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Multimedia Glossary: RS - Z (3 of 3) (1/96)

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TOPIC ----------

This article is one of three articles that contain definitions of multimedia terms.

DISCUSSION ----------

RS-170 RGB

Refers to RGB signals timed to RS-170 specifications. Since the red, green and blue signals are actually individual monochrome signals representing their respective colors, RS-170 RGB merely refers to three black and white signals sharing one sync signal which is either provided separately as a fourth signal or (usually) combined with the green signal. Compare RS-170A, RS-170.

RS-343

An EIA (Electronics Industries Association) standard for non-broadcast high resolution monochrome video, specifying a 60 Hz non-interlaced scan with a composite sync signal with timings that produce a non-interlace (progressive) scan at 675 to 1023 lines.
While the Macintosh version of the RS-343 signal varies somewhat, it essentially follows the guidelines necessary for connection to RS-343 display devices. Therefore, with a display adapter (available from Covid , Extron, or Inline) the Mac can drive a RS-343 device (i.e. video projector or large monitor).

The major differences between Macintosh video and the RS-343 standard are: a separate TTL level composite sync signal on pin 3, the separate video lines used to produce RGB color, a vertical scan rate of 66.67 Hz to reduce screen flicker, and a voltage white level of 1 volt for its red and blue signals and 1.3 volts on its green signal. RS-343 provides for a 60-Hz signal but has been changed to 66.67 Hz on the Macintosh video card to prevent the screen flicker which is visible at 60 Hz. The inclusion of the analog composite sync found on pin 5 of

the video card connector, called the green signal, allows for monochrome composite video.

S-Video

A consumer form of component video (Y/C) used primarily with Hi8 and S-VHS equipment.

Safe Title Area
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80 percent of the TV screen, from the center of the screen; that area of the display screen (and therefore of the camera scanning area) which will reproduce legible title credits no matter how poorly adjusted the monitor or receiver may be.

SC Phase

The phase of the color subcarrier.

Scan Converter

A device that changes the scan rate of a video signal and may also convert it from non-interlaced to interlaced mode. A scan converter allows computer graphics to be recorded on videotape or displayed on a standard video monitor.

Scan Rate

The scan rate is the time it takes the electron gun to move across one line of the screen or repeat one entire screen. These values are known as the horizontal and vertical scan rates, respectively. The number of times a screen is redrawn each second. Computer display scan rates differ from standard video scan rates.

Scanning

The rapid movement of the election beam in a pickup device of a camera or in the CRT of a television receiver. It is formatted in a line-for-line manner across the photo sensitive surface which produces or reproduces the video picture.

SECAM

Systeme Couleur Avec Memoire. The television broadcast standard for France, the USSR and various eastern European countries. Like PAL, SECAM is based on a 50 Hz power system, but it utilizes a different encoding process and displays 819 lines interlaced at 50 fields per second. The color information is transmitted sequentially (R-Y followed by B-Y, etc.) for each line and conveyed by a frequency modulated subcarrier that avoids the distortion arising during NTSC transmission. SECAM is not compatible with NTSC or PAL, although conversion between the standards is possible.

Serial Device Control

Most professional video equipment can be controlled via an RS-232 serial port. The protocols used for controlling these devices varies from vendor to vendor,

however, Sony's protocol is supported by most editing systems.

Signal-to-noise Ratio (S/N)

An S/N ratio can be given for the luminance signal, chrominance signal, and audio signal. The S/N ratio is the ratio of noise to actual total signal, and it shows how much higher the signal level is than the level of noise. It is expressed in decibels (dB), and the bigger the value is, the more crisp and clear the picture and sound will be during playback.

SMPTE

Society of Motion Picture and Television Engineers, pronounced "simptee." An organization which studies and proposes standards for the film and television industry.

SMPTE Format, SMPTE Standard

In component video these terms refer to the SMPTE standards for parallel analog component video interconnection. The SMPTE has standardized both RGB and Y, Pr, Pb color difference systems (a version of Y, B-Y, R-Y).

