ATM Forum, and in the Network Management Forum.

CSG (Constructive Solid Geometry) – In CSG, solid objects are represented as Boolean combinations (union, intersection, and difference) of solids.

CSPS – Constrained System Parameter Stream.

CSS (Content Scrambling System) – A type of digital copy protection sanctioned by the DVD forum.

CTA – Cordless Terminal Adapter.

Cue – **a)** An editing term meaning to bring all source and record VTRs to the predetermined edit point plus pre-roll time. **b)** An audio mixer function that allows the user to hear an audio source (usually through headphones) without selecting that source for broadcast/recording; the audio counterpart of a preview monitor. **c)** The act of rewinding and/or fast-forwarding a video- or audiotape so that the desired section is ready for play.

Cue Control – A switch that temporarily disables a recorder’s Tape Lifters during fast forward and rewind so the operator can judge what portion of the recording is passing the heads.

Cupping – Curvature of a tape in the lateral direction. Cupping may occur because of improper drying or curing of the coating or because of differences between the coefficients of thermal or hygroscopic expansion of coating and base film.

Current – The flow of electrons.

Current Tracer – Handheld troubleshooting tool used to detect current flow in logic circuits.

Current Working Directory – The directory within the file system in which you are currently located when you are working in a shell window.

Cursor – **a)** The small arrow on the screen that echoes the movements of the mouse. It changes shape depending on its location on the screen.

b) An indicator on a screen that can be moved to highlight a particular function or control which is the current parameter now under adjustment or selected.

Curve – A single continuous line with continuity of tangent vector and of curvature. It is defined by its type, degree, and rational feature.

Cusp – Breakpoints on curves.

Cut – **a)** The immediate switching from one video source to another during the vertical blanking interval. The visual effect is an abrupt change from one picture to another. **b)** The nearly instantaneous switch from one picture to another at the on-air output of the switcher. The switcher circuitry allows cuts only during the vertical interval of the video signal so as to prevent disruption of the picture. On the Vista, the Cut push-button in the Effects Transition control group activates an effects cut. The DSK Cut Key-In push-button cuts the downstream key on or off air. On AVCs, this is performed by a zero time auto transition.

Cut-Off Frequency – That frequency beyond which no appreciable energy is transmitted. It may refer to either an upper or lower limit of a frequency band.

Cutout – See Matte.

Cuts Only – Transition limited to on/off or instantaneous transition-type edits; a basic editing process with limited capabilities.

Cutting Head – A transducer used to convert electrical signals into hills and valleys in the sides of record grooves.

CVC – Compatible Video Consortium.

CW (Continuous Wave) – Refers to a separate subcarrier sine wave used for synchronization of the chrominance information.

CX Noise Reduction – A level sensitive audio noise reduction scheme that involves compression, on the encode side, and expansion, on the decode side. It was originally developed for CBS for noise reduction on LP records and is a trademark of CBS, Inc. The noise reduction obtained by CX was to be better than Dolby B3 for tape, but remain unnoticeable in playback if decoding didn't take place. A modified CX system was applied to the analog audio tracks for the laserdisc to compensate for interference between the audio and video carriers. The original CX system for LP records was never implemented.

Cycle – An alternation of a waveform which begins at a point, passes through the zero line and ends at a point with the same value and moving in the same direction as the starting point.

Cycle Per Second – A measure of frequency, equivalent to Hertz.

Cycle Time – Total time required by a memory device to complete a read or write cycle and become available again.

Cyclic Redundancy Check (CRC) – **a)** Binary polynomial. Used to generate check information on blocks of data. Similar to a checksum, but is harder to generate and more reliable. **b)** Used in data transfer to check if the data has been corrupted. It is a check value calculated for a data stream by feeding it through a shifter with feedback terms "EXORed" back in. A CRC can detect errors but not repair them, unlike an ECC, which is attached to almost any burst of data that might possibly be corrupted. CRCs are used on disks, ITU-R 601 data, Ethernet packets, etc.

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D – Definition.

D1 – A non-compressed component digital video recording format that uses data conforming to the ITU-R BT.601-2 standard. Records on high-end 19 mm (3/4") magnetic tape recorders. Systems manufactured by Sony and BTS. Most models can record 525, 625, ITU-R BT.601-2, and SMPTE 125M. The D1 designation is often used incorrectly to indicate component digital video.

D16 – A format to store film resolution images on D1 format tape recorders. Records one film frame in the space normally used for 16 video frames.

D2 – A non-compressed composite digital video recording format originally developed by Ampex that uses data conforming to SMPTE 244M and four 20-bit audio channels. Records on high-end 19 mm (3/4") magnetic tape recorders. It uses the same tape cassette cartridge but the tape itself is metal particle tape like Beta SP and MII. The D2 designation is often used incorrectly to indicate composite digital video.

D2-MAC – Similar to D-MAC, the form preferred by manufacturers for European DBS. See also MAC.

D3 – A non-compressed composite digital video recording format that uses data conforming to SMPTE 244M and four 20-bit audio channels. Records on high-end 1/2" magnetic tape similar to M-II. The format was developed by Matsushita and Panasonic.

D4 – A format designation never used due to the fact that the number four is considered unlucky (being synonymous with death) in some Asian languages.

D5 – A non-compressed, 10-bit 270 Mbit/second, component or composite digital video recording format developed by Matsushita and Panasonic. It is compatible with 360 Mbit/second systems. It records on high-end 1/2" magnetic tape recorders.

D6 – A digital tape format which uses a 19 mm helical-scan cassette tape to record uncompressed high definition television material at 1.88 GBps (1.2 Gbps).

D7 – DVCPRO. Panasonic's development of native DV component format.

D8 – There is no D8, nor will there be. The Television Recording and Reproduction Technology Committee of SMPTE decided to skip D8 because of the possibility of confusion with similarly named digital audio and data recorders.

D9 – Digital-S. A 1/2-inch digital tape format developed by JVC which uses a high-density metal particle tape running at 57.8 mm/s to record a video data rate of 50 Mbps.

DA-88 – A Tascam-brand eight-track digital audio tape machine using the 8 mm video format of Sony. It has become the defacto standard for audio post production though there are numerous other formats, ranging from swappable hard drives to analog tape formats and everything in between.

DAB – See Digital Audio Broadcasting.

DAC – Digital-to-Analog Converter.

DAC to DAC Skew – The difference in a full scale transition between R, B, and B DAC outputs measured at the 50% transition point. Skew is measured in tenths of nanoseconds.

Daisy Chain – Bus line that is interconnected with units so that the signal passes from one unit to the next in serial fashion.

DAM – DECT Authentication Module.

Damped Oscillation – Oscillation which, because the driving force has been removed, gradually dies out, each swing being smaller than the preceding in smooth regular decay.

DAT (Digital Audio Tape) – **a)** A consumer digital audio recording and playback system developed by Sony, with a signal quality capability surpassing that of the CD. **b)** A magnetic tape from which you can read and to which you can copy audio and digital information.

Data – General term denoting any or all facts, numbers, letters, and symbols or facts that refer to or describe an object, idea, condition, situation, or other factors. Connotes basic elements of information that can be processed or produced by a computer. Sometimes data is considered to be expressible only in numerical form, but information is not so limited.

Data Acquisition – Collection of data from external sensors usually in analog form.

Data Base – Systematic organization of data files for easy access, retrieval, and updating.

Data Bus – Set of lines carrying data. The data bus is usually bidirectional and three-state.

Data Carousels – The data broadcast specification for data carousels supports data broadcast services that require the periodic transmission of data modules through DVB compliant broadcast networks. The modules are of known sizes and may be updated, added to, or removed from the data carousel in time. Modules can be clustered into a group of modules if required by the service. Likewise, groups can in turn be clustered into SuperGroups. Data broadcast according to the data carousel specification is transmitted in a DSM-CC data carousel which is defined in MPEG-2 DSM-CC. This specification defines additional structures and descriptors to be used in DV compliant networks. The method is such that no explicit references are made to PIDs and timing parameters enabling preparation of the content off-line.

Data Compression – Application of an algorithm to reduce the bit rate of a digital signal, or the bandwidth of an analog signal while preserving as much as possible of the information usually with the objective of meeting the constraints in subsequent portions of the system.

Data Domain – Analysis or display of signals in which only their digital value is considered and not their precise voltage or timing. A logic state analyzer displays information in the data domain.

Data Element – An item of data as represented before encoding and after decoding.

Data Essence – Essence that is distinguished as different from video or audio essence. Digital data that may stand alone or may be associated with video or audio essence or metadata.

Data Partitioning – A method for dividing a bit stream into two separate bit streams for error resilience purposes. The two bit streams have to be recombined before decoding.

Data Piping – The data broadcast specification profile for data pipes supports data broadcast services that require a simple, asynchronous, end-to-end delivery of data through DVB compliant broadcast networks. Data broadcast according to the data pipe specification is carried directly in the payloads of MPEG-2 TS packets.

Data Rate – The speed at which digital information is transmitted, typically expressed in hertz (Hz), bits/second (b/s), or bytes/sec (B/s). The higher the data rate of your video capture, the lower the compression and the higher the video quality. The higher the data rate, the faster your hard drives must be. Also called throughput.

Data Reduction – The process of reducing the number of recorded or transmitted digital data samples through the exclusion of redundant or unessential samples. Also referred to as Data Compression.

Data Search Information (DSI) – These packets are part of the 1.00 Mbit/s overhead in video applications. These packets contain navigation information for searching and seamless playback of the Video Object Unit (VOBU). The most important field in this packet is the sector address. This shows where the first reference frame of the video object begins. Advanced angle change and presentation timing are included to assist seamless playback. They are removed before entering the MPEG systems buffer, also known as the System Target Decoder (STD).

Data Set – A group of two or more data essence or metadata elements that are predefined in the relevant data essence standard or Dynamic Metadata Dictionary and are grouped together under one UL Data Key. Set members are not guaranteed to exist or be in any order.

Data Streaming – The data broadcast, specification profile for data streaming supports data broadcast services that require a streaming-oriented, end-to-end delivery of data in either an asynchronous, synchronous, or synchronized way through DVB compliant broadcast networks. Data broadcast according to the data streaming specification is carried in Program Elementary Stream (PES) packets which are defined in MPEG-2 systems. See Asynchronous Data Streaming, Synchronous Data Streaming.

DATV (Digitally Assisted Television) – An ATV scheme first proposed in Britain.

DAVIC (Digital Audio Visual Council) – Facing a need to make a multitude of audio/visual technologies and network protocols interoperate, DAVIC was formed in 1993 by Dr. Leonardo Chiariglione, convenor of the MPEG. The purpose of DAVIC is to provide specifications of open interfaces and protocols to maximize interoperability in digital audio/visual applications and services. Thus, DAVIC operates as an extension of technology development centers, such as MPEG.

dB – Abbreviation for decibels. dB is a standard unit for expressing changes in relative power. Variations of this formula describe power changes in terms of voltage or current.

$$\text{dB} = 10 \log_{10}(P1/P2)$$

dBm – Refer to the definition of dB. dBm is a special case of dB where P2 in the dB formula is equal to 1 mW.

dBFS – Decibel Full Scale.

DBN – See Data Block Number.

DBS – See Direct Broadcast Satellite.

dBw – Refer to the definition of dB. dBw is a special case of dB where P2 in the dB formula is equal to 1 watt.

DC Coefficient – The DCT coefficient for which the frequency is zero in both dimensions.

DC Coupled – A connection configured so that both the signal (AC component) and the constant voltage on which it is riding (DC component) are passed through.

DC Erasure – See Erasure.

DC Noise – The noise arising when reproducing a tape which has been non-uniformly magnetized by energizing the record head with DC, either in the presence or absence of bias. This noise has pronounced long wavelength components which can be as much as 20 dB higher than those obtained from a bulk erased tape. At very high values of DC, the DC noise approaches the saturation noise.

