



Tech Info Library

Multimedia Glossary: G - RS (2 of 3) (1/96)

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TOPIC -----

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

DISCUSSION -----

Gamut

The range of voltages allowed for a video signal, or a component of a video signal. Signal voltages outside of the range (exceeding the gamut) may lead to clipping, crosstalk, or other distortions.

Gate Weave

An artifact of poor registration either during the film-to-tape transfer process or the actual filming that manifests itself as a weaving back and forth of the film image. See registration.

GBR

The same signals as RGB. The sequence is often rearranged to indicate the mechanical sequence of the connectors in the SMPTE standard.

Generation Loss

With analog video formats extensive efforts are made to keep generations to a minimum since each successive generation will exhibit some loss of image quality in the form of noise and other artifacts. This characteristic varies from format to format. For example, 1-inch Type C exhibits almost imperceptible loss up to 4 generations while VHS shows considerable degradation each generation. With digital formats such as D-1 and D-2, however, this requirement is no longer necessary, since each copy can potentially be very close to perfect. This is important for applications such as compositing which require images to be dubbed several times.

Generations

The number of times a video clip is copied or processed. See generation loss.

Genlock

The capability to synchronize video signals from one device with those of another video source. This is required when mixing signals together as in overlaying computer graphics on an image from a camera, VCR or videodisc player to prevent screen flicker or rolling.

Genlocking a Macintosh requires changing its video scan rate, switching the video into an NTSC timed interlaced image which can then be synchronized with the other video source. This requires either an encoder box attached to a video card which supports genlock or a scan converter.

Genlock is a process of sync generator locking. This is usually performed by introducing a composite video signal from a master source to the subject sync generator. The generator to be locked has circuits to isolate vertical drive, horizontal drive and subcarrier. The process then involves locking the subject sync generator to the master subcarrier, horizontal, and vertical drives so that the result is that both sync generators are running at the same frequency and phase.

Ghost

A shadowy or weak image in the received picture, offset either to the right or to the left of the primary image. It is the result of transmission conditions where secondary signals are created and received earlier or later than the primary signal caused by a reflected RF signal.

Gray Scale

A series of tones which range from true black to true white, it is usually expressed in 10 steps in video applications.

HDTV

High Definition Television. Still, limited to some very high-end applications. The FCC is close to establishing a broadcast standard for HDTV. The SMPTE has proposed a high definition television production standard consisting of 1125 lines, 2:1 interlace, 60 Hz field (30 frames/sec), a 16:9 aspect ratio and 30 MHz RGB and luminance bandwidth.

Hertz (Hz)

The unit of frequency of vibration or oscillation, defined as the number of cycles per second. Named for the physicist Heinrich Hertz.

Horizontal Blanking

The blanking signal that is produced at the end of each scanning line.

Horizontal Blanking Interval

The time between the display of the rightmost pixel on one line and the leftmost

pixel on the next line.

Horizontal Drive

See horizontal sync.

Horizontal Resolution

The smallest increment of a television picture that can be discerned in the horizontal plane. This increment is dependent upon the video bandwidth and is measured in frequency or lines.

Horizontal Scan Frequency

The frequency at which horizontal sync pulses start the horizontal retrace for each line. A high frequency is needed for a non-interlaced scan. The horizontal sync frequency for a color Macintosh connected to the 13-in. RGB display is 35 KHz, while the NTSC frequency is 15.75 KHz. Projection of high resolution non-interlaced Macintosh color video requires projectors capable of 35 KHz horizontal sync frequency.

Horizontal Sync

A signal created and used to synchronize the horizontal scan of a video signal, often combined with vertical sync into a composite sync. This signal is derived by dividing sub-carrier by 227.5 and then doing some pulse shaping. The signal is used by monitors and cameras to determine the start of each horizontal line. See horizontal scan frequency.

House Sync

A common sync signal generated by a sync generator and fed to all video devices in an editing facility in order to synchronize the devices. See sync.

Hue

(1) The distinction between colors. Red, blue, green, yellow, etc. are hues. White, black, and gray are not considered hues. The dimension of color that is referred to a scale of perceptions ranging from red through yellow, green, blue back to red.

