

## Video Glossary

### **3:2 Pull-down**

Method used to map the 24fps of film onto the 30fps (60 fields) of 525 line NTSC video, so that one film frame occupies three video fields, the next two, etc. In this way the film can play at a standard video rate. It means the two fields of every other video frame come from different film frames, this can cause problems in the editing process.

### **4:1:1 Sampling**

A ratio used to describe the sampling frequency of a digitized signal. The ratio describes luminance as being sampled 4 times at 3.37 MHz, while color is sampled 1 time at 3.37 MHz in each of its separate parts. DV, DVCAM and DVCPRO25 use 4:1:1 color sampling. Formulated as: Y (luminance) is sampled at 13.5 MHz (or  $3.37 \times 4$ ), R-Y (color) is sampled at 3.37 MHz (or  $3.37 \times 1$ ), B-Y (color) is sampled at 3.37 MHz (or  $3.37 \times 1$ ) equals 4:1:1.

### **Aperture**

The iris opening in a lens that regulates the amount of light passing into a camera. The size of the aperture opening determines the amount of light that will get to the imager (CCD). The larger the opening, the more light that will enter. Aperture is usually defined in f/stops.

### **Aspect Ratio**

The ratio of height over width of an image: a standard video monitor has an aspect ratio of three units of height (vertical) to four units of width (horizontal). This is expressed as a 3:4 aspect ratio. Images will become distorted if forced into a different aspect ratio during enlargement, reduction, or transfer. The aspect ratio for HDTV is 16:9.

### **Auto Iris (Camera feature)**

A lens iris equipped with a photosensitive detector that can read changes in lighting conditions and automatically open or close the iris to compensate for the changes.

### **B-frame (*B*-directional-frame)**

Predictive frames composed by checking the difference between the previous and the following frames in a MPEG-2 signal. By itself a B-frame does not make up a complete picture. An entire sequence of MPEG-2 frames must be decoded to form a whole picture. A B-frame can also act as a uni-directional frame, if there is only one I-frame to reference in an edit. This is known as a BU-frame.

### **CCD (Charged Coupled Device)**

A semiconductor that can produce an electrical output analogous to the amount

of light striking each of its elements. CCD sensors (imager) are used in both motion video and still video cameras.

### **Component Video**

Each individual component of the video signal is transmitted separately. Transmission methods include the R/G/B method, which transmits the R (red), G (green), and B (blue) signals separately, and the Y/PB/PR method that transmits Y (luminance) signal and PB/PR (color difference) signals separately.

### **Composite Video**

A single video signal that contains luminance, color and synchronization information.

### **Compression Ratio**

The ratio of the amount of data in the original (uncompressed) digital video signal to the amount of data after compression. The resulting picture quality can vary considerably, depending on both picture content and compression method.

### **Firewire**(Apple Computer) (*IEEE-1394*)

A communications protocol developed by Apple Computer, which provides for the fast transmission of data, video, audio, and power over a single cable. Data is transmitted at 400 Mbps (400 million bits per second).

### **f/Stop**

A calibrated measure of aperture lens opening. f/Stop is a numerical relationship between the diameter of the lens opening and the focal length of the lens. Common f/Stops include f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22. The higher the number, the smaller the lens opening and the less light falling on the imager (CCD). In low-light situations, a large aperture (e.g. f/1.4) would be needed.

### **GOP** (*Group of Pictures*)

P and/or B-frames between successive I-frames in an MPEG signal. A GOP is usually about 15 frames long in an NTSC system. The length of a GOP can vary depending on editing needs. The length of a GOP represents the editing capability of an MPEG signal. If an edit occurs within a GOP, an MPEG decoder/recoder will be needed to reclose the GOP. A GOP must begin with an I-frame and end with an I-frame, therefore if a cut occurs in the middle of a GOP, the signal needs to be reconstructed with a decoder/recoder.

