PROPOSED

SMPTE RECOMMENDED PRACTICE RP 83

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 Draft American National Standard Dimensions and Location of Records for 1-in Type B Helical-Scan Video Tape Recording, C98.16.

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.

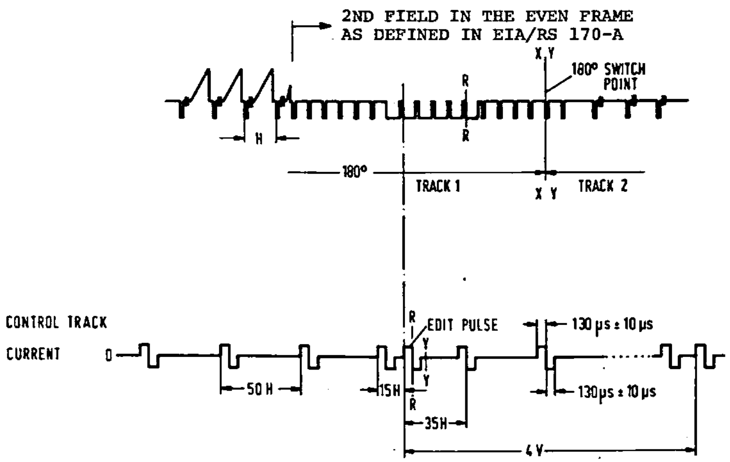
2.5 The amplitude of the control signal current flowing through the recording head shall be such that the tape is driven to the verge of saturation.

2.6 The edit pulse shall be coincident with the second field of the even frame, as defined in EIA Standard RS-170-A, Electrical Performance Standards—Monochrome Television Studio Facilities.

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 Draft American National Standard Basic System Parameters for 1-in Type B Helical-Scan Video Tape Recording, C98.15.



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

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

PROPOSED

SMPTE RECOMMENDED PRACTICE RP 84

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

Page 1 of 2 pages

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 Draft American National Standard Basic System Parameters for 1-in Type B Helical-Scan Video Tape Recording, C98.15.

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.

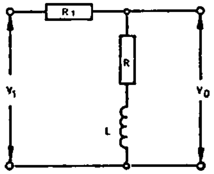
The ideal recording chain described above is intended to be taken as a basis for producing reference tapes to be used for the alignment of television tape recorders.

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.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

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.



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

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

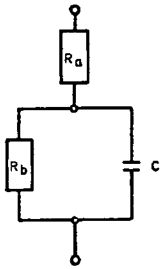
$$\frac{V_0}{V_1} = \frac{j\omega t_2 + 1\ t_1}{j\omega t_1 + 1\ t_2}$$

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.

PROPOSED

SMPTE ENGINEERING COMMITTEE RECOMMENDATION

ECR 1

Alignment Color Bar Test Signal for Television Picture Monitors

1. *Scope*

This recommendation specifies the purpose, format and usage of a television picture monitor alignment color bar test signal with chroma set and black set signals.

2. *Purpose*

2.1 The alignment color bar test signal is intended to standardize the adjustment of chroma gain, chroma phase and black level monitor controls.

2.2 Chroma gain and chroma phase for picture monitors are conventionally adjusted by observing the standard encoded color bar signal (see Fig. 1) with red and green monitor guns switched off. The four visible blue bars are adjusted for equal brightness. This procedure is prone to error because of the subjective judgment necessary and especially because the blue bars are widely separated on the screen. The use of the chroma set signal portion of the alignment color bar test signal greatly increases the accuracy of this adjustment since it provides a signal with the blue bars to be matched vertically adjacent to each other. Because the bars are adjacent, the eye can easily perceive any difference in brightness. It also eliminates effects due to shading or purity from one part of the monitor to another.

2.3 Black level for picture monitors is conventionally adjusted by observing a known black portion of the signal and matching it to a blanked area of the signal. This procedure is prone to error because of the subjective judgment necessary to make the match. The use of the black set signal portion of the alignment color bar test signal greatly increases the accuracy of this adjustment since it provides a positive go-no-go criterion for the proper setting. It also minimizes errors due to variations in ambient light.

3. *Format*

3.1 Fig. 1 shows the appearance of the EIA Standard RS-189-A, Encoded Color Bar Signal on a picture monitor. Fig. 2 shows the appearance of the Alignment Color Bar Test Signal on a picture monitor. Note that Fig. 2, the Alignment Color Bar Test Signal, is the same as Fig. 1 except for the addition of chroma set signal (X-X¹) and black set signal (within Y-Y¹).

3.2 The chroma set signal is a small band of bars displayed in place of the bottom portion of normal color bars. The bars are displayed in reverse order. Only the four bars which contain blue are necessary; the remaining three bars may be black. Fig. 3 shows the appearance of one line of the chroma set signal on a waveform monitor.

3.3 The black set signal is located in the bottom right-hand portion of the raster. Two bars, one slightly whiter-than-black and the other slightly blacker-than-black, are included. Fig. 4 shows the appearance of one line of the black set signal on a waveform monitor.

4. *Usage*

4.1 To set chroma gain and phase the picture monitor, red and green guns are switched off. Chroma gain is adjusted by matching the brightness of the outer left or right main blue bar with the chroma set bar just below. In a similar manner, chroma phase is adjusted by matching the brightness of either center main blue bar with the chroma set bar just below.

4.2 To set black level, the picture monitor brightness control is adjusted so that the whiter-than-black bar is visible with respect to the black surround but the blacker-than-black bar is not visible.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY