



CCTV Glossary

A

Aberration - A term from optics that refers to anything affecting the fidelity of the image in regards to the original scene.

AC - Alternating current.

Activity detection - Refers to a method built into some multiplexers for detecting movement within the camera's field of view (connected to the multiplexer), which is then used to improve camera recording update rate.

AC/DC - Alternating current and direct current.

A/D (AD) - Usually refers to analog to digital conversion.

ADC - Analog to digital conversion. This is usually the very first stage of an electronic device that processes signals into digital format. The signal can be video, audio, control output and similar.

AGC - Automatic gain control. A section in an electronic circuit that has feedback and regulates a certain voltage level to fall within predetermined margins.

ALC - Automatic light control. A part of the electronics of an automatic iris lens that has a function similar to backlight compensation in photography.

Aliasing - An occurrence of sampled data interference. This can occur in CCD image projection of high spatial frequencies and is also known as Moiré patterning. It can be minimized by a technique known as optical low pass filtering.

Alphanumeric video generator (also text inserter) - A device for providing additional information, normally superimposed on the picture being displayed; this can range from one or two characters to full-screen alphanumeric text. Such generators use the incoming video signal sync pulses as a reference point for the text insertion position, which means if the video signal is of poor quality, the text stability will also be of poor quality.

Amplitude - The maximum value of a varying waveform.

Analog signal - Representation of data by continuously varying quantities. An analog electrical signal has a different value of volts or amperes for electrical representation of the original excitement (sound, light) within the dynamic range of the system.

ANSI - American National Standards Institute.

Anti-aliasing - A procedure employed to eliminate or reduce (by smoothing and filtering) the aliasing effects.

Aperture - The opening of a lens that controls the amount of light reaching the surface of the pickup device. The size of the aperture is controlled by the iris adjustment. By increasing the F-stop number (F/1.4, F/1.8, F/2.8, etc.) less light is permitted to pass to the pickup device.

Apostilb - A photometric unit for measuring luminance where, instead of candelas, lumens are used to measure the luminous flux of a source.

Archive - Long-term off-line storage. In digital systems, pictures are generally archived onto some form of hard disc, magnetic tape, floppy disk or DAT cartridge.

Artifacts - Undesirable elements or defects in a video picture. These may occur naturally in the video process and must be eliminated in order to achieve a high-quality picture. The most common are cross-color and cross-luminance.

ASCII - American Standard Code for Information Interchange. A 128-character set that includes the upper case and lower-case English alphabet, numerals, special symbols and 32 control codes. A 7-bit binary number represents each character. Therefore, one ASCII-encoded character can be stored in one byte of computer memory.

Aspect ratio - This is the ratio between the width and height of a television or cinema picture display. The present aspect ratio of the television screen is 4:3, which means four units wide by three units high. Such aspect ratio was elected in the early days of television, when the majority of movies were of the same format. The new, high definition television format proposes a 16:9 aspect ratio.

Aspherical lens - A lens that has an aspherical surface. It is harder and more expensive to manufacture, but it offers certain advantages over a normal spherical lens.

Astigmatism - The uneven foreground and background blur that is in an image.

Asynchronous - Lacking synchronization. In video, a signal is asynchronous when its timing differs from that of the system reference signal. A foreign video signal is asynchronous before a local frame synchronizer treats it.

ATM - Asynchronous transfer mode. A transporting and switching method in which information does not occur periodically with respect to some reference such as a frame pattern.

Attenuator - A circuit that provides reduction of the amplitude of an electrical signal without introducing appreciable phase or frequency distortion.

ATSC - Advanced Television System Committee (think of it as a modern NTSC). An American committee involved in creating the high definition television standards.

Attenuation - The decrease in magnitude of a wave, or a signal, as it travels through a medium or an electric system. It is measured in decibels (dB).

Auto iris (AI) - An automatic method of varying the size of a lens aperture in response to changes in scene illumination.

AWG - American wire gauge. A wire diameter specification based on the American standard. The smaller the AWG number, the larger the wire diameter (see the reference table in the Camera Power Supply section).

B

Back-focus - A procedure of adjusting the physical position of the CCD-chip/lens to achieve the correct focus for all focal length settings (especially critical with zoom lenses).

Back porch - 1. The portion of a video signal that occurs during blanking from the end of horizontal sync to the beginning of active video. 2. The blanking signal portion that lies between the trailing edge of a horizontal sync pulse and the trailing edge of the corresponding blanking pulse. Color burst is located on the back porch.

Balanced signal - In CCTV this refers to a type of video signal transmission through a twisted pair cable. It is called balanced because the signal travels through both wires, thus being equally exposed to the external interference, so by the time the signal gets to the receiving end, the noise will be cancelled out at the input of a differential buffer stage.

Balun - This is a device used to match or transform an unbalanced coaxial cable to a balanced twisted pair system.

Bandwidth - The complete range of frequencies over which a circuit or electronic system can function with minimal signal loss, usually measured to the point of less than 3 dB. In PAL systems the bandwidth limits the maximum visible frequency to 5.5 MHz, in NTSC to 4.2 MHz. The ITU 601 luminance channel sampling frequency of 13.5 MHz was chosen to permit faithful digital representation of the PAL and NTSC luminance bandwidths without aliasing.

Baseband - The frequency band occupied by the aggregate of the signals used to modulate a carrier before they combine with the carrier in the modulation process. In CCTV the majority of signals are in the baseband.

Baud - Data rate, named after Maurice Emile Baud, which generally is equal to 1 bit/s. Baud is equivalent to bits per second in cases where each signal event represents exactly 1 bit. Typically, the baud settings of two devices must match if the devices are to communicate with one another.

BER - Bit error rate. The ratio of received bits that are in error relative to the total number of bits received, used as a measure of noise induced distortion in a digital bit stream. BER is expressed as a power of 10. For example, a 1 bit error in 1 million bits is a BER of 10^{-6} .

Betamax - Sony's domestic video recording format, a competitor of VHS.

Bias - Current or voltage applied to a circuit to set a reference operating level for proper circuit performance, such as the high frequency bias current applied to an audio recording head to improve linear performance and reduce distortion.

Binary - A base 2 numbering system using the two digits 0 and 1 (as opposed to ten digits [0-9] in the decimal system). In computer systems, the binary digits are represented by two different voltages or currents, one corresponding to zero and another corresponding to one. All computer programs are executed in binary form.

Bipolar - A signal containing both positive-going and negative-going amplitude. May also contain a zero amplitude state.

B-ISDN - Broadband Integrated Services Digital Network. An improved ISDN, composed of an intelligent combination of more ISDN channels into one that can transmit more data per second.

Bit - A contraction of binary digit. Elementary digital information that can only be 0 or 1. The smallest part of information in a binary notation system. A bit is a single 1 or 0. A group of bits, such as 8 bits or 16 bits, compose a byte. The number of bits in a byte depends on the processing system being used. Typical byte sizes are 8, 16 and 32.

Bitmap (BMP) - A pixel-by-pixel description of an image. Each pixel is a separate element. Also a computer file format.

Bit rate - Bps = Bytes per second, bps = bits per second. The digital equivalent of bandwidth, bit rate is measured in bits per second. It is used to express the rate at which the compressed bitstream is transmitted. The higher the bit rate, the more information that can be carried.

Blackburst (color-black) - A composite color video signal. The signal has composite sync, reference burst and a black video signal, which is usually at a level of 7.5 IRE (50 mV) above the blanking level.

Black level - A part of the video signal, close to the sync level, but slightly above it (usually 20 mV - 50 mV) in order to be distinguished from the blanking level. It electronically represents the black part of an image, whereas the white part is equivalent to 0.7 V from the sync level.

Blanking level - The beginning of the video signal information in the signal's waveform. It resides at a reference point taken as 0 V, which is 300 mV above the lowest part of the sync pulses. Also known as pedestal, the level of a video signal that separates the range that contains the picture information from the range that contains the synchronizing information.

Blooming - The defocusing of regions of a picture where brightness is excessive.

BNC - BNC stands for Bayonet-Neil-Concelman connector, and it is the most popular connector in CCTV and broadcast TV for transmitting a basic bandwidth video signal over a coaxial cable.