DC Restore – DC restore is the process in which a video waveform has its sync tips or backporch set to some known DC voltage level after it has been AC coupled.

DC Restorer – A circuit used in picture monitors and waveform monitors to clamp one point of the waveform to a fixed DC level.

DC Servo Motor – A motor, the speed of which is determined by the DC voltage applied to it and has provision for sensing its own speed and applying correcting voltages to keep it running at a certain speed.

DCAM – Digital Camera.

DCC (Digital Compact Cassette) – A consumer format from Philips using PASC audio coding.

DCE – Data Communication Equipment.

DCI (Display Control Interface) – A software layer that provides direct control of the display system to an application or client. The display vendor provides information to the system (in addition to the display driver) that allows DCI to offer a generic interface to a client.

DCT – See Discrete Cosine Transform.

DCT Coefficient – The amplitude of a specific cosine basis function.

DCT Recording Format – Proprietary recording format developed by Ampex that uses a 19 mm (3/4") recording cassette. Records ITU-R BT.601-2 and SMPTE 125M data with a 2:1 compression.

DCT-1/IDCT – Inverse Discrete Cosine Transform.

DD (Direct Draw) – A Windows 95 version of DCI. See DCI.

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DD2 – Data recorders that have been developed using D2 tape offer relatively vast storage of image or other data. Various data transfer rates are available for different computer interfaces. Other computer storage media editing is difficult and images are not directly viewable.

DDB – Download Data Block.

DDC – Data Download Control.

DDC2B – A serial control interface standard used to operate control registers in picture monitors and video chips. The two-wire system is defined by data and clock signals.

DDP (Disc Description Protocol) – A file or group of files which describe how to master a data image file for optical disc (DVD or CD). This is an ANSI industry standard developed by Doug Carson and Associates. The laser beam recorders use this information in the mastering process.

DDR (Digital Disk Recorder) – See Digital Disk Recorder.

DDS – Digital Data Service.

Debouncing – Elimination of the bounce signals characteristic of mechanical switches. Debouncing can be performed by either hardware or software.

Debugger – A program designed to facilitate software debugging. In general, it provides breakpoints, dump facilities, and the ability to examine and modify registers and memory.

Decay – **a)** The length of time it takes for an audio signal to fall below the noise threshold. **b)** The adjustable length of time it takes for an ADO DigiTrail effect to complete. (The trail catches up with the primary video.)

Decay Time – The time it takes for a signal to decrease to one-millionth of its original value (60 dB down from its original level).

Decibel – One-tenth of a Bel. It is a relative measure of signal or sound intensity or “volume.” It expresses the ratio of one intensity to another. One dB is about the smallest change in sound volume that the human ear can detect. (Can also express voltage and power ratios logarithmically.) Used to define the ratio of two powers, voltages, or currents. See the definitions of dB, dBm, and dBw.

Decimation – Term used to describe the process by which an image file is reduced by throwing away sampled points. If an image array consisted of 100 samples on the X axis and 100 samples on the Y axis, and every other sample were thrown away, the image file is decimated by a factor of 2 and the size of the file is reduced by 1/4. If only one sample out of every four is saved, the decimation factor is 4 and the file size is 1/16 of the original. Decimation is a low-cost way of compressing video files and is found in many low-cost systems. Decimation however introduces many artifacts that are unacceptable in higher-cost systems.

Decimation Filter – The Decimation Filter is designed to provide decimation without the severe artifacts associated with throwing data away although artifacts still exist. (See the definition of Decimation.) The Decimation Filter process still throws data away but reduces image artifacts by smoothing out the voltage steps between sampled points.

Deck, Tape – A tape recorder that does not include power amplifiers or speakers.

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

Decoded Stream – The decoded reconstruction of a compressed bit stream.

Decoder – **a)** Device used to recover the component signals from a composite (encoded) source. Decoders are used in displays and in various processing hardware where component signals are required from a composite source such as composite chroma keying or color correction equipment.

b) Device that changes NTSC signals into component signals; sometimes devices that change digital signals to analog (see DAC). All color TV sets must include an NTSC decoder. Because sets are so inexpensive, such decoders are often quite rudimentary. **c)** An embodiment of a decoding process.

Decoder Input Buffer – The first-in first-out (FIFO) buffer specified in the video buffering verifier.

Decoder Input Rate – The data rate specified in the video buffering verifier and encoded in the coded video bit stream.

Decoding (Process) – The process that reads an input coded bit stream and produces decoded pictures or audio samples.

Decoding Time Stamp (DTS) – A field that may be present in a PES packet header that indicates the time that an access unit is decoded in the system target decoder.

Decompress – The process of converting video and audio data from its compact form back into its original form in order to play it. Compare Compress.

Decrement – Programming instruction that decreases the contents of a storage location.

DECT – Digital Enhanced Cordless Telecommunications.

Dedicated – Set apart for some special use. A dedicated microprocessor is one that has been specially programmed for a single application such as weight measurement, traffic light control, etc. ROMs, by their very nature, are dedicated memories.

Dedicated Keyboard – A keyboard assigned to a specific purpose.

Deemphasis – Also known as postemphasis and post-equalization. Deemphasis modifies the frequency-response characteristic of the signal in a way that is complementary to that introduced by preemphasis.

Deemphasis Network – Circuit that restores the preemphasized frequency response to its original levels.

Deesser – A compressor which reduces sibilance by triggering compression when it senses the presence of high frequency signals above the compression threshold.

Default – The setup condition (for example, transition rate settings, color of the matte gens, push-button status) existing when a device is first powered-up, before you make any changes.

Default Printer – The printer to which the system directs a print request if you do not specify a printer when you make the request. You set the default printer using the Print Manager.

Defaults – A set of behaviors specified on every system. You can later change these specifications which range from how your screen looks to what type of drive you want to use to install new software.

Defect – For tape, an imperfection in the tape leading to a variation in output or a dropout. The most common defects take the form of surface projections, consisting of oxide agglomerates, imbedded foreign matter, or redeposited wear products.

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.

Degaussing – A process by which a unidirectional magnetic field is removed from such transport parts as heads and guides. The presence of such a field causes noise and a loss of high frequencies.

Degenerate – Being simpler mathematically than the typical case. A degenerate edge is reduced to one point. A degenerate polygon has a null surface.

Degree – An indication of the complexity of a curve.

Del Ray Group – Proponent of the HD-NTSC ATV scheme.

Delay – **a)** The time required for a signal to pass through a device or conductor. **b)** The time it takes for any circuitry or equipment to process a signal when referenced to the input or some fixed reference (i.e., house sync). Common usage is total delay through a switcher or encoder. **c)** The amount of time between input of the first pixel of a particular picture by the encoder and the time it exits the decoder, excluding the actual time in the communication channel. It is the combined processing time of the encoder and decoder. For face-to-face or interactive applications, the delay is crucial. It usually is required to be less than 200 milliseconds for one-way communication.

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.

Delay Distortion – Distortion resulting from non-uniform speed of transmission of the various frequency components of a signal; i.e., the various frequency components of the signal have different times of travel (delay) between the input and the output of a circuit.

Delay Distribution Amplifier – An amplifier that can introduce adjustable delay in a video signal path.

Delete – Edit term to remove.

Delivery – Getting television signals to a viewer. Delivery might be physical (e.g., cassette or disc) or electronic (e.g., broadcast, CATV, DBS, optical fiber).

Delivery System – The physical medium by which one or more multiplexes are transmitted, e.g., satellite system, wideband coaxial cable, fiber optics, terrestrial channel of one emitting point.

Delta Frame – A frame containing only the data that has changed since the last frame. Delta frames are an efficient means of compressing image data. Compare Key Frame.

Demodulation – The process of recovering the intelligence from a modulated carrier.

Demodulator – A device which recovers the original signal after it has been modulated with a high-frequency carrier. In television, it may refer to: an instrument such as the Tektronix 1450 which takes video in its transmitted form (modulated picture carrier) and converts it to baseband; the circuits which recover R-Y and B-Y from the composite signal.

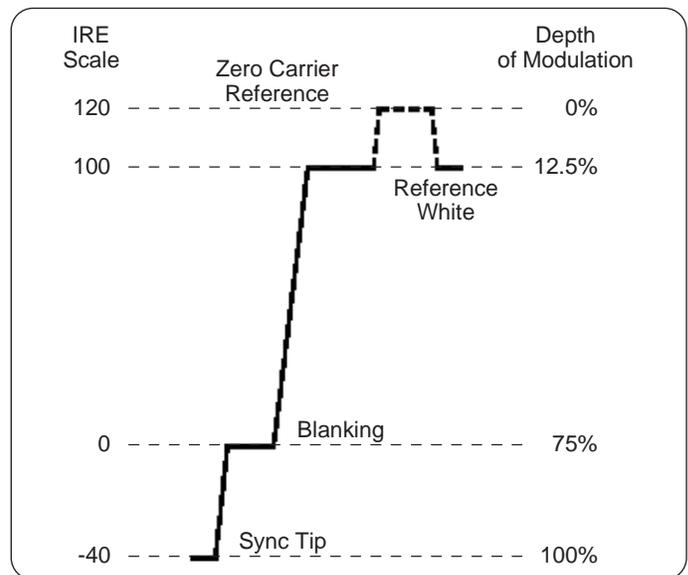
Demultiplexer (Demux) – A device used to separate two or more signals that were previously combined by a compatible multiplexer and transmitted over a single channel.

Demultiplexing – Separating elementary streams or individual channels of data from a single multi-channel stream. For example, video and audio streams must be demultiplexed before they are decoded. This is true for multiplexed digital television transmissions.

Depth Cueing – Varies the intensity of shaded surfaces as a function of distance from the eye.

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.

Depth of Modulation – This measurement indicates whether or not video signal levels are properly represented in the RF signal. The NTSC modulation scheme yields an RF signal that reaches its maximum peak-to-peak amplitude at sync tip (100%). In a properly adjusted signal, blanking level corresponds to 75%, and peak white to 12.5%. The zero carrier reference level corresponds to 0%. Refer to the diagram at the right. Over modulation often shows up in the picture as a nonlinear distortion such as differential phase or differential gain. ICPM or white clipping may also result. Under modulation often results in degraded signal-to-noise performance.



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Dequantization – The process of rescaling the quantized discrete cosine transform coefficients after their representation in the bit stream has been decoded and before they are presented to the inverse DCT

Deserializer – A device that converts serial digital information to parallel.

Desk Top Video (DTV) – Use of a desktop computer for video production.

Detail – Refers to the most minute elements in a picture which are distinct and recognizable. Similar to Definition or Resolution.

Development System – Microcomputer system with all the facilities required for hardware and software development for a given microprocessor. Generally consists of a microcomputer system, CRT display, printer, mass storage (usually dual floppy-disk drivers), PROM programmer, and in-circuit emulator.

Device Driver – Software to enable a computer to access or control a peripheral device, such as a printer.

DFD (Displaced Frame Difference) – Differential picture if there is motion.

D-Frame – Frame coded according to an MPEG-1 mode which uses DC coefficients only.

D/I (Drop and Insert) – A point in the transmission where portions of the digital signal can be dropped out and/or inserted.

DII – Download Information Indication.

Diagnostics – A series of tests that check hardware components of a system.

Diagonal Resolution – Amount of detail that can be perceived in a diagonal direction. Although diagonal resolution is a consequence of horizontal and vertical resolution, it is not automatically equivalent to them. In fact, ordinary television systems usually provide about 40 percent more diagonal resolution than horizontal or vertical. Many ATV schemes intentionally sacrifice diagonal resolution in favor of some other characteristics (such as improved horizontal or vertical resolution) on the theory that human vision is less sensitive to diagonal resolution than to horizontal or vertical. There is some evidence that diagonal resolution could be reduced to about 40 percent less than either horizontal or vertical (overall half of its NTSC value) with no perceptible impairment. See also Resolution.

