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# MAGNETIC TAPE GLOSSARY

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AMPEX MAGNETIC TAPE DIVISION

## A

**A.C.T. (Anti-Comet-Tail):** This is a complex technique of preventing picture highlights from "comet-tailing" due to a lack of beam current. (The usually colored trail behind a moving, very bright light/reflection in a picture is called a "comet-tail" since the effect looks similar to an astronomical comet.) The technique involves a special tube and circuitry to drive it. Basically, the charge due to a very bright object is never allowed to build up to an unmanageable level by discharging the target above a preset level during horizontal retrace time when the ACT action is turned on, with an increased beam current.

**Absorption Coefficient:** A measurement of the absorptive characteristics of a material in comparison to air.

**AC Bias:** The alternating current, usually of frequency several times higher than the highest signal frequency, that is fed to a record head in addition to the signal current. AC bias serves to linearize the recording process and is universally used in analog recording. Generally, a large AC bias is necessary to achieve maximum long wavelength output and linearity, but a lower value of bias is required to obtain maximum short-wavelength output. The mechanism of AC bias can best be explained in terms of an-hysteresis.

**AC Erasure:** See *ERASURE*.

**Acicular:** Needle-shaped, used to describe the shape of oxide particles.

**Acoustic Shadow:** An area in which sound waves are attenuated due to the presence of an acoustic absorber or reflector in the path of the sound waves.

**Additive:** Any material in the coating of magnetic tape other than the oxide and the binder resins; for example, plasticizers (materials used to soften an otherwise hard or brittle binder), lubricants (materials used to lower the coefficient of friction of an otherwise high-friction binder), fungicides (materials used to prevent fungus growth), dispersants (to uniformly distribute the oxide particles) and dyes.

**Adhesion:** The degree to which the coating adheres to the base film. Anchorage may be checked by measuring the force required to separate the coating from the base film by means of a specially designed plow blade or, more simply, by determining whether the coating can be peeled from the base film by means of ordinary pressure-sensitive adhesive tape.

**ALC:** See *AUTOMATIC LEVEL CONTROL*.

**Aliasing:** When reconstructing an analog signal from its sampled data representation, false lower frequency components can result from an insufficient sampling rate, i.e., less than required by the sampling theorem. This undesirable result is called aliasing.

**Alignment:** Most commonly, Head Alignment, but also used to describe the process of adjusting a recorder's Bias and Equalization for optimum results from a specific tape.

**Amplitude:** The height of a waveform above or below the zero line.

**Amplitude Non-Uniformity:** A term used in connection with magnetic tape testing and refers to the reproduced peak-to-peak voltage and its variation from what was recorded.

**Analog:** Refers to the historic method of recording an audio signal in the same manner in which it is heard.

**Anchorage:** The degree to which the magnetic tape oxide coating adheres to the base film.

**Anechoic Chamber:** A room which has totally sound absorbant walls, so that no reflected waves can exist and only the direct waves are heard.

**Anhysteresis:** The process whereby a material is magnetized by applying a unidirectional field upon which is superimposed an alternating field of gradually decreasing amplitude. One form of this process is analogous to the recording process using AC Bias.

**Anisotropy:** Directional dependence of magnetic properties, leading to the existence of easy or preferred directions of magnetization. Anisotropy of a particle may be related to its shape, to its crystalline structure or to the existence of strains within it. Shape anisotropy is the dominant form in acicular particles.

**ANRS, Super ANRS:** A noise reduction system used by JVC. ANRS operates on principles similar to those used by the Dolby system. Therefore, there is a degree of compatibility between recordings made with either system.

**Aspect Ratio:** The relationship between the width and height of the picture. The ratio is standardized in the United States at 3:4.

**Asperities:** Small projecting imperfections on the surface of the tape coating that limit and cause variations in head-to-tape contact.

**Audio:** The common name for the sound portion of a television transmission.

**Automatic:** Refers to either electrical or mechanical automatic bias switching devices.

**Automatic Level Control (ALC):** A circuit which automatically holds recording levels within permissible limits. Also known as Automatic Volume Control (AVC).

**Automatic Shut-off:** A device (usually a mechanical switch) incorporated into most tape recorders that automatically stops the machine when the tape runs out or breaks.

**Average Picture Level (APL):** The average signal level during active scanning time (excluding blanking and synchronizing intervals) integrated over a frame period. It is expressed as a percentage of the blanking to reference white range.

**Azimuth:** The angle of a tape head's recording gap relative to the tape

**Azimuth Alignment:** Alignment of the recording and reproducing gaps so that their centerlines lie parallel with one another and at right angles to the direction of head/tape motion. Misalignment of the gaps causes a loss in output at short wavelengths. For example, using a track width of 50 mils, a misalignment of only 0.05 degrees will cause a 3 dB loss at a wavelength of 0.1 mil.

**Azimuth Loss:** High frequency losses caused by head misalignment.

## B

**Back Porch:** That portion of the composite picture signal which lies between the trailing edge of the horizontal sync pulse and the trailing edge of the corresponding blanking pulse.

**Back Porch Tilt:** The slope of the back porch from its normal horizontal position. Positive or negative refer respectively to upward or downward tilt to the right.

**Back-Timing:** Timing of a program from the end to the beginning. A reversal of clock-order so that remaining time or time left to the end of the program can be easily seen.

**Backcoating:** A conductive additional coating used on the reverse side of magnetic tape to control mechanical handling and minimize static generation.

**Baffles:** Sound absorbing panels used to prevent sound waves from entering or leaving a certain space.

**Balanced Line:** A line using two conductors to carry the signal, neither of which is connected to ground.

**Bandwidth:** The range of frequency within which the performance of a recorder with respect to some characteristics, usually frequency response, falls within specified limits, or within which some performance characteristics, such as noise, are measured.

**Base Film:** The plastic substrate that supports the coating. The base film of most precision magnetic tape is made of polyester.

**Base Film Thickness:** The thickness of the polyester material used for magnetic tape, varying from 0.24 mil in C120 cassette tape to 1.5 mil for audio mastering tape and instrumentation tape.

**Baseline Restorer:** An information processing unit intended to remove the DC and low order frequency distortion terms that result from use of record/reproduce transfer function which cannot pass DC in conjunction with a binary code that requires low frequency response to DC (i.e., zero frequency) for accurate recovery of such a code.

**Bearding:** An overloading condition in which highly saturated or white areas of a television picture appear to flow irregularly into darker areas.

**Beats:** Variation in the amplitude of a mixture of two signals of close frequency as a result of constructive and destructive interference.

**BH Loop Tracer:** See *BH METER*.

**BH Meter:** A device for measuring the intrinsic hysteresis loop of a sample of magnetic material. Usually, the sample is magnetized in a 60 Hz field supplied by a solenoid and the intrinsic flux is detected by integrating the emf produced in an opposing pair of search coils, one of which surrounds the sample. The hysteresis loop may be displayed on an oscilloscope by feeding the X and Y plates with voltages proportional to the magnetizing coil current and the integrated search coil emf respectively.

**Bi O-L:** Bi-phase Level (Code). Also called Manchester (Code).

**Bias:** A steady-state signal applied to the tape (usually by a high frequency oscillation of 50-100,000 Hz or more) to minimize distortion and noise and increase frequency response and efficiency in recording. Every tape formulation has slightly different bias requirements.

**Bias Adj.:** The control which regulates the amount of bias mixed in with the signal to be recorded.

**Bias Cal.:** A control which calibrates the VU meter on a recorder so it reads 0 VU in the bias position of the output selector switch when bias is properly set.

**Bias Switch:** Switch used on cassette recorder to change the amount of bias current required for different types of tapes.

**Bidirectional:** (1) In open reel or cassette recorders, the ability to play (and, in some cases, record) both stereo track pairs on a tape by reversing the tape's direction of motion without removing and replacing the tape reels or

cassette. (2) In microphones, a Figure-Eight pickup pattern.

**Binaural Effect:** The ability to localize the direction from which a sound comes due to the fact that people have two ears.

**Binder:** The binder is usually composed of organic resins used to bond the oxide particles to the base material. The actual composition of the binder is considered proprietary information by each magnetic tape manufacturer. The binder is required to be flexible and still maintain the ability to resist flaking or shedding binder material during extended wear passes.

**Bit:** As applied in magnetic recording, bit is usually an abbreviation of binary digit.

**Bit Density:** See *PACKING DENSITY*.

**Bit Error:** The incorrect interpretation of a binary bit by a message processing unit.

**Bit Error Rate:** This term is used in High Density Digital Recording (HDDR), or High Density Recording (HDR), or other such names and refers to the number of errors a specific magnetic tape may contain, and is expressed in errors per data bits, such as one in  $10^6$  or one error in one million data bits.

**Bit Packing Density:** The number of bits recorded per track length unit, usually expressed in terms of kilobits per inch (KBPI) or bits per millimeter (BPM). (BPM).

**Bit Slip:** The condition in a message processing unit where the bit rate clock has gained (or lost) more than 180 degrees phasing with respect to synchronism with the binary message bits.

**Bit Synchronizer:** An information processing unit intended to extract the binary message and associated bit rate clock included in a PCM signal.

**Black Compression:** Amplitude compression of the signals corresponding to the black regions of the picture, thus modifying the tonal gradient.

**Black Peak:** The maximum excursion of the picture signal black direction at the time of observation.

**Blacker-than-Black:** The amplitude region of the composite video signal below reference black level in the direction of the synchronizing pulses.

**Blanking (Picture):** The portion of the composite video signal whose instantaneous amplitude makes the vertical and horizontal retrace invisible.

**Blanking Level:** The level of the front and back porches of the composite video signal.

**Blast Filter:** A dense mesh screen on a microphone, which minimizes overload caused by loud, close sounds.

**Bleeding Whites:** An overloading condition in which white areas appear to flow irregularly into black areas.

**Blocking:** The tendency for adjacent layers of tape in a roll to adhere, particularly after prolonged storage under conditions of high temperature and/or humidity.

**Blooming:** The defocussing of regions of the picture where the brightness is at an excessive level, due to enlargement of spot size and halation of the fluorescent screen of the cathode-ray picture tube.

**Board:** The audio console control in radio and television.

**Board Fade:** A radio term, used to designate the process of gradually fading the volume of sound by means of a master fading control on the board.

**Bounce:** An unnatural sudden variation in the brightness of the picture.

**BPI:** Bits per linear inch down a recorded track.

**Break Elongation:** The relative elongation of a specimen of magnetic tape or base film at the instant of breaking when it has been stretched at a given rate.