B-picture - Bi-directionally predictive coded picture; an MPEG term for a picture that is coded using motion compensated prediction from a past and/or future reference picture.

Braid - A group of textile or metallic filaments interwoven to form a tubular structure that may be applied over one or more wires or flattened to form a strap.

Brightness - In NTSC and PAL video signals, the brightness information at any particular instant in a picture is conveyed by the corresponding instantaneous DC level of active video. Brightness control is an adjustment of setup (black level, black reference).

Burst (color burst) - Seven to nine cycles (NTSC) or ten cycles (PAL) of sub-carrier placed near the end of horizontal blanking to serve as the phase (color) reference for the modulated color sub-carrier. Burst serves as the reference for establishing the picture color.

Bus - In computer architecture, a path over which information travels internally among various components of a system and is available to each of the components.

Byte - A digital word made of 8 bits (zeros and ones).

C

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

CAD - Computer-aided design. This usually refers to a design of system that uses computer specialized software.

Candela [cd] - A unit for measuring luminous intensity. One candela is approximately equal to the amount of light energy generated by an ordinary candle. Since 1948 a more precise definition of a candela has become: "the luminous intensity of a black body heated up to a temperature at which platinum converges from a liquid state to a solid."

CATV - Community antenna television.

C-band - A range of microwave frequencies, 3.7~4.2 GHz, commonly used for satellite communications.

CCD - Charge-coupled device. The new age imaging device, replacing the old tubes. When first invented in the 1970s, it was initially intended to be used as a memory device. Most often used in cameras, but also in telecine, fax machines, scanners, etc.

CCD aperture - The proportion of the total area of a CCD chip that is photosensitive.

CCIR - Comité Consultatif International des Radiocommuniqué or, in English, Consultative Committee for International Radio, which is the European standardization body that has set the standards for television in Europe. It was initially monochrome; therefore, today the term CCIR is usually used to refer to monochrome cameras that are used in PAL countries.

CCIR 601 - An international standard (renamed ITU 601) for component digital television that was derived from the SMPTE RP1 25 and EBU 3246E standards. ITU 601 defines the sampling systems, matrix values and filter characteristics for Y, Cr, Cb and RGB component digital television. It establishes a 4:2:2 sampling scheme at 13.5 MHz for the luminance channel and 6.75MHz for the chrominance channels with eight-bit digitizing for each channel. These sample frequencies were chosen because they work for both 525-line 60Hz and 625-line 50Hz component video systems. The term 4:2:2 refers to the ratio of the number of luminance channel samples to the number of chrominance channel samples; for every four luminance samples, the chrominance channels are each sampled twice. The DI digital videotape format conforms to ITU 601.

CCIR 656 - The international standard (renamed ITU 601) defining the electrical and mechanical interfaces for digital television equipment operating according to the ITU 601 standard. ITU 656 defines both the parallel and serial connector pinouts, as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces.

CCTV - Closed circuit television. Television system intended for only a limited number of viewers, as opposed to broadcast TV.

CCTV camera - A unit containing an imaging device that produces a video signal in the basic bandwidth.

CCTV installation - A CCTV system, or an associated group of systems, together with all necessary hardware, auxiliary lighting, etc., located at the protected site.

CCTV system - An arrangement comprising of a camera and lens with all ancillary equipment required for the surveillance of a specific protected area.

CCVE - Stands for closed circuit video equipment. An alternative acronym for CCTV.

CD - Compact disc. A standard of media as proposed by Philips and Sony, where music and data are stored in digital format.

CD-ROM - Compact disk read only memory. The total capacity of a CD-ROM when storing data is 640 MB.

CDS - Correlated double sampling. A technique used in the design of some CCD cameras that reduces the video signal noise generated by the chip.

CFA - Color filter array. A set of optical pixel filters used in single-chip color CCD cameras to produce the color components of a video signal.

Chip - An integrated circuit in which all the components are micro-fabricated on a tiny piece of silicon or similar material.

Chroma crawl - An artifact of encoded video, also known as dot crawl or cross-luminance, Occurs in the video picture around the edges of highly saturated colors as a continuous series of crawling dots and is a result of color information being confused as luminance information by the decoder circuits.

Chroma gain (chroma, color, saturation) - In video, the gain of an amplifier as it pertains to the intensity of colors in the active picture.

Chroma key (color key) - A video key effect in which one video signal is inserted in place of areas of a particular color in another video signal.

Chrominance - The color information of a color video signal.

Chrominance-to-luminance intermodulation (crosstalk, cross-modulation) - An undesirable change in luminance amplitude caused by superimposition of some chrominance information on the luminance signal. Appears in a TV picture as unwarranted brightness variations caused by changes in color saturation levels.

CIE - Commission Internationale de l'Eclairag . This is the International Committee for Light, established in 1965. It defines and recommends light units.

Clamping (DC) - The circuit or process that restores the DC component of a signal. A video clamp circuit, usually triggered by horizontal synchronizing pulses, re-establishes a fixed DC reference level for the video signal. A major benefit of a clamp is the removal of low-frequency interference, especially power line hum.

Cladding - The outer part of a fiber optics cable, which is also a fiber but with a smaller material density than the center core. It enables a total reflection effect so that the light transmitted through the internal core stays inside.

Clipping Level - An electronic limit to avoid overdriving the video portion of the television signal.

C-mount - The first standard for CCTV lens screw mounting. It is defined with the thread of 1" (2.54 mm) in diameter and 32 threads/inch, and the back flange-to-CCD distance of 17.526 mm (0.69"). The C-mount description applies to both lenses and cameras. C-mount lenses can be put on both, C-mount and CS-mount cameras, only in the latter case an adaptor is required.

CMYK - A color encoding system used by printers in which colors are expressed by the "subtractive primaries" (cyan, magenta and yellow) plus black (called K). The black layer is added to give increased contrast and range on printing presses.

Coaxial cable - The most common type of cable used for copper transmission of video signals. It has a coaxial cross-section, where the center core is the signal conductor, while the outer shield protects it from external electromagnetic interference.

CODEC - Code/Decode. An encoder plus a decoder is an electronic device that compresses and decompresses digital signals. CODECs usually perform A/D and D/A conversion.

Color bars - A pattern generated by a video test generator, consisting of eight equal width color bars. Colors are white (75%), black (7.5% setup 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).

Color carrier - The sub-frequency in a color video signal (4.43 MHz for PAL) that is modulated with the color information. The color carrier frequency is chosen so its spectrum interleaves with the luminance spectrum with minimum interference.

Color difference signal - A video color signal created by subtracting luminance and/or color information from one of the primary color signals (red, green or blue). In the Betacam color difference format, for example, the luminance (Y) and color difference components (R-Y and B-Y) are derived as follows:

$$\begin{aligned} Y &= 0.3 \text{ Red} + 0.59 \text{ Green} + 0.11 \text{ Blue} \\ R-Y &= 0.7 \text{ Red} - 0.59 \text{ Green} - 0.11 \text{ Blue} \\ B-Y &= 0.89 \text{ Blue} - 0.59 \text{ Green} - 0.3 \text{ Red} \end{aligned}$$

The G-V color difference signal is not created because it can be reconstructed from the other three signals. Other color difference conventions include SMPTE, EBU-N1 0 and MII. Color difference signals should not be referred to as component video signals. That term is reserved for the RGB color components. In informal usage, the term "component video" is often used to mean color difference signals.

Color field - In the NTSC system, the color sub-carrier is phase-locked to the line sync so that on each consecutive line, subcarrier phase is changed 180° with respect to the sync pulses. In the PAL system, color subcarrier phase moves 90° every frame. In NTSC this creates four different field types, while in PAL there are eight. In order to make clean edits, alignment of color field sequences from different sources is crucial.

Color frame - In color television, four (NTSC) or eight (PAL) properly sequenced color fields compose one color frame.

Color phase - The timing relationship in a video signal that is measured in degrees and keeps the hue of a color signal correct.

Color subcarrier - The 3.58MHz signal that carries color information. This signal is superimposed on the luminance level. Amplitude of the color subcarrier represents saturation and phase angle represents hue.

