4. Track Usage

4.1 When a single program record is used, it shall be placed on the Audio 1 track.

4.2 When two tracks are used for stereo recording, the left channel shall be recorded on the Audio 1 track and the right on Audio 2 track.

4.3 A cue signal or time and control code shall be placed on Audio 3 track.

5. Program Audio Head Phasing

When the same signal is recorded on two tracks, the tracks shall be so phased that when reproduced with a full-track head, they will be additive.

NOTE: In addition to this standard, there is available American National Standard Basic System Parameters for 1-in Type B Helical-Scan Video Tape Recording, ANSI C98.15M-1980.

SMPTE RECOMMENDED PRACTICE

RP 83–1980

Specifications of Tracking Control Record for 1-in Type B Helical-Scan Video Tape Recording

1. *Scope*

This practice specifies the recorded relationships among the tracking control signal, the edit pulse signal and the video signal for 1-in Type B helical-scan video tape recordings.

2. *Dimensions*

2.1 The recorded relationship among the tracking control signal, the edit pulse signal and the video signal shall be as specified in the figure.

2.2 The position of the field synchronizing signal on the video tracks shall be as specified in Sec. 3.5 of American National Standard Dimensions and Location of Records for 1-in Type B Helical-Scan Video Tape Recording, ANSI C98.16M-1980.

2.3 The signal recorded on the control track shall consist of a series of tracking pulses and additional editing pulses as indicated in the figure.

2.4 The polarity of the tracking pulses shall be as follows: If the tracking pulses on the tape are regarded as discrete magnets, the leading part of the pulses constitute a magnet whose south-seeking pole points in the direction of tape motion.

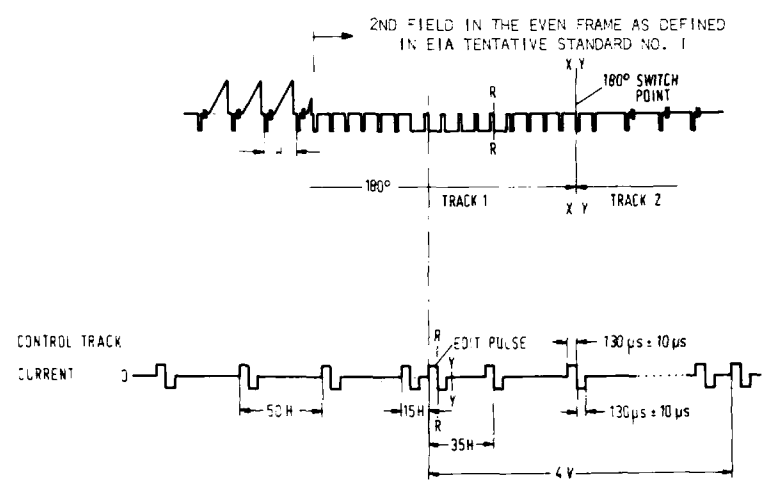
2.5 The amplitude of the control signal current flowing through the recording head shall be such that the tape is driven to the verge of saturation.

2.6 The edit pulse shall be coincident with the second field of the even frame, as defined in EIA Industrial Electronics Tentative Standard No. 1, Color Television Studio Picture Line Amplifier Output Drawing.

2.7 The edit and control pulses shall be 130 ± 10 μs in width.

2.8 The rise time of the signal shall be no longer than 10 μs.

NOTE: In addition to this practice, there is available American National Standard Basic System Parameters for 1-in Type B Helical-Scan Video Tape Recording, ANSI C98.15M-1980.



Position and Waveform of Control Track and Edit Pulse
525 Line—60 Field System (NTSC)

Approved 13 July 1978

SMPTE RECOMMENDED PRACTICE — RP 84-1980

Video Reference Carrier Frequencies and Pre-Emphasis Characteristics for 1-in Type B Helical-Scan Video Tape Recording

1. *Scope*

This practice specifies the video reference frequencies to which the carrier is deviated and the associated video pre-emphasis for 1-in Type B helical-scan video tape recording. (The video de-emphasis to be used in reproduction is specified indirectly by requiring a flat input-to-output video response along with a specified pre-emphasis in recording.)