**Breathing:** Amplitude variations similar to "bounce" but at a slow, regular rate.

**Brightness:** This is the attribute of a color perception permitting it to be classed as equivalent to some member of a series of achromatic color perceptions ranging from very dim to very bright.

**Brown Stain:** A non-magnetic substance that forms on that area of a magnetic head's surface over which tape passes. Its origin is not well understood but it is known to occur primarily in the presence of low humidity.

**Buckling:** Deformation of the circular form of a tape pack which may be caused by a combination of improper winding tension, adverse storage conditions and/or poor reel hub configuration.

**Built-in Reference Tones:** Refers to adjustment tones which are available within the recorder for adjusting record level and bias.

**Bulk Eraser:** A device used to erase an entire tape at one time. Bulk erasers are usually more effective than recorders' erase heads.

**Burned-in Image:** An image which persists in a fixed position in the output signal of a camera tube after the camera has been turned to a different scene.

**Buss:** A wire carrying line level signals (anything greater than mike level).

## C

**Camera Chain:** Television camera and associated equipment, consisting of power supply and sync generator.

**Camera Tube:** See *PICKUP TUBE*.

**Capstan:** The driven spindle or shaft in a tape recorder — sometimes the motor shaft itself — which rotates against the tape (which is backed up by a rubber pressure or pinchroller), pulling it through the machine at constant speed during recording and playback modes of operation.

**Capstan Idler:** A rubber wheel which presses the magnetic tape against the capstan so that the capstan can move the tape.

**Cardioid:** The quasi-heart-shaped sensitivity pattern of most unidirectional microphones. Hypercardioid and supercardioid microphones have basically similar patterns, but with longer, narrower areas of sensitivity at the front, and slightly increased rear sensitivity.

**Cartridge:** A plastic container that holds tape for easy loading into a matching recorder or player, especially the Eight-track Cartridge.

**Cassette:** A tape cartridge in which the tape passes from one hub to another. Most commonly applied to the Compact Cassette developed by Philips, but also to a variety of Micro and Mini Cassette systems that are not mutually compatible.

**Cathode-Ray Tube:** An electron tube assembly containing an electron gun arranged to direct a beam upon a fluorescent screen. Scanning by the beam can produce light at all points in the scanned raster.

**Celanar:** Trade name for polyester produced by Celanese.

**Ceramic Microphone:** See *PIEZOELECTRIC MICROPHONE*.

**Certified Tape:** Tape that is electrically tested on a specified number of tracks and is certified by the supplier to have less than a certain total number of permanent errors.

**Certifier:** Equipment that evaluates the ability of magnetic tape to record and reproduce. The equipment normally counts and charts each error on the tape, including level and duration of dropouts. In the Certify Mode, it stops on error to allow for visually inspecting the tape to see if the error cause is correctible or permanent.

**Channel:** An independent signal path. Stereo recorders have two such channels. Quadraphonic ones have four.

**Chroma Comp:** This is a deliberate distortion of colors usually used to achieve unusual matching. By detecting the quadrant the color is in (by normally deciding whether R-Y and B-Y are positive or negative), the amplitude of R-Y, B-Y just for colors in that quadrant can be changed; hence, the hue and saturation can be changed for those colors without affecting others.

**Chroma Flutter:** A rapid coherent variation in the chroma saturation.

**Chroma Key:** A method of inserting an object or objects from one camera's picture into the scene of another camera's picture such that the object appears to be part of the second scene. R, G and B videos from the camera are sent directly to the chroma key section of a production switcher for this purpose. However, the blue signal is normally used to extract the "key" or switching signal.

**Chroma Noise:** Unwanted random variations of chroma saturation and phase.

**Chromium Dioxide (CrO<sub>2</sub>):** A modern magnetic particle oxide of the high energy type. Chromium dioxide is a highly acicular particle with the crystal structure of rutile. Tapes made with CrO<sub>2</sub> exhibit a coercivity of 425 to 475 Oersteds.

**Cinching:** Longitudinal slippage between the layers of tape in a tape pack when the roll is accelerated or decelerated.

**Clamper:** A device which functions during the horizontal blanking or sync interval to fix the level of the picture signal at some predetermined reference level at the beginning of each scanning line.

**Clamping:** The process that establishes a fixed level for the picture signal at the beginning of each scanning line.

**Clean Rooms:** Rooms whose cleanliness is measured by the number of particles of a given size per cubic foot of room volume. For example, a class 100,000 clean room may have no more than 100,000 particles one-half micron or larger per cubic foot. Similarly, for class 10,000 and class 100 rooms. In addition, a class 10,000 room may have no more than 65 five-micron particles per cubic foot, while class 100,000 may have no more than 700.

**Clipping:** The shearing off of the peaks of a signal. For a picture signal this may affect either the positive (white) or negative (black) peaks. For a composite video signal, the sync signal may be affected.

**Close Miking:** Placing a mike close to the sound source in order to pick up mainly direct sound and avoid picking up reverberant sound.

**Closed Circuit:** Television program that is distributed, usually by cable, to specific receivers but not telecast to the public.

**Closed-loop Drive:** A tape transport mechanism in which the tape's speed and tension are controlled by contact with a capstan at each end of the head assembly.

**Coating:** The magnetic layer of a magnetic tape, consisting of oxide particles held in a binder that is applied to the base film.

**Coating Resistance:** The electrical resistance of the coating measured between two parallel electrodes spaced a known distance apart along the length of tape.

**Coating Thickness:** The thickness of the magnetic coating applied to the base film. Modern tape coatings range in thickness from 170 to 650 microinches. Coating thickness is normally optimized for the intended application. In general, thin coatings give good resolution at the expense of reduced output at long wavelengths; thick coatings give a high output at long wavelengths at the expense of degraded resolution.

**Cobalt Doped Oxide:** This is normally a gamma ferric oxide particle which has been doped with cobalt to achieve a higher coercivity. Modern forms of this oxide are acicular and have been used to make tapes with coercivities in excess of 1000 Oersteds.

**Coefficient of Friction:** The tangential force required to maintain (dynamic coefficient) or initiate (static coefficient) motion between two surfaces divided by the normal force pressing the two surfaces together.

**Coefficient of Hygroscopic Expansion:** The relative increase in the linear dimension of a tape or base material per percent increase in relative humidity measured in a given humidity range.

**Coefficient of Thermal Expansion:** The relative increase in the linear dimension of a tape or base material per degree rise in temperature (usually Fahrenheit) measured in a given temperature range.

**Coercivity:** Measured in Oersteds, the measurement of a magnetic characteristic. The demagnetizing force required to reduce the magnetic induction in a magnetic material to zero from its saturated condition.

**Color Masking:** A method of correcting color errors which are fundamental in any three primary color additive reproducing system, by electrically changing the R, G and B signals with a matrix or masking amplifier which mixes (usually subtracts) the signals in a very precise predetermined amount. The form is generally:

$$R \text{ out} = R \text{ in} + a (G-R) + b (R-B)$$

$$G \text{ out} = G \text{ in} + c (G-R) + d (B-G)$$

$$B \text{ out} = B \text{ in} + e (R-B) + f (B-G)$$

a, b, c, d, e and f are referred to as the masking or correction coefficients.

**Color Saturation:** This is the attribute of color perception determining the degree of its difference from the achromatic color perception most resembling it. NOTE: An achromatic color perception is defined as one not possessing a hue/color. In other words, how much "color" in an object.

**Color Temperature:** A way of specifying the color of so-called "white light." Any light source that uses a heated element for the light emitter gives off a continuous spectrum of light emissions similar to a heated "black body radiator." In fact, when we say that a lamp is 3200° K (color

temp), we mean it emits light just like a "black body radiator" heated to this temperature. (NOTE: Degrees K = degrees Centigrade + 273.) A light source such as a fluorescent lamp can only have an equivalent color temp, which means it looks like a "black body radiator" to a human eye, although its actual spectral emissions are quite different. This difference causes color fidelity problems for a color camera.

**Combination Tone:** A tone produced by the ear which is equal in frequency to the sum or difference of the frequencies of two loud tones which differ by more than 50 Hz.

**Compact Cassette:** A small (4 x 2½ x ½") tape cartridge developed by Philips, containing tape about 1/7" wide, running at 1-7/8 ips. Recordings are bidirectional, with both stereo tracks adjacent for compatibility with monophonic cassette recorders, whose heads scan both stereo tracks at once.

**Compression:** An undesired decrease in amplitude of a portion of the composite video signal relative to that of another portion. Also, a less than proportional change in output of a circuit for a change in input level. For example, compression of the sync pulse means a decrease in the percentage of sync during transmission.

**Compressor:** A device which reduces the dynamic range of a signal by either reducing the level of loud signals or increasing the level of soft signals when the combined level of all the frequencies contained in the input is above or below a certain threshold level.

**Condenser Mike:** A microphone which converts sound pressure level variations into variations in capacitance and then into electrical voltage.

**Conductive Coatings:** Coatings that are specially treated to reduce the coating resistance, and thus prevent the accumulation of static electrical charge. Untreated, non-conductive coatings may become highly charged, causing transport, noise and dust-attraction problems.

**Contrast:** The range of light and dark values in a picture, or the ratio between the maximum and minimum brightness values. For example, in a high contrast picture, there would be intense blacks and whites, whereas a low contrast picture would contain only various shades of grey.

**Contrast Ratio:** Related to gamma law and is a measurement of the maximum range of light to dark objects that a T.V. system can reproduce.

**Control Room:** The enclosed room where the electronic control system for radio and television are located and where the director and TD sit.

**Coring:** Both aperture correction and enhancement can be cored. It involves preventing any boosting of very low level edge transitions. The threshold point is the coring control. The more the coring is increased, the more the extra noise added by the enhancer (or aperture corrector) high frequency boosting is reduced. Of course, the fine detail enhancement is also reduced or eliminated. Too high levels of coring can cause a "plastic picture" effect.

**Crawl:** Titles that crawl slowly up the screen, mounted on a revolving drum.

**Credits:** Listing of actors, singers, directors, etc., in title preceding or directly following the program.

**Cross-play:** By cross-play capability is meant the ability to record and reproduce on the same or a different machine, record at one speed and reproduce at the same or a different speed;

accomplish the foregoing singly or in any combination without readjustment for tape or transport type.

