

Video Terms and Acronyms

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▶ O

OAM – Operation Administration and Maintenance.

Object Carousels – The object carousel specification has been added in order to support data broadcast services that require the periodic broadcasting of DSM-CC User-User (U-U) Objects through DVB compliant broadcast networks, specifically as defined by DVB Systems for Interactive Services (SIS). Data broadcast according to the DVB object carousel specification is transmitted according to the DSM-CC Object Carousel and DSM-CC Data Carousel specification which are defined in MPEG-2 DSM-CC.

Object Program – End result of the source language program (assembly or high-level) after it has been translated into machine language.

OBO – Output Back Off.

OC3 (Optical Carrier Level 3) – A 155 Mbps ATM SONET signal stream that can carry three DS-3 signals.

Occlusion – The process whereby an area of the video raster is blocked or made non-transparent by controlling selected bits. Occlusion is used when more than one picture is displayed or windowed simultaneously.

OCT – Octal Notation.

Octal – Base-8 number system. Often used to represent binary numbers, since each octal digit corresponds directly to three binary digits.

Octave – A two to one frequency ratio.

Odd Number – The number of scanning lines per frame necessary in an interlaced scanning system. One line is split between fields to ensure proper spacing between scanning lines from different fields. A progressively scanned system may use an even number of scanning lines.

Oersted – A unit of magnetic field strength.

OFDM – Orthogonal Frequency Domain Multiplex.

Off-Line Editing – Editing that is done to produce an edit decision list, which is used later for assembling that program. A video tape (sometimes called a work print) may be produced as a by-product of off-line editing.

Off-Line Editor – A low resolution, usually computer and disk based edit system in which the creative editing decisions can be made at lower cost and often with greater flexibility than in an expensive fully equipped on-line bay.

Offline Encoder – The Indeo video codec's normal mode of operation, in which it takes as long as necessary to encode a video file so that it displays the best image quality and the lowest and most consistent data rate. Compare Quick Compressor.

OIRT – Organisation Internationale de Radiodiffusion-Television.

OLE (Object Linking and Embedding) – A standard for combining data from different applications that updates automatically.

O-Member – Observing Member.

Omnidirectional – A microphone type that picks up sound relatively evenly from all directions.

OMWF (Open MPEG Windows Forum) – OMWF is a Japanese industry consortium aiming at compatibility in MPEG-based multimedia applications. The group, that includes various hardware and software vendors and content providers in Japan, has its offspring in the popularity in Japan of CD movies and Karaoke. Through cooperation with the Open MPEG Consortium in the USA, the OMWF cleared up details in the MCI standard, that impeded compatibility. The new specification, called the Video CD specification, allows Windows machines to play MPEG-1 video CDs, and allows Windows data and applications to be stored on the same CD along with the video contents.

On the Fly – a) Depressing a button causing some change while a switcher is transitioning. **b)** Selecting a tape edit point while VTR is moving.

On-Air Output – Ready to use for transmission or videotaping, this is the PGM output.

One Wire Interconnect – Interconnect consists of a single wire transporting an encoded, composite analog video signal.

One's Complement – Number representation system used for signed binary integers in which the negative of a number is obtained by complementing it. The leftmost bit becomes the sign bit, with 0 for plus, 1 for minus.

On-Line Editing – a) Editing that is done to produce a finished program master. **b)** Final editing session, the stage of post-production in which the edited master tape is assembled from the original production footage, usually under the direction of an edit decision list (EDL).

On-Line Editor – An editing system where the actual video master is created. An on-line bay usually consists of an editing computer, video switcher, audio mixer, one or more channels of DVE, character generator, and several video tape machines.

On-Screen Display – A function on many VCRs and televisions in which operational functions (tint, brightness, VCR function, programming, etc.) are displayed graphically on the television screen.

ONU – Optical Node Unit.

OOB – Out of Band.

Opcode – See Operation Code.

OPCR – Original Program Clock Reference.

Open – To double-click an icon, or to select an icon then choose "Open" from a menu in order to display a window that contains the information that the icon represents.

Open Architecture – A concept for television receivers that acknowledges an absence of ATV transmission/distribution standards and allows a receiver to deal with a multiplicity of standards and delivery mechanisms.

Open-Ended Edit – a) Assemble mode. **b)** Edit that has a start time but no designated stop time.

Open-Loop – Circuit or other system operating without feedback.

Open MPEG Consortium – The goal of the Open MPEG Consortium is to “create a single API for the playback of MPEG-1 titles under Windows and DOS.” The consortium has developed the MPEG Multimedia Control Interface (MCI) which defines how MPEG boards operate under Windows. Due to some undefined topics, the MCI specification has not been able to curb incompatibility, but the consortium has later cooperated with the Japanese OMWF group on an enhanced specification.

Operating Level – A certain level of flux recorded on magnetic tape.

Operating Program – Computer software program which controls all functions of related computers and hardware devices.

Operation Code (Opcode) – Segment of the machine-language instruction that specifies the operation to be performed. The other segments specify the data, address, or port. For the 8085, the first byte of each instruction is the opcode.

Optical Fiber – A glass strand designed to carry light in a fashion similar to the manner in which wires carry electrical signals. Since light is electromagnetic radiation of tremendously high frequency, optical fibers can carry much more information than can wires, though multiple paths through the fiber place an upper limit on transmission over long distances due to a characteristic called pulse dispersion. Many feel that the wide bandwidth of an optical fiber eliminates the transmission problems associated with the high base bandwidth of HDEP schemes. CATV and telephone companies propose connecting optical fibers directly to homes.

Option Button – Used to select from a list of related items. The selected option box has a black dot. (One item in the group must be selected.)

Option Drive – Any internal drive other than the system disk. Option drives include floppy disk drives, secondary hard disk drives, or DAT drives.

Orientation – **a)** For animation, many 3D systems fix the viewer's location at a specified distance from the viewing screen. Currently, PictureMaker is one of these. In such systems, the database is moved relative to the viewer. The set of motions that accomplish any particular view of the world is called its “orientation.” Using the three coordinate axes as references, we can translate (shuffle on a plane) and rotate objects to create new views. During animation, we change the amounts of these motions. A set of numbers describes orientation: x-trans, y-trans, z-trans, x-rot, y-rot, z-rot. **b)** A direction of presentation affecting resolution requirements. Horizontal lines become vertical lines when their orientation is rotated by 90 degrees; a pattern of dots appearing to be in horizontal and vertical rows may not appear to be diagonally aligned when its orientation is rotated 45 degrees due to characteristics of the human visual system.

Orientation Animation – We can also use splines to calculate orientations for objects in between their orientations at keyframe positions. This allows the motions of an object to be smooth rather than robot-like. In traditional animation, orientation animation required an artist to redraw the object when it rotated out of the plane of the platen (on the animation stand) and path animation was limited to repositioning the cells in X and Y (although the whole scene could be zoomed). In computer graphics, it is easy to rotate and reposition objects anywhere in three dimensions. That's why you see so much of it!

Orientation Direction – The arrangement of magnetic particles on recording tape. In tapes designed for quadruplex recording applications,

the orientation direction is transverse. For helical and longitudinal recording, it is longitudinal.

Orientation Ratio – In a material composed of oriented particles, the orientation ratio is the ratio of the residual flux density in the orientation direction to the residual flux density perpendicular to the orientation direction. The orientation ratio of conventional tapes is typically about 1.7.

original_network_id – A unique identifier of a network.

Origination – The production cycle begins with the introduction of images in photographic, electronic imaging, or computational media. Image capture in real-time is usually essential for recording live subjects and maintaining the impact of realism. Image generation, normally achieved in nonreal-time, provides additional subject matter that can be edited into and combined with recorded live subjects to achieve programs that are more artistic, or more instructional, or both.

Orthicon (Conventional) – A camera tube in which a low-velocity electron beam scans a photoemissive mosaic on which the image is focused optically and which has electrical storage capability.

Orthicon (Image) – A camera tube in which the optical image falls on a photo-emissive cathode which emits electrons that are focused on a target at high velocity. The target is scanned from the rear by a low-velocity electron beam. Return beam modulation is amplified by an electron multiplier to form an overall light-sensitive device.

Orthicon Effect – One or more of several image orthicon impairments that have been referred to as “Orthicon Effect” as follows: edge effect, mesh-beat or Moiré, ghost, halo, burned in image. It is obviously necessary to indicate specifically the effects experienced and, therefore, it is recommended that use of this term be discontinued.

Orthogonal Projection – With orthogonal projection, parallel receding lines do not converge. The process of projecting from 3D to 2D is particularly simple, simply throw away the Z-value of each coordinate.

Orthogonal Sampling – **a)** Sampling of a line of repetitive video signal in such a way that samples in each line are in the same horizontal position.

b) Picture sampling arranged in horizontal rows and vertical columns.

Osborne, Joseph – An ATV proponent issued a patent for a data compression transmission scheme for HD signals. The Osborne compression system is said to allow channel-compatible but not receiver-compatible HDTV.

OSI (Open Systems Interconnection) – The OSI Reference Model was formally initiated by the International Organization for Standardization (ISO) in March, 1977, in response to the international need for an open set of communications standards. OSI's objectives are: to provide an architectural reference point for developing standardized procedures; to allow inter-networking between networks of the same type; to serve as a common framework for the development of services and protocols consistent with the OSI model; to expedite the offering of interoperable, multi-vendor products and services.

OSI Model – The model is similar in structure to that of SNA. It consists of seven architectural layers: the physical layer and data link layer, the net-

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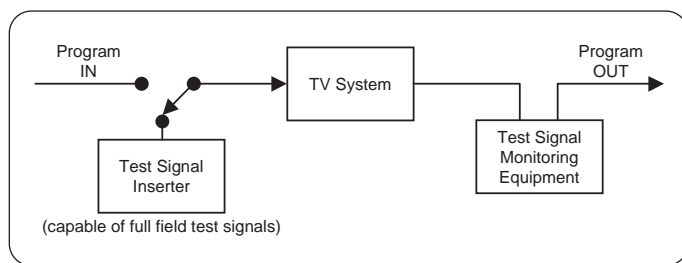
work layer; the transport layer; the session layer; the presentation layer; the application layer.

OSI Model

Physical and Data Link Layers	Provides the same functions as their SNA counterparts (physical control and data link control layers).
Network Layer	Selects routing services, segments blocks and messages, and provides error detection, recovery, and notification.
Transport Layer	Controls point-to-point information interchange, data packet size determination and transfer, and the connection/disconnection of session entities.
Session Layer	Serves to organize and synchronize the application process dialog between presentation entities, manage the exchange of data (normal and expedited) during the session, and monitor the establishment/release of transport connections as requested by session entities.
Presentation Layer	Responsible for the meaningful display of information to application entities. More specifically, the presentation layer identifies and negotiates the choice of communications transfer syntax and the subsequent data conversion or transformation as required.
Application Layer	Affords the interfacing of application processes to system interconnection facilities to assist with information exchange. The application layer is also responsible for the management of application processes including initialization, maintenance and termination of communications, allocation of costs and resources, prevention of deadlocks, and transmission security.

OUI – Organizational Unique Identifier.

Out-of-Service (Full Field Testing) –



Outlets – Openings in the hardware to which you attach connectors to make an electrical connection.

Outline – A type of key border effect. An outline key with a character generator appears as if the letters have been traced; the background video is visible all around the letter as well as inside it.

Output – The magnitude of the reproduced signal voltage, usually measured at the output of the reproduce amplifier. The output of an audio or instrumentation tape is normally specified in terms of the maximum output that can be obtained for a given amount of harmonic distortion, and is expressed in dB relative to the output that can be obtained from a reference tape under the same conditions.

Output Format – The form in which video is presented by a video chip to monitoring or recording systems is called the output format. This can be RGB, YUV, YCRCB, etc.

Output Port – Circuit that allows the microprocessor system to output signals to other devices.

Ovenized Crystal Oscillator – A crystal oscillator that is surrounded by a temperature regulated heater (oven) to maintain a stable frequency in spite of external temperature variations.

Overflow – Results when an arithmetic operation generates a quantity beyond the capacity of the register. An overflow status bit in the flag register is set if an operation causes an overflow.

Overhead Bits – Bits added to the binary message for the purpose of facilitating the transmission and recovery of the message (e.g., frame synchronization words, check bits, etc.)

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

Oversampling – Sampling data at a higher rate than normal to obtain more accurate results or to make it easier to sample.

Overscan – Increases scanning amplitudes approximately 20%. Used for tube/yoke set-up and sometimes as a precaution against an edge of picture “raster burn.”

Overshoot – An excessive response to a unidirectional signal change. Sharp overshoots are sometimes referred to as “spikes.”

Oxide (Magnetic Oxide) – The magnetizable particle used in the manufacture of magnetic tape.

Oxide Buildup – The accumulation of oxide or, more generally, wear products in the form of deposits on the surface of heads and guides.

Oxide Coating – The magnetic material coated on base film.

Oxide Loading – A measure of the density with which oxide is packed into a coating. It is usually specified in terms of the weight of oxide per unit volume of the coating.

Oxide Shed – The loosening of particles of oxide from the tape coating during use.

▶ **P**

P – Puncturing.

Pack – A pack consists of a pack header followed by zero or more packets. It is a layer in the system coding syntax.

Packed 24-Bit – A compression method where a graphics accelerator transfers more than one bit on each clock cycle, then reassembles the fragmented pixels. For example, some chips can transfer 8, 24-bit pixels in three clocks instead of the four normally required, saving bandwidth.

Packed Pixel – Color information for a pixel packed into one word of memory data. For a system with few colors, this packed pixel may require only a part of one word of memory; for very elaborate systems, a packed pixel might be several words long. See Planar

Packet – A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax.

Packet Data – Contiguous bytes of data from an elementary data stream present in the packet.

Packet Identifier (PID) – a) A unique integer value used to associate elementary streams of a program in a single- or multi-program transport stream. **b)** MPEG-2 transmits transport stream data in packets of 188 bytes. At the start of each packet is a packet identifier (PID) that tells the receiver what to do with the packet. Since the MPEG-2 data stream might be in MCPC mode, the receiver has to decide which packets are part of the current channel being watched and pass them on to the video decoder for further processing. The packets that aren't part of the current channel are simply discarded. There are typically four types of PIDs used by satellite receivers. The VPID is for the video stream and the APID is for the audio stream. Usually this data is embedded into the video stream, though occasionally a PCR (Program Clock Reference) PID is used to synchronize the video and audio packets. The fourth PID is used for data such as the program guide and information about other frequencies that make up the total package.

Packet Switched Network – Network that transmits data in units called packets. The packets can be routed individually over the best available network connection and reassembled to form a complete message at the destination.

Packet Switching – The method of dividing data into individual packets with identification and address, and sending these packets through a switched network.

Packet Video – The integration of video coding and channel coding to communicate video over a packetized communication channel. Usually, these techniques are designed to work in the presence of high packet jitter and packet loss.

Packets – A term used in two contexts: in program streams, a packet is a unit that contains one or more presentation units; in transport streams, a packet is a small, fixed size data quantum.

Packing Density – The amount of digital information recorded along the length of a tape measured in bit per inch (bpi).

Padding – A method to adjust the average length of an audio frame in time to the duration of the corresponding PCM samples, by continuously adding a slot to the audio frame.

Page – Usually a block of 256 addresses. The lower eight bits of an address, therefore, specify the location within the page, while the upper eight bits specify the page.

Painter's Algorithm – In traditional painting, paint is applied in layers, and the last paint applied is what is visible. Digitally, the last value placed in a pixel determines its color.

Pairing – A partial or complete failure of interlace in which the scanning lines of alternate fields do not fall exactly between one another but tend to fall (in pairs) one on top of the other.

PAL – See Phase Alternate Line.

PAL Format – A color television format having 625 scan lines (rows) of resolution at 25 frames per second (25 Hz). See PAL. Compare NTSC Format.

PALE – See Phase Alternating Line Encoding.

Palette – The limited set of colors that a computer can simultaneously display. A typical palette contains 256 unique colors, chosen from over 16 million possible colors. An "optimized palette" refers to a palette whose colors are chosen to best represent the original colors in a particular graphic or series of graphics.

Palette Flash – A phenomenon caused by simultaneously displaying more than one bitmap or video that do not share the same palette.

PALplus, PAL+ – PALplus (ITU-R BT.1197) is 16:9 aspect ratio version of PAL, and is compatible with standard (B, D, G, H, I) PAL. Normal (B, D, G, H, I) PAL video signals have 576 active scan lines. If a film is broadcast, usually 432 or fewer active scan lines are used. PALplus uses these unused "black" scan lines for additional picture information. The PALplus decoder mixes it with the visible picture, resulting in a 16:9 picture with the full resolution of 576 active scan lines. Widescreen televisions without the PALplus decoder, and standard (B, D, G, H, I) PAL TVs, show a standard picture with about 432 active scan lines. PALplus is compatible with standard studio equipment. The number of pixels of a PALplus picture is the same as in (B, D, G, H, I) PAL, only the aspect ratio is different.

Pan – Term used for a type of camera movement, to swing from left to right across a scene or vice versa.

Pan and Scan – A method of transferring movies with an aspect ratio of 16:9 to film, tape, or disc to be shown on a conventional TV with a 4:3 aspect ratio. Only part of the full image is selected for each scene. Pan and Scan is the opposite of "letterbox" or "widescreen."

Pan Pot – An electrical device which distributes a single signal between two or more channels or speakers.

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Pan Vector – Horizontal offset in video frame center position.

Panel Memory – See STAR system.

PAP – Password Authentication Protocol.

Paper Edit – Rough edit decision list made by screening original materials, but without actually performing edits.

Parade – A waveform monitor display mode in which the Y and two chrominance components of an analog component video are shown side by side on the waveform screen.

Parallel Cable – A multi-conductor cable carrying simultaneous transmission of data bits. Analogous to the rows of a marching band passing a review point.

Parallel Component Digital – The component signal sampling format specified by ITU-R BT.601-2 and the interface specified by ITU-R BT.656.

Parallel Composite Digital – The composite signal sampling format specified in SMPTE 244M for NTSC. The EBU is working on the PAL standard. The composite signals are sampled at the rate of 4FSC which is 14.4 MHz for NTSC and 17.7 MHz for PAL.

Parallel Data – Transmission of data bits in groups along a collection of wires (called a bus). Analogous to the rows of a marching band passing a review point. A typical parallel bus may accommodate transmission of one 8-, 16-, or 32-bit byte or word at a time.

Parallel Device – Any hardware device that requires a parallel cable connection to communicate with a workstation.

Parallel Digital – A digital video interface which uses twisted pair wiring and 25-pin D connectors to convey the bits of a digital video signal in parallel. There are various component and composite parallel digital video formats.

Parallel HDDR – The recording of multiple PCM data streams which are synchronous to a common clock onto multitrack recorder/reproducers.

Parallel Interface – A PC port which receives or transmits data in byte or word form rather than bit form.

Parallel Port – An outlet on a workstation to which you connect external parallel devices.

Parameter – **a)** A variable which may take one of a large range of values. A variable which can take one of only two values is a flag and not a parameter. **b)** The values shown in X, Y, and Z in each menu, so called because they represent the numerical values assigned to each feature of a video picture, size, aspect ratio, etc. Changing these values, shown in the "X, Y, and Z" columns, produces ADO's visual effects. **c)** A setting, level, condition, or position, i.e., clip level, pattern position, system condition. **d)** Value passed from one routine to another, either in a register or a memory location.

Parametric Modeling – This method uses algebraic equations (usually polynomials) to define shapes and surfaces. The user can build and modify complex objects by combining and modifying simple algebraic primitive shapes.

Parental Level – A mechanism that allows control over what viewers may see depending on the settings in the DVD player, the parental code on a

DVD, and the structure of the material on the DVD. This is especially useful for youthful viewers whose parents wish to exercise a degree of control over what their children can watch.

Parity – **a)** An extra bit appended to a character as an accuracy check. For example, if parity is even, the sum of all 1s in the character should be even. **b)** Number of 1s in a word, which may be even or odd. When parity is used, an extra bit is used to force the number of 1s in the word (including the parity bit) to be even (even parity) or odd (odd parity). Parity is one of the simplest error detection techniques and will detect a single-bit failure.

Parity Clock – A self-checking code employing binary digits in which the total number of 1s (or 0s) in each code expression is always even or always odd. A check may be made for even or odd parity as a means of detecting errors in the system.

Partial Transport Stream (TS) – Bitstream derived from an MPEG-2 TS by removing those TS Packets that are not relevant to one particular selected program, or a number of selected programs.

Particle Orientation – The process by which acicular particles are rotated so that their longest dimensions tend to lie parallel to one another. Orientation takes place in magnetic tape by a combination of the sheer force applied during the coating process and the application of a magnetic field to the coating while it is still fluid. Particle orientation increases the residual flux density and hence the output of a tape and improves performance in several other ways.

Particle Shape – The particles of gamma ferric oxide used in conventional magnetic tape are acicular, with a dimensional ratio of about 6:1.

Particle Size – The physical dimensions of magnetic particles used in a magnetic tape.

Particles – Refers to such vague objects as clouds, fire, water, sand, or snow that can be rendered using a special program.

PASC (Precision Adaptive Sub-Band Coding) – The PASC is very close to the Layer 1 subset in the MPEG audio specification. The algorithm, which is used in the DCC system from Phillips, provides a 384 kbit/s data stream.

Password – A combination of letters and/or numbers that only the user knows. If you specify a password for your account or if you are assigned a password by the system administrator, you must type it after you type your login name before the system lets you access files and directories.

Past Reference Picture – A past reference picture is a reference picture that occurs at an earlier time than the current picture in display order.

PAT (Program Association Table) – Data appearing in packets having PID code of zero that the MPEG decoder uses to determine which programs exist in a Transport Stream. PAT points to PMT (Program Map Table), which, in turn, points to the video, audio, and data content of each program.

Patch – **a)** To connect jack A to jack B on a patch bay with a patch cord. **b)** A section of curved, non-planar surface; it can be likened to a rectangular rubber sheet which can be pulled in all directions. **c)** Section of coding inserted into a routine to correct a mistake or alter the routine. It is usually not inserted into the actual sequence of the routine being corrected, but

placed somewhere else. A jump to the patch and a return to the routine are then provided.

Patch Panel (or Bay, Board, Rack) – A manual method of routing signals using a panel of receptacles for sources and destinations and wire jumpers to interconnect them.

Path Length – The amount of time it takes for a signal to travel through a piece of equipment or a length of cable. Also called propagation delay.

Pathname – The list of directories that leads you from the root (/) directory to a specific file or directory in the file system.

Pattern (PTN) – In general switcher terms, a pattern is any geometric shape which grows, rotates, or pivots and in so doing removes the foreground video while simultaneously revealing the background video. Strictly speaking, a pattern is a fully enclosed shape on the screen. This definition is our internal view, but not consistent with the industry. Typical patterns are rectangles, diamonds, and circles.

Pattern Border – A variable-width border that occurs at the edges of a wipe pattern. The border is filled with matte video from the border matte generator.

Pattern Extender – The hardware (and software in AVC) package which expands the standard pattern system to include rotary wipes, and rotating patterns (and matrix wipes in AVC).

Pattern Limit – See Preset Pattern.

Pattern Modification – The process of altering one or more pattern parameters. See Modifier.

Pattern Modifier – An electronic circuit which modifies basic patterns by rotating, moving positionally, adding specular effects to the borders, etc., thereby increasing the creative possibilities.

Pattern System – The electronic circuitry which generates the various pattern (wipes).

Pause Control – A feature of some tape recorders that makes it possible to stop the movement of tape temporarily without switching the machine from “play” or “record.”

Payload – Useful data in TS (Transport Stream). Payload refers to the bytes which follow the header byte in a packet. For example, the payload of a transport stream packet includes the PES_packet_header and its PES_packet_data_bytes or pointer_field and PSI sections, or private data. A PES_packet_payload, however, consists only of PES_packet_data_bytes. The transport stream packet header and adaptation fields are not payload.

PC – Printed Circuit or Program Counter.

PC² – Pattern Compatible Code.

PCB – Printed Circuit Board.

PCI (Peripheral Component Interface) – In 1992, Intel introduced the Peripheral Component interface bus specification. PCI, a high-speed interconnection system that runs at processor speed, became compatible with the VL bus by its second release in 1993. PCI includes a 64-bit data bus and accommodates 32-bit and 64-bit expansion implementations. PCI is designed to be processor-independent and is used in most high-speed multimedia systems. PCI is designed so that all processors, co-processors,

and support chips can be linked together without using glue logic and can operate up to 100 MHz, and beyond. PCI specifies connector pinout as well as expansion board architecture.

PCI Bus Mastering – The key technology that has allowed under \$1000 video capture cards to achieve such high quality levels. With PCI bus mastering, you get perfect audio sync and sustained throughput levels over 3 megabits per second.

PCM (Pulse Code Modulation) – Pulsed modulation in which the analog signal is sampled periodically and each sample is quantized and transmitted as a digital binary code.

PCM Disk – A method of recording digital signals on a disk like a standard vinyl record.

PCMCIA (Personal Computer Memory Card International Association) – A standard format for credit-card size expansion cards used to add storage capacity or peripherals such as modems to a computer.

PCR (Program Clock Reference) – **a)** The sample of the encoder clock count that is sent in the program header to synchronize the decoder clock. **b)** The “clock on the wall” time when the video is multiplexed. **c)** Reference for the 27 MHz clock regeneration. Transmitted at least every 0.1 sec.

PCRI (Interpolated Program Clock Reference) – A PCR estimated from a previous PCR and used to measure jitter.

PCS – Personal Conferencing Specification.

PCWG – Personal Conferencing Work Group.

PCX (PC Exchange Format) – A file format common to most bitmap file format conversions which can be handled by most graphic applications.

PDH – Plesiochronous Digital Hierarchy.

PDP – Plasma Display Panel.

PDU – Protocol Data Unit.

PE – Phase Error.

Peak Boost – A boost which is greater at the center frequency than either above or below it.

Peak Indicator – An indicator that responds to short transient signals, often used to supplement Recording Level Meters which usually indicate average signal levels.

Peak Magnetizing Field Strength – The positive or negative limiting value of the magnetizing field strength.

Peak Value – The maximum positive or negative instantaneous value of a waveform.

Peaking Equalization – Equalization which is greater at the center frequency than at either side of center.

Peak-Reading Meter – A type of Recording Level Meter that responds to short transient signals.

Peak-to-Peak – The amplitude (voltage) difference between the most positive and the most negative excursions (peaks) of an electrical signal.

Pedding – Raising or lowering the camera while the camera remains level. Vertical equivalent of dollying.

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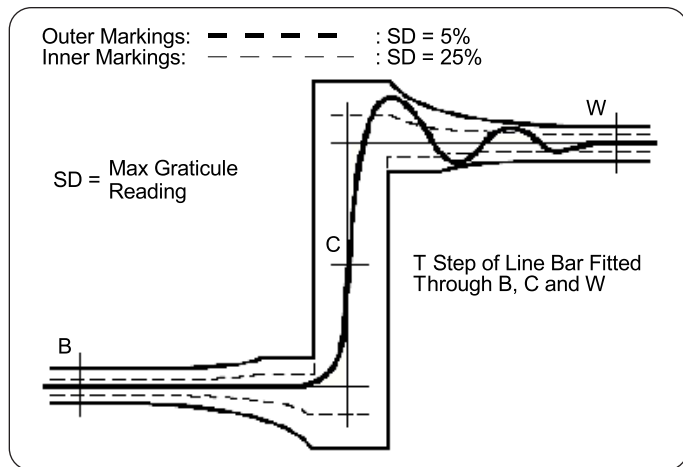
Pedestal – The offset used to separate the active video from the blanking level. When a video system uses a pedestal, the black level is above the blanking level by a small amount. When a video system doesn't use a pedestal, the black and blanking levels are the same. (M) NTSC uses a pedestal set at +7.5 IRE, (B, D, G, H, I) PAL does not.

Pedestal Level – This term is obsolete; "blanking level" is preferred.

Pel (Picture Element) – See Pixel.

Pel Aspect Ratio – The ratio of the nominal vertical height of pel on the display to its nominal horizontal width.

Percent SD – Short time distortion amplitudes are not generally quoted directly as a percent of the transition amplitude but rather are expressed in terms of an amplitude weighting system which yields "percent-SD." This weighting is necessary because the amount of distortion depends not only on the distortion amplitude but also on the time the distortion occurs with respect to the transition. The equation for NTSC Systems is $SD = at^{0.67}$ where "a" is the lobe amplitude and "t" is the time between transitions and distortions. In practice, screen graticules eliminate the need for calculations. Refer to the figure below. Also see the discussion on Short Time Distortions.



Percentage Sync – The ratio, expressed as a percentage, of the amplitude of the synchronizing signal to the peak-to-peak amplitude of the picture signal between blanking and reference white level.

Perception, Visual – The interpretation of impressions transmitted from the retina to the brain in terms of information about a physical world displayed before the eye. Note: Visual perception involves any one or more of the following: recognition of the presence of something; identifying it; locating it in space; noting its relation to other things; identifying its movement, color, brightness, or form.

Periodic Noise – The signal-to-periodic 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 noise. Different performance objectives are sometimes specified for periodic noise (single frequency) between 1 kHz and the upper limit of the video frequency band and the power supply hum, including low-order harmonics.

Peripheral – Any interface (hardware) device connected to a computer that adds more functionality, such as a tape drive. Also, a mass storage or communications device connected to a computer. See also External Devices and Internal Drives.

Permanent Elongation – The percentage elongation remaining in a tape or length of base film after a given load, applied for a given time, has been removed and the specimen allowed to hang free, or lightly loaded, for a further period.

Perm'ed – Magnetized to a level which cannot be removed with a hand-held degausser.

Perpendicular Direction – Perpendicular to the plane of the tape.

Perspective – The artistic method in a two-dimensional plane to achieve a three-dimensional look. The technique or process of representing on a plane or curved surface, the spatial relation of objects as they might appear to the eye, one giving a distinct impression of distance.

Perspective (Menu) – The 3D function that enables changing the skew and perspective of an image. **Skew X:** Uses the X axis to slant the image right or left to change the image geometry into a parallelogram.

Perspective: Uses the Z axis to change the point of view (perspective) of an image, to give it a three-dimensional appearance.

Perspective Projection – When perspective is used, a vanishing point is used. With perspective, parallel lines receding into the screen appear to converge. To make this happen, the process of converting a 3D coordinate (x, y, z) into its 2D perspective on the screen requires dividing the original x and y coordinates by an amount proportional to the original z value. Thus, the larger z is, points on the parallel lines that are far away will be closer together on the screen.

Perturbation – A method to add noise so as to enhance the details of a surface.

PES (Packetized Elementary Stream) – Video and audio data packets and ancillary data of undefined length.

PES Header – Ancillary data for an elementary stream.

PES Packet – The data structure used to carry elementary stream data. It consists of a packet header followed by PES packet payload.

PES Packet Header – The leading fields in a PES packet up to but not including the PES_packet_data_byte fields where the stream is not a padding stream. In the case of a padding stream, the PES packet header is defined as the leading fields in a PES packet up to but not including the padding_byte fields.

PES Stream – A PES stream consists of PES packets, all of whose payloads consist of data from a single elementary stream, and all of which have the same stream_id.

Petabyte – 1000 terabytes, or 1 million gigabytes.

P-Frame (Predicted Frame) – One of the three types of frames used in the coded MPEG-2 signal. The frame in an MPEG sequence created by predicting the difference between the current frame and the previous one. P-frames contain much less data than the I frames and so help toward the low data rates that can be achieved with the MPEG signal. To see the origi-

nal picture corresponding to a P-frame, a whole MPEG-2 GOP has to be decoded.

PGM – Program.

Phantom Matrix – That portion of the switcher electronic crosspoints which are not controlled by a row of push buttons on the console. See Bus.

Phantom Points – See Ghost Point.

Phantom Power – Electricity provided by some broadcast and industrial/professional quality audio mixers for use by condenser microphones connected to the audio mixer. Some microphones require phantom power, and must be connected to audio mixers that provide it.

Phase – A measure of the time delay between points of the same relative amplitude (e.g., zero crossings) on two separate waveforms.

Phase Adjust – The method of adjusting the color in a (M) NTSC video signal. The phase of the chroma information is adjusted relative to the color burst and affects the hue of the picture.

Phase Alternate Line (PAL) – a) European video standard with image format 4:3 aspect ratio, 625 lines, 50 Hz and 4 MHz video bandwidth with a total 8 MHz of video channel width. PAL uses YUV; The Y component represents Luminance, the U component represents B-Y, The V component represents R-Y. The V component of burst is inverted in phase from one line to the next in order to minimize hue errors that may occur in color transmission. **b)** The color television transmission standard used in Europe and other parts of the world. This standard uses a subcarrier which is alternated 90 degrees in phase from one line to the next to minimize hue errors in color transmission. PAL-I uses a 4.43361875 subcarrier. A single frame (picture) in this standard consists of 625 scanning lines. One frame is produced every 1/25 of a second. PAL-M uses a 3.57561149 MHz subcarrier and 525 scanning lines. One frame is produced every 1/30 of a second. **c)** The television and video standard in use in most of Europe. Consists of 625 horizontal lines at a field rate of 50 fields per second. (Two fields equals one complete frame.) Only 576 of these lines are used for picture. The rest are used for sync or extra information such as VITC and Closed Captioning.

Phase Alternating Line Encoding (PALE) – A method of encoding the PCM NTSC signal by reversing the encoding phase on alternate lines to align the code words vertically.

Phase Comparator – Circuit used in a phase-locked loop to tell how closely the phase locked loop reference signal and the PLL output are in phase with each other. If the two signals are not in phase, the Phase Comparator generates an error signal that adjusts the PLL frequency output so that it is in phase with the reference signal.

Phase Distortion – A picture defect caused by unequal delay (phase shifting) of different frequency components within the signal as they pass through different impedance elements – filters, amplifiers, ionosphere variations, etc. The defect in the picture is “fringing”-like diffraction rings at edges where the contrast changes abruptly.

Phase Error – a) A picture defect caused by the incorrect relative timing of a signal in relation to another signal. **b)** A change in the color subcarrier signal which moves its timing out of phase, i.e., it occurs at a different instant from the original signal. Since color information is encoded in a

video signal as a relation between the color subcarrier and the color burst phase, a deviation in the color subcarrier phase results in a change in the image's hue.

Phase Shift – The movement of one signal's phase in relation to another signal.

Phase-Locked Loop – The phase locked loop (PLL) is central to the operation of frequency and phase stable circuitry. The function of the PLL is to provide a frequency/phase stable signal that is based on an input reference signal.

Phasing – Adjusting the delay of a video signal to a reference video signal to ensure they are synchronous. This includes horizontal and subcarrier timing. Also called timing.

PHL – Physical.

Phon – A unit of equal loudness for all audio frequencies. Phons are related to dB, SPL re: 0.0002 microbar by the Fletcher-Munson curves. For example, a loudness level of 40 phons would require 40 dB SPL at 1 kHz and 52 dB at 10 kHz.

Phong – A type of rendering (shadows, environmental reflections, basic transparency, and textures).

Phong Shading – A more realistic and time-consuming type of shading, Phong shading actually calculates specular reflections.

Phono – A connector used in audio and video components, characterized by its single connection post and metal flanges. See also RCA Connector.

Photo YCC – A color encoding scheme developed by Kodak for its Image PAC file format.

Photoemissive – Emitting or capable of emitting electrons upon exposure to radiation in and near the visible region of the spectrum.

PIC – A standard file format for animation files.

Pick-Off Jitter – Jitter is a random aberration in the time period due to noise or time base instability. Pick-off means sample point.

Pick-Up Pattern – The description of the directionality of a microphone. The two prominent microphone pick-up patterns are omnidirectional and unidirectional.

Pickup Tube – An electron-beam tube used in a television camera where an electron current or a charge-density image is formed from an optical image and scanned in a predetermined sequence to provide an electrical signal.

PICT – A standard file format for bit-mapped and object-oriented graphic files.