SMPTE Timecode

A coding scheme standardized by the Society of Motion Picture and Television Engineers (SMPTE). Frame accuracy is achieved through timecode, a method of coding a unique "stamp" on each frame. Timecode consists of four numbers representing hours, minutes, seconds, and frames, for example, 23:59:59:29. Since color video actually runs at 29.97 fps rather than 30 fps, two kinds of timecode have evolved: drop fame and non-drop frame. Drop-frame timecode literally drops certain agreed-upon numbers to compensate for the 0.03 fps discrepancy. Drop-frame timecode allows a 30:00:00:00 tape to really be 30 minutes long, which is critical in broadcast applications. For non-broadcast applications it tends to do nothing but create problems, and non-drop-frame timecode is usually preferred.

Most of the low-end videotape formats, like VHS and Video 8 do not have timecode. They can count frame pulses on the tape, but are not frame-accurate. Sony has introduced "8mm timecode" in order to support more accurate editing applications with Hi8.

There are two basic techniques used to record SMPTE time code on videotape, see longitudinal time code (LTC) and vertical interval time code (VITC).

Snow
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(1) Random noise on the display screen, often resulting from dirty videotape heads.
(2) TV signal breakup caused by weak or no video reception.

Sound Digitizer

A device for recording natural sounds and voices and storing them as computer

files. Once digitized, the audio can be easily edited or used to create various effects. On the low-end there are products like the Farallon MacRecorder or Apple's built-in capability on some Macintosh models. With the AudioMedia card or Pro Tools interface from DigiDesign, CD-quality sound digitizing is possible with the Macintosh.

Split Screen

A special effect utilizing two or more video sources so that two or more scenes are visible simultaneously on each part of the screen. Often used to make window-dubs of multi-camera shoots.
A useful means for comparing two sources simultaneously. Permits a fast visual check of the phase and sync timing between two inputs.

Staircase

A pattern generated by the NTSC generator, consisting of equal width luminance steps of 0, +20, +40, +60, +80, and + 100 IEEE units and a constant amplitude chroma signal at color burst phase. Chroma amplitude is selectable at 20 IEEE units (low stairs) or 40 IEEE units (high stairs). The staircase pattern is useful for checking linearity of luminance and chroma gain, differential gain, and differential phase.

Standard, Interconnect Standard

The specific signal configuration, reference pulses, voltage levels, etc. which describe the input/output requirements for a particular type of equipment. Some standards have been established by professional groups or government bodies (such as SMPTE or EBU). Others are determined by equipment vendors.

Still Video Cameras

Still video cameras are cameras that look like something in-between a still and a video camera. The Sony Mavica records on a two-inch disk that holds 25 frames or 50 fields on flexible disks which are erasable and reusable. The encoding is analog component, but with less bandwidth (and therefore a noticeably lower quality image).

Electronic still photography has been used for "electronic journalism," where images are shot in the field and sent by modem from any available phone. These cameras have already begun to replace still picture film cameras for many applications which do not require the high resolution and image quality of 35mm still picture film.

Storyboard

A series of panels of pictures (usually sketches) designed to show how a production will look. Comic books are essentially storyboards.

Sub-carrier

A 3.58 MHz signal modulated by color signals and combined with luminance signals to produce an NTSC composite video signal.

Subcarrier (SC, 3.58, 3.58CW)

This is the basic signal in all NTSC sync signals. It is a continuous sine wave, usually generated and distributed at 2 volts in amplitude, and having a frequency of 3.58 MHz. Subcarrier is usually divided down from a primary crystal running at 14.32 MHz, and that divided by 4 is 3.58. All other synchronizing signals are directly divided down from the subcarrier.

Subcarrier Phase Shifter

Special circuitry designed to control the phase relationships of the two portions of the encoded color signal so that they maintain their correct relationship during recording transmission and reproduction.

Switcher, Video Switcher

The switcher is the central router and mixer of video source material in an on-line suite. Switchers are generally analog devices, and are capable of performing analog effects as well as switching incoming channels. These effects include fades and dissolves, wipes and borders, and keys (opaque overlays based on replacing black or a particular color). In earlier days this was called the "special effects generator" or SEG.

Sync

(1) Short for synchronous. Refers to signals used to synchronize the horizontal and vertical scans of a video signal. This signal is derived from a composite or combination of horizontal and vertical drives, with some slightly narrowed and delayed pulses as well as the addition of equalizing pulses. When used, is usually accompanied by subcarrier.