Color temperature - Indicates the hue of the color. It is derived from photography where the spectrum of colors is based upon a comparison of the hues produced when a black body (as in Physics) is heated from red through yellow to blue, which is the hottest. Color temperature measurements are expressed in Kelvin.

Comb filter - An electrical filter circuit that passes a series of frequencies and rejects the frequencies in between, producing a frequency response similar to the teeth of a

comb - Used on encoded video to select the chrominance signal and reject the luminance signal, thereby reducing cross-chrominance artifacts or conversely, to select the luminance signal and reject the chrominance signal, thereby reducing

cross-luminance artifacts - Introduced in the S-VHS concept for a better luminance resolution.

Composite sync - A signal consisting of horizontal sync pulses, vertical sync pulses and equalizing pulses only, with a no-signal reference level.

Composite video signal - A signal in which the luminance and chrominance information has been combined using one of the coding standards NTSC, PAL, SECAM, etc.

Concave lens - A lens that has negative focal length, i.e., the focus is virtual and it reduces the objects.

Contrast - A common term used in reference to the video picture dynamic range, i.e., the difference between the darkest and the brightest parts of an image.

Convex lens - A convex lens has a positive focal length, i.e., the focus is real. It is usually called magnifying glass, since it magnifies the objects.

CPU - Central processing unit. A common term used in computers.

CRO - Cathode ray oscilloscope (see Oscilloscope).

Crosstalk - A type of interference or undesired transmission of signals from one circuit into another circuit in the same system. Usually caused by unintentional capacitance (AC coupling).

CS-Mount - A newer standard for lens mounting. It uses the same physical thread as the C-mount, but the back flange-to-CCD distance is reduced to 12.5 mm in order to have the lenses made smaller, more compact and less expensive. CS-mount lenses can only be used on CS-mount cameras.

CS-to-C-mount adaptor - An adaptor used to convert a CS-mount camera to C-mount to accommodate a C-mount lens. It looks like a ring 5 mm thick, with a male thread on one side and a female on the other, with 1" diameter and 32 threads/inch. It usually comes packaged with the newer type (CS-mount) of cameras.

CVBS - Composite video bar signal. In broadcast television this refers to the video signal, including the color information and syncs.

D

D/A (also DA) - Opposite to A/D, i.e., digital to analog conversion.

Dark current - Leakage signal from a CCD sensor in the absence of incident light.

Dark noise - Noise caused by the random (quantum) nature of the dark current.

DAT (digital audio tape) - A system developed initially for recording and playback of digitized audio signals, maintaining signal quality equal to that of a CD. Recent developments in hardware and software might lead to a similar inexpensive system for video archiving, recording and playback.

dB - Decibel. A logarithmic ratio of two signals or values, usually refers to power, but also voltage and current. When power is calculated the logarithm is multiplied by 10, while for current and voltage by 20.

DBS - Direct broadcast satellite. Broadcasting from a satellite directly to a consumer user, usually using a small aperture antenna.

DC - Direct current. Current that flows in only one direction, as opposed to AC.

DCT - Discrete cosine transform. Mathematical algorithm used to generate frequency representations of a block of video pixels. The DCT is an invertible, discrete orthogonal transformation between time and frequency domain. It can be either forward discrete cosine transform (FDCT) or inverse discrete cosine transform (IDCT).

Decoder - A device used to recover the component signals from a composite (encoded) source.

Degauss - To demagnetize.

Delay line - An artificial or real transmission line or equivalent device designed to delay a wave or signal for a specific length of time.

Demodulator - A device that strips the video and audio signals from the carrier frequency.

Depth of field - The area in front of and behind the object in focus that appears sharp on the screen. The depth of field increases with the decrease of the focal length, i.e., the shorter the focal length the wider the depth of field. The depth of field is always wider behind the objects in focus.

Dielectric - An insulating (nonconductive) material.

Differential gain - A change in sub-carrier amplitude of a video signal caused by a change in luminance level of the signal. The resulting TV picture will show a change in color saturation caused by a simultaneous change in picture brightness.

Differential phase - A change in the sub-carrier phase of a video signal caused by a change in the luminance level of the signal. The hue of colors in a scene change with the brightness of the scene.

Digital disc recorder - A system that allows recording of video images on a digital disc.

Digital signal - An electronic signal where every different value from the real-life excitation (sound, light) has a different value of binary combinations (words) that represent the analog signal.

DIN - Deutsche Industrie-Normen. Germany's standard.

Disk - A flat circular plate, coated with a magnetic material, on which data may be stored by selective magnetization of portions of the surface. May be a flexible, floppy disc or rigid hard disk. It could also be a plastic compact disc (CD) or digital video disc (DVD).

Distortion - Nonproportional representation of an original.

DMD - Digital micro-mirror device. A new video projection technology that uses chips with a large number of miniature mirrors, whose projection angle can be controlled with digital precision.

DOS - Disk operating system. A software package that makes a computer work with its hardware devices such as hard drive, floppy drive, screen, keyboard, etc.

Dot pitch - The distance in millimeters between individual dots on a monitor screen. The smaller the dot pitch the better, since it allows for more dots to be displayed and better resolution. The dot pitch defines the resolution of a monitor. A high-resolution CCTV or computer monitor would have a dot pitch of less than 0.3 mm.

Drop-frame Time Code - SMPTE time code format that continuously counts 30 frames per second, but drops two frames from the count every minute except for every tenth minute (drops 108 frames every hour) to maintain synchronization of time code with clock time. This is necessary because the actual frame rate of NTSC video is 29.94 frames per second rather than an even 30 frames.

DSP - Digital signal processing. It usually refers to the electronic circuit section of a device capable of processing digital signals.

Dubbing - Transcribing from one recording medium to another.

Duplex - A communication system that carries information in both directions is called a duplex system. In CCTV, duplex is often used to describe the type of multiplexer that can perform two functions simultaneously, recording in multiplex mode and playback in multiplex mode. It can also refer to duplex communication between a matrix switcher and a PTZ site driver, for example.

DV-Mini - Mini digital video. A new format for audio and video recording on small camcorders, adopted by the majority of camcorder manufacturers. Video and sound are recorded in a digital format on a small cassette (66x48x12 mm), superseding S-VHS and Hi 8 quality.

D-VHS - A new standard proposed by JVC for recording digital signals on a VHS video recorder.

DVR - Digital Video Recorder,

Dynamic range - The difference between the smallest amount and the largest amount that a system can represent.

E

EBU - European Broadcasting Union.

EIA - Electronics Industry Association, which has recommended the television standard used in the US, Canada and Japan, based on 525 lines interlaced scanning. Formerly known as RMA or RETMA.

Encoder - A device that superimposes electronic signal information on other electronic signals.

Encryption - The rearrangement of the bit stream of a previously digitally encoded signal in a systematic fashion to make the information unrecognizable until restored on receipt of the necessary authorization key. This technique is used for securing information transmitted over a communication channel with the intent of excluding all other than authorized receivers from interpreting the message. Can be used for voice, video and other communications signals.

ENG camera - Electronic News Gathering camera. Refers to CCD cameras in the broadcast industry.

EPROM - Erasable and programmable read only memory. An electronic chip used in many different security products that stores software instructions for performing various operations.

Equalizer - Equipment designed to compensate for loss and delay frequency effects within a system. A component or circuit that allows for the adjustment of a signal across a given band.

Ethernet - A local area network used for connecting computers, printers, workstations, terminals, etc. within the same building. Ethernet operates over twisted wire and coaxial cable at speeds up to 10 Mbps. Ethernet specifies a CSMA/CD (carrier sense multiple access with collision detection). CSMA/CD is a technique of sharing a common medium (wire, coaxial cable) among several devices.

External synchronization - A means of ensuring that all equipment is synchronized to the one source.

F

FCC - Federal Communications Commission (US).

FFT - Fast Fourier Transformation.

Fiber optics - A technology designed to transmit signals in the form of pulses of light. Fiber optic cable is noted for its properties of electrical isolation and resistance to electrostatic and electromagnetic interference.

Field - Refers to one-half of the TV frame that is composed of either all odd or even lines. In CCIR systems each field is composed of $625/2 = 312.5$ lines, in EIA systems $525/2 = 262.5$ lines. There are 50 fields/second in CCIR/PAL, and 60 in the EIA/NTSC TV system.

