

**Video Test Tape for Quadruplex Video Frequency
Magnetic Tape Recorders Operating at 15 in/s and
Practice HB of SMPT E Recommended Practice RP 6**



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1. Scope
This practice specifies a video frequency test tape to be used with quadruplex television video tape recorders operating at 15 in/s (38.1 cm/s) and Practice HB of SMPT E Recommended Practice RP 6-1985. Recorded Carrier Frequencies and Pre-emphasis Characteristics for 2-in Quadruplex Video Magnetic Tape Recording for 525-Line/60-Field Television Systems. It is to be used for:

- (a) Positioning of the vacuum guide
- (b) Indication of video frequency response characteristics of the reproducing system
- (c) Adjustment of gain of the video reproducing system
- (d) Comparison of carrier frequencies of the video recording system
- (e) Verification of level and phase of the control track recording system
- (f) Adjustment of the gain of the program audio reproducing system

2. General Specifications

2.1 Dimensions of Records. The dimensions of pertinent records making up this test tape shall conform to American National Standard for Video Recording—Video, Audio and Tracking/Control Records—2-in Quadruplex Tape, ANSI/SMPT E 6-1985.

2.2 Tape Speed. The nominal linear speed of this test tape shall be 15 in/s in accordance with American National Standard for Video Recording—2-in Magnetic Tape for Quadruplex Recording—Speed, ANSI V98.4-1983.

2.3 Tape Stock. The test sections shall be recorded on transversely-oriented television magnetic recording tape optimized for use with Practice HB of SMPT E Recommended Practice RP 6. The dimensions of the tape stock shall be as specified in American National Standard, Dimensions of 2-in Video Magnetic Recording Tape, ANSI C98.1-1978 (R1984).

2.4 Tracking Control Signal. A tracking control signal, conforming to that in SMPT E Recommended Practice RP 16-1988. Specifications of Tracking Control Record for 2-in Quadruplex Video Magnetic Tape Recordings, shall be recorded throughout the tape.

2.5 Voice announcements at the beginning of this tape shall reference this practice. Voice announcements shall be recorded at a level approximately 5 dB below reference level, as defined in American National Standard Specifications for an Audio Operating Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 in/s, ANSI V98.8, 1982. Announcements shall be recorded on Audio 1 Record only. A video identification signal may be included during the voice announcement section. If no video identification signal is used, sync and set-up or test signal shall be recorded on the video channel during the voice announcement.

2.6 Recorded carrier frequencies shall conform to those specified by Practice HB of SMPT E RP 6-1985; recording pre-emphasis shall match the pre-emphasis characteristic specified by Practice HB of SMPT E RP 6-1985.

2.7 Tape vacuum guide radius and position shall conform to SMPT E Recommended Practice RP 11-1984, Tape Vacuum Guide Configuration and Position for Quadruplex Video Magnetic Tape Recording.

2.8 Audio 1 Record shall be in accordance with American National Standard for Video Recording—Frequency Response and Operating Level of Recorders and Reproducers—Audio 1 Record on 2-in Tape Operating at 15 and 7.5 in/s, ANSI/SMPT E 3-1986.

2.9 Video synchronizing waveforms and signal amplitudes shall conform to the rules and regulations of the Federal Communications Commission for color transmissions. Color subcarrier synchronizing burst shall be included throughout the recording. The timing of the synchronizing waveforms shall be uninterrupted during the transition from the identification signals specified in 2.5 to the video test signals specified in 3.1 and 3.2, and shall be uninterrupted during the transitions between video test signals specified in 3.2.

2.10 Geometric distortion on the test tape caused by lack of exact 90° angular separation (quadrature error) of the transducers on the video head wheel making the recording shall not exceed 0.03 microseconds peak to peak.

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Approved June 14, 1988

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2.11 The position of the tape neutral plane shall be in accordance with SMPT E Recommended Practice RP 36-1984. Positioning the Headwheel and Adjacent Tape Guides for 2-in Quadruplex Video Magnetic Tape Recorders.

3. Test Section

3.1 Video Test Signals. Five types of test signals, as specified in 3.1.1 through 3.1.5, shall be recorded on the tape.

3.1.1 Color Bars. An encoded color-bar signal conforming to FCC Rules and Regulations, Part 73, Subpart E, March 1980. An encoded color-bar signal conforming to SMPT E Engineering Committee Recommendation ECR 1-1978 (R1983). Alignment Color Bar Test Signal for Television Picture Monitors, shall be permissible.