**Crossfade:** To fade out one song or sound while fading in another, so that at some points during the crossfade both sounds are audible.

**Crossover Network:** A device which divides a signal into two or more frequency bands before low frequency outputs of a crossover network. The level of each output at this frequency is 3 dB down from the flat section of the crossover's frequency response curve.

**Crossover Network:** A device which divided a signal into two or more frequency bands before feeding it either directly or through separate power amps to the separate limited frequency range drivers which make up a speaker system.

**Crosstalk:** Undesired signal leakage from one sound channel or track to another.

**Cue Control:** A switch which temporarily disables a recorder's Tape Lifters during fast forward and rewind so the operator can judge what portion of the recording is passing the heads.

**Cupping:** Curvature of a tape in the lateral direction. Cupping may occur because of improper drying or curing of the coating or because of differences between the coefficients of thermal or hygroscopic expansion of coating and base film.

**Current:** The flow of electrons.

**Cut-off Frequency:** That frequency beyond which no appreciable energy is transmitted. It may refer to either an upper or lower limit of a frequency band.

**Cutting Head:** A transducer used to convert electrical signals into hills and valleys in the sides of record grooves.

**Cycle:** An alternation of a waveform which begins at a point, passes through the zero line and ends at a point with the same value and moving in the same direction as the starting point.

**Cycle Per Second:** A measure of frequency, equivalent to Hertz.

## D

**Damped Oscillation:** Oscillation which, because the driving force has been removed, gradually dies out, each swing being smaller than the preceding in smooth regular decay.

**DC Erasure:** See *ERASURE*.

**DC Noise:** See *NOISE*.

**DC Servo Motor:** A motor, the speed of which is determined by the DC voltage applied to it and has provision for sensing its own speed and applying correcting voltages to keep it running at a certain speed.

**De-esser:** A compressor which reduces sibilance by triggering compression when it senses the presence of high frequency signals above the compression threshold.

**Decay Time:** The time it takes for a signal to decrease to one-millionth of its original value (60 dB down from its original level).

**Decibel:** Abbreviated "dB" or "db", it is a relative measure of signal or sound intensity or "volume." It expresses the ratio of one intensity to another. One dB is about the smallest change in sound volume that the human ear can detect. (Can also express voltage and power ratios logarithmically.)

**Deck, Tape:** A tape recorder that does not include power amplifiers or speakers.

**Defect:** An imperfection in the tape leading to a variation in output or a dropout. The most common defects take the form of surface projections, consisting of oxide agglomerates, imbedded foreign matter, or redeposited wear products.

**Definition:** Degree of detail in television picture transmission.

**Degaussing:** A process by which a unidirectional magnetic field is removed from such transport parts as heads and guides. The presence of such a field causes noise and a loss of high frequencies.

**Delay Distortion:** Distortion resulting from non-uniform speed of transmission of the various frequency components of a signal; i.e., the various frequency components of the signal have different times of travel (delay) between the input and the output of a circuit.

**Detail:** Refers to the most minute elements in a picture which are distinct and recognizable. Similar to Definition or Resolution.

**Differential Gain:** The amplitude change, usually of the 3.6 mc color subcarrier, introduced by the overall circuit, measured in dB or percent, as the subcarrier is varied from blanking to white level.

**Differential Phase:** The phase change of the 3.6 mc color subcarrier introduced by the overall circuit, measured in degrees, as the subcarrier is varied from blanking to white level.

**Digital Audio Recording:** A system which converts audio signals into digital words which are stored on magnetic tape for later reconversion to audio, in such a manner that dropouts, noise, distortion and other poor tape qualities are eliminated.

**Digital Delay:** A process which converts audio into digital form for storage in a memory bank for reconversion into audio after a predetermined time passes.

**Digital Recording:** A method of recording in which the information is first coded in a digital form. Most commonly, a binary code is used and recording takes place in terms of two discrete values of residual flux.

**Digital System:** A system utilizing devices that can be in only one of two possible states.

**Direct Recording:** A type of analog recording which records and reproduces data in the electrical form of its source.

**Direct Sound:** The sound which reaches a mike or listener without hitting or bouncing off any obstacles.

**Direct to Disk:** A method of recording directly to the cutting head of the disk cutter, eliminating the magnetic recorder in the sequence, typified by no tape hiss.

**Directional Microphone:** One whose sensitivity to sound varies with direction. Such microphones can be aimed so their most sensitive sides face the sound source, while their least sensitive sides face sources of noise or other undesired sound. See *CARDIOID, FIGURE EIGHT*.

**Dispersion:** Distribution of the oxide particles within the binder. A good dispersion can be defined as one in which equal numbers of particles would be found in equal, vanishingly small volumes sampled from different points within the coating.

**Displacement of Porches:** Refers to any difference between the level of the front porch and the level of the back porch.

**Dissolve:** A gradual overlapping of one image by another, followed by the slow disappearance of the first. Usually used as a bridge to a sequence.

**Distant Miking:** Placing a mike far from a sound source so that a high proportion of reflected sound is picked up.

**Distortion:**

3rd Harmonic: The introduction of an unwanted 3rd harmonic of the fundamental signal (3 octaves higher than the fundamental signal).

Intermodulation (IM): Distortion that results when two or more pure tones produce new tones with frequencies representing the sums and differences of the original tones and their harmonics.

**DM-M:** Delayed Modulation Mark (Code). Also called **Miller Code**.

**DNL:** Noise reduction system produced by Philips.

**Dolby:** A proprietary electronic device or circuit that reduces the amount of noise (principally tape hiss) introduced during the recording process by boosting — in carefully controlled amounts — the strength of weak high frequency signals before they are recorded. During playback the signals (and the noise) are cut back by an exactly equivalent amount. The original dynamics are restored, but the noise is reduced by 10 dB.

**Domain:** The smallest known permanent magnet.

**Doppler Effect:** An effect in which the pitch of a tone rises as its source approaches a listener, and falls as the source moves away from the listener.

**Doubling:** To overdub the same part that has previously been recorded, with the object of making the part appear to have been performed by several instruments playing simultaneously.

**Dropout:** The momentary loss of a recorded signal.

**Dropout Count:** The number of dropouts detected in a given length of magnetic tape.

**Dry Signal:** A signal without any added effects, especially without reverb.

**Dual Capstan:** Refers to a transport system in which a capstan and pinchroller are used on both sides of the recording and playback head system.

**Dub:** To copy another recording, or the copy so made.

**Durability:** Usually expressed as a number of passes that can be made before a significant degradation of output occurs; divided by the corresponding number that can be made using a reference tape.

**Dynamic Mike:** A mike in which the diaphragm moves a coil suspended in a magnetic field to generate an output voltage proportional to the sound pressure level.

**Dynamic Range/Signal-to-Noise Ratio:** In magnetic recording, considered to be the range measured in dB from the noise floor to the point at which 3.0% of 3rd harmonic distortion occurs.

## E

**E-Value:** The difference in inches between the radii of the outside layer of tape in a roll and the outside edge of the reel flange.

**Echo (or Reflection):** A wave which has been reflected at one or more points in the transmission medium, with sufficient magnitude and time difference to be perceived in some manner as a wave distinct from that of the main or primary transmission. Echoes may be either leading or lagging the primary wave and appear in the picture monitor as reflections or "ghosts."

**Echo Plate:** A metal plate used to create reverberation by inducing waves in it by bending the metal.

**Electronic Crossover:** A crossover network which uses active filters and is used before rather than after the signal passes through the power amp.

**Electrostatic Pickup:** Pickup of noise generated by electrical sparks such as those caused by fluorescent lights and electrical motors.

**ENRZ:** Enhanced Non-Return to Zero (Code).

**Equalization:** The selective amplification or attenuation of certain frequencies. Also refers to recognized industry standards for recording and reproducing "characteristics" (such as the NAB Standard).

**Equalizer:** A device which is designed to change the frequency balance of a signal.

**Equalizing Pulses:** Pulses of one-half the width of the horizontal sync pulses which are transmitted at twice the rate of the horizontal sync pulses during the blanking intervals immediately preceding and following the vertical sync pulses. The action of these pulses causes the vertical deflection to start at the same time in each interval, and also serves to keep the horizontal sweep circuits in step during the vertical blanking intervals immediately preceding and following the vertical sync pulse.

**Equipment Noise:** See *NOISE*.

**Equivalent Input Noise:** Noise created by the input stage of an amplifier which appears in the output of the amplifier increased in level by the gain of the amp.

**Erase Adj.:** A control which adjusts the coupling of the bias oscillator to the erase head in a manner which purifies the oscillator's waveform.

**Erase Field Strength:** The minimum initial amplitude of a decreasing alternating field (normally applied in the longitudinal direction) required to reduce the output of a given recorded signal by a specified amount.

**Erase Head:** A device used to remove recorded signals from magnetic tape.

**Erasure:** A process by which a signal recorded on a tape is removed and the tape made ready for rerecording.

**Error:** In digital recording, either a dropout or a noise pulse that exceeds a certain limit is usually termed an error. In video and instrumentation recording, an error has no commonly accepted meaning but is defined in relation to the particular system requirements.

**Error Correction:** The process of correcting detected bit errors.

**Error Detection:** The process of detecting bit errors.

**Evaluator:** Equipment that evaluates physical and magnetic quality of tape, usually provided as an adjunct to a winder/cleaner. In contrast to a certifier, it does not stop when it detects an error.

**Expander:** A device which increases the dynamic range of a signal by either reducing the level of soft signals or increasing the level of loud signals when the input is above or below a certain threshold level.

**Eye Pattern:** The pattern that results, as displayed on an oscilloscope, from the superpositioning of "one's" and zero's" in a digital data sequence, when the time base of the oscilloscope is synchronized to the bit rate clock.

## F

**Fade:** A gradual change in the intensity of the picture. In a FADE OUT, the picture grows gradually darker and to black. In a FADE IN, the picture gradually appears out of the darkness.

**Fade to Black:** The picture is gradually faded down until the screen is black.

**Fast Forward:** The provision on a tape recorder permitting tape to be run rapidly through it in normal play direction, usually for search purposes.

**Feed Reel:** Also called "stock," "supply" or "storage" reel. The reel on a tape recorder from which tape unwinds as the machine records or plays.

**Ferrichrome:** A relatively recent word describing the technique of dual coating with both a layer of gamma ferric oxide and a layer of chromium dioxide. An intermediate level bias position used only for ferrichrome tapes.