Film recorder - A device for converting digital data into film output. Continuous tone recorders produce color photographs as transparencies, prints or negatives.

Fixed focal length lens - A lens with a predetermined fixed focal length, a focusing control and a choice of iris functions.

Flash memory - Nonvolatile, digital storage. Flash memory has slower access than SRAM or DRAM.

Flicker - An annoying picture distortion, mainly related to vertical syncs and video fields display. Some flicker normally exists due to interlacing; more apparent in 50 Hz systems (PAL). Flicker shows also when static images are displayed on the screen such as computer generated text transferred to video. Poor digital image treatment, found in low-quality system converters (going from PAL to NTSC and vice versa), creates an annoying flicker on the screen. There are several electronic methods to minimize flicker.

F-number - In lenses with adjustable irises, the maximum iris opening is expressed as a ratio (focal length of the lens)/(maximum diameter of aperture). This maximum iris will be engraved on the front ring of the lens.

Focal length - The distance between the optical center of a lens and the principal convergent focus point.

Focusing control - A means of adjusting the lens to allow objects at various distances from the camera to be sharply defined.

Foot-candela - An illumination light unit used mostly in American CCTV terminology. It equals ten times (more precisely, 9.29) of the illumination value in luxes.

Fourier Transformation - Mathematical transformation of time domain functions into frequency domain.

Frame - (See also Field). Refers to a composition of lines that make one TV frame. In CCIR/PAL TV system one frame is composed of 625 lines, while in EIA/NTSC TV system of 525 lines. There are 25 frames/second in the CCIR/PAL and 30 in the EIA/NTSC TV system.

Frame store - An electronic device that digitizes a TV frame (or TV field) of a video signal and

stores it in memory. Multiplexers, fast scan transmitters, Quad compressors and even some of the latest color cameras have built-in frame stores.

Frame switcher - Another name for a simple multiplexer, which can record multiple cameras on a single VCR (and play back any camera in full screen) but does not have a mosaic image display.

Frame synchronizer - A digital buffer that, by storage and comparison of sync information to a reference and timed release of video signals, can continuously adjust the signal for any timing errors.

Frame transfer (FT) - Refers to one of the three principles of charge transfer in CCD chips. The other two are interline and frame-interline transfer.

Frame-interline transfer (FIT) - Refers to one of the few principles of charge transfer in CCD chips. The other two are interline and frame transfer.

Frequency - The number of complete cycles of a periodic waveform that occur in a given length of time. Usually specified in cycles per second (Hertz).

Frequency modulation (FM) - Modulation of a sine wave or carrier by varying its frequency in accordance with amplitude variations of the modulating signal.

Front porch - The blanking signal portion that lies between the end of the active picture information and the leading edge of horizontal sync

G

Gain - Any increase or decrease in strength of an electrical signal. Gain is measured in terms of decibels or number of times of magnification.

Gamma - A correction of the linear response of a camera in order to compensate for the monitor phosphor screen nonlinear response. It is measured with the exponential value of the curve describing the non-linearity. A typical monochrome monitor's gamma is 2.2, and a camera needs to be set to the inverse value of 2.2 (which is 0.45) for the overall system to respond linearly (i.e., unity).

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

Gen-lock - A way of locking the video signal of a camera to an external generator of synchronization pulses.

GHz - GigaHertz. One billion cycles per second.

GB - Gigabyte. Unit of computer memory consisting of about one thousand million bytes (a thousand megabytes). Actual value is 1,073,741,824 bytes.

GND - Ground (electrical).

Gray scale - A series of tones that range from true black to true white, usually expressed in 10 steps.

Ground loop - An unwanted interference in the copper electrical signal transmissions with shielded cable, which is a result of ground currents when the system has more than one ground. For example, in CCTV, when we have a different earthing resistance at the camera, and the switcher or monitor end. The induced electrical noise generated by the surrounding electrical equipment (including mains) does not discharge equally through the two earthings (since they are different) and the induced noise shows up on the monitors as interference.

GUI - Graphical user interface.

H

HAD - Hole accumulated diode. A type of CCD sensor with a layer designed to accumulate holes (in the electronic sense), thus reducing noise level.

HDD - Hard disk drive. A magnetic medium for storing digital information on most computers and electronic equipment that process digital data.

HDDTV - High definition digital television. The upcoming standard of broadcast television with extremely high resolution and aspect ratio of 16:9. It is an advancement from the analog high definition, already used experimentally in Japan and Europe. The picture resolution is nearly 2000×1000 pixels, and uses the MPEG-2 standard.

HDTV - High definition television. It usually refers to the analog version of the HDDTV. The SMPTE in the US and ETA in Japan have proposed a HDTV product standard: 1125 lines at 60 Hz field rate 2:1 interlace; 16:9 aspect ratio; 30 MHz RGB and luminance bandwidth.

Headend - The electronic equipment located at the start of a cable television system, usually including antennas, earth stations, preamplifiers, frequency converters, demodulators, modulators and related equipment.

Helical scan - A method of recording video information on a tape, most commonly used in home and professional VCRs.

Horizontal Drive (also Horizontal 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.

Horizontal resolution - Chrominance and luminance resolution (detail) expressed horizontally across a picture tube. This is usually expressed as a number of black to white transitions or lines that can be differentiated. Limited by the bandwidth of the video signal or equipment.

Herringbone - Patterning caused by driving a color-modulated composite video signal (PAL or NTSC) into a monochrome monitor

Horizontal retrace - At the end of each horizontal line of video, a brief period when the scanning beam returns to the other side of the screen to start a new line.

Horizontal sync pulse - The synchronizing pulse at the end of each video line that determines the start of horizontal retrace.

Hertz - An unit that measures the number of certain oscillations per second.

Housings, environmental. Usually refers to cameras' and lenses containers and associated accessories, such as heaters, washers and wipers, to meet specific environmental conditions.

HS - Horizontal sync.

Hue (tint, phase, chroma phase) - One of the characteristics that distinguishes one color from another. Hue defines color on the basis of its position in the spectrum, i.e., whether red, blue, green or yellow, etc. Hue is one of the three characteristics of television color: see also Saturation and Luminance. In NTSC and PAL video signals, the hue information at any particular point in the

picture is conveyed by the corresponding instantaneous phase of the active video subcarrier.

Hum - A term used to describe an unwanted induction of mains frequency.

Hum bug - Another name for a ground loop corrector.

Hyper-HAD - An improved version of the CCD HAD technology, utilizing on-chip micro-lens technology to provide increased sensitivity without increasing the pixel size.

I

IDE - Interface device electronics. Software and hardware communication standard for interconnecting peripheral devices to a computer.

I/O - Input/Output.

I/P - Input. A signal applied to a piece of electric apparatus or the terminals on the apparatus to which a signal or power is applied.

I²R - Formula for power in watts (W), where I is current in amperes (A), R is resistance in ohms (W).

IEC - International Electrotechnical Commission (also CEI).

Imaging device - A vacuum tube or solid state-device in which the vacuum tube light-sensitive face plate or solid-state light-sensitive array provides an electronic signal from which an image can be created.

Impedance - A property of all metallic and electrical conductors that describes the total opposition to current flow in an electrical circuit. Resistance, inductance, capacitance and conductance have various influences on the impedance, depending on frequency, dielectric material around conductors, physical relationship between conductors and external factors. Impedance is often referred to with the letter Z. It is measured in ohms, whose symbol is the Greek letter omega - Ω .

Input - Same as **I/P**.

Insertor (also alphanumeric video generator) - A device for providing additional information, normally superimposed on the picture being displayed; this can range from one or two characters to full-screen alphanumeric text. Usually, such generators use the incoming video signal sync pulses as a reference point for the text insertion position, which means if the video signal is of poor quality, the text stability will also be of poor quality.

Interference - Disturbances of an electrical or electromagnetic nature that introduce undesirable responses in other electronic equipment.

Interlaced scanning - A technique of combining two television fields in order to produce a full frame. The two fields are composed of only odd and only even lines, which are displayed one after the other but with the physical position of all the lines interleaving each other, hence interlace. This type of television picture creation was proposed in the early days of television to have a minimum amount of information yet achieve flickerless motion.

