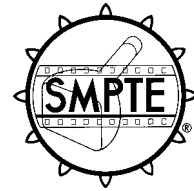


SMPTE STANDARD

ANSI/SMPTE 251M-1996

Revision of
ANSI/SMPTE 251M-1991

for Television Analog Recording — 1/2-in Type M-2 — Electrical Parameters of Video, Audio, Time and Control Code and Tracking Control



Page 1 of 18 pages

1 Scope

1.1 This standard specifies the recording system for the video, audio, time and control code, and tracking-control signals for 1/2-in type M-2 helical-scan video tape recorders operating with video signals having a typical scanning structure of 525 lines, 59.94 fields/s, 2:1 interlace, and utilizing the video cassettes specified in ANSI/SMPTE 250M.

1.2 The audio frequency modulation (AFM) recording shown in this standard is optional. Pulse code modulation (PCM) audio recording mode with limited interchangeability, as defined in ANSI/SMPTE 249M, is a secondary audio recording mode which is specified in ANSI/SMPTE 252M.

1.3 Where nominal values are given without tolerances, the interchange performance will be limited by implementation accuracy.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI/SMPTE 12M-1995, Television, Audio and Film — Time and Control Code

ANSI/SMPTE 249M-1996, Television Analog Recording — 1/2-in Type M-2 — Records

ANSI/SMPTE 250M-1996, Television Analog Recording — 1/2-in Type M-2 — Tapes and Cassettes

ANSI/SMPTE 252M-1996, Television Analog Recording — 1/2-in Type M-2 — Pulse Code Modulation Audio

IEC 268-12 (1987), Part 12: Application of Connectors for Broadcast and Similar Use

3 Video signal recording

Type M-2 video tape recorders shall record component video signals and are intended to operate interchangeably in an NTSC environment. This component video recording system shall provide independent signal channels for the luminance and chrominance signals. These component signals shall be recorded on two independent tracks on the video tape as frequency modulated signals. The two separate tracks shall be designated as the Y track for the luminance signals and the C track for the chrominance signals. The chrominance signals, in the form of R-Y and B-Y color-difference signals, shall be recorded in the form of a time compressed and time division multiplexed signal on the C track. (The AFM audio signal recording shall be recorded in the form of a frequency multiplexed signal together with the FM color-difference signal on the C track.) The PCM audio signal shall be recorded using the luminance and chrominance heads on the luminance and chrominance tracks.