Picture – a) Source, coded, or reconstructed image data. A source or reconstructed picture consists of three rectangular matrices of 8-bit numbers representing the luminance and two chrominance signals. For progressive video, a picture is identical to a frame, while for interlaced video, a picture can refer to a frame, the top field, or the bottom field of the frame depending on the context. **b)** In general, the term “picture” covers a coded entity. A picture can either be a frame or a field. It is possible to change dynamically between frame coding and field coding from frame to frame. Frame coding is preferred when a lot of details, but little motion is

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present, and field coding is best for fast movements. It is also important to realize that when the coded material originates from film, the two fields cover the exact same time, but when the source material comes from a video camera, the two fields relate to different moments.

Picture Element – The smallest area of a television picture capable of being delineated by an electric signal passed through the system or part thereof. Note: It has three important properties, namely P_v , the vertical height of the picture element; P_h , the horizontal length of the picture element; and P_a , the aspect ratio of the picture element. In an analog system $P_v = 1/N$, where N is the number of active scanning lines in the raster, $P_h = trA/tc$, where tr is the average value of the rise and delay times (10% to 90%) of the most rapid transition that can pass through the system or part thereof, tc is the duration of the part of a scanning line that carries picture information, and A is the aspect ratio of the picture.

Picture Height – In a scanning standard, the number of raster lines that contain the vertical extent of a white flatfield between the 50% response points, top and bottom.

Picture Monitor – Refers to a cathode-ray tube and its associated circuits, arranged to view a television picture.

Picture Safety Area – The area of a video signal which will be visible on a receiving monitor. Often denoted by marks within the viewfinder of the video camera.

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

Picture Signal – That portion of the composite video signal which lies above the blanking level and contains the picture information.

Picture Tube – A cathode-ray tube used to produce an image by variation of the intensity of a scanning beam.

Picture Width – In a scanning standard, that fraction of a total raster line that contains the horizontal extent of a white flatfield between the 50% response points, left and right.

PID (Packet Identifier) – A 13-bit code in the transport packet header. PID 0 indicates that the packet contains a PAT PID. PID 1 indicates a packet that contains CAT. The PID 8191 (all 1s) indicates null (stuffing) packets. All packets belonging to the same elementary stream have the same PID.

Piezoelectric Microphone – A microphone whose generating element is a crystal or ceramic element, which generates a voltage when bent or stressed by movement of the diaphragm.

Pigeons – Noise observed on picture monitors as pulses or bursts of short duration, at a slow rate of occurrence; a type of impulse noise.

Pinchroller – A rubber or neoprene wheel which presses the tape against the capstan during recording or play.

Pink Noise – **a)** Random noise which has equal energy per octave throughout the audio spectrum. **b)** A type of noise whose amplitude is inversely proportional to frequency over a specified range. Pink noise is

characterized by a flat amplitude response per octave band of frequency (or any constant percentage bandwidth), i.e., it has equal energy, or constant power, per octave. Pink noise can be created by passing white noise through a filter having a 3 dB/octave slope.

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

Pipe – A way of stringing two or more programs together so that the output of one is fed to the other as input.

Pipeline – A stage in a processor which executes a partial task. For example, a memory pipeline might use pipelined (sequential) stages to calculate the address, read the value of the memory cell, and store the value in a register. A pipeline allows starting the execution of a cycle before a previous cycle has been completed. A processor can start to execute a complex instruction in a pipeline before the preceding instruction has been completed.

Pit Art – A type of DVD labeling in which the pits are cut in a design to resemble writing or another image. It sometimes has the look of a hologram.

Pitch Control – A circuit which permits the speed of a tape transport's motor to be varied slightly to raise and lower the musical pitch of the recording or to slightly lengthen or shorten playing time.

Pixel (Picture Element) – a) Related to a particular image address in digital systems or to the smallest reproducible element in an analog system. A single point on the screen. As an example, if a system is said to have a display resolution of 1280 by 1024, there are 1280 pixels per horizontal line and 1024 horizontal lines from the top of the screen to the bottom. **b)** A pixel is the digital representation of the smallest area of a television picture capable of being delineated by the bit stream; i.e., the digital value or set of values that defines the characteristics of a picture element. A pixel of a full-color image is represented by a minimum of three components, reflecting the trichromatic nature of human vision. A pixel of a monochrome image may be represented by a single component. Pixels may carry additional information such as transparency. The total number of picture elements in a complete picture is of interest since this number provides a convenient way of comparing systems. **c)** One of the tiny points of light that make up the picture on a computer screen. The smaller and closer together the pixels are, the higher the resolution.

Pixel, Square – a) Picture element with equal vertical and horizontal sample spacing, having an aspect ratio of 1:1. Square pixels are used by computers, and the software expects the use of square pixels for proper operation. Video originally was unconcerned about the aspect ratio of its pixels. Increasing dependence upon electronic post-production has emphasized the advantage of square pixels. **b)** System M/NTSC, by comparison, does not have square pixels. With 485 active vertical lines per frame, and 768 samples per active horizontal line (when sampled at four times subcarrier) in a 4:3 aspect ratio, the resulting pixels have an aspect ratio (width:height) of 0.842. **c)** During image processing, some transforms that manipulate individual pixels as independent picture elements – especially those operations involving any image rotation, distortion, or size changes

are performed with simplified programs and less risk of artifacts when the pixels are square.

Pixel, Rectangular – Picture element that has different vertical and horizontal sample spacing. Rectangular pixels are usually used by consumer video equipment and video conferencing.

Pixel Clock – This clock divides the incoming horizontal line of video into pixels. The pixel clock is very stable relative to the incoming video or the picture will not be stored correctly. The higher the frequency of the pixel clock, the more pixels that will appear across the screen.

Pixel Depth – The number of bits of color information per pixel. A system using eight bits per pixel can display 256 (2⁸) colors. A system using 16 bits per pixel can display 65,536 (2¹⁶) colors. A system using 24 bits per pixel can display over 16.7 million colors. Twenty-four-bit color is often called true color because the human eye can distinguish among approximately six million different colors, or fewer than are available in a 24-bit color system.

Pixel Drop Out – A common source of image artifacts that appear as black spots on the screen, either stationary or moving around. Several things can cause pixel drop out, such as the ADC not digitizing the video correctly or pixel timing being incorrect anywhere in the system.

PJ – Phase Jitter.

Planar – In display terms, the pixel color information is stored in four bits across four memory planes. This allows a maximum of 16 colors (2⁴). See Packed Pixel.

Planes – A plane is a flat surface, infinitely large.

Playback – The reproduction of sound previously recorded on a tape.

Playback Head – A transducer which converts magnetic flux into electrical current.

PLL – See Phase Locked Loop.

PLUGE (Picture Line-Up Generating Equipment) – The PLUGE signal was designed for rapid and accurate adjustment of the black level, reference and, hence, the luminance range, display. It provides adjacent vertical bars, one at black level, reference and continuous bars slightly above and slightly below that reference. Following initial development by the BBC, CCIR now recognizes at least eight versions. SMPTE EG 1-1990 includes a variant in which the black level, reference is flanked by bars at -4 IRE and +4 IRE. When the -4 IRE merges into the black level, reference bar, but the +4 IRE bar is distinguishable, black level, reference is correctly set. A white patch is included at peak white, to define IRE 100, and the luminance range, display CRT.

Plug-Ins – Software programs that can install into a main nonlinear editing software to give you additional features and/or specs.

PLV (Production Level Video) – A digital video algorithm developed by Intel in 1989 which can produce VHS-quality video at 30 frames per second at 256 x 240 pixels. Horizontal line doubling is used to produce a VGA 640 x 480 pixels.

PM – Pulse Modulation.

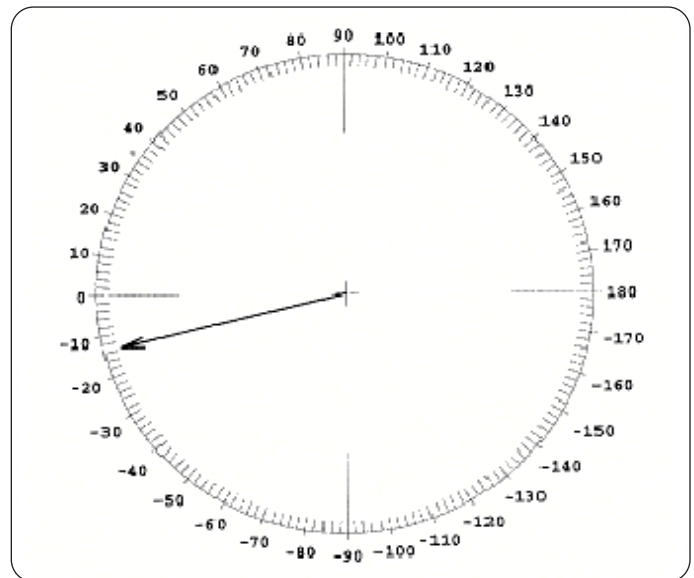
P-Member – Primary Member.

PMT (Program Map Tables) – The PMT identifies the locations of the streams that make up each service and the location of the PCR fields for a service. This table is transmitted in sections. Name of programs, copyright, reference of the state streams with PIDs, etc., belonging to the relevant program.

Point Source – Light that emanates from a given point with equal intensity in all directions with a maximum intensity at its position. It exponentially dies out to zero at the distance of its radius. This is called the sphere light source.

Points – Points are locations in 3D space. They are represented in the computer as numerical triplets (x, y, z) where x, y, and z measure the point's distance from the origin. A point is also called a vertex (plural is vertices). Objects are defined in terms of points. Vertex is a synonym for point. A point's x, y, and Z values are called its coordinates.

Polar SCH Phase Display – This type of display shows the phase relationship of the color oscillator and the 50% point on the leading edge of the horizontal sync pulse. The phase of these two can be within 0 to 360 degrees of each other. In the example below, there is a 12 degree phase difference between the two.



Polarity of Picture Signal – Refers to the polarity of the black portion of the picture signal with respect to the white portion of the picture signal. For example, in a “black negative” picture, the potential corresponding to the black areas of the picture is negative with respect to the potential corresponding to the white areas of the picture; in a “black positive” picture, the potential corresponding to the black areas of the picture is positive. The signal as observed at the broadcasters’ master control rooms and telephone company television operating centers is “black negative.”

Pole Pieces – The metal pieces of a head through which magnetic flux passes to or from the gap.

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Polling – One method used to identify the source of an interrupt request. The CPU must poll (read) the devices to determine which one caused the interrupt.

Polyester – An abbreviation for polyethylene terephthalate, the material most commonly used as a base film for precision magnetic tape. The chief advantages of polyester over other base film materials lie in its humidity and time stability, its solvent resistance, and its mechanical strength.

Polygon – A polygon is an enclosed piece of a plane, bounded by vectors.

Polygon Plane – The plane containing the polygon which defines its shape.

Pop – Operation of reading a word from the stack. Same as Pull.

Pop Filter – See Blast Filter.

Port – An outlet to which you attach cable connectors. Point at which the I/O devices are connected to the computer.

Position Words – This term is a purely Cubicomp buzzword. As used within their software and documentation, a position word is the set of numbers that orient a single keyframe. Each keyframe gets a position word, and a position word stores the translations, rotations, and zooms that were used to create the view of the world seen in the keyframe. Position words do triple duty: They define the current view of the world. A position word is made up of nine numbers: x, y, and Z rotation; x, y, and z translation; x and y offsets; and scale; They define keyframes (since a keyframe is a particular view of the world; Similarly, in-betweens are automatically generated views of the world that are in between keyframes.

Positioner – a) The console device which allows an operator to move a pattern around the screen. The AVC has a rate positioner as opposed to an absolute positioner. The direction of pattern movement is the same as the direction in which the positioner is moved and the rate of pattern movement is proportional to the distance the positioner is moved from center. When it is released, the pattern stops in its current position and the positioner returns to center. The 4100 has an absolute positioner whose angle and direction correspond to the location of the pattern on the screen. **b)** A joystick control that allows the origin of a wipe pattern to be moved within the active picture area.

Positive Logic – True level is the more positive voltage level in the system.

Posterization – a) Special effect in which the picture is reduced to a small number of colors or luminance levels removing any fine gradations of color and brightness resulting in an oil painting effect. Both the Video Equalizer and Digital Video Mixer includes this effect. **b)** An ADO special effect where a frame of video is broken down into flat areas of color. This mimics the silk screen printing method used by graphic designers to create poster designs, hence the derivations of the name.

Post-Production – a) All production work done after the raw video footage and audio elements have been captured. Editing, titling, special effects insertion, image enhancement, audio mixing, and other production work is done during post-production. Videonics equipment is ideally suited for use in post-production. **b)** The application of image processing to photographic or electronic recorded image information. Usually in addition to scene selection and simple scene transitions, rather complex processing may be proposed: montage of two or more images; integration of photo-

graphic and electronic image information; fitting and over-recording; changes of size, contrast, hue, or luminance; introduction of computer-generated components; simulated motion; creation of multi-layered composites with control of transparency. Audio information, maintained in synchronism with the images as specified by the script, is processed along with the image information.

Post-Production, Electronic – Performing one or more of the steps in the post-production sequence with the image information encoded in the electronic mode. The initial and final records, as well as any of the intermediates, may employ the photographic and electronic modes in any combination or permutation.

Post-Production, Off-Line – a) Electronic: Complex post-production may require such large image bandwidths, such storage requirements, and such extensive calculations that it necessitates conduction in non-real-time, off-line. **b) Photographic:** Traditionally all photographic post-production has been off-line.

Post-Production, Studio – When the studio and distribution standard are identical, and/or program urgency is great, simplified post-production is frequently conducted with all program segment decisions made in real-time review. For such applications, the program is usually in distribution or emission/transmission format.

Post-Roll – The number of frames (or seconds and frames) that roll after the edit out-point.

PostScript – A computer language designed to control exactly how and where printed elements (lines, type, graphics) will appear on the page.

Pot (Potentiometer) – Gain control in audio or video.

Power Cable – The cable that connects the workstation to an electrical outlet.

Power Down – To turn off the power switches on the workstation chassis and the monitor.

Power Supply – The piece of hardware within the chassis that directs power from an electrical outlet to the chassis, the monitor, and other internal devices.

Power Up – To turn on the power switches on the workstation chassis and the monitor.

Power!Video – An intra-frame video compression algorithm from Horizons Technology, Inc., dedicated to desktop computers, and providing playback without additional hardware. The Power!Video Pro version provides additional controls and settings.

Power-On Diagnostics – A series of tests that automatically check hardware components of a system each time it is turned on.

Power-Up Reset – Initialization process whereby storage elements within a system are preset to defined conditions when power is first applied.

PP – See Peak to Peak.

PPI – PDH Physical Interface.

P-Picture (Predictive-Coded Picture) – One of the three types of digital pictures in an MPEG data stream. A picture that is coded using motion-compensated prediction from past reference pictures. The motion compen-

sation is causal, that is, only based on preceding pictures, which can be I-pictures or P-pictures. This type of picture generally has more data than B-picture types.

PPP – Point-to-Point Protocol.

PPT – PDH Path Termination.

PPV – Pay Per View.

PQ Information – Information on the disc (or tape) that determines track start points, control bits, timing information, etc.

PRBS – See Pseudo Random Binary Sequence.

Predicted Pictures (P-Pictures or P-Frames) – Pictures that are coded with respect to the nearest previous I- or P-picture. This technique is termed forward prediction. P-pictures provide more compression than I-pictures and serve as a reference for future P-pictures or B-pictures. P-pictures can propagate coding errors when P-pictures (or B-pictures) are predicted from prior P-pictures where the prediction is flawed.

Prediction – a) The use of a predictor to provide an estimate of the pel value or data element currently being decoded. **b)** Prediction of a picture (P or B) with indication of a motion vector.

Prediction Error – The difference between the actual value of a pel or data element and its predictor.

Predictive-Coded Picture – A picture that is coded using motion compensated prediction from past reference pictures.

Predictor – A linear combination of previously decoded pel values or data elements.

Preemphasis (Predistortion) – A change in level of some frequency components of the signal with respect to the other frequency components at the input to a transmission system. The high-frequency portion of the band is usually transmitted at a higher level than the low-frequency portion of the band.

Preenhancement – In many situations, video losses can be anticipated, allowing signal precompensation in a way that partially corrects for the losses. See Line Compensation.

Premastering – The process of formatting data into the exact form that will appear on a DVD, including file structure and file locations. A premastered product is ready to be mastered and replicated.

Preprocessing – The video signal processing that occurs before MPEG encoding. Noise reduction, downsampling, cut-edit identification, and 3:2 pull-down identification are examples of preprocessing.

Pre-Production – The universe of tasks that must be completed before shooting begins.

Pre-Read – See Read Before Write.

Prerecorded Tape – A commercially available recorded tape.

Pre-Roll – The number of frames (or seconds and frames) between the cue point and the edit point which allows ACE to synchronize transports prior to an edit.

Presence – How near the sound source seems to be with respect to the listener. Related to the intensity of the frequencies in the 2.5 K to 7.5 kHz range.

Present Pattern – a) An effect selected by the PST PTN push-button where a wipe pattern is used. The characteristics of the pattern are set using the pattern controls. If the effect is wiped on-air over an existing on-air background, the wipe pattern will only move as far as the limit set by the vertical and horizontal limit controls. This is sometimes called a preset wipe or a wipe to a pattern limit. If the effect is mixed on-air, it is called a mix to a pattern limit. **b)** The ability to set both horizontal and vertical limits to the size a pattern will grow to when the fader is moved to the B bus. Ampex switchers can wipe to a preset size, mix in a pattern already at a preset size, and mix or wipe in keys with preset limits. Mixing in a key using preset patterns allows portions of the key to be masked off, and this is the mask key feature on Ampex switchers.

Presentation Data – Information, such as video or audio samples, which are presented at a specified time.

Presentation Time Stamp (PTS) – A field that may be present in a PES packet header that indicates the time that a presentation unit is presented in the system target decoder.

Presentation Unit (PU) – A decoded audio access unit or a decoded picture.

Preset Background Bus – A row of crosspoint push-buttons used to select the video input that will be placed on-air during the next DSM background transition.

Preset Bus – The line of push button switches on the control panel which select and indicate the next video that will appear when the DSK fader is pulled (AVC series in flip or flip-flop mode only). The idea behind the name is that this is a bus that allows one to pre-select (or preset) the next video.

Preset Wipe – See Preset Pattern.

Preset/Key Bus – The line of push button switches on the control panel which select and indicate the preview output, and represents the next video that will appear when the DSK fader is pulled. It can also select and indicate key sources to other keyers due to the fact that it is a “split” bus. That is, reentries can be selected for the next video as well as bus inputs for a key source, both at the same time. This type of bus is exclusive to 4100 series switchers.

Pressure Pad – A device that forces tape into intimate contact with the head gap, usually by direct pressure at the head assembly.

Pressure Zone Microphone (PZM) – A microphone consisting of a metal plate and a small microphone element. The PZM collects and processes all sound waves that strike the metal plate.

Preview – To rehearse an edit without actually performing edits.

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

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Preview Key – The ability to see how a key will appear, and the effect of all adjustments on that key, without having to put the key “on-air.”

Preview Monitor – A video monitor which displays the picture from a video source. It is used to evaluate a video source before selecting it.

Preview Output – The output of the switcher which allows you to observe an effect before it is placed on-air. Also called Look Ahead Preview. This includes previewing keys.

Primary Colors – Colors, usually three, that are combined to produce the full range of other colors within the limits of a system. All non-primary colors are mixtures of two or more of the primary colors. In television, the primary colors are specific sets of red, green, and blue.

Primary Distribution – The links that feed the signals to the transmission sites, such as terrestrial transmitters, cable head-ends, and satellite up-links, from the studio or “Play-Out Center,” often via a switching center.

Primary Inputs – The eight video inputs applied to the Key, Program Background, and Preset Background buses.

Primary Matrix – That portion of the crosspoint electronics associated with bus rows accessible from the switcher console. That is, the rows of buttons on the left side of a switcher which select the video inputs to the M/Es and including the program, preset (or line A/B) and PST/key bus row push buttons.

Primitives – Refer to the most basic three-dimensional shapes, for example cubes, cylinders, cones, and spheres. From these you can build more complex 3D objects.

Print Manager – A tool accessed through either the System Toolchest or the System Manager that is used to set up printer software and monitor jobs that are sent to the printer.

Print-Thru – The effect of signals being magnetically impressed on adjacent portions of tape. This is the effect of magnetic induction and its cause can be excessive spooling or heat. Factors affecting spurious printing are principally heat, tape thickness, and recording level and, to a lesser extent, time. Print-thru increases linearly with the logarithm of the time of contact, other factors being constant.

Priority – Number assigned to an event or device that determines the order in which it will receive service if more than one request is made simultaneously.

Proc Amp – See Video Processing Amplifier.

Processed External Key – Synonym for Isolated Key.

Processing Amplifier (or Proc Amp) – A set of electronic circuitry used to insure that the video output signal of a switcher (or other video equipment) maintains proper levels and relationships and that sync and burst are clean and useable. The AVC series switcher comes with a limited proc amp as a standard feature. This proc amp can pass the video signal as it appears at the input, or strip the old sync and add a new sync pulse. It can also strip both sync and burst and add new sync and burst prior to the output of the switcher.

Processor – Same as Microprocessor.

Production – Creation of recorded image information with associated audio, including necessary editing to achieve the thematic and artistic con-

tent desired for distribution. Production includes the three subdivisions: origination, post-production, and distribution. During production, there may be one or more interconversions of the image information between photographic and electronic modes. At the conclusion of the production step, the program has its intended final artistic and thematic content. When the major portion of the production process has been completed and the program is transferred to distribution, it may be required to transform systems to whatever formats best meet the program’s distribution requirements.

Production Switcher – A device that allows transitions between different video pictures. Also allows keying and matting (compositing). See Video Switcher.

Production System HDTV – Production system HDTV is the analog of studio standard, HDTV, and addresses only a small part of what the SMPTE Committee on Hybrid Technology (H19) considers production, and in fact only a small part of what they consider electronic production. Thus, in the context of SMPTE 240M, Television Signal Parameters 1125/60 High-Definition Production System, production has a much more restrictive definition than that employed by CCIR, or the SMPTE Committee on Hybrid Technology (H19). To illustrate by example from SMPTE 240M, the scope explains, this standard defines the basic characteristics of the video signals associated with origination equipment operating at the 1125/60 high-definition television production system. It is, therefore, directed to the equipment that first encodes the image information into this electronic format, for example, the studio camera and its associated electronics.

Production, Electronic – Performing one or more of the steps in the production sequence with the image information encoded in the electronic mode.

Production, Electronic, Digital – The SMPTE Working Group on Digital Picture (H19.16) with initial focus upon nonreal-time digital representation of images, has been formed to develop standards and recommended practices with emphasis upon the production process. The SMPTE Task Force on Digital Image Architecture (ST13.20) has been formed to define further requirements for the exchange of digital pictures at various resolutions and across the interfaces with a variety of video, computer, and data media.

Profile – a) A defined subset of the syntax of a specification.

b) Subdivision of video coding into different resolutions. **c)** Defines the amount of functions and compression processes involved. It is, in other words, a defined subset of the entire syntax, and limits the number of facilities that may be used. For instance, a profile specifies the allowed scalability features.

Program (PGM) – a) Procedure for solving a problem, coded into a form suitable for use by a computer. Frequently referred to as software. **b)** A collection of program elements. Program elements may be elementary streams. Program elements need not have any defined time base; those that do have a common time base and are intended for synchronized presentation. **c)** A concatenation of one or more events under the control of a broadcaster, e.g., news show, entertainment show.

Program Access – Prohibition on exclusive programming contracts between cable operators and program services controlled by cable operators, designed to give alternative multichannel distributors (such as wire-

less cable and DBS) the opportunity to bid for established cable services (such as CNN or Nickelodeon). The rule expires in 2002.

Program Background Bus – A row of crosspoint push-buttons used to select the on-air background output of the switcher.

Program Bus – **a)** Similar to the preview bus in concept except that the resulting output is the final signal which goes “on the air.” **b)** The line of push button switches on the control panel which select and indicate the video source of the switcher output on a flip or flip-flop style switcher.

Program Clock Reference (PCR) – A time stamp in the transport stream from which decoder timing is derived.

Program Counter (PC) – Register in the CPU that holds the address of the next program word to be read. Branching requires loading of the jump address into the program counter. Otherwise, the PC is incremented after each word is read.

Program Element – A generic term for one of the elementary streams or other data streams that may be included in the program.

Program Output – The on-air or final output of the switcher as selected on the program or line A/B bus and as keyed, mixed, or faded with the DSK.

Program Specific Information (PSI) – Normative data which is necessary for the demultiplexing of transport streams and the successful regeneration of programs.

Program Stream – **a)** A bit stream containing compressed video, audio, and timing information. **b)** Multiplex of several audio and video PES using the same clock. **c)** Combines one or more packetized elementary streams (PES), which have a common time base into a single stream. The program stream was designed for use in relatively error-free environments, and is suitable for applications which may involve software processing. Program stream packets may be of variable length.

Programming Language – A means of specifying an ordered group of instructions that a computer will execute.

Progressive – Short for progressive scanning. A system of video scanning whereby lines of a picture are transmitted consecutively, such as in the computer world.

Progressive Scan – See Noninterlaced Scan.

Progressive Sequence – Sequence of pictures, that all are frame pictures with frame DCT coding.

Projection – When a database is visualized, it is “projected” from 3D into 2D (the screen). Two kinds of projection are used, projection and orthogonal.

PROM (Programmable Read-Only Memory) – Integrated circuit memory that is manufactured with a pattern of all logical 0s and 1s and has a specified pattern written into it by a special hardware programmer.

PROM Monitor – The interface used to communicate with the system after it is powered up, but before it is booted up and running IRIX.

Prompt – A character or word that the system displays that indicates the system is ready to accept commands.

Propagation Delay – The time it takes for a signal to travel through a circuit, piece of equipment, or a length of cable. When the luminance and

color information of a video signal are separated for processing, then reunited at the output of a device, it is critical that the propagation delay for each signal component is equal or distortion similar to ghosting will result. Propagation delay is most noticeable in color-under VHS players. Propagation delay is also a problem when routing computer data and clock signals around a chip or circuit board. The faster the clock, the more critical the path delays.

Proshare – A videoconferencing video system by Intel which adapts PCs using added circuit boards, to videoconferencing. The Proshare system is based on H.320 recommendations for audio and video teleconferencing.

Protocol – Set of syntax rules defining exchange of data including items such as timing, format, sequencing, error checking, etc.

Provider – A software layer that provides services to other layers. A provider may or may not involve dedicated hardware.

PS – See Program Stream.

PSA – Public Service Announcement.

Pseudo-Color – A color relationship scheme in which a color table contains available color values; an index into this table is used to refer to a color. If a desired color is not found in the table, it may be matched to the closest available entry or an existing entry may be overwritten.

Pseudo-Instruction – Instruction that is used in an assembly language program but is an instruction for the assembler. Pseudo-instructions have no direct correspondence to machine language.

Pseudo-Random Binary Sequence (PRBS) – A random sequence of bits which repeat after $2^n - 1$.

Pseudo-Random Sequences/Patterns – Certain systems described in these standards employ feedback shift registers to modify sequences or patterns of bits in a predetermined manner or to restore such modified bit patterns to their original sequence. With outputs of suitably selected stages added modulo-2 and applied to its feedback loop, an n-stage feedback shift register will generate a bit sequence or pattern ($2^n - 1$) bits long before repeating. Because such repeating sequences exhibit many of the statistical properties of uniformly distributed random number sequences (e.g., their probability density and autocorrelation functions satisfy appropriate conditions), they are called pseudo-random.

PSI (Program Specific Information) – a) Information that keeps track of the different programs in an MPEG transport stream and in the elementary streams in each program. PSI includes: PAT, PMT, NIT, CAT, ECM, and EMM. **b)** Normative data necessary for the demultiplexing of TSs and the regeneration of programs.

PSI/SI – A general term for combined MPEG PSI and DVB-SI.

PSIP (Program and System Information Protocol) – A part of the ATSC digital television specification that enables a DTV receiver to identify program information from the station and use it to create easy-to-recognize electronic program guides for the viewer at home. The PSIP generator inserts data related to channel selection and electronic program guides into the ATSC MPEG transport stream.

PSK – Phase Shift Keying.

PST – Preset.

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PSTN – Public Switched Telephone Network.

PSW – Pan and Scan Window.

PTS (Presentation Time Stamp) – a) The time at which a presentation unit is to be available to the viewer. When the packet should arrive and its destination. **b)** Time stamp for vision and sound integrated into PES, transmitted at least every 0.7 sec.

PTV – See Public Television.

PU (Presentation Unit) – a) One compressed picture or block of audio. **b)** Decoded AAU or a decoded picture.

Public Television – Television stations and networks that operate as non-commercial ventures.

Puck – Another name for a capstan idler.

Pull-Down – Technique that eliminates redundant frames when converting film material (24 fps) into NTSC 930 fps).

Pull-Up Resistor – Used to provide the source current for open-collector and three-state logic gates or a termination for unused inputs. Pulls the voltage level up when no other device is driving the line.

Pulse Code Modulation (PCM) – a) Coding where analog input signal is represented by a given number of fixed-width digital samples per second.

Often used for the coding employed in the telephone network. **b)** A technical term for an analog source waveform, for example, audio or video signals, expressed as periodic, numerical samples. PCM is an uncompressed digital signal. **c)** This is a form of the digital audio signal used for both CD and laserdisc. It is a serial data stream that is coded for transmission or recording. PCM is also used for many other types of serial data communications.

Pulse to Bar Ratios – The amplitude ratio between a 2T pulse and a line bar is sometimes used as an indication of short time distortion. The results of this measurement can be described in units of K-2T or K-PB.

Pulse-Bar Inequality – $K_{\text{pulse/bar}} = 1/4 | (\text{barpulse})/\text{pulse} | \times 100\%$

Pulser – See Logic Pulser.

Pulse-to-Bar Ratio – $(\text{pulse}/\text{bar}) \times 100\%$

Push – Operation of adding a word to the stack.

Push-Down Stack – See Stack.

PVW – Preview.

▶ **Q**

Q – Quantization.

Q-1 – Inverse Quantization.

QAM – See Quadrature Amplitude Modulation.

QCIF – a) See Quarter Common Interface Format (also called the Quarter Common Source Intermediate Format). **b)** One-quarter-resolution (176 x 144 pixels) Common Interchange Format. See CIF.

QE – Quadrature Error.

QEF (Quasi Error Free) – Less than one uncorrected error per hour at the input of the MPEG-2 decoder.

QEV – Quadrature Error Vector.

QoS – Quality of Service.

QPSK (Quaternary Phase Shift Keying) – Type of modulation for digital signals (DVB-S). The digital, serial signal components I and Q directly control phase shift keying. The constellation diagram with its four discrete states is obtained by representing the signal components using the I and Q signals as coordinate axes. Due to the high nonlinear distortion in the satellite channel, this type of modulation is used for satellite transmission. The four discrete states all have the same amplitude that is why nonlinear amplitude distortions have no effect.

QS – Quantization Scaling.

QSIF – a) See Quarter Square Interface Format. **b)** One-quarter-resolution Source Input Format. See SIF.

Quad Chroma – Another name for 4FSC because the pixel clock is four times the frequency of the chroma burst. For (M) NTSC the pixel clock is 14.32 MHz (4 x 3.579545 MHz), and 17.73 MHz (4 x 4.43361875 MHz) in (B, D, G, H, I) PAL systems.

Quad Select – The matrix and its control that select the video sources feeding each of the four quadrants of a quad split. This is a separate option on the 4100 but has been integrated into the quad split on the AVC.

Quad Split – The visual effect of dividing a picture into four segments, each of which may display video from a separate source. Also the name of the switcher panel module which controls this effect.

Quadrature Amplitude Modulation – a) A process that allows two signals to modulate a single carrier frequency. The two signals of interest Amplitude Modulate carrier signals which are the same frequency but differ in phase by 90 degrees (hence the Quadrature notation). The two resultant signals can be added together, and both signals recovered at the other end, if they are also demodulated 90 degrees apart. **b)** Type of modulation for digital signals (DVB-C). Two signal components I and Q are quantized and modulated onto two orthogonal carriers as appropriate for the QAM level (4, 16, 32, 64, 128, 256). The constellation diagram is obtained by plotting the signal components with I and Q as the coordinate axes. Therefore, 2, 3, 4, 5, 6, or 8 bits of a data stream are transmitted with one symbol, depending on the QAM level (4, 16, 32, 64, 128, 256). This type of modulation is used in cable systems and for coding the COFDM single carriers.

Quadrature Distortion – Distortion resulting from the asymmetry of sidebands used in vestigial-sideband television transmission. Quadrature distortion appears when detection is used, but can be eliminated by using a synchronous demodulator.

Quadrature Modulation – The modulation of two carrier components, which are 90 degrees apart in phase.

Quality Assessment – The (subjective) process in measuring the quality of an image or video sequence as it appears to humans. Humans find certain types of errors (image distortions) to be more acceptable than others. In video coding, one is often trying to maximize the subjective quality of the video produced by the coding algorithm, which is often quite different than the mathematical quality (measured, for example, by the peak signal-to-noise ratio or PSNR).

Quantization – a) The process of converting a continuous analog input into a set of discrete output levels. **b)** A process in which the continuous range of values of an input signal is divided into non-overlapping subranges, and a discrete value of the output is uniquely assigned to each subrange. Whenever the signal value falls within a given subrange, the output has the corresponding discrete value.

Quantization Error – The amount that the digital quantity differs from the analog quantity.

Quantization Matrix – A set of sixty-four 8-bit values used by the dequantizer.

Quantization Noise – Inaccurate digital representations of an analog signal that occurs during the analog-to-digital signal processing. Typically, the digital interpretation of video resolution is limited through the digital sampling of the analog video input signal.

Quantized DCT Coefficients – DCT coefficients before Dequantization. A variable length coded representation of quantized DCT coefficients is stored as part of the compressed video bit stream.

Quantizer – A processing step which intentionally reduces the precision of DCT coefficients.

Quantizer Scale – A scale factor coded in the bit stream and used by the decoding process to scale the dequantization.

Quantizing – The process of converting the voltage level of a signal into digital data before or after the signal has been sampled.

Quantizing Error – Inaccuracies in the digital representation of an analog signal. These errors occur because of limitations in the resolution of the digitizing process.

Quantizing (Quantization) Noise – The noise (deviation of a signal from its original or correct value) which results from the quantization process. In serial digital, a granular type of noise only present in the presence of a signal.

Quarter Common Interface Format – This video format is often used in low-cost video phones. This format has a luminance resolution of 176 x

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144 active pixels per line, a refresh rate of 29.97 frames per second at uncompressed bit rate of 9.115 Mbits/s.

Quarter Square Interface Format – Defines square pixels used in computer applications.

Quarter-Track – See Four-Track.

Quick Compressor – A compressor compatible with Indeo video interactive that handles data more quickly than the offline compressor. Videos that compress in hours can take minutes using the quick compressor. Compare Offline Encoder.

QuickTime – QuickTime is a software platform from Apple that allows integration of audio visual data into software applications. It supports various algorithms through its built-in image compression manager. The algo-

rithms supported include CinePak, JPEG, and MPEG. QuickTime files have the file extension “.mov.”

QuickTime for Windows – Apple’s multimedia playback environment for Microsoft™ Windows operating system. You use QuickTime for Windows by installing several drivers and libraries on your hard disk.

Quiet Line – A horizontal line in the vertical interval that is sometimes used to evaluate the amount of noise introduced in a certain part of the transmission path. A line is reinserted (and is therefore relatively noise free) at one end of the transmission path of interest. This ensures that any noise measured on that line at the other end was introduced in that part of the path.

Quit – To stop running an application.

▶ **R**

R, G, B Color Space – a) An additive color space with colorimetric coordinates based on red, green, and blue stimuli or primaries. Color values are negative in certain areas outside the gamut defined by the R, G, B primaries. The R, G, B values used are intensities. **b)** The three linear video signals carrying respectively the red, the green, and the blue information. By convention, the unprimed symbols signify that there is a linear relationship between the luminance in each spectral region and the corresponding video signal. The spectral composition of the luminance forming each of these signals is one of the specifications required of the video system. The recently adopted CCIR Rec 709 reflects worldwide agreement on the current definition of R, G, B primary colors. CCIR Rec 709 identifies this as an interim agreement to be superseded by preferred primary colors encompassing a wider color gamut as soon as the technologies and practices permit. **c)** The colorimetric coordinates defined by three nonlinear video signals carrying respectively the red, the green, and the blue information. By convention the primed symbols signify that there has been a nonlinear transformation of the video signals vs. luminance, relative, scene, with its resulting modification of the opto-electric transfer function.