Synchronization Of Video Tape Recorders

In order for any mixing or editing of video signals to occur, all source and record decks must be in sync with each other, running at exactly the same speed and in identical phase. You can picture the process as being similar to transferring goods between high-speed trains running alongside each other. In editing facilities, all decks are fed a common sync signal, called "house sync." See pre-roll.

Without synchronization, each individual transport would all run at slightly different rates. Analog tape transports, being mechanical, have small fluctuations in tape speed called "wow and flutter". The capstans on tape machines can slip over time as well, also generating changes in tape speed. With disk-based systems there is no mechanical transport and no tape. Instead, the playback and record speeds are controlled by quartz crystal oscillators. However, no two oscillators are exactly the same, and an oscillator's frequency can vary with time and temperature. What all this means is that any two transports, even when started at exactly the same time, will begin to drift apart over time and the audio on the different systems will eventually drift out of sync.

Synchronization is achieved in these systems by constantly checking to see the current SMPTE frame, and adjusting the playback speed to keep all devices locked. In analog systems, this is achieved by automated motor speed control. In digital systems it is achieved by adjusting the playback sample rate. See sync, SMPTE time code.

Synchronous

Able to perform two or more processes at the same time, such as sending and receiving data, by means of a mutual timing signal or clock. Compare asynchronous.

Synchronous Transmission

A transmission process that uses a clocking signal to ensure an integral number of unit (time) intervals between any two characters. Compare asynchronous transmission.

Telecine
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(1) A device which consists of a projector without the lens and a video camera aimed directly at the illuminated film to record it. A telecine projector incorporates a five-bladed shutter splitting the film into 1/120 second flashes and resulting in two exposures of film for each video field. Since these would not necessarily be of the same film frame, the video fields would often have two different images superimposed. This can cause problems with videodisc still framing.
(2) A Rank or Bosch. These are the highest-quality devices for film-to-video transfer. Unlike a telecine projector, they do not use a lens. Instead, a dot of light on one side of the film and a light sensor on the other side is used to scan the film. The Rank uses a small picture tube as the source of the dot of light. This is called a flying-spot scanner. The Bosch uses a one-dimensional CCD array. Both the Rank and the Bosch produce excellent results. The Rank has the advantage of changing the scanning size electronically, allowing control over the size and position of the film area being scanned. Both of these machines have highly developed methods of color correction, allowing very selective work. For example, a single shade of color in a particular area of the picture can be changed without affecting anything else.

Television Receiver

A device capable of accepting video signals broadcast as RF. Also capable of producing a demodulated video signal output from a off-air input signal. Compare monitor.

Television Set

A display device capable of receiving broadcast video signals (such as commercial television broadcasts) by means of an antenna. Compare RGB monitor.

Test Pattern

An optical guide for television camera reference alignment.

Time Base Corrector (TBC)

A time base corrector, or TBC, is a device which corrects the timing irregularities that occur during VTR playback.

Since synchronization between videotape decks is so important, it is imperative that all decks perform at precisely the same speed. Speeds always vary, at least slightly, due to VCR velocity errors and tape stretch. TBCs are essential for any kind of multiple mixing of input from videotape source decks, including wipes, dissolves, and overlays. Each source deck must have its own TBC, and each must be synchronized to "house sync."

TBCs are also used simply to "clean up" the timing of a recorded video signal. These TBCs act like black boxes, taking in unstable video and putting out stable video. Because they work alone, without house sync, they are often called standalone TBCs.

Time Base Stability

The maintenance of the scanning process to very close tolerances. See time based corrector.

Time Code

See SMPTE time code.

Time Code Editing

By recording a sequential time code along with the video and audio material, you can obtain a precise reference for editing. Each frame has its own number or code which tells the time in hours, minutes, and seconds, and includes a frame number. The industry standard code is called SMPTE time-code . Time code permit very fast and accurate editing. Automatic editing is possible using an edit controller. See EDL, edit controller. Compare control track editing.