(2) The color tint of a video image. The color of an analog video signal is determined by three factors: hue, saturation and luminance. In a composite video signal, the hue is determined by the phase relationship to the color burst.

IEEE

The Institute of Electrical and Electronic Engineers, an organization which sets many of the standards in the electronic industry.

Interactivity

An open-loop control where a programmed system is directed by its user through

mutual and simultaneously activity where either can interrupt the other without crashing the operation, where there is limited ability to anticipate, no default path and there is the impression of an infinite database.

In Point/Out Point

The first and last frames of a selected portion of a large clip. Frame notation (00:00:00:00= hours:minutes:seconds:frame) is the used to designate an in point and an out point.

Interlace

An NTSC 525 line frame which is separated into two sequential scans, or fields, of 262.5 lines each. Field one scans the odd numbered lines and field two scans the even numbered lines creating two interlaced images per frame. The process results in 60 fields per second and is used to reduce the flickering which is apparent when the eye is presented with 30 images per second. In standard video, odd-numbered lines are drawn first. Most computer displays are not interlaced.

IRE scale, IRE units

A unit used for the measurement of video levels. The scale used for the graticule on a waveform monitor. 140 IRE represents 1.000 volts, 100 IRE represents 0.714 volts, while 1 IRE represents 0.007 volts.

ISO

Acronym for International Standards Organization.

Jitter

Small and rapid variations in a wave form due to mechanical disturbances, changes in the characteristics of components, supply voltages, imperfect synchronizing signals, circuits, etc.

Kelvin

Also expressed as Kelvin or K, the unit of measurement of the temperature of light In color recording, light temperature affects the color values of the lights and the scene that they illuminate.

Keying

The process of replacing part of one television image with video from another image. See chroma keying and insert keying.

Kilohertz (KHz)

One thousand hertz, or cycles per second. See Hertz.

LANC

A protocol defined by Sony which permits the external control of video devices

and access to status information from the device. Also referred to as Control-L.
See VISCA, Vbox.

Legal Signal

A video signal in which each component does not exceed the specified gamut for the given format. Compare valid signal.

Light Valve Projector

A video projector design with very high light output. An example of a projector using this technology is the Talaria from General Electric.

Longitudinal Time Code (LTC)

Longitudinal time code (LTC) is recorded as an audio signal on the address track or one of the audio tracks of a video tape. It may also be recorded on a track of audio tape. LTC can be read at high tape shuttle speeds, allowing time code readers to stay "in-sync" during rewind or fast forward. Unfortunately, LTC cannot be read at very slow shuttle speeds (such as when you are "crawling" the tape frame by frame) or in pause. See SMPTE time code, compare vertical interval time code.

Looping

A term indicating that a high impedance device has been permanently connected in parallel to a video source.

LTC

See longitudinal time code.

Luminance

The aspect of the video signal carrying information about the brightness of an image.

Macintosh Video

Typically refers to the signal produced by a Macintosh 8•24 display card or Quadra built-in video. Although several scan rates and resolutions are supported, when connected to the 13-in. RGB monitor the display resolution is 640 x 480 pixels with a 67.7 Hz scan rate.

Matte

(1) A film term sometimes used in video production work to denote a keyed effect, an insert of video signal information keyed from one source into a second video signal.

(2) A opaque piece of art or a model that leaves a selected area unexposed to be filled on a subsequent pass or in composite. Also referred to as a mask.

Mavica

The name-brand of a popular still video camera sold by Sony, See still video cameras.

Megahertz (MHz)

One million hertz, or cycles per second. See Hertz.

Metal Particle Tape

Videotape using iron in its pure metallic form, instead of as an oxide. Offers improved frequency response and wider dynamic range than traditional oxide formulations.

MIDI

Acronym for Musical Instrument Digital Interface. A standard communications protocol used by electronic music equipment allowing device control from personal computers. MIDI has moved into the audio and video realm for mixing and editing.

MIDI Time Code

A time code system allowing timed device control through MIDI protocols. It has become more important in video post production as more and more people are working with personal computer based systems. Compare SMPTE time code.