Rack – The physical setting of a head in the direction toward or away from the tape.

Radio Common Carrier – Common carriers whose major businesses include radio paging and mobile telephone services.

Radix – Total number of distinct characters or numbers used in a numbering system. Same as Base.

RAID (Redundant Array of Independent Disks) – a) Using more than one drive to achieve either higher throughput, security, or both. New technology has made it possible to create EIDE RAID systems that give excellent performance at a very low cost. **b)** A grouping of standard disk drives together with a RAID controller to create storage that acts as one disk to provide performance beyond that available from individual drives. Primarily designed for operation with computers, RAIDs can offer very high capacities, fast data transfer rates, and much increased security of data. The latter is achieved through disk redundancy so that disk errors or failures can be detected and corrected. A series of RAID configurations is defined by

levels and, being designed by computer people, they start counting from zero. Different levels are suited to different applications.

Level 0: No redundancy, benefits only of speed and capacity, generated by combining a number of disks. Also known as "striping".

Level 1: Complete mirror system, two sets of disks both reading and writing the same data. This has the benefits of Level 0 plus the security of full redundancy, but at twice the cost. Some performance advantage can be gained in read because only one copy need be read, so two reads can occur simultaneously.

Level 2: An array of nine disks. Each byte is recorded with one bit on each of eight disks and a parity bit recorded to the ninth. This level is rarely, if ever, used.

Level 3: An array of $n+1$ disks recording 512 byte sectors on each of the n disks to create $n \times 512$ "super sectors" + 1 \times 512 parity sector on the additional disk which is used to check the data. The minimum unit of transfer is a whole superblock. This is most suitable for systems in which large amounts of sequential data are transferred, such as for audio and video. For these, it is the most efficient RAID level since it is never necessary to read/modify/write the parity block. It is less suitable for database types of access in which small amounts of data need to be transferred at random.

Level 4: The same as Level 3 but individual blocks can be transferred. When data is written, it is necessary to read the old data and parity blocks before writing the new data as well as the updated parity block, which reduces performance.

Level 5: The same as Level 4 but the role of the parity disk is rotated for each block. In Level 4, the parity disk receives excessive load for writes and no load for reads. In Level 5 the load is balanced across the disks.

RAM (Random Access Memory) – a) The chips in a computer that contain its working memory. **b)** Usually used to mean semiconductor read/write memory. Strictly speaking, ROMs are also RAMs. See also Random Access. **c)** This term has come to mean any semiconductor memory whose write access time is approximately the same as its read access time. This is typically taken to include SRAMs (Static RAMs) and DRAMs (Dynamic RAMs). This definition specifically eliminates memories that cannot be altered at all and memories that require a special fixture for erasing (such as EPROMs).

Ramped Color – Color intensity extracted from a "smooth" set of predetermined values varying from an initial to a final intensity.

Random Access – a) The process of beginning to read and decode the coded bit stream at an arbitrary point. **b)** Access method in which each word can be retrieved in the same amount of time (i.e., the memory locations can be accessed in any order).

Random Interlace – Obsolete form of inexpensive 525 scanning-line system with such poor interlace that line pairing was the norm rather than the exception.

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Random Logic – Hard-wired (or random) logic design solutions require interconnection of numerous integrated circuits representing the logic elements. The function of the circuit is determined by the functional blocks and their interconnections, rather than by a program.

Random Noise – Also called thermal noise, a transmission or recording impairment that manifests itself as snow in a picture and hiss in sound. A number of techniques have been developed to reduce random noise in a picture through signal averaging.

Random Noise (Weighted) – The signal-to-weighted noise ratio is the ratio in decibels, of the nominal amplitude of the luminance signal (100 IRE units) to the RMS amplitude of the noise measured at the receiving end after band limiting and weighting with a specified network. The measurement should be made with an instrument having, in terms of power, a time constant or integrating time of 0.4 seconds.

Randomized Rounding – Digitizing technique whereby the contouring effects of digital video are minimized by adding a small amount of random noise to the signal. Also see Dithering.

RAS (Row Address Strobe) – A DRAM control signal.

Raster – **a)** A series of horizontal scan lines that make up a display. The scanned (illuminated) area of the cathode-ray picture tube. **b)** A set of scanning lines; also the type of image sampling using scanning lines (as in raster scanning).

Rate Conversion – **a)** Technically, the process of converting from one sample rate to another. The digital sample rate for the component format is 13.5 MHz; for the composite format it is either 14.3 MHz for NTSC or 17.7 MHz for PAL. **b)** Often used incorrectly to indicate both resampling of digital rates and encoding/decoding.

Rate Distortion Theory – The study of the distortion (error) of a lossy coding algorithm as a function of the bit rate. Rate distortion theory sets the lower bound on the bit rate as a function of the distortion.

Raw – A bitstream format in which the video data is uncompressed. See Compress, Encode.

Raw Footage – Videotape recordings that have not been edited.

Ray Tracing – A method where each pixel is calculated to reflect or refract off, or through, any surface encountered to simulate a true optical ray. This produces more realistic images but is computationally expensive and time-consuming and can involve the use of more memory.

RBOC (Regional Bell Operating Company) – An acronym sometimes applied to the Baby Bell holding companies and sometimes to individual Bell telephone companies. See also Baby Bell.

RC – Return Channel.

RC Time Code (Rewriteable Consumer) – A time-code system, available on 8 mm and Hi-8 formats only, supported by the thumbs up editor. The code can be added either before or after video recording without affecting the video or audio.

RCA (Radio Corporation of America) – Now part of GE. RCA was once involved in every aspect of television, from camera to receiver, supplying production, transmission, consumer electronic, and CATV equipment, and operating a television network (NBC) and a satellite transmission carrier.

RCA developed the first effective HDTV camera tube, proposed several HDEP schemes ranging from 750 to 2625 scanning lines, and did extensive ATV research at RCA Laboratories (now SRI International's DSRC). RCA's broadcast equipment group no longer exists, Burle is selling its tubes, and its consumer electronics are now part of the Thomson group. GE has, thus far, retained the satellite transmission carrier (renaming it GE Americom) and the NBC television network, a proponent of the ACTV ATV schemes.

RCA Connector – A type of connector used on all consumer VCRs and camcorders to carry the standard composite video and audio signals. See also Phono.

RCC – See Radio Common Carrier.

RDI – Remote Defect Indication.

Read Before Write – A feature of some videotape recorders that plays back the video or audio signal off of tape before it reaches the record heads, sends the signal to an external device for modification, and then applied the modified signal to the record heads so that it can be re-recorded onto the tape in its original position.

Real Time – **a)** Actual elapsed time (as opposed to "tape time").

b) Displaying an image or responding to a user's request almost simultaneously. When you display an animation in real time, you perform the movements at the speed you made them in the animation. **c)** Computation or processing done in the present to control physical events occurring in the present. For example, when a digital effects system operator moves a joystick and the video images on the monitor appear to move simultaneously, the computations required to make the images move are said to have occurred in real time.

Real Time Clock – Timing signal derived from the house composite sync.

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

RealAudio – RealAudio is an on-line audio software platform, from the company Progressive Networks, dedicated to audio links on the Internet via 14.4 kbit/s, 28.8 kbit/s or faster connections. RealAudio software features a player, a server, and development tools, and is available for Windows, Unix, and Apple Macintosh environments.

Rec Cal – A control which matches the signal level monitored in the input position of the output selector switch to that of the signal recorded and played back from the tape.

Rec. 601 – CCIR recommendation (standard) for digital component video, equally applicable to 525 and 625 scanning lines, also called 4:2:2. Digital component video is about as close in quality as current 525 scanning line equipment can come to ATV. See ITU-R BT.601-2.

Recall – The act of calling stored data out of memory.

Receiver-Compatible – Term used for an ATV scheme that allows existing NTSC television sets to tune into the ATV signal and get pictures and sounds; also used to describe an MIT ATV scheme using blanking adjustment for aspect ratio accommodation and using various sub-channels to carry additional information but requiring a very complex receiver to recover that information. It is said to offer 600 lines of vertical and 660 lines of horizontal static luminance resolution, with reduced static diagonal resolu-

tion and with dynamic resolution comparable to NTSC. The term Receiver Compatibility, as it is usually used, allows some degradation in pictures from the highest NTSC quality, in the same way that the receiver-compatible NTSC color system introduced cross-luminance to existing black-and-white TV sets.

Reclocking – The process of clocking the data with a regenerated clock.

Record Level – The amount of energy delivered to the recording head and to the magnetic tape. Indicated by the VU meter and measured in nanowebers per meter.

Record Review – A feature on many video cameras and camcorders that allows the videographer to see the last few seconds of video recorded on the videotape.

Record Tabs – Those plastic tabs seen in the back edge of a cassette. When removed, sensing fingers prevent the record button from being depressed.

Recorder, Film – Equipment for transducing a video waveform into displayed images, and making a record of such images on motion-picture film so that they may be stored and subsequently retrieved as film images.

Recorder, Video – Equipment for making a record of a video waveform so that the mapped images may be stored and subsequently retrieved as the video waveform.

Recording Level Meter – An indicator on a tape recorder that provides some idea of the signal levels being applied to the tape from moment to moment. It is intended as an aid in setting the recording levels.

Recording Speed (IPS) – Refers to the number of inches per second, or centimeters per second, of tape movement.

Reel – The flanged hub, made of metal, glass, or plastic, on which magnetic tape is wound.

Reel Number – Number assigned by the operator to each reel or cassette of video tape used in the editing session. The reel number identifies each reel or cassette on the edit list for final assembly or for future revisions.

Ref Sync Amplitude – Refer to the Horizontal Timing discussion.

Reference – A space where objects exist as a set of mathematical descriptions. In a 3D scene, references are used to organize the objects (position, orientation and scaling) by defining a parent-child relationship.

Reference Black Level – Refer to the Horizontal Timing discussion.

Reference Picture – Reference pictures are the nearest adjacent I or P pictures to the current picture in display order.

Reference Tape – A tape used as a reference against which the performances of other tapes are compared. The use of a reference tape is necessary in specifying most performance characteristics because of the difficulty of expressing these characteristics in absolute terms.

Reference Video – **a)** Video signal which is used to synchronize different pieces of video equipment by providing a common timing signal. It is generated from a single source and distributed. Typically, reference video consists of black color or color bars, and control track pulses. **b)** A composite video signal used to compare all other video signals to for timing purposes.

Reference White Level – The level corresponding to the specified maximum excursion of the luminance signal in the white direction. Refer to the Horizontal Timing discussion.

Reflectance Factor R – Ratio of the radiant or luminous flux reflected in the directions delimited by the given cone to the reflected in the same directions by a perfect reflecting diffuser identically irradiated or illuminated.

Reflected Sound – Sound which reaches a mike or listener after one or more reflections from surrounding surfaces.

Reflections or Echoes – In video transmission, this may refer either to a signal or to the picture produced. **a) Signal:** Waves reflected from structures or other objects; waves which are the result of impedance or other irregularities in the transmission medium. **b) Picture:** "Echoes" observed in the picture produced by the reflected waves.

Refresh – **a)** An image drawn on a CRT display remains visible only for a few milliseconds (the persistence of the screen phosphor), unless it is redrawn continuously. This process is called display refresh or screen refresh. Different displays use different refresh rates, but display refresh is normally required between 60 and 80 times a second to avoid any visible screen flickering. 75 times a second is a common refresh rate. In general, a higher refresh rate results in a more stable appearing display. **b)** Process of restoring the charge in a dynamic memory. Refresh logic must rewrite the contents of the complete RAM periodically (typically 2 ms), called refreshing the memory. See Dynamic Memory.

Regenerative Pulse Distribution Amplifier (Regenerative Pulse DA) – Reconstructs the signal and allows for adjustment of delay. Also see Linear Pulse DA.

Region Coding – Region coding has received attention because of the ease with which it can be decoded and the fact that a coder of this type is used in Intel's Digital Video Interactive system (DVI), the only commercially available system designed expressly for low-cost, low-bandwidth multimedia video. Its operation is relatively simple. Envision a decoder that can reproduce certain image primitives well. A typical set of image primitives might consist of rectangular areas of constant color, smooth shaded patches, and some textures. The image is analyzed into regions that can be expressed in terms of these primitives. The analysis is usually performed using a tree-structured decomposition where each part of the image is successively divided into smaller regions until a patch that meets either the bandwidth constraints or the quality desired can be fitted. Only the tree description and the parameters for each leaf need then be transmitted. Since the decoder is optimized for the reconstruction of these primitives, it is relatively simple to build. To account for image data that does not encode easily using the available primitives, actual image data can also be encoded and transmitted, but this is not as efficient as fitting a patch. This coder can also be combined with prediction (as it is in DVI), and the predicted difference image can then be region coded. A key element in the encoding operation is a region growing step where adjacent image patches that are distinct leaves of the tree are combined into a single patch. This approach has been considered highly asymmetric in that significantly more processing is required for encoding/analysis than for decoding. While hardware implementations of the hybrid DCT coder have been built for extremely low bandwidth teleconferencing and for HDTV, there is no hardware for a region coder. However, such an assessment is deceptive since much of the

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processing used in DVI compression is in the motion predictor, a function common to both methods. In fact, all compression schemes are asymmetric, the difference is a matter of degree rather than one of essentials.

Register – a) Single word of memory. Registers within the CPU are more readily accessible than external memory locations. Registers external to the CPU are simply a group of flip-flops. **b)** A memory storage location. Each can store the data for a complete switcher setup. **c)** In a VGA controller, these are the storage elements that contain data relating to the mode or configuration of the device, as opposed to the display memory, which contains the image. Traditionally, the registers are divided into six groups: General, Sequencer, CRT Controller, Graphics Controllers, Attribute, and Extensions. The registers are accessed by a number of addressing schemes, usually involving an index or address register and a data register.

Register-Level Compatibility – If a peripheral is compatible at the register level with another peripheral, it means that every bit in every register of the two devices has precisely the same meaning. This implies that application programs can circumvent the BIOS and directly program registers in a peripheral device without functionality problems.

Registration – The accuracy of having all three images (red, green, and blue) with exactly the same geometry.

Relative Addressing – Specifying an address as a distance from the current address (e.g., three bytes ahead or four bytes backwards).

Relative Burst Gain Error – The change in gain (amplitude) of the color burst signal relative to the gain (amplitude) of the chrominance subcarrier, in the active line time, caused by processing the video signal.

Relative Burst Phase Error – The change in phase of the color burst signal relative to the phase of the chrominance subcarrier, in the active line time, caused by processing the video signal.

Relative Chroma Level – See Chrominance-to-Luminance Gain.

Relay – An electromagnetically operated switch.

Reluctance – Resistance to the flow of magnetic flux.

Remanance – The amount of magnetism left in a magnetic material after the removal of the magnetizing force.

Remote – Any program originating outside the studio.

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

Remote Workstation, Drive, Disk, File System, or Printer – A hardware device or the information or media it contains that can be accessed across the network; they are not physically connected to the workstation.

Render to Disk – Since it can take considerable time to render a single 3D image, and most of that time is CPU compute time, many facilities using PC-based rendering systems have used large Winchester disks to which they send their final rendered images. This frees up the frame buffer for other work in the meantime. Later, when the animation is fully computed, the disk images can be quickly recalled and placed in the frame buffer, before being sent to videotape.

Rendering – a) The process of drawing the database, making it visible, is called rendering. There are many ways to render the same database; as a “wireframe,” as a wireframe with “hidden” lines removed, or as a solid with various types of “shading.” **b)** The process by which the video editing software and hardware convert the raw video, effects, transitions, and filters into a new continuous video file. **c)** The process of non-real time drawing of a picture relying on computer processing speed for graphics and compositing.

Repeater – Repeaters are transparent devices used to interconnect segments of an extended network with identical protocols and speeds at the physical layer (OSI layer 1). An example of a repeater connection would be the linkage of two carrier sense multiple access/collision detection (CSMA/CD) segments within a network.

Replication – One method of hardware zooming is accomplished by multiplying the number of pixels and is known as pixel replication or simply, replication. Because replication increases the size of pixels and the effect is a blocky picture when zoomed, interpolation is a preferred technology where intermediate pixels are approximated causing less block video.

Reproduce Level – A control which determines the output level of signals played back from the tape by the reproduce head.

Resampling – Video image information may be presented in a specific system with, for example, its own frame rate, line count per frame, and line resolution (if the system is analog, resolution = video bandwidth; if the system is digital, resolution = pixels per line) and need to be recast into a target system differing in one or more of the specifications. Or in post-production, it may be desirable to change image size, to crop or zoom, or to distort geometrically, etc. The original signal is sampled and the samples processed by a suitable algorithm to generate a new set of samples compatible with the specifications of the target system.

Reserved – The term “reserved” when used in the clause defining the coded bit stream, indicates that the value may be used in the future for ISO defined extensions. Unless otherwise specified within the present document all “reserved” bits shall be set to “1.”

reserved_future_use – The term “reserved_future_use,” when used in the clause defining the coded bit stream, indicates that the value may be used in the future for ETSI defined extensions. Unless otherwise specified, all “reserved_future_use” bits shall be set to “1.”

Reset – To activate a restart sequence to a CPU, ILC, or other device which has locked up or is for some other reason not responding correctly.

Reset Button – A physical button on the workstation that you press to reinitialize the processor and some other hardware without removing power to the workstation. You should never press this button while IRIX is running, unless all attempts to shut down the system using software fail. See also Shut Down.

Residual Flux – In a uniformly magnetized sample of magnetic material, the product of the residual flux density and the cross-sectional area. Residual flux is indicative of the output that can be expected from a tape at long wavelengths.

Residual Flux Density, B_r, Gauss – The magnetic flux density at which the magnetizing field strength is zero when a sample of magnetic material

is in a symmetrically cyclically magnetized condition. Normally, the residual flux density of a tape is measured in the orientation direction, using an alternating magnetizing field of amplitude 1000 Oe. Residual flux density is indicative of the output that can be expected from a tape at short wavelengths.

Residual Subcarrier – The amount of color subcarrier information in the color data after decoding a composite color video signal. Values appears as $-n$ dB where the larger n , the better.

Residual-to-Maximum Flux Ratio – In tapes consisting of oriented, acicular particles, this ratio is an indication of the degree of particle orientation. Theoretically, the ratio varies from 0.5 for randomly oriented particles to 1.0 for completely oriented particles. In practice, oriented tapes typically have ratios between 0.70 and 0.76.

Resistance – Opposition to the flow of electrons.

Resolution – The sharpness or “crispness” of the picture. Resolution can be measured numerically by establishing the number of scanning lines used to create each frame of video. **a)** The number of bits (four, eight, ten, etc.) determines the resolution of the digital signal; 4-bits = a resolution of 1 in 16, 8-bits = a resolution of 1 in 256 (minimum for broadcast TV), 10-bits = a resolution of 1 in 1024. **b)** The basic measurement of how much information is on the screen. It is usually described as the number of pixels in the horizontal axis by the number of horizontal lines. The higher the numbers, the better the system’s resolution. Some typical resolutions are: NTSC VHS – 240 x 485; NTSC broadcast – 330 x 485; NTSC laserdisc – 425 x 485; ITU-R BT.601 (525/60) – 720 x 485; Computer screen – 1280 x 1024. **c)** The capability of making distinguishable individual parts of an image. A measure of how clear the picture looks. **d)** Perceivable detail. See also Chroma Resolution, Diagonal Resolution, Dynamic Resolution, Horizontal Resolution, Spatial Resolution, Static Resolution, and Temporal Resolution. **e)** The amount of detail in an image. Higher resolution equals more detail. Generally expressed in “lines.” It is the number of vertical line pairs that the system can distinguish, and has no relationship to the number of horizontal scan lines.

Resolution Independent – A term to describe equipment that can work in more than one resolution. Dedicated TV equipment is designed to operate at a single resolution although some modern equipment, especially that using the ITU-R 601 standard, can switch between the specific formats and aspect ratios of 525/60 and 625/50. By their nature, computers can handle files of any size, so when applied to imaging, they are termed resolution independent. As the images get bigger, so the amount of processing, storage, and data transfer demanded increases in proportion to the resulting file size. So, for a given platform, the speed of operation slows. Other considerations when changing image resolution may be reformatting disks, checking if the RAM is sufficient to handle the required size of file, allowing extra time for RAM/disk caching, and how to show the picture on an appropriate display.

Resolution, Color – The number of simultaneous colors is determined by the number of bits associated with each pixel in the display memory. The more colors, the more bits. If n bits per pixel are used, 2^n color combinations can be generated. EGA uses from 1-4 bits per pixel, permitting up to 16 (2^4) colors to be displayed on the screen simultaneously. The BGA has

an added mode that supports 8 bits per pixel, or 256 (2^8) simultaneous colors.

Resolution, Horizontal – The amount of resolvable detail in the horizontal direction in a picture. It is usually expressed as the number of distinct vertical lines, alternately black and white, which can be seen in three-quarters of the width of the picture. This information usually is derived by observation of the vertical wedge of a test pattern. A picture which is sharp and clear and shows small details has a good, or high resolution. If the picture is soft and blurred and small details are indistinct it has poor, or low resolution. Horizontal resolution depends upon the high-frequency amplitude and phase response of the pickup equipment, the transmission medium and the picture monitor, as well as the size of the scanning spots.

Resolution, Image – In the practical sense, resolution is usually judged by imaging test targets bearing sets of spaced black-and-white lines in a square-wave pattern, and determining the minimum spacing for which the lines are distinguishable in the resultant image. With instrumentation read-out, resolution target charts are less ambiguous and more useful if they bear sets of spaced “black” and “white” lines sinewave modulated in density, rather than square-wave modulated. Whereas square-wave targets introduce a Fourier series of higher frequencies, sinewave targets limit the analysis to a single frequency for each line set. Quantitative measurement of the modulations provides convenient determination of the transfer function.

Resolution, Spatial – The number of pixels in an area or on the screen. Resolution is typically specified as pixels per scan line and scan lines per frame. Higher resolution images require more processing and greater storage requirements per image. In addition, monitor costs increase with resolution, particularly above about one million pixels. Different applications require different resolutions.

Resolution, Vertical – The amount of resolvable detail in the vertical direction in a picture. It is usually expressed as the number of distinct horizontal lines, alternately black and white, which can be seen in a test pattern. Vertical resolution is primarily fixed by the number of horizontal scanning lines per frame. Beyond this, vertical resolution depends on the size and shape of the scanning spots of the pickup equipment and picture monitor and does not depend upon the high-frequency response or bandwidth of the transmission medium or picture monitor.

Resolution, Visual – **a) Qualitatively:** Capacity for seeing distinctly fine details that have a very small angular separation. **b) Quantitatively:** Any of a number of measures of spatial discrimination such as the reciprocal of the value of the angular separation in minutes of arc of two neighboring objects (points or lines or other specified stimuli) which the observer can just perceive to be separate. **c)** In system design, the reference value for normal human visual limiting resolution is 30 cycles/degree, i.e., 60 TV lines per angular degree subtended at the viewing position. For systems of

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current interest, the maximum viewing distances for discrete vertical resolution of the number of lines presented are shown in the following table.

Limiting Resolution of Vertical Detail ⁽¹⁾

TV Line Total	Per Frame Active	Subtended Vertical Angle	Maximum Viewing Distance ⁽¹⁾ ⁽²⁾
525	485	8.08"	$7.1h^{(3)} = 5.3w^{(4)}$
625	575	9.58"	$6.0h = 4.5w^{(4)}$
1125	1035	17.25"	$3.3h = 1.9W^{(5)}$

(1) No adjustment has been applied for possible interlace or Kell effects.

(2) Assumes a shadow mask, if present, is not limiting.

(3) h is vertical height of display.

(4) w is horizontal width of display for 4:3 aspect ratio.

(5) W is horizontal width of display for 16:9 aspect ratio.

Resolving Power – Classically, two point objects are considered resolved when the centers of their diffraction disks in the image are separated by at least one disk diameter. This leads to a theoretical minimum angular separation for objects at a distance: $a = (1.22)(\lambda)/D$. Resolving power of a lens increases with increasing optical aperture. Systems vary enormously in the closeness with which their actual resolving power approaches this diffraction-controlled ultimate limit.

Resonant Frequency – The frequency at which a parallel LC circuit has highest opposition to current and at which a series LC circuit has the lowest opposition to current.

Resource – A unit of functionality provided by the host for use by a module. A resource defines a set of objects exchanged between module and host by which the module uses the resource.

Restore – To return a register or other computer word to its initial or pre-selected value.

Restore (Files) – To copy files that once resided on your hard disk from another disk or a tape back onto your hard disk.

Restorer – As used by the telephone company, a network designed to remove the effects of predistortion or preemphasis, thereby resulting in an overall normal characteristic.

Restricted Slice Structure – In order to conform to “restricted slice structure,” all slices added together must cover the picture. This applies to Main Profile, for instance.

Retentivity – The maximum value of the residual flux density corresponding to saturation flux density.

Retiming – Adjustment of a local synchronizing generator which has been locked to a distant source. This permits the local facility to use the distant source in real-time production through a video switcher.

RETMA – Radio Electronic Television Manufacturers Association.

Retrace (Return Trace) – The movement of the electron beam from the right-hand edge of the display to the left-hand edge or from bottom to top. Retrace occurs during the blanking time. See Horizontal Retrace and Vertical Retrace.

Retransmission Consent – Local TV broadcasters’ right to negotiate a carriage fee with local cable operators, as provided in 1992 Cable Act.

Return – In particular, an instruction at the end of a subroutine that causes control to resume at the proper point in the main routine.

Return Loss – A measure of the similarity of the impedance of a transmission line and impedance at its termination. It is a ratio, expressed in dB, of the power of the outgoing signal to the power of the signal reflected back from an impedance discontinuity.

Reverberation – The persistence of a sound after the source stops emitting it, caused by many discrete echoes arriving at the ear so closely spaced in time that the ear cannot separate them.

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

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

RF Mode – A Dolby Digital decoder operational mode intended primarily for cable set-top boxes that are connected to the RF (antenna) input of a television set. The dialnorm reference playback level is –20 dBFS and compr words are used in dynamic range compression. Refer to Dynamic Range Compression.

RF Modulation – The process of combining a video signal and/or audio signal with an RF source so the result can be transmitted to a radio receiver, television, or VCR.

RF Modulator – An electronic device that modifies an RF signal using an audio and/or video signal.

RF Pattern – A term sometimes applied to describe a fine herringbone pattern in a picture. May also cause a slight horizontal displacement of scanning lines resulting in a rough or ragged vertical edge of the picture. Caused by high-frequency interference.

RF Signal – Modulated composite (video and audio) signal produced by television stations and VCRs, and to be processed by televisions.

RF Splitter – A device that provides multiple RF signals. An RF splitter is used to send the signal from one VCR to two or more televisions.

RFC – Request For Comment.

RGB (Red, Green, and Blue) – a) The basic parallel component analog signal set (red, green, blue) in which a signal is used for each primary color. These three color signals are generated by the camera and are used in the color television’s additive color reproduction system to produce a picture. Also used to refer to the related equipment, interconnect format or standards. The same signals may also be called “GBR” as a reminder of the mechanical sequence of connections in the SMPTE interconnect standard. **b)** A color model used chiefly for computer displays in which colors are specified according to their red, green, and blue components. Compare YUV.

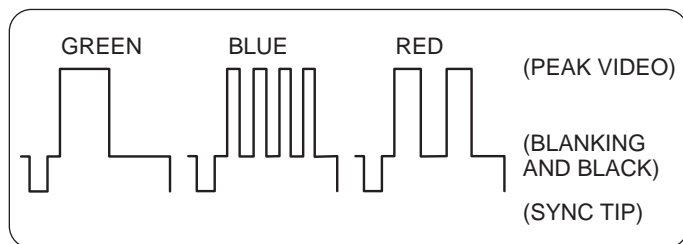
RGB Chroma Key – A chroma key wherein the keying signal is derived from the separate red, green and blue camera video signals, as opposed to

composite chroma key. It is an option to all switchers that allows chroma keys to be performed. See Chroma Key.

RGB Format – There are four RGB formats. The main difference between them are in the voltage levels as shown below. These voltage levels can make the formats incompatible with each other.

	SMPTE/ EBU N10	NTSC (no setup)	NTSC (setup)	MII
Max	700 mV	714 mV	714 mV	700 mV
Min	0 mV	0 mV	54 mV	53 mV
Range	700 mV	714 mV	660 mV	647 mV
Sync	–300 mV	–286 mV	–286 mV	–300 mV
P-P	1 V	1 V	1 V	1 V

Following are the basic RGB waveforms found in the four RGB standards. The signals are full amplitude unlike their color difference counterparts. Refer to the color difference discussion for an example of the color difference waveforms.



RGB System – See the RGB discussion.

RHC (Regional Holding Company) – See Baby Bell.

Ribbon Mike – A mike which uses a thin metal foil ribbon which moves in a fixed magnetic field in response to sound waves and thus generates an output for the mike.

RIFF (resource Interchange File Format) – Not an actual file format (like the name implies), RIFF is a tagged multimedia file structure. It is a specification upon which many file formats are defined. RIFF files have the advantage of extensibility; file formats based on RIFF can be used by future software inasmuch as format changes can be ignored by existing applications.

Ringing – **a)** A common filter artifact, manifesting itself in television pictures as ghost-like images of sharp edges. **b)** An oscillatory transient occurring in the output of a system as a result of a sudden change in input. Results in close-spaced multiple reflections, particularly noticeable when observing test patterns, equivalent square waves, or any fixed objects whose reproduction requires frequency components approximating the cut-off of the system.

RIP (Raster Image Processor) – A piece of hardware or software that converts object-oriented graphics and fonts into the bitmaps required for output on a printer.

Rise Time – The time it takes a signal to make a transition from one state to another, usually measured between the 10% and 90% completion points

on the transition. Faster rise times require more bandwidth in a transmission channel.

Rising Edge – Low-to-high logic transition.

RLC – See Run Length Coding.

RLE – See Run Length Encoding.

RMS (Root Mean Square) – The value assigned to an alternating current or voltage that results in the same power dissipation in a given resistance as DC current or voltage of the same numerical value. Calculated as 0.707 of peak amplitude of a sine wave at a given frequency.

RMS Value – The effective value of a wave. The value of continuous (direct current) signal that would produce the same power as the wave in question.

RNRZ – Randomized Non-Return-to-Zero Code.

Robust – Term for a transmission or recording scheme that can tolerate significant impairments, without catastrophic failure (severe degradation).

Roll – A lack of vertical synchronization which causes the picture as observed on the picture monitor to move upward or downward.

Roll Off – The effect that occurs when a piece of equipment can no longer process the frequency which is being fed into it (a reduction in amplitude with an increase of frequency).

Roll-Off – A gradual attenuation of gain frequency response at either or both ends of the transmission pass band.

ROM (Read-Only Memory) – Permanently programmed memory. Mask-programmed ROMs are programmed by the chip manufacturer. PROMs (Programmable ROMs) can be programmed by the user. EPROMs (Erasable PROMs) can be erased with ultraviolet light and then reprogrammed.

Root – **a)** The base directory from which all other directories stem, directly or indirectly. It is designated by the slash (/) character in many systems or a backslash (\) in PCs. **b)** The directory at the top of the file system hierarchy.

Root Account – The standard UNIX or IRIX login account reserved for use by the system administrator. This account's home directory is the root (/) directory of the file system; the user of the root account has full access to the entire file system (that is, can change and delete any file or directory). The user of this account is sometimes referred to as the superuser.

Rotary Wipe – A pattern system effect that creates a design for revealing video using segments that have angular movement. This definition is our internal view, but not consistent within the industry.

Rotate (Menu) – The function used to turn or rotate an image. Rotate turns the image around the intersection of the X, Y, and Z axes, the center point for rotation. Rotate does not move or reposition the center point of the image.

Rotating Pattern – A pattern system effect that reveals video through a shape or shapes that spin about an axis on the screen. This definition is our internal view, but not consistent within the industry.

Rotational Extrusion – In rotational extrusion, the silhouette is rotated about an axis, like using a lathe to create a fancy table leg. The cross-sec-

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tion of an object created this way is circular. Such objects are often called “solids of revolution.”

Rotoscope – When animators want to capture the realism of a live object’s motion, a technique called rotoscoping is used. In traditional film animation, film footage of the motion is rear-projected, one frame at a time, onto a frosted screen that is mounted on the animators worktable. The artist traces the frames onto cels. This process is called rotoscoping. The video equivalent is called keying or matting. Digital rotoscoping has recently become possible. Here, the frame buffer is used to hold the incoming action, and software picks out the image of interest from the background, assuming the subject was shot against a solid color.

Rough Cut – Preliminary edit of raw footage to establish tentative sequence, length of approximate sequence, and content of the eventual video program.

Rounding – Deleting the least-significant digits of a quantity and applying some rule of compensation and correction to the part retained.

Router – Routers connect networks at OSI layer 3. Routers interpret packet contents according to specified protocol sets, serving to connect networks with the same protocols (DECnet to DECnet, TCP/IP (Transmission Control Protocol/Internet Protocol) to TCP/IP). Routers are protocol-dependent; therefore, one router is needed for each protocol used by the network. Routers are also responsible for the determination of the best path for data packets by routing them around failed segments of the network.

Routing Switcher – An electronic device that routes a user-supplied signal (audio, video, etc.) from any input to any user-selected output(s).

RP-125 – See SMPTE 125M.

RPC – Remote Procedure Call.

RRT – Region Rating Table.

RS Protection Code – A 16-byte long error control code added to every 187 (scrambled) +1 syncbyte-long transport packet with the following result. The packet has a length of 204 bytes and the decoder can correct up to $T = 8$ errored bytes. This code ensures a residual error bit rate of approximately 1×10^{-11} at an input error rate of 2×10^{-4} .

RS-170A – Now called EIA-170A, this is the EIA NTSC Video Signal specification standard.

RS-232 – a) A standard, single-ended (unbalanced) interconnection scheme for serial data communications. **b)** Computer communication standard used in video for the control of certain video equipment. Computer controlled VCRs, edit controllers, switchers, and other studio equipment can commonly be found in professional video studios. Successfully linking two devices, at the very least, requires that they use the same communication protocol.

RS-422 – A medium range (typically up to 300 m/1000 ft or more) balanced serial data transmission standard. Data is sent using an ECL signal on two twisted pairs for bidirectional operation. Full specification includes 9-way D-type connectors and optional additional signal lines. RS-422 is widely used for control links around production and post areas for a range of equipment.

RS-343 – Specification for higher-resolution video such as used in computers.

RST (Running Status Table) – Accurate and fast adaptation to a new program run if time changes occur in the schedule.

RSVP (Resource Reservation Protocol) – Defines signaling methods for IP networks to allocate bandwidth.

RTE – Residual Target Error.

RTF (Rich Text File) – A standard method of encoding text and graphics using only 7-bit ASCII characters. The format includes font sizes, type faces, and styles as well as paragraph alignment, justification, and tab control.

RTP (Real Time Protocol) – Defines packet formats for real-time data.

RTSP (Real Time Streaming Protocol) – Defines client/server interaction for streaming media.

Run-Length Coding – a) A type of data compression where a string of identical values is replaced by codes to indicate the value and the number of times it occurs. Thus, a string of 70 spaces can be replaced by two bytes. One to indicate the string consists of spaces and a byte to indicate there are 70 of them. Run-Length Coding is not as efficient as DCT for compression of pictures or video, since long sequences of the same values rarely exist in images. Run-Length Coding is part of JPEG, MPEG, H.261, and H.263 compression schemes. **b)** A coding scheme that counts the number of similar bits instead of sending them individually. **c)** Coding of data with different numbers of bits. Frequently reoccurring data has the smallest number of bits, data seldom reoccurring have the highest number of bits.

Run-Length Encoding – A compression scheme. A run of pixels or bytes of the same color or value are coded as a single value recording the color or byte value and the number of duplications in the run.

R-Y – 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 from 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, PhotoYCC, 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. The R-Y signal drives the vertical axis of the vectorscope.

► **S**

S/F – Sound over film, meaning the film is silent and sound will come.