Timecode, 8mm

8mm timecode is a proprietary form of timecode used by Sony with some of their Hi8 products. Compatibility problems in time-code editing environments is solved by using a third-party device made by Horita that converts the timecode from the Sony EVO-9850 and EVO-9800 editing decks to standard SMPTE time code.

Title Generator

A black and white camera that is used to shoot titles which are electronically superimposed on the video picture while shooting or during editing. Title color can be selected and changed independently. A more sophisticated device know as a character generator (CG) can generate titles directly.

Track

A grouping of homogeneous data within a movie file. Typical track types might

include video, sound, transitional effects, closed caption text, MIDI data, etc.

Tracking

The angle and speed at which the tape passes the video heads.

Transcoder

A device used to convert from one video component set to another. For example, to dub a Hi8 tape to Betacam SP with the highest possible results, you would need to use a transcoding TBC which includes a transcoder capable of converting the Hi8 (Y/C) signal to the Betacam SP component (Y, R-Y, B-Y) signal.

TTL RGB

A type of video monitor that can accept only a limited number of digital values and display only a correspondingly limited number of colors. Compare analog RGB.

Underscan

A mode available on professional video monitors which decreases the raster size H and V so that all four edges of the picture are visible on the monitor. Allows viewing of skew and tracking which would not be visible in normal (overscanned) mode. Also helpful when aligning test charts to be certain they touch all four corners of the raster.

Valid Signal

A video signal which will remain legal when transcoded to any other format. Signals which are not valid will be processed without problems in their current format, but problems may be encountered if the signal is transcoded to a different format. For example, the Macintosh will let you generate highly saturated colors which may be legal in the RGB domain, however, when converted to composite video will exceed the NTSC specifications. A valid signal is always legal, but a legal signal is not necessarily valid.

Vbox

The Vbox is a an interface device which can be connected to a personal computer via an RS-232 serial interface. Through the Vbox the computer can control LANC (also called Control-L) compatible video devices. The Vbox translates the VISCA commands from the computer into Sony's LANC protocol. Up to 7 Vboxes can be daisy-chained from one serial port. See LANC, VISCA.

VCR

Video Cassette Recorder. See VTR.

Vectorscope

A round oscilloscope used to analyze and align the amplitude and phase of the

color video signal.

Vertical Blanking

See vertical interval.

Vertical Interval

The period of time during which the scan is retraced from the bottom of the screen back to the top. The picture is blanked during this part of the scan. The vertical interval period contains sync pulses and in broadcast use, can contain network information, test signals and closed captioning signals.

Vertical Interval Time Code (VITC)

VITC is recorded within the video signal, each timecode stamp is recorded between the video frames, during the vertical blanking interval. VITC cannot be recorded on audio tracks. With VITC, video devices can capture the timecode from the video deck when it's paused or in "crawl" mode, however, most synchronizers cannot read VITC at speeds exceeding about ten times playback speed, preventing slaved machines from maintaining synchronization during rewind and fast forward. See SMPTE time code, compare longitudinal time code.

Vertical Retrace

The return of the electron beam to the top of a television picture tube screen or a camera pickup device target at the completion of the field scan.

Vertical Scan Frequency

The frequency of the vertical sync pulses, or the frequency of the vertical scan. NTSC vertical scan frequency is 59.9 Hz. The Macintosh video vertical scan frequency is 67.7 Hz.

Vertical Sync

A pulse used to trigger the vertical retrace of a scanning electron gun from the bottom of a frame back to the top.

Vertical Sync Pulse

A portion of the vertical blanking interval which is made up of blanking level and six pulses (92% duty cycle at -40 IRE units) at twice the horizontal sync pulse repetition rate. Synchronizes vertical scan of television receiver to composite video signal. Starts each frame at same vertical position (sequential fields are offset 1/2 line to achieve interlaced scan.

Video
---
(1) A means for reproducing moving visual images by representing them with an analog electronic signal. The images are decomposed into a series of horizontal scan lines. In this way the signal can be stored, transmitted and reproduced. See rasterization, field, frame.

(2) Referring to the NTSC composite video standard. This is a widespread standard such that the "video in" of one machine is compatible with the "video out" of another.
(3) There are various standards which define this signal, see RS-170, RS-170A, NTSC, PAL, SECAM, RGB, CAV.