Diagonal Split – An unusual quad split feature found on Ampex switchers, allowing diagonal or X-shaped divisions between sources, as opposed to the traditional horizontal and vertical divisions.

Dialog Normalization Value – The dialog normalization value is a Dolby Digital parameter that describes the long-term average dialog level of the associated program. It may also describe the long-term average level of programs that do not contain dialog, such as music. This level is specified on an absolute scale ranging from –1 dBFS to –31 dBFS. Dolby Digital decoders attenuate programs based on the dialog normalization value in order to achieve uniform playback level.

DIB (Device Independent Bitmap) – A file format that represents bitmap images in a device-independent manner. Bitmaps can be represented at 1, 4, and 8 bits-per-pixel with a palette containing colors representing 24 bits. Bitmaps can also be represented at 24 bits-per-pixel without a palette in a run-length encoded format.

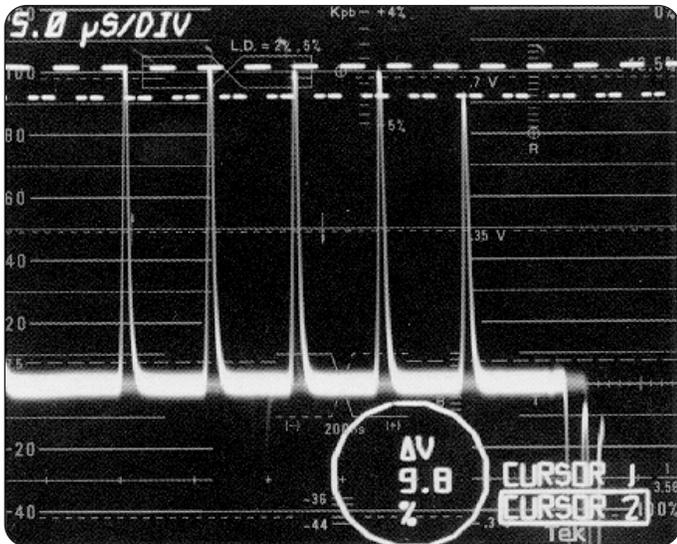
Differential Gain – a) This nonlinear distortion is often referred to as “diff gain” or “dG.” It is present if a signal’s chrominance gain is affected by luminance levels. This amplitude distortion is a result of the system’s inability to uniformly process the high-frequency chrominance signals at all luminance levels. The amount of differential gain distortion is expressed in percent. Since both attenuation and peaking of chrominance can occur in the same signal, it is important to specify whether the maximum over all amplitude difference or the maximum deviation from the blanking level amplitude is being quoted. In general, the NTSC measurement standard defines differential gain as the largest amplitude deviation between any two levels, expressed as a percent of the largest chrominance amplitude. When differential gain is present, color saturation has an unwarranted dependence on luminance level. Color saturation is often improperly reproduced at high luminance levels. The Modulated Ramp or Modulated Stair Step signals can be used to test for differential gain. **b)** The amplitude change, usually of the 3.6 MHz color subcarrier, introduced by the overall circuit, measured in dB or percent, as the subcarrier is varied from blanking to white level.

Differential Phase – a) This nonlinear distortion is often referred to as “diff phase” or “dP.” It is present if a signal’s chrominance phase is affected by the luminance level. It occurs because of the system’s inability to uniformly process the high-frequency chrominance information at all luminance levels. Diff Phase is expressed in degrees of subcarrier phase. The subcarrier phase can be distorted such that the subcarrier phase is advanced (lead or positive) or delayed (lag or negative) in relation to its original position. In fact, over the period of a video line, the subcarrier phase can be both advanced and delayed. For this reason, it is important to specify whether “peak to peak diff phase” is being specified or “maximum deviation from 0” in one direction or another. Normally the “peak to peak diff phase” is given. dP distortions cause changes in hue when picture brightness changes. Colors may not be properly reproduced, particularly in high-luminance areas of the picture. **b)** The phase change of the 3.6 MHz color subcarrier introduced by the overall circuit, measured in degrees, as the subcarrier is varied from blanking to white level.

Differential Pulse Code Modulation – DPCM is a source coding scheme that was developed for encoding sources with memory. The reason for using the DPCM structure is that for most sources of practical interest, the variance of the prediction error is substantially smaller than that of the source.

Differentiated Step Filter – A special filter sometimes also called a “diff step” filter that is used to measure luminance nonlinearity. When this filter is used with a luminance step waveform (see the waveform discussed in the Luminance Nonlinearity discussion), each step on the waveform is translated into a spike that is displayed on the waveform monitor. The height of each spike translates into the height of the step so the amount of

distortion can be determined by comparing the height of each spike. Refer to the figure below.



Diffuse – Diffuse light is the light reflected by a matte surface; without glare or highlight. It is based on relative orientation of surface normal and light source positions and luminance.

Digicipher – Digicipher is a compression and transmission technology from General Instrument, dedicated to Digital TV distribution via satellite. Digicipher video coding is based on DCT like MPEG, but does not use B-pictures. Instead, it uses a so-called adaptive prediction mode. Digicipher 1 was the first incarnation and is still used today by many providers since it was the first commercially available digital compression scheme.

Digicipher 2 – General Instrument's latest distribution system and is the standard for 4DTV product. DC2 uses standard MPEG-2 video encoding, but just about everything else in this "standard" is unique to DC2. For example, DVB/MPEG-2 uses Musicam for audio whereas DC2 uses Dolby AC-3. Despite using the same video standard, DVB/MPEG-2 and DC2 signals are totally incompatible and no receiver can currently receive both.

Digiloop – Patented circuitry within the Vista switcher, which allows the insertion of a digital effects device within the architecture of the switcher. This allows multi-channels of digital effects to be used on a single M/E, which would otherwise require 3 M/Es.

Digimatte (Menu) – The key channel processor, providing a separate channel specifically for black and white key signals that processes and manipulates an external key signal in the same way as source video in 3D space.

Digit – Sign or symbol used to convey a specific quantity of information either by itself or with other numbers of its set: 2, 3, 4, and 5 are digits. The base or radix must be specified and each digit's value assigned.

Digital – **a)** Having discrete states. Most digital logic is binary, with two states (on or off). **b)** A discontinuous electrical signal that carries information in binary fashion. Data is represented by a specific sequence of off-on electrical pulses. 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.

Digital Audio Broadcasting (DAB) – a) NRSC (National Radio Systems Committee) term for the next generation of digital radio equipment.

b) Modulations for sending digital rather than analog audio signals by either terrestrial or satellite transmitter with audio response up to compact disc quality (20 kHz). **c)** DAB was started as EUREKA project EU 147 in 1986. The digital audio coding process called MUSICAM was designed within EUREKA 147 by CCETT. The MUSICAM technique was selected by MPEG as the basis of the MPEG-1 audio coding, and it is the MPEG-1 Layer II algorithm which will be used in the DAB system. The EUREKA 147 project, in close cooperation with EBU, introduced the DAB system approach to the ITU-R, which subsequently has been contributing actively for the worldwide recognition and standardization of the DAB system. EBU, ETSI and EUREKA 147 set up a joint task committee with the purpose of defining a European Telecommunications Standard (ETS) for digital sound broadcasting, based on the DAB specifications. ETSI published the EUREKA 147 system as standard ETS 300 401 in February 1995, and market adoption is forthcoming; the BBC, for instance, plans to have 50% transmission coverage in 1997 when DAB receivers are being introduced to the public.

Digital Audio Recording – A system which converts audio signals into digital words which are stored on magnetic tape for later reversion to audio in such a manner that dropouts, noise, distortion, and other poor tape qualities are eliminated.

Digital Betacam – A development of the original analog Betacam VTR which records digitally on a Betacam-style cassette. A digital video tape format using the CCIR 601 standard to record 4:2:2 component video in compressed form on 12.5 mm (1/2") tape.

Digital Borderline – A GVG option and term. A digital border type with fewer settings, hence less control than the analog type used on Ampex switchers.

Digital Cinemas – Facing the high costs of copying, handling and distribution of film, an infrastructure enabling digital transport of movies to digital cinemas could be highly attractive. In addition, digital delivery of films can effectively curb piracy. The MPEG-2 syntax supports the levels of quality and features needed for this application.

Digital Chroma Keying – Digital chroma keying differs from its analog equivalent in that it can key uniquely from any one of the 16 million colors represented in the component digital domain. It is then possible to key from relatively subdued colors, rather than relying on highly saturated col-

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ors that can cause color spill problems on the foreground. A high-quality digital chroma keyer examines each of the three components of the picture and generates a linear key for each. These are then combined into a composite linear key for the final keying operation. The use of three keys allows much greater subtlety of selection than does a chrominance-only key.

Digital Component – Component signals in which the values for each pixel are represented by a set of numbers.

Digital Component Video – Digital video using separate color components, such as YCbCr or RGB. See ITU-R BT.601-2. Sometimes incorrectly referred to as D1.

Digital Composite Video – The digitized waveform of (M) NTSC or (B, D, G, H, I) PAL video signals, with specific digital values assigned to the sync, blank, and white levels. Sometimes incorrectly referred to as D2 or D3.

Digital Disk Recorder (DDR) – a) A digital video recording device based on high-speed computer disk drives. Commonly used as a means to get video into and out from computers. **b)** A video recording device that uses a hard disk or optical disk drive mechanism. Disk recorders offer quick access to recorded material.

Digital Effects – Special effects created using a digital video effects (DVE) unit.

Digital Parallel Distribution Amplifier – A distribution amplifier designed to amplify and fan-out parallel digital signals.

Digital Recording – A method of recording in which the information (usually audio or video) is first coded in a digital form. Most commonly, a binary code is used and recoding takes place in terms of two discrete values of residual flux.

Digital S – A digital tape format that uses 1.25" high-density metal particle tape, running at 57.8 mm/s, to record a video data rate of 50 Mb/s. Video sampled at 4:2:2 is compressed at 3:3:1 using DCT-based intra-frame compression. Two individually editable audio channels are recorded using 16-bit, 48 kHz sampling. The tape can be shuttled and searched up to x32 speed. Digital S includes two cue tracks and four further audio channels in a cassette housing with the same dimensions as VHS.

Digital Sampling Rate – The frequency at which an analog signal is sampled to create a digital signal.

Digital Storage Media – A means of storage (usually magnetic tape, disk, or DVD) for audio, video, or other information that is in binary form.

Digital System – A system using devices that can be in only one of two possible states.

Digital Television Communications System (DITEC) – System developed by Comstat Corp. for satellite links.

Digital TV Group – A UK forum of technology and service providers created in August 1995 with the objective to speed up the introduction of digital terrestrial TV in the UK. With its focus on implementation aspects, the efforts of the group are seen as an extension of the work done in DVB. Membership is open to those DVB members who wish to participate actively in the introduction of digital terrestrial TV in the UK.

Digital Versatile Disk (DVD) – DVD is the outcome of a battle between two formerly rivaling camps of optical data discs, each supporting the

MMCD (Multimedia CD) and the SD (Super Density) formats. The MMCD and SD proposals featured different error correction, modulation, disc structure, etc., but targeted identical markets. Wisely, the two camps merged and agreed on a third format, that was a mix of the other two. The DVD, initially, addressed only movie player applications, but the nature of the medium has attracted other applications, too. In light of the increasing number of possible applications of the new disc format, it was therefore renamed to Digital Versatile Disc. The DVD consortium intends to position the DVD as a high-capacity, multimedia storage medium. A total of nine working groups in the consortium elaborate on various technology specific topics, such as video, ROM applications, audio-only systems, and copy-protection. The movie player application remains the DVD's reason for being, but there's a chance that the DVD may also take over a huge share of the CD-ROM market. The promoters of the format agreed in December 1995 on a core set of specifications. The system operates at an average data rate of 4.69 Mbit/s and features 4.7 GB data capacity, which allows MPEG-2 coding of movies, or which may be used for a high-resolution music disc. For the PAL and NTSC specifications of the DVD, different audio coding has been chosen to obey market patterns. For the NTSC version, the Dolby AC-3 coding will be mandatory, with MPEG audio as an option, whereas the opposite is true for PAL and SECAM markets.