S/N – Signal-to-Noise Ratio.

SA – Scientific-Atlanta.

SAA – Standards Australia.

SABC – South Africa Broadcasting Corporation.

Safe Action Area – This amounts to about 90% of the total picture area. It is symmetrically located inside of the picture border. Home sets are over-scanned. The entire picture isn't seen, the edges being lost beyond the border of the screen. Safe action area is designated as the area of the picture that is "safe" to put action that the viewer needs to see.

Safe Area – This allows the material positioning of video images to be checked. Both safe title and safe action boundaries are included. This signal can be keyed by any switcher or special effects generator that incorporates the luminance keying function.

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

Sampled Data – Sampled data is that in which the information content can be, or is, ascertained only at discrete intervals of time. Note: Sampled data can be analog or digital.

Samples Per Picture Width – In a digital video system, the number of pixels corresponding to the reference picture width. Some pixels at the borders of the picture region may be corrupted by the picture blanking transitions and by the effects of post-production image processing. Currently, SMPTE 260M defines a clean aperture within the production aperture, confining visible artifacts around the image to a thin border.

Sampling – a) Process where analog signals are measured, often millions of times per second for video, in order to convert the analog signal to digital. The official sampling standard definition for television is ITU-R 601. For TV pictures 8 or 10 bits are normally used; for sound, 16 or 20 bits are common, and 24 bits are being introduced. The ITU-R 601 standard defines the sampling of video components based on 13.5 MHz, and AES/EBU defines sampling of 44.1 and 48 kHz for audio. **b)** The process of dealing with something continuous in discrete sections. Sampling is probably best known as the first step in the process of digitization, wherein an analog (continuous) signal is divided into discrete moments in time. Yet, even analog television signals have already been sampled twice; once temporally (time being sampled in discrete frames) and once vertically (the vertical direction being divided into discrete scanning lines). If these initial sampling processes are not appropriately filtered (and they rarely are in television), they can lead to aliases. See also Alias, Digitization, and Nyquist.

Sampling Frequency – The number of discrete sample measurements made in a given period of time. Often expressed in megahertz for video. These samples are then converted into digital numeric values to create the digital signal.

Sampling, Orthogonal – In digital video, the sampling is orthogonal if the luminance and color-difference samples are generated from pixels arranged in common, continuous vertical and horizontal lines on a rectilinear grid that remains constant field/frame to field/frame.

Sampling, Quincunx – a) In a digital video system, the sampling is quincunx if the luminance and color-difference samples are generated from pixels arranged on one of two congruent rectilinear grids, the one being displaced horizontally from the other by half the horizontal pixel spacing. The alternate grid is usually chosen for alternate lines, but may instead be chosen for alternate field/frames. **b)** In a digital video system, a sampling structure with an array of samples wherein alternate rows of pixel samples are displaced horizontally in the grid by half of the pitch of the pixel samples along the remaining rows.

SANZ – Standards Association of New Zealand.

SAP – See Secondary Audio Program.

SAR – Segmentation and Re-Assembly Sublayer.

Sarnoff, David – As general manager, president, and chair of the board of RCA, he strongly shaped the future of television; also the David Sarnoff Research Center named for him, currently part of SRI International, formerly RCA Laboratories, home of ACTV research and development.

SAS – Subscriber Authorization System.

SAT – Saturation.

Saturated Color – A color as far from white, black, or gray as it can be (e.g., vermilion rather than pink).

Saturation – a) The property of color which relates to the amount of white light in the color. Highly saturated colors are vivid, while less saturated colors appear pastel. For example, red is highly saturated while pink is the same hue but much less saturated. **b)** In signal terms, saturation is determined by the ratio between luminance level and chrominance amplitude. It should be noted that a vectorscope does not display saturation; the length of the vectors represents chrominance amplitude. In order to verify that the saturation of the colors in a color bar signal is correct, you must check luminance amplitudes with a waveform monitor in addition to observing the vectors. **c)** The amount of gray, as opposed to hue, in a color. See Hue.

Saturation Flux Density, BS – The maximum intrinsic flux density possible in a sample of magnetic material. The intrinsic flux density asymptotically approaches the saturation flux density as the magnetizing field strength is increased. A magnetizing field strength in excess of 5000 Oe is necessary to obtain an accurate measure of the saturation flux density of a typical tape.

Saturation Moment – The maximum magnetic moment possible in a sample of magnetic material.

Saturation Noise – The noise arising when reproducing a uniformly saturated tape. This is often some 15 dB higher than the bulk erased noise and is associated with imperfect particle dispersion.

SAV – See Start of Active Video.

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SBE – Society of Broadcast Engineers.

SC – Subcommittee.

SCA – See Subsidiary Communications Authorizations.

Scalability – **a)** Scalability is the ability of a decoder to decode an ordered set of bit streams to produce a reconstructed sequence. Moreover, useful video is output when subsets are decoded. The minimum subset that can thus be decoded is the first bit stream in the set which is called the base layer. Each of the other bit streams in the set is called an enhancement layer. When addressing a specific enhancement layer, lower layers refer to the bit stream which precedes the enhancement layer. **b)** A characteristic of MPEG-2 that provides for multiple quality levels by providing layers of video data. Multiple layers of data allow a complex decoder to produce a better picture by using more layers of data, while a more simple decoder can still produce a picture using only the first layer of data. **c)** The degree video and image formats can be combined in systematic proportions for distribution over communications channels for varying capacities. **d)** Scalability implies that it is possible to decode just a fraction of the information in a bit stream. In MPEG, we find SNR scalability, spatial scalability, and temporal scalability, and even in combination (hybrid scalability). In connection with scalability we find the terms “lower layer,” which represents the basic information, and the “enhancement layer,” which represents the additional information. In case of hybrid scalability, up to three layers are found. All types of scalability may be used for transmission systems with split data channels with different error rate. The lower layer is transmitted on a channel with high protection rate, whereas the enhancement layer is transmitted on a channel with higher bit error rate. **e)** A feature of the Indeo video codec with which quality can be optimized during playback depending on the system resources being used to play the video.

Scalable Coding – The ability to encode a visual sequence so as to enable the decoding of the digital data stream at various spatial and/or temporal resolutions. Scalable compression techniques typically filter the image into separate bands of spatial and/or temporal data. Appropriate data reduction techniques are then applied to each band to match the response characteristics of human vision.

Scalar Quantization – The mapping of a (large) number of signal levels into a smaller number of levels. The quantization may be uniform or nonlinear.

Scaling – The act of changing the effective resolution of the image. Images can be scaled down so that more images can be displayed or scaled up such that the image takes up more screen space.

Scaling Moving Images – Moving images present a unique set of scaling challenges. In NTSC TV, fields alternate every 16.6 ms. Any object that moves significantly between field-refresh times will appear distorted. If an image is scaled in the Y direction by assembling two fields into a single frame, the distortion is even more exaggerated. When the full frame is scaled down using decimation (line-dropping), a group of lines from one field can end up adjacent to a group of lines from another field, causing a jagged, stepped appearance in the scaled image. This distortion is often more noticeable than the distortion in the original TV image. Therefore, a general rule for scaling down is to use either the even or odd field from each frame. If the final image is to be less than one-half the size of the original, scale the single field down to the required size. If the final image

is to be greater than one-half the size of the original, use one field, then increase image to the required number of lines with line replication.

Scan Converter – External device that converts a computer’s VGA output to video, it can be displayed on a TV or VCR.

Scan Line – An individual horizontal sweep across the face of the display by the electron beam. It takes 525 of these scan lines to make up a single frame of an NTSC picture and 625 for PAL.

Scan Velocity Modulation (SVM) – SVM is one of the many tricks manufacturers use to get more light out of a picture tube, at the cost of real picture detail. It changes the speed or velocity of the beam as it is scanned from the left to the right side of the picture. In the process, it distorts real picture detail, causing dark areas of the picture on light backgrounds to be reproduced much larger than normal and light areas on dark backgrounds to be reproduced much smaller than normal. When the beam spends more time “writing” light areas, the phosphors receive more energy and produce more light output. The fact that this will contribute to phosphor blooming, as well as detail distortion seems to be lost on a number of manufacturers calling it a “feature.” The presence or absence of SVM can be easily detected by displaying the needle pulse test pattern. In the test pattern, the width of the white line on the black background, and black line on the white background are the same. In a set with SVM, the width of the black line will be much larger than the white line. If SVM is found on a set, look for an ability to turn it off. Several sets provide this option in the mode of the set designed to accurately reproduce the signal source. In some other sets, it is easily defeated by a qualified service technician.

Scanner, Motion-Picture Film – **a)** A device for scanning photographic motion-picture images and transcoding them into an electronic signal in one of the standardized or accepted video formats. **b)** Film scanner is a general term, and may be applied to slow-rate as well as real-time transcoding, and may provide the input to a recorder, a signal processor, a transmission channel, or any other desired peripheral system.

Scanning – The process of breaking down an image into a series of elements or groups of elements representing light values and transmitting this information in time sequence.

Scanning Circuitry – Camera or display subsystems designed for moving an electron beam around to form a raster.

Scanning Lines – **a)** A single, continuous narrow strip of the picture area containing highlights, shadows and half-tones, determined by the process of scanning. **b)** Horizontal or near-horizontal lines sampling a television

image in the vertical direction. In tube-type cameras and displays equipped with CRTs, the scanning lines are caused by electron beam traces.

Scanning Lines Per Frame

525 – NTSC
625 – Most non-NTSC broadcast systems
655 – Used for electronic cinematography with 24 frames per second
675 – EIA industrial standard
729 – EIA industrial standard
750 – RCA and International Thomson progressive scanning proposal
819 – CCIR System E (used in France)
875 – EIA industrial standard
900 – International Thomson progressive scanning proposal
945 – EIA industrial standard
1001 – French progressive scanning proposal for NTSC countries
1023 – EIA industrial standard
1029 – EIA industrial standard
1049 – Double NTSC with interlaced scanning
1050 – Double NTSC with progressive scanning, French interlace proposal
1125 – ATSC/SMPTE HDEP standard
1200 – French progressive scanning proposal for non-NTSC countries
1225 – EIA industrial standard
1249 – Double non-NTSC with interlaced scanning
1250 – Double non-NTSC with progressive scanning
1501 – Early BBC proposal
2125 – Early NHK monochrome system
2625 – RCA electronic cinematography proposal

Scanning Spot – Refers to the cross-section of an electron beam at the point of incidence in a camera tube or picture tube.

Scanning Standard – The parameters associated with raster scanning of a computer display, camera, or video recorder. Denoted by the total line count, field rate, and interlace ratio.

Scanning Structure – A term sometimes used to describe a number of scanning lines per frame, interlace ratio, and frame rate; also sometimes used to describe what appears when scanning lines are visible.

Scanning, Interlaced – A scanning process in which the distance from center to center of successively scanned lines is two or more times the nominal line width, and in which the adjacent lines belong to different fields. For a given number of active vertical lines per frame, and a given frame-rate, interlaced scanning provides system-limited definition for still images. Moving images, however, provide reduced perceived spatial definition. Although the interlaced scanning field-rate at a multiple of the frame-rate could improve temporal resolution, this is seldom perceived. When scanning interlaced 2:1 in either capture or display mode, the lines constituting one frame of the image are scanned and/or presented in two successive fields one-half the lines in one field and the other half interleaved as the following field. In a system based upon a nominal 60 Hz, for exam-

ple, the generation and presentation of the two fields in succession require a total of 1/30 sec per frame, with a continual temporal progression from start to finish of the scanning. Note: Interlaced scanning may be introduced in the original scanning for image capture, or may be developed from progressive scanning of the original.

Scanning, Progressive – a) A rectilinear scanning process in which the distance from center to center of successively scanned lines is equal to the nominal line width. **b)** A display mode for electronic imaging in which all of the scanned lines are presented successively, and each field has the same number of lines as a frame. Also known as sequential scanning. For a given number of active vertical lines per frame, and a given frame rate, progressive scanning requires the same bandwidth as interlaced scanning. When compared at a given field rate, progressive scanning requires twice the bandwidth of 2:1 interlaced scanning. Note: Most image processing in electronic post-production requires that a progressive scanned image first be captured or created. The image information may have originated in progressive scanning, or it may have been interpolated from an origination in interlaced scanning.

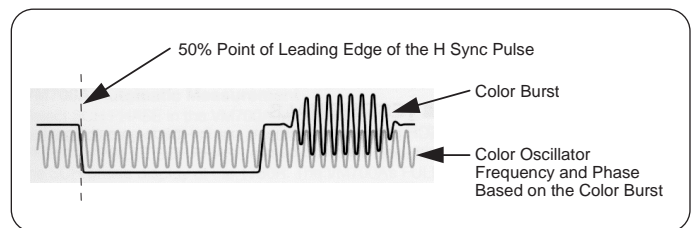
Scanning, Sequential – See Scanning, Progressive.

SCART – See Syndicat des Constructeurs d'Appareils Radio Recepteurs et Televiseurs.

Scene – A collection of entities that can change over time.

Scene Complexity – The intrinsic difficulty of the image sequence to code. For example, the “talking head” video sequences which occurs often in video conferencing applications are much easier to code than an action-filled movie for entertainment applications.

SCH Phase (Subcarrier to Horizontal Phase) – This is a measurement of the color oscillator frequency and phase as set by the color burst in relation to the 50% point on the leading edge of the horizontal sync pulse.



Schmidt Trigger – Circuit with hysteresis used for input signals that are noisy or have slow transition times.

Scientific-Atlanta – CATV, satellite transmission, and production equipment firm that has been selling B-MAC equipment for years and is a proponent of the HDB-MAC ATV scheme.

Scope – Short for oscilloscope (waveform monitor) or vectorscope, devices used to measure the television signal.

SCPC (Single Channel Per Carrier) – Type of transmission where only a part of the available transponder is used for the signal, allowing the satellite operator to sell the remaining space on the transponder to other uplinkers. SCPC is typically used for feeds rather than for direct programming. The advantage of SCPC over MCPC is that the signals uplinked to the

Video Terms and Acronyms

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same transponder can be transmitted up to the satellite from different locations.

SCR (System Clock Reference) – a) Reference in PS (Program Stream) for synchronizing the system demultiplex clock in the receiver, transmitted at least every 0.7 sec. Integrated into PES (Packetized Elementary Stream). **b)** A time stamp in the program stream from which decoded timing is derived.

Scrambling – a) Usually used as a synonym for encryption, controlled disordering of a signal to prevent unauthorized reception. **b)** Sometimes used to describe controlled disorganization of a signal to improve its robustness. This form is more often called shuffling. **c)** To transpose or invert digital data according to a prearranged scheme in order to break up the low-frequency patterns associated with serial digital signals. **d)** The digital signal is shuffled to produce a better spectral distribution. **e)** The alteration of the characteristics of a video, audio, or coded data stream in order to prevent unauthorized reception of the information in a clear form. This alteration is a specified process under the control of a conditional access system.

Scratchpad – Memory containing intermediate data needed for final results.

Screen – The portion of the monitor that displays information. The face of a monitor, TV, or terminal.

Screw Assembly – Refers to the method of joining the two plastic parts of a cassette with screws, as opposed to sonically welding.

Scroll – Graphics that roll from the bottom to the top of the screen, for example, end credits.

SCSI (Small Computer System Interface) – a) Special type of disk drive designed for moving very large amounts of information as quickly as possible. **b)** A very widely used high data rate general purpose parallel interface. A maximum of eight devices can be connected to one bus, for example a controller, and up to seven disks or devices of different sorts – Winchester disks, optical disks, tape drives, etc., and may be shared between several computers. SCSI specifies a cabling standard (50-way), a protocol for sending and receiving commands and their format. It is intended as a device-independent interface so the host computer needs no details about the peripherals it controls. But with two versions (single-ended and balanced), two types of connectors and numerous variations in the level of implementation of the interface, SCSI devices cannot “plug & play” on a computer with which they have not been tested. Also, with total bus cabling for the popular single-ended configuration limited to 18 feet (6 meters), all devices must be close to each other.

SCSI, Differential – An electrical signal configuration where information is sent simultaneously through pairs of wires in a cable. Information is interpreted by the difference in voltage between the wires. Differential interfaces permit cable lengths up to 75 feet (25 meters).

SCSI, Single-Ended – An electrical signal configuration where information is sent through one wire in a cable. Information is interpreted by the change in the voltage of the signal relative to two system ground. Single-ended interfaces permit cable lengths up to 18 feet (6 meters).

SCSI Address – A number from one to seven that uniquely identifies a SCSI device to a system. No two SCSI devices that are physically connected to the same workstation can have the same SCSI address.

SCSI Address Dial – A small plastic dial connected to every SCSI device supplied by Silicon Graphics, Inc. You click on its small buttons to select a SCSI address for a new SCSI device. Each device on a SCSI bus normally should have a unique address.

SCSI Bus Line – The combined length of all internal and external SCSI cables in a system.

SCSI Cable – A cable that connects a SCSI device to a SCSI port on a workstation.

SCSI Device – A hardware device that uses the SCSI protocol to communicate with the system. Hard disk, floppy disk, CD-ROM, and tape drives may be SCSI devices.

SCSI Terminator – A metal cap that you plug into any open SCSI port on a SCSI bus line. No SCSI devices on a SCSI bus line will work unless all SCSI ports are occupied by either a cable or terminator.

SD (Super Density) – A proposal for an optical disc format from Toshiba, Time Warner and an alliance of several other manufacturers. The SD format is now integrated in the DVD format.

SDDI – Serial Digital Data Interface.

SDDS – Sony Dynamic Digital Sound.

SDH – Synchronous Digital Hierarchy.

SDI – Serial Digital Interface.

SDL – Specification and Description Language.

SDP – Severely Disturbed Period.

SDT (Service Description Table) – A table listing the providers of each service in a transport stream. The SDT contains data describing the services in the system, i.e., includes names of services, the service provider, etc.

SDTI (Serial Digital Transport Interface) – SMPTE 305M. Allows faster-than-real-time transfers between various servers and between acquisition tapes, disk-based editing systems, and servers, with both 270 Mb and 360 Mb, are supported. With typical real-time compressed video transfer rates in the 18 Mbps to 25 Mbps range, SDTI's 200+ Mbps payload can accommodate transfers up to four times normal speed. The SMPTE 305M standard describes the assembly and disassembly of a stream of 10-bit words that conform to SDI rules. Payload data words can be up to 9 bits. The 10th bit is a complement of the 9th to prevent illegal SDI values from occurring. The basic payload is inserted between SAV and EAV although an appendix permits additional data in the SDI ancillary data space as well. A header immediately after EAV provides a series of flags and data IDs to indicate what is coming as well as line counts and CRCs to check data continuity.

SDTV (Standard Definition Television) – a) The new HDTV standards call for a range of different resolutions. Those that are higher than today's NTSC are considered HDTV. The ones that are comparable to NTSC are considered SDTV. Because SDTV is component and digital, it will still be higher quality than NTSC. **b)** This term is used to signify a digital television system in which the quality is approximately equivalent to that of NTSC.

Also called standard digital television. See also Conventional Definition Television and ITU-R Recommendation 1125.

Seam Elimination – Techniques to make picture panel seams invisible.

Seams – Vertical lines in the picture where separately transmitted widescreen panels are joined to the center of the image. CBS proved that seams could be made invisible in its two-channel ATV transmission scheme.

SECAM – See Sequential Color and Memory.

Secondary Audio Program – An audio track(s) separate from the normal program audio. This second track is commonly used to transmit a second language but may be used for other purposes.

Secondary Distribution – The links that radiate from the cable TV head-end, or the path from a satellite up-link and beyond, or a link directly feeding TVs in the homes.

Section – A table is subdivided into several sections. If there is a change, only the section affected is transmitted.

SEDAT (Spectrum Efficient Digital Audio Technology) – A proprietary audio compression algorithm from Scientific-Atlanta, used for satellite links.

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

Segment Marker – A marker indicating the segment ends on curves.

Select – To position the cursor over an icon then click the (left) mouse button. (To select an option button.) Once an icon is selected, it is the object of whatever operation you select from a menu.

Self Fill Key – A key which is filled with the same video that was used to cut the hole for the key.

Self Key – A key effect in which a video signal serves as both the key source and fill.

Self-Contained – In PC video, a MooV file that contains all of its video and audio data, instead of including references to data in other files. See MooV.

Self-Demagnetization – The process by which a magnetized sample of magnetic material tends to demagnetize itself by virtue of the opposing fields created within it by its own magnetization. Self-demagnetization inhibits the successful recording of short wavelengths or sharp transitions in a recorded signal.

Self-Erasure – The erasure of high frequencies which occurs during recording due to the formation of a secondary gap after the trailing edge of the record head. Self-erasure is increased by excess bias and by excess high-frequency signal levels (especially at low tape speeds).

Self-Test – Test performed by a product on itself.

SelSync – A configuration which enables the engineer to play back the signal from the record head for use in overdubbing.

SelSync Bias Trap – A control used to remove bias signal from adjacent recording heads which can leak into the record head being used to play back a signal.

SelSync Gain – A control used to equalize the gain of SelSync playback from the record head with the gain of playback from the reproduce head.

Sensitivity – **a)** The magnitude of the output when reproducing a tape recorded with a signal of given magnitude and frequency. The sensitivity of an audio or instrumentation tape is normally expressed in dB relative to the sensitivity of a reference tape measured under the same recording conditions. **b)** The amount of signal a camera can emit from a particular sensor illumination at a particular SNR, sometimes expressed as a certain scene illumination (in lux or foot-candles) at an assumed reflection and signal strength, at a particular lens transmission aperture, at a particular SNR. The sensitivity of a camera can be truly increased by improving its image sensor, increasing its transmission aperture, or slowing its frame rate; it can be seemingly increased by allowing the SNR to be reduced. All other things being equal, at this time the sensitivity of an HDEP camera is less than the sensitivity of an NTSC camera. The sensitivity of first-generation HDTV 1125 scanning-line cameras is two to three stops less sensitive than that of a 525-line camera (needing four to eight times as much light). HARP tubes and new CCD advances may offer a solution to this problem.

SEP – Symbol Error Probability.

Separation – The degree to which two channels of a stereo signal are kept apart.

Separation Loss – The loss in output that occurs when the surface of the coating fails to make perfect contact with the surfaces of either the record or reproduce head.

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

Sequence – A coded video sequence that commences with a sequence header and is followed by one or more groups of pictures and is ended by a sequence end code.

Sequential Color and Memory (Sequential Couleur avec Memoire) – **a)** French developed color encoding standard similar to PAL. The major differences between the two are that in SECAM the chroma is frequency modulated and the R'-Y' and B'-Y' signals are transmitted line sequentially. The image format is 4:3 aspect ratio, 625 lines, 50 Hz and 6 MHz video bandwidth with a total 8 MHz of video channel width. **b)** A composite color standard based upon line-alternate B-Y and R-Y color-difference signals, frequency modulated upon a color subcarrier. All applications are in 625/50/2:1 systems.

Sequential Logic – Circuit arrangement in which the output state is determined by the previous state and the current inputs. Compare with Combinational Logic.

Sequential Scanning – Progressive scanning, so named because scanning lines are transmitted in numerical sequence, rather than in odd- or even-numbered fields, as in interlaced scanning.

SER – Symbol Error Rate.

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Serial Device – Any hardware device that requires a serial connection to communicate with the workstation.

Serial Digital – Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

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

Serial Digital Interface (SDI) – The standard based on a 270 Mbps transfer rate. This is a 10-bit, scrambled, polarity independent interface, with common scrambling for both component ITU-R 601 and composite digital video and four channels of (embedded) digital audio. Most new broadcast digital equipment includes SDI which greatly simplifies its installation and signal distribution. It uses the standard 75-ohm BNC connector and coax cable as is commonly used for analog video, and can transmit the signal over 600 feet (200 meters) depending on cable type.

Serial Digital Video – Uses scrambled channel coding and NRZI signal format as described in SMPTE 259M and EBU Tech. 3267. The various serial digital data rates are: 143 Mb/s for serial composite NTSC; 177 Mb/s for serial composite PAL; 270 Mb/s for serial component 525/59.94 and 625/50; 360 Mb/s for serial component 16:9 aspect ratio.

Serial HDDR – The recording of a digital data stream onto a single recording track. With multitrack recorders, multiple streams can be recorded as long as each stream is recorded on a separate track. There is no requirement that multiple streams have a common synchronous clock nor is it required that the multiple streams be the same recording code.

Serial Interface – An option to switcher which allows all switcher functions to be controlled remotely by a computer editor. Data is transmitted serially between the editor and the switcher at selectable baud (transmission) rates.

Serial Port – a) A computer I/O (input/output) port through which the computer communicates with the external world. The standard serial port uses RS-232 or RS-422 protocols. **b)** An outlet on a workstation to which you connect external serial devices.

Serial Storage Architecture (SSA) – A high-speed data interface developed by IBM and used to connect numbers of storage devices (disks) with systems. Three technology generations are planned: 20 Mbps and 40 Mbps are now available, and 100 Mbps is expected to follow.

Serial Video Processing – A video mixing architecture where a series of video multipliers, each combining two video signals, is cascaded or arranged in a serial fashion. The output of one multiplier feeds the input of the next, and so on, permitting effects to be built up, one on top of the other.

Serializer – A device that converts parallel digital information to serial digital.

Serration Pulses – Pulses that occur during the vertical sync interval, at twice the normal horizontal scan rate. These pulses ensure correct 2:1 interlacing and eliminate the buildup of DC offset.

Serrations – A term used to describe a picture condition in which vertical or nearly vertical lines have a sawtooth appearance. The result of scanning lines starting at relatively different points during the horizontal scan.

Server, File – A storage system that provides data files to all connected users of a local network. Typically, the file server is a computer with large disk storage which is able to record or send files as requested by the other connected (client) computers, the file server often appearing as another disk on their systems. The data files are typically at least a few kilobytes in size and are expected to be delivered within moments of request.

Server, Video – A storage system that provides audio and video storage for a network of clients. While there are some analog systems based on optical disks, most used in professional and broadcast applications are based on digital disk storage. Aside from those used for video on demand (VOD), video servers are applied in three areas of television operation: transmission, post production and news. Compared to general purpose file servers, video servers must handle far more data, files are larger and must be continuously delivered. There is no general specification for video servers and so the performance between models varies greatly according to storage capacity, number of channels, compression ratio, and degree of access to stored material, the latter having a profound influence. Store sizes are very large, typically up to 500 gigabytes or more. Operation depends entirely on connected devices, edit suites, automation systems, secondary servers, etc., so the effectiveness of the necessary remote control and video networking is vital to success.

Service – A set of elementary streams offered to the user as a program. They are related by a common synchronization. They are made of different data, i.e., video, audio, subtitles, other data.

Service Information (SI) – Digital data describing the delivery system, content and scheduling/timing of broadcast data streams, etc. It includes MPEG-2 PSI together with independently defined extensions.

service_id – A unique identifier of a service within a TS (Transport Stream).

Servo – In cameras, a motorized zoom lens. Originally a brand name, servo is now a generic name for any motor-controlled zoom lens. A servo is usually operated by pressing buttons labeled “T” (telephoto) and “W” (wide-angle) on the video camera’s hand grip.

Servo System – An electrical device controlling the speed of a moving or rotating device such as a capstan/pinchroller rotating speed.

SES – Seriously Errored Second.

Set – A studio or part thereof which has a particular function (i.e., news) and hence includes all props, desks, etc.

Set/Trim In, Set/Trim Out – Function of entering edit in- and out-points in the time-code format. Preceding the numeric entry with a + or – adds to or subtracts from already existing edit points.

Settling Time – Settling time is the time it takes the output analog signal of a DAC to attain the value of the input data signal. This time (usually measured in nanoseconds) is measured from the 50% point of full-scale transition to within ± 1 LSB of the final value.

Setup – a) In NTSC systems, video black is typically 7.5 IRE above the blanking level. This 7.5 IRE level is referred to as the black setup level, or simply setup. **b)** The ratio between reference black level and reference white level, both measured from blanking level. It is usually measured in percent. Black level reference expressed as a percentage of the blanking-

to-reference-white excursion. Conventionally 7.50% in system M, conforming to ANSI/EIA/TIA 250-C. Conventionally zero in all other systems where blanking level and black level reference are identical.

Set-Up Mode – The functional level in which you can program the system's baud rate, parity, and bus address to match the communications standards of an external editor.

Set-Up Time – Time that data must be stable prior to a write signal.

SFDMA – Synchronous Frequency Division Multiple Access.

SFN (Single Frequency Network) – A TV transmitter network in which all the transmitters use the same frequency. The coverage areas overlap. Reflections are minimized by guard intervals. The transmitters are separated by up to 60 km. The special feature of these networks is efficient frequency utilization.

SFP (Societe Francaise de Production et de Creation Audiovisuelles) – Drafter of the French proposals.

Shading – In order to look solid, a polygon must be “shaded” with color. This happens when the polygon is rendered. There are several ways to shade a polygon. These have varying degrees of realism and cost. A polygon's shading depends on its surface properties, the properties and location of the lights with which it is lit. The shading methods (types) available on PictureMaker are constant, flat, Gouraud, and Phong. The latter two are “smooth” shading types.

Shadow – A type of key border effect. A shadow key with a character generator appears as if the letters have been raised off the surface slightly and a light is shining from the upper left; a shadow appears to the right and bottom of the characters.

Shadow Chroma Key – The ability to key a subject as a regular chroma key, while using the border channel of the keyer to mix in the low luminance portions of the key signal. This allows a true shadow effect where any shadow in the key video appears as if it is in the background. All Ampex switchers have this feature, with variable shadow levels and densities (bdr adj and bdr lum respectively).

Shadow Mask – A perforated metal plate which is mounted close to the inside of a color CRT display surface. This plate causes the red, green and blue electron beams to hit the proper R, G, or B phosphor dots.

Shannon's Theorem – A criterion for estimating the theoretical limit to the rate of transmission and correct reception of information with a given bandwidth and signal-to-noise ratio.

Sharpness – **a)** Apparent image resolution. High sharpness may be the result of high resolution, or it might be an optical illusion caused by image enhancement or by visible edges in a display, such as the vertical stripes of an aperture grille CRT (e.g., Trinitron). Visible scanning lines can actually increase perceived sharpness. This may be one reason why, in some subjective ATV tests, some viewers have expressed a preference for NTSC pictures over ATV. **b)** Sharpness is the casual, subjective evaluation of detail clarity in an image. It is often assumed that sharpness and resolution are directly related, in that images possessed of greater sharpness are assumed to have greater resolution. An increase in subjective sharpness is usually reported when objects are more clearly delineated from each other and from background having hard, sharply-defined edges. A major contri-

bution to subjective sharpness is this high contrast at edge transitions, as is emphasized by both edge enhancement and aperture correction, for example. In many practical systems, increasing the contrast at edge transitions is often accompanied by a reduction in fine detail, and under these conditions, sharpness and resolution may describe opposite characteristics.

Shedding – A tape's giving off of oxide or other particles from its coating or backing, usually causing contamination of the tape transport and, by redeposit, on the tape itself.

Shell – **a)** The command interpreter between the user and the computer system. **b)** A window into which you type IRIX, UNIX, or DOS commands.

SHF (Super High Frequency) – The band of frequencies ranging from 3 GHz to 30 GHz, currently including all communications satellite signals and most microwave transmissions. SHF has been suggested as a band to be used for terrestrial ATV transmission channels.

Shielded Cable – A cable with a conductive covering which reduces the possibility of interference with radio, television, and other devices.

Shift – To move the characters of a unit of information right or left. For a binary number, this is equivalent to multiplying or dividing by two for each shift.

Shoot and Protect – A concept of aspect ratio accommodation central to the selection of the 16:9 aspect ratio for the SMPTE HDEP standard. In a shoot and protect system, in production the action is confined to certain bounds (the shoot range) but a larger area (the protect range) is kept free of microphone booms, lights, and other distracting elements. Shoot and protect has been used for years in film, where the shoot aspect ratio is the 1.85:1 used in NTSC. The 16:9 aspect ratio was selected mathematically as the one requiring the least area to protect both 1.33:1 television and 2.35:1 widescreen film. In such a system, both the shoot and the protect aspect ratios would be 16:9. A rectangle of shoot width and protect height would be 1.33:1 (12:9); a rectangle of shoot height and protect width would be 2.35:1 (about 21:9). The concept of 3-perf film conflicts strongly with 1.85:1 shoot and protect.

Short Time Linear Distortions – These distortions cause amplitude changes, ringing, overshoot, and undershoot in fast rise times and 2T pulses. The affected signal components range in duration from 125 nsec to 1 μ sec. A 1T pulse must be used to test for these distortions. See the discussion on Linear Distortions. Errors are expressed in “percent-SD.” The presence of distortions in short time domain can also be determined by measuring K_{2T} or $K_{pulse/bar}$. See the discussion on K Factor. Picture effects include fuzzy vertical edges. Ringing will sometimes generate chrominance artifacts near vertical edges.

Shortwave – Transmissions on frequencies of 6 to 25 MHz.

Shot – Picture information recorded by a camera.

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

Shoulder – On the characteristic curve for a photographic material (the plot of density vs. log exposure) that portion representing nonlinear response at the higher densities. For the electronic relationship of a positive video image to the shoulder of photographic negatives.

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Showscan – A film process using 70 mm (65 mm in the camera) film at 60 frames per second. It seems an ideal film production format (expense considerations aside) for transfer to ATV and has been demonstrated as such.

Shut Down – To safely close all files, log out, and bring the workstation to a state where you can safely power it down.

Shuttle – A variable-rate search, forward or reverse, of a videotape using a video deck or VCR capable of such an operation.

SI (Service Information) – SI provides information on services and events carried by different multiplexes, and even other networks. SI is structured as six tables (PAT, NIT, CAT, SDT, EIT, and BAT). The applications are only concerned with NIT, BAT, SDT, and EIT.

Side Information – Information in the bit stream necessary for controlling the decoder.

Side Panels – Additional sections of picture that, when added to a television image, change a 1.33:1 aspect ratio into a wider one. Many ATV schemes transmit these panels separately from the main picture.

Sideband – A signal that is a consequence of some forms of modulation. When modulation forms two sidebands, one can sometimes be filtered out to increase efficiency without sacrificing information.

Sides (Submenu) – Under Source, the function that enables each side of the video image to be cropped.

SIF (Standard Interchange Format) – A half-resolution input signal used by MPEG-1. See Standard Input Format. This is also known as “Source Input Format” and “Standard Interchange Format.”

SIGGRAPH – The Association of Computing Machinery (ACM) Special Interest Group on Computer Graphics. Internet: www.siggraph.org

Signal Amplitude – The nominal video signal amplitude shall be 1.0 volt peak-to-peak (140 IRE units).

Signal Polarity – The polarity of the signal shall be positive, i.e., so that black-to-white transitions are positive going.

Signal, Chrominance – Video: The color-difference signal(s) and the equation(s) for their derivation. **Color Television:** The sidebands of the modulated chrominance subcarrier that are added to the luminance signal to convey color information.

Signal, Luminance – Video: The signal that describes the distribution of luminance levels within the image and the equation for deriving that information from the camera output. **Television, Composite Color:** A signal that has major control of the luminance. Note: The signal is a linear combination of gamma-corrected primary color signals.

Signaling Rate – The bandwidth of a digital transmission system expressed in terms of the maximum number of bits that can be transported over a given period of time. The signaling rate is typically much higher than the average data transfer rate for the system due to software overhead for network control, packet overhead, etc.

Signal-to-Noise Ratio (SNR) – a) The ratio of signal to noise expressed in dB. In general, the higher the signal to noise ratio the better. If there is a low signal-to-noise ratio, the picture can appear grainy, snowy, and sparkles of color may be noticeable. Equipment will not be able to synchro-

nize to extremely noisy signals. **b)** It may not be possible to directly compare SNRs for ATV and for NTSC as the eye’s sensitivity to noise varies with the detail of the noise. **c)** The measurement of the dynamic range of a piece of equipment, measuring from the noise floor (internally generated noise) to the normal operating level or the level prior to limiting.

Signature – Four-digit value generated by a signature analyzer, which is used to characterize data activity present on a logic node during a specific period of time.

Signature Analysis – Technique used to facilitate the troubleshooting of digital circuits. Nodes of the circuit, stimulated during a test mode, produce “signatures” as the result of the data compression process performed by the signature analyzer. When a node signature is compared to a known good documented signature, faulty nodes can be identified.