2. *Electrical Parameters*

2.1 Modulation System. The video information shall be recorded in the form of an rf signal frequency modulated by the video signal. The instantaneous frequencies of the rf signal shall vary linearly with respect to the amplitude of the modulating signal.

2.2 Characteristic Frequencies. The instantaneous frequencies of the rf signal corresponding to characteristic levels of the video signal shall be as specified in Table 1.

2.3 Pre- and De-Emphasis. The time constants of the video emphasis networks shall be as defined in Table 2.

Table 1

Video Levels	MHz
Synchronization tip	7.06 nom
Blanking	7.90 ± 0.05
Peak white	10.00 ± 0.05

Table 2

Time Constants	ns
t_1	240
t_2	600

NOTE: In addition to this practice, there is available American National Standard Basic System Parameters for 1-in Type B Helical-Scan Video Tape Recording, ANSI C98.15M-1980.

Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included for information purposes only.)

Transmission Characteristics of the Signal Chain

The transmission characteristics of the signal chain of a television tape recorder may be defined by one of two methods which are in agreement:

1. *Definition of the Recording Chain*

For reference purposes, an ideal recording chain is defined as consisting of (a) a modulator having a flat frequency response with respect to the modulating video frequencies, (b) an rf section having a transfer characteristic that produces constant amplitude alternating magnetic flux in the video head pole tips when driven by an alternating signal from the modulator having constant amplitude and (c) a video pre-emphasis network inserted before the modulation stage.

The pre-emphasis is then defined by the frequency and phase characteristic of a network, such as that shown in Fig. 1, fed from a low-impedance source and feeding a high-impedance load.

The ideal recording chain described above is intended to be taken as a basis for producing reference tapes to be used for the alignment of television tape recorders.

When using present-day recording chains, the following points should be considered:

An approximately linear relationship exists between the magnetic flux emanating from the video head pole tips and the rf current flowing through the video head windings.

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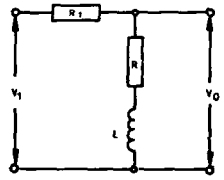
The amplitude of the recording current in the video heads should be such as to produce maximum rf output in replay at the frequency corresponding to mid-gray level.



$$t_1 = \frac{L}{R_1 + R}$$

$$t_2 = \frac{L}{R}$$

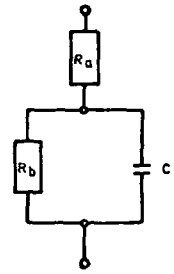
$$\frac{V_0}{V_1} = \frac{j\omega t_2 + 1}{j\omega t_1 + 1}\,\frac{t_1}{t_2}$$

Fig. 1

2. *Definition of the Playback Chain*

The de-emphasis characteristic is introduced following the demodulator in the signal playback circuitry. (To obtain a flat input-to-output video response over the passband of interest, a complementary video pre-emphasis characteristic is introduced ahead of the frequency modulator stage during recording.)

The video de-emphasis curves are defined as the normalized impedance of the two-terminal network, as shown in Fig. 2 where t_1 and t_2 are time constants in microseconds, R is resistance in ohms and C is capacitance in microfarads.



$$t_1 = \frac{R_a R_b}{R_a + R_b} C$$

$$t_2 = R_b C$$

Fig. 2

The de-emphasis network is introduced following the demodulator in the signal playback circuitry. (To obtain a flat input-to-output video response over the passband of interest, a complementary pre-emphasis network is introduced ahead of the frequency modulator stage during recording.)

This definition assumes that all pre-emphasis and de-emphasis are placed in the video portion of the signal path and that the response of the rf portion of the signal path is flat over the passband of interest. Ideally, the magnitude of the remanent flux on a recorded tape should be independent of frequency over the frequency range of interest, but since there is no practical way of measuring it, the most practical approach is to ensure that the recording current in the video heads is independent of frequency over the passband of interest.