Digital Video – A video signal represented by computer-readable binary numbers that describe colors and brightness levels.

Digital Video Broadcasting (DVB) – a) A system developed in Europe for digital television transmission, originally for standard definition only, though high-definition modes have now been added to the specification. DVB defines a complete system for terrestrial, satellite, and cable transmission. Like the ATSC system, DVB uses MPEG-2 compression for video, but it uses MPEG audio compression and COFDM modulation for terrestrial transmission. **b)** At the end of 1991, the European Launching Group (ELG) was formed to spearhead the development of digital TV in Europe. During 1993, a Memorandum of Understanding was drafted and signed by the ELG participants, which now included manufacturers, regulatory bodies and other interest groups. At the same time, the ELG became Digital Video Broadcasting (DVB). The TV system provided by the DVB is based on MPEG-2 audio and video coding, and DVB has added various elements not included in the MPEG specification, such as modulation, scrambling, and information systems. The specifications from DVB are offered to either ETSI or CENELEC for standardization, and to the ITU.

Digital Video Cassette (DVC) – a) Tape width is 1/4", metal particle formula. The source and reconstructed video sample rate is similar to that of CCIR-601, but with additional chrominance subsampling (4:1:1 in the case of 30 Hz and 4:2:0 in the case of 25 Hz mode). For 30 frames/sec, the active source rate is 720 pixels/lines x 480 lines/frame x 30 frames/sec x 1.5 samples/pixel average x 8 samples/pixel = ~124 Mbit/sec. A JPEG-like still image compression algorithm (with macroblock adaptive quantization) applied with a 5:1 reduction ratio (target bit rate of 25 Mbit/sec) averaged over a period of roughly 100 microseconds (100 microseconds is pretty small compared to MPEG's typical 1/4 second time average!) **b)** A digital tape recording format using approximately 5:1 compression to produce near-Betacam quality on a very small cassette. Originated as a consumer product, but being used professionally as exemplified by Panasonic's variation, DVC-Pro.

Digital Video Disc (DVD) – A new format for putting full-length movies on a 5" CD using MPEG-2 compression for “much better than VHS” quality. Also known as Digital Versatile Disc.

Digital Video Interactive (DVI) – A multimedia system marketed by Intel. DVI is not just an image-compression scheme, but includes everything that is necessary to implement a multimedia playback station including chips, boards, and software. DVI technology brings television to the microcomputer. DVI's concept is simple: information is digitized and stored on a random-access device such as a hard disk or a CD-ROM, and is accessed by a computer. DVI requires extensive compression and real-time decompression of images. Until recently this capability was missing. DVI enables new applications. For example, a DVI CD-ROM disk on twentieth-century artists might consist of 20 minutes of motion video; 1,000 high-res still images, each with a minute of audio; and 50,000 pages of text. DVI uses the YUV system, which is also used by the European PAL color television system. The Y channel encodes luminance and the U and V channels encode chrominance. For DVI, we subsample 4-to-1 both vertically and horizontally in U and V, so that each of these components requires only 1/16 the information of the Y component. This provides a compression from the 24-bit RGB space of the original to 9-bit YUV space. The DVI concept originated in 1983 in the inventive environment of the David Sarnoff Research Center in Princeton, New Jersey, then also known as RCA Laboratories. The ongoing research and development of television since the early days of the Laboratories was extending into the digital domain, with work on digital tuners, and digital image processing algorithms that could be reduced to cost-effective hardware for mass-market consumer television.

Digital Video Recording – “D1” Component, “D2” Composite.

Digital Word – The number of bits treated as a single entity by the system.

Digital Zoom – A feature found on some camcorders that electronically increases the lens zoom capability by selecting the center of the image and enlarging it digitally.

Digitization – The process of changing an electronic signal that is an analogy (analog) of a physical process such as vision or hearing into a discrete numerical form. Digitization is subdivided into the processes of sampling the analog signal at a moment in time, quantizing the sample (assigning it a numerical level), and coding the number in binary form. The advantages of digitization include improved transmission; the disadvantages include a higher bit rate than the analog bandwidth. Bit rate reduction schemes work to reduce that disadvantage.

Digitize – a) The process of turning an analog signal into digital data.
b) To convert an image from hard copy (a photo) into digital data for display on a computer.

Digitizer – A system that converts an analog input to a digital format, such as analog-to-digital converters (ADC), touch tablets, and mice. The last two, for example, take a spatial measurement and present it to a computer as a digital representation.

Digitizing – The act of taking analog audio and/or video and converting it to digital form. In 8-bit digital video there are 256 possible steps between maximum white and minimum black.

Digitizing Time – Time taken to record footage into a disk-based editing system, usually from a tape-based analog system, but also from newer digital tape formats without direct digital connections.

DigiTrail – An enhancement of ADO effects by adding trails, smearing, sparkles, etc.

DigiVision – A company with an early line-doubling ATV scheme.

Dimmer Switch – A control used to gradually increase and decrease the electricity sent to a lighting fixture, thereby effecting the amount of light given by the lighting fixture.

DIN (Deutsches Institut fuer Normung) – A German association that sets standards for the manufacture and performance of electrical and electronic equipment, as well as other devices. DIN connectors carry both audio and video signals and are common on equipment in Europe. (Also referred to as Deutsche Industrie Normenausschuss.)

DIP (Dual In-Line Package) – Standard IC package with two parallel rows of pins.

Dipswitch – A block of small switches formed so that they fit into an IC socket or into a PCB on standard IC spacing.

Direct Access Restriction – The ability to limit a user's capability to gain access to material not intended in the product structure. This is not parental control, but it is useful for material such as games or training material where such access would destroy the intent of the product. This type of control is usually accomplished with pre and post commands in the authoring process.

Direct Addressing – Standard addressing mode, characterized by the ability to reach any point in main storage directly. The address is specified as part of the instruction.

Direct Broadcast Satellite (DBS) – a) A distribution scheme involving transmission of signals directly from satellites to homes. It does not carry the burden of terrestrial broadcasting's restricted bandwidth and regulations and so is thought by many to be an ideal mechanism for the introduction of high base bandwidth ATV. DBS is the most effect delivery mechanism for reaching most rural areas; it is relatively poor in urban areas and in mountainous terrain, particularly in the north. Depending on the frequency band used, it can be affected by factors such as rain. **b)** Multiple television channel programming service that is transmitted direct from high powered satellites, directly to a home receiving dish.

Direct Color – An SVGA mode for which each pixel color value is specified directly by the contents of a bit field.

Direct Draw Overlay – A feature that lets you see the video full screen and full motion on your computer screen while editing. Most new 3D graphics cards support this. If your's does not, it simply means you will need an external monitor to view the video. Direct Draw Overlay has absolutely nothing to do with your final video quality.

Direct Memory Access (DMA) – Method of gaining direct access to main storage in order to perform data transfers without involving the CPU.

Direct Recording – A type of analog recording which records and reproduces data in the electrical form of its source.

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Direct Sound – The sound which reaches a mike or listener without hitting or bouncing off any obstacles.

Direct to Disk – A method of recording directly to the cutting head of the audio disk cutter, eliminating the magnetic recorder in the sequence, typified by no tape hiss.

Directional Antenna – An antenna that directs most of its signal strength in a specific direction rather than at equal strength in all directions.

Directional Microphone – One whose sensitivity to sound varies with direction. Such microphones can be aimed so their most sensitive sides face the sound source, while their least sensitive sides face sources of noise or other undesired sound.

Directional Source – Light that emanates from a constant direction with a constant intensity. This is called the infinite light source.

Directory – A container in the file system in which you store other directories and files.

Direct-View – A CRT watched directly, as opposed to one projecting its image on a screen.

DIS – Draft International Standard.

Disable – Process of inhibiting a device function.

Discrete – Having an individual identity. An individual circuit component.

Discrete Cosine Transform (DCT) – **a)** Used in JPEG and the MPEG, H.261 and H.263 video compression algorithms, DCT techniques allow images to be represented in the frequency rather than time domain. Images can be represented in the frequency domain using less information than in the time domain. **b)** A mathematical transform that can be perfectly undone and which is useful in image compression. **c)** Many encoders perform a DCT on an eight-by-eight block of image data as the first step in the image compression process. The DCT converts the video data from the time domain into the frequency domain. The DCT takes each block, which is a 64-point discrete signal, and breaks it into 64 basis signals. The output of the operation is a set of 64 basis-signal amplitudes, called DCT coefficients. These coefficients are unique for each input signal. The DCT provides a basis for compression because most of the coefficients for a block will be zero (or close to zero) and do not need to be encoded.

Discrete Time Oscillator – Digital implementation of the voltage-controlled oscillator.

Disk – An information/digital data storage medium.

Disk (Menus) – Recall and Store enable effects to be stored, renamed, and recalled on 3-1/2" disks in the disk drive provided with the system.

Disk Drive – The machine used to record and retrieve digital information on disk.

Disk Resource – Any disk (hard, CD-ROM, or floppy) that you can access either because it is physically attached to your workstation with a cable, or it is available over the network.

Disk Use – The percentage of space on your disk that contains information.

Dispersion – Distribution of the oxide particles within the binder. A good dispersion can be defined as one in which equal numbers of particles

would be found in equal, vanishingly small volumes sampled from different points within the coating.

Displacement of Porches – Refers to any difference between the level of the front porch and the level of the back porch.

Display – **a)** The ultimate image presented to a viewer; the process of presenting that image. **b)** CRT, LCD, LED, or other photo luminescent panel upon which numbers, characters, graphics, or other data is presented.

Display Order – The order in which the decoded pictures are displayed. Normally this is the same order in which they were presented at the input of the encoder.

Display Signal Processing – An efficient, widely compatible system required that distribution be free of detailed requirements specific to display, and that necessary additional display processing unique to that display class be conducted only at the display. The variety of display systems, already numerous, continues to increase. Each system or variant has its own set of specifications, performance characteristics, and requirements, including electro-optic transfer function, color gamut, scanning sequence, etc. Display signal processing might include transformation at the display to the appropriate luminance range and chrominance, to display primaries and reference white, matrixing to achieve metameric color match, adaptation to surround, plus conversion to scanning progressive or scanning interlaced, etc. Display processing may not be required for transmission if there is unique point-to-point routing clearly identified and appropriate processing has been provided in distribution. But it is frequently required for emission to a diffuse population of display systems.

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

Distant Miking – Placing a mike far from a sound source so that a high proportion of reflected sound is picked up.

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 – **a)** The process of getting a television signal from point to point; also the process of getting a television signal from the point at which it was last processed to the viewer. See also Contribution. **b)** The delivery of a completed program to distribution-nodes for emission/transmission as an electrical waveform, or transportation as a physical package, to the intended audiences. Preparation for distribution is the last step of the production cycle. Typical distribution-nodes include: release and duplicating laboratories, satellite systems, theatrical exchanges, television networks and groups, cable systems, tape and film libraries, advertising and program agencies, educational systems, government services administration, etc.

Distribution Amplifier – Device used to multiply (fan-out) a video signal. 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. May also include cable equalization and/or delay.

Distribution Quality – The level of quality of a television signal from the station to its viewers. Also known as Emission Quality.

DIT – Discontinuity Information Table.

DITEC – See Digital Television Communications System.

Dither – **a)** Typically a random, low-level signal (oscillation) which maybe added to an analog signal prior to sampling. Often consists of white noise of one quantizing level peak-to-peak amplitude. **b)** The process of representing a color by mixing dots of closely related colors.