Signature Analyzer – Instrument used to convert the long, complex serial data streams present on microprocessor system nodes into four-digit signatures.

Silhouette – In a boundary rep system, the typical method for creating a solid begins by drawing a silhouette outline of it; a plan view (in architectural terminology).

SIMM (Single In-Line Memory Module) – A small printed circuit board with several chips that contain additional megabytes of random-access memory (RAM).

SIMM Removal Tool – An L-shaped metal tool used to loosen SIMMs that are installed in the SIMM socket.

SIMM Socket – A long, thin, female connector located on the CPU board into which you insert a SIMM.

Simple Profile – MPEG image streams using only I and P frames is less efficient than coding with B frames. This profile, however, requires less buffer memory for decoding.

Simple Surface – Consists of a regular patch mesh and is created with a single surface creation operation such as extrude, revolve, sweep, and smooth lofts.

Simulation – A technique for trying an ATV scheme inside a computer without actually building specialized equipment. Some question the validity of ATV simulations.

Simulator – Special program that simulates the logical operation of the microprocessor. It is designed to execute machine language programs on a machine other than the one for which the program is written. This allows programs for one microprocessor to be debugged on a system that uses another processor.

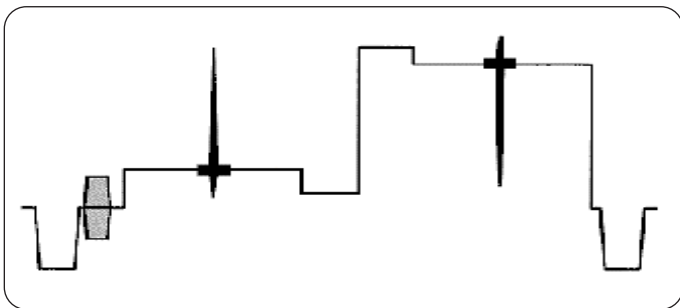
Simulcast (Simultaneous Broadcast) – Prior to the advent of multi-channel television sound broadcasting, the only way to transmit a stereo television show to homes was by simultaneous broadcasting on TV and radio stations. Proponents of non-receiver compatible ATV schemes suggest the same technique to achieve compatibility with existing NTSC TV sets: The non-compatible ATV signal will be transmitted on one channel and a second channel will carry a standards-converted NTSC signal. It is sometimes suggested that such simulcast techniques of ATV transmission are more efficient than augmentation techniques since, when the penetration of ATV sets into households reaches some limit, the NTSC simulcast

channel can be eliminated, conserving bandwidth. In Britain, an almost identical situation occurred when 625 scanning-line television replaced 405. For many years, all programming was simulcast in both line rates with 405 eventually eliminated.

SimulCrypt – a) DVB SimulCrypt specifically addresses the requirements for interoperability between two or more CA systems at a headend. **b)** A process that facilitates using several conditional access (CA) systems in parallel, in conjunction with the DVB common scrambling algorithm, to control access to pay-TV services.

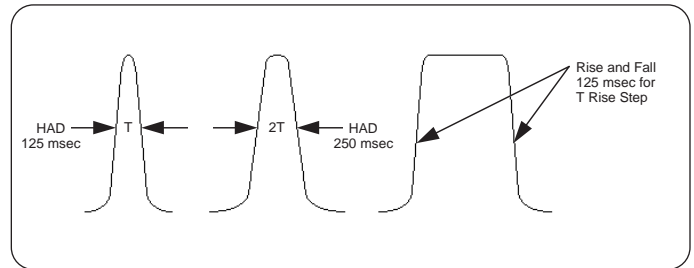
Simultaneous Colors – The number of colors in a display system that can be displayed on the screen at one time. This number is limited by the circuitry of the display adapter, and is often much smaller than the number of colors the display device can actually support. The number of simultaneous colors a display adapter supports is normally determined by the number of color planes, or bits per pixel, that it uses. For example, a device with 4 bits per pixel supports 16 simultaneous colors.

(Sin X)/X Pulse – This signal has equal energy present at all harmonics of the horizontal scan frequency up to a cutoff point of 4.75 MHz. This allows it to produce a flat spectral display when viewed on a spectrum analyzer. (Sin X)/X is primarily designed for use with a spectrum analyzer or an automatic measurement set such as the VM700A/T. Very little information is discernible in a time-domain display. The waveform is shown in the figure below. This signal is used for Frequency Response measurements. Refer to the Frequency Response discussion.



Sine-Squared Pulses – Fast rise time square waves cannot be used for testing bandwidth-limited systems because attenuation and phase shift of out-of-band components will cause ringing in the output pulse. These out-of-band distortions can obscure the in-band distortions that are of interest. Sine-squared pulses are bandwidth limited and are useful for testing bandwidth-limited television systems. **Description of the Pulse:** Sine-squared pulses look like one cycle of a sine wave as shown. Mathematically, a sine-squared wave is obtained by squaring a half-cycle of a sine wave. Physically, the pulse is generated by passing an impulse through a sine-squared shaping filter. **T Intervals:** Sine-squared pulses are specified in terms of half amplitude duration (HAD) which is the pulse width measured at the 50% pulse amplitude points. Pulses with HADs which are multiples of the time interval T are used to test bandwidth limited systems. T, 2T, and 12.5T pulses are common examples. T is the Nyquist interval, or 1/2 f_c where f_c is the cutoff frequency of the system to be measured. For NTSC, f_c is taken to be 4 MHz, thus T is 125 nsec. **T Steps:** The rise times of transitions to a constant luminance level (such as the white bar) are also

specified in terms of T. A T step has a 10% to 90% rise time of nominally 125 nsec, while a 2T step has a rise time of 250 nsec. Refer to the figure below. **Energy Distribution:** Sine-squared pulses possess negligible energy at frequencies above $f = 1/HAD$. The amplitude of the envelope of the frequency spectrum at 1/(2 HAD) is one-half of the amplitude at zero frequency.



Single Channel – Channel-compatible, an ATV scheme fitting into 6 MHz of bandwidth.

Single-Domain Particle – All ferromagnetic materials are composed of permanently magnetized regions in which the magnetic moments of the atoms are ordered. These domains have a size determined by energy consideration. When a particle is small enough, it cannot support more than one domain and is called a single-domain particle.

Single-Forked – A MooV file whose resources have been moved into the data fork, creating a file that can be played on a PC. See MooV.

Single-Page Mapping – Refers to always using Offset Register 0 (GR9) as the window into display memory. The mode is selected when GRB(0) is programmed to “0.”

Single-Step – Process of executing a program one instruction or machine cycle at a time.

Sink Current – Current input capability of a device.

SIS (Systems for Interactive Services) – ETS 300 802.

SIT – Selection Information Table.

Sizing – The operation of shrinking or stretching video data between a system’s input and display. Normally, a combination of scaling and zooming.

Skew – a) Passage of tape over a head in a direction other than perpendicular to the height of the gap. **b)** Term used for an ADO action whereby rectangles become trapezoids.

Skipped Macroblock – A macroblock for which no data is encoded.

Slapback – Discrete repeats created by either digital or tape delay.

Slate – a) To label with a take number by recording a voice on the tape.

b) Term used for a frame of video text usually recorded after bars prior to countdown sequence at the top of a commercial or program containing information on date recorded, ad agency, direction, etc.

Slice – A series of macroblocks, all placed within the same row horizontally. Slices are not allowed to overlap. The division of slices may vary from picture to picture. If “restricted slice structure” is applied, the slices must cover the whole picture. If “restricted slice structure” is not applied, the

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decoder will have to decide what to do with that part of the picture which is not covered by a slice. Motion vectors are not allowed to point at the part of the picture, which is not covered by a slice. Note that Main Profile uses “restricted slice structure,” that is, all the slices put together must cover the picture.

Slow-In/Slow-Out – In real life, when an object at rest begins to move, it starts slowly. Similarly, when an object changes its speed, or direction, it rarely does so instantaneously, but rather makes the change gradually (that’s one reason we use splines to describe motion paths in computer animation). In order to create satisfying animation, it is important to be sensitive to the rate at which objects change their direction and speed; these factors are the most expressive component of path animation, like tempo and dynamics in music. In particular, the term slow-in/slow-out refers to an object at rest which gradually accelerates, reaches a final velocity, then slows and stops.

SLSC (Split-Luminance, Split-Chrominance) – A family of ATV schemes proposed by Bell Labs and IIT. SLSC is a receiver-compatible, non-channel compatible ATV scheme using a high line rate camera and prefiltering with receiver line doubling to increase vertical resolution and additional bandwidth to increase horizontal resolution and help reduce NTSC artifacts. Aspect ratio is increased by blanking stuffing in the HBI. SLSC schemes have been proposed with at least two types of chroma encoding and three types of widescreen panel transmission.

S-MAC (Studio MAC) – **a)** A MAC standard proposed for studio intraconnection by the SMPTE working group on CAV standards. The S-MAC system uses time compression and time-domain multiplexing techniques to convey (Y, C_R, C_B) video signals – a version of (Y, R-Y, B-Y). **b)** A MAC designed for single transmission of CAV signals in a television facility or between facilities. See also MAC.

Small Scale Integration (SSI) – Technology of less complexity than medium scale integration. Usually means less than ten gate functions in the IC.

Smart Video Recorder Pro – Intel’s PC video capture card that can capture and even compress video in real-time, using Indeo technology.

SMATV – Satellite Master Antenna Television.

SMATV-DTM – SMATV system based on digital trans-modulation.

SMATV-IF – SMATV system based on distribution at IF (Intermediate Frequency).

SMATV-S – SMATV system based on distribution at extended super band.

Smear – A term used to describe a picture condition in which objects appear to be extended horizontally beyond their normal boundaries in a blurred or “smeared” manner.

SMI – Storage Media Interoperability.

Smooth Shading – Even though an object may be represented by polygons, with smooth shading the facets can be made to appear to blend into each other, making the object look smooth. Smooth shading also makes possible the simulation of “highlights.”

SMPTE (Society of Motion Picture and Television Engineers) – American standardizing body. SMPTE 240M is the first SMPTE HDEP stan-

dard, calling for 1125 scanning lines, 2:1 interlace, a 16:9 aspect ratio, and 60 fields per second, among other characteristics. It is identical to the HDEP standard approved by ATSC. It need not be SMPTE’s only HDEP standard, however. The Society has current standards for more than ten different videotape recording formats, with more pending. There are indications that members of SMPTE’s WG-HDEP are interested in a progressively-scanned HDEP system, an evolution of the 1125-line interlace standard.

SMPTE 120M – NTSC color specification.

SMPTE 125M – SMPTE standard for Bit-Parallel Digital Interface – Component Video Signal 4:2:2. SMPTE 125M (formerly RP-125) defines the parameters required to generate and distribute component video signals on a parallel interface.

SMPTE 170M – Proposed SMPTE standard for Television – Composite Analog Video Signal, NTSC for Studio Application. This standard describes the composite color video signal for studio applications, system M/NTSC, 525 lines, 59.94 fields, 2:1 interface, with an aspect ratio of 4:3. This standard specifies the interface for analog interconnection and serves as the basis for the digital coding necessary for digital interconnection of system M/NTSC equipment. Note: Parts of the system M/NTSC signal defined in this document differ from the final report of the Second National Television System Committee (NTSC 1953) due to changes in the technology and studio operating practices.

SMPTE 240M – SMPTE standard for Television – Signal Parameters – 1125/60 High-Definition Production System. This standard defines the basic characteristics of the video signals associated with origination equipment operating in the 1125/60 high-definition television production system. As this standard deals with basic system characteristics, all parameters are intoleranced.

SMPTE 244M – Proposed SMPTE standard for Television System M/NTSC Composite Video Signals Bit-Parallel Digital Interface. This standard describes a bit-parallel composite video digital interface for systems operating according to the 525-line, 59.94 Hz NES standard 35 described by SMPTE 170M, sampled at four times color subcarrier frequency. Sampling parameters for the digital representation of encoded video signals, the relationship between sampling phase and color subcarrier, and the digital levels of the video signal are defined.

SMPTE 259M – Proposed SMPTE standard for Television 10-Bit 4:2:2 Component and 4fsc NTSC Composite Digital Signals – Serial Digital Interface. This standard describes a serial digital interface for system M (525/60) digital television equipment operating with either 4:2:2 component signals or 4fsc NTSC composite digital signals.

SMPTE 260M – Standard for high definition digital 1125/60.

SMPTE 267 – Defines the serial digital signal format for 16:9 aspect ratio television. The signal rate is 360 Mb/s.

SMPTE 267M – Standard for component digital video with a 16:9 aspect ratio that uses both 13.5 MHz and 18 MHz sampling.

SMPTE 272M – The SMPTE recommended practice for formatting AES/EBU audio and auxiliary data into digital video ancillary data space.

SMPTE 274M – 1920 x 1080 Scanning And Interface.

SMPTE 291M – Ancillary Data Packet And Space Formatting.

SMPTE 292M – The SMPTE recommended practice for bit-serial digital interface for high definition television systems.

SMPTE 293M – 720 x 483 Active Line At 59.94 Hz Scan, Digital Representation.

SMPTE 294M – 720 x 483 Active Line At 59.94 Hz scan, Bit Serial Interfaces.

SMPTE 295M – 1920 x 1080 50 Hz Scanning and Interfaces.

SMPTE 296M – 1280 x 720 Scanning, Analog and Digital Representation And Analog Interface.

SMPTE 297M – Serial Digital Fiber Transmission For SMPTE 295M Signals.

SMPTE 298M – Universal Labels For Unique Identification Of Digital Data.

SMPTE 299M – The SMPTE recommended practice for 24-bit digital audio format for HDTV bit-serial interface. Allows eight embedded AES/EBU audio channel pairs.

SMPTE 305M – The SMPTE standard for Serial Digital Transport Interface.

SMPTE 308M – Television – MPEG-2 4:2:2 Profile At High Level.

SMPTE 310M – Television – Synchronous Serial Interface For MPEG-2 Transport Streams.

SMPTE 312M – Television – Splice Points For MPEG-2 Transport Streams.

SMPTE 314M – Television – Data Structure For DV Based Audio, Data And Compressed Video – 25 Mb/s and 50 Mb/s.

SMPTE 318M – Reference Signals For The Synchronization Of 59.95 Hz Related Video And Audio Systems In Analog And Digital Areas (Replaces RP 154).

SMPTE Format – In component television, these terms refer to the SMPTE standards for parallel component analog video interconnection. The SMPTE has standardized both an RGB system and a (Y, P_R, P_B) color difference system – a version of (Y, R-Y, B-Y).

SMPTE RP 154 – Standard that defines reference synchronizing signals for analog or digital 525-line systems including recommendations for black burst.

SMPTE RP 155 – Standard for digital audio reference levels for digital VTRs. This is being revised into a studio standard.

SMPTE RP 165 – Standard for error detection and handling in serial digital component and composite systems.

SMPTE RP 168 – Standard for vertical interval switching points for 525/625 systems.

SMPTE Standard – See the SMPTE format discussion.

SMPTE Time Code – Binary time code denoting hours, minutes, seconds, and frames. See also Time Code.

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

SMS – Subscriber Management System.

SN – Sequence Number.

SNA – Systems Network Architecture entered the market in 1974 as a hierarchical, single-host network structure. Since then, SNA has developed steadily in two directions. The first direction involved tying together main-frames and unintelligent terminals in a master-to-slave relationship. The second direction transformed the SNA architecture to support a cooperative-processing environment, whereby remote terminals link up with main-frames as well as each other in a peer-to-peer relationship (termed Low Entry Networking (LEN) by IBM). LEN depends on the implementation of two protocols: Logical Unit 6.2, also known as APPC, and Physical Unit 2.1 which affords point-to-point connectivity between peer nodes without requiring host computer control. The SNA model is concerned with both logical and physical units. Logical units (LUs) serve as points of access by which users can use the network. LUs can be viewed as terminals that provide users access to application programs and other services on the network. Physical units (PUs) like LUs are not defined within SNA architecture, but instead, are representations of the devices and communication links of the network.

SNAP – Sub Network Attachment Point.

SNG – Satellite News Gathering.

SNMP – Simple Network Management Protocol.

Snow – Heavy random noise.

SNR – See Signal-to-Noise Ratio.

SNR Scalability – A type of scalability where the enhancement layer(s) contain only coded refinement data for the DCT coefficients of the base layer. SNR scalability is aimed at transmission in noisy environments, and offers a form of graceful degradation. Under poor reception conditions, only the lower layer (which is covered by the highest error protection) is decoded. The picture quality is then not the best, of course, but at least a picture is available. The alternative is a total loss of picture (the “brick wall” effect) below a certain SNR. The lower layer and the enhancement layer operate with the same resolution, but the enhancement layer may contain the higher frequencies of the picture.

SOF (Sound On Film) – The sound track is on the film itself.

Soft Border – **a)** The quality of diffusion between adjacent visual areas in a picture around a pattern. **b)** A wipe pattern border which is missing between the “A” bus video and “B” bus video on the edges to give a soft effect. This has no matte color added.

Soft Edge – An edge between two video signals in which the signals are mixed together for a soft transition effect, used on both patterns and keys.

Soft Key – **a)** A selector on the display that changes state or initiates an action when you touch it on screen. You use soft keys to select test signals or a sub-window of functions or to enter a file name. **b)** A soft key's function changes to match the block above it, in the bottom line of the screen. **c)** The softening of a key edge by reducing the gain of the keyer.

Software – Operating instructions loaded into computer memory from disk that controls how system hardware will execute its operation. See Programs.

Software Option – Any software product that you buy other than the standard system software that comes on your system disk.

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Solarization – Special effect in which the lightest and darkest values of a picture are made dark while the middle tones become light. An ADO effect. Also a photo-optic process.

Solder Bridge – Glob of excess solder that shorts two conductors. A common problem on production PC boards.

Solid – Polygons meshed together to create closed volumes. It is a compact set of contiguous points in three-dimensional space.

Solo – To listen to one mike or track of a tape without listening to the others through the use of a solo button.

Sone – A unit of loudness. 2 sones are twice as loud as 1 sone.

Sonic Welded Assembly – Refers to the joining of the two plastic parts of a cassette by the use of a sonic weld, actually melting the plastic at the point of joining.

Sony – First company to sell an HDEP recorder, making HDEP practical. Also the strongest HDEP proponent, spending a great deal to promote it and going so far as to display the products of some of its competitors, as long as they complied with the 1125 scanning-line system.

Sound Booth – Term for a small acoustically dead room from which an announcer will record voice overs.

Sound Pressure Levels (SPL) – **a)** A measure of the sound pressure created by a sound, usually in the units of dB referred to 0.0002 microbar of pressure. **b)** A measure of acoustic wave force. The force that sound can exert against an object; our ear drums are an example. It is measured in dB and is “0” referenced to 1 dyne per square centimeter.

Sound-on-Sound – A method by which material previously recorded on one track of a tape may be rerecorded on another track while simultaneously adding new material to it.

Source – Video producing equipment such as cameras, tape recorders, or character generators.

Source (Menu) – The function that changes the aspect ratio and size of the image. The word Source refers to the image generated by the input video, which occupies “Source Space” on the screen. **a)** Source Aspect uses the X and Y axis. **b)** Source Size uses the Z axis. The image does not move.

Source Code – Program written in other than machine language. May be assembly language or a high-level language.

Source Coding – Coding that uses a model of the source from which parameters are extracted and transmitted to the decoder. When used particularly for voice, the coders are called vocoders.

Source Current – Current output capability of a device.

Source Stream – A single, nonmultiplexed stream of samples before compression coding.

Source Synchronizing Generator – A synchronizing pulse generator used to drive a specific piece of source equipment. It is referenced to a master reference synchronizing generator.

Source Timing Modules – A synchronizing generator on a module that is used to adjust the timing of a specific piece of source equipment. It is kept in time by a reference sync pulse generator.

Source/Tape Switch – A control found on control amplifiers with tape monitor jacks, and on recorders with monitor heads, allows comparison of the signal being fed to the tape (source) with the signal just recorded.

Southwestern Bell – A Baby Bell, and the first organization to transmit HDHEP 9, as opposed to some bandwidth-reduced form of ATV), a long distance, via optical fiber.

Sparkle – An ADO DigiTrail effect.

Spatial – Relating to the area of an image.

Spatial Resolution – What is usually referred to as resolution, linearly measurable detail in an image in the vertical, horizontal, or diagonal directions.

Spatial Scalability – A type of scalability where an enhancement layer also uses predictions from pel data derived from a lower layer without using motion vectors. The layers can have different frame sizes, frame rates or chroma formats. Spatial scalability offers a layering of the picture resolution, suitable for HDTV transmissions, for instance. By decoding of the lower layer, a “normal” picture is obtained, and by decoding of the enhancement layer, the HDTV picture may be constructed.

Spatio-Temporal Filtering – Filtering in both space and time.

Spatio-Temporal Spectrum – A three-dimensional representation of the energy distribution of a television signal. The three dimensions are horizontal, vertical, and time.

S/PDIF (Sony/Philips Digital Interface Format) – A consumer version of the AES/EBU digital audio interconnection standard. The format uses a 75-ohm coaxial cable with RCA connectors and has a nominal peak-to-peak value of 0.5 V. The frame ordering differs slightly than that of AES/EBU, specifically in the channel status information. Refer to AES/EBU interface.

Special Effects – Artistic effects added to a video production in order to enhance the production by creating drama, enhancing the mood or furthering the story. Special effects may vary from the limited addition of patterns or the mixing of several video images together, to sophisticated digital effects such as picture compression, page flipping, and three-dimensional effects. Special effects are usually created using SEGs such as those included in the Video Equalizer, Video TitleMaker 2000, and Digital Video Mixer.

Special Effects Generator – A video component that processes video signals and has the ability to manipulate the signal with a variety of wipes and distortions.

Special Magnetic Moment – The value of the saturation moment per unit weight of a magnetic material expressed in emu/gm. The specific magnetic moment is the most convenient quantity in which to express the saturation magnetization of fine particle materials.

Spectra Key – An enhancement to a standard RGB chroma key, employing a patented chroma nulling circuitry, thereby removing any color from the background video. This enables keys to be performed through glass or smoke or with shadows. This would otherwise not be possible without the blue or green fringing effect typical of standard RGB keyers.

Spectral Analysis – a) Determination of the monochromatic components of the luminance considered. **b)** Objective detailed specification of a white reference, of a color, or of the transmission function, with respect to wavelength and intensity.

Spectral Sensitivity – Quotient of the detector output $dY(\lambda)$ by the monochromatic detector output $dX(\lambda) = X(\lambda)d\lambda$ in the wavelength interval $d\lambda$ as a function of the wavelength λ .

Spectrophotometric Match – Spectrophotometry determines the spectral transmittance and the spectral reflectance of objects ... to compare at each wavelength the radiant flux leaving the object with that incident upon it. A spectrophotometric match thus occurs only when the two objects being compared are identical in their color structure. Such a match will be maintained regardless of viewing conditions. Spectrophotometric matches are seldom encountered and rarely necessary; in practice, the usual objective is to achieve a metameric match. Metameric matches, however, appear identical only under one set of specified viewing conditions.

Spectrum Allocation – Designation of certain bandwidths at certain frequencies for certain purposes. For example, channel 2 has been allocated 6 MHz of bandwidth from 54 MHz to 60 MHz for television broadcasting. All ATV transmission schemes require some form or another of spectrum allocation. See also Frequency Allocation Table.

SPI – Synchronous Parallel Interface.

Spike – See Overshoot.

SPL (Sound Pressure Level) – The SPL of a sound is equal to twenty times the logarithm (base 10) of the ratio of the root-mean-square sound pressure to the reference sound pressure. As a point of reference, 0 dB-SPL equals the threshold of hearing, while 140 dB-SPL produces irreparable hearing damage.

Splice – A physical join between pieces of tape.

Splicing – Concatenation of, or switching between, two different streams of compressed data.

Splicing Tape – A special pressure-sensitive, non-magnetic tape used for joining two lengths of magnetic tape.

Spline – a) A type of mathematical model used to represent curves. They are usually displayed as polylines with a large number of very small sides. The importance of splines is that they give very smooth curves for a relatively small number of points. **b)** In wooden ships, the curved skeleton of a hull is built by attaching bendable strips of wood to small, fixed, and angled blocks of wood. The strips are splines. In computer graphic splines, the blocks of wood are called control points. In computer graphics, curved lines are always visualized by drawing many short vectors. However, since each vector requires a fair amount of storage, curves are often stored in terms of their control points; whenever the curve is needed, the spline is recreated. Another advantage of storing splines as curves is the ease with which a spline curve is manipulated by moving its control points. Instead of moving the curve's vectors one at a time, a large section of the curve is moved by dragging its control point. Splines convert discontinuity into smoothness. These properties make splines very useful in animation. When we create a keyframe for path animation, the object's position becomes a

control point for a spline that defines the entire path for all the in-between frames as well. This allows us to get smooth motion between all the keyframes, and avoid instantaneous (single frame) changes of direction. Such changes would be highly unrealistic and could never yield satisfying animation. Another tremendous advantage of splines is that they are resolution independent. Magnifying and then redrawing a shape that is represented by a spline does not reveal the short vectors that represent the curve on the screen, because these vectors are recalculated to take into account the new magnification. Spline represented objects can also be easily rotated or skewed in 3D, again with no loss in clarity. So called "vector-based" systems make use of these features by representing fonts and shapes with splines, rather than the traditional bitmap. Bitmap systems, on the other hand, cannot represent or manipulate shapes nearly as handily.

Split Edit – Type of edit transition where either the video or audio of the source is delayed from being recorded for a given time.

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

Split Sync Scrambling – Video scrambling technique, used with horizontal blanking inversion, active video inversion, or both. In split sync, the horizontal sync pulse is "split," with the second half of the pulse at +100 IRE instead of the standard -40 IRE. Depending on the scrambling mode, either the entire horizontal blanking interval is inverted about the +30 IRE axis, the active video (after color burst and until the beginning of front porch blanking) is inverted about the +30 IRE axis, both are inverted, or neither is inverted. By splitting the horizontal sync pulse, a reference of both -40 IRE and +100 IRE is available to the descrambler. Since a portion of the horizontal sync is still at -40 IRE, some sync separators may still lock on the shortened horizontal sync pulses. However, the timing circuits that look for color burst a fixed interval after the beginning of horizontal sync may be confused. In addition, if the active video is inverted, some video information may fall below 0 IRE, possibly confusing sync detector circuits. The burst is always present at the correct frequency and timing, however, the phase is shifted 180 degrees when the horizontal blanking interval is inverted.

Spoking – A form of buckling in which the tape pack is deformed into a shape which approximates a polygon.

Spot – Term used for a commercial.

Spot Light – A unidirectional source geometrically defined by its position and target.

Spotlight – a) The effect of a spotlight falling on a video scene, and the switcher feature that allows this to be accomplished. On the AVC, the spotlight control adjusts attenuation of the A bus video. A typical spotlight effect is obtained by selecting the same source on both buses, a soft bordered circle wipe, and using size and position control. Many other effects are also possible with this feature. **b)** A highlight effect produced by a full-strength video signal shaped by a wipe pattern and an attenuated (darkened) signal from the same video source. This is activated by selecting spotlight on the M/E effects group of buttons, and adjusting spotlight control on the pattern adjust group of controls to darken the desired area.

Sprites – In MPEG-4, static background scenes. Sprites can have dimensions much larger than what will be seen in any single frame. A coordinate

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system is provided to position objects in relation to each other and the sprites. MPEG-4's scene description capabilities are built on concepts used previously by the Internet community's Virtual Reality Modeling Language (VRML).

Square Pixels – Pixels generated in a television system having the same horizontal and vertical resolution. There is some evidence that a large mismatch between horizontal and vertical resolution prevents the higher resolution from being fully perceived by the human visual system. NTSC was created with square pixels with a resolution of approximately 330 by 330 lines.

Squareness – A measure of magnetic behavior expressed as a ratio. 1.00 would be considered perfect and the normal range for magnetic material is 0.7 to 0.9.

Squeal – Audible tape vibrations, primarily in the longitudinal mode, caused by frictional excitation at heads and guides.

Squeeze – A change in aspect ratio. Anamorphic lenses sometimes squeeze a widescreen scene by a factor of two horizontally, so it will fit on a 1.33:1 aspect ratio frame. In projection, another anamorphic lens "expands" the squeeze (squeezes vertically) to restore the original aspect ratio. When a widescreen film is presented on television without being expanded, it is said to be squeezed. An unexpanded film print is said to be a squeeze print (the opposite is "flat").

SRI (Stanford Research Institute) – SRI International owns DSRC, developer of the ACTV schemes.

SRM – Session and Resource Manager.

SSA – See Serial Storage Architecture.

SSI – See Small Scale Integration.

SSCG – Spread-Spectrum Clock Generator.

ST – Stuffing Table.

Stack – Block of successive memory locations that is accessible from one end on a last-in-first-out basis (LIFO). For most processors, the stack may be a block of successive locations in the read/write memory.

Stack Pointer – Contains the address of the top of the stack. In general, the stack pointer is decremented immediately following the storage in the stack of each byte of information. Conversely, the stack pointer is incremented immediately before retrieving each byte of information from the stack.

Stand-Alone Workstation – A workstation that is not connected to a network.

Standard – a) The specific signal configuration, reference pulses, voltage levels, etc., that describe the input/output requirements for a particular tape of equipment. Some standards have been established by professional groups or government bodies (such as SMPTE or EBU). Others are determined by equipment vendors and/or users. **b)** A set of rules or characteristics defining a particular television system. Some standards (such as those contained in FCC rules and regulations) are mandatory. Most (including those of the EIA, IEEE, and SMPTE) are voluntary. The establishment of a standard often freezes development at a certain level but allows users and manufacturers to deal with a much larger array of products than might be

available without a standard. There is currently one U.S. HDEP standard, the ATSC/SMPTE 1125 scanning-line system. CCIR system E is an HDTV transmission standard, used in France, calling for 819 scanning lines in a 14 MHz bandwidth.

Standard Bodies – Any country having a national group of people consisting of experts from industry and universities who develop standards for all kinds of engineering problems.

Standard Definition Television – See SDTV.

Standard Input Format – Video format developed to allow the storage and transmission of digital video. The 625/50 SIF format has a resolution of 352 x 288 active pixels and a refresh rate of 25 frames per second. The 525/59.94 SIF format has a resolution of 352 x 240 active pixels and a refresh rate of 29.97 frames per second. MPEG-1 allows resolutions up to 4095 x 4095 active pixels, however, there is a "constrained subset" of parameters defined as SIF. The computer industry, which uses square pixels, has defined SIF to be 320 x 240 active pixels, with a refresh rate of whatever the computer is capable of supporting.

Standards Converter – A device for converting signals from one standard to another. Converting between different color schemes with the same scanning structure is called transcoding. Converting between different scanning structures requires line and field interpolation, which usually introduces artifacts. Standards conversion between 525 scanning line and 625 scanning line signals is performed regularly. Conversion from HDEP to either NTSC or a receiver-compatible ATV system will require standards conversion. It may seem that it is more difficult to convert from 1125 scanning lines to 525 than from 1050 to 525, but in a pre-filtering converter, the difference, if any, may not be large. For dealing with the field-rate difference (HDEP 60 and NTSC 59.94), some HDEP to NTSC conversions are performed by slowing the HDEP recorders to 59.94-field playback. Others are performed through standards converters that periodically omit fields.

Standing Wave Ratio – The ratio of transmitted power to reflected power in transmission lines, antenna systems, connectors, etc.

STAR System (Setup Swap, Transfer and Recall Panel Memory System) – Describes the possible operations of this feature, using the concept of a setup as an instantaneous snapshot of a complete switcher panel, including all button selections, adjustments, positions, and fader values. Setups may be broken down into each of the six major modules on the switcher, with the ability to store or recall them independently into any of eight setup registers. This system also provides the capability of transferring the setup of one M/E to another, or swapping their setups.

Start Codes (System and Video) – 32-bit codes embedded in that coded bit stream that are unique. They are used for several purposes including identifying some of the structures in the coding syntax. Start codes consist of a 24-bit prefix (0x000001) and an 8-bit stream_id.

Start of Active Video (SAV) – Digital data that indicates the start of active video time in serial digital component video systems.

Static Electricity – Whenever your body comes in physical contact with metal parts (including printed circuit boards) of computer equipment there is the potential for you to feel an electrical shock (electro-static discharge or ESD) which could damage the equipment. To prevent this you must

always wear a wrist strap when working with internal parts of a workstation.

Static Memory – Memory devices that do not need clocks or refreshing.

Static Resolution – Detail in a stationary image. Any amount of bandwidth is sufficient for the transmission of HDTV images with high static resolution, even a telephone line; the smaller the bandwidth, the longer it takes to transmit all of the resolution. Therefore, many ATV schemes with reduced bandwidths offer the static resolution of HDEP with limited dynamic resolution, resulting in motion artifacts such as motion surprise.

Statistical Multiplexing – Increases the overall efficiency of a multi-channel digital television transmission multiplex by varying the bit-rate of each of its channels to take only that share of the total multiplex bit-rate it needs at any one time. The share apportioned to each channel is predicted statistically with reference to its current and recent-past demands.

Status – Present condition of the device. Usually indicated by flag flip-flips or special registers. See Flag.

Status Monitor – A B/W video output available as an option on AVC series switchers that provides display of all switcher adjustments, pattern menus, and diagnostic tools.

STB – Set Top Box.

STC (System Time Clock) – The common clock used to encode video and audio in the same program. A 27 MHz clock regenerated from PCR for a jitter-free readout of MPEG data.

STD – System Target Decoder.

STD Input Buffer – A first-in, first-out buffer at the input of a system target decoder for storage of compressed data from elementary streams before decoding.

STE – System Target Error.

STED – System Target Error Deviation.

STEM – System Target Error Mean.

Stderr – Standard error file. Error messages sent by programs are displayed on the screen, which is by default, the Stdout.

Stdin – Standard input file.

Stdout – Standard output file.

Stereo – Sound received from two separate sources. Simulates human hearing.

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

Stereophonic, Stereo – Using two or more channels to create a spatial effect.

Stiction – A term loosely used to describe the phenomenon of tape adhering to transport components such as heads or guides.

Still Picture – A coded still picture consists of a video sequence containing exactly one coded picture which is intra coded. This picture has an associated PTS, and the presentation time of succeeding pictures, if any, is later than that of the still picture by at least two picture periods.

Still Store – Device for storage of specific frames of video.

STL – Studio Transmitter Link.

Storage – See Memory.

Storage Capacity – Using the ITU-R 601 4:2:2 digital coding standard, each picture occupies a large amount of storage space, especially when related to computer storage devices such as DRAM and disks. So much so that the numbers can become confusing unless a few benchmark statistics are remembered. Fortunately, the units of mega, giga, tera, and penta make it easy to express the very large numbers involved. The capacities can all be worked out directly from the 601 standard. Bear in mind that sync words and blanking can be regenerated and added at the output, only the active picture area need be stored.

Store – The action of retaining in memory panel parameters (in the case of switchers), edit decision lists (in the case of editors), frames of video (in the case of machines like AVA, ESS and CGs).

Storyboard – A storyboard is an animator's sketch, or rough of all the keyframes involved in a particular piece of animation. Used as a visual script or shooting plan.

Stow – To reduce a window to an icon for later use. In Windows® it is called "minimize."

Streaking – A term used to describe a picture condition in which objects appear to be extended horizontally beyond their normal boundaries. This will be more apparent at vertical edges of objects when there is a large transition from black to white or white to black. The change in luminance is carried beyond the transition, and may be either negative or positive. For example, if the tonal degradation is an opposite shade to the original figure, (white following black), the streaking is called negative; however, if the shade is the same as the original figure, (white following white), the streaking is called positive. Streaking is usually expressed as short, medium, or long streaking. Long streaking may extend to the right edge of the picture, and in extreme cases of low-frequency distortion, can extend over a whole line interval.

Stream – A collection of digital data of one type; such as a video stream, an audio stream, or a subtitle stream. Each stream, for example an audio stream, may also have channels within it.

Stress Testing – Introducing mechanical, electrical, or thermal stress on electrical devices so as to modify their operation and allow intermittent problems and/or failures to be observed.

