

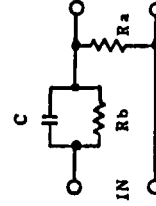
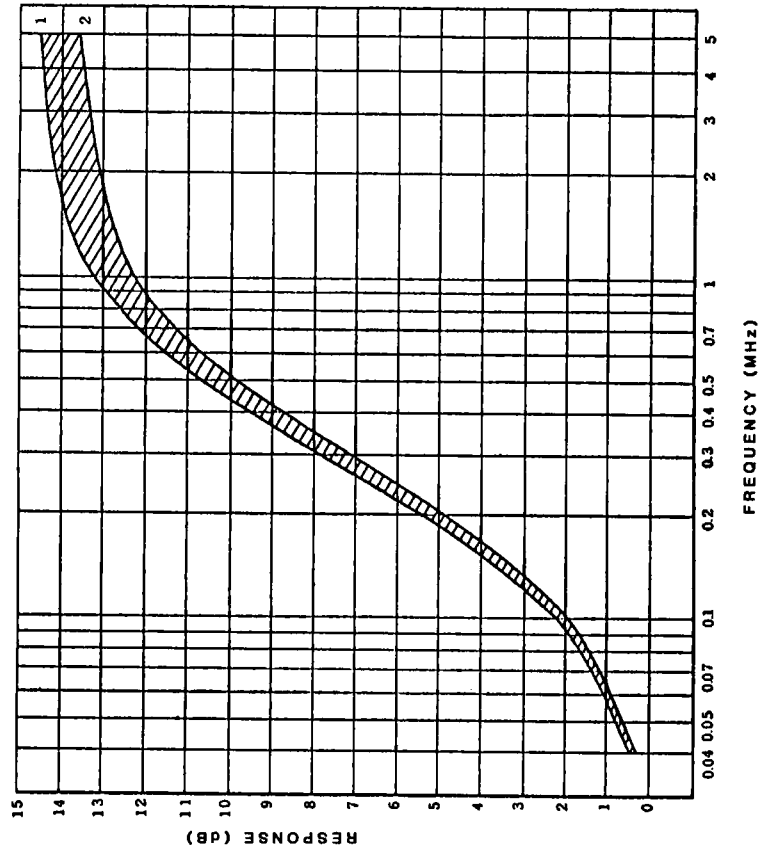
## SMPTE RECOMMENDED PRACTICE

RP 112

### Reference Carrier Frequencies, Pre-emphasis Characteristic and Audio and Control Signals for 1/2-in Type H Helical-Scan Video Tape Cassette Recording

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RP 112



$$T = C \cdot R_b = 1.3 \mu\text{sec} \pm 0.05 \mu\text{sec} \quad \left. \begin{array}{l} T = 1.3 \text{ to } 5 \mu\text{sec} \\ X = 4.3 \end{array} \right\} \dots [1]$$

$$X = \frac{R_b}{R_a} = 4 \pm 0.3 \quad \left. \begin{array}{l} T = 1.2 \text{ to } 5 \mu\text{sec} \\ X = 3.7 \end{array} \right\} \dots [2]$$

Fig. 1  
Pre-emphasis Characteristic of Luminance Signal

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#### 1. Scope

This practice specifies the reference frequencies for deviation of the frequency modulated carrier and the associated video pre-emphasis characteristic for 1/2-in Type H helical-scan video tape cassette recording of 32-line NTSC monochrome and color television signals. In addition, the characteristics of the audio and control signals are specified.

#### 2. Video Signal

##### 2.1 FM Recording of Luminance Component

2.1.1 Low-pass Filter for Separation. Luminance component of the composite video signal is separated by a low-pass filter, the attenuation of which is more than 40 dB at the chrominance subcarrier frequency.

2.1.2 Modulation Characteristics. FM carrier frequencies corresponding to reference video levels are as shown below:

Reference white level (100 IRE Units)	$4.4 \pm 0.1$ MHz
Reference sync level (-10 IRE Units)	$3.4 \pm 0.1$ MHz
Frequency deviation, white to sync (140 IRE Units)	$1.0 \pm 0.1$ MHz

2.1.3 Pre-emphasis and Clipping. Luminance signal shall be emphasized and clipped prior to frequency modulation. The characteristics of the pre-emphasis network are shown in Fig. 1 and clipping levels are as shown below:

White clipping level $100 + 10$ —5 percent from sync tip
Dark clipping level —10 $\pm$ 10 percent from sync tip

2.1.4 High Pass Filter for FM Signal. The amplitude/frequency response of the FM high-pass filter shall be in accordance with Fig. 2.

##### 2.1.5

Recording Level. The recording current shall have the optimum value over the entire FM carrier bandwidth. (Optimum record current is the recording current value which is necessary to obtain the maximum output signal level during playback.)

##### 2.2 NTSC Chrominance Signal Recording

2.2.1 Recording Method. The chrominance signal is separated from the NTSC color video signal through a band-pass filter with its bandwidth of  $3.58 \pm 0.50$  MHz at the  $-3$  dB points. The separated chrominance component shall then be down-converted so that its new carrier frequency equals 10 times the horizontal scanning rate (629,371 Hz). The recording process is illustrated in Fig. 3.