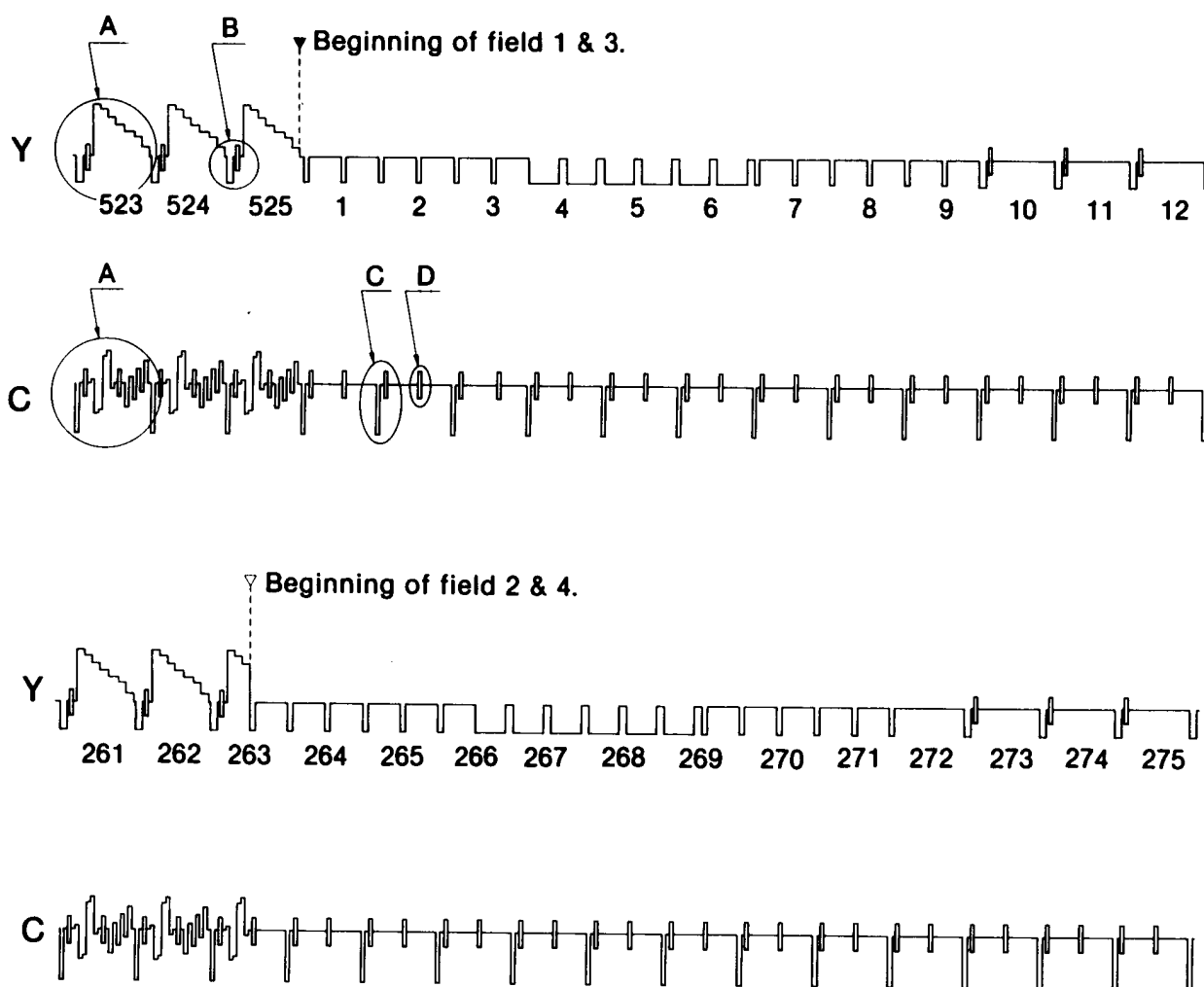
3.1 Luminance channel

3.1.1 Signal processing

A signal processing system, as specified in this standard, shall contain the following elements in the order of signal flow:

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- 1) Means for adding a timing burst signal to the luminance signal
- 2) Means for adding vertical interval subcarrier when appropriate
- 3) A luminance nonlinear preemphasis circuit
- 4) A luminance preemphasis network
- 5) Means for clipping the preemphasized luminance signal to the amplitude of the modulating frequencies
- 6) A linear frequency modulator having constant deviation with respect to the amplitude of the modulating frequencies
- 7) A circuit for mixing the PCM audio CH5 signal to the frequency modulated luminance signal
- 8) The recording current amplifier for the Y track video heads



NOTE – No burst signals are mixed during the 9H period of Y vertical blanking.

Figure 1 — Waveform of burst mixed luminance and burst and sync added chrominance signals