**Field:** One-half of a complete picture (or frame) interval, containing all of the odd or even scanning lines of the picture.

**Field Frequency:** The rate at which a complete field is scanned, nominally 60 times a second.

**Figure-8 Microphone:** A microphone (usually a ribbon type) whose sensitivity is greatest to front and rear, and weakest to both sides.

**Film Loop:** A piece of film, quite short, which is continuous.

**Flanging:** Another name for phasing. Originally, the method of phasing where phase was varied by resting your thumb on the flanges of the reel to slow it down.

**Flash:** Momentary interference to the picture of a duration of approximately one field or less, and of sufficient magnitude to totally distort the picture information. In general, this term is used alone when the impairment is of such short duration that the basic impairment cannot be recognized. Sometimes called "Hit."

**Flat Field:** As used herein, the entire area viewed by a television camera with the viewed area being uniformly white or any single specified color or any shade or grey.

**Flutter:** Distortion which occurs in sound reproduction as a result of undesired speed variations during recording or reproducing. Flutter occurring at frequencies below approximately 6 Hz is termed "wow."

**Flux:** Magnetic current generated by a record heat, stored on magnetic tape, and picked up by the playback head. Also the magnetic field that exists between the poles of a magnet.

**Flux Transition:** A 180° change in the flux pattern of a magnetic medium brought about by the reversal of the magnetic poles within the medium.

**Flux Transition Density:** Number of flux transitions per track length unit.

**Fly-Back:** See HORIZONTAL RETRACE.

**FM Recording:** The data signal is used to modulate the frequency of a "carrier" having a frequency much higher than any spectral component of the data signal. Permits the recording of DC or very low signal frequencies.

**Following (or Trailing) Blacks:** A term used to describe a picture condition in which the edge following a white object is overshadowed toward black. The object appears to have a trailing black border. Also called "trailing reversal."

**Following (or Trailing) Whites:** A term used to describe a picture condition in which the edge following a black or dark grey object is shaded toward white. The object appears to have a trailing white border. Also called "trailing reversal."

**Foot Candles:** A measure of the amount of light falling on an object (its illumination). 1 foot candle = 1 lumen per sq. ft.

NOTE: This is a measure only of the light energy that can be seen by the human eye (becoming an obsolete unit; replaced by the Lux).

**Foot Lamberts:** A measurement of the brightness of an object. If 100 foot candles are illuminating a 60% white chip, then its brightness will be 60 foot lamberts, regardless of viewing distance. Again, remember that brightness is measured over the same energy response of a human eye (becoming obsolete unit; replaced by the Nit).

**Four-Track or Quarter-Track Recording:** The arrangement by which four different channels of sound may be recorded on quarter-inch-wide audio tape. These may be recorded as four separate and distinct tracks (monophonic) or two stereo pairs of tracks. Tracks 1 and 3 are recorded in the "forward" direction of a given reel, and Tracks 2 and 4 are recorded in the "reverse" direction.

**Frame:** One complete picture consisting of two fields of interlaced scanning lines.

**Frame Frequency:** The rate at which a complete frame is scanned, nominally 30 frames per second.

**Frame Roll:** A momentary roll.

**Frame Synchronizer:** Processing unit intended to detect frames and subframes of a binary message and to deliver the included corresponding words.

**Frequency:** The rate of vibration of an electrical or mechanical oscillation. Measured by the number of complete cycles executed in 1 second. In audio terminology, frequency range is considered to be from 20 cycles per second, or 20 Hertz, up to 20,000 cycles per second, or 20 Kilohertz.

**Frequency Response:** The variation of response with respect to signal frequency. Usually, the frequency response of a tape is given in dB relative to that of a reference tape measured under the same conditions.

**Frequency Response Curve:** The curve relating the variation in output with frequency of a piece of equipment or magnetic tape when the input is kept constant.

**Fringing:** The pickup of extra bass frequency signals by a playback head when reproducing a signal recorded by a head with a wider track configuration, such as playing a full track tape with a half-track head.

**Front Porch:** That portion of the composite picture signal which lies between the leading edge of the horizontal blanking pulse and the leading edge of the corresponding sync pulse.

**Front-to-Back Ratio:** The ratio between a cardioid microphone's sensitivity to sounds arriving from the front and from the rear, a measure of its directionality.

**FullTrack Recording:** Recording monophonically on one track whose width is essentially the same as the tape's.

## G

**Gain:** The ratio of output power to the input power for a system or component. Usually expressed in decibels.

**Gamma Ferric Oxide:** The common magnetic constituent of magnetic tapes in the form of a dispersion of fine acicular particles within the coating.

**Gap:** The space between the pole pieces of a tape head.

**Gap Depth:** The dimension of the gap measured in the direction perpendicular to the surface of a head.

**Gap Length:** The dimension of the gap of a head measured from one pole face to the other. In longitudinal recording, the gap length can be defined as the dimension of the gap in the direction of tape travel.

**Gap Loss:** The loss in output attributable to the finite gap length of the reproduce head. The loss increases as the wavelength decreases.

**Gap Scatter:** The phenomenon of the gaps in a multitrack head not being in a straight line.

**Gap Smear:** This is due to lack of head wear and is the bridging or shorting out of the record or reproduce gap as the result of flowing of the pole face material in the direction of tape motion.

**Gap Width:** The dimension of the gap measured in the direction parallel to the head surface and pole faces. The gap width of the record head governs the track width. The gap widths of reproduce heads are sometimes made appreciably less than those of the record heads to minimize tracking errors.

**Gauss:** The metric unit of magnetic flux density equal to one Maxwell per square centimeter.

**Generation Loss:** The increase in noise level which occurs each time a signal is recorded on tape.

**Geometric Distortion:** Any aberration which causes the reproduced picture to be geometrically dissimilar to the perspective plane projection of the original scene.

**Glitch:** A form of low frequency interference, appearing as a narrow horizontal bar moving vertically through the picture. This is also observed on an oscilloscope at field or frame rate as an extraneous voltage pip moving along the signal at approximately reference black level.

**Gloss Level:** A shiny surface imparted to the magnetic coating due to calendaring.

**Graphic Equalizer:** An equalizer which indicates its frequency response graphically through the position of its controls. When the controls are in a straight line at the 0 position, the response is flat.

**Gray Scale:** A scale of 10 from TV black to TV white indicating the shades of gray a camera can see at any one time and to which a camera can be adjusted. A gray scale adjustment of 7 is good.

**Green Tape:** An abrasive tape used to clean and lap heads that are unevenly worn, stained, scratched, etc. Should be used with caution and

should not be used on ferrite heads. This also applies to grey tape.

**Ground:** A point of zero voltage potential. The point in reference to which all voltages are measured.

**Ground Loop:** Hum caused by currents circulating through the ground side of a piece of equipment due to grounding it at points of different voltage potential.

## H

**Halo:** Most commonly, a dark area surrounding an unusually bright object, caused by overloading of the camera tube. Reflection of studio lights from a piece of jewelry, for example, might cause this effect. With certain camera tube operating adjustments, a white area may surround dark objects.

**Hard Banding:** A variation in thickness or elasticity across the width of the tape, it may be a coating defect, or it may be caused by stretch damage either during manufacture or in use. It results in a variation of the recovered RF due to the effect on head-to-tape contact and may result in color saturation banding and velocity errors.

**Harmonic Distortion:** Signal nonlinearity characterized by the appearance in the output of harmonics other than the fundamental, when the input signal is sinusoidal.

**Harmonics:** Whole number multiples of a frequency.  $F \times 1$  is called the fundamental or first harmonic;  $F \times 2$  is the second harmonic;  $F \times 3$  is the third harmonic; etc.

**HDDR:** High Density Digital Recording.

**Head:** In a magnetic recorder, the generally ring-shaped electromagnet across which the tape is drawn. Depending on its function, it either (a) erases a previous recording, (b) converts an electrical signal to a corresponding magnetic pattern and records it on the tape, or (c) picks up a magnetic pattern already on the tape and converts it to an electrical playback signal.

2 Head: The system used on most cassette recorders, requiring that playback occur after the recording has been made.

3 Head: Refers to the recording/playback head configuration within the recorder. A 3-head system allows simultaneous playback of recorded material.

**Head Alignment:** Mechanical adjustment of the spatial relationships between the head gaps and the tape.

**Head Block:** An assembly holding an erase, record and playback head in a certain physical alignment.

**Head Demagnetizer or Degausser:** A device used to neutralize possible residual or induced magnetism in heads or tape guides.

**Head-to-Tape Contact:** The degree to which the surface of the magnetic coating approaches the surface of the record or replay heads during normal operation of a recorder. Good head-to-tape contact minimizes separation loss and is essential in obtaining high resolution.

**Headroom:** The number dB increase possible above the operating level (0 VU) before unacceptable distortion occurs.

**Heads Out:** A way of winding tape so that the beginning of a selection is on the outside of the reel.

**Height:** The vertical positioning of a head with respect to a piece of tape. The size of the picture in a vertical direction.

**Hertz (Hz):** The unit of frequency. Equivalent to cycles per second.

**Hi Impedance Mike:** A mike designed to be fed into an amplifier with input impedance greater than 20 or 50 ohms.

**High Density Digital Recording (HDDR) on Magnetic Tape:** Recording of digital data on a magnetic medium, having a flux transition density in excess of 15,000 transitions per inch per track.

**High Energy Oxide:** Any magnetic oxide particle exhibiting a  $B_2H_3$  product higher than that of gamma ferric oxide. Chromium dioxide and cobalt doped oxide are the two most common examples at the present time.

**High Energy Tape:** A tape made with a high energy oxide.

**High Pass Filter:** A device designed to pass high frequency signals and attenuate low frequency signals.

**High,  $CrO_2$ :** bias position required for high bias tapes, including both chromium dioxide and cobalt modified.

**Holdback Tension:** Tension applied by the supply turntable to hold the tape firmly against the heads.

**Horizontal (Hum) Bars:** Relatively broad horizontal bars, alternately black and white, which extend over the entire picture. They may be stationary, or may move up or down. Sometimes referred to as a "venetian blind" effect. Caused by approximate 60 cycle interfering frequency, or one of its harmonic frequencies.

**Horizontal Blanking:** The blanking signal at the end of each scanning line.

**Horizontal Displacements:** Describes a picture condition in which the scanning lines start at relatively different points during the horizontal scan. See *SERRATIONS* and *JITTER*.