Interline transfer - This refers to one of the three principles of charge transferring in CCD chips. The other two are frame transfer and frame-interline transfer.

IP - Index of protection. A numbering system that describes the quality of protection of an enclosure from outside influences, such as moisture, dust and impact.

IRE - Institute of Radio Engineers. Units of measurement dividing the area from the bottom of sync to peak white level into 140 equal units. 140 IRE equals 1Vpp. The range of active video is 100 IRE.

IR light - Infrared light, invisible to the human eye. It usually refers to wavelengths longer than 700 nm. Monochrome (B/W) cameras have extremely high sensitivity in the infrared region of the light spectrum.

Iris - A means of controlling the size of a lens aperture and therefore the amount of light passing through the lens.

ISDN - Integrated Services Digital Network. The newer generation telephone network, which uses 64 kb/s speed of transmission (being a digital network, the signal bandwidth is not expressed in kHz, but rather with a transmission speed). This is much faster than a normal PSTN telephone line. To use the ISDN network you have to talk to your communications provider, but in general a special set of interface units (like modems) are required.

ISO - International Standardization Organization.

ITU - International Telecommunications Union (also UIT).

J

JPEG - Joint Photographic Experts Group. A group that has recommended a compression algorithm for still digital images that can compress with ratios of over 10:1. Also the name of the format itself.

K

kb/s - Kilobits per second. Thousand bits per second. Also written as kbps.

Kelvin - One of the basic physical units of measurement for temperature. The scale is the same as the Celsius, but the 0°K starts from -273°C. Also the unit of measurement of the temperature of light is expressed in Kelvins or K. In color recording, light temperature affects the color values of the lights and the scene that they illuminate.

K factor - A specification rating method that gives a higher factor to video disturbances that cause the most observable picture degradation.

kHz - Kilohertz. Thousand Hertz.

Kilobaud - A unit of measurement of data transmission speed equalling 1000 baud.

KiloByte - 1024 bytes.

L

Lambertian source or surface - A surface is called a Lambert radiator or reflector (depending whether the surface is a primary or a secondary source of light) if it is a perfectly diffusing surface.

LAN - Local Area Network. A short distance data communications network (typically within a building or campus) used to link together computers and peripheral devices (such as printers, CD ROMs and modems) under some form of standard control.

Laser - Light amplification by stimulated emission of radiation. A laser produces a very strong and coherent light of a single frequency.

LED - Light Emitting Diode. A semiconductor that produces light when a certain low voltage is applied to it in one direction.

Lens - An optical device for focusing a desired scene onto the imaging device in a CCTV camera.

Level - When relating to a video signal it refers to the video level in volts. In CCTV optics, it refers to the auto iris level setting of the electronics that processes the video signal in order to open or close the iris.

Line-locked - In CCTV, this usually refers to multiple cameras being powered by a common alternative current (AC) source (either 24 V AC, 110 V AC or 240 V AC) and consequently have field frequencies locked to the same AC source frequency (50 Hz in CCIR systems and 60 Hz in EIA systems).

Liquid crystal display (LCD) - A screen for displaying text/graphics based on a technology called liquid crystal, where minute currents change the reflectiveness or transparency of the screen. The advantages of LCD screens are very small power consumption (can be easily battery driven) and low price of mass-produced units. The disadvantages are narrow viewing angle, slow response (a bit too slow to be used for video), invisibility in the dark unless the display is back lighted, and difficulties displaying true colors with color LCD displays.

Lumen [lm] - A light intensity produced by the luminosity of 1 candela in one radian of a solid angle.

Luminance - Refers to the video signal information about the scene brightness. The measurable, luminous intensity of a video signal. Differentiated from brightness in that the latter is nonmeasurable and sensory. The color video picture information contains two components, luminance (brightness and contrast) and chrominance (hue and saturation). The photometric quantity of light radiation.

LUT - Look-up table. A cross-reference table in the computer memory that transforms raw information from the scanner or computer and corrects values to compensate for weakness in equipment or for differences in emulsion types.

Lux [lx] - Light unit for measuring illumination. It is defined as the illumination of a surface when luminous flux of 1 lumen falls on an area of 1 m². It is also known as lumen per square meter, or meter-candelas.

M

MAC - Multiplexed analog components. A system in which the components are time multiplexed into one channel using time domain techniques, i.e., the components are kept separate by being sent at different times through the same channel. There are many different MAC formats and standards

Manual iris - A manual method of varying the size of a lens's aperture.

Matrix - A logical network configured in a rectangular array of intersections of input/output channels.

Matrix switcher - A device for switching more than one camera, VCR, video printer and similar, to more than one monitor, VCR, video printer and similar. Much more complex and more powerful than video switchers.

MATV - Master antenna television.

MB - Megabyte. Unit of measurement for computer memory consisting of approximately one million bytes. Actual value is 1,048,576 bytes. Kilobyte x Kilobyte = Megabyte.

MB/s - Megabytes per second. Million bytes per second or 8 million hits per second. Also written as MBps.

Mb/s - Megabits per second. Million bits per second. Also written as Mbps.

MHz - Megahertz. One million hertz.

Microwave - One definition refers to the portion of the electromagnetic spectrum that ranges between 300 MHz and 3000 GHz. The other definition is when referring to the transmission media where microwave links are used. Frequencies in microwave transmission are usually between 1 GHz and 12 GHz.

MOD - Minimum object distance. Feature of a fixed or a zoom lens that indicates the closest distance an object can be from the lens's image plane, expressed in meters. Zoom lenses have MOD of around 1 m, while fixed lenses usually much less, depending on the focal length.

Modem - This popular term is made up of two words: modulate and demodulate. The function of a modem is to connect a device (usually computer) via a telephone line to another device with a modem.

Modulation - The process by which some characteristic (i.e., amplitude, phase) of one RF wave is varied in accordance with another wave (message signal).

Moiré pattern - An unwanted effect that appears in the video picture when a high-frequency pattern is looked at with a CCD camera that has a pixel pattern close (but lower) to the object pattern.

Monochrome - Black-and-white video. A video signal that represents the brightness values (luminance) in the picture, but not the color values (chrominance).

MPEG - Motion Picture Experts Group. An ISO group of experts that has recommended manipulation of digital motion images. Today there are a couple of MPEG recommendations, of which the most well known are MPEG-1 and MPEG-2. The latter one is widely accepted for high definition digital television, as well as multimedia presentation.

MPEG-1 - Standard for compressing progressive scanned images with audio. Bit rate is from 1.5 Mbps up to 3.5 Mbps.

MPEG-2 - The standard for compression of progressive scanned and interlaced video signals with high quality audio over a large range of compression rates with a range of bit rates from 1.5 to 100 Mbps. Accepted as a HDTV and DVD standard of video/audio encoding.

N

Noise - An unwanted signal produced by all electrical circuits working above the absolute zero. Noise cannot be eliminated but only minimized.

Non-drop frame time code - SMPTE time code format that continuously counts a full 30 frames per second. Because NTSC video does not operate at exactly 30 frames per second, non-drop-frame time code will count 108 more frames in one hour than actually occur in the NTSC video in one hour. The result is incorrect synchronization of time code with clock time. Drop-frame time code solves this problem by skipping or dropping 2 frame numbers per minute, except at the tens of the minute count.

Noninterlaced - The process of scanning whereby every line in the picture is scanned during the vertical sweep.

NTSC - National Television System Committee. American committee that set the standards for color television as used today in the US, Canada, Japan and parts of South America. NTSC television uses a 3.57945 MHz sub-carrier whose phase varies with the instantaneous hue of the televised color and whose amplitude varies with the instantaneous saturation of the color. NTSC employs 525 lines per frame and 59.94 fields per second.

Numerical aperture - A number that defines the light gathering ability of a specific fiber. The numerical aperture is equal to the sine of the maximum acceptance angle.

O

O/P - Output.

Objective - The very first optical element at the front of a lens.

Ocular. The very last optical element at the back of a lens (the one closer to the CCD chip).

Ohm - The unit of resistance. The electrical resistance between two points of a conductor where a constant difference of potential of 1 V applied between these points produces in the conductor a current of 1 A, the conductor not being the source of any electromotive force.