STU – Set Top Unit.

Studio Address System – An intercom system that allows communication between control-room personnel and personnel working on the studio floor.

Studio Standard, HDTV – a) Approaches to the specification of a studio standard, HDTV have been in the context of present operations in 525/59.94 and 625/50: i.e., operations in the studio conform to the specifications for transmission and broadcast. The studio standard with its implication of no systems transform, therefore, might be described also as one of the distribution standards – expected to be one of the inputs to display, and to be evaluated by subjective judgment of the display. **b)** As employed by CCIR Rep 801-4 and its annexes, the term studio standard loosely embraces everything from image capture through distribution. To illustrate the interpretation by examples from the document. (a) Sec 1, Introduction:

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A single standard could be beneficial to program producers as well as broadcasting organizations and viewers. (b) Sec 2, Technical Matters: This entire section is concerned with defining the system by reference to the subjective, visual appraisal of the final display. (c) Annex II, entitled Parameter Values for Signal Generation in HDTV Studios and For International Exchange of HDTV Programs. (d) Sec 1e explains that the advantages of a single HDTV worldwide standard includes lower HDTV equipment costs for broadcasters and viewers, easier exchange of programs and technical information, and encouragement to the ideal of international solutions to common technical problems. These concepts of a studio standard accordingly address only a small part of what the SMPTE Committee on Hybrid Technology considers production.

Stuffing (bits); Stuffing (bytes) – Code-words that may be inserted into the compressed bit stream that are discarded in the decoding process. Their purpose is to increase the bit rate of the stream.

STV – Subscription Television.

Sub-Band Coding – A pure sub-band coder performs a set of filtering operations on an image to divide it into spectral components. Usually, the result of the analysis phase is a set of sub-images, each of which represents some region in spatial or spatio-temporal frequency space. For example, in a still image, there might be a small sub-image that represents the low-frequency components of the input picture that is directly viewable as either a minified or blurred copy of the original. To this are added successively higher spectral bands that contain the edge information necessary to reproduce the original sharpness of the original at successively larger scales. As with DCT coder, to which it is related, much of the image energy is concentrated in the lowest frequency band. For equal visual quality, each band need not be represented with the same signal-to-noise ratio; this is the basis for sub-band coder compression. In many coders, some bands are eliminated entirely, and others are often compressed with a vector or lattice quantizer. Successively higher frequency bands are more coarsely quantized, analogous to the truncation of the high-frequency coefficients of the DCT. A sub-band decomposition can be the intraframe coder in a predictive loop, thus minimizing the basic distinctions between DCT-based hybrid coders and their alternatives.

Subcarrier – a) The modulation sidebands of the color subcarrier contain the R-Y and B-Y information. For NTSC, the subcarrier frequency is 3.579545 MHz. For PAL the subcarrier is approximately 4.43 MHz. **b)** An auxiliary information carrier added to the main baseband signal prior to modulation. The most common example in television is the NTSC color subcarrier. Many ATV schemes propose adding additional subcarriers to NTSC. **c)** A sine wave which is imposed on the luminance portion of a video signal and modulated to carry color information. Subcarrier is also used to form burst. The frequency of the subcarrier is 3.58 MHz in NTSC and PAL-M and 4.43 MHz in PAL. **d)** The high-frequency signal used for quadrature amplitude modulation of the color difference signals.

Sub-Channel – A transmission path within the main transmission path. Subcarriers are examples of sub-channels, but there are others. Quadrature modulation of the picture carrier provides a sub-channel; so does blanking stuffing.

Submaster – High quality copy of a master tape used to make additional copies. See also Dub.

Sub-Nyquist Sampling – A scheme for sampling at a frequency lower than that prescribed by the Nyquist sampling theorem.

Sub-Picture Information – Captions, subtitles, or other text that can be displayed or hidden.

Sub-Pixel – A spatial resolution smaller than that of a pixel. Although digital images are composed of pixels, it can be very useful to resolve image detail to smaller than pixel size, i.e., sub-pixel. For example, the data for generating a smooth curve on television needs to be created to a finer accuracy than the pixel grid itself, otherwise the curve will look jagged. Again, when tacking an object in a scene or executing a DVE move, the size and position of the manipulated picture must be calculated, and the picture resolved, to a far finer accuracy than the pixels, otherwise the move will appear jerky.

Subroutine – Self-contained portion of a program that performs a well-defined task. May be used at any place in the same program.

Subsampled – Signal that has been sampled at a lower rate than some other signal in the system. A good example of this is the Y'CbCr color space used in component serial video (ITU-R BT.601). For every two luma (Y') samples, only one Cb and Cr sample is taken causing the Cb and Cr signals to be subsampled.

Sub-Sampling – Sampling within samples. For example, dividing an NTSC pixel into three or four sub-pixels is an example of sub-sampling. Some ATV schemes use such pixel subdivision to transmit a high-definition image over a sequence of multiple fields or frames, with only one sub-pixel being transmitted per field or frame. The resulting potential artifacts include motion surprise and twinkle.

Subsidiary Communications Authorizations – Authorizations granted to FM broadcasters for using subcarriers on their channels for other communications services.

Substrate – A DVD half-disc. Two substrates, each 0.6 mm thick, are bonded together to form a 1.2 mm thick DVD disc.

Subtractive Color System – Color specification system in which primary colors are subtracted from a reference color to achieve a desired color. Examples include the cyan/magenta/yellow (CMY) and luminance/red – luminance/blue – luminance (Y, R-Y, B-Y) systems.

Super – See Title.

Super Black – Keying signal that is embedded within the composite video signal as a level between black and sync. It is used to improve luma self-keying because the video signal contains black, making a good luma self-key hard to implement. Where the downstream keyer detects the super black level, it inserts the second composite video signal. See Blacker-than-Black.

Super NTSC – An ATV scheme proposed by Faroudja. It combines progressive scanning, pre-filtering, pre-combing, image enhancement, and gamma correction at the transmission end with complementary processing and line doubling at the receiver. It is both channel-compatible and receiver-compatible and is one of the few ATV schemes that keep an aspect ratio of 12:9.

Super VHS – S-VHS is an enhancement to regular VHS video tape decks. S-VHS provides better resolution and less noise than VHS. S-VHS video

tape decks support separate luma (Y) and chroma (C) video inputs and outputs, although this is not required. It does, however, improve the quality by not having to continuously merge and then separate the luma and chroma signals.

Superimpose (Super) – To place in front of video, e.g., placing text over a video signal.

Superimposition (or Super) – a) Two images simultaneously picked up by two different cameras and electronically mixed on the face of a kinescope tube in such a manner that both images are visible. **b)** A film term describing the mixing of two or more video sources such that they appear to be overlaid.

Superstation – Local television station whose signal is retransmitted via satellite to cable systems beyond reach of over-the-air signal.

Superuser – An alternate name for the user of the root login account. See also System Administrator.

Sup-Picture – A simple picture intended to be superimposed over the video. Display size varies but is bound to CCIR 601 picture dimensions (720 x 480 for NTSC-rate displays or 720 x 576 for PAL-rate displays).

Supply Turntable – The turntable which feeds tape to the heads of a tape deck.

Surface – A set of one or more patches which have been connected together.

Surface Asperities – Small, projecting imperfections on the surface of the coating that limit and cause variations in head-to-tape contact. A term useful in discussions of friction and modulation noise.

Surface Properties – To allow more realism to 3D models, the surfaces of an object can have distinctive attributes or properties: ambient light, diffuse light, transparency, texture (these four in PictureMaker). Other systems have other properties such as true metallic versus plastic (or other material) surface types.

Surface Treatment – Any process by which the surface smoothness of the tape coating is improved after it has been applied to the base film.

Surge Protector – An electronic device which protects electronic equipment from power fluctuations.

Surround Sound – This usually implies an audio system with more than two channels of information. The additional channels provide “ambiance” or sound information that is happening somewhere other than from the left or right speaker.

S-VHS (Super VHS) – a) An improved version of the VHS tape format capable of recording better picture resolution (definition). A higher-density tape is required which provides a wider luminance bandwidth, resulting in sharper picture quality (>400 horizontal lines vs. 240 for standard VHS) and improved signal-to-noise ratio. Because the equipment is usually smaller and lighter than 3/4" equipment, it is ideally suited for ENG/EFM applications. **b)** Super VHS, a consumer videotape format offering horizontal resolution somewhat greater than that offered by NTSC broadcasting but allowing component recording and playback without cross-luminance or cross-color artifacts through a four-pin S-Video connection.

SVHS, S-VHS – See Super VHS.

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

S-Video (Separated Video) – The standard for the way a signal is carried on the cable itself. The industry has settled on a 4-pin mini plug connector. S-Video does not have any relation to the resolution or refresh rate of the signal. Do not confuse S-Video with S-VHS. S-VHS is a tape/signal standard. S-Video is a hardware standard that defines the physical cable jacks. S-Video allows you to bypass the comb filter in a device. Generally, less processing of the signal results in a better picture. The comb filter separates the chroma (color) and luma (brightness) components of a video signal into separate parts. This is also called Y/C, where Y represents brightness and C color. When color and brightness are not separated, when they are combined in the signal, it is called a composite signal. S-Video cables have separate wires for the color and brightness. That is, they carry a Y/C signal. The best picture comes when the color and brightness is separate from the source. VCRs record this way, and DSS broadcasts this way too. Laserdiscs store a composite picture rather than Y/C separated. Even when the signals have been combined at some point on their way to the monitor, different comb filters perform to different degrees of quality, so one can pick how to connect one's components to try to use the best comb filter. Some older sets with S-Video input jacks may actually combine the Y/C in a crude way, making the S-Video input no better than a typical composite signal. Newer sets do not do this.

Sweep Signal – Line rate and field rate sweep signals can be used to measure the frequency response of a system. In a sweep signal, the frequency of the waveform is continuously increased over the length of the line or field. A sweep signal allows you to examine the frequency response continuously over the interval of interest rather than at only discrete frequency intervals as tested by the multiburst or multiphase signals. The Sweep signal however cannot be used for VITS, thus is limited to out-of-service testing. See the Frequency Response discussion.

Sweetening – a) The final combining and enhancing of a video program's audio tracks. **b)** Electronically improving the quality of an audio or video signal, such as by adding sound effects, laugh tracks, and captions.

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

Switching – a) The process of connecting and routing digital data on a network. **b)** The editing and splicing together of program segments.

Symmetrically, Cyclically, Magnetized Condition – A magnetic material is in this condition when, using the influence of a magnetizing field cycled between equal but opposite values, its successive hysteresis loops coincide.

Symmetry – An adjustment that allows distortion of the aspect ratio of a pattern.

Sync – a) Abbreviation for synchronization. Usually refers to the synchronization pulses necessary to coordinate the operation of several interconnected video components. When the components are properly synchronized, they are said to be “in sync.” **b)** Signals which control the sweep of the electron beam across the face of the display. The horizontal sync, or HSYNC for short, tells the display where to put the picture in the left-to-right dimension, while the vertical sync (VSYNC) tells the display where to

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put the picture from top-to-bottom. **c)** The portion of an encoded video signal which occurs during blanking and is used to synchronize the operation of cameras, monitors, and other equipment. Horizontal sync occurs within the blanking period in each horizontal scanning line, and vertical sync occurs within the vertical blanking period.

Sync Buzz – A noise containing harmonics of 59.94 Hz, heard on television set speakers under certain signal and transmission conditions. One such condition is the transmission of electronically generated characters of high level and resolution greater than can be carried in NTSC. The ringing resulting when those signals hit an NTSC filter causes the television carrier to momentarily disappear. Since the characters are within a television field, the rate of appearance and disappearance is a multiple of the field rate, 59.94 Hz.

Sync Compression – The reduction in amplitude of the sync signal, with respect to the picture signal, occurring between two points of a circuit.

Sync Generator – Circuit that provides sync signals. A sync generator may or may not have genlock capability.

Sync Level – The level of the tips of the synchronizing pulses.

Sync Noise Gate – Circuit used to define an area within the video waveform where the sync stripper is to look for the sync pulse.

Sync Pulse – Timing pulses added to a video signal to keep the entire video process synchronized in time.

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

Sync Stripper – Circuit which removes the sync information from the composite signal.

Sync to Blanking End – Refer to the Horizontal Timing discussion.

Sync to Burst End – Refer to the Horizontal Timing discussion.

Sync to Subcarrier Time Base Error – A random variation in the phase relationship between sync and subcarrier.

Sync Word – A synchronizing bit pattern which is different from the normal bit stream pattern for purposes of synchronization or clocking. Synchronizing words usually consist of unique bit patterns which are easily recognized as a clock or sync signal. Sync words are used for framing in serial receivers.

Synchronization – The maintenance of one operation in step with another. The precise coincidence of two or more sync pulses.

Synchronization Word – **a)** A synchronizing bit pattern differentiated from the normal data bit patterns, used to identify reference points in the television signal; also to facilitate word framing in a serial receiver. **b)** A fixed pattern of bits inserted in a binary message for the purpose of synchronizing the message interpreting unit.

Synchronized – To happen at the same time.

Synchronizer – Device that ensures audio and video signals from varying sources are coordinated by timing them against a reference signal and advancing or delaying them as needed.

Synchronizing Pulse Generator – Equipment that generates synchronizing pulses needed by source equipment. Also called sync generator or SPG.

Synchronous – A transmission procedure by which the bit and character stream are slaved to accurately synchronized clocks, both at the receiving and sending end.

Synchronous Data Streaming – **a)** Streaming of data with timing requirements in the sense that the data and clock can be regenerated at the receiver into a synchronous data stream (i.e., E1, T1). **b)** Streaming of data with timing requirements in the sense that the data within the stream can be played back in synchronization with other kinds of data streams (e.g., audio, video). See Asynchronous Data Streaming, Synchronous Data Streaming.

Synchronous Detection – A demodulation process in which the original signal is recovered by multiplying the modulated signal with the output of a synchronous oscillator locked to the carrier.

Synchronous Motor – A motor with speed controlled by the frequency of the applied voltage.

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

Syndicat des Constructeurs d'Appareils Radio Récepteurs et Téléviseurs (SCART) – A 21-pin connector for European audio/video consumer products. It supports mono/stereo audio, composite video, S-video, and RGB video to be transmitted between equipment.

Syndrome – Initial result of an error checking calculation. Generally, if the syndrome is zero, there is assumed to be no error.

Sysinfo – The program used to retrieve the system identifier of your Silicon Graphic workstation.

System – An organized assembly of equipment, personnel, procedures, and other facilities designed to perform a specific function or set of functions.

System Administration – The tasks associated with setting up, maintaining, and troubleshooting a networked or stand-alone workstation or a network of workstations.

System Administrator – The individual responsible for setting up, maintaining, and troubleshooting a network of workstations. The system administrator uses the root login account to perform most administrative tasks.

System Clock Reference – See SCR.

System Crash – When the operating system fails and the system will not accept keyboard or mouse input.

System Disk – The physical disk that contains the standard operating system software, the software that makes a workstation run.

System Gamma – The overall light-in/light-out characteristic of a television system, from camera through receiver. In an ideal system, the gamma should be one. In practice, it appears to be about 1.4.

System Header – The system header is a data structure that carries information summarizing the system characteristics of the Digital Television Standard multiplexed bit stream.

System Manager – A set of tools that the administrator uses to set up and manage the IRIS. You access the System Manager through the System Toolchest.

System Software – The standard operating system software and tools that come on the system disk and on the tape or DC-ROM that you use in the event of a system crash.

System Target Decoder – See STD.

System Toolchest – The toolchest in the upper left-hand corner of the screen labeled System. You start system tools such as the Workspace and System Manager using its menu.

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T – Tele- or Time.

T Intervals – See the definition of Sine-Squared Pulses.

T Steps – See the definition of Sine-Squared Pulses.

T.120 – A set of specifications for multipoint communications and data sharing for PC platforms. T.120 is based on the H.320 broad-based PB platform standard for Personal Teleconferencing.

T1 – In telecommunications, the paired cable used to transport DS-1 service.

T1Q1.5 – The T1Q1.5 Video Teleconferencing/Video Telephony (VTC/VT) ANSI Subworking Group (SWG) was formed to draft a performance standard for digital video. Important questions were asked, relating to video digital performance characteristics of video teleconferencing/video telephony:

a) Is it possible to measure motion artifacts with VTC/VT digital transport?

b) If it can be done by objective measurements, can they be matched to subjective tests? **c)** Is it possible to correlate the objective measurements of analog and digital performance specification? The VTC/VT Subworking Group's goal is to answer these questions. It has become a first step to the process of constructing the performance standard.

Table – **a)** Collection of data in a form suitable for ready reference, frequently stored in sequential memory locations. **b)** A table is comprised of a number of sub_tables with the same value of table_id.

Table Look-Up – Obtaining a value from a table of values stored in the computer.

Taboos – Empty channel spaces in the frequency allocation table to which broadcast channels cannot be assigned due to potential interference. The most obvious one is the co-channel taboo: two different television or radio stations cannot operate on the same frequency in the same geographical area. Other taboos cover geographical spacing for adjacent channels and for "images" (spurious frequencies akin to aliases) that are caused by reception in existing television sets. The taboos effectively knock out much of the UHF television band, so some ATV proponents wonder whether they might be too strict.

Tachometer – A device which counts the number of revolutions per second of a motor or other rotating device.

Tag – The tag forms the most important part of a cache directory entry. Using the tag, the cache controller determines whether a cache hit or miss occurs. The tag holds the address of the assigned cache line.

Tails Out – A way of winding tape such that the end of the selection is at the outside of the reel.

Take – A cut that takes place on-air. Also, the flip or flip-flop of sources on a preset/program style switcher.

Takeup Reel – The reel on the tape recorder that accumulates the tape as it is recorded or played.

Takeup Turntable – The turntable which takes up the tape after it passes by the heads.

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

Talker – Device that outputs data to a data bus. A ROM is a talker.

Tally – **a)** An indication of all sources that are contributing to a switcher's final output at any given time. **b)** A light which lights up to indicate that the associated push-button has been selected or to indicate that the associated input to the switcher is on-air. **c)** A relay closure to activate a remotely situated lamp, i.e., on top of a camera, to warn the production crew which camera is on-air. Most monitors have tally lights and common practice is to connect them to the switcher tally output so that the director can see which source is on-air.

Tally Lamp – A signal lamp or LED installed on a video camera which informs performers and crew members that the camera is currently live.

Tally Relay – Contacts provided on the switcher to allow users to activate tally lamps on cameras, monitors, and otherwise indicate what sources are on-air.

Tangential Signal-to-Noise Measurement Method – This is one method of measuring a signal's signal-to-noise ratio. It requires a waveform monitor such as the 1780R. Refer to the 1780R operator's manual for a complete description of the signal-to-noise measurement technique.

Tape – A tape with a magnetizable layer on which data can be stored. Usually a workstation's tape is packaged in a cartridge.

Tape Delay – Using magnetic tape as a storage medium for a brief period of time to delay the playback of a signal. Delay time equals the distance between the record and playback heads divided by the tape speed.

Tape Drive – A mechanism for controlling the movement of magnetic tape, commonly used to move magnetic tape past a read head or write head, or to allow automatic rewinding.

Tape Guides – Grooved pins or rollers mounted between and at both sides of the tape head assembly to position the magnetic tape correctly on the head as it is being recorded or played.

Tape Lifters – A system of movable guides that automatically prevents the tape from contacting the recorder's heads during fast forward or rewind modes of operation, thus preventing head wear.

Tape Loop – A length of magnetic tape with the ends joined together to form an endless loop. It makes possible the repetitive playback of a recording without rewinding the tape.

Tape Pack – The form taken by the tape wound on to a reel. A good pack is one that has a uniform wind, has an acceptable E-value and is free from spoking, cinching, and layer-to-layer adhesion.

Tape Player – A unit that is not capable of recording and is used only for playing recorded tapes.

Tape Skew – The deviation of a tape from following a linear path when transported across the heads, causing a time displacement between signals recorded on different tracks and amplitude differences between the outputs from individual tracks owing to variations in azimuth alignment. The

adjectives static and dynamic are used to distinguish between the steady and fluctuating components of tape skew.

Tape Speed – The speed at which tape is transported from feed (supply) to takeup reels during normal recording or reproduction.

Tape Speed Override (TSO) – Allows the editor to manually control the capstan speed of the selected transport + and –10% using the joystick. TSO is especially important when tape machines need to be exactly synchronized before finalizing an edit. If audio monitors for all transports are left up, the edit point on the transport can be selected by listening for the audio echo and adjusting the transport speed until the machines are in exact synchronization.

Tape Transport – The mechanism that extracts magnetic tape from a storage device, moves it across magnetic heads at a controlled speed, and then feeds it into another storage device. Typical storage devices are tape loops, bins, reels, and magazines (cassettes, cartridges). The tape transport is one part of a magnetic tape recorder/reproducer system that normally consists of: magnetic heads, magnetic tape, tape transport, record electronics, and reproduce electronics.

Tape-to-Head Speed – The relative speed of tape and head during normal recording or replay. The tape-to-head speed coincides with the tape speed in conventional longitudinal recording but is considerably greater than the tape speed in systems where the heads are scanned across or along the tape.

Target – A picture monitor displaying ADO video output can be thought of as a window which reveals a finite area of target space.

Target (Menu) – The 2D function that moves or sizes the image on the 2D plane, which is “Target Space.” In 3D systems, Target is used to move an image without perspective and to “fine tune” an effect.

Tariff – Common carrier’s statement describing services it offers and rates it charges.

T-Axis – Time axis of the spatio-temporal spectrum.

TBC – See Time Base Corrector.

TCM – Trellis Coded Modulation.

TCP (Transport Control Protocol) – The major transport protocol in the Internet suite of protocols providing reliable, connection-oriented, full-duplex streams. Uses IP for delivery.

TCP/IP – The standard networking software that is included in the system software.

TDAC (Time Domain Aliasing Cancellation) – A coding technique used in AC-3 audio compression.

TDF – See Telediffusion de France and Time Division Frequency.

TDL (Telecine Decision List) – A list of the edits made in a telecine session which can be loaded into an off-line editor.

TDM – See Time Division Multiplex.

TDMA – Time Division Multiple Access.

TDI (Time and Data Table) – UTC time and date. Used in DVB-SI.

Tear Strength – The force, usually in gm, required to initiate and/or propagate a tear in a specially shaped specimen of tape or base film.

Tearing – A lateral displacement of the video lines due to sync instability. Visually, it appears as though parts of the images have been torn away.

Telecine – A term used to describe a device used to convert film to video. In advanced telecine machines, the movie film is digitally sampled and converted to video, frame by frame in real-time. Frame rate is the biggest problem encountered in film-to-video conversion. Movie film has a frame rate of 18, 24, or 30 fps (frames per second) contrasting with the 30 and 25 fps video frame rates of NTSC and PAL respectively. See Flicker.

Telediffusion de France (TDF) – A proponent of the French proposals.

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

Teletext – A method of transmitting data with a video signal. ITU-R BT.653 lists the major teletext systems used around the world. World System Teletext (WST) is system B; North American Broadcast Teletext Specification (NABTS) is 525-line system C.

TeleText – An information service of 200-700 “pages” covering a wide range of topics including TV Schedules, News, Financial Market prices, Comment, Reviews, Concert and Theater information. Subtitles are typically transmitted on page 888 in the UK, on pages 199/299/399 in Belgium and Holland, on page 150 in Germany, and on page 777 in Italy. There are a number of variant character sets used, but the encoding is identical and all English alphabet characters plus numbers and most punctuation can be handled by any decoder. Includes support for eight colors, and limited block graphics, and selective revealing of underlying TV picture. Transmitted on a variable number of lines (specified in header which contains basic information such as time, date, and channel), starting on line 12 and continuing for 7-8 lines typically. Found on broadcasts and some Laserdiscs; recording of TeleText signals is marginal on S-VHS, almost impossible on VHS, hence, the PAL/625 version of CC.

Television – A combination tuner, RF demodulator, picture tube, and audio speaker that converts RF signal into picture and sound.

Television, Broadcast – Generally refers to terrestrial radiation of television signals in one or more of the frequency bands defined by CCIR (and in the U.S. reaffirmed by the FCC). The U.S. has 59 television channels, each 6 MHz wide, for video plus correlated audio.

Television, Digital (for Studios) – An extensive family of compatible digital coding standards for studio use with current television systems is defined by CCIR Red 601-2, equally applicable to component encoded 525/60 Hz and 625/50 Hz systems. The member of the family to be used for the standard digital interface between main digital studio equipment and for international program exchange (i.e., for the interface with video recording equipment and for the interface with the transmission system) should be that in which the luminance and color-difference sampling frequencies are related in the ratio 4:2:2. Specifications include: **Coded**

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Signals; luminance (Y) plus two color-difference signals (CR and CB).

Sampling Frequency; luminance 13.5 MHz, color-difference 6.75 MHz (for each of the two signals); **Samples (8-bit) per Digital Active Line;** luminance 720, color-difference 360 (for each of CR and CB). Other more detailed specifications are included in CCIR Rec 601-2. Compressed and expanded derivations (4:1:1 and 4:4:4 specifically) are postulated variants with minimum or maximum color information.

Television, Digital Component – A signal format in which either the tri-stimulus value red (R), green (G), and blue (B) signals representing the picture contents or a matrixed version consisting of the luminance (Y) and two color-difference signals (R-Y, L3-Y) – are individually digitized and combined into a single data stream. SMPTE 125M describes a digital component television signal interface for 525-line/59.94 field/sec television systems. Specifications for digital magnetic video tape recording of component digital video of 525-line or 625-line structure sampled at 13.5 MHz are grouped into the D1 VTR standards. For 525-line, samples at 13.5 MHz, the specifications are SMPTE 224M, 225M, 226M, 227M, RP 155, and EG 10. An index to the specifications for D1, both 525-line and 625-line versions, is SMPTE EG 22.

Television, Digital Composite – A signal format in which the signal matrix representing the picture contents consisting of the luminance and the two color-difference signals modulated on a color subcarrier are digitized in the matrixed form as a single data stream. SMPTE 244M describes a digital composite television signal interface for 525-line/59.94 field/sec television systems. Specifications for digital magnetic video tape recording of composite digital video of 525-line or 625-line structure are grouped into the D2 VTR standards. For 525-line, sampled at 14.32 MHz, the specifications are SMPTE 245M, 246M, 247M, 248M, EG 20, and RP 155. An index to the specifications for D2 is SMPTE EG 22.

Television, Digital HDTV – An extensive family of compatible digital coding standards for studio use with high-definition television is under study and test by the SMPTE Committee on Television Signal Technology (S17). Digital representation of the 1125/60 system is documented in SMPTE 260M.

Television, Enhanced (ETV or EDTV) – The term “enhanced television” designates a number of different improvements applicable to 525/60 Hz and 625/50 Hz television systems. They include all television systems not specified in CCIR Report 624-4, Characteristics of Television Systems and Report 801-4, The Present State of High-Definition Television, either with unchanged or new radiation standards and without specification of aspect ratio.

Television, High-Definition (HDTV) – A high-definition television system is a system designed to allow viewing at about three times the picture height, such that the system is virtually, or nearly, transparent to the quality of portrayal that would have been perceived in the original scene or performance by a discerning viewer with normal visual acuity. Such factors include improved motion portrayal and improved perception of depth. A high-definition system generally implies in comparison with conventional television systems: spatial resolution in the vertical and horizontal directions of about twice that available in CCIR Red 601-2; any worthwhile improvements in temporal resolution beyond that achievable with CCIR Red

601-2; improved color rendition; a wider aspect ratio; multichannel high-fidelity sound.

Temporal – Relating to time.

Temporal Aliasing – a) A visual defect that occurs when the image being sampled moves too fast for the sampling rate. A common example is wagon wheels that appear to rotate backwards. **b)** An alias caused by violation of the Nyquist limit on sampling in time with frames.

Temporal Resolution – The finest moments of time that can be perceived in a particular system. It is not the same as dynamic resolution, which is spatial resolution when an image is changing. As an example, suppose a spoked wheel is turning. If the spokes are a blur when the wheel is not turning, the system has poor static resolution; if they are clear, it has good static resolution (for the spokes). If they are a blur when the wheel is turning, the system has poor dynamic resolution and poor temporal resolution. If they are clear when the wheel is turning, the system has good dynamic resolution. If, though clear, they appear to be stationary, or turning in the wrong direction, or turning at the wrong speed, or flashing rapidly in different positions so it is impossible to tell which way or at what speed they are turning (a temporal blur), the system has poor temporal resolution. A great deal of evidence indicates that the human visual system cannot simultaneously perceive high spatial resolution and high temporal resolution.

Temporal Scalability – A type of scalability where an enhancement layer also uses predictions from pel data derived from a lower layer using motion vectors. The layers have identical frame rates size, and chroma formats, but can have different frame rates.

Terabyte – 1 trillion bytes. A 2-hour HDTV movie at the maximum resolution of 1920 x 1084 would take about 1 terabyte to store in an uncompressed format.

Terminal – A computer interface comprised of a monitor, keyboard, and usually some memory.

Termination – In order to accurately send a signal through a transmission line, there must be an impedance at the end which matches the impedance of the source and the line itself. Amplitude errors and reflections will otherwise result. Video is a 75-ohm system, so a 75-ohm terminator must be put at the end of the signal path.

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

Terrestrial Transmission Standards –

Code	Frames	Scan Lines	Frequency Band	Sound Offset	In Use
Terrestrial Transmission Standards					
A	25	405	VHF	–3.5 MHz	No
B	25	625	VHF	+5.5 MHz	Yes
C	25	625	VHF	+5.5 MHz	Yes
D	25	625	VHF	+6.5 MHz	Yes
E	25	819	VHF	+11 MHz	No
F	25	819	VHF	+5.5 MHz	No
G	25	625	UHF	+5.5 MHz	Yes
H	25	625	UHF	+5.5 MHz	Yes
I	25	625	UHF	+6.0 MHz	Yes
K	25	625	UHF	+6.5 MHz	Yes
KI	25	625	UHF	+6.5 MHz	Yes
L	25	625	UHF	+6.5 MHz	Yes
M	30	525	VHF/UHF	+4.5 MHz	Yes
N	25	625	VHF/UHF	+4.5 MHz	Yes
Satellite Transmission Standards					
Ku-Band	Any	Any	~11 GHz	+6.50 MHz	Yes
C-Band	Any	Any	~4 GHz	+6.50 MHz	Yes

Tessellated Sync – European designation for serrated sync.

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

Test Signal Generators – These instruments provide a variety of known test and synchronization signals for the characterization of television systems.

TEV – Target Error Vector.

Text Box – Used to enter text.

Text Mode – A graphics adapter mode where only the characters of a certain character set can be displayed on the monitor. The pixels cannot be addressed individually and are generated by a hardware character generator.

Texture Map – A texture map is a 2D image that can be created with a paint program such as AVA3 or TIPS, or scanned into a frame buffer from a video source, and then mapped onto the surface of a 3D object. ADO effects are a simple, real-time, on-line version of this general process.

Texture Mapping – Texture mapping is made possible by full color mode. Texture mapping refers to the process of covering the surface of a polygon with values that come from a “texture” that come from some picture stored elsewhere in the system, say a scanned in image.

TGA – The TARGA file format (TGA) and TARGA board were developed for graphics prior to the advent of large-screen, super VGA displays.

THD – Total Harmonic Distortion.

Thomson – Major French electronics firm that recently purchased GE/RCA Consumer Electronics and previously purchased German consumer electronics interests, the latter sometimes referred to as International Thomson. Through its GE/RCA holdings, Thomson is a proponent of the ACTV ATV schemes; through International Thomson, it has proposed progressive schemes. Thomson also sells television production equipment and for a time owned the production equipment branch of CBS Laboratories, then called Thomson-CSF Laboratories.

Three-Wire Interconnect – Interconnect consisting of three wires. One wire transports luminance while the other two wires each transport a color-difference signal. This system is commonly used for connecting equipment in a “component facility” because it is more compatible with non-VTR video sources, time-base correctors, displays, and monitoring equipment.

Three-State – Logic device whose output can be placed into a high-impedance (off) state, in addition to the usual high and low states. This feature allows more than one device output to be connected to the same logic node. Three-state operation is a fundamental requirement for devices used on microprocessor data buses. Same as Tri-State (registered trademark).

Threshold of Feeling – The sound pressure level at which people feel discomfort 50% of the time. Approximately 118 dB SPL at 1 kHz.

Threshold of Hearing – The sound pressure level at which people hear only 50% of the time. Approximately 0 dB SPL at 1 kHz.

Threshold of Pain – The sound pressure level at which people feel actual pain 50% of the time. Approximately 140 dB SPL at 1 kHz.

Throughput – Speed with which problems or segments of problems are performed. Throughput will vary from application to another.

Thumbscrew – The ridged knob attached to a screw in a cable connector that you turn to secure the connector to an outlet.

Thunk – Thunk refers to the byte-shuffling that occurs when 32-bit code must communicate with 16-bit code.

TIF – A file format (tagged image format file) preferred over the bitmap (BMP) file format for Windows applications. TIF files may be compressed or uncompressed and contain a header similar to BMP files. A special version of TIF is used for compressed data FAX transmission.

TIFF (Tag Image File Format) – The standard file format for high-resolution bit-mapped graphics, especially from scanners.

TIFF-EP (Tag Image File Format for Electronic Photography) – A version of TIFF file format used by Kodak digital cameras to store non-image data with many different types of image data.

Tilt – Term used for camera movement in an up and down mode.

Timbre – The harmonic content of a tone and the relative intensities of the different harmonics.

Time and Control Code – a) SMPTE 12M – A digital code recorded by video and audio magnetic tape recorders, identifying each frame with a unique and complete address. Unassigned bits permit limited production identification. The time and control code was developed for 525-line/60-field systems. An international version compatible with SMPTE 12M is described in IEC Publication 461. Variants have evolved for 24- and 25-

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frame systems. **b) Cinematography** – A digital code format applicable to motion-picture film at 24, 25, or 30 frames/sec. Two types are described: Type C, a continuous code very similar to SMPTE 12M and IEC Publication 461 to be read from continuously moving film, and Type B, a non-continuous block-type code for intermittently moving film, but still decodable with the same type of electronic equipment used to read Type C.

Time Base Corrector (TBC) – a) Device used to correct for time base errors and stabilize the timing of the video output from a tape machine. Machines like VHS players where a single pass of the video head represents many video lines are particularly susceptible to tape stretch, jitter, and speed variations which cause some recorded video lines to be shorter or longer than others. The TBC acts as a “rubber-band” storage device to line up each horizontal line at its proper location allowing for synchronous playback. **b)** A device used to rectify any problems with a video signal's sync pulses by generating a new clean time base and synchronizing any other incoming video to this reference. The Digital Video Mixer includes two infinite window, full field TBCs.

Time Code – a) A digital code number recorded onto a videotape for editing purposes. When decoded, the time code identifies every frame of a videotape using digits reading hours:minutes:seconds and frames. Each individual video frame is assigned a unique address, a must for accurate editing. The three time code systems used for video are VITC, LTC, and RC (consumer). **b)** Electronically generated digital clock information which is recorded onto tapes on a special track such that an editor can accurately locate individual frames (fields) of video information for editing purposes. The SMPTE standard for encoding time in hours, minutes, seconds, and frames and video.

Time Code Generator – Signal generator designed to generate and transmit SMPTE time code.

Time Compressed Video-On-Demand – The ideas of electronic video rental could be realized through the techniques of time compression: video data compression is used for “less than real time” delivery of video/audio as opposed to real-time, compressed video in “normal” distribution applications.

Time Compression – A technique used in many ATV schemes (including all of the MACs) for squeezing a signal of a certain duration into a time period of lesser duration. This effectively multiplies the bandwidth of the original signal by the compression factor. If the higher bandwidth is not available, horizontal resolution is lost. Time compression is most frequently used for color components (which can often afford the resolution loss due to restricted visual acuity) and for widescreen panels (with the resolution loss made up via some sub-channel).

Time Division Frequency (TDF) – The management of multiple signals by transmitting or receiving each on its own assigned frequency.

Time Division Multiplex (TDM) – The management of multiple signals on one channel by alternately sending portions of each signal and assigning each portion to particular blocks of time.

Time Domain – Information that is a direct function of time. An oscilloscope displays information in the time domain.