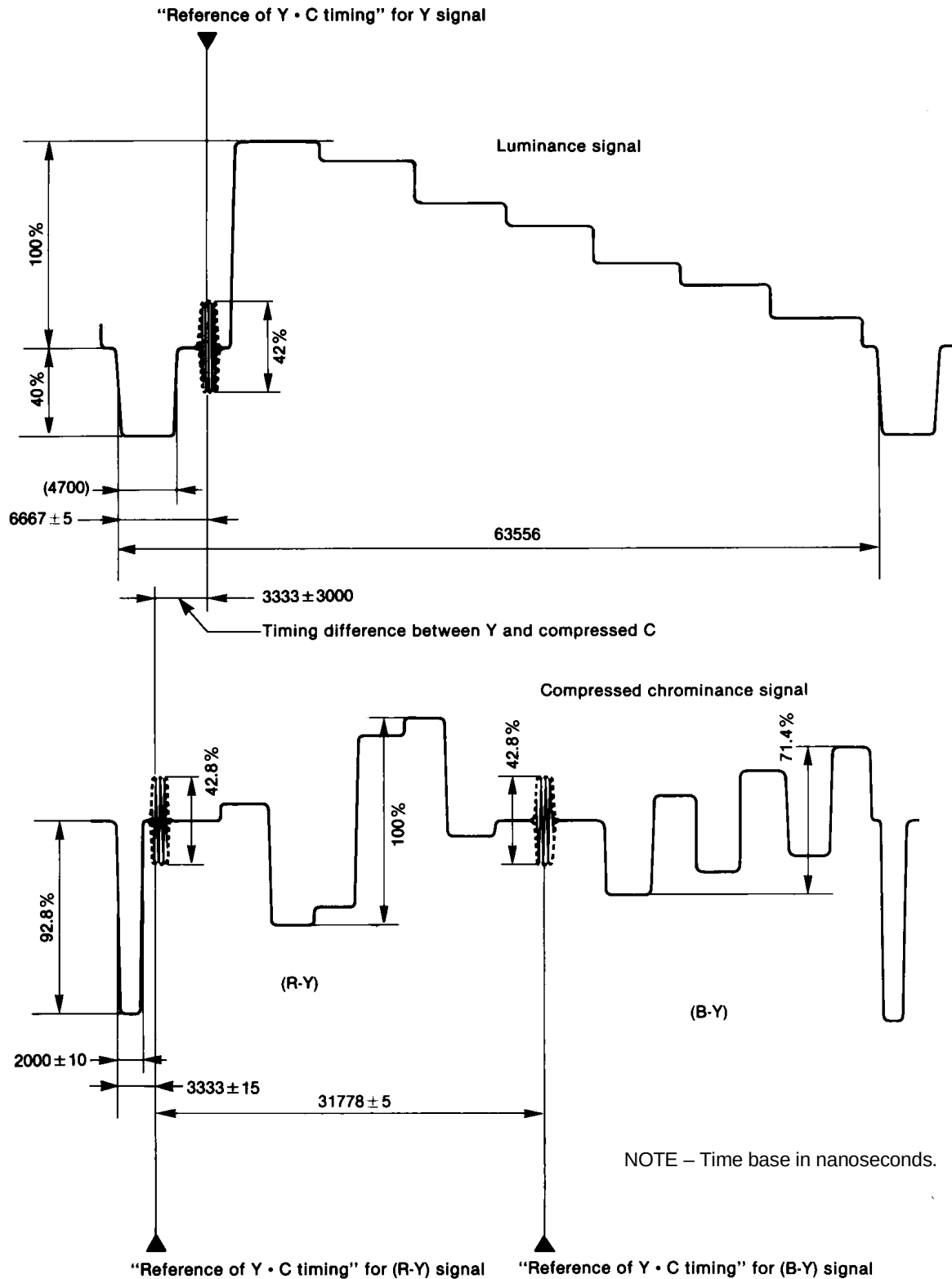


**Figure 2 – Luminance signal and compressed chrominance signals
for 100/7.5/77/7.5 color bars
(Details of figure 1A)**

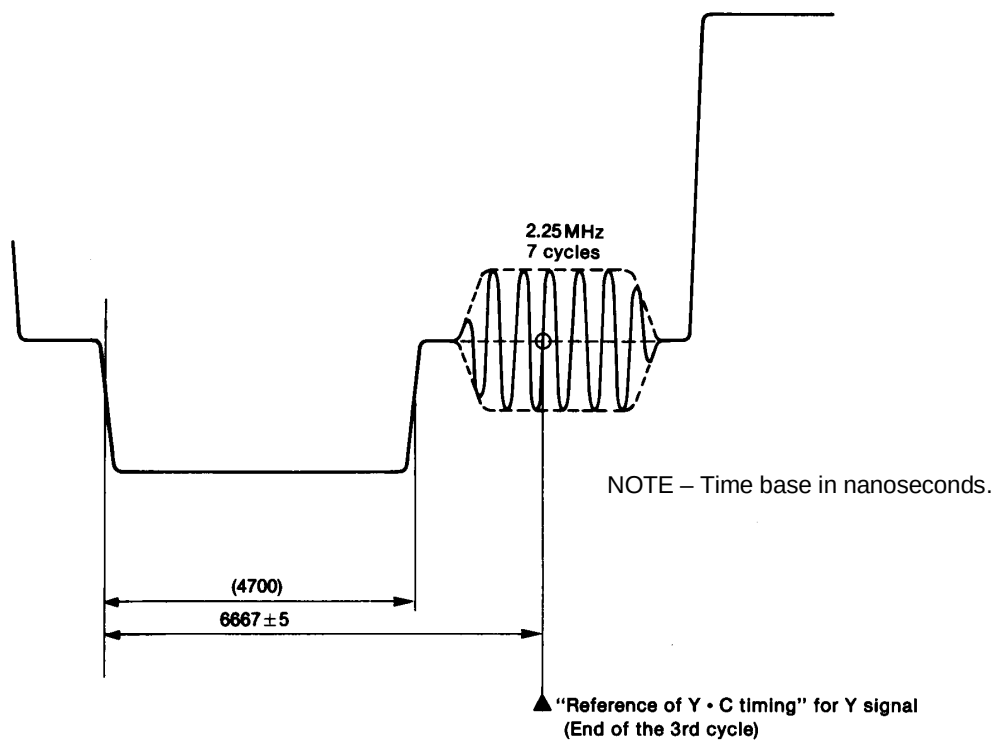