Modulate

To modify or alter a signal so as to transmit information. For example, conventional broadcast television transmits the video image by modulating the amplitude and frequency of a carrier signal. Compare demodulate.

Moire

Optical disturbance caused by interference of similar frequencies. The wavy effect produced by the convergence of lines. It usually appears as a curving of the lines in the horizontal wedges of a test pattern. It is a natural optical effect when converging lines in a television picture are nearly parallel to the scanning lines. Compare aliasing.

Monitor

A particular type of television that receives a composite and/or component video signal (as opposed to an RF signal) directly from a VCR, camera, or separate TV tuner for high quality picture reproduction. Does not contain a channel selector. Compare television receiver.

Monochrome Signal

A single color video signal; usually a black and white signal or, sometimes, the luminance portion of a composite or component color signal.

Motion Control Photography

A system for using computers to precisely control camera movements so that different elements of a shot can later be composited in a natural and believable way.

Movie

Movie (in QuickTime) refers to all dynamic data, such as sound, video and animation. The QuickTime movie file format is a container for this timebased data

Multiscan

A term taken by a particular manufacturer often used to refer to any multisync device. See multisync.

Multisync Monitors (and Projectors)

Video displays which accept a wide variety of horizontal and vertical timings, from NTSC to computer video signals. Multisync monitors and projectors will often automatically adjust to the appropriate timing. Since the horizontal frequency range varies among different models, product specifications should be checked to assure a monitor or projector will support the Macintosh connected to it. Multisync monitors manufactured by Apple are called Multiple Scan Displays.

Neutral Colors

The range of gray levels, from black to white, but without color. For neutral areas in the image the RGB signals will all be equal, in color difference formats the color difference signals will be zero.

NTSC

(1) Abbreviation for National Television Standards Committee, which standardized the NTSC color broadcasting system which is used today in the in the US, Japan and elsewhere.

(2) The standard video format defined by the NTSC, also called composite because it combines all the video information, including color, into a single signal. See NTSC composite.

NTSC Color Bars

A pattern generated by an NTSC generator consisting of eight equal width color bars. Colors are white (75%), black (7.5% set-up level), 75% saturated pure colors red, green, and blue, and 75% saturated hues of yellow, cyan, and magenta. (Mixtures of two colors in 1:1 ratio without third color).

NTSC Composite

A video signal standard proposed by the National Television Standards Committee

of the Electronics Industries Association and adopted by the FCC for broadcast television in the United States. The signal is a composite video signal of 525 lines, interlaced, 60 fields per second (30 frames per second) with a bandwidth limited to 4 MHz so that it will fit into a 6 MHz broadcast television channel without interfering with adjacent channels. NTSC is also the standard system for Japan.

The standard was created to allow color television signals to be compatible with existing monochrome (black and white) television. The restriction of compatibility with the earlier technology results in compromises in color image quality. The NTSC composite signal format is required for video recording except with devices which support component video.

Though there are 525 scan lines, more than 40 lines are blanked during vertical retrace periods. Overscanning and poorly adjusted televisions reduce the number of visible lines further, leaving viewers around 360 lines of video information in a normal television picture.

Macintosh video can be converted to NTSC composite using an encoder or scan converter. When using an encoder with a Macintosh video card there is an unavoidable reduction in image quality and single pixel lines, for instance, will flicker (unless the video card supports convolution) due to the interlaced nature of the NTSC signal. Images intended for NTSC use should be designed according to the limitations of the format, unless a more expensive scan converter is being used. See encoder and scan converter.

NTSC RGB

Interlaced red, green, and blue video signals timed to NTSC standards. Refers to three monochrome signals representing the primary colors of the image. This is a superior signal format to composite video which is one signal encoded from the three signals. An NTSC RGB signal differs from a component video signal which consists of Y, R-Y, and B-Y signals.