Oscilloscope (also CRO, from cathode ray oscilloscope) - An electronic device that can measure the signal changes versus time. A must for any CCTV technician.

Overscan - A video monitor condition in which the raster extends slightly beyond the physical edges of the CRT screen, cutting off the outer edges of the picture.

Output impedance - The impedance a device presents to its load. The impedance measured at the output terminals of a transducer with the load disconnected and all impressed driving forces taken as zero.

P

PAL.- Phase alternating line. Describes the color phase change in a PAL color signal. PAL is a European color TV system featuring 625 lines per frame, 50 fields per second and a 4.43361875-MHz sub-carrier. Used mainly in Europe, China, Malaysia, Australia, New Zealand, the Middle East and parts of Africa. PAL-M is a Brazilian color TV system with phase alternation by line, but using 525 lines per frame, 60 fields per second and a 3.57561149 MHz sub-carrier.

Pan and tilt head (P/T head). - A motorized unit permitting vertical and horizontal positioning of a camera and lens combination. Usually 24 V AC motors are used in such P/T heads, but also 110 VAC, i.e., 240 VAC units can be ordered.

Pan unit. - A motorized unit permitting horizontal positioning of a camera.

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

Pedestal.- In the video waveform, the signal level corresponding to black. Also called setup.

Phot.- A photometric light unit for very strong illumination levels. One phot is equal to 10,000 luxes.

Photodiode.- A type of semiconductor device in which a PN junction diode acts as a photosensor.

Photo-effect.- Also known as photoelectric-effect. This refers to a phenomenon of ejection of electrons from a metal whose surface is exposed to light.

Photon.- A representative of the quantum nature of light. It is considered as the smallest unit of light.

Photopic vision. - The range of light intensities, from 105 lux down to nearly 10–2 lux, detectable by the human eye.

Pinhole lens. - A fixed focal length lens, for viewing through a very small aperture, used in discrete surveillance situations. The lens normally has no focusing control but offers a choice of iris functions.

Phase locked loop (PLL). A circuit containing an oscillator whose output phase or frequency locks onto and tracks the phase or frequency of a reference input signal. To produce the locked condition, the circuit detects any phase difference between the two signals and generates a correction voltage that is applied to the oscillator to adjust its phase or frequency.

Photo multiplier. - A highly light-sensitive device. Advantages are its fast response, good signal-to-noise ratio and wide dynamic range. Disadvantages are fragility (vacuum tube), high voltage and sensitivity to interference.

Pixel or picture element. - Derived from picture element. Usually refers to the CCD chip unit picture cell. It consists of a photosensor plus its associated control gates. The smallest visual unit that is handled in a raster file, generally a single cell in a grid of numbers describing an image.

Plumbicon. - Thermionic vacuum tube developed by Philips, using a lead oxide photoconductive layer. It represented the ultimate imaging device until the introduction of CCD chips.

Polarizing filter. An optical filter that transmits light in only one direction (perpendicular to the light path), out of 360° possible. The effect is such that it can eliminate some unwanted bright areas or reflections, such as when looking through a glass window. In photography, polarizing filters are used very often to darken a blue sky.

POTS. - Plain old telephone service. The telephone service in common use throughout the world today. Also known as PSTN.

P-picture. - Prediction-coded picture. An MPEG term to describe a picture that is coded using motion-compensated prediction from the past reference picture.

Preset positioning. - A function of a pan and tilt unit, including the zoom lens, where a number of certain viewing positions can be stored in the system's memory (usually this is in the PTZ site driver) and recalled when required, either upon an alarm trigger, programmed or manual recall.

Primary colors. - A small group of colors that, when combined, can produce a broad spectrum of other colors. In television, red, green and blue are the primary colors from which all other colors in the picture are derived.

Principal point. - One of the two points that each lens has along the optical axis. The principal point closer to the imaging device (CCD chip in our case) is used as a reference point when measuring the focal length of a lens.

PROM. - Programmable read only memory. A ROM that can be programmed by the equipment manufacturer (rather than the PROM manufacturer).

Protocol. - A specific set of rules, procedures or conventions relating to format and timing of data transmission between two devices. A standard procedure that two data devices must accept and use to be able to understand each other. The protocols for data communications cover such things as framing, error handling, transparency and line control.

PSTN. - Public switched telephone network. Usually refers to the plain old telephone service, also known as POTS.

PTZ camera. - Pan, tilt and zoom camera.

PTZ site driver (or receiver or decoder). - An electronic device, usually a part of a video matrix switcher, which receives digital, encoded control signals in order to operate pan, tilt, zoom and focus functions.

Pulse. - A current or voltage that 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.

Q

QAM. - Quadrature amplitude modulation. Method for modulating two carriers. The carriers can be analog or digital.

Quad compressor (also split screen unit). - Equipment that simultaneously displays parts or more than one image on a single monitor. It usually refers to four quadrants display.

R

Radio frequency (RF). - A term used to describe incoming radio signals to a receiver or outgoing signals from a radio transmitter (above 150 Hz). Even though they are not properly radio signals, TV signals are included in this category.

RAM. - Random access memory. Electronic chips, usually known as memory, holding digital information while there is power applied to it. Its capacity is measured in kilobytes. This is the computer's work area.

RAID. - Redundant arrays of independent disks. This a technology of connecting a number of hard drives into one mass storage device, which can be used, among other things, for digital recording of video images.

Random interlace. - In a camera that has a free-running horizontal sync as opposed to a 2:1 interlace type that has the sync locked and therefore has both fields in a frame interlocked together accurately.

Registration. - An adjustment associated with color sets and projection TV's to ensure that the electron beams of the three primary colors of the phosphor screen are hitting the proper color dots/stripes.

Resolution. - A measure of the ability of a camera or television system to reproduce detail. The number of picture elements that can be reproduced with good definition.

Retrace. - The return of the electron beam in a CRT to the starting point after scanning. During retrace, the beam is typically turned off. All of the sync information is placed in this invisible portion of the video signal. May refer to retrace after each horizontal line or after each vertical scan (field).

Remote control. - A transmitting and receiving of signals for controlling remote devices such as pan and tilt units, lens functions, wash and wipe control and similar.

RETMA. - Former name of the EIA association. Some older video test charts carry the name RETMA Chart.

RF signal. - Radio frequency signal that belongs to the region up to 300 GHz.

RG-11. - A video coaxial cable with 75-W impedance and much thicker diameter than the popular RG-59 (of approximately 12 mm). With RG-11 much longer distances can be achieved (at least twice the RG-59), but it is more expensive and harder to work with.

RG-58. A coaxial cable designed with 50-W impedance; therefore, not suitable for CCTV. Very similar to

RG-59, only slightly thinner.

RG-59. A type of coaxial cable that is most common in use in small to medium-size CCTV systems. It is designed with an impedance of 75-W. It has an outer diameter of around 6 mm and it is a good compromise between maximum distances achievable (up to 300 m for monochrome signal and 250 m for color) and good transmission.

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.

RMS. Root Mean Square. A measure of effective (as opposed to peak) voltage of an AC waveform. For a sine wave it is 0.707 times the peak voltage. For any periodic waveform, it is the square root of the average of the squares of the values through one cycle.

ROM. Read only memory. An electronic chip, containing digital information that does not disappear when power is turned off.

Routing Switcher. An electronic device that routes a user-supplied signal (audio, video, etc.) from any input to any user-selected output. This is a broadcast term for matrix switchers, as we know them in CCTV.

RS-125. - A SMPTE parallel component digital video standard.

RS-170. - A document prepared by the Electronics Industries Association describing recommended practices for NTSC color television signals in the United States.

RS-232. - A format of digital communication where only two wires are required. It is also known as a serial data communication. The RS-232 standard defines a scheme for asynchronous communications, but it does not define how the data should be represented by the bits, i.e., it does not define the overall message format and protocol. It is very often used in CCTV communications between keyboards and matrix switchers or between matrix switchers and PTZ site drivers. The advantage of RS-232 over others is its simplicity and use of only two wires.