Dither Component Encoding – A slight expansion of the analog signal levels so that the signal comes in contact with more quantizing levels. The results are smoother transitions. This is done by adding white noise (which is at the amplitude of one quantizing level) to the analog signal prior to sampling.

DLT (Digital Linear Tape) – **a)** A high capacity data tape format. **b)** A high-density tape storage medium (usually 10-20 gigabytes) used to transport and input data to master a DVD. Media is designated as “Type III” or “Type IV” for tapes used for DVD.

DMA – See Direct Memory Access.

D-MAC – Originally, a MAC (Multiplexed Analog Component) with audio and data frequency multiplexed after modulation, currently a term used in Europe to describe a family of B-MAC-like signals, one of which is the British choice for DBS. See also MAC.

DMK (Downstream Mixer-Keyer) – See DSK.

DM-M (Delayed Modulation Mark) – Also called Miller Code.

DNG (Digital News Gathering) – Electronic News Gathering (ENG) using digital equipment and/or transmission.

DNL – Noise reduction system produced by Philips.

Document Window – A sub-window inside an application. The size is user adjustable but limited by the size of its application window.

Dolby AC-2 and AC-3 – These are compression algorithms from the Dolby Laboratories. The AC-2 coding is an adaptive transform coding that includes a filterbank based on time-domain alias cancellation (TDAS). The AC-3 is a dedicated multichannel coding, which like AC-2 uses adaptive transform coding with a TDAS filterbank. In addition, AC-3 employs a bit-allocation routine that distributes bits to channels and frequencies depending on the signals, and this improves the coding efficiency compared to AC-2. The AC-3 algorithm is adopted for the 5.1-channel audio surround system in the American HDTV system.

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 – Formerly AC-3, a perceptual audio coding system based upon transform coding techniques and psycho-acoustic principles. Frequency-domain processing takes full advantage of noise masking by confining quantization noise to narrow spectral regions where it will be masked by the audio signal. Designed as an emissions (delivery) system, Dolby Digital provides flexible coding of up to 5.1 audio channels at a vari-

ety of data rates. In addition, Dolby Digital bit streams carry informational data about the associated audio.

Dolby Surround – A passive system that matrix encodes four channels of audio into a standard two-channel format (Lt/Rt). When the signal is decoded using a Dolby Surround Pro Logic decoder, the left, center, and right signals are recovered for playback over three front speakers and the surround signal is distributed over the rear speakers.

Dolby Surround Pro Logic (DSPL) – An active decoding process designed to enhance the sound localization of Dolby Surround encoded programs through the use of high-separation techniques. Dolby Surround Pro Logic decoders continuously monitor the encoded audio program and evaluate the inherent sound field dominance, applying enhancement in the same direction and in proportion to that dominance.

Dolly – **a)** A set of casters attached to the legs of a tripod to allow the tripod to roll. **b)** A forward/backward rolling movement of the camera on top of the tripod dolly.

Domain – The smallest known permanent magnet.

Doppler Effect – An effect in which the pitch of a tone rises as its source approaches a listener, and falls as the source moves away from the listener.

DOS – Disk Operating System.

Dot Crawl – See Chroma Crawl.

Dot Matrix – Method of forming characters by using many small dots.

Dot Pitch – **a)** The density measurement of screen pixels specified in pixels/mm. The more dense the pixel count, the better the screen resolution. **b)** The distance between phosphor dots in a tri-color, direct-view CRT. It can be the ultimate determinant of resolution.

Double Precision Arithmetic – Uses two words to represent each number.

Double-Click – To hold the mouse still, then press and release a mouse button twice, very rapidly. When you double-click an icon, it opens into a window; when you double-click the Window menu button, the window closes.

Doubling – To overdub the same part that has previously been recorded, with the object of making the part appear to have been performed by several instruments playing simultaneously.

Down Converter – This device accepts modulated high-frequency television signals and down converts the signal to an intermediate frequency.

Down Link – **a)** The frequency satellites use to transmit data to earth stations. **b)** Hardware used to transmit data to earth stations.

Download – The process of having an effect moved from disk storage into the ADO control panel.

Downmix – A process wherein multiple channels are summed to a lesser number of channels. In the audio portion of a DVD, there can be as many as eight channels of audio in any single stream and it is required that all DVD players produce a stereo version of those channels provided on the disc. This capacity is provided as legacy support for older audio systems.

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Downscaling – The process of decimating or interpolating data from an incoming video signal to decrease the size of the image before placing it into memory.

Downstream – A term describing the precedence of an effect or key. The “stream” of video through a switcher allows multiple layers of effects to be accomplished, with each successive layer appearing on top of the previous one. The most downstream effect is that video which appears as the top-most layer.

Downstream Keyer – The last keyer on the switcher. A key on the DSK will appear in front of all other video. Ampex DSKs are actually DMKs, that is they also allow mixes and fades with the switcher output.

Downstream Keyer (DSK) – A term used for a keyer that inserts the key “downstream” (last layer of video within switcher) of the effects system video output. This enables the key to remain on-air while the backgrounds and effects keys are changed behind it.

DPCM – See Differential Pulse Code Modulation.

D-Pictures – Pictures for which only DC coefficients are transmitted. D-pictures are not part of MPEG-2 but only of MPEG-1. MPEG-2 decoders must be able to decode D-pictures.

Drag – To press and hold down a mouse button, then move the mouse. This drags the cursor to move icons, to highlight menu items, or to perform other functions.

DRAM (Dynamic Random Access Memory) – An integrated circuit device that stores data bits as charges in thousands of tiny capacitors. Since the capacitors are very small, DRAM must be constantly refreshed to restore charges in appropriate cells. DRAM is used for short-term memory such as frame and screen memory and memory which contains operating programs which are loaded from ROM or disk.

DRC (Dynamic Range Control) – A feature of Dolby Digital that allows the end user to retain or modify the dynamic range of a Dolby Digital Encoded program upon playback. The amount of control is dictated by encoder parameter settings and decoder user options.

Drift – Gradual shift or change in the output over a period of time due to change or aging of circuit components. Change is often caused by thermal instability of components.

Drive – A hardware device that lets you access information on various forms of media, such as hard, floppy, and CD-ROM disks, and magnetic tapes.

Drive Address – See SCSI Address.

Drive Pulse – A term commonly used to describe a set of signals needed by source equipment such as a camera. This signal set may be composed of any of the following: sync, blanking, subcarrier, horizontal drive, vertical drive, and burst flag. Also called pulse drive.

Driving Signals – Signals that time the scanning at the pickup device.

Drop Frame – System of modifying the frame counting sequence (dropping two frames every minute except on every tenth minute) to allow time code to match a real-time clock.

Drop Frame Time Code – **a)** SMPTE time code format that skips (drops) two frames per minute except on the tenth minute, so that the time code

stays coincident with real time. **b)** The television broadcast standard for time code. **c)** The NTSC color coding system uses a 525/60 line/field format, it actually runs at 59.94 fields per second, or 29.97 frames per second (a difference of 1:1000). Time code identifies 30 frames per second, whereas drop frame time code compensates by dropping two frames in every minute except the tenth. Note that the 625/50 PAL system is exact and does not require drop frame.

Drop Outs – Small bit of missing picture information usually caused by physical imperfections in the surface of the video tape.

Drop Shadow – **a)** A type of key border where a key is made to look three dimensional and as if it were illuminated by a light coming from the upper left by creating a border to the right and bottom. **b)** A key border mode which places a black, white, or gray border to the right and below the title key insert, giving a shadow effect.

Drop-Down List Box – Displays a list of possible options only when the list box is selected.

Dropout – **a)** 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.

b) Drop in the playback radio frequency level, resulting from an absence of oxide on a portion of the videotape, causing no audio or video information to be stored there. Dropout usually appears as a quick streak in the video.

Dropout Count – The number of dropouts detected in a given length of magnetic tape.

Dry Signal – A signal without any added effects, especially without reverb.

DS (Dansk Standard) – Danish standardizing body.

DS0 (Digital Signal Level Zero) – 64 kbps.

DS1 – A telephone company format for transmitting information digitally. DS1 has a capacity of 24 voice circuits at a transmission speed of 1.544 megabits per second.

DS3 (Digital Service 3) – One of a hierarchy of North American data transmission rates associated with ISDN and B-ISDN, 44.736 Mbps. The terrestrial and satellite format for transmitting information digitally. DS3 has a capacity of 672 voice circuits at a transmission speed of 44.736 Mbps (commonly referred to as 45 Mbps). DS3 is used for digital television distribution using mezzanine level compression – typically MPEG-2 in nature, decompressed at the local station to full bandwidth signals (such as HDTV) and then re-compressed to the ATSC’s 19.39 Mbps transmission standard.

DSI – Download Server Initiate.

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.

DSK Monitor – A video output showing program video with the DSK key over full time.

DSM – See Digital Storage Media

DSM-CC U-N – DSM-CC User-to-Network.

DSM-CC-U-U – DSM-CC User-to-User.

DSNG – Digital Satellite News Gathering.

DSP – Digital Signal Processing.

DSRC (David Sarnoff Research Center) – Formerly RCA Laboratories (now part of SRI International), home of the ACTV research.

DSS (Direct Satellite System) – An alternative to cable and analog satellite reception initially using a fixed 18-inch dish focused on one or more geostationary satellites. DSS units are able to receive multiple channels of multiplexed video and audio signals as well as programming information, email, and related data. DSS typically used MPEG-2 encoding.

DSSB (Dual Single Sideband) – A modulation technique that might be applied to two of the components of ACTV.

DTE – Data Terminal Equipment.

DTM – Digital Transmodulation.

DTMF – Dual Tone Multi-Frequency.

D-to-A Converter (Digital to Analog Converter) – A device that converts digital signals to analog signals.

DTS (Decoding Time Stamp) – Part of PES header indicating when an access unit is to be decoded.

DTT – Digital Terrestrial Television.

DTTB – Digital Terrestrial Television Broadcasting.

DTTV-SA – Digital Terrestrial Television – System Aspects)

DTV (Digital Television) – a) A term used for all types of digital television including High Definition Television and Standard Definition Television.

b) Another acronym for the new digital television standards. See HDTV.

DTV Team – Originally Compaq, Microsoft, and Intel, later joined by Lucent Technology. The DTV Team promotes the computer industry's views on digital television, namely, that DTV should not have interlace scanning formats but progressive scanning formats only. (Intel, however, now supports all the ATSC Table 3 formats, including those that are interlace, such as 1080i.)

DTVB – Digital Television Broadcasting.

DTVC – Digital Television by Cable.

Dual Capstan – Refers to a transport system in which a capstan and pinchroller are used on both sides of the recording and playback head system.

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

Dubs – Copies of videotape.

Durability – Usually expressed as a number of passes that can be made before a significant degradation of output occurs; divided by the corresponding number that can be made using a reference tape.

Duration – Length of time (in hours, minutes, seconds, and frames) that a particular effect or section of audio or video material lasts.

DV – This digital VCR format is a cooperation between Hitachi, JVC, Sony, Matsushita, Mitsubishi, Philips, Sanyo, Sharp, Thomson, and Toshiba. It uses 6.35 mm (0.25-inch) wide tape in a range of products to record 525/60 or 625/50 video for the consumer (DV) and professional markets (Panasonic's DVCPRO, Sony's DVCAM and Digital-8). All models use digital intra-field DCT-based "DV" compression (about 5:1) to record 8-bit component digital video based on 13.5 MHz luminance sampling.

DVB (Digital Video Broadcasting) – Broadcasting TV signals that comply with a digital standard.

DVB-C (Digital Video Broadcasting – Cable) – Broadcasting TV signals that comply with a digital standard by cable (ETS 300 429).

DVB-CA – Support for use of scrambling and conditional access (CA) within digital broadcasting systems (ETR 289).

DVB-CI – Common interface specification for conditional access and other digital video broadcasting decoder applications (EN 50221).

DVB-Cook – A guideline for the use of DVB specifications and standards (TR 101 200).