**Horizontal Retrace:** The return of the electron beam from the right to the left side of the raster after the scanning of one line.

**Hue:** This is the attribute of a color perception denoted by blue, green, yellow, red, purple, etc.

**Hypercardioid:** A directional pickup pattern where maximum discrimination occurs at more than 90 and less than 180 degrees off axis.

**IC:** Integrated Circuit, a small device incorporating the equivalent of hundreds or thousands of transistors, capacitors, resistors and other components within a small, solid block.

**Iconoscope:** A camera tube in which a high velocity electron beam scans a photo-emissive mosaic which has electrical storage capability.

**Impact Strength:** A measure of the work done in breaking a test sample of tape or base film by subjecting it to a sudden stress.

**Impedance:** The opposition of a device to current flow. A combination of resistance, inductive reactance and capacitive reactance. When no capacitance or inductance is present, impedance is the same as resistance.

**Inertia Idler:** A rotating guide attached to a heavy flywheel to reduce the effect of varying supply reel friction on tape speed.

**Input:** The terminals, jack or receptacle provided for the introduction of an electrical signal or electric power into a device or system.

**Insertion Loss:** The decrease in level which occurs when a piece of equipment is inserted into a circuit so that the signal must flow through it.

**Instantaneous Value:** The amplitude of a waveform at any one instant of time.

**Interference:** In a signal transmission path, extraneous energy which tends to interfere with the reception of the desired signals.

**Interlaced Scanning (Interlace):** A scanning process in which each adjacent line belongs to the alternate field.

**Intermodulation distortion:** Signal nonlinearity characterized by the appearance of frequencies in the output equal to the sums and differences of integral multiples of the component frequencies present in the input signal. Harmonics are usually not included as part of the intermodulation distortion.

**Intrinsic Coercive Force:** The magnetizing field strength needed to reduce flux density from saturation to zero.

**Intrinsic Coercivity:** The maximum value of the intrinsic coercive force. The intrinsic coercivity is a basic magnetic parameter for the material and requires complete saturation of the sample for its measurement as does the saturation flux density.

**Intrinsic Flux:** In a uniformly magnetized sample of magnetic material, the product of the intrinsic flux density and the cross-sectional area.

**Intrinsic Flux Density:** In a sample of magnetic material for a given value of the magnetizing field strength, the excess of the normal flux density over the flux density in vacuum.

**Intrinsic Hysteresis Loop:** Graph of magnetic flux (B) plotted against the magnetizing force (H) producing it. The value of B when H has dropped to zero is the residual magnetism, and the reverse force needed to reduce B to zero is known as the coercivity. Units used are: Magnetizing Force (H) in Oersted and Flux Density (B) in Gauss. Coercivity is measured in Oersted.

**IO:** Image Orthicon tube; the picture forming tube in a TV camera.

**Ion:** A charged atom, usually an atom of residual gas in an electron tube.

**Ion Spot:** A spot on the fluorescent surface of a cathode ray tube, which is somewhat darker than the surrounding area because of bombardment by negative ions which reduce the sensitivity.

**Ion Trap:** An arrangement of magnetic fields and apertures which will allow an electron beam to pass through but will obstruct the passage of ions.

**IPS:** Abbreviation for inches per second.

**IRE:** The Institute of Radio Engineers.

**IRE Roll-off:** The IRE standard oscilloscope frequency response characteristic for measurement of level. This characteristic is such that at 2 megacycles the response is approximately 3.5 dB below that in the flat (low frequency) portion of the spectrum, and cuts off slowly.

**IRE Scale:** An oscilloscope scale in keeping with IRE Standard 50, IRE 23.S1 and the recommendations of the Joint Committee of TV Broadcasters and Manufacturers for Coordination of Video Levels.

**IRIG:** Inter-Range Instrumentation Group. Has recently been renamed "Range Control Council."

**Iron Oxide/Gamma Ferric Oxide:** The most popular oxide particle produced from an oxide of pure iron.

## J

**Jack:** Receptacle for a plug connector leading to the input or output circuit of a tape recorder or other piece of equipment. A jack matches a specific plug.

**Jitter:** A tendency toward lack of synchronization of the picture. It may refer to individual lines in the picture or to the entire field of view.

**Jitter Amplitude:** The variation in phase of the bit rate clock expressed as a percent of the bit period.

**Jitter Rate:** The rate of change of the jitter amplitude expressed as a frequency in Hertz.

## K

**KHz:** Abbreviation for kilohertz, or one thousand cycles per second.

**Kinescope:** Frequently used to mean picture tubes in general. However, this name has been copyrighted.

**Kinescope Recording:** Motion pictures taken of a program photographed directly from images on the face of a kinescope tube. Called a KINE. A television transcription.

A motion picture film recording of the presentation shown by a picture monitor. Also known as Television Recording (TVR), Vitapix, etc.

## L

**Lap Dissolve:** A slow dissolve in which both pictures are actually overlapped for a very brief period of time. Same as dissolve.

**Lateral Direction:** Across the width of the tape.

**Lavalier:** A microphone designed to hang from the performer's neck.

**Layer-to-Layer Adhesion:** The tendency for adjacent layers of tape in a roll to adhere to one another.

**Layer-to-Layer Signal Transfer:** The magnetization of a layer of tape in a roll by the field from a nearby recorded layer, sometimes referred to as "print-thru."

**Leader:** Special non-magnetic tape that can be spliced to either end of a magnetic tape to prevent damage and possible loss of recorded material and to indicate visually where the recorded portion of the tape begins and ends.

**Leading Blacks:** A term used to describe a picture condition in which the edge preceding a white object is overshadowed toward black. The object appears to have a preceding or leading black border.

**Leading Whites:** A term used to describe a picture condition in which the edge preceding a black object is shaded toward white. The object appears to have a preceding or leading white border.

**Leakage:** A term describing the signal picked up by a mike which is intended to pick up other signals only.

**Length:** The physical length of the tape wound on a reel or on a hub, varying from 213 in a C45 cassette to 9200 in a roll of instrumentation tape.

**Limiters:** A compressor with a ratio greater than or equal to 10:1.

**Line Frequency:** The number of horizontal scans per second, nominally 15,750 times per second.

**Linearity:** The uniformity of scanning speed which primarily affects the accuracy of geometry along a horizontal or vertical line through the picture center.

The extent to which the magnitude of the reproduced output is directly proportional to the magnitude of the signal applied to the input of the recorder. Good linearity is synonymous with low distortion.

**Liners/Friction Plates:** Friction controlling plastic sheets used inside a Philips cassette to control winding uniformity and torque level.

**Live:** Actually presented in the studio, with cameras feeding out to the lines as the performance is done.

**Lock-up Time:** The time before a machine is activated and the time it is ready for use.

**Logarithm:** A mathematical function which spreads out low values and squeezes together higher values.

**Longitudinal Curvature:** Any deviation from straightness of a length of tape.

**Longitudinal Direction:** Along the length of the tape.

**Loop:** Piece of tape spliced beginning (head) to end (tail) for continuous playback or recording. To fold around. A continuous electrical or TV circuit. A loop/slack section of film with the necessary "play" to allow film which had been previously and continuously moving from a reel to be intermittently moved through a gate/projection head/optical lens arrangement. Proper loop size is important in threading a film projector, i.e., in telecine for film to videotape transfer.

**Loss:** Reduction in signal strength or level.

**Low Band Color:** The old, original professional videotape color recording.

**Low End:** The lowest frequency of a signal (see *HIGH END*).

**Low Impedance Mike:** A mike designed to be fed into an amplifier or transformer with input impedance of 150 to 250 ohms.

**Luminance:** Light intensity (brightness).

**Luminance Signal:** The black and white signal (the brightness signal) in color TV. The luminance signal is formed by combining a proportion of 30% red, 50% green and 11% blue from the color signal. This combined output becomes the luminance (brightness/monochrome) signal.

**Luminescence:** The absorption of energy by matter and its following emission as light. If the light follows and then completes itself quickly after absorption of the energy, the term fluorescence is used. If the process is of a longer and more persistent length, the term phosphorescence is applied.

**Lux:** The metric unit for illumination is 1 lumen per square meter. NOTE: 1 foot candle = 10.76 Lux.

## M

**M and E Tracks:** Stands for music and effects audio tracks.

**M Load:** The cassette tape loading mechanism used in VHS videotape recorder/playback technology.

**M O S:** Stands for Mit Out Sound (without sound).

**M.O.L. (Maximum Output Level):** In audio tape, that record level which produces a 3rd harmonic distortion component at 3.0%.

**M<sup>2</sup>:** Miller Squared Code.

**Machine Error:** A machine hardware malfunction.

**Machine Operator:** A person trained in the operation of a specific machine.

**Mag Track:** This term usually refers to the sound track. It is usually used only in reference to the separate sound tape used in double system recording and editing. In a sense, videotape is a magnetic medium too, but the term mag track is only used in reference to sound tape and not to sound on a videotape picture.

**Magnetic Density:** The amount of magnetic flux within a specific area.

**Magnetic Field:** An area under the influence of magnetism.

**Magnetic Film:** Sprocketed base with a magnetic coating for audio recording and playback.

**Magnetic Force:** The amount of magnetic influence/force within a specific area/field.

**Magnetic Head:** That part of a videotape recorder which converts electric variations into magnetic variations and vice versa.

**Magnetic Induction:** To magnetize by being put within the magnetic influence of a magnetic field.

**Magnetic Instability:** The property of a magnetic material that causes variations in the residual flux density of a tape to occur with temperature, time and/or mechanical flexing. Magnetic instability is a function of particle size, magnetization and anisotropy.

**Magnetic Recording:** The technology and process of recording audio/video information using magnetism as the medium storage of information. The term is often used to mean the process/capability of both recording and reproduction/playback.

**Magnetic Tape:** With a few exceptions, magnetic tape consists of a base film coated with magnetic particles held in a binder. The magnetic particles are usually of acircular shape and approach single domain size. See gamma ferric oxide, chromium dioxide and cobalt doped oxide.

**Magnetic Track:** A sound-track recorded on magnetic film or tape.

**Magnetism:** The property of certain physical materials to exert a force on other physical materials, and to cause voltage to be induced in conducting bodies moving relative to the magnetized body.

**Magnetizing Field Strength, H:** The instantaneous strength of the magnetic field applied to a sample of magnetic material.