Figure 3 – Details of figure 1B

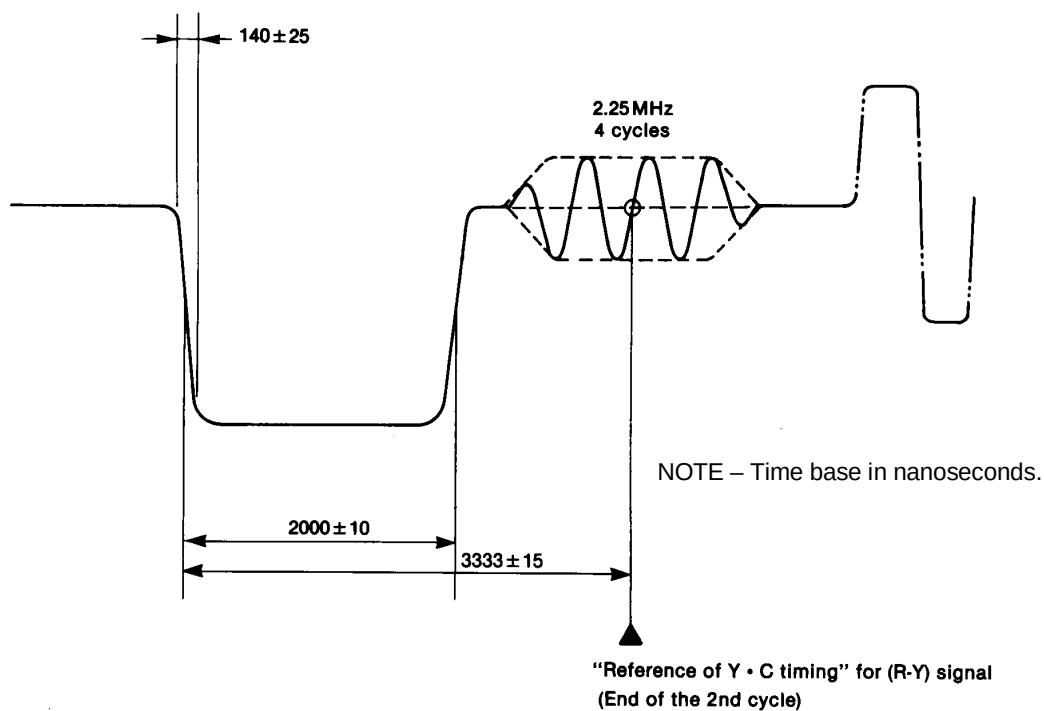
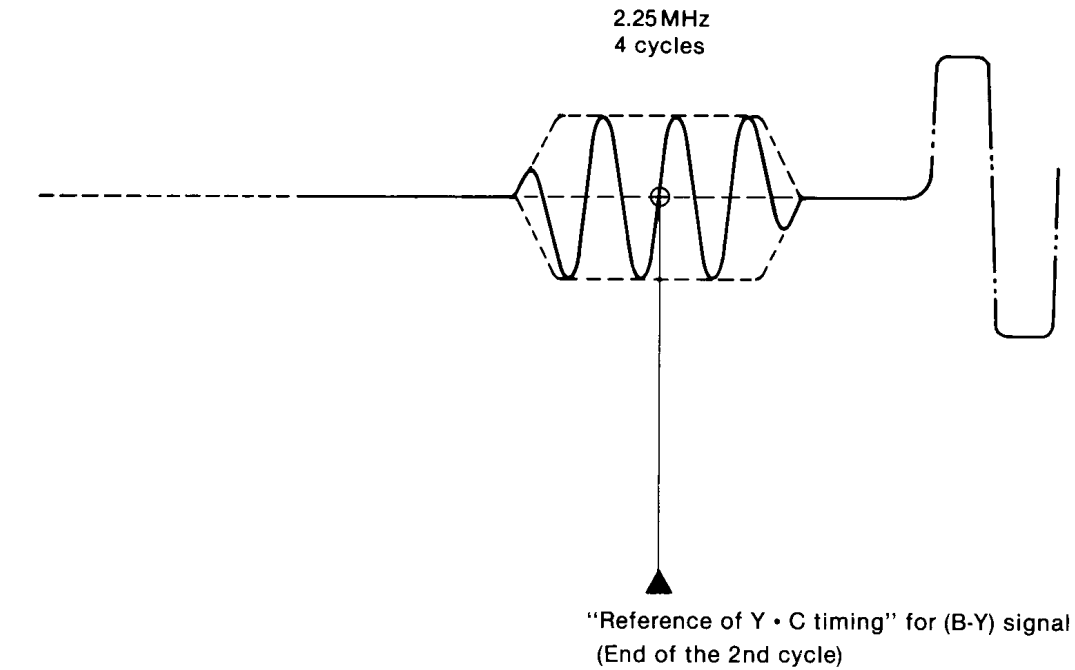
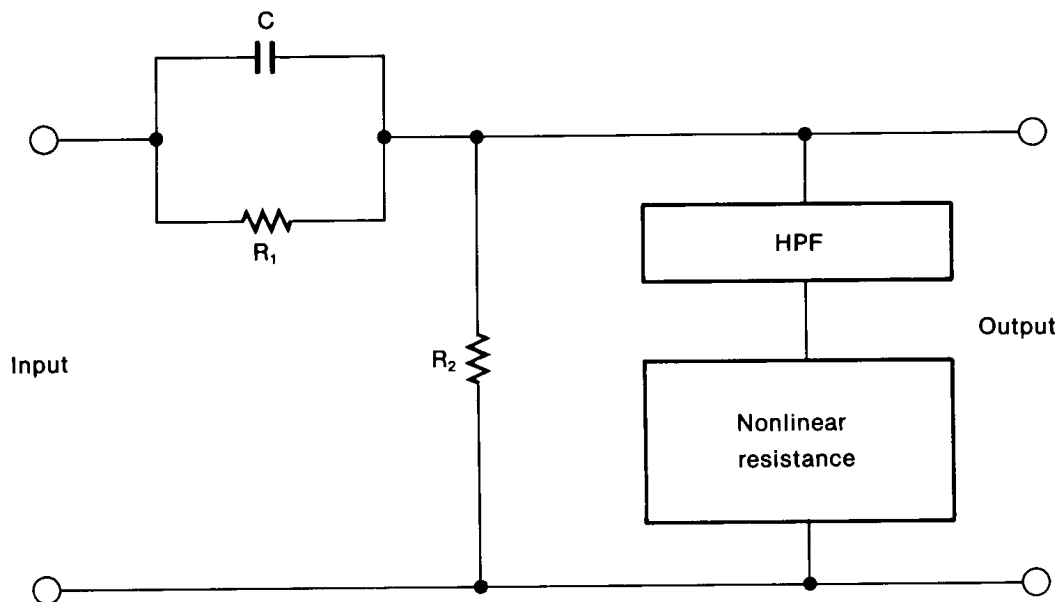


Figure 4 – Details of figure 1C



NOTE – Time base in nanoseconds.

Figure 5 – Details of figure 1D



NOTE – The input signals are fed from the zero impedance source, and the output signals are applied to the infinite impedance load.

Figure 6 – Luminance nonlinear preemphasis circuit