DVB-CS – Digital video broadcasting baseline system for SMATV distribution systems (ETS 300 473).

DVB-Data – Specification for Data Broadcasting (EN 301 192).

DVB-DSNG – Digital satellite news gathering (DSNG) specification (EN 301 210).

DVB-IRD (Digital Video Broadcasting Integrated Receiver Decoder) – A receiving decoder that can automatically configure itself using the MPEG-2 Program Specific Information (PSI).

DVB-IRDI – Interface for DVB-IRDs (EN 50201).

DVB-M – Measurement guidelines for DVB systems (ETR 290).

DVB-MC – Digital video broadcasting baseline system for multi-point video distribution systems below 10 GHz (EN 300 749).

DVB-MPEG – Implementation guidelines for the use of MPEG-2 systems, video and audio in satellite, cable, and terrestrial broadcasting applications (ETR 154).

DVB-MS – Digital video broadcasting baseline system for multi-point video distribution systems at 10 MHz and above (EN 300 748).

DVB-NIP – Network-independent protocols for DVB interactive services (ETS 300 802).

DVB-PDH – DVB interfaces to pliesochronous digital hierarchy (PDH) networks (ETS 300 813).

DVB-PI – Interfaces for CATV/SMATV headends and similar professional equipment (EN 50083-9).

DVB-RCC – Interaction channel for cable TV distribution system (CATV) (ETS 300 800).

DVB-RCCS – Interaction channel for satellite master antenna TV (SMATV) distribution systems. Guidelines for versions based on satellite and coaxial sections (TR 101 201).

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DVB-RCDECT – Interaction channel through the digital enhanced cordless telecommunications (DECT) (EN 301 193).

DVB-RCL – Interaction channel for local multi-point distribution system (LMDS) distribution systems (EN 301 199)

DVB-RCT – Interaction channel through public switched telecommunications network (PSTN)/integrated services digital networks (ISDN) (ETS 300 801).

DVB-S (Digital Video Broadcasting – Satellite) – Broadcasting TV signals to a digital standard by satellite (ETS 300 421).

DVB-SDH – Interfaces to synchronous digital hierarchy (SDH) networks (ETS 300 814).

DVB-SFN – Mega-frame for single frequency network (SFN) synchronization (TS 101 191).

DVB-SI (Digital Video Broadcasting – Service Information) –
a) Information carried in a DVB multiplex describing the contents of different multiplexes. Includes NIT, SDT, EIT, TDT, BAT, RST, and ST. **b)** The DVB-SI adds the information that enables DVB-IRDs to automatically tune to particular services and allows services to be grouped into categories with relevant schedule information (ETS 300 468).

DVB-SIM – DVB SimulCrypt. Part 1: headend architecture and synchronization (TS 101 197).

DVB-SMATV – DVB satellite master antenna television (SMATV) distribution systems (EN 300 473).

DVB-SUB – DVB subtitling systems (ETS 300 743).

DVB-T (Digital Video Broadcasting – Terrestrial) – Terrestrial broadcasting of TV signals to a digital standard (ETS 300 744).

DVB-TXT – Specification for conveying ITU-R system B teletext in DVB bit-streams (ETS 300 472).

DVC – See Digital Video Cassette.

DVCAM – Sony's development of native DV which records a 15 micron (15x10⁻⁶ m, fifteen thousandths of a millimeter) track on a metal evaporated (ME) tape. DVCAM uses DV compression of a 4:1:1 signal for 525/60 (NTSC) sources and 4:2:0 for 625/50 (PAL). Audio is recorded in one of two forms – four 12-bit channels sampled at 32 kHz or two 16-bit channels sampled at 48 kHz.

DVCPRO50 – This variant of DV uses a video data rate of 50 Mbps – double that of other DV systems – and is aimed at the higher quality end of the market. Sampling is 4:2:2 to give enhanced chroma resolution, useful in post-production processes (such as chroma-keying). Four 16-bit audio tracks are provided. The format is similar to Digital-S (D9).

DVCPROHD – This variant of DV uses a video data rate of 100 Mbps – four times that of other DV systems – and is aimed at the high-definition EFP end of the market. Eight audio channels are supported. The format is similar to D9 HD.

DVCPRO P – This variant of DV uses a video data rate of 50 Mbps – double that of other DV systems – to produce 480 progressive frames. Sampling is 4:2:0.

DVCR – Digital Video Cassette Recorder.

DVD – See Digital Versatile Disks or Digital Video Disks.

DVD-5 – A DVD format in which 4.7 gigabytes of data can be stored on one side of a disc in one layer.

DVD-9 – A DVD format in which 8.5 gigabytes of data can be stored on one side of a two-layer disc.

DVD-10 – A DVD format in which 9.4 gigabytes of data can be stored on two sides of a two-layer disc.

DVD-18 – A DVD format in which 17.0 gigabytes of data are stored on two sides of the disc in two layers each.

DVD-on-CD – A DVD image stored on a one-sided 650 megabyte CD.

DVD-R – A DVD format in which 3.95 gigabytes of data are stored on a one-sided write-once disc.

DVD-ROM – DVD disks for computers. Expected to eventually replace the conventional CD-ROM. The initial version stores 4.7 GB on one disk. DVD-ROM drives for computers will play DVD movie disks.

DVE™ (Digital Video Effects) – **a)** 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. **b)** A “black box” which digitally manipulates the video to create special effects, for example, the ADO (Amplex Digital Optics) system. Common DVE effects include inverting the picture, shrinking it, moving it around within the frame of another picture, spinning it, and a great many more.

D-VHS – Digital – Video Home System.

DVI – See Digital Video Interactive.

DVTR – Digital Video Tape Recorder.

Dynamic Gain Change – This distortion is present when picture or sync pulse luminance amplitude is affected by APL changes. This is different from APL induced Transient Gain Distortions which only occur at the APL change transition time. Rather, this distortion refers to gain changes that occur after the APL has changed. The amount of distortion is usually expressed as a percent of the amplitude at 50% APL, although sometimes the overall variation in IRE units is quoted. This is an out-of-service test. This distortion causes picture brightness to seem incorrect or inconsistent as the scene changes.

Dynamic Gain Distortion – One of several distortions (long-time waveform distortions is another) that may be introduced when, at the sending end of a television facility, the average picture level (APL) of a video signal is stepped from a low value to a high value, or vice versa, when the operating point within the transfer characteristic of the system is affected, thereby introducing distortions on the receiving end.

Dynamic Memory – Memory devices whose stored data must be continually refreshed to avoid degradation. Each bit is stored as a charge on a single MOS capacitor. Because of charge leakage in the transistors, dynamic memory must be refreshed every 2 ms by rewriting its entire contents. Normally, this does not slow down the system but does require additional memory refresh logic.

Dynamic Metadata Dictionary – The standard database of approved, registered Metadata Keys, their definitions, and their allowed formats.

Dynamic Mike – A mike in which the diaphragm moves a coil suspended in a magnetic field to generate an output voltage proportional to the sound pressure level.

Dynamic Range – a) A circuit's signal range. **b)** An audio term which refers to the range between the softest and loudest levels a source can produce without distortion. **c)** The difference, in decibels, between the overload level and the minimum acceptable signal level in a system or transducer. **d)** The ratio of two instantaneous signal magnitudes, one being the maximum value consistent with specified criteria or performance, the other the maximum value of noise. **e)** The concept of dynamic range is applicable to many measurements beyond characterization of the video signal, and the ratios may also be expressed as f-stops, density differences, illumination, or luminance ratios, etc.

Dynamic Range, Display – The range of luminances actually achieved in a display. The system's overall transfer function is the most informative specification of dynamic range, inasmuch as nonlinear processing has nearly always been applied to the luminance of the reproduced scene. Frequently, however, the dynamic range, display is estimated by observing the reproduction of a stepped gray-scale having calibrated intervals. Conventionally, the dynamic range is reported to include every step whose transition can be detected, no matter how miniscule. Human vision is less adept at judging luminance of extended areas, but particularly sensitive to luminance transitions which may even have been exaggerated by edge enhancement. "Resolved steps" may be reported, therefore, even when the perceived luminance difference between the areas of adjacent steps is not obvious.

Dynamic Range, Image Capture – The range of luminances actually captured in the image is defined and limited by the transfer function which is usually nonlinear. Capture and recording systems traditionally limit their linear response to a central portion of their dynamic range, and may have extended nonlinear shoulder and toe regions. For any scene, it is usually possible to place the luminances of interest on a preferred portion of the transfer function, with excursions into higher and lower limits rolled off or truncated by the respective shoulder and toe of the curve.

Dynamic Range Compression – Level adjustment applied to an audio signal in order to limit the difference, or range of the loudest to the softest sounds.

Dynamic Resolution – The amount of spatial resolution available in moving pictures. In most television schemes, dynamic resolution is considerably less than static resolution. See also Motion Surprise, Spatial Resolution, and Temporal Resolution.

Dynamic Rounding – The intelligent truncation of digital signals. Some image processing requires that two signals are multiplied, for example in digital mixing, producing a 16-bit result from two original 8-bit numbers. This has to be truncated, or rounded, back to 8-bits. Simply dropping the lower bits can result in visible contouring artifacts especially when handling pure computer-generated pictures. Dynamic rounding is a mathematical technique for truncating the word length of pixels, usually to their normal 8-bits. This effectively removes the visible artifacts and is non-cumulative on any number of passes. Other attempts at a solution have involved increasing the number of bits, usually to 10, making the LSBs smaller but only masking the problem for a few generations. Dynamic rounding is a licensable technique, available from Quantel and is used in a growing number of digital products both from Quantel and other manufacturers.

Video Terms and Acronyms

► Glossary

► E

E – Enhanced/Extended.

E Mem – Term used for a panel memory system.

EACEM – European Association of Consumer Electronics Manufacturers

EAROM – Electrically Alterable.

Earth Station – Equipment used for transmitting or receiving satellite communications.

EAV (End of Active Video) – A term used with component digital systems.

EB – Errored Block.

EBR – See Electron Beam Recording.

EBU (European Broadcasting Union) – An organization of European broadcasters that, among other activities, produces technical statements and recommendations for the 625/50 line television system. Created in 1950 and headquartered in Geneva, Switzerland, the EBU is the world's largest professional association of national broadcasters. The EBU assists its members in all areas of broadcasting, briefing them on developments in the audio-visual sector, providing advice and defending their interests via international bodies. The Union has active members in European and Mediterranean countries and associate members in countries elsewhere in Africa, the Americas, and Asia.

EBU TECH.3267-E – a) The EBU recommendation for the serial composite and component interface of 625/50 digital video signal including embedded digital audio. **b)** The EBU recommendation for the parallel interface of 625-line digital video signal. A revision of the earlier EBU Tech.3246-E, which in turn was derived from CCIR-601 and contributed to CCIR-656 standards.

ECC/EDC – Error Correction Code/Error Detection Code.

Eccentricity – A mathematical constant that, for an ellipse, is the ratio between the major and minor axis length.

Echo (or Reflection) – a) A wave which has been reflected at one or more points in the transmission medium, with sufficient magnitude and time difference to be perceived in some manner as a wave distinct from that of the main or primary transmission. Echoes may be either leading or lagging the primary wave and appear in the picture monitor as reflections or “ghosts.” **b)** Action of sending a character input from a keyboard to the printer or display.

Echo Plate – A metal plate used to create reverberation by inducing waves in it by bending the metal.

E-Cinema – An HDTV film-complement format introduced by Sony in 1998. 1920 x 1080, progressive scan, 24 fps, 4:4:4 resolution. Using a 1/2-inch tape, the small cassette (camcorder) will hold 50 minutes while the large cassette will hold 156 minutes. E-Cinema's camcorder will use three 2/3-inch FIT CCDs and is equivalent to a film sensitivity of ISO 500. The format will compress the electronic signal somewhere in the range of 7:1. The format is based on the Sony HDCAM video format.