**Maintenance Routine:** A schedule and procedure for the servicing of equipment.

**Man-Pack:** Designed to be carried by one person.

**Masking:** The phenomenon by which loud sounds prevent the ear from hearing softer sounds of similar frequency. The process of blocking out portions of a picture area/signal.

**Mastering Lathe:** A turntable and cutting head used to cut the disk from which the plates used to press records are made.

**Matched Dissolve:** A dissolve where the main object is matched in each camera.

**Matte:** Without shine or gloss (i.e., print this title on black matte paper). Relatively unreflective of light (i.e., print this title on black matte paper). Removal of a portion of a TV picture and replacement of it with another picture.

**Matte Edge:** An undesirable, unwanted outline around a matted image. This is also called matte ring, matte ride, but more generally called a "bad matte."

**Matte In:** To add.

**Matte Out:** To remove, eliminate.

**Maximum Intrinsic Flux:** In a uniformly magnetized sample of magnetic material, the product of the maximum intrinsic flux density and the cross-sectional area.

**Maximum Intrinsic Flux Density:** The maximum value, positive or negative, of the intrinsic flux density in a sample of magnetic material which is in a symmetrically, cyclically magnetized condition.

**Maxwell:** A unit of magnetic flux.

**Medium:** The substance through which a wave is transmitted.

**Mega:** One million, i.e., Megacycle is one million cycles.

**Megahertz:** One million hertz (unit of frequency).

**Memory Counter (or Rewind):** A system which allows the tape to be rewound automatically to any predetermined point on the tape.

**Metal Particle:** One of the most recent developments of a magnetizable particle for magnetic tape, produced from pure iron and having very high coercivity in the range of 850 to 1250 Oersteds.

**MHZ:** Abbreviation for MegaHertz.

**Micro:** One millionth.

**Micro-Cassette:** A miniature cassette system originated by Olympus, allowing 30 minutes of recording per side on a capstan-driven tape, 1/7" wide, running at 15/16 ips.

**Microdropouts:** Low level, short duration dropouts. They correspond to RF envelope dropouts of 10 dB or greater with a duration of .5 to .8 microseconds.

**Microphone:** A transducer which converts sound pressure waves into electrical signals.

**Microphonics:** In video transmission, refers to the mechanical vibration of the elements of an electron tube resulting in a spurious modulation of the normal signal. This usually results in erratically spaced horizontal bars in the picture.

**Microsecond:** One millionth of a second. A term used to mean very fast/instantaneous.

**Microwave Dish:** A dish shaped antenna used for microwave signals.

**Microwave Transmission:** Communication systems using microwaves to carry the signal information.

**Microwaves:** Radio frequencies with very short wavelengths (UHF).

**Mike:** Microphone.

**Mike Boom.** A boom on which a mike has been hung.

**Mike Pad:** An attenuator placed between the output of a mike and the input of a mike preamp to prevent overdriving the preamp.

**Mil:** .001 of an inch.

**Millimeter:** One thousandth of a meter.

**Millimicron:** One billionth of a meter.

**Millisecond:** One thousandth of a second.

**Mini-Cassette:** A miniature cassette system originated by Philips, allowing 15 minutes of recording per side on a narrow tape.

**Mixer:** The audio or video control equipment used for mixing sound and/or video. The person who mixes. In video, a device for combining several video input signals.

**Mixing:** To combine various pictures and/or audio elements together.

**Mixing Console:** A device which can combine several signals into one or more composite signals, in any desired proportion.

**Mm:** Abbreviation for millimeter.

**Mobile Unit:** Equipment designed to be movable as a unit. A truck/van with all the necessary equipment to do photography/production on location. Sometimes mobile units have cameras and VTR's within them and sometimes they are added for specific jobs.

**Modulate:** To vary/control a signal. To watch a signal and be ready to control it by varying it.

**Modulated Carrier Recording:** Signal information recorded in the form of a modulated carrier.

**Modulation:** The imposing of a signal on some type of transmission or storage medium, such as a radio carrier or magnetic tape.

**Modulation Noise:** Noise which results from the agitation of the oxide molecules through the recording process. The modulation noise level increases as record level increases and disappears when no signal is present.

**Modulator:** A section within a VTR that changes the frequency of the video signal information coming in from an external source (i.e., an electronic camera) to signal information that is compatible with the requirements of the VTR heads, while keeping the picture information basically unchanged.

**Moire:** The spurious pattern in the reproduced television picture resulting from interference beats between two sets of periodic structures in the image. It usually appears as a curving of the lines in the horizontal wedges of the test pattern and is most pronounced near the center where the lines forming the wedges converge. A Moire pattern is a natural optical effect when converging lines in the picture are nearly parallel to the scanning lines.

**Moment of Inertia:** A measure of the rotational force required to accelerate or decelerate a reel of tape.

**Monitor:** A TV set, or a TV set specifically designed for closed circuit viewing (i.e., from a VTR) without the electronic capability to receive broadcast signals.

**Monitor Head:** A separate playback head on some tape recorders that makes it possible to listen to the material on the tape an instant after it has been recorded and while the recording is still in progress.

**Mono, Monophonic:** Single-channel sound.

**Monochrome:** One color. Without color.

**Monochrome Transmission (Black and White):** The transmission of a signal wave which represents the brightness values in the picture but not the color (chrominance) values in the picture.

**Monophonic:** One sound channel/source/signal. Sometimes called monaural.

**Moving-Coil:** A microphone whose generating element is a coil which moves within a magnetic gap in response to sound pressure on the diaphragm attached to it, rather like a small loudspeaker in reverse. The most common type of Dynamic Microphone.

**Multi-Standard:** TV sets, VTR's, etc., that are designed to work using more than one technical standard; i.e., a VTR which can record both NTSC and PAL signals/recordings is a multi-standard machine.

**Multiple Blanking Lines:** Evidenced by a thickening of the blanking line trace or by several distinct blanking lines as viewed on an oscilloscope. May be caused by hum.

**Multiplex:** To take, or be capable of taking, several different signals and send them through one source.

**Multitrack Tape:** A piece of magnetic tape which can be used to store two or more discrete signals.

**Music and Effects Track(s):** Music and effects audio without audio. Can be on one track, on different tracks on one piece of film or tape, or on different tapes, which are combined during an audio "track mix" session. Sometimes abbreviated M & E.

**Mylar:** A registered trademark of E.I. duPont de Nemours & Co., designating their polyester film.

## N

**N.G.:** An often-used term meaning "no good."

**NAB:** National Association of Broadcasters. An association which has standardized the equalization used in recording and reproducing. This is a station owner and/or operator's trade association.

**NAB Curves, NAB Equalization:** Standard playback equalization curves for various tape speeds, developed by the National Association of Broadcasters.

**NAB Reel, NAB Hub:** Reels and hubs used in professional recording, having a large center hole and usually an outer diameter of 10 1/2".

**NABET:** Initials standing for National Association of Broadcast Employees and Technicians. NABET is a union of technicians that supplies members for many videotape, live and film productions.

**Nagra:** A brand of audio tape recorder using 1/4" wide audio tape extensively used for studio and location separate audio recording.

**Nanosecond:** One billionth of a second.

**NAVA:** Initials of the National Audio-Visual Association, a trade association of audio-visual dealers, manufacturers and producers.

**NCTA:** Initials standing for the National Cable Television Association. This is the primary cable TV owner and/or operator's trade association.

**Negative Image:** Refers to a picture signal having a polarity which is opposite to normal polarity and which results in a picture in which the white areas appear as black and vice versa.

**NET:** National Educational Television Network. A public TV network of stations.

**Network:** A group of stations connected together for common broadcast or common business purposes; multiple circuits.

**Neutral:** Normal; without power; not in working position; without much color or brightness purposes; multiple circuits.

**Nits (Candles/m<sup>2</sup>):** The metric unit for brightness. 1 foot lambert = 3.425 Nits.

**Nodules:** Clusters of materials, i.e., a large nodule of iron oxide on magnetic tape would be a tape defect.

**Noise:** Any unwanted electrical disturbances, other than crosstalk or distortion components, that occur at the output of the reproduce amplifier. System noise is the total noise produced by the whole recording system, including the tape. Equipment noise is the noise produced by all the components of the system, with the exception of the tape. Tape noise is the noise that can be specifically ascribed to the tape. Typical sources of tape noise are: 1) Bulk Erased Noise — the noise arising when reproducing a bulk erased tape with the erase and record heads completely de-energized; 2) Zero Modulation Noise — the noise arising when reproducing an erased tape with the erase and record heads energized as they would be in normal operation, but with zero input signal. This noise is usually 3-4 dB higher than the bulk erased noise. The difference between bulk erased and zero modulation noise is sometimes termed bias induced noise; 3) Saturation Noise — the noise arising when reproducing a uniformly saturated tape. This is often some 15 dB higher than the bulk erased noise and is associated with imperfect particle dispersion; 4) DC Noise — the noise arising when reproducing a tape which has been non-uniformly magnetized by energizing the record head with DC, either in the presence or absence of bias. This noise has pronounced long wavelength components which can be as much as 20 dB higher than those obtained from a bulk erased tape. At very high values of DC, the DC noise approaches the saturation noise; 5) Modulation Noise — the noise arising when reproducing a tape which has been recorded with a given signal, and which is a function of the instantaneous amplitude of the signal. This is related to DC noise and arises from the same causes.

**Noise Pulse:** A spurious signal of short duration that occurs during reproduction of a tape and is of magnitude considerably in excess of the average peak value of the ordinary system noise.

**Noise Reduction:** The amount in dB that the noise added to a signal by transmission or storage chain, especially a tape recorder, is reduced from the level at which it would be if no noise reduction devices were used.

**Noise Reduction Systems:** Refers to electronic circuits designed to minimize hiss level in magnetic recording.

**Noise Weighting:** An adjustment used in the electrical measurement of television signal noise values, to take into account the difference between the observable effect of noise in a television picture and the actual electrical value of noise.

**Noise/A-Weighted:** Unwanted electrical signals produced by electronic equipment or by magnetic tape. Mostly confined to the extremes of the audible frequency spectrum where it occurs as hum and/or hiss. A-weighted noise is noise measured within the audio frequency band using a measuring instrument that has a frequency selective characteristic. The frequency sensitivity of the measuring instrument is adjusted to correspond to that of the average human hearing response.