2.2.2 Phase Rotation of Chrominance Signal. The chrominance signal shall have phase shift at every horizontal sync as follows:

Video 1 track +90°
Video 2 track -90°

Phase shift should be completed prior to the color burst. Dimensions for the video tracks are specified in Proposed American National Standard Dimensions and Location of Records for 1/2-in Type H Helical-Scan Video Tape Cassette Recording, ANSI V98-82M.

2.2.3 Amplitude Modulation Recording. The chrominance signal is recorded as an amplitude-modulated carrier. Its record level should be adjusted so that the playback level is 7 to 10 dB below the level corresponding to the saturation recorded signal.

2.2.1 Color Burst Amplitude Doubler. Amplitude of color burst is increased by  $6.0 \pm 0.5$  dB prior to recording.

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3. Audio Signal

Reproducing de-emphasis shall be in accordance with Fig. 4. The time constants are 120 and 3180  $\mu$ s.

dence with the start of Video 1 track scan as shown in Fig. 5. (See ANSI V98.32M.)

4.2 Polarity: The control signal shall be recorded so that the rotating drum side of the control head poles would be north polarized when the pulse signal is positive.

4. Control Signal

4.1 Recording Signal: A positive-going edge of recorded control pulse signal shall be in coinci-

4.3 Recording Current Waveform: The rise time shall be less than 200  $\mu$ s.

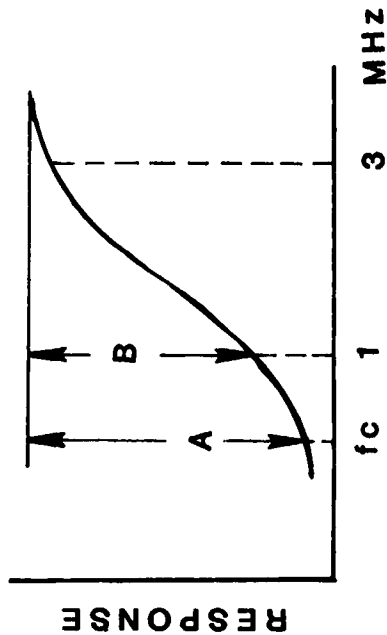


Fig. 2 FM High-Pass Filter

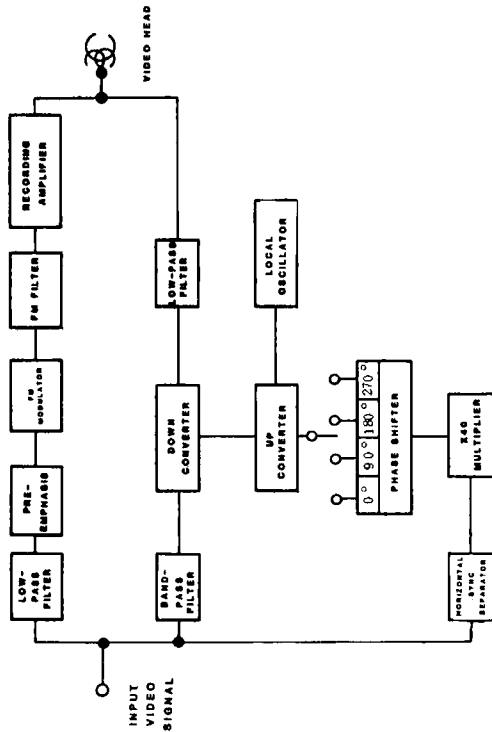


Fig. 3 Recording Color Video Signal

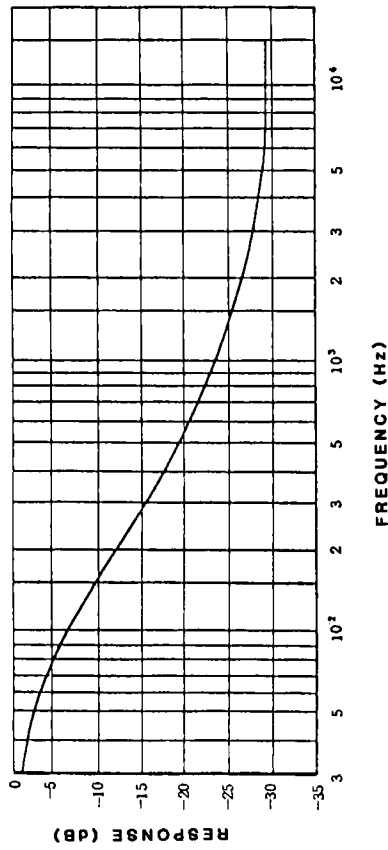


Fig. 4 Reproducing De-emphasis of Audio Signal

Frequency (Hz)	Response (dB)
30	-1.3
40	-2.1
50	-3.0
70	-4.7
100	-7.0
200	-12.2
300	-15.5
400	-17.7
500	-19.5
600	-20.8
700	-21.9
800	-22.7
1000	-24.1
1500	-26.0
2000	-26.9
3000	-27.7
4000	-28.0
5000	-28.2
7000	-28.3
10 000	-28.4
15 000	-28.4

Fig. 4 Reproducing De-emphasis of Audio Signal