Off-line, Off-line Editing

The preliminary or rough edit usually done on a low-cost editing system using videocassette work tapes. In an increasing number of situations random-access non-linear editing system using digitized video or laserdiscs are being used for off-line editing. Allows editors to make decisions and gain necessary approvals before making the more expensive and demanding on-line edit. Since the actual edit session in a professional video facility is very expensive, it is always best to make all editing decisions in advance. This is called off-line editing or off-lining. See window dubs, on-line, special effects.

On-line, On-line Editing

The final edit of a video using original master tapes to produce the finished piece. An on-line edit suite usually has a full range of high-end video devices (switcher, TBCs, DVE, character generator, etc.) which would normally be too expensive to use during an off-line edit session.

The on-line session is where the actual editing and effects take place. It occurs in an edit suite with a professional editor (known as the on-line editor). Again, the more prepared you are, the better since "things happen." It is very easy to go way over your budget estimate for an off-line edit if your EDL contains little surprises like a mislabeled in-point. Computer based editing systems like the Digital F/X and Avid Media Composer automatically generate EDLs which are very accurate, reducing on-line time considerably. See CMX, special effects, window-dubs. Compare off-line.

Opticals

Visual effects produced optically using an optical printer that contains one camera head and several projectors. The projectors are precisely aligned in order to produce multiple exposures in exact registration on the film in the camera head. Rapidly being replaced with special high-resolution video devices for all but feature applications.

Overscan

- (1) The television picture beyond area of normal screen size.

(2) A method by which the video image is scanned beyond the normal viewing area of the screen. Compare underscan.

Paintbox

Paintbox is the trade name for a device made by Quantel, however, it is geneeally used to describe a digital video paint program capable of drawing and shading images from scratch or from digitized video frames. The Paintbox creates only still images, but sequences of animated images can be made from the still images by loading frame by frame onto a Harry or equivalent.

PAL

Phase Alternative Line system. The television broadcast standard for most of western Europe. Based on the 50 Hz power system, it displays 625 lines interlaced at 50 fields per second (25 frames per second). By reversing the relative phase of the color signal components on alternate scanning lines, this system avoids the color distortion that appears in NTSC reception. PAL is not compatible with NTSC or SECAM, though conversion between the standards is possible. Video products to be used in Europe require compatibility with PAL standards.

Pedestal

See blanking level.

Period

The time elapsed during one complete cycle of a wave.

Phase

- (1) A stage in a periodic process; a point in a cycle.
- (2) The relationship between two periodic signals or processes.
- (3) The amount by which the cycles of one wave precede or lag behind the cycles of another wave of the same frequency.
- (4) Some fraction of a wave cycle (measured from a fixed point on the wave).

Posters

A single frame of a QuickTime movie that is designated as a static substitute for the movie's video data. The poster is typically the frame that would be printed if a movie was pasted into a document.

Pre-roll

Almost all videotape decks need a running start to get up to speed. This is called pre-roll, and varies between machines from about 3 to 10 seconds. This means that for every edit, source and record decks must first stop, count backward the exact number of frames required for pre-roll, begin playing simultaneously, then at the precise edit point begin recording. It is a mechanical and electronic marvel that video editing can be frame-accurate at all. See sync.

Primary Colors

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

Pulse

A current or voltage which changes abruptly from one value to another and back to the original value in a finite length of time. Used to describe one particular variation in a series of wave motions.

Pulse Distribution Amplifier

An amplifier designed to boost the strength of the sync as well as other control signals to the proper level for distribution to a number of cameras, special effects generators, or other equipment.

QuickTime

An operating system software extension for dynamic media such as sound, video and animation for Macintosh computers. The QuickTime standard file format is a "movie". QuickTime is also available for MS Window computers and FM-Towns (in Japan).

Radio-Frequency (RF) Modulator

A device that makes your television set work as a monitor. See modulator.

Rank

The brand-name of a device used for film-to-video transfer. See telecine.

Raster

The rectangular, repeating pattern of lines scanned in a video monitor or camera pickup tube creating the video image. The scan is a continuous cycle regardless of the image content.

RCA Connector

A connector typically used for audio and video signals, with some professional equipment and most consumer equipment. Compare BNC connector, XLR connector.

RCA Connector

A connector typically used for cabling in both audio and video applications.