**Non-Compatible:** Incapable of working together.

**Non-Ferrous:** Without iron or iron oxide.

**Non-Return-to-Zero (NRZ) Recording:** See *DIGITAL RECORDING*.

**Non-Synchronous:** Separate things not operating together properly, i.e., audio and video or the inability to properly operate together with another specific piece of equipment or signal. (See *SYNCHRONOUS*.)

**Nondirectional:** A pickup pattern which is equally sensitive to sounds from all directions.

**Normal/Standard/Low:** The bias switch position used for standard gamma ferric oxide tapes.

**Notch Filter:** A device which attenuates a particular frequency greatly, but has little effect on frequencies for either side of it.

**NTSC:** Initials of the National Television Standards Committee (USA). Also stands for Never Twice the Same Color.

**NTSC Color:** The color signal TV standard set by the National Television Standards Committee of the USA.

## O

**Octave:** A two to one frequency ratio.

**Oersted:** A unit of magnetic field strength.

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

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

**Orientation Direction:** The direction in which particle orientation takes place. In tapes designed for quadruplex recording applications, the orientation direction is transverse. For helical and longitudinal recording, it is longitudinal.

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

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

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

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

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

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

**Overshoot:** An excessive response to a unidirectional signal change. Sharp overshoots are sometimes referred to as "spikes."

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

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

**Oxide Coating:** The magnetic material coated on base film.

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

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

## P

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

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

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

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

**Parity Check:** A self-checking code employing binary digits in which the total number of one's (or zero's) in each code expression is always even or always odd. A check may be made for even or odd parity as a means of detecting errors in the system.

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

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

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

**Patch:** To connect jack A to jack B on a patch bay with a patch cord.

**Patch Bay (or Board or Panel or Rack):** A group of jacks, each of which is connected to a piece of equipment in the control room to enable signal paths to be changed by patch cords.

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

**PC<sup>2</sup>:** Pattern Compatible Code.

**PCM:** Pulse Code Modulation.

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

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

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

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

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

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

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

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

**Pedestal:** This term is obsolete.

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

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

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

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

**Perpendicular Direction:** Perpendicular to the plane of the tape.

**Phase:** A measure of the time delay between points of the same relative amplitude (e.g., maximum positive excursion) on two separate waveforms.

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

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

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

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

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

**Piezoelectric Microphone:** A microphone whose generating element is a crystal or ceramic element, which generates a voltage when bent or stressed.

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

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

**Pink Noise:** Random noise which has equal energy per octave throughout the audio spectrum.

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

**Playback:** The reproduction of sound previously recorded on a tape.

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

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

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

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

**Pop Filter:** See *BLAST FILTER*.

**Pot:** Gain control in audio or video.

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

**Prerecorded Tape:** A commercially available recorded tape.

**Presence:** How near the sound source appears to be with respect to the listener. Related to the intensity of the frequencies in the 2.5K to 7.5KHz range.

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

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

**Pseudorandom Sequences/Patterns:** Certain systems described in these standards employ feedback shift registers to modify sequences or patterns of bits in a predetermined manner or to restore such modified bit patterns to their original sequence. With outputs of suitably selected stages added modulo-2 and applied to its feedback loop, an n-stage feedback shift register will generate a bit sequence or pattern ( $2^n - 1$ ) bits long before repeating. Because such repeating sequences exhibit many of the sta-

tistical properties of uniformly distributed random number sequences (e.g., their probability density and autocorrelation functions satisfy appropriate conditions), they are called pseudorandom.

**Puck:** Another name for a capstan idler.

**Pulse-Code Modulation (PCM):** A type of digital recording.

## Q

**Quarter-Track:** See *FOUR-TRACK*.

## R

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

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

**Raster:** The scanned (illuminated) area of the cathode ray picture tube.

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

**Record Level:** The amount of energy level delivered to the recording head and to the magnetic tape. Indicated by the VU meter and measured in Nanowebers per meter.

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

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

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

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

**Reference Black Level:** The level corresponding to the specified maximum excursion of the luminance signal in the black direction.

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

**Reference White Level:** The level corresponding to the specified maximum excursion of the luminance signal in the white direction.

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

**Reflections or Echoes:** In video transmission, this may refer either to a signal or to the picture produced.

1. Signal:
  - 1 (a) Waves reflected from structures or other objects.
  - 1 (b) Waves which are the result of impedance or other irregularities in the transmission medium.
2. Picture:
  - 1 "Echoes" observed in the picture produced by the reflected waves.

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

**Relay:** An electromagnetically operated switch.

**Reluctance:** Resistance to the flow of magnetic flux.

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

**Remote:** Any program originating outside the studio.

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

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

**Residual Flux Density,  $B_r$  Gauss:** The magnetic flux density at which the magnetizing field strength is zero when a sample of magnetic material is in a symmetrically cyclically magnetized condition. Normally, the residual flux density of a tape is measured in the orientation direction, using an alternating magnetizing field of amplitude 1000 Oe. Residual flux density is indicative of the output that can be expected from a tape at short wavelengths.

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

**Resistance:** Opposition to the flow of electrons.

**Resolution:** The degree to which the distance between differing states of magnetization recorded along a tape can be reduced and these states still be usefully distinguished on reproduction.

**Resonant Frequency:** The frequency at which a parallel LC Circuit has highest opposition to current and at which a Series LC Circuit has the lowest opposition to current.

**Restorer:** As used by the telephone company, a network designed to remove the effects of predistortion or pre-emphasis, thereby resulting in an overall normal characteristic.

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

**RETMA:** Abbreviation for Radio Electronic Television Manufacturers Association.

**Retrace (Return Trace):** See *HORIZONTAL RETRACE* and *VERTICAL RETRACE*.

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

**Reverberation Time:** Same as decay time.

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

**Ringings:** An oscillatory transient occurring in the output of a system as a result of a sudden change in input. Results in close spaced multiple reflections, particularly noticeable when ob-

serving test patterns, equivalent square waves, or any fixed objects whose reproduction requires frequency components approximating the cutoff of the system.

**RMS VALUE:** The effective value of a wave. The value of continuous (direct current) signal that would produce the same power as the wave in question. For a sine wave, this value is equal to 0.707 times the peak value.

**RNRZ:** Randomized Non-Return-to-Zero (Code).

**Roll:** A reel wound with a standard length of tape.

**Roll-off:** A gradual attenuation of gain frequency response at either or both ends of the transmission pass band.

## S

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

**S/N:** See *SIGNAL-TO-NOISE RATIO*.

**Saturation:** The condition reached in magnetic tape recording where output does not increase with increased input and hence distortion increases significantly.

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

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

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

**Scanning Line:** A single, continuous narrow strip of the picture area containing highlights, shadows and half-tones, determined by the process of scanning.

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

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

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

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

**SelfSync:** A configuration which enables the engineer to play back the signal from the record head for use in overdubbing.

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

**SelfSync Gain:** A control used to equalize the gain of SelfSync playback from the record head with the gain of playback from the reproduce head.

**Sensitivity:** The magnitude of the output when reproducing a tape recorded with a signal of given magnitude and frequency. The sensitivity of an audio or instrumentation tape is normally expressed in dB relative to the sensitivity of a reference tape measured under the same recording conditions.

**Separation:** The degree to which two stereo signals are kept apart.

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

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

**Serrated Pulses:** A series of equally spaced pulses within a pulse signal. For example, the vertical sync pulse is serrated in order to keep the horizontal sweep circuits in step during the vertical sync pulse interval.

**Serrations:** This is a term used to describe a picture condition in which vertical or nearly vertical lines have a saw-tooth appearance. The result of scanning lines starting at relatively different points during the horizontal scan.

**Servo System:** An electrical device controlling the speed of a moving or rotating device such as a capstan/pinroller rotating speed.

**Setup:** The separation in level between blanking and reference black levels.

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

**Signal-to-Noise Ratio:** The ratio, usually expressed in decibels, between the loudest undistorted tone a system can handle and the noise remaining when the signal is reduced to zero.

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

**Skew:** Passage of tape over a head in a direction other than perpendicular to the height of the gap.

**Slapback:** Discrete repeats created by either digital or tape delay.

**Slate:** To label with a take number by recording a voice on the tape.

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

**Snow:** Heavy random noise.

**SOF:** Sound On Film, meaning the sound track is on the film itself.

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

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

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

**Sound Pressure Levels (SPL):** A measure of the sound pressure created by a sound, usually in the units of dB referred to 0.0002 microbar of pressure.

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

**Source/Tape Switch:** A control found on control amplifiers with tape monitor jacks, and on recorders with Monitor Heads; allows comparison of the signal being fed to the tape (Source) with the signal just recorded.

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

**Spike:** See *OVERSHOOT*.

**Splice:** A physical join between pieces of tape.

**Splicing Tape:** A special pressure-sensitive, non-magnetic tape used for joining two lengths of magnetic tape.

**Spoking:** A form of buckling in which the tape pack is deformed into a shape which approximates a polygon.

**Squareness:** A measure of magnetic behavior expressed as a ratio. 1.00 would be considered perfect and the normal range for magnetic material is .7 to .9.

**Squeal:** Audible tape vibrations, primarily in the longitudinal mode, caused by frictional excitation at heads and guides.

**Stereophonic, Stereo:** Using two or more channels to create a spatial effect.

**Stiction:** A term loosely used to describe the phenomenon of tape adhering to transport components such as heads or guides.

**Streaking:** A term used to describe a picture condition in which objects appear to be extended horizontally beyond their normal boundaries. This will be more apparent at vertical edges of objects when there is a large transition from black to white or white to black. The change in luminance is carried beyond the transition and may be either negative or positive. For example, if the tonal degradation is an opposite shade to the original figure (white following black), the streaking is called negative; however, if the shade is the same as the original figure (white following white), the streaking is called positive. Streaking is usually expressed as short, medium or long streaking. Long streaking may extend to the right edge of the picture and, in extreme cases of low frequency distortion, can extend over a whole line interval.

**Superimposition (or Super):** Two images simultaneously picked up by two different cameras and electronically mixed on the face of a kine-scope tube in such a manner that both images are visible.

**Supply Turntable:** The turntable which feeds tape to the heads.

**Surface Asperities:** Small, projecting imperfections on the surface of the coating that limit and cause variations in head-to-tape contact. A term useful in discussions of friction and modulation noise.

**Surface Treatment:** Any process by which the surface smoothness of the tape coating is improved after it has been applied to the base film.

**Switcher:** A panel of buttons that allows switching from one camera to another. Also the engineer who operates the switches.