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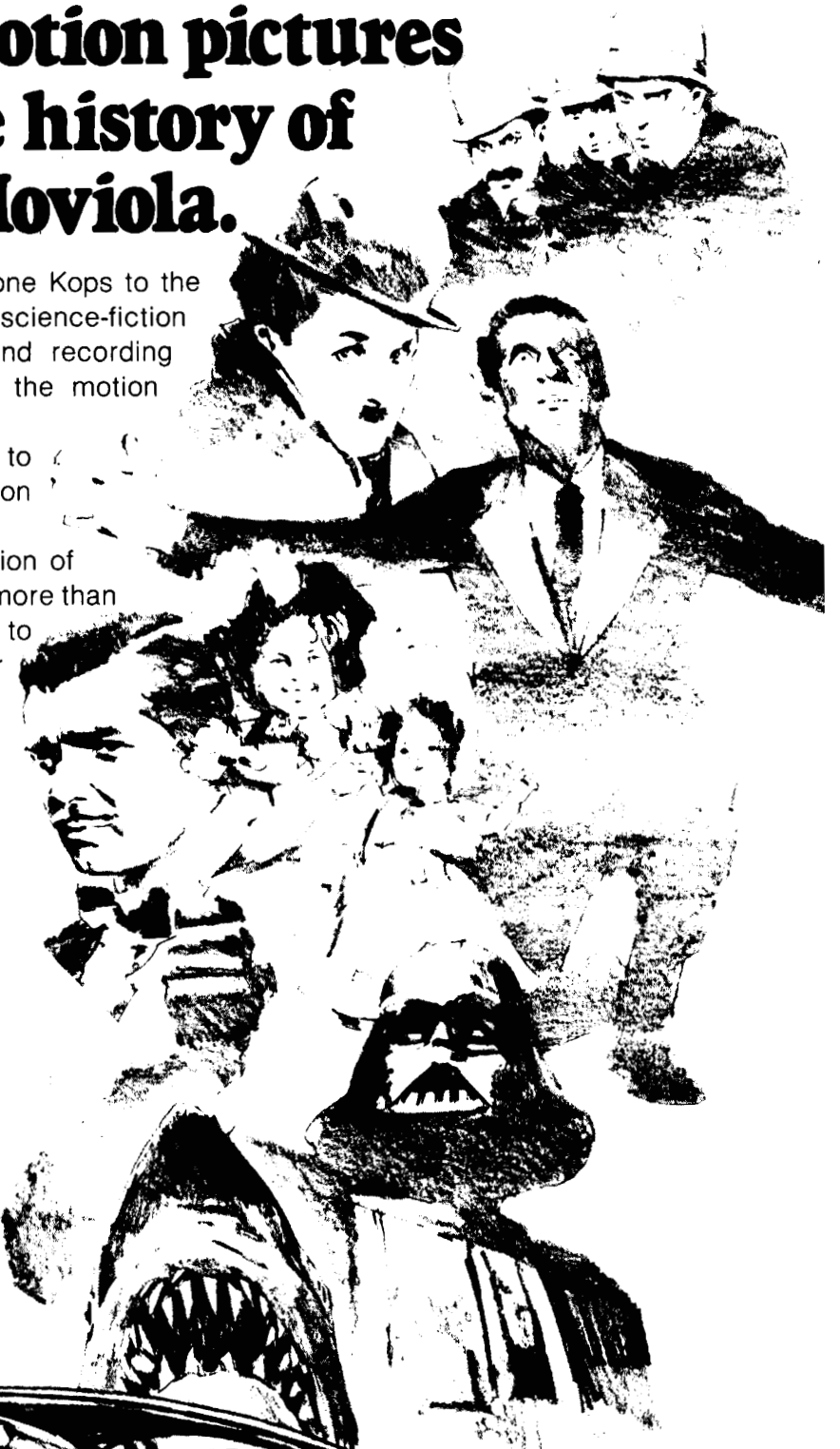

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