RS-422. - This is an advanced format of digital communication when compared to RS-232. The basic difference is in the need for four wires instead of two as the communications is not single-ended as with RS-232, but differential. In simple terms, the signal transmitted is read at the receiving end as the difference between the two wires without common earth. So if there is noise induced along the line, it will be cancelled out. The RS-422 can drive lines of over a kilometre in length and distribute data to up to 10 receivers.

RS-485. - This is an advanced format of digital communications compared to RS-422. The major improvement is in the number of receivers that can be driven with this format, and this is up to 32.

S

Saturation (in color). - The intensity of the colors in the active picture. The degree by which the eye perceives a color as departing from a gray or white scale of the same brightness. A 100% saturated color does not contain any white; adding white reduces saturation. In NTSC and PAL video signals, the color saturation at any particular instant in the picture is conveyed by the corresponding instantaneous amplitude of the active video sub-carrier.

Scanning. - The rapid movement of the electron beam in the CRT of a monitor or television receiver. It is formatted line-for-line across the photo-sensitive surface to produce or reproduce the video picture. When referred to a PTZ camera, it is the panning or the horizontal camera motion.

Scanner. - 1. When referring to a CCTV device it is the pan only head.
2. When referring to an imaging device it is the device with CCD chip that scans documents and images.

Scene illumination. - The average light level incident upon a protected area. Normally measured for the visible spectrum with a light meter having a spectral response corresponding closely to that of the human eye and is quoted in lux.

Scotopic vision. - Illumination levels below 10–2 lux, thus invisible to the human eye.

SCSI. - Small computer systems interface. A computer standard that defines the software and hardware methods of connecting more external devices to a computer bus.

SECAM. - Sequential Couleur Avec Memoire, sequential color with memory. A color television system with 625 lines per frame (used to be 819) and 50 fields per second developed by France and the former U.S.S.R. Color difference information is transmitted sequentially on alternate lines as an FM signal.

Serial data. - Time-sequential transmission of data along a single wire. In CCTV, the most common method of communicating between keyboards and the matrix switcher and also controlling PTZ cameras.

Serial interface. - A digital communications interface in which data are transmitted and received sequentially along a single wire or pair of wires. Common serial interface standards are RS-232 and RS-422.

Serial port. - A computer I/O (input/output) port through which the computer communicates with the external world. The standard serial port is RS-232 based and allows bidirectional communication on a relatively simple wire connection as data flow serially.

Sidebands. The frequency bands on both sides of a carrier within which the energy produced by the process of modulation is carried.

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 crisper and clearer the picture and sound will be during playback. An S/N ratio is calculated with the logarithm of the normal signal and the noise RMS value.

Silicon. - The material of which modern semiconductor devices are made.

Simplex. - In general, it refers to a communications system that can transmit information in one direction only. In CCTV, simplex is used to describe a method of multiplexer operation where only one function can be performed at a time, e.g., either recording or playback individually.

Single-mode fiber. - An optical glass fiber that consists of a core of very small diameter. A typical single-mode fiber used in CCTV has a 9 mm core and a 125 mm outer diameter. Single-mode fiber has less attenuation and therefore transmits signals at longer distances (up to 70 km). Such fibers are normally used only with laser sources because of their very small acceptance cone.

Skin effect. -The tendency of alternating current to travel only on the surface of a conductor as its frequency increases.

Slow scan. - The transmission of a series of frozen images by means of analog or digital signals over limited bandwidth media, usually telephone.

Smear. - An unwanted side effect of vertical charge transfer in a CCD chip. It shows vertical bright stripes in places of the image where there are very bright areas. In better cameras smear is minimized to almost undetectable levels.

SMPTE. - Society of Motion Picture and Television Engineers.

SMPTE time code. - In video editing, time code that conforms to SMPTE standards. It consists of an 8-digit number specifying hours: minutes: seconds: frames. Each number identifies one frame on a videotape. SMPTE time code may be of either the drop-frame or non-drop-frame type.

Snow. - Random noise on the display screen, often resulting from dirty heads or weak broadcast video reception.

S/N ratio. - See Signal-to-noise ratio.

Spectrum. - In electromagnetics, spectrum refers to the description of a signal's amplitude versus its frequency components. In optics, spectrum refers to the light frequencies composing the white light which can be seen as rainbow colors.

Spectrum analyzer. - An electronic device that can show the spectrum of an electric signal.

SPG. - Sync pulse generator. A source of synchronization pulses.

Split-screen unit (quad compressor). - Equipment that simultaneously displays parts or more than one image on a single monitor. It usually refers to four quadrants' display.

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

Start bit. - A bit preceding the group of bits representing a character used to signal the arrival of the character in asynchronous transmission.

Sub-carrier (SC). - Also known as SC: 3.58 MHz for NTSC, 4.43 MHz for PAL. These are the basic signals in all NTSC and PAL sync signals. It is a continuous sine wave, usually generated and distributed at 2V in amplitude, and having a frequency of 3.579545 MHz (NTSC) and 4.43361875 MHz (PAL). Sub-carrier is usually divided down from a primary crystal running at 14.318180 MHz, for example, in NTSC, and that divided by 4 is 3.579545. Similar with PAL. All other synchronizing signals are directly divided down from sub-carrier.

S-VHS. - Super VHS format in video recording. A newer standard proposed by JVC, preserving the downwards compatibility with the VHS format. It offers much better horizontal resolution up to 400 TV lines. This is mainly due to the color separation techniques, high-quality video heads and better tapes. S-VHS is usually associated with Y/C separated signals.

Sync. - Short for synchronization pulse.

Sync generator (sync pulse generator, SPG). - Device that generates synchronizing pulses needed by video source equipment to provide proper equipment video signal timing. Pulses typically produced by a sync generator could be sub-carrier, burst flag, sync, blanking, H and V drives and color black. Most commonly used in CCTV are H and V drives.

T

T1. - A digital transmission link with a capacity of 1.544 Mbps. T1 uses two pairs of normal twisted wires. T1 lines are used for connecting networks across remote distances. Bridges and routers are used to connect LANs over T1 networks.

T1 channels. - In North America, a digital transmission channel carrying data at a rate of 1.544 million bits per second. In Europe, a digital transmission channel carrying data at a rate of 2.048 million bits per second. AT&T term for a digital carrier facility used to transmit a DS-1 formatted digital signal at 1.544 Mbps.

T3 channels. - In North America, a digital channel that communicates at 45.304 Mbps commonly referred to by its service designation of DS-3.

TBC. - Time base correction. Synchronization of various signals inside a device such as a multiplexer or a time base corrector.

TDG. - Time and date generator.

TDM. - Time division multiplex. A time-sharing of a transmission channel by assigning each user a dedicated segment of each transmission cycle.

Tearing. - A lateral displacement of the video lines due to sync instability. It appears as though parts of the images have been torn away.

Teleconferencing. - Electronically linked meeting conducted among groups in separate geographic locations.

Telemetry. - Remote controlling system of, usually, digital encoded data, intended to control pan, tilt, zoom, focus, preset positions, wash, wipe and similar. Being digital, it is usually sent via twisted pair cable or coaxial cable together with the video signal.

Termination. - This usually refers to the physical act of terminating a cable with a special connector, which for coaxial cable is usually BNC. For fiber optic cable this is the ST connector. It can also refer to the impedance matching when electrical transmission is in use. This is especially important for high frequency signals, such as the video signal, where the characteristic impedance is accepted to be 75-W.

TFT. Thin-film-transistor. - This technology is used mainly for manufacturing flat computer and video screens that are superior to the classic LCD screens. Color quality, fast response time and resolution are excellent for video.

Time lapse VCR (TL VCR). - A video recorder, most often in VHS format, that can prolong the video recording on a single tape up to 960 hours (this refers to a 180 min tape). This type of VCR is often used in CCTV systems. The principle of operation is very simple – instead of having the video tape travel at a constant speed of 2.275 cm/s (which is the case with the domestic models of VHS VCRs), it moves with discrete steps that can be controlled. Time Lapse VCRs have a number of other special functions very useful in CCTV, such as external alarm trigger, time and date superimposed on the video signal, alarm search and so on.

Time lapse video recording. - The intermittent recording of video signals at intervals to extend the recording time of the recording medium. It is usually measured in reference to a 3-hr (180-min) tape.

