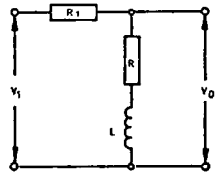
The amplitude of the recording current in the video heads should be such as to produce maximum rf output in replay at the frequency corresponding to mid-gray level.



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

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

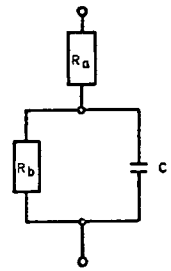
$$\frac{V_0}{V_i} = \frac{j\omega t_2 + 1}{j\omega t_1 + 1}\,\frac{t_1}{t_2}$$

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.

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-X^1) and black set signal (within Y-Y^1).

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.

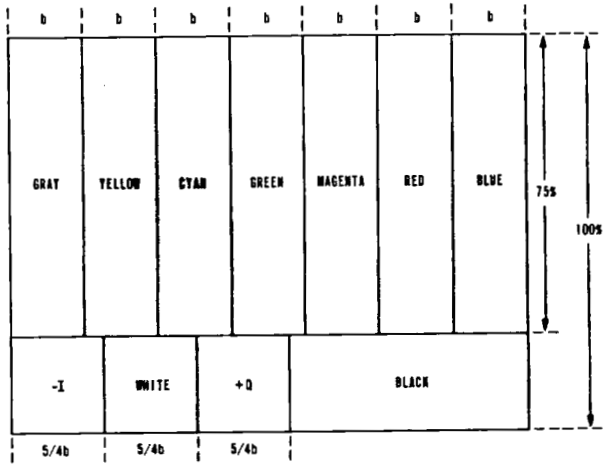


Fig. 1
EIA Standard RS-189-A, Encoded Color Bar Signal

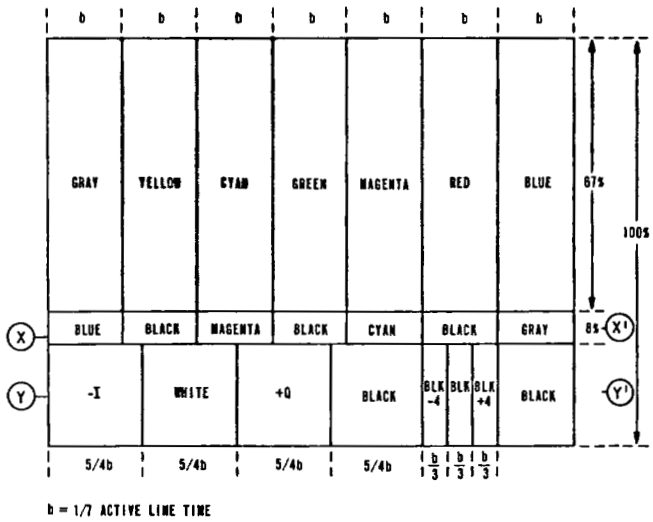


Fig. 2
Alignment Color Bar Test Signal

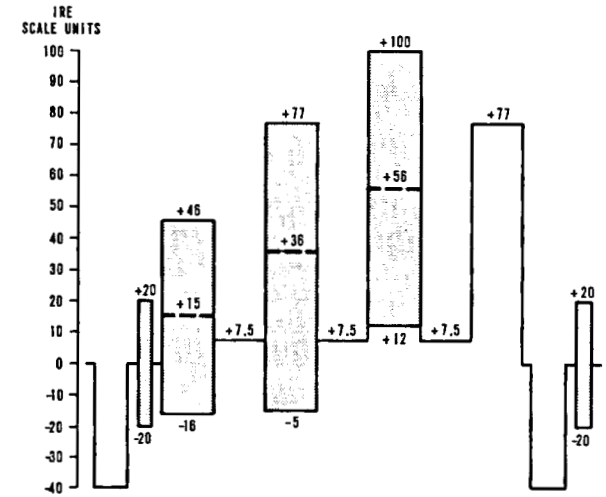


Fig. 3
One Line of Chroma Set Signal, X-X'

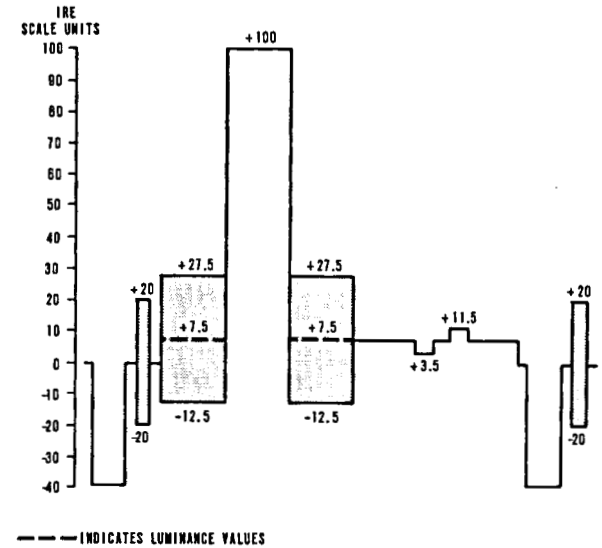


Fig. 4
One Line of Black Set Signal with —I, +Q, & White Reference, Y-Y'