Time Line – The graphical interface used by most nonlinear editing software. You simply drag and drop your clips onto the time line then your transitions, effects, filters, and titles.

Time Multiplex – In the case of CCIR-601, a technique for transmitting three signals at the same time on a group of parallel wires (parallel cable). See also Multiplex.

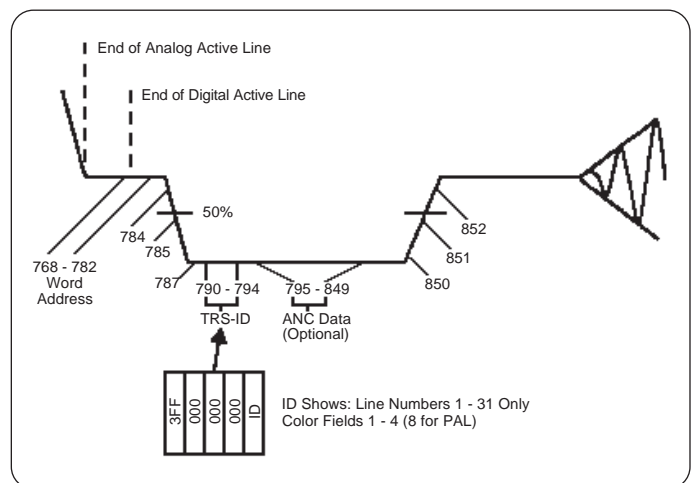
Time Stamp – A term that indicates the time of a specific action such as the arrival of a byte or the presentation of a presentation unit.

Timeline (Menu) – The time function that performs (runs) the keyframes of an effect in sequence and enables the timing of the effect to be modified.

Timing Reference Mark – The 50% point on the leading edge of the horizontal sync pulse. In an RGB system, the green signal's horizontal sync pulse is used. In color-difference formats, the Y signal's horizontal sync pulse is used.

Timing Reference Signal Identification (TRS-ID) – A four-word reference used to maintain timing in serial composite digital systems.

Timing Reference Signals (TRS) – A four-word reference signal used in serial composite digital systems to synchronize the conversion of serial data back to parallel.



Title – A caption or super is a graphic, usually text, from a character generator i.e., chyron, 3M, or from a title camera (black/white high resolution camera).

Title Bar – Located at the top of the application window, it contains the name of the application and sometimes the name of the open file.

Title Key – A key effect which imposes a caption over a background scene. The source of the title key signal may be a character generator or a graphics camera.

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

image during shooting. The Video TitleMaker 2000 is a powerful tool for titling.

TMC (Time Multiplex Component) – An old CBS ATV proposal for delivery via two NTSC-capable DBS channels. One channel would carry a MAC signal of NTSC characteristics; the other would carry additional vertical resolution and widescreen panels. This was the first system to prove that widescreen seams could be rendered invisible.

To Source – Video source that is supplying the video and/or audio that is being cut, dissolved, or wipe to.

Toe – On the characteristic curve for a photographic material (the plot of density vs. log exposure), that portion representing nonlinear response at the lower densities. For electronic image, relationship to photographic negatives or positives.

Toggle – Switch back and forth from one state or value to another (i.e., on, off, on, off, etc.) by alternately opening and closing an electric circuit.

Tolerance – The allowable deviation from the stated nominal width or length.

Tool – A graphic entity on the screen which is not an object.

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

Toshiba – One of the first television set manufacturers to demonstrate an IDTV set. Also a proponent of a widescreen ATV system using high-frequency subcarriers to carry the side panels in a receiver-compatible, channel-compatible signal.

TOT (Time Offset Table) – UTC time and date with indication of local time offset.

Total Thickness – Normally, the sum of the thicknesses of the base film and the magnetic coating. The total thickness governs the length of tape that can be wound on a given reel.

Touchscreen – Term used for a special type of machine controller which has a matrix of photovoltaic transmitters and receivers across the face of a monitor such that placing a finger on the desired point of the screen intersects this light matrix and automatically activates the corresponding switch.

TOV – Threshold of Visibility.

TPS – Transmission Parameter Signaling.

Tracer – See Current Tracer.

Track – An area of tape surface that coincides with the location of the recorded magnetization produced by one record gap.

Track Spacing – The distance between the center lines of adjacent tracks.

Track Width – The width of the track corresponding to a given record gap.

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

Tracking Shot – A shot containing camera movement.

Trailing Edge – The place on the record head where the recording actually takes place.

Training Signal – A Philips-proposed signal to be used in a two-channel ATV transmission scheme that would alert the receiver to flaws that may have been introduced in the transmission of the second channel so that it can compensate for them.

Trajectory – A curve using a set of control points to interpolate in-between points.

TRANS – Transition.

Transcoder – Device that converts one component format to another, e.g., to convert (Y, R-Y, B-Y) signals to (RGB) signals.

Transducer – A device which converts energy from one medium to another.

Transfer Function – A complex function of frequency response (and correlated levels) relating the output to the input of the device as a function of frequency. A mathematical, graphical, tabular statement of the influence which a module has on a signal or action compared at input and at output terminals.

Transfer Function, Electro-Optic – a) Display – The relationship between the video signal supplied to a display device and the luminance of the resulting image produced by that display device. **b) Recorder, Film** – The relationship between the video signal supplied to the recorder and the resultant illuminance exposing the film.

Transfer Function, Monitor Electro-Optic – The relationship between video input to the monitor and the luminance of the CRT. Monitors are required to conform to a narrower range of performance specifications than is expected of commercial receivers. Confirming these tighter tolerances requires attention to measurement details since, for example, the luminance may vary if different areas of the tube face are selected. Light output is routinely measured in the center of large, uniform “patches” or windows. Since there is significant “bleeding” of light within a CRT face, the monitor transfer function also decreases with decreasing size of the windows (it is thus reduced for fine detail) and with increasing video level of the raster surrounding the windows.

Transfer Function, Opto-Electronic – The relationship between scene luminances and the corresponding video signal. There may be several opto-electronic transfer functions for a single system, depending upon where in the progression of possible nonlinear processing, bandlimiting, etc., the video signal is being identified. When referred to the camera output before bandlimiting and processing, however, it is essentially a linear function.

Transfer Manager – A tool that you access through the System Toolchest used to copy files to and from local and remote tapes or disks.

Transform Coding – a) A method of encoding a picture by dividing each picture into sub-pictures, performing a linear transformation on each sub-picture and then quantizing and coding the resulting coefficients. **b)** The conversion of a signal from one domain to another, e.g., the conversion of two-dimensional picture samples into the frequency domain by means of DCT, which is used in MPEG.

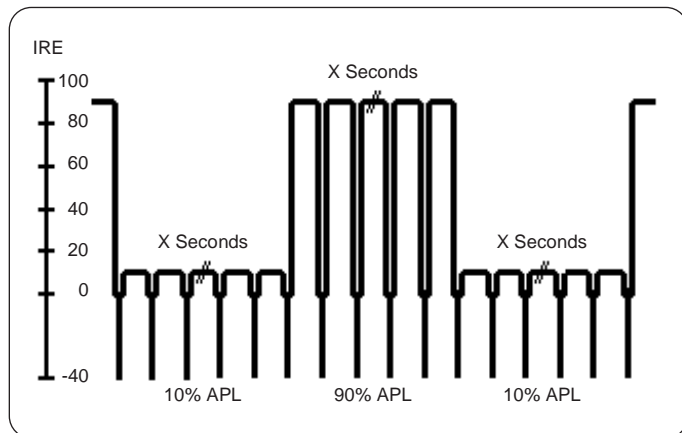
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Transform, Systems – Electronic production requires that images originating in a multiplicity of systems and formats be made compatible in post-production for image processing. The necessary transforms may include temporal, spatial, resolution, colorimetry, etc.

Transformation – Refers to geometric motion or change to an object's orientation (i.e., translate, rotate, scale).

Transient Gain Distortions – Transient gain distortion, also referred to as transient nonlinearity, is present when abrupt changes in APL temporarily affect signal amplitudes. The error is defined as the maximum transient departure in amplitude of a sync pulse from the amplitude it had before the change to the amplitude after the change. Measurement of transient gain distortions is done as an out-of-service test and should be checked for transitions of low-to-high APL and high-to-low APL. If the transient gain distortion only affects the sync pulse and then not so severely as to cause the sync to be unusable, then the viewable picture would not be affected. However if the sync pulse is affected, the rest of the picture is also normally affected; when transient gain distortions affect the picture, it appears as abnormal transient brightness effects. A test signal generator capable of producing a “bouncing” flat-field signal is used to test for transient gain distortions. A typical signal is shown below. The time between bounces (APL level changes) must be longer than the transient effects so that all the transient effects can be viewed before the next APL change occurs.



Transient Nonlinearity – See the discussion on transient gain distortion.

Transients – Signals which endure for a brief time. These may include overshoots, damped sinusoidal waves, etc., and, therefore, additional qualifying information is necessary.

Transition – **a)** A change from one picture to another. Any mix, wipe, cut, non-additive mix, or introduction of a key. **b)** The moving of a fader arm or initiating an “auto transition” to accomplish any of the above effects.

Transition Mode – Exclusively on the AVC series, an operator may choose automatic transitions that are not linear, that is that do not have the same rate as they progress. One may choose logarithmic, starting rapidly and finishing slowly; exponential, starting slowly and finishing rapidly; or sinusoidal, starting and finishing slowly but fast in the middle.

Transition Rate – The duration of an automatic transition from one bus to the other is defined as the transition rate. The transition rate may be applied to a mix, wipe or E key, and is operator-selectable from 0 to 9.9 seconds.

Translate – To move an object without rotation in a straight line, either left or right, up or down, in or out, or any combination thereof, in three-dimensional space.

Translating – The process for converting one color difference signal format to another. See the discussion on Matrix.

Translational Extrusion – In translational extrusion, the silhouette follows a linear path.

Translator – Broadcast station that rebroadcasts signals of other stations without originating its own programming.

Transmission – **a)** The electrical transfer of a signal, message, or other form of intelligence from one location to another. **b)** The transfer of a video waveform from point to point by conductive cable or fiber.

Transmission Aperture – A number used to compare the amounts of light passed through optical systems, such as camera lenses. Transmission aperture takes into consideration both the f-stop (geometric aperture) and the amount of light absorbed or reflected in the optical system.

Transmission Standard – A standard to be used for transmitting signals to the home, not necessarily for producing them. The scanning structure of NTSC is identical for both production and transmission, but this need not be the case in ATV schemes. For example, an HDEP standard of 1125 scanning lines might be used with a transmission standard of 1050 lines. Standards converters translate one standard into another.

Transparency – **a)** Defines the amount of incident light that passes through a surface. Both ambient and diffuse light falling on a transparent polygon are transmitted through the polygon, but highlights are not. In paint systems, a similar property called “opacity” determines how opaque the paint loaded on the artist’s brush really is. **b)** Full-color mode makes it possible for a polygon to be translucent by assigning a transparency between 0% and 100% (0 = opaque, 100 = fully transparent). To implement transparency, we assume that a semi-transparent polygon covers only a fraction of each pixel which it covers. The final pixel’s value is a blend of the background and the polygon. Again, color maps have too few colors to do this. **c)** A feature in Indeo Video interactive codec in which software emulates chroma keying, allowing foreground video objects to be composited dynamically over a different background, a bitmap or possibly even another video. See Chroma Key.

Transparency Frame – In the transparency technique first-frame analysis, the first frame of the video file. It contains no video data, but merely supplies the color or range of colors to be rendered as transparent. See First-Frame Analysis, Transparency.

Transponder – Satellite transmitter/receiver that picks up signals transmitted from earth, translates them into new frequencies and amplifies them before retransmitting them back to ground.

Transport – Term used for any machine using motors usually meaning a VTR, DTR, or video disk.

Transport Stream – A multiplex of several program streams that are carried in packets. Demultiplexing is achieved by different packet IDs (PIDs). See PSI, PAT, PMT, and PCR.

Transport Stream Packet Header – The leading fields in a transport stream packet up to and including the continuity_counter field.

transport_stream_id – A unique identifier of a TS within an original network.

Transportation – The delivery in physical form of a program prepared for distribution. The completed program may be in the form of a tape recording, a film print, an optical disc, etc.

Transverse – Across the width of the tape.

Trellis Coding – Trellis coding is a source coding technique that has resulted in numerous publications and some very effective source codes. Unfortunately, the computational burden of these codes is tremendous and grows exponentially with the encoding rate. A trellis is a transition diagram, that takes time into account, for a finite state machine. Populating a trellis means specifying output symbols for each branch, specifying an initial state yields a set of allowable output sequences. A trellis coder is defined as follows: given a trellis populated with symbols from an output alphabet and an input sequence x of length n , a trellis coder outputs the sequence of bits corresponding to the output sequence x that maximizes the SNR of the encoding.

Trellis Diagram – The time sequence of the bits (DVB-S) is predefined by convolutional coding and, like the state diagram of a finite automaton, is represented as a trellis diagram.

Triad – Three colored phosphor dots on the faceplate of a tri-color CRT. Some tri-color CRTs use vertical stripes of different color phosphors or vertically oriented oblong dots. These dots or stripes are the ultimate determinants of maximum horizontal resolution. When the dots are round, they are also the maximum determinants of vertical resolution. The finer the dot pitch, the higher the resolution, since it is not possible to reduce the size of a black-and-white pixel below the size of one triad. Triad spacing also cannot be optimized for all numbers of scanning lines. Thus, a tube optimized for 1125 scanning lines will not yield optimum performance with a signal of 1050 scanning lines, or vice versa. Neither black-and-white CRTs nor the three single-color CRTs used in most projection TV sets suffer from these limitations as their faceplates are uniformly covered with a layer of phosphor; resolution is ultimately determined by the size of the electron beam and the projection optics. Picture tubes with striped apertures can deal effectively with multiple scanning rates, but still restrict horizontal resolution to the width of three stripes.

Trigger – Slang term for the button on the video camera or camcorder that, when depressed, sends a signal to the videotape recorder to begin or stop recording.

Trim – **a)** To add or subtract from and EDK time or switcher sequence duration. **b)** To perform some minor adjustment or X, Y, or Z axis on ADO or switcher effects.

Trim Curves – Curves that define holes on or parts cut away from a surface; they are linked to the surface.

Tripod – A three-legged video camera or camcorder mounting device that provides steady, tireless service.

Tripod Dolly – A combination tripod and dolly.

Tri-Scan – Term for the technique of sub-sampling each NTSC pixel into three sub-pixels used in the HD-NTSC ATV scheme.

Tristimulus Values – **a)** Amounts of the three reference color stimuli in a given trichromatic system required to match the color of the stimulus considered. Note: In the CIE standard colorimetric systems, the tristimulus values are represented by the symbols X, Y, Z and X_{\sim} , Y_n , Z_n . **b)** The amounts of the three reference or matching stimuli required to give a match with the light considered in a given trichromatic system.

Troubleshoot – To seek the cause of a malfunction or erroneous program behavior in order to remove the malfunction.

Troubleshooting Tree – Flow diagram consisting of tests and measurements used to diagnose and locate faults in a product.

TRS – See Timing Reference Signals.

TRS-ID – See Timing Reference Signal Identification.

TRT (Total Running Time) – Usually expressed in hr:min:sec:frames or min:sec:frames.

Truck – Term used for a type of camera movement where the camera actually moves left to right (or vice versa) across a scene.

True Color – An image in which each pixel is individually represented using three color components, such as RGB or Y'CbCr. The color components of each pixel may be independently modified.

True NTSC – A concept of an idealized NTSC that is identical throughout the NTSC world. Unfortunately, the NTSC standards are loose enough to allow various sub-channel schemes, though these schemes may be mutually incompatible. It is possible that some years from now an NTSC television set designed for one form of enhanced NTSC may be receiver-incompatible with transmission of another form of enhanced NTSC.

Truncation – **a)** Deletion of lower significant bits on a digital system. Usually results in digital noise. **b)** Shortening the word length of a sample or coefficient by removing low-order bits. **c)** To terminate a computational process in accordance with some rule. For example, when digital mixing or other operations create extra bits per sample (such as 16 bits from multiplication of two 8-bit samples), it is usually necessary at some point to truncate (or round) the result back to the original bit length, and to apply some rule to the correction of the part retained. Various rules have been introduced for how this may be done with digital video images for the least noticeable result.

TS – Transport Stream.

TS Header – The first four bytes of each TS packet contain the data (PID) required for the demultiplexer in addition to the sync byte (0x47). These bytes are not encoded.

TSB – Telecommunication Standardization Bureau.

TSDT – Transport Stream Description Table.

T-STD (Transport Stream System Target Decoder) – A decoder having a certain amount of buffer memory assumed to be present by an encoder.

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TTL (Transistor Transistor Logic) – Family of digital integrated circuits that have bipolar transistor inputs and outputs.

TTY – Teletype.

Tuner – An element of a television set that allows the user to select specific signals and frequencies (channels) to be shown on the picture tube and played through the speaker.

TV Lines – Measure of resolution. A TV line is either black or white, so two TV lines (one black and one white) form one cycle of spatial resolution. TV lines are often confused with scanning lines. For vertical resolution, scanning lines multiplied by the Kell factor (and, when appropriate, by the interlace coefficient) yield TV lines.

TWAIN – A scan-control program that pops up within an application to allow for the adjustment of brightness, contrast, etc.

Twinkle – A sparkling effect that can be caused by sub-sampling, since the finest detail is transmitted at a rate below the flicker frequency (and sometimes even below the fusion frequency).

Twitter – A flickering of fine horizontal edges caused by interlaced scanning. A fine line appearing in only one field is presented below the flicker frequency; therefore, it flickers. Twitter is eliminated in line doubling schemes that change from interlaced to progressive scanning, as most of the IDTV schemes do. Interestingly, twitter was much less of a problem in

the early days of NTSC, than it is today, because early cameras and displays didn't have sufficient detail to confine an edge to one scanning line.

Two-Wire Interconnect – Interconnect consisting of two wires. One wire transports the luminance signal while the other transports the multiplexed chrominance signals. This system allows efficient dubbing between recorders because recorders normally record the luminance on one tape channel and the two color difference signal on a single channel. To record the two-color difference signals on a single channel, the two-color difference signals are compressed and then multiplexed together. Transferring the two video signals between tape recorders in the two-wire format prevents the two tape recorders from having to do additional signal processing.

Two's Complement Numbers – Numbering system commonly used to represent both positive and negative numbers. The positive numbers in two's complement representation are identical to the positive numbers in standard binary. However, the Two's complement representation of a negative number is the complement of the absolute binary value plus 1. Note that the eighth or most significant bit indicates the sign: 0 = plus, 1 = minus.

Two-Track Recording – On 1/4" wide tape, the arrangement by which only two channels of sound may be recorded, either as a stereo pair in one direction or as separate monophonic tracks (usually in opposite directions).

▶ U

U – The B-Y signal after a weighting factor of 0.493 has been applied. The weighting is necessary to reduce peak modulation in the composite signal.

UART (Universal Asynchronous Receiver Transmitter) – a) A serial to parallel and parallel to serial converter. **b)** A serial interface which serializes parallel data and inserts start, stop, and parity bits. It may also change a serial data stream into parallel bits or bytes and separate start, stop, and parity bits.

US – Upstream Channel.

UDF Bridge – A “bridge” ties several specifications together. In DVD, bridges are drawn to UDF, MPEG-2, and Dolby C-3.

UDP (User Datagram Protocol) – A transport protocol in the Internet suite of protocols. UDP, like TCP, uses IP for delivery; however, unlike TCP, UDP provides for exchange of datagrams without acknowledgements or guaranteed delivery.

UDTV (Ultra Definition TV) – UDTV with a 2,000-line (or more) display is being contemplated in Japan. The ideas underline the importance of scalability in future broadcast technology, and suggest that rigid standards will only have a limited life span. The MPEG-2 syntax would support the level of resolution found in UDTV, but actual tests of conformance at this resolution are not planned so far. In addition, a question of interoperability with other digital TV services will also have to be investigated.

UHF – See Ultra High Frequency.

UI – Unit Interval.

Ultimate Tensile Strength – The force per unit cross-sectional area required to break a tape or length of base film, usually given in pounds per square inch (psi). Ultimate tensile strength is also quoted in terms of pounds per tape sample of given width and base thickness.

Ultra High Frequency (UHF) – The frequency band (300 MHz to 3,000 MHz). In television, UHF refers to a subset of that band, the range from 470 MHz to 890 MHz, once allocated to TV channels 14 through 83. Demands of other transmission services (such as police radios) have eaten into both the lower and the upper reaches of the UHF TV allocations. Taboos eliminate still more channels. Nevertheless, the UHF TV band is seen by many ATV proponents as the most likely place to situate receiver-incompatible and augmentation ATV channels.

Ultra SCSI (Ultra Wide SCSI) – Currently, the newest and best kind of drives for DV. New technology makes these drives better than AV optimized.

Unbalanced Line – A line using two conductors to carry a signal, where one of the conductors is connected to ground.

Underscan – Most televisions use overscanning, resulting in some of the video being lost beyond the edges of the screen. Underscanning modifies the video timing so that the entire video signal appears in a rectangle centered on the television screen with a black border. The resolutions for square-pixel underscan and overscan images are:

NTSC overscan: 640 x 480	PAL overscan: 768 x 576
NTSC underscan: 512 x 384	PAL underscan: 640 x 480

UNI (Ente Nazionale Italiano di Unificazione) – Italian standardization body.

Unidirectional – a) A pickup pattern which is more sensitive to sounds arriving from one direction than from any other. **b)** Wire or group of wires in which data flows in only one direction. Each device connected to a unidirectional bus is either a transmitter, or a receiver, but not both.

Unidirectional Mike – A microphone which picks up signals primarily from one direction and discriminates against or rejects sounds arriving from other directions.

Unidirectional Prediction – A form of compression in which the codec uses information only from frames that have already been decompressed. Compare Bidirectional Prediction.

Uniform B-Spline – A curve that rarely passes through its control point. Usually very smooth and may be controlled locally without generating breakpoints (cusps).

Uniformity – The extent to which the output remains free from variations in amplitude. Uniformity is usually specified in terms of the positive and negative deviations from the average output within a roll, and in terms of the deviations in the average outputs between one roll and another. Uniformity is normally quoted in percent or dB.

Uni-Key – A dedicated ISO keyer on the Vista switcher for use of a digital effects unit or character generator.

Universal Label (UL) – A mechanism defined in SMPTE 298M used to identify the type and encoding of data within a general purpose data stream or file.

Universal Label Code – A code in the Universal Label created by concatenating the first two sub-identifiers for ISO and ORG. For the SMPTE UL, this field must be “2B” in hexadecimal (hex) notation (0x2B).

Universal Label Data Key – The 16-byte Universal Label that identifies the data being represented. Equivalent to “descriptor” in the terminology of MPEG-7 requirements.

Universal Label Header – The first three octets of a Universal Label containing information unique to the label.

Unmodulated – When used to describe television test signals, this term refers to pulses and pedestals which do not have high-frequency chrominance information added to them.

Unmount – To make a file system that is accessible from a specific directory on a workstation temporarily inaccessible.

UNO-CDR – Universal Networked Object-Common Data Representative.

UNO-RPC – Universal Networked Object-Remote Procedure Call.

Up-Down Buttons – The replacement for potentiometers on AVC switchers. These allow three speeds of adjustment and may be assigned to any module. They offer a more compact package, and eliminate the problem of recalling an event that has different settings than the physical pots may have.

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Upgrade – Hardware that you add to the basic hardware that increases performance, such as additional memory (SIMMs) or faster graphics boards.

Uplink – The carrier used by Earth stations to transmit information to a satellite.

Upscaling – The process of creating extra data from an incoming video stream to increase the image size by interpolating or replicating data before placing it into memory.

Upstream – 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. A module or effect whose video priority is lower, or underneath subsequent modules or effects is said to be upstream.

USB – Universal Serial Bus.

User Bits – Bits in a time code sequence that are user definable; i.e., to give the sequence a name or to add the date, etc.

User Data – All data above the channel layer. That includes video, audio, systems packet overhead, sub-pictures, navigation data, DSI packets, and file management data. The DVD reference data rate is specified as 11.08 Mb/s.

User ID – A number that uniquely identifies a user to the system.

UTC (Universal Time, Coordinated) – Greenwich meantime.

Utilities – Auxiliary functions or operations.

▶ **V**

V – The R-Y signal after a weighting factor of 0.877 has been applied. The weighting is necessary to reduce peak modulation in the composite signal.

VADIS – Video-Audio Digital Interactive System.

Valid Signal – A video signal that will remain legal when translated to any other format. A valid signal is always legal, but a legal signal is not necessarily valid. Signals that are not valid will be processed without problems in their current format, but problems may be encountered if the signal is translated to a new format.

Value – **a)** The amount of black mixed into pigment. **b)** The instance of information described by the UL Data Key.

Vaporware – Software or hardware that is talked about, but may never actually appear.

Variable Bit Rate (VBR) – Operation where the bit rate changes with time during the decoding of a compressed bit stream. Although variable bit rate is acceptable for plain linear playback, one important consideration not to use variable bit rate is that reasonably quick random access becomes nearly impossible. There is no table of contents or index in MPEG. The only tool the play back system has for approximating the correct byte position is the requested play back time stamp and the bit rate of the MPEG stream. MPEG streams do not encode their play back time. To approximate an intermediate position in a variable bit rate stream, the play back system must grope around near the end of the stream to calculate the playback time, and assume the stream is approximately constant bit rate. The groping around for the correct position can take several seconds. This is not appropriate for an interactive presentation or game. This groping around is, at least, annoying when trying to view a portion of a movie but it is not even possible for video streams because there are no time stamps (the SMPTE. time codes in video streams need not be continuous or unique). Audio streams are always fixed bit rate.

Variable Length Coding – A reversible procedure for coding that assigns shorter code-words to frequent events and longer code-words to less frequent events.

VAU (Video Access Unit) – One compressed picture in a program stream.

VBI – See Vertical Blanking Interval.

VBR – See Variable Bit Rate.

VBV – See Video Buffering Verifier.

VCI – Virtual Channel Identifier.

VCR – Video Cassette Recorder.

Vector – **a)** A vector is a directed edge. That is, given points A and B, the line that connects A and B becomes a vector if we specify its direction (i.e., which point is the start point). The vector that goes from A to B is not the same vector as the one that goes from B to A. Vectors exist in 3D; they connect points in 3D space. **b)** An entity that possesses the attributes of a norm and a direction. It can be defined in 3D space by two points, one representing the origin and the other, the extremity. **c)** A motion compensation

parameter that tells a decoder how to shift part of a previous picture to more closely approximate the current picture.

Vector Interrupt – See Interrupt Vectoring.

Vector Quantization – **a)** A compression technique in which groups of picture samples (the vectors) are represented by predetermined codes. Encoding is done by matching the vectors with code words in a code book, and the addresses of the code book are then sent to the decoder. The picture quality depends widely on suitable code books and the match algorithms. **b)** A technique where a vector (usually a square of samples of one color component of an image) are represented by a single number. This number is an index into a code book by which the vector is reconstructed. The major issues are finding (calculating) a robust code book and how to choose the “best” code book entry for a given input vector.

Vectorscope – A specialized oscilloscope which demodulates the video signal and presents a display of R-Y versus B-Y. The angle and magnitude of the displayed vectors are respectively related to hue (R-Y) and saturation (B-Y). The vectorscope allows for the accurate evaluation of the chrominance portion of the signal. Some vectorscopes can select either 75% or 100% color bars. Make sure the correct mode is selected or the chroma gain can be misadjusted.

Vertical Alias – An alias caused by unfiltered sampling in the vertical direction by scanning lines. Vertical aliasing is frequently noticed when reading vertical resolution on a resolution chart. The wedge-like lines become finer and finer until they reach the limit of the vertical resolution of the system, but then they may appear to widen or to change position. This is caused by lines on the chart sometimes falling between scanning lines and sometimes on them. In a properly filtered television system, detail finer than the vertical resolution of the system would be a smooth blur.

Vertical Blanking – **a)** Refers to the blanking signals which occur at the end of each field. **b)** The time during which the electron beams of an output device are turned off and positioned to the upper left edge of the display. **c)** A video synchronizing signal that defines the border or black area at the top and bottom of the display and, in a CRT, hides (blanks out) the electron beam's retrace path from the bottom to the top of the display.

Vertical Blanking Interval (VBI) – **a)** That part of the video signal where the voltage level is at 0 IRE and the electron beam sweeps back from the bottom to the top of the screen. **b)** A period during which the electron beam in a display is blanked out while it travels from the bottom of the screen to the top. It is the black bar that becomes visible when the vertical hold on a television set is not correctly adjusted. The VBI is usually measured in scanning lines. When the VBI is subtracted from the total number of scanning lines, the result is the number of active scanning lines. In NTSC, the VBI has a duration of 20.5 or 21 lines (depending on the field), of which nine lines are devoted to the vertical synchronizing signal that lets television sets know when a field has been completed. The remaining lines have long been used to carry auxiliary information, such as test and reference signals, time code, and encoded text, such as captions for the hearing impaired. Some ATV schemes propose expanding the VBI to accommo-

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date widescreen images by the letterbox technique; some propose using it as a sub-channel for additional picture information. See also Blanking.

Vertical Drive – A pulse at field rate used in TV cameras. Its leading edge is coincident with the leading edge of the vertical blanking pulse and its duration may be 10.5 lines.

Vertical Interval – **a)** The synchronizing information which appears between fields. The vertical interval signals the picture monitor to go back to the top of the screen to begin another vertical scan. **b)** The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in the cameras and monitors are turned off so they can return from the bottom of the screen to the top to begin another scan.

Vertical Interval Reference (VIR) – A signal used as a reference for amplitude and phase characteristics of a color television program (FCC assigned to line 19).

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

Vertical Interval Test Signal (VITS) – **a)** Test signal that is inserted on one line in the vertical interval. These signals are used to perform in-service tests. **b)** Signals transmitted on lines 17 and 18 in both fields for evaluation of system performance. Usually color bars, multi-burst, modulated stairstep, and composite are transmitted.

Vertical Interval Time Code (VITC) – **a)** Time-code information stored on specific scan lines during the vertical blanking interval. A popular method for recording time code onto videotape. A time-code address for each video frame is inserted in the vertical interval (the vertical blanking retrace period) of the video signal, where it is invisible on-screen yet easily retrieved, even when a helical scanning VCR is in pause mode. The most common form of VITC is SMPTE-VITC. The Thumbs Up editor supports SMPTE-VITC (as well as RC time code). **b)** Time code stored in the vertical interval of the video signal. Has the advantage of being readable by a VTR in still or jog. Multiple lines of VITC can be added to the signal allowing the encoding of more information than can be stored in normal LTC.

Vertical Resolution – The amount of detail that can be perceived in the vertical direction; the maximum number of alternating white and black horizontal lines that can be counted from the top of the picture to the bottom. It is not the same as the number of scanning lines. It is the number of scanning lines minus the VBI times the Kell factor (and, where appropriate, times the interlace coefficient).

Vertical Retrace – The return of the electron beam from the bottom to the top of the raster after completion of each field.

Vertical Serrations – A vertical synchronizing pulse contains a number of small notches called vertical serrations.

Vertical Size – Vertical size (from the top to the bottom of the screen) can be reduced making objects appear short and squat or increased making

objects appear tall and thin. Vertical size which is not unity is distortion. The control comes from analog video where a control was made available to compensate for unstable sweep circuitry. Vertical size in digital video is controlled by line replication or line interpolation.

Vertical Sync Pulse – The synchronizing pulse at the end of each field which signals the start of vertical retrace.

Vertical-Temporal Pre-Filtering – Filtering at the camera or transmission end to eliminate vertical and temporal aliases. When a high line rate, progressively scanned camera is pre-filtered to NTSC rates, the resulting image is not only alias-free but can also be used by an advanced receiver to provide vertical and temporal resolution beyond that normally found in NTSC. The Kell factor of such a system can be close to one.

Vertical-Temporal Sampling – Sampling that occurs in every television signal due to individual frames (which sample in time) and individual scanning lines (which sample in the vertical direction). This sampling can cause aliases unless properly pre-filtered.

Very High Frequency (VHF) – The range from 30 MHz to 300 MHz, within which are found U.S. television channels 2 through 13. VHF television channels seem about as filled as current technology allows, which is why much ATV debate centers on channel allocations in UHF and/or SHF. Some ATV proponents, however, feel that a robust, low-level digital augmentation channel might be squeezed into adjacent VHF channels without interference, perhaps even two augmentation channels per adjacent channel. If that can be done, every U.S. television broadcaster would be able to have an ATV augmentation channel.

Very Large Scale Integration (VLSI) – Technology by which hundreds of thousands of semiconductor devices are fabricated on a single chip.

Vestigial Sideband – The vestige of a sideband left after filtering.

Vestigial Sideband Transmission – A system of transmission wherein the sideband on one side of the carrier is transmitted only in part.

VESA Local Bus (VL) – In late 1992, VESA (Video Electronics Standard Association) completed the specification for a local bus expansion for PCs. One of the most important things about VL Bus design is that it specified connector pinout. The VL Bus, considered a high-speed bus with a maximum speed of 66 MHz, was designed with the Intel 486 in mind. The 32-bit bus, which includes unbuffered control, data, and address signals is compatible with 16-bit operations. One drawback of the VL Bus implementation is that the more expansion connectors used, the slower the operation of the bus. For example, using two connectors, the highest recommended speed is 40 MHz. When multiple bus slots are desired, multiple VL Bus subsystems can be built into a single PC.

VHF – See Very High Frequency.

VHS (Video Home System) – Consumer videocassette record/playback tape format using half-inch wide magnetic tape. The most common home VCR format in the U.S.

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

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

Video – a) A term pertaining to the bandwidth and spectrum position of the signal which results from television scanning and which is used to reproduce a picture. **b)** A complex and sophisticated electronic signal which, when properly processed by a television receiver can be used to provide full-color pictures. **c)** An electrical signal used to carry visual information. Composite video includes sync and blanking signals. Non-composite video does not include sync.

Video Band – The frequency band used to transmit a composite video signal.

Video Bandwidth – The range between the lowest and highest signal frequency of a given video signal. In general, the higher the video bandwidth, the better the quality of the picture. Video bandwidths used in studio work typically vary between 3 and 12 MHz. Consumer VCRs are generally capable of 3 to 5.5 MHz.

Video Buffering Verifier (VBV) – A hypothetical decoder that is conceptually connected to the output of the encoder. Its purpose is to provide a constraint on the variability of the data rate that an encoder or editing process may produce (ISO13818-2 Annex C). This postulates the existence of a buffer in the receiver and a prediction mechanism in the encoder. This mechanism will predict the buffer fullness due to the constant fill from the constant bit rate (CBR) stream and the variable empty due to the variation in decoder bit demand. This latter factor can be controlled at the encoder by varying the quality of the encoding process (quantization factor, mainly).

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

Video Capture – The process of converting analog video to digital video.

Video Compression (M-JPEG and MPEG) – Both these standards use special hardware and software to store video directly on a hard drive. Video compression is done in various ratios (e.g., 10:1, 5:1). The higher the ratio, the more video can be stored per meg, and conversely the lower the compression, the higher the video quality. See CODEC.

Video Deck – An electronic component consisting of a video/audio head assembly, a system of transporting a videotape past the heads, and operational controls, used for recording and playback of videotape.

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

editing. The Thumbs Up offers a versatile solution for most editing applications.

Video Enhancer – A general term used to describe a device used to correct video image problems.

Video Fill – A video signal from a primary input or external input used to fill the hole made by a key signal.

Video for Windows – Microsoft's older multimedia environment for the Windows operating system. You use Video for Windows by installing several drivers and libraries in your Windows directories.

Video Gain – Expressed on the waveform monitor by the voltage level of the whitest whites in the active picture signal. Defined as the range of light-to-dark values of the image which are proportional to the voltage difference between the black and white voltage levels of the video signal. Video gain is related to the contrast of the video image.

Video Index – A data packet for carrying picture and program related source data in conjunction with the video signal. There are three classes of data to be included: Class 1 contains information that is required to know how to use the signal; Class 2 contains heritage information for better usage of the signal; Class 3 contains other information. The SMPTE Working Group on Video Index (P18.41) is developing the proposed recommended practice.