3.1.2 Multiburst. A white pulse followed by a series of six sine-wave bursts. The white pulse width and the width of each burst shall be 1/2 the width of the scan line between the end of H blanking and the start of H blanking. The white bar level shall be 100 ± 1 IRE units. The axis of the bursts shall be at a level of 57 ± 1 IRE units, and the peak-to-peak amplitude of the bursts shall be 90 ± 1 IRE units. The frequencies of the bursts in time sequence shall be 500 KHz, 1.5 MHz, 2.0 MHz, 3.0 MHz, 3.6 MHz, and 4.2 MHz. Harmonic distortion of the sine wave burst signals shall be less than 1 percent.

3.1.3 Ramp. A continuous ramp (or staircase signal consisting of 10 equal-height steps) extending from 0 to 100 IRE units, and repeating at a line rate. Color subcarrier having a peak-to-peak amplitude of 20 ± 2 IRE units shall be combined additively with the ramp (or staircase signal).

3.1.4 Window and Pulses. A window signal, a modulated 12½T (1.36 msec) pulse, and a 2T (0.25 msec) sine-squared pulse. All signals shall extend from 7½ ± 2½ IRE units to 100 ± 1 IRE units. The three signals shall occur on each line. The leading and trailing edges of the window shall correspond in slope and rise time to the leading and trailing edges of the 2T pulse, respectively. The timings of the pulses and window shall be measured at their half-amplitude points, and shall be as specified below:

- (i) Leading edge of 12½T pulse: 0.13H after trailing edge of preceding horizontal sync pulse.
- (ii) Leading edge of 2T pulse: 0.25H after trailing edge of preceding horizontal sync pulse.
- (iii) Leading edge of window: 0.33H after trailing edge of preceding horizontal sync pulse.
- (iv) Width of window: 0.10H.
- (v) Tolerances: All dimensions given in (i) through (iv) shall be held within ± 0.03H.

3.1.5 Black. A signal consisting of sync, burst, and 7½ ± 2½ IRE units of set-up.

3.2 Sequence of Video Signals. The video signals shall be recorded in the sequence indicated as follows:

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Signal	Duration	Nominal Time from Start of Test Signals	Begin	End
Black	0-20	0-00	0-20	
Multiburst	0-30	0-20	0-50	1-15
Ramp	0-25	0-50	1-15	1-40
Window and Pulses	0-30	1-40	2-10	2-20
Color Bars	0-10	2-20	3-50	4-00
Black	0-10	3-50	4-00	6-20
Ramp	2-20	4-00	6-20	6-30
Black	0-10	6-30	6-30	7-50
Window and Pulses	1-20	6-30	7-50	8-00
Black	3-10	7-50	8-00	10-20
Color Bars	2-20	8-00	10-20	10-30
Black	0-10	10-20	10-30	

3.2.1 The tolerance on all durations shall be ± 2 seconds, with the exception of the black signals, which shall have a tolerance of ± 1 seconds, —0 seconds.

3.3 Audio Test Signals

3.3.1 Audio 1 Record. A 1 kHz ± 5 percent tone shall be recorded at a short circuit tape flux level of 110 ± 5 nanowebers per meter of track width throughout the test section on Audio 1 Record, except as interrupted for the announcements defined in 3.4.

3.3.2 Audio 2 Record. A 1 kHz ± 5 percent tone shall be recorded throughout the length of the tape at a short circuit tape flux level of 260 ± 10 nanowebers per meter of track width on Audio 2 Record (cue track).

3.4 Voice Announcements. Each time the type of signal recorded on the tape is changed, an appropriate voice announcement identifying the new signal shall be made. Instructional or precautionary information may be included in such announcements. No identifying announcements shall be required during the black signal portions of the tape. All voice announcements shall be made under the same conditions as stated in 2.5, except that the video test signal shall not be interrupted.

4. Calibration

4.1 Calibration of audio level on all test tapes for field use shall be accomplished by comparison on a calibrated reproducer with a test tape made in accordance with ANSI V98.8-1982.

4.2 Audio Level Measurements. All level measurements shall be made by means of a standard volume indicator, as specified in IEEE Std 152-1953 (R1971). Volume Measurements of Electrical Speech and Program Waves.

4.3 Video Level Measurements. All video measurements of luminance levels shall be made in accordance with IEEE Std 205-1958 (R1972). Television: Measurement of Luminance Signal Levels.

Note: The frequency response of a recovered video signal is a function of such variables as recording current and type of tape stock used; therefore, the optimum reproducing-equalization setting for this tape will not necessarily be the optimum reproducing-equalization setting for all other recordings.