ECL – Emitter Coupled Logic.

ECM (Entitlement Control Message) – Conditional access information specifying control words or other stream-specific scrambling parameters.

ECMA – European Computer Manufacturers Association.

ED-Beta (Extended Definition Betamax) – A consumer/Professional videocassette format developed by Sony offering 500-line horizontal resolution and Y/C connections.

Edge – a) An edge is the straight line that connects two points.

b) Synonym for key border. Used by our competitors but not preferred by Ampex. **c)** A boundary in an image. The apparent sharpness of edges can be increased without increasing resolution. See also Sharpness.

Edge Busyness – Distortion concentrated at the edge of objects, characterized by temporally varying sharpness or spatially varying noise.

Edge Effect – See Following Whites or Following Blacks.

Edge Enhancement – Creating hard, crisp, high-contrast edges beyond the correction of the geometric problem compensated by aperture correction, frequently creates the subjective impression of increase image detail. Transversal delay lines and second-directive types of correction increase the gain at higher frequencies while introducing rather symmetrical “under-shoot followed by overshoot” at transitions. In fact, and contrary to many causal observations, image resolution is thereby decreased and fine detail becomes obscured. Creating a balance between the advantages and disadvantages is a subjective evaluation and demands an artistic decision.

Edge Enhancing – See Enhancing.

Edge Numbers – Numbers printed on the edge of 16 and 35 mm motion picture film every foot which allows frames to be easily identified in an edit list.

EDH (Error Detection and Handling) – Proposed SMPTE RP-165 for recognizing inaccuracies in the serial digital signal. It may be incorporated into serial digital equipment and employ a simple LED error indicator.

Edit – a) The act of performing a function such as a cut, dissolve, wipe on a switcher, or a cut from VTR to VTR where the end result is recorded on another VTR. The result is an edited recording called a master. **b)** Any point on a video tape where the audio or video information has been added to, replaced, or otherwise altered from its original form.

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 Decision List (EDL) – a) 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. **b)** Record of all edit decisions made for a video program (such as in-times, out-times, and effects) in the form of printed copy, paper tape, or

floppy disk file, which is used to automatically assemble the program at a later point.

Edit Display – Display used exclusively to present editing data and editor's decision lists.

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

Editing – A process by which one or more compressed bit streams are manipulated to produce a new compressed bit stream. Conforming edited bit streams are understood to meet the requirements defined in the Digital Television Standard.

Editing Control Unit (ECU) – A microprocessor that controls two or more video decks or VCRs and facilitates frame-accurate editing.

Editor – A control system (usually computerized) which allows you to control video tape machines, the video switcher, and other devices remotely from a single control panel. Editors enable you to produce finished video programs which combine video tape or effects from several different sources.

EDL (Edit Decision List) – A list of edit decisions made during an edit session and usually saved to floppy disk. Allows an edit to be redone or modified at a later time without having to start all over again.

EDO DRAM (Extended Data Out Dynamic Random Access Memory) – EDO DRAM allows read data to be held past the rising edge of CAS (Column Address Strobe) improving the fast page mode cycle time critical to graphics performance and bandwidth. EDO DRAM is less expensive than VRAM.

EDTV – See Extended/Enhanced Definition Television.

E-E Mode (Electronic to Electronic Mode) – The mode obtained when the VTR is set to record but the tape is not running. The VTR is processing all the signals that it would normally use during recording and playback but without actually recording on the tape.

EEPROM E2, E-squared PROM – An electronically-erasable, programmable read-only memory device. Data can be stored in memory and will remain there even after power is removed from the device. The memory can be erased electronically so that new data can be stored.

Effect – a) One or more manipulations of the video image to produce a desired result. **b)** Multi-source transition, such as a wipe, dissolve, or key.

Effective Competition – Market status under which cable TV systems are exempt from regulation of basic tier rates by local franchising authorities, as defined in 1992 Cable Act. To claim effective competition, a cable system must compete with at least one other multi-channel provider that is available to at least 50% of an area's households and is subscribed to by more than 15% of the households.

Effects (Setup) – Setup on the AVC, Century, or Vista includes the status of every push-button, key setting, and transition rate. The PANEL-MEM system can store these setups in memory registers for future use.

Effects Keyer (E Keyer) – The downstream keyer within an M/E, i.e., the last layer of video.

Effects System – The portion of the switcher that performs mixes, wipes, and cuts between background and/or affects key video signals. The Effects

System excludes the Downstream Keyer and Fade-to-Black circuitry. Also referred to as Mix Effects (M/E) system.

EIA (Electronics Industries Association) – A trade organization that has created recommended standards for television systems (and other electronic products), including industrial television systems with up to 1225 scanning lines. EIA RS-170A is the current standard for NTSC studio equipment. The EIA is a charter member of ATSC.

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

EISA (Enhanced Industry Standard Architecture) – In 1988 a consortium of nine companies developed 32-bit EISA which was compatible with AT architecture. The basic design of EISA is the result of a compilation of the best designs of the whole computer industry rather than (in the case of the ISA bus) a single company. In addition to adding 16 new data lines to the AT bus, bus mastering, automated setup, interrupt sharing, and advanced transfer modes were adapted making EISA a powerful and useful expansion design. The 32-bit EISA can reach a peak transfer rate of 33 MHz, over 50% faster than the Micro Channel architecture. The EISA consortium is presently developing EISA-2, a 132 MHz standard.

EIT – Encoded Information Type.

EIT (Event Information Table) – The EIT contains data concerning events (a grouping of elementary broadcast data streams with a defined start and end time belonging to a common service) and programs (a concatenation of one or more events under the control of a broadcaster, such as event name, start time, duration, etc.). Part of DVB-SI.

Electromagnetic Interference (EMI) – Interference caused by electrical fields.

Electron Beam Recording – A technique for converting television images to film using direct stimulation of film emulsion by a very fine long focal length electronic beam.

Electronic Cinematography – Photographing motion pictures with television equipment. Electronic cinematography is often used as a term indicating that the ultimate product will be seen on a motion picture screen, rather than a television screen. See also HDEP and Mathias.

Electronic Crossover – A crossover network which uses active filters and is used before, rather than after, the signal passes through the power amp.

Electronic Matting – The process of electronically creating a composite image by replacing portions of one image with another. One common, if rudimentary, form of this process is chroma-keying, where a particular color in the foreground scene (usually blue) is replaced by the background scene. Electronic matting is commonly used to create composite images where actors appear to be in places other than where they are being shot. It generally requires more chroma resolution than vision does, causing contribution schemes to be different than distribution schemes. While there is a great deal of debate about the value of ATV to viewers, there does not appear to be any dispute that HDEP can perform matting faster and better than almost any other moving image medium.

Electrostatic Pickup – Pickup of noise generated by electrical sparks such as those caused by fluorescent lights and electrical motors.

Video Terms and Acronyms

▶ Glossary

Elementary Stream (ES) – a) The raw output of a compressor carrying a single video or audio signal. **b)** A generic term for one of the coded video, coded audio, or other coded bit streams. One elementary stream is carried in a sequence of PES packets with one and only one stream_id.

Elementary Stream Clock Reference (ESCR) – A time stamp in the PES from which decoders of PES may derive timing.

ELG (European Launching Group) – Now superseded by DVB.

EM (Electronic Mail) – Commonly referred to as E-mail.

Embedded Audio – a) Digital audio is multiplexed onto a serial digital data stream. **b)** Digital audio that is multiplexed and carried within an SDI connection – simplifying cabling and routing. The standard (ANSI/SMPTE 272M-1994) allows up to four groups each of four mono audio channels.

Embossing – An artistic effect created on AVAs and/or switchers to make characters look like they are (embossed) punched from the back of the background video.

EMC – Entitlement Control Message.

EMC – Electromagnetic Compatibility.

EMF – Equipment Management Function.

EMI – Electromagnetic Interference.

Emission – a) The propagation of a signal via electromagnetic radiation, frequently used as a synonym for broadcast. **b)** In CCIR usage: radio-frequency radiation in the case where the source is a radio transmitter or radio waves or signals produced by a radio transmitting station.

c) Emission in electronic production is one mode of distribution for the completed program, as an electromagnetic signal propagated to the point of display.

EMM (Entitlement Management Message) – Conditional access information specifying authorization level or services of specific decoders. An individual decoder or a group of decoders may be addressed.

Emphasis – A boost in signal level that varies with frequency, usually used to improve SNR in FM transmission and recording systems (wherein noise increases with frequency) by applying a pre-emphasis before transmission and a complementary de-emphasis to the receiver. See also Adaptive Emphasis.

Enable – Input signal that allows the device function to occur.

ENB – Equivalent Noise Bandwidth.

Encode – a) The process of combining analog or digital video signals, e.g., red, green, and blue, into one composite signal. **b)** To express a single character or a message in terms of a code. To apply the rules of a code.

c) To derive a composite luminance-chrominance signal from R, G, B signals. **d)** In the context of Indeo video, the process of converting the color space of a video clip from RGB to YUV and then compressing it. See Compress, RGB, YUV. Compare Decode.

Encoded Chroma Key – Synonym for Composite Chroma Key.

Encoded Subcarrier – A reference system created by Grass Valley Group to provide exact color timing information.

Encoder – a) A device used to form a single composite color signal (NTSC, PAL, or SECAM) from a set of component signals. An encoder is

used whenever a composite output is required from a source (or recording) which is in component format. **b)** Sometimes devices that change analog signals to digital (ADC). All NTSC cameras include an encoder. Because many of these cameras are inexpensive, their encoders omit many of the advanced techniques that can improve NTSC. CAV facilities can use a single, advanced encoder prior to creating a final NTSC signal. **c)** An embodiment of an encoding process.

Encoding (Process) – A process that reads a stream of input pictures or audio samples and produces a valid coded bit stream as defined in the Digital Television Standard.

Encryption – The process of coding data so that a specific code or key is required to restore the original data. In broadcast, this is used to make transmission secure from unauthorized reception as is often found on satellite or cable systems.

END – Equivalent Noise Degradation.

End Point – End of the transition in a dissolve or wipe.

ENG (Electronic News Gathering) – Term used to describe use of video-recording instead of film in news coverage.

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.

ENRZ – Enhanced Non-Return to Zero.

Entitlement Management Messages (EMM) – Private Conditional Access information which specifies the authorization levels or the services of specific decoders. They may be addressed to an individual decoder or groups of decoders.

Entropy Coding – Variable-length lossless coding of the digital representation of a signal to reduce redundancy.

Entropy Data – That data in the signal which is new and cannot be compressed.

Entropy – In video, entropy, the average amount of information represented by a symbol in a message, is a function of the model used to produce that message and can be reduced by increasing the complexity of the model so that it better reflects the actual distribution of source symbols in the original message. Entropy is a measure of the information contained in a message, it's the lower bound for compression.

Entry – The point where an edit will start (this will normally be displayed on the editor screen in time code).

Entry Point – The point in a coded bit stream after which the decoder can be initialized and begin decoding correctly. The picture that follows the entry point will be an I-picture or a P-picture. If the first transmitted picture is not an I-picture, the decoder may produce one or more pictures during acquisition. Also referred to as an Access Unit (AU).

E-NTSC – A loosely applied term for receiver-compatible EDTV, used by CDL to describe its Prism 1 advanced encoder/decoder family.

ENTSC – Philips ATV scheme now called HDNTSC.

Envelope Delay – The term "Envelope Delay" is often used interchangeably with Group Delay in television applications. Strictly speaking, envelope

delay is measured by passing an amplitude-modulated signal through the system and observing the modulation envelope. Group Delay, on the other hand, is measured directly by observing phase shift in the signal itself. Since the two methods yield very nearly the same result in practice, it is safe to assume the two terms are synonymous.

Envelope Detection – A demodulation process in which the shape of the RF envelope is sensed. This is the process performed by a diode detector.