**Symmetrically, Cyclically, Magnetized Condition:** A magnetic material is in this condition when, under the influence of a magnetizing field cycled between equal but opposite values, its successive hysteresis loops coincide.

**Sync:** An abbreviation for the words "synchronization," "synchronizing," etc. Applies to the synchronization signals or timing pulses, which lock the electron beam of the picture monitors in step, both horizontally and vertically, with the electron beam of the pickup tube.

**Sync Compression:** The reduction in the amplitude of the sync signal, with respect to the picture signal, occurring between two points of a circuit.

**Sync Level:** The level of the tips of the synchronizing pulses.

**Synchronization:** The maintenance of one operation in step with another.

**Synchronization Word:** A fixed pattern of bits inserted in a binary message for the purpose of synchronizing the message interpreting unit.

**Synchronous:** The condition of having the same rate and phase.

**Synchronous Motor:** A motor with speed controlled by the frequency of the applied voltage.

## T

**Tachometer:** A device which counts the number of revolutions per second of a motor.

**Tails Out:** A way of winding tape such that the end of the selection is at the outside of the reel.

**Takeup Reel:** The reel on the tape recorder that accumulates the tape as it is recorded or played.

**Takeup Turntable:** The turntable which takes up the tape after it passes by the heads.

**Tape Delay:** Using magnetic tape as a storage medium for a brief period of time to delay the playback of a signal. Delay time equals the distance between the record and playback heads divided by the tape speed.

**Tape Guides:** Grooved pins or rollers mounted between and at both sides of the tape head assembly to position the magnetic tape correctly on the head as it is being recorded or played.

**Tape Lifters:** A system of movable guides that automatically prevents the tape from contacting the recorder's heads during fast forward or rewind modes of operation, thus preventing head wear.

**Tape Loop:** A length of magnetic tape with the ends joined together to form an endless loop. It makes possible the repetitive playback of a recording without rewinding the tape.

**Tape Pack:** The form taken by the tape wound on to a reel. A good pack is one that has a uniform wind, has an acceptable E-value and is free from spoking, cinching and layer-to-layer adhesion.

**Tape Player:** A unit that is not capable of recording and is used only for playing recorded tapes.

**Tape Skew:** The deviation of a tape from following a linear path when transported across the heads, causing a time displacement between signals recorded on different tracks and amplitude differences between the outputs from individual tracks owing to variations in azimuth alignment. The adjectives static and dynamic are used to distinguish between the steady and fluctuating components of tape skew.

**Tape Speed:** The speed at which tape is transported from feed (supply) to takeup reels during normal recording or reproduction.

**Tape Transport:** The mechanism that extracts magnetic tape from a storage device, moves it across magnetic heads at a controlled speed, and then feeds it into another storage device. Typical storage devices are tape loops, bins, reels and magazines (cassettes, cartridges). The tape transport is one part of a magnetic tape recorder/reproducer system that normally consists of:

1. Magnetic heads
2. Magnetic tape
3. Tape transport
4. Record electronics
5. Reproduce electronics

**Tape-to-Head Speed:** The relative speed of tape and head during normal recording or replay. The tape-to-head speed coincides with the tape speed in conventional longitudinal recording but is considerably greater than the tape speed in systems where the heads are scanned across or along the tape.

**Tear Strength:** The force, usually in gm, required to initiate and/or propagate a tear in a specially shaped specimen of tape or base film.

**Tearing:** A term used to describe a picture condition in which groups of horizontal lines are displaced in an irregular manner. Caused by lack of horizontal synchronization.

**THD:** Total Harmonic Distortion.

**Threshold of Feeling:** The sound pressure level at which people feel discomfort 50% of the time. Approximately 118 dB SPL at 1 KHz.

**Threshold of Hearing:** The sound pressure level at which people hear only 50% of the time. Approximately 0 dB SPL at 1 KHz.

**Threshold of Pain:** The sound pressure level at which people feel actual pain 50% of the time. Approximately 140 dB SPL at 1 KHz.

**Timbre:** The harmonic content of a tone and the relative intensities of the different harmonics.

**Tolerance:** The allowable deviation from the stated nominal width or length. Width tolerance is usually considered to be  $\pm 0.001$ ".

**Total Thickness:** Normally, the sum of the thicknesses of the base film and the magnetic coating. The total thickness governs the length of tape that can be wound on a given reel.

**Track:** An area of tape surface that coincides with the location of the recorded magnetization produced by one record gap.

**Track Spacing:** The distance between the center lines of adjacent tracks.

**Track Width:** The width of the track corresponding to a given record gap.

**Trailing Edge:** The place on the record head where the recording actually takes place.

**Transducer:** A device which converts energy from one medium to another.

**Transients:** Signals which endure for a brief time. These may include overshoots, damped sinusoidal waves, etc., and, therefore, additional qualifying information is necessary.

**Transverse:** Across the width of the tape.

**Two-Track Recording:** On  $\frac{1}{4}$ " wide tape, the arrangement by which only two channels of sound may be recorded, either as a stereo pair in one direction or as separate monophonic tracks (usually in opposite directions).

## U

**Ultimate Tensile Strength:** The force per unit cross-sectional area required to break a tape or length of base film, usually given in pounds per square inch (psi). Ultimate tensile strength is also quoted in terms of pounds per tape sample of given width and base thickness.

**Unbalanced Line:** A line using two conductors to carry a signal, where one of the conductors is connected to ground.

**Unidirectional:** A pickup pattern which is more sensitive to sounds arriving from one direction than from any other.

**Unidirectional Mike:** A microphone which picks up signals primarily from one direction and discriminates against or rejects sounds arriving from other directions.

**Uniformity:** The extent to which the output remains free from variations in amplitude. Uniformity is usually specified in terms of the positive and negative deviations from the average output within a roll, and in terms of the deviations in the average outputs between one roll and another. Uniformity is normally quoted in percent or dB.

## V

**Variable Frequency Oscillator (VFO):** An oscillator which puts out a waveform of continuously variable frequency.

**Velocity Mike:** A mike which is sensitive to the velocity of the air molecules hitting its sound sensing element.

**Vertical Blanking:** Refers to the blanking signals which occur at the end of each field.

**Vertical Retrace:** The return of the electron beam from the bottom to the top of the raster after completion of each field.

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

**Vestigial Sideband Transmission:** A system of transmission wherein the sideband on one side of the carrier is transmitted only in part.

**Vibrating-Sample Magnetometer, VSM:** A device for determining the magnetic properties of a sample of magnetic material by vibrating it in a magnetic field and measuring the emf induced in search coils in close proximity to the sample. The VSM is particularly useful in determining the specific magnetic moment of oxides and the oxide loading of tapes, since it can be designed to provide much higher magnetizing field strengths (10,000 Oe. or more) than can be conveniently obtained in a B-H meter.

**Video:** The visual portion of the television program.

**Video Band:** The frequency band utilized to transmit a composite video signal.

**Video Recording:** This may be defined as any method employed to record television type signals. The most common methods employ frequency modulation of a carrier; however, almost every analog and digital recording technique has made or is being used for video recording.

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

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

**Video-in-Black:** A term used to describe a condition as seen on the waveform monitor when the black peaks extend through reference black level.

**Voice Over:** The sound source is not visible or seen in the frame of the picture.

**VTR:** Video Tape Recording.

**VU Meter:** A type of recording level indicator which shows average signal levels in decibels relative to a fixed reference level (and, often, in percent of maximum recommended modulation). While the term is frequently used for any level meter using this scale, it applies most strictly to meters having a specified, standard degree of damping.

## W

**Wave:** A continuous fluctuation in the amplitude of a quantity with respect to time. A wave will have a propagation velocity dependent on the medium through which it travels. For example, in air at 70°F, the propagation velocity of a sound pressure wave is 1130 feet per second.

**Wave Velocity:** The propagation velocity of a wave. The time it takes for one point of a waveform to travel a certain distance. Wave velocity is dependent on the medium through which the wave travels and the temperature of the medium.

**Wave-Form Monitor:** This refers to a cathode ray oscilloscope used to view the form of the composite video signal for waveform analysis. Sometimes called "A-scope."

**Waveform:** The shape traced on a graph by the fluctuation of a quantity with time.

**Wavelength:** In tape recording, the shortest distance between two peaks of the same magnetic polarity; also, the ratio of tape speed to recorded frequency.

**Waveshape:** Same as Waveform. The shape traced by the varying amplitude of the wave.

**Wear Product:** Any material that is detached from the tape during use. The most common wear products are oxide particles or agglomerates, portions of coating and material detached from the edges of the tape.

**Wet Signal:** The output of an effect device, especially a reverb unit.

**White Compression:** Amplitude compression of the signals corresponding to the white regions of the picture, thus modifying the tonal gradient.

**White Peak:** The maximum excursion of the picture signal in the white direction at the time of observation.

**Width:** Refers to the width of the tape, varying from 0.150" in cassette tape to 2.0" for video, mastering and instrumentation tapes. The size of the picture in a horizontal direction.

**Wind:** The way in which tape is wound onto a reel. An A-wind is one in which the tape is wound so that the coated surface faces toward the hub; a B-wind is one in which the coated surface faces away from the hub. A uniform wind, as opposed to an uneven wind, is one giving a flat-sided tape pack free from laterally displaced, protruding layers.

**Winder/Cleaner:** A device designed to wind and clean magnetic tape in order to restore it to a quality that approaches the condition of a new tape, providing the tape has not been physically damaged.

**Wipe:** An electronic process whereby the output of one camera can be out in a portion of the screen already taking a picture from another camera, thereby wiping out the portion of the first picture, where the second picture appears. Can be almost any shape.

**Wow:** Slow, periodic variations in the speed of the tape, characterized by its effect on pitch. A measure of non-uniform movement of magnetic tape or other recording parts.

**Wrap:** The length of the path along which tape and head are in intimate physical contact.

**Yield Strength:** The minimum force per unit cross-sectional area at which the tape or base film deforms without further increase in the load. Units are pounds per square inch (psi) or pounds per tape sample of given width and base film thickness.

## Z

**Zenith:** The tilt of the head in the direction perpendicular to the tape travel.

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**Footnote:** \* Many of the terms listed in this Glossary have been found in various documents such as Morton Dubin's "Videotape Glossary," "A Glossary of Terms Used in Magnetic Recording" by Tony Booker, Stereo Review's "Tape Recording & Buying Guide" published by Ziff-Davis Publishing Co., and several unidentifiable glossary listings.