SMPTÉ RECOMMENDED PRACTICE

Specifications for Subjective Reference Tapes for Helical-Scan Video Tape Reproducers for Checking Receiver/Monitor Setup

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relationship to proper receiver/monitor setup, is recorded on one of the audio channels.

(b) Orchestral music, for evaluation of general audio reproduction, is recorded on the other audio channel.

3.3 General Specifications

(a) The main title shall include the issue number of the reference tape.

(b) Each cassette shall be supplied in a case and accompanied by a Wraatten 47B blue filter (or equivalent) and an instruction sheet on tape usage.

(c) A suitable marking shall appear on the case, and cassette indicating that they contain the official SMPTÉ Subjective Reference Tape.

NOTE: A reference tape made in accordance with this practice is available from the Society of Motion Picture and Television Engineers.

Appendix

(This Appendix is not part of the SMPTÉ Recommended Practice, but is included for information only.)

This recording of split-field SMPTÉ color bars is provided for an initial check out of the overall playback system. Please note, however, that the purpose of this tape is to verify that your video cassette playback system is operating normally, and to supply reference signals for adjusting operating controls on your receiver or monitor. It is not intended for video tape recorder alignment.

First, adjust the tracking control and, if available, the skew controls, for best picture clarity and stability. Now disable any receiver or monitor automatic controls and adjust the picture controls for best color picture, according to your normal operating procedures.

If you are experienced in color monitor setup using color bars, and this was a routine playback system check-out before use, you need not view the remaining tape segments. However, if you are still dissatisfied with the colorimetry or geometry or noise in this picture, you will find guidance for possible improvements in one of these following tape segments:

(2) brightness and contrast adjustment; (3) colorimetry adjustment; (4) subjective quality touchup; (5) raster geometry and convergence check out.

If you surr all the picture and adjustment controls properly during tape segment 1, you are now viewing a picture with a light gray background, and seven bars with clearly discernible adjacent bar brightness differences. The top row of bars should range from full white on the left to black on the right. The bottom row has the reverse arrangement. If there is color visible anywhere in the picture, the cause may be either color-control misadjustment or a problem analyzed in Segment 5 which will require technician servicing. Disable any automatic color adjustment circuits and turn off all color controls to remove color from the picture.

(f) Patterns as specified in SMPTÉ Recommended Practice on Specifications for Safe Action and Safe Title Areas Test Pattern for Television Systems, RP 27.3, 1983

(g) A crosstatch pattern video signal (with color burst) in accordance with IEEE Std 202-1954 (R1972), Television: Methods of Measurement of Aspect Ratio and Geometric Distortion, to check scanning linearity

(h) A dot pattern video signal (with color burst) as specified in IEEE Std 202-1954

(i) A full red field to check picture tube purity having the same luminance and chrominance as the red bar in a 75-percent color bar signal

3.2 Audio Samples

(a) Commentary describing the scenes and calling attention to the reference material and its

A1. Instructions for Setup and Playback

With the video tape reproducer set for playback, and the operator controls adjusted in accordance with the instruction book furnished with the equipment, listen to the voice of the commentator as he describes each scene and what it is intended to check. As you view the tape, observe the following:

(a) Look for an excessive amount of noise or snow—it may indicate clogged or excessively worn video heads.

(b) Note picture stability at the top and sides.

(c) Note picture sharpness and color fidelity.

(d) Listen for smooth, even music; quaver may indicate flutter.

(e) Listen for natural sound of voice.

(f) Look for excessive overscanning or underscanning.

A2. Narration Script

The following descriptive narration script is suggested for use with the Subjective Reference Tape, and is used on tapes available from the SMPTÉ:

SMPTÉ, the Society of Motion Picture and Television Engineers, presents Receiver-Monitor Setup Video Cassette No. 3. Before using this video tape further, be sure that this SMPTÉ identification appears both on the case and on the video cassette. Absence of this identification indicates that it is an unauthorized duplicate, and cannot be relied upon for its intended use.

Potentially hazardous voltages exist within the receiver/monitor. Any adjustment requiring removal of any portion of the cabinet should be referred to a qualified service technician.

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2.2.3 Cassette. The test tape shall be packaged in a cassette made in accordance with American National Standard for Video Recording—1/2-in Type G—Cassette and Tape, ANSI V98.35M-1983.

2.3 1/2-in Type H Format

2.3.1 Tape Records. The location and dimensions of the video and audio records shall be in accordance with American National Standard for Video Recording—1/2-in Type H Cassette—Records, ANSI V98.32M-1983.