Video Distribution Amplifier

A special amplifier for strengthening the video signal so that it can be supplied to a number of video monitors or other devices at the same time.

Video Editing

Editing is the process of selecting the frames and arranging them on the edit master videotape. In professional applications usually edits must be frame accurate. For example. When mastering a laserdisc frame accuracy absolutely essential, especially when single frame elements are involved. See off-line, on-line, et al.

Video Format

A standard determining how a video signal is recorded onto videotape. These include 1-inch Type C, 3/4" U-Matic, 3/4" U-Matic SP, Betacam, Betacam SP, M-II, D-1, D-2, D-3, VHS, Hi8, Video 8, Beta, and S-VHS.

Video Monitor

A display device that can receive video signals by direct connection only and cannot receive broadcast signals such as commercial television; it can be connected directly to the computer. Compare television set.

Video Recording

Any image, still or moving, can be converted into a video signal, most often through a video camera. Then the video signal can be recorded. By far the most common method of recording video is on videotape.

Video Signal

A dynamic signal which represents the varying levels of a video image but does not contain the sync pulses for its display. The video signal can be combined with sync pulses into a composite signal.

Video Waveform

The pictorial display on a waveform monitor (a special oscilloscope) of the various components of the video signal, used to check the integrity of the signal and signal components.

Videocassette

A self-contained video module played on a specially designed video tape recorder; similar in design to an audio cassette; houses two reels (supply and

take-up) with the tape running between them but connected to both.

Videodisc

A double-sided optical disc capable of storing and playing back full-motion video. Videodisc has come to refer to all video media that are disc-shaped, regardless of whether they are optical or magnetic, digital or analog.

Videotape

A magnetic medium capable of storing an electronic signal and consisting of backing, binder, and coating. The coating usually consists of iron oxide, however, metal particle or metal evaporated coatings are also used.

Videotape Formats

Videotape equipment ranges in price from $250 for a bargain-basement VHS deck to over $200,000 for a digital component deck. Nevertheless, both produce the same 525-line, 30-frame-per-second image. The differences lie in visual quality, generation loss characteristics and in control capabilities.

VISCA

Acronym for Video System Control Architecture. VISCA is a device control language designed for synchronized control of multiple video devices. The protocol is device and platform independent. See LANC, V-Box.

VITC

See Vertical Interval Time Code.

VTR

Video Tape Recorder. An electro-mechanical device capable of recording, storing, and reproducing an electronic signal which contains audio, video, and control information. The term VTR includes reel-to-reel and cassette type (VCR) recorders.

Waveform
---
(1) The shape of a wave (a graph of a wave's amplitude over time).
(2) Slang for waveform monitor.

Waveform Monitor

An oscilloscope used to display the video waveform.

Wavelength

The horizontal extent of one complete cycle of a wave.

Window Dubs

The trick to off-lining is to always have access to the timecode for all of the source material. If the source medium is of professional quality, like Betacam SP, then viewing the material is expensive and complex. But it is also unnecessary: the material can be transferred to a more accessible medium, like 3/4-inch or VHS tape, with the timecode "burned in" on the picture, usually near the bottom. This is called a window dub. Each video frame is marked permanently with the exact timecode number. The advantage this offers is the ability to see the timecode on a VCR without a timecode reader. This assures frame accuracy during off-lining. Window-dubs are the video equivalent of workprints in film.

Wipe

A visual transition between images during which the edge of one image moves across the screen revealing the next image.

Wow and Flutter

Small fluctuations in tape speed. Wow is a gradually occurring change; flutter is a rapidly occurring change. A widely used specification in analog audio and videotape recorders.

XLR Connector

A connector with three conductors used in professional audio applications, typically with a balanced signal. Compare RCA connector and BNC connector.

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, I, Q

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

A version of component video (Y, R-Y, B-Y) specified for the SMPTE analog component standard .

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 NTSC systems; Y is the luminance signal, R-Y is the 1st color difference signal and B-Y is the 2nd color difference signal.

Y, U, V

The luminance and color difference components for PAL systems; simply the Y, B-Y, R-Y components with new names. The derivation from RGB is identical.

Y/C Delay

Lag of timing between the luminance (Y) and chrominance (C) signals.

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