### **Horizontal Resolution**

The ability of a system to reproduce closely spaced alternating black and white vertical lines of detail across the screen. The number of alternating black and white lines is divided by the aspect ratio to make comparisons between horizontal and vertical resolution easier. This number is usually expressed as TV lines per picture height.

**IF Lens** (Internal Focus) (Lens feature)

A lens which, when focused allows the internal lens elements to turn while the external barrel of the lens as well as the front lens element remain stationary. This feature greatly reduces lens flare and lens aberrations. An IF lens is required for certain screw-on filters and matte boxes, to prevent them from turning during a focus pull.

**I-frame** (Intra-frame)

A frame included in a GOP, which contains information to construct a whole picture. The I-frame usually surrounds a B-frame and a P-frame.

**Lux**

A unit of measure of incident light (not reflected from the scene). The lux rating of a camera is usually, loosely used to determine if the camera is capable of producing an image in low light situations. The lower the lux specifications, the lower the required light level needed to produce an image. Generally, the lux rating of a camera is listed in the specifications as "Minimum Illumination". The Minimum Illumination specification lists the lux rating as well as the f/Stop and gain settings needed to achieve the lowest lux possible on that particular camera.

**MPEG** (*Motion Picture Experts Group*)

It is the nickname given to a family of International Standards used for coding audio-visual information in a digital compressed format. MPEG standards include MPEG-1, MPEG-2 and MPEG-4. MPEG-1, is the standard on which such products as Video CD and MP3 are based. MPEG-2, the standard on which such products as Digital Television set top boxes and DVD are based and MPEG-4, the standard for multimedia on the web. The current thrust is MPEG-7, "Multimedia Content Description Interface".

**NTSC** (National Television System Committee)

Color system mainly used in North America and East Asia (Japan and Taiwan). NTSC uses 525 scan lines with a 30-frame/60-field per second rate.

**PAL** (Phase Alternation by Line)

Color system mainly used in Europe (except France), South America, Africa, Oceania and China. PAL uses 625 scan lines with a 25-frame/50-field per second rate.

**P-frame** (Predicted-frame)

Contains only predictive information. The predictive information is determined by looking at the difference between the present frame and the previous frame. P-frames do not make up a whole picture by themselves. P-frames are not used in the Betacam SX MPEG2 4:2:2P@ML compression scheme.

**RGB** (*Red, Green, & Blue*)

The basic components of the color television system. They are also the primary colors of light, not to be confused with Cyan, Magenta, and Yellow, the primary pigments.

**(R-Y), (B-Y)**

Color difference signals of component video.

**SECAM (Sequential Couleur A Memoire)**

Color system used in France and some African countries, Eastern Europe and Russia.

**SDI (Serial Digital Interface) (SMPTE 259M)**

Standard based on an uncompressed 270Mbps-transfer rate. This is a 10-bit, scrambled, polarity independent interface, with a common scrambling for both component (ITU-R 601) and composite digital video and four channels of embedded digital audio. Uses a 75-ohm BNC connector and coax cable. Can transmit over 600 feet (200 meters).

**Time Code**

An electronic address code used to identify each video frame by Hour, Minute, Second, Frame. In the NTSC system, SMPTE (Society of Motion Picture and Television Engineers) time code is generally used, while EBU (European Broadcasting Union) time code is generally used for the PAL system.

**Waveform Monitor**

A specialized oscilloscope that is used to display and evaluate video signals. A time base synchronized to the video signal drives the horizontal axis of a waveform monitor. The amplitude of the video signal drives the vertical axis of the display.

**Y Channel**

Pure analog luminance information.

**Zoom Ratio**

The ratio of the focal length at the telephoto end of a lens to that at the wide end. A zoom lens can change the size of an object appearing on the monitor to the extent specified by the zoom ratio. The zoom ratio of a lens can be determined by dividing the longest focal length by the shortest (ie.  $82\text{mm} / 6.8\text{mm} = 12\text{X}$  zoom)