Registration

(1) An adjustment associated with color monitors and projectors to ensure that the three electron beams (the three primary colors) are hitting the proper color dots/stripes on the phosphor screen, A similar adjustment exists on color tube cameras.

(2) The alignment of film frame-by-frame in a camera, projector or telecine. Good registration is critical in order to eliminate gate weave. See gate-weave.

Resolution

A measure that shows to what extent details can be distinguished on the TV screen. Generally called horizontal resolution when referring to a video image. It can be evaluated by establishing the limit to which lines can be distinguished on a test pattern with the naked eye. A broader frequency band of the video signal permits a higher resolution.

Macintosh video has a bandwidth of 30 MHz, resolving color images at 640 pixels by 480 pixels. This exceeds the capabilities of an NTSC composite signal.

RF

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Radio Frequency refers to a composite video signal superimposed on a very high (radio) frequency capable of being broadcast through the atmosphere. Standard television sets receive these signals, separate the composite signal from the RF, and then decode and display the composite signal.

Until recently, television sets were designed to receive only RF signals, which were applied to their antenna terminals. VCRs, videodisc players and some computers provide RF signals for use with televisions. The process of mixing composite video with RF, only to have it removed again by the television, further degrades the image quality.

RGB

Red, Green, Blue. Refers to three monochrome signals representing the primary colors of the image. RGB signals are provided on individual outputs with composite sync available either on a fourth output or combined with the green signal. RGB signals can be interlaced (timed to NTSC standards) or non interlaced (at higher sync frequencies).

RGB Monitor

A type of color monitor that receives separate signals for each color (red, green, and blue). See also composite video.

RGB, RGB Format, RGB System

Red, Green, and Blue. The basic parallel component set, in which a signal is used for each primary color; or the related equipment or interconnect formats or standards. The same signals may also be called GBR as a reminder of the mechanical sequence of connections in the SMPTE interconnect standard. See RGB component. Compare component video.

Rise Time

The time taken for a signal to make a transition from one state to another; usually measured between the 10% and 90% completion points of the transition. Shorter, or faster rise times require more bandwidth in a transmission channel.

Rotoscope

A camera set up that projects live-action film one frame at a time onto a surface so that an animator can trace complicated movements. The completed animation film exactly matches the motion of the original action.

RS-170

The EIA (Electronics Industries Association) standard that defines the timing of broadcast video in the United States, Japan, and several other markets. It specifies a 15.75-KHz horizontal and a 60-Hz vertical interlaced scan frequency as well as other aspects of the composite signal such as voltage, sync levels and timing of blanking.

Interlacing is the process by which two fields, called scan lines, are interleaved on the screen. Due to the limitations of video devices at the time the standard was being set in 1957, the speed of broadcast signals and picture tubes required the image to be displayed in parts.

The solution allowed the partial update of video pictures to remain unnoticed to the viewer. An RS-170 video frame contains 525 lines and is displayed 60 times per second—for a total of 15,750 lines, or 15.75 KHz. Of these lines, only the odd or even lines are displayed with each frame. A total of 60 frames per second allows 30 frames per second, or a 30-Hz update of each line.

Like the RS-343 standard, RS-170 is strictly a timing specification for monochrome video signals. By combining three such signals to control individual red, green, and blue sweep circuits, you can create a full-color system. The

RS-170 mode is available with the Macintosh video card as a way for VCRs and large screen projectors, not capable of high-frequency scans, to interface with the Macintosh. Compare RS-343, RS-170A, RS-170 RGB.

RS-170A

Twenty years after the drafting of RS-170, the EIA video signal standard proposal RS-170A evolved into what is known today as the NTSC composite video signal. RS-170A specifies timing of scans (essentially the same as RS-170: 15.732 KHz horizontal and 59.94 Hz vertical) and blanking as well as the 3.58 MHz burst required to decode the color signals. As adopted by the FCC for broadcast use, the standards are precisely adhered to and carry the force of law. For non-broadcast use, EIA standards are merely recommendations and are not enforced. Specifications referring to RS-170A do not necessarily mean the signals are broadcast standard. RS-170 RGB, RS-170.

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