Envelope Detector – A form of device in a television set that begins the process of converting a broadcast or CATV television signal into a video signal that can be displayed. Envelope detectors are sensitive to some of the modifications to television signals that have been proposed for receiver-compatible ATV systems.

EPG (Electronic Program Guide) – A program guide delivered by data transfer rather than printed paper. The EPG gives the content of the current program.

EPROM (Erasable Programmable Read Only Memory) – A PROM that can be reused. Most EPROMs can be erased by exposing them to ultraviolet light.

EPS (Encapsulated PostScript) – A standard file format for high-resolution PostScript illustrations.

EPU (European Platforms Union) – EPU is a body that coordinates national platforms in Europe for widescreen TV and the migration to HDTV. EPU seeks to promote and to coordinate knowledge about widescreen TV, embracing broadcasting, medicine, corporate, and cinema use. EPU emphasizes digital aspects and the migration to HDTV, but not necessarily 1250-line HDTV. Through the EPU, the national platforms may exchange experience, facts, and views.

EQ – See Equalization.

EQTV (Enhanced Quality Television) – See EDTV.

Equalization (EQ) – a) Process of altering the frequency response of a video amplifier to compensate for high-frequency losses in coaxial cable. **b)** The selective amplification or attenuation of certain frequencies.

Equalizer – The pulses which occur before and after the broad pulses in the vertical interval. These pulses help the horizontal oscillator to maintain synchronization. See Equalizing Pulses.

Equalizing Pulses – Pulses of one-half the width of the horizontal sync pulses which are transmitted at twice the rate of the horizontal sync pulses during the blanking intervals immediately preceding and following the vertical sync pulses. The action of these pulses causes the vertical deflection to start at the same time in each interval, and also serves to keep the horizontal sweep circuits in step during the vertical blanking intervals immediately preceding and following the vertical sync pulse.

Equipment Noise – See Noise.

Equivalent Input Noise – Noise created by the input stage of an amplifier which appears in the output of the amplifier increased in level by the gain of the amp.

Erase Adj. – A control which adjusts the coupling of the bias oscillator to the erase head in a manner which purifies the oscillator's waveform.

Erase Field Strength – The minimum initial amplitude of a decreasing alternating field (normally applied in the longitudinal direction) required to reduce the output of a given recorded signal by a specified amount.

Erase Head – A device used to remove recorded signals from magnetic tape.

Erased Noise – The noise arising when reproducing a bulk-erased tape with the erase and record heads completely de-energized.

Erasure – A process by which a signal recorded on a tape is removed and the tape made ready for rerecording.

Error – In digital recording, either a dropout or a noise pulse that exceeds a certain limit is usually termed an error. In video and instrumentation recording, an error has no commonly accepted meaning but is defined in relation to the particular system requirements.

Error Blocks – A form of block distortion where one or more blocks in the received image bear no resemblance to the current or previous scene and often contrast greatly with adjacent blocks.

Error Concealment – a) A technique used when error correction fails (see Error Correction). Erroneous data is replaced by data synthesized from surrounding pixels. **b)** When the error correction program discovers in the reproduced signal, an error too extensive to permit reconstruction, the redundancy in most image information makes it possible for error concealment to make the error nearly inobvious. Video images are frequently nearly identical from frame to frame. Adjacent video lines frequently have almost the same detail. It becomes possible, therefore, when a “burst error” involving the modification or loss of many recorded bits occurs, to determine from image segments adjacent in time or in space, a most probable substitution. Such substitutions, when infrequent and supported by the image redundancy, are often accepted by the viewers as “correct.” (This is a degree of freedom in image data recording that obviously is not available to scientific and financial data recording. The additional information needed by the algorithm for decision and substitution is usually provided by a data-storage cache established during reproduction.)

Error Detection and Correction – a) Coding schemes incorporated into the information before it is transmitted (or stored) in such a way that errors which may arise in transmission can be detected and corrected before restoration or retrieval. In PCM systems, error correction effectively improves the SNR of the system. **b)** Ingenious software programs make it possible to check that the digital stream of image information has not been corrupted by the loss of a few bits here and there. Additional information introduced as “overhead” to the image bit stream (thereby increasing the bit rate, recording) is chosen to conform to specific rules of construction. Departures from this construction can be detected readily, so that many potential errors can not only be identified, but corrected so that the information can be restored with high probability. Error correction contributes to the reliability of recording/reproducing and is a normal part of all data recording.

Error Rate – The ratio of the number of bits incorrectly transmitted to the total number of bits of information received.

ES (Elementary Stream) – Data stream for video, audio, or data. Preliminary stage to PES.

Video Terms and Acronyms

► Glossary

ESAC – Economics and Statistics Advisory Committee.

ESCR (Elementary Stream Clock Rate) – A time stamp in PES stream from which decoders may derive timing.

Essence – The actual program (audio, video, and/or data) without meta-data. Essence could also be graphics, telemetry, photographs, or other information.

ESPRIT – European Strategic Program for Research and Development in Information Technology.

Ethernet (IEEE 802.3) – a) A type of high-speed network for interconnecting computing devices. Ethernet can be either 10 or 100 Mbps (Fast Ethernet). Ethernet is a trademark of Xerox Corporation, Inc. **b)** A type of local area network that enables real-time communication between machines connected directly together through cables. A widely implemented network from which the IEEE 802.3 standard for contention networks was developed, Ethernet uses a bus topology (configuration) and relies on the form of access known as CSMA/CD to regulate traffic on the main communication line. Network nodes are connected by coaxial cable (in either of two varieties) or by twisted-pair wiring.

ETR – ETSI Technical Report.

ETS (European Telecommunications Standards) – Issued by the ETSI.

ETSI (European Telecommunication Standard Institute) – A European forum for standardization with participation of major players in the telecommunications industry. ETSI replaced the CEPT in 1988 with the objective of making the telecommunications standards needed for the implementation of the common market in Europe. ETSI has now become a leading body on all telecommunications standards, however, and provides a strong input to international bodies. This being so, the ETSI focuses on standards that involve interactions between public and private networks, and specifies the framework of activities that form the telecommunications infrastructure. ETSI produces standards through a number of technical committees, and uses project teams composed of paid experts to produce drafts of standards. The standards produced are called European Telecommunications Standards (ETS) or Interim European Telecommunications Standards (I-ETS).

ETV – Educational Television.

EuroDAB – An organization formed through the EBU with the purpose of paving the way for DAB in Europe. The group, which holds more than 100 broadcasters, manufacturers, regulators, etc., looks into services to be offered, identified features, and applications. It researches data services and receiver implementation, and monitors national regulations. Finally, the group is analyzing satellite DAB projects.

Eureka – A massive European research effort, sometimes called the European version of Star Wars, embracing many separate R&D projects, including semiconductors, telecommunications, and computers. The Eureka EU-95 project is about ATV systems for 625 scanning line/50 field per second countries.

Europe – A geographic region that led the opposition to the ATSC proposal when it was presented to the CCIR as a proposed worldwide standard and is developing its own ATV systems. European television currently has 625 scanning lines and 50 field per second as opposed to NTSC's 525/59.94.

Evaluator – Equipment that evaluates physical and magnetic quality of tape, usually provided as an adjunct to a winder/cleaner. In contrast to a certifier, it does not stop when it detects an error.

E-Value – The difference in inches between the radii of the outside layer of tape in a roll and the outside edge of the reel flange.

Even Number – The number of scanning lines per frame possible in a progressively scanned television system. An interlaced scan system must use an odd number of lines so that sequential fields will be displaced by one scanning line.

Event – a) An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time. **b)** A grouping of elementary broadcast data streams with a defined start and end time belonging to a common service, e.g., first half of a football match, News Flash, first part of an entertainment show.

Event Number – Number assigned by the system (or editor) to each edit that is recorded in the EDL.

EVM – Error Vector Magnitude.

Event Number – Number assigned by the system (or editor) to each edit that is recorded in the EDL.

EVM – Error Vector Magnitude.

Exabyte – An 8 mm data tape format. Popular for storing graphics files due to its low cost and high capacity (commonly 8 GB, but new models hold up to 40 GB). Exabyte is also the number of bytes that comes after petabyte.

Execute (Cycle) – Last cycle of instruction execution. The instruction operation is performed during this time.

Execution Time – Time required for the execution of an instruction.

Exif (Exchangeable Image Format) – A file format used in digital cameras.

Exit – The point at which an edit will end (normally displayed by time code).

Expander – A device which increases the dynamic range of a signal by either reducing the level of soft signals or increasing the level of loud signals when the input is above or below a certain threshold level.

Expansion – An undesired increase in amplitude of a portion of the composite video signal relative to that of another portion. Also, a greater than proportional change in the output of a circuit for a change in input level. For example, expansion of the sync pulse means an increase in the percentage of sync during transmission.

Exponent – Power of ten by which a number is multiplied, used in floating point representation. For example, the exponent in the decimal number 0.9873×10^7 is 7.

Export – To use NFS software to make all or part of your file system available to other users and systems on the network.

Exposure Sheet – In a piece of animation, there are hundreds of frames. Typically, they are organized on an exposure sheet. The sheet describes, for each piece of artwork used, on which frame the art is first used, what happens to it (on a frame by frame basis) while it is used, and on which frame

it disappears. Also noted on the sheet, for each frame, are any changes in the animation system (animation table, camera, lights, etc.). Exposure sheets on the PictureMaker are created using the SEQ program, and are organized somewhat differently than traditional sheets, in order to best use the computer. Each level (or layer, or plane) can be one of three types: Image (a file of pixel values), object (a 3D database and animation path), and explicit command (a PictureMaker command mode command). Each level specifies a beginning from and duration (ending frame), and the computer keeps track of all levels with respect to their overlaps in both time and space.

Extended/Enhanced Definition Television (EDTV) – a) Extended (or Enhanced) Definition Television is a proposed intermediate television system for evolution to full HDTV that offers picture quality substantially improved over conventional 525-line or 625-line receivers, by employing techniques at the transmitter and at the receiver that are transparent to (and cause no visible quality degradation to) existing 525-line or 625-line receivers. One example of EDTV is the improved separation of luminance and color components by pre-combing the signals prior to transmission. Also see Improved Definition Television. **b)** Specifically, a video format with sampling frequencies 18 MHz (Y), 4.5 MHz (C), and resolution 960 pixels by 576 lines (Y), 480 pixels by 288 lines (C).

Extended Studio PAL – A 625-line video standard that allows processing of component video quality digital signals by composite PAL equipment. The signal can be distributed and recorded in a composite digital form using D2 or D3 VTRs.

Extensibility – A property of a system, format, or standard that allows changes in performance or format within a common framework, while retaining partial or complete compatibility among systems that belong to the common framework.

External Device – In computer systems, any piece of hardware that is attached to the workstation with a cable.

External Key Input – Extra key inputs that may be accessed by keyboard that do not appear on the bus rows. Traditionally, these inputs are used only for luminance keys, such as simple character generators or titling cameras; however, they are not limited to this on Ampex switchers. These are sources 9 and 0 on 4100 series switchers, and 31 and 32 on AVC switchers.

External Key Processor – See Processed External Keys.

Extrusion – The next step in creating a boundary rep solid is to “extrude” the silhouette. Extrusion (or sweeping) is a method of dragging a polygon through space in order to define a solid. There are typically two kinds of extrusion: translational and rotational.

Eye Pattern – Waveform monitor pattern produced by random waves introduced to verify the ability to test for the presence or absence of pulses in a digital system.

Eye Tracking – The process by means of which eyes follow a person or object across a television screen. Many ATV techniques take advantage of the fact that human vision cannot simultaneously demand high spatial resolution and high temporal resolution to reduce the amount of spatial resolution transmitted for moving objects. However, when the eyes track such an object, its image is stationary on the retina, and the visual system can demand as much resolution as it would for a truly stationary object. See also Dynamic Resolution.