2.3.2 Signal Parameters. The video and audio signals shall be recorded in accordance with SMPTÉ Recommended Practice on Reference Carrier Frequencies, Pre-Emphasis Characteristic and Audio and Control Signals for 1/2-in Type H Helical-Scan Video Tape Cassette Recording, RP 112-1983 (R1988).

2.3.3 Cassette. The test tape shall be packaged in a cassette made in accordance with American National Standard for Video Recording—1/2-in Type H Cassette—Tape and Cassette, ANSI V98.35M-1983.

3. Content of Reference Tape

3.1 Video Information. The video portion shall contain the following scenes:

(a) A color bar signal in accordance with EIA Standard RS-180-A, Encoded Color Bar Signal, as modified by SMPTÉ Engineering Guideline on Alignment Color Bar Test Signal for Television Picture Monitors, ECR 1-1978 (R1983)

(b) A seven-step gray scale signal

(c) Closeups of female and male models for skin tone evaluation and general definition

(d) Selected indoor scenes to show typical indoor color

(e) Selected outdoor scene showing samples of sky, architecture, and human models with outdoor illumination

1. Scope

This practice specifies magnetic video reference tapes for subjective evaluation of receiver or monitor setup, and overall performance of video, and audio derived from 3/4-in Type E and 1/2-in Types G and H magnetic helical-scan tape reproducers. No test instruments are required.

2. Reference Tapes

2.1 3/4-in Type E Format

2.1.1 Tape Records. The location and dimensions of the video and audio records shall be in accordance with American National Standard for Video Recording—3/4-in Type E Helical-Scan—Records, ANSI/SMPTÉ 21M-1986.

2.1.2 Signal Parameters. The video and audio signals shall be recorded in accordance with SMPTÉ Recommended Practice on Reference Carrier Frequencies, Pre-Emphasis Characteristic and Audio and Control Signals for 3/4-in Type E Helical-Scan Video Tape Cassette Recording, RP 87-1986.

2.1.3 Cassette. The test tape shall be packaged in a cassette made in accordance with American National Standard for Video Recording—3/4-in Type E Helical-Scan—Cassette, ANSI/SMPTÉ 22M-1986.

2.2 1/2-in Type G Format

2.2.1 Tape Records. The location and dimensions of the video and audio records shall be in accordance with American National Standard for Video Recording—1/2-in Type G Cassette—Records, ANSI V98.34M-1981.

2.2.2 Signal Parameters. The video and audio signals shall be recorded in accordance with SMPTÉ Recommended Practice on Reference Carrier Frequencies, Pre-Emphasis Characteristics and Audio and Control Signals for 1/2-in Type G Helical-Scan Video Tape Recording Cassette Systems, RP 119-1981.

Revision of RP 96-1983
Approved June 14, 1988

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If you are using a receiver, adjust its fine-tuning control to minimize picture noise. The black in the top row right bar should match the long horizontal black bar dividing the upper and lower rows, and the seven white-to-black bars should all be clearly visible. If they are not, sequentially adjust and touch up the settings of the contrast (picture) and brightness (intensity) controls. In most receivers and monitors, there is interaction between these two controls. If your experimentation does not achieve the proper results, have a technician familiar with the receiver-monitor check out both its circuits and your adjustment procedures. There may also be a problem in the VCR playback electronics requiring adjustment or servicing.

If your picture is now properly adjusted for brightness and contrast, on the upper half of the screen you are now seeing six vertical bars decreasing in light intensity from left to right. If you do not, repeat the Segment 2 adjustment or consult a service technician. Now bring up the color intensity control sufficiently to color all the bars, but not so much as to add picture noise. If you cannot achieve satisfactory or uniform color, there may be a color subcarrier problem in the VCR playback electronics. Consult its manual or your technician for advice.

Now take the blue filter supplied with the cassette and view the picture through it while you make the remainder of the Segment 3 adjustments. If you are using a professional monitor, you may obtain the same results by switching off the red and green guns. In either case, you should now see four light blue bars and three dark bars in the upper two-thirds of your screen. To adjust color intensity, turn up the color control until the two outermost light blue bars exactly match the color and the intensity of the short bars directly below them.

Now adjust the tint control, sometimes called "hue" or "phase," until the two innermost light blue bars exactly match the color and intensity of the short bars directly below them. You may need to repeat this procedure several times to obtain the proper match. When you have achieved the proper settings, set aside the blue filter or, if you have turned off the red and green guns, return them to the "on" position. If your picture contrast, brightness, and color adjustments have been made correctly, all the values in this interior scene should be acceptable for all viewers. Only minor touch up to satisfy personal preferences should be necessary.

The following interior and exterior scenes contain brightness values throughout the full