Video Manager – Top-level menu linking multiple tiles from a common point.

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

Video Noise – Poor quality video signal within the standard video signal. Also called Snow.

Video On Demand (VOD) – True VOD implies completely random access to video. Users may access the video they want and when they want it. This is, in other words, synonymous with dialing a video from a data bank and not having to go to a video rental store. In contrast, near-VOD often implies a set of TV channels showing the same movie, but with shifted starting times. Owing to the demanding nature of the application in sense of data capacity, compression techniques are needed. The bit rates applied in some VOD projects are comparable to that of CD-based video, which provides a reasonable picture quality and makes delivery possible by means of ADSL over copper cables of a length commonly found in telephony. The Asymmetric Digital Subscriber Line (ADSL) technology is typically used on distances up to about 5 to 6 km at 2 Mbit/s.

Video Path – The path that video takes through the switcher.

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

Video Processing Amplifier (Video Procamp) – A device that stabilizes the composite video signal, regenerates the synchronizing pulses, and can make other adjustments to the video signal.

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Video Program System (VPS) – Information is included in the video signal to automatically control VCRs.

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

Video Sequence – **a)** A series of one or more pictures. **b)** In MPEG, the total, coded bit stream (the ES at system level). **c)** A video sequence is represented by a sequence header, one or more groups of pictures, and an `end_of_sequence` code in the data stream.

Video Signal – The electrical signal produced by video components.

Video Streaming – New technologies used to send video information over the internet. Rather than wait for the whole file to download, the video streaming technology lets the clip begin playing after only a few seconds.

Video Switcher – A device that allows transitions between different video pictures. May contain special effects generators. Also called production switcher or switcher.

Video Tape Recorder (VTR) – A device developed in Germany which permits audio and video signals to be recorded on magnetic tape.

Video Time Base Error – Where all components of the video signal jitter (change in time) together in relation to another video signal.

Video_TS – UDF filename used for the video directory on the disc volume. Files under this directory name contain pointers to the sectors on the disc that hold the program streams.

Video Units – See IRE Units.

Video Wall – A large array of several monitors, placed close to each other in the shape of a video screen or “wall.” Each monitor is fed only part of the original video image by using a video-wall generating unit. This device is a digitally-based processor which converts the original analog video signal to digital, rescans, resamples, and generates several individual analog video outputs for driving each array monitor separately. When viewed from a distance, the effect can be very dramatic.

Video, Composite Signal – The electric signal that represents complete color picture information and all sync signals. Includes blanking and the deflection sync signals to which the color sync signal is added in the proper time relationship.

Video, Peak – See White Clip, White Peak, White, Reference.

Videocassette – A length of videotape wound around two reels and enclosed in a plastic shell.

Videocassette Recorder (VCR) – An electronic component consisting of a tuner, an R modulator, and a video deck used for recording and playback of a videocassette.

Videography – Operation of a video camera or camcorder in video production.

Video-in-Black – A term used to describe a condition as seen on the waveform monitor when the black peaks extend through reference black level.

Videotape – Oxide-coated plastic-based magnetic tape used for recording video and audio signals.

Vidiotext – Two-way interactive service that uses either two-way cable or telephone lines to connect a central computer to a television screen.

View Direction – This direction also requires three numbers, and specifies the direction in which the viewer is looking, and which direction is up.

Viewfinder – Camera feature that allows the operator to view the image as it is being recorded. Video viewfinders typically depict the recorded image in black-and-white.

Viewing Distance – Distance between image and a viewer’s eyes. In television, the distance is usually measured in picture heights. In film it is sometimes measured in picture widths. As a viewer gets closer to a television set from a long distance, the amount of detail perceptible on the screen continually increases until, at a certain point, it falls off rapidly. At that point, scanning line or triad visibility is interfering with the viewer’s ability to see all of the detail in the picture, sort of not being able to see the forest for the trees. The finer the triad or scanning structure, the closer to the screen this point can be (in picture heights). Therefore, high-definition screens allow either closer viewing for the same size screen or larger screens for the same physical viewing distance (not in picture heights). When the effects of scanning lines and triads are reduced, other artifacts (such as temporal alias or panning called strobing) may become more obvious. From far enough away, it is impossible to tell high-definition resolution from NTSC resolution.

Viewpoint – Viewpoint defines the location of the viewer’s eye in the 3D world, as a (x, y, z) triplet of numbers. To define what is finally seen, the “view direction” must also be known.

Viewport – A rectangular subregion of the video image that is displayed using local decode. See Local Decode.

VIR – See Vertical Interval Reference.

Visible Scanning Lines – Normally considered a defect that affects perception of fine vertical detail. Scanning line visibility can also have an apparent sharpness increasing effect, however. See also Sharpness and Viewing Distance.

Visible Subcarrier – The most basic form of cross-luminance.

VISION 1250 – The organization, headquartered in Brussels, investigates the ways of developing European widescreen production and seeks to contribute to the deployment of digital and widescreen broadcasting and high definition video production. Specifically, the organization helps European producers in the making of programs through provision of technical expertise.

VISTA (Visual System Transmission Algorithm) – The NYIT ATV scheme. VISTA is based on the inability of the human visual system to perceive high temporal and high spatial resolution simultaneously. It combines low frame rate, high line rate information with normal frame rate, normal line rate information to create a channel-compatible, receiver-compatible signal plus a 3 MHz augmentation channel. Aspect ratio accommodation has been suggested by blanking adjustment, squeeze, and shoot and protect techniques. In spite of the relatively small size of NYIT’s research cen-

ter, VISTA was one of the first ATV schemes to actually be implemented in hardware.

Visual Acuity – The amount of detail perceptible by the human visual system. It depends on many factors, including brightness, color, orientation, and contrast. Optimum viewing distance depends upon visual acuity.

VITC – See Vertical Interval Time Code.

Viterbi Decoding – Viterbi decoding makes use of the predefined time sequence of the bits through convolutional coding (DVB-S). Thanks to a series of logic decisions, the most probable correct way is searched for through the trellis diagram and incorrectly transmitted bits are corrected.

VITS – See Vertical Interval Test Signal.

VITS Inserter – Device that produces a test signal in the video in the vertical interval so as not to be visible to the home viewer but allows the broadcasters to test signal quality during transmission.

VL – See VESA Local Bus.

VLC – See Variable Length Coding.

VLSI – See Very Large Scale Integration.

VM (Video Verification Mode) – The set of video coding algorithms that precedes the actual MPEG-4 video coding specification.

VOB (Video Object) – Usually a group of pictures.

VOD (Video On Demand) – A system in which television programs or movies are transmitted to a single consumer, and then, only when requested.

Volatile Memory – Memory devices whose stored data is lost when power is removed. RAMs can be made to appear nonvolatile by providing them with back-up power sources.

Volume Unit (VU) Meter – A device used for measuring the intensity of an audio signal.

VP – Virtual Path.

VPE – Virtual Path Entity.

VPI – Virtual Path Identifier.

VPME – Virtual Path Multiplexing Entity.

VPS – See Video Program System.

VPU (Video Presentation Unit) – A picture.

VSAT – Very Small Aperture Terminal.

VSF (Vestigial Sideband Modulation) – 8 VSB in ATSC system implies eight discrete amplitude levels.

VSF-AM – See AM-VSB.

VSF – See the definition of Sync.

VTR – See Video Tape Recorder.

VTS (Video Tile Set) – A maximum of 10 files (in ISO 9660 structure) may comprise a video tile set. Each video tile set is preceded by a Management File. Each file in turn is limited to 1 Gbyte.

VU (Volume Units) – A unit of measure for complex audio signals, usually in dB. Zero VU is referenced to 1 milliwatt of power into a 600-ohm load. The reference level of –20 dB in this program is 0 VU.

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Wait State – When a system processor is reading or writing a memory or peripheral device that cannot respond fast enough, one or more time intervals (typically on the order of tens of nanoseconds each) are inserted during which the processor does nothing but wait for the slower device. While this has a detrimental effect on system throughput, it is unavoidable. The number of wait states can be reduced using techniques such as CPU-bus caches or write FIFOs.

Walking-Ones – Memory test pattern in which a single one bit is shifted through each location of a memory filled with 0s. A walking-zero pattern is the converse.

Warp – A special effect created by ADO to distort (twist) video pictures.

Warping – This video effect is related to morphing except that a warp consists of transforming one video image into one of a completely different type. For example, a scorebox might be twisted on and off a screen containing video action. Some examples of video transitions include fly-ons/off, slide ons/off, zoom in or out to/from a pinpoint, shattered glass transition, pixelization where on screen explodes into thousands of pixels, and fades out at a controlled rate.

Wave – A continuous fluctuation in the amplitude of a quantity with respect to time. A wave will have a propagation velocity dependent on the medium through which it travels. For example, in air at 70° F, the propagation velocity of a sound pressure wave is 1130 feet per second.

WAVE – A file format (.wav) used to represent digitized sound.

Wave Velocity – The propagation velocity of a wave. The time it takes for one point of a waveform to travel a certain distance. Wave velocity is dependent on the medium through which the wave travels and the temperature of the medium.

Waveform – The shape of an electro-magnetic wave. A graphical representation of the relationship between voltage or current and time.

Waveform Coding – Coding that aims to reconstruct the waveform of the original (audio) signal as close as possible, independently of the material. Includes linear PCM, differential PCM, adaptive differential PCM, sub-band coding, adaptive transform coding, etc.

Waveform Monitor – A piece of test equipment which displays waveforms (analog video signals) at a horizontal and/or vertical rate. A specialized oscilloscope for evaluating television signals. **a) DC Restore** – A circuit used in picture monitors and waveform monitors to clamp on point of the waveform to a fixed DC level. Typically the tip of the sync pulse or the back porch. This ensures the display does not move vertically with changes in the signal amplitude or average picture level (APL). The DC Restore speed can be set to SLOW or FAST DC. SLOW allows hums and other low-frequency distortions to be seen. FAST DC removes the effects of hum from the display so it will not interfere with other measurements. **b) AFC/Direct** – This selection allows the waveform monitor's horizontal sweep to trigger on each individual horizontal sync pulse (direct mode). This will allow the user to see any jitter that might be in the signal. Or the waveform monitor can trigger horizontally in the AFC mode which causes the horizontal sweep to

trigger on the average value of the horizontal sync pulses. The AFC mode eliminates jitter.

Wavelength – In tape recording, the shortest distance between two peaks of the same magnetic polarity; also, the ratio of tape speed to recorded frequency.

Wavelet – **a)** A transform in the basic function that is not of fixed length but that grows longer as frequency is reduced. **b)** A compression algorithm that samples the video image based on frequency to encode the information. This creates a series of bands representing the data at various levels of visual detail. The image is restored by combining bands sampled at low, medium, and high frequencies.

Waveshape – The shape traced by the varying amplitude of the wave. See Waveform.

WD – Working Draft.

Wear Product – Any material that is detached from the tape during use. The most common wear products are oxide particles or agglomerates, portions of coating and material detached from the edges of the tape.

Weighting – **a)** A method of changing the distribution of the noise that is due to truncation by premultiplying values. **b)** In a sound level meter, this is a filter that creates a response that corresponds to the ear's varying sensitivity at different loudness levels. A weighting corresponds to the sensitivity of the ear at lower listening levels. The filter design weights or is more sensitive in certain frequency bands than others. The goal is to obtain measurements that correlate well with the subjective perception of noise.

Weighting, ANSI A – The A-curve is a side bandpass filter centered at 2.5 kHz with ~20 dB attenuation at 100 Hz, and ~10 dB attenuation at 20 kHz. Therefore, it tends to heavily roll off the low end, with a more modest effect on high frequencies. It is essentially the inverse of the 30-phon (or 30 dB-SPL) equal-loudness curve of a Fletcher-Munson.

Weighting, ANSI B – The B-weighting curve is used for intermediate level sounds and has the same upper corner as the C-weighting, but the lower amplitude corner is 120 Hz.

Weighting, ANSI C – The C-curve is basically "flat," with -3 dB corners of 31.5 Hz and 8 kHz, respectively.

Weighting, CCIR 468 – This filter was designed to maximize its response to the types of impulsive noise often coupled into audio cables as they pass through telephone switching facilities. The CCIR 468-curve peaks at 6.3 kHz, where it has 12 dB of gain (relative to 1 kHz). From here, it gently rolls off low frequencies at a 6 dB/octave rate, but it quickly attenuates high frequencies at ~30 dB/octave (it is down -22.5 dB at 20 kHz, relative to +12 dB at 6.3 kHz).

Weighting, CCIR ARM (or CCIR 2 kHz) – This curve is derived from the CCIR 468-curve. Dolby Laboratories proposed using an average-response meter with the CCIR 468-curve instead of the costly true quasi-peak meters used by the Europeans in specifying their equipment. They further proposed shifting the 0 dB reference point from 1 kHz to 2 kHz (in

essence, sliding the curve down 6 dB). This became known as the CCIR ARM (average response meter), as well as the CCIR 2 kHz-weighting curve.

Wet Signal – The output of an effect device, especially a reverb unit.

WG – Working Group.

WGHDPEP – SMPTE Working Group on High-Definition Electronic Production (N15.04). Now reformed as the SMPTE Committee on Hybrid Technology (H19).

Whip Pan – A quick movement of the camera from left to right or right to left which creates a blurred image. Also called Swish Pan.

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

White Clip – The maximum video signal excursion in the white direction permitted by the system.

White Compression – **a)** Amplitude compression of the signals corresponding to the white regions of the picture, thus modifying the tonal gradient. **b)** The reduction in gain applied to a picture signal at those levels corresponding to light areas in the picture, with respect to the gain at the level corresponding to the midrange light value in the picture. 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. The overall effect of white compression beyond bandwidth limiting is to reduce contrast in the highlights of the picture as seen on a monitor.

White Level – Level which defines white for the video system.

White Level Control – This is a name for the contrast or picture control. It describes a function that is otherwise not clearly spelled out in names of controls used on monitors. It is not a term found on a monitor control. (As “black level” clearly defines the brightness control function, “white level” more clearly defines the contrast or picture control function.)

White Noise – A random signal having the same energy level at all frequencies (in contrast to pink noise which has constant power per octave band of frequency).

White Peak – The maximum excursion of the picture signal in the white direction at the time of observation.

White Point – That point on the chromaticity diagram having the tristimulus of a source appearing white under the viewing conditions; i.e., a spectrally nonselective sample under the illumination of viewing conditions.

White, Reference – **a)** The light from a nonselective diffuse reflector (in the original scene) that is lighted by the normal illumination of the scene. That white with which the display device stimulates reference white of the original scene. **b)** In production context, reference white is defined as the luminance of a white card having 90% reflectance and subjected to scene illumination. It is expected that there will be the capability of some discrimination of surface texture or detail within that portion of the transfer function incorporating reference white.

Wide Screen Signaling System (WSS) – It is used on (B, D, G, H, I) PAL line 23 and (M) NTSC lines 20 and 283 to specify the aspect ratio of the program and other information. ITU-R BT.1119 specifies the WSS signal for PAL and SECAM system. EIAJ CPX-1204 specifies the WSS signal for NTSC systems.

Wide-Angle – Refers to camera lenses with short focal length and broad horizontal field of view.

Wideband – Relatively wide in bandwidth.

Widescreen – An image with an aspect ratio greater than 1.33:1 aspect ratio.

Widescreen Panels – Additional sections of picture information that can be added to a 1.33:1 aspect ratio picture to create a widescreen image.

Width – Refers to the width of recording tape, varying from 0.150" in cassette tape to 2.0" for video, mastering and instrumentation tapes. The size of the picture in a horizontal direction.

Width Border – The 4100 series name for a Hard Border.

Wind – The way in which tape is wound onto a reel. An A-wind is one in which the tape is wound so that the coated surface faces toward the hub; a B-wind is one in which the coated surface faces away from the hub. A uniform wind, as opposed to an uneven wind, is one giving a flat-sided tape pack free from laterally displaced, protruding layers.

Winder/Cleaner – A device designed to wind and clean magnetic tape in order to restore it to a quality that approaches the condition of a new tape, providing the tape has not been physically damaged.

Window – **a)** A portion of the screen that you can manipulate that contains text or graphics. **b)** Video containing information or allowing information entry, keyed into the video monitor output for viewing on the monitor CRT. **c)** A video test signal consisting of a pulse and bar. When viewed on a monitor, the window signal produces a large white square in the center of the picture. **d)** A graphical user interface that presents icons and tools for manipulating a software application. Most applications have multiple windows that serve different purposes.

Window Dub – Copies of videotape with “burnt in” time-code display. Hours, minutes, seconds, and frames appear on the recorded image. Window dubs are used in off-line editing.

Window Shades – See Side Panels.

Windows, Analog – All analog windowing architectures multiplex graphics and video as analog signals rather than as digital information, but they vary widely in signal manipulation and digital processing capabilities. While they do offer some advantages, analog architectures fail to address certain problems. For example, the graphics pixel-clock frequency becomes the pixel clock for the video image. Therefore, the greater screen resolution, the smaller the video window. Since enlarging the image means losing graphics resolution, the end user may find himself changing display drivers several times a day to fit the immediate task. The simplest analog architecture is the genlocked video overlay. Composite video is decoded into its RGB components. Having no control over the video source, the graphics controller must be genlocked to the video source, operating at a resolution and timing characteristic compatible with the incoming video signal. The graphics signal is switched in and out at appropriate times so that the

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graphic appears in the desired place in the image. The multiplexed output is then encoded into a new composite signal. The analog multiplexer, currently the most popular architecture, is actually a group of slightly varied architectures. The most popular variation imports the graphics data and pixel clock from the graphics card feature connector across a ribbon cable, where it is fed to a DAC.

The video signal is digitized, color-converted, and scaled, then is stored in a frame buffer similar to a FIFO which synchronizes the data. When the video data emerges from the frame buffer, it is fed to a second DAC. The two DACs are connected to an analog multiplexer that is controlled by a set of counters that keep track of the beam position on the graphics display. When the beam enters the video-window area, the mux is switched from the graphics signal to the video signal.

Windows, Digital – Digital windowing offers a distinct advantage over analog. It digitizes the video image immediately, only converting it to analog as it is sent to the CRT. Incoming composite video is digitized and decoded to produce a YUV data stream, which then enters the video-processing pipeline (color-space and format conversion, scaling and/or zooming). After processing, the data is stored in the frame buffer. At the appropriate time, the data moves to the overlay controller, which serves as a digital multiplexer. Graphics data remains in digital form through the overlay controller; it is not converted to analog until the final DAC that drives the CRT.

Wipe – **a)** A transition between two video signals that occurs in the shape of a selected pattern. **b)** Any pattern system effect that reveals a new video, and more specifically, one that does not have an enclosed boundary on the screen. **c)** Special effect in which two pictures from different video sources are displayed on one screen. Special effects generators provide numerous wipe patterns varying from simple horizontal and vertical wipes to multi-shaped, multi-colored arrangements. The Digital Video Mixer includes this effect.

Wireframe – An image generated by displaying only the edges of all polygons or surfaces.

Wireless Microphone System – A microphone system consisting of a microphone, an FM transmitter, and a tuned receiving station that eliminates the need for long runs of microphone cable.

WMF (Windows Meta File) – The standard vector-based structure of the Windows operating system. Bitmapped images may be embedded in WMF files.

Word – Set of characters that occupies one storage location and is treated by the computer circuits as a unit. Ordinarily a word is treated by the control unit as an instruction and by the arithmetic unit as a quantity. See Byte.

Workspace – The main window for working with icons and customizing your view of the file system. You place files and directories from all over the file system here for easy access; placing them in the Workspace does not change their actual location in the file system.

Workstation – The physical hardware that contains the CPU and graphics boards, a system disk, and a power supply. You connect it to a monitor, keyboard, and mouse to configure a working system. It is also sometimes referred to as the chassis.

World Coordinate System – See World Reference.

World Reference – The absolute coordinate system which is the root reference and upon which all other references are based. It cannot be animated.

World Standard – A television standard accepted in all parts of the world. CCIR recommendation 601 is currently the closest there is to a world standard. It is accepted throughout the world, but can be used with either 525-scanning line or 625-scanning line picture. HDTV 1125/60 Group is attempting to promote its system as a world HDEP standard, but Zenith suggests the same for 3XNTSC, and there are other candidates.

World System Teletext (WST) – ITU-R BT.653 525-line and 625-line system B teletext.

World Transmission Standards – For a definition of “TV” column codes. See Terrestrial Transmission Standards.

Country	TV	Color	Stereo	Subtitles
Albania	B/G	PAL		
Argentina	N	PAL-N		
Australia	B/G	PAL	FM-FM	TeleText
Austria	B/G	PAL	FM-FM	TeleText
Azores (Portugal)	B	PAL		
Bahamas	M	NTSC		
Bahrain	B	PAL		
Barbados	N	NTSC		
Belgium	B/G	PAL	Nicam	TeleText
Bermuda	M	NTSC		
Brazil	M	PAL-M	MTS	
Bulgaria	D	SECAM		
Canada	M	NTSC	MTS	CC
Canary Islands	B	PAL		
China	D	PAL		
Colombia	N	NTSC		
Cyprus	B	PAL		
Czech Republic	D/K	SECAM/PAL		
Denmark	B	PAL	Nicam	TeleText
Egypt	B	SECAM		
Faroe Islands (DK)	B	PAL		
Finland	B/G	PAL	Nicam	TeleText
France	E/L	SECAM		Antiope
Gambia	I	PAL		
Germany	B/G	PAL	FM-FM	TeleText
Germany (previously East)	B/G	SECAM/PAL		
Gibraltar	B	PAL		
Greece	B/H	SECAM		
Hong Kong	I	PAL	Nicam	

Country	TV	Color	Stereo	Subtitles
Hungary	D/K	SECAM		
Iceland	B	PAL		
India	B	PAL		
Indonesia	B	PAL		
Iran	H	SECAM		
Ireland	I	PAL	Nicam	TeleText
Israel	B/G	PAL		
Italy	B/G	PAL	FM/FM	TeleText
Jamaica	M	SECAM		
Japan	M	NTSC	MTS	
Jordan	B	PAL		
Kenya	B	PAL		
Luxembourg	B/G	PAL		TeleText
Madeira	B	PAL		
Madagascar	B	SECAM		
Malaysia	B	PAL		
Malta	B/G	PAL		
Mauritius	B	SECAM		
Mexico	M	NTSC	MTS	CC
Monaco	L/G	SECAM/PAL		
Morocco	B	SECAM		
Netherlands	B/G	PAL	FM-FM	TeleText
New Zealand	B/G	PAL	Nicam	TeleText
North Korea	D/K?	SECAM		
Norway	B/G	PAL	Nicam	
Pakistan	B	PAL		
Paraguay	N	PAL		
Peru	M	NTSC		
Philippines	M	NTSC		
Poland	D/K	PAL		TeleText
Portugal	B/G	PAL	Nicam	TeleText
Romania	G	PAL		
Russia	D/K	SECAM		
Saudi Arabia	B	SECAM		
Seychelles	I	PAL		
Singapore	B	PAL		
South Africa	I	PAL		
South Korea	N	NTSC		
Spain	B/G	PAL	Nicam	
Sri Lanka	B/G	PAL		
Sweden	B/G	PAL	Nicam	TeleText
Switzerland	B/G	PAL	FM-FM	TeleText

Country	TV	Color	Stereo	Subtitles
Tahiti	KI	SECAM		
Taiwan	M	NTSC		
Thailand	B	PAL		
Trinidad	M	NTSC		
Tunisia	B	SECAM		
Turkey	B	PAL		TeleText
United Arab Emirates	B/G	PAL		
United Kingdom	I	PAL	Nicam	TeleText
Uruguay	N	PAL		
United States	M	NTSC	MTS	CC
Venezuela	M	NTSC		
Yugoslavia	B/H	PAL		
Zimbabwe	B	PAL		

WORM (Write Once, Read Many) – A WORM is an optical drive where the data is recorded once (usually with a laser) but may be read many times. CD ROMs are WORMs.

Wow – Slow, periodic variations in the speed of the tape, characterized by its effect on pitch. A measure of non-uniform movement of magnetic tape or other recording parts.

WPP (Wipe to Preset Pattern) – See Preset Pattern.

Wrap – a) The length of the path along which tape and head are in intimate physical contact. **b)** A term used to signify the session (job) is finished.

Wrist Strap – A coiled cable with a loop for your wrist at one end and an alligator clip at the other. You fasten the clip to a metal part of the workstation and place the loop around your wrist whenever you work with internal components of the workstation to avoid electrical shocks to yourself and the components. See also Static Electricity.

Write – a) To transfer information, usually from a processor to memory or from main storage to an output device. **b)** To record data in a register, location, or other storage device.

Write Buffer – A term used to denote the buffer that is logically positioned between the CPU interface and the display memory.

Write-Through – A strategy where cache data is always written into main memory when data is written by the CPU. The write-through is done through the cache system.

WRS – Wireless Relay Station.

WSS – See Wide Screen Signaling System.

WST – See World System Teletext.

WYSIWYG (What You See Is What You Get) – Usually, but not always, referring to the accuracy of a screen display to show how the final result will look. For example, a word processor screen showing the final layout and typeface that will appear from the printer.

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X.25 – A standard networking protocol suite approved by the CCITT and ISO. This protocol suite defines standard physical, link, and networking layers (OSI layers 1 through 3). X.25 networks are in use throughout the world.

X.400 – The set of CCITT communications standards covering mail services provided by data networks.

X-Axis – The horizontal axis of a graph. When a television signal is examined in one dimension, the x-axis is usually time. When it is examined in three dimensions, the x-axis is usually horizontal resolution.

XLR – An audio connector characterized by three prongs covered by a metal sheath.

► **Y**

Y (Luminance) – a) An abbreviation or symbol for luminance, the black and white information in a television signal. **b)** Signal which is made up of $0.59G + 0.3R + 0.11B$. **c)** The y-axis of the chart of the spectral sensitivity of the human visual system.

Y, C1, C2 – A generalized set of CAV signals: Y is the luminance signal, C1 is the 1st color-difference signal, and C2 is the 2nd color-difference signal.

Y, Cb, Cr – The international standard ITU-R BT.601-1 specifies eight-bit digital coding for component video, with black at luma code 16 and white at luma code 235, and chroma in 8-bit two's complement form centered on 128 with a peak at code 224. This coding has a slightly smaller excursion for luma than for chroma: luma has 219 risers compared to 224 for Cb and Cr. The notation CbCr distinguishes this set from PbPr where the luma and chroma excursions are identical. For Rec. 601-1, coding is eight bits per component.

$$Y_{8b} = 16 + 219 * 9$$

$$Cb_{8b} = 128 + 112 * (0.5/0.866) * (B_{gamma} - Y)$$

$$Cr_{8b} = 128 + 112 * (0.5/0.701) * (R_{gamma} - Y)$$

Some computer applications place black at luma code 0 and white at luma code 255. In this case, the scaling and offsets above can be changed accordingly, although broadcast-quality video requires the accommodation for headroom and footroom provided in the CCIR-601-1 equations. ITU-R BT.601-1 Rec. calls for two-to-one horizontal subsampling of Cb and Cr, to achieve 2/3 the data rate of RGB with virtually no perceptible penalty. This is denoted 4:2:2. A few digital video systems have used horizontal subsampling by a factor of four, denoted 4:1:1. JPEG and MPEG normally subsample Cb and Cr two-to-one horizontally and also two-to-one vertically, to get 1/2 the data rate of RGB. No standard nomenclature has been adopted to describe vertical subsampling. To get good results using subsampling you should not just drop and replicate pixels, but implement proper decimation and interpolation filters. YCbCr coding is employed by D1 component digital video equipment.

Y, CR, CB – The three nonlinear video signals in which the information has been transformed into a luminance signal and two chrominance signals, each of which has been subject to nonlinear processing, and the chrominance signals at least have also been bandlimited. By convention, C'R, and C'B represent color-difference signals in digital format with typical excursion of values for 16 to 240.

Y, I, Q – The human visual system has less spatial acuity for magenta-green transitions than it does for red-cyan. Thus, if signals I and Q are formed from a 123 degree rotation of U and V respectively, the Q signal can be more severely filtered than I (to about 600 kHz, compared to about 1.3 MHz) without being perceptible to a viewer at typical TV viewing distance. YIQ is equivalent to YUV with a 33 degree rotation and an axis flip in the UV plane. The first edition of W.K. Pratt "Digital Image Processing," and presumably other authors that follow that bible, has a matrix that erroneously omits the axis flip; the second edition corrects the error. Since an analog NTSC decoder has no way of knowing whether the encoder was encoding YUV or YIQ, it cannot detect whether the encoder was running at

0 degree or 33 degree phase. In analog usage, the terms YUV and YIQ are often used somewhat interchangeably. YIQ was important in the early days of NTSC, but most broadcasting equipment now encodes equiband U and V. The D2 composite digital DVTR (and the associated interface standard) conveys NTSC modulated on the YIQ axes in the 525-line version and PAL modulated on the YUV axes in the 625-line version. The set of CAV signals specified for the NTSC system: Y is the luminance signal, I is the 1st color-difference signal and Q is the 2nd color-difference signal.

Y, Pb, Pr – If three components are to be conveyed in three separate channels with identical unity excursions, then the Pb and Pr color difference components are used. These scale factors limit the excursion of EACH color difference component to $-0.5 \dots +0.5$ with respect to unity Y excursion: 0.886 is just unity less the luma coefficient of blue. In the analog domain, Y is usually 0 mV (black) to 700 mV (white), and Pb and Pr are usually ± 350 mV. YPbPr is part of the CCIR Rec. 709 HDTV standard, although different luma coefficients are used, and it is denoted E'Pb and E'Pr with subscript arrangement too complicated to be written here. YPbPr is employed by component analog video equipment such as M-II and Betacam; Pb and Pr bandwidth is half that of luma. A version of the (Y, R-Y, B-Y) signals specified for the SMPTE analog component standard.

$$Pb = (0.5/0.866) * (B_{gamma} - Y)$$

$$Pr = (0.5/0.701) * (R_{gamma} - Y)$$

Y, PR, PB – The three nonlinear video signals in which the information has been transformed into a luminance signal and two chrominance signals, each of which has been subject to nonlinear processing, and the chrominance signals at least have also been bandlimited. By convention, P'R and P'B represent color-difference signals in analog format, with typical excursion between -350 mV and $+350$ mV.

Y, R-Y, B-Y – The general set of CAV signals used in the PAL system as well as for some encoder and most decoder applications in the NTSC systems. Y is the luminance, R-Y is the 1st color-difference signal and B-Y is the 2nd color-difference signal.

Y, U, V – Luminance and color difference components for PAL systems. Y, U, and V are simply new names for Y, R-Y, and B-Y. The derivation from RGB is identical. In composite NTSC, PAL or S-Video, it is necessary to scale (B-Y) and (R-Y) so that the composite NTSC or PAL signal (luma plus modulated chroma) is contained within the range $-1/3$ to $+4/3$. These limits reflect the capability of composite signal recording or transmission channel. The scale factors are obtained by two simultaneous equations involving both B-Y and R-Y, because the limits of the composite excursion are reached at combinations of B-Y and R-Y that are intermediate to primary colors. The scale factors are as follows: $U = 0.493 * (B-Y)$; $V = 0.877 * (R-Y)$. U and V components are typically modulated into a chroma component: $C = U * \cos(t) + V * \sin(t)$ where t represents the ~ 3.58 MHz NTSC color sub-carrier. PAL coding is similar, except that the V component switches Phase on Alternate Lines (± 1), and the sub-carrier is at a different frequency, about 4.43 MHz. It is conventional for an NTSC luma signal in a composite environment (NTSC or S-Video) to have 7.5% setup:

Video Terms and Acronyms

► Glossary

$Y_setup = (3/40) + (37/40) * Y$. A PAL signal has zero setup. The two signals Y (or Y_setup) and C can be conveyed separately across an S-Video interface, or Y and C can be combined (encoded) into composite NTSC or PAL: NTSC = Y_setup + C; PAL = Y + C. U and V are only appropriate for composite transmission as 1-wire NTSC or PAL, or 2-wire S-Video. The UV scaling (or the IQ set, described below) is incorrect when the signal is conveyed as three separate components. Certain component video equipment has connectors labeled YUV that in fact convey YPbPr signals.

Y/C (Luminance and Chrominance) – A term used to describe the separation of video signal components used in systems such as Hi-8 and S-VHS. Generically called S-Video, all Videonics video products support the (Y/C) format.

Y/C Connections – Connections between videotape recorders and between videotape recorders and cameras, monitors, and other devices that keep luminance and chrominance separate and thus avoid cross-color and cross-luminance. See also S-Video.

Y/C Separator – Decoder used to separate luma and chroma in an (M) NTSC or (B, D, G, H, I) PAL system.

Y/C Video – Shorthand for luma (Y) and chroma (C).

Y-Axis – The vertical axis of a graph. When a television signal is examined in one dimension, the y-axis is usually signal strength. When it is examined in three dimensions, the y-axis is usually vertical resolution.

YCC (Kodak PhotoCD™) – Kodak's Photo YCC color space (for PhotoCD) is similar to YCbCr, except that Y is coded with lots of headroom and no footroom, and the scaling of Cb and Cr is different from that of Rec. 601-1 in order to accommodate a wider color gamut. The C1 and C2 components are subsequently subsampled by factors of two horizontally and vertically,

but that subsampling should be considered a feature of the compression process and not of the color space.

$$Y_8b = (255/1.402 * Y$$

$$C1_8b = 156 + 111.40 * (Bgamma - Y)$$

$$C2_8b = 137 + 135.64 * (Rgamma - Y)$$

Yield Strength – The minimum force per unit cross-sectional area at which the tape or base film deforms without further increase in the load. Units are pounds per square inch (psi) or pounds per tape sample of given width and base film thickness.

YUV – a) A video system employing luminance and two chroma components directly related to the red and blue components. This professional component video system is used in studios and requires special equipment. Interface devices are used to link the various component systems, i.e., RGB, Y/C, YUV, and YIQ (A system similar to YUV). **b)** A color model used chiefly for video signals in which colors are specified according to their luminance, the Y component, and their hue and saturation, the U and V components. See Hue, Luminance, Saturation. Compare RGB.

YUV12 – Intel's notation for compressed video.

YUV9 – a) Intel's notation for compressed Y, U, V format that provides a compression ratio of 3 to 1. **b)** A bitstream format that does not compress the video signal, but converts it from the RGB into the YUV color model and averages pixel colors so that the signal uses only nine bits per pixel. See Compress, Encode, RGB, YUV. Compare YUV9.

YUV9C – A bitstream format that converts the video signal from RGB into the YUV color model, averages pixel colors so that the signal uses only nine bits per pixel, and then compresses the signal slightly. See Compress, Encode, RGB, YUV. Compare YUV9.

▶ **Z**

Z-Axis – An axis of a three-dimensional graph, which, when printed on a flat piece of paper, is supposed to be perpendicular to the plane of the paper. When a television signal is examined in three dimensions, the z-axis is usually time.

Zenith – **a)** The tilt of the head relative to a direction perpendicular to the tape travel. **b)** Major U.S. consumer electronics manufacturer and proponent of the 3XNTSC ATV scheme, also possibly the first organization to suggest pre-combing for NTSC.

Zero Carrier Reference – A 120 IRE pulse in the vertical interval which is produced by the demodulator to provide a reference for evaluating depth of modulation.

Zero Modulation Noise – The noise arising when reproducing an erased tape with the erase and record heads energized as they would be in normal operation, but with zero input signal. This noise is usually 3 to 4 dB

higher than the bulk erased noise. The difference between bulk erased and zero modulation noise is sometimes referred to as induced noise.

Zero Timing Point – The point at which all video signals must be in synchronization (typically the switcher input).

Zig-Zag Scan – Zig-zag scan of quantized DCT coefficient matrix. This gives an efficient run length coding (RLC).

Zig-Zag Scanning Order – A specific sequential ordering of the DCT coefficients from (approximately) the lowest spatial frequency to the highest.

Zoom – Type of image scaling. The process where a video picture is increased in size by processing pixels and lines through interpolation or replication. A 640 x 512 image will take up one quarter of a 1280 x 1024 screen. To fill the screen, the 640 x 512 image must be zoomed. Zooming makes the picture larger so that it can be viewed in greater detail.

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