Time multiplexing. - The technique of recording several cameras onto one time lapse VCR by sequentially sending camera pictures with a timed interval delay to match the time lapse mode selected on the recorder.

T-pulse to bar. - A term relating to frequency response of video equipment. A video signal containing equal amplitude T-pulse and bar portions is passed through the equipment and the relative amplitudes of the T-pulse and bar are measured at the output. A loss of response is indicated when one portion of the signal is lower in amplitude than the other.

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

Transcoder. - A device that converts one form of encoded video to another, e.g., to convert NTSC video to PAL. Sometimes mistakenly used to mean translator.

Transducer. - A device that converts one form of energy into another. For example, in fiber optics, a device that converts light signals into electrical signals.

Translator. - A device used to convert one component set to another, e.g., to convert Y, R-Y, B-Y signals to RGB signals.

Transponder. - The electronics of a satellite that receives an uplinked signal from the earth, amplifies it, converts it to a different frequency and returns it to the earth.

TTL. 1. Transistor-transistor logic. - A term used in digital electronics mainly to describe the ability of a device or circuit to be connected directly to the input or output of digital equipment. Such compatibility eliminates the need for interfacing circuitry. TTL signals are usually limited to two states, low and high, and are thus much more limited than analog signals. 2. Thru-the-lens viewing or color measuring.

Twisted-pair. - A cable composed of two small insulated conductors twisted together. Since both wires have nearly equal exposure to any interference, the differential noise is slight.

U

UHF signal. - Ultra high frequency signal. In television it is defined to belong in the radio spectrum between 470 MHz and 850 MHz.

Unbalanced signal. - In CCTV, this refers to a type of video signal transmission through a coaxial cable. It is called unbalanced because the signal travels through the center core only, while the cable shield is used for equating the two voltage potentials between the coaxial cable ends.

Underscan. - Decreases raster size H and V so that all four edges of the picture are visible on the monitor.

UPS. - Uninterruptible power supply. These are power supplies used in the majority of high security systems, whose purpose is to back-up the system for at least 10 minutes without mains power. The duration of this depends on the size of the UPS, usually expressed in VA, and the current consumption of the system itself.

UTP. - Unshielded twisted pair. A cable medium with one or more pairs of twisted insulated copper conductors bound in a single sheath. Now the most common method of bringing telephone and data to the desktop.

V

Variable bit rate. - Operation where the bit rate varies with time during the decoding of a compressed bit stream.

VDA. - See video distribution amplifier.

Vectorscope .- An instrument similar to an oscilloscope, that is used to check and/or align amplitude and phase of the three color signals (RGB).

Velocity of propagation.- Speed of signal transmission. In free space, electromagnetic waves travel at the speed of light. In coaxial cables, this speed is reduced by the dielectric material. Commonly expressed as percentage of the speed in free space.

Vertical interval. - 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 monitors are turned off (invisible) so that they can return from the bottom of the screen to the top to begin another scan.

Vertical interval switcher. - A sequential or matrix switcher that switches from one camera to another exactly in the vertical interval, thus producing roll-free switching. This is possible only if the various camera sources are synchronized.

Vertical resolution. - Chrominance and luminance detail expressed vertically in the picture tube. Limited by the number of scan lines.

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 shift register. - The mechanism in CCD technology whereby charge is read out from the photosensors of an interline transfer or frame interline transfer sensor.

Vertical sync pulse. - A portion of the vertical blanking interval which is made up of blanking level. Synchronizes vertical scan of television receiver to composite video signal. Starts each frame at same vertical position.

Vestigial sideband transmission. - A system of transmission wherein the sideband on one side of the carrier is transmitted only in part.

VGA. - Video graphics array.

Video bandwidth. - The highest signal frequency that a specific video signal can reach. The higher the video bandwidth, the better the quality of the picture. A video recorder that can produce a very broad video bandwidth generates a very detailed, high quality picture on the screen. Video bandwidths used in studio work vary between 3 and 12 MHz.

Video distribution amplifier (VDA). - A special amplifier for strengthening the video signal so that it can be supplied to a number of video monitors at the same time.

Video gain. - The range of light-to-dark values of the image that are proportional to the voltage difference between the black and white voltage levels of the video signal. Expressed on the waveform monitor by the voltage level of the whitest whites in the active picture signal. Video gain

is related to the contrast of the video image.

Video equalization corrector (video equalizer). - A device that corrects for unequal frequency losses and/or phase errors in the transmission of a video signal.

Video framestore. - A device that enables digital storage of one or more images for steady display on a video monitor.

Video in-line amplifier. - A device providing amplification of a video signal.

Video matrix switcher (VMS). - A device for switching more than one camera, VCR, video printer and similar to more than one monitor, VCR, video printer and similar. Much more complex and more powerful than video switchers.

Video monitor. - A device for converting a video signal into an image.

Video printer. - A device for converting a video signal to a hard copy printout. It could be a monochrome (B/W) or color. They come in different format sizes. Special paper is needed.

Video signal. - An electrical signal containing all of the elements of the image produced by a camera or any other source of video information.

Video switcher. - A device for switching more than one camera to one or more monitors manually, automatically or upon receipt of an alarm condition.

VITS. - Video insertion test signals. Specially shaped electronic signals inserted in the invisible lines (in the case of PAL, lines 17, 18, 330 and 331) that determine the quality of reception.

Video wall. - A video wall is a large screen made up of several monitors placed close to one another, so when viewed from a distance, they form a large video screen or wall.

VOD. - Video on Demand. A service that allows users to view whatever program they want whenever they want it with VCR-like control capability such as pause, fast forward and rewind.

VHF. - Very high frequency. A signal encompassing frequencies between 30 and 300 MHz. In television, VHF band I uses frequencies between 45 MHz and 67 MHz, and between 180 MHz and 215 MHz for Band III. Band II is reserved for FM radio from 88 MHz to 108 MHz.

VHS. - Video home system. As proposed by JVC, a video recording format used most often in homes but also in CCTV. Its limitations include the speed of recording, the magnetic tapes used and the color separation technique. Most of the CCTV equipment today supersedes VHS resolution.

VLF. - Very low frequency. Refers to the frequencies in the band between 10 and 30 kHz.

VMD. - Video motion detector. A detection device generating an alarm condition in response to a change in the video signal, usually motion, but it can also be change in light. Very practical in CCTV as the VMD analyzes exactly what the camera sees, i.e., there are no blind spots.

VR. - Virtual Reality. Computer-generated images and audio that are experienced through high-tech display and sensor systems and whose imagery is under the control of a viewer.

VS. - Vertical sync.

W

WAN. - Wide area network.

Waveform monitor. - Oscilloscope used to display the video waveform.

Wavelet. - A particular type of video compression that is especially suitable for CCTV. Offers higher compression ratio with equal or better quality to JPEG.

White balance. - An electronic process used in video cameras to retain true colors. It is performed electronically on the basis of a white object in the picture.

White level. - This part of the video signal electronically represents the white part of an image. It resides at 0.7 V from the blanking level, whereas the black part is taken as 0 V.

Wow and flutter. - Wow refers to low frequency variations in pitch while flutter refers to high-frequency variations in pitch caused by variations in the tape-to-head speed of a tape machine.

W-VHS. - A new wide-VHS standard proposed by JVC, featuring a high resolution format and an aspect ratio of 16:9.

X

No entries for this letter.

Y

Y/C. - A video format found in Super-VHS video recorders. Luminance is marked with Y and is produced separate to the C, which stands for chrominance. Thus, an S-VHS output Y/C requires two coaxial cables for a perfect output.

Y, R-Y, B-Y. - The general set of component video 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 first color difference signal and B-Y is the second color difference signal.

Y, U, V. - Luminance and color difference components for PAL systems; Y, B-Y, R-Y with new names; the derivation from RGB is identical.

Z

Z. - In electronics and television this is usually a code for impedance.

Zoom lens. - A camera lens that can vary the focal length while keeping the object in focus, giving an impression of coming closer to or going away from an object. It is usually controlled by a keyboard with buttons that are marked zoom-in and zoom-out.

Zoom ratio. - A mathematical expression of the two extremes of focal length available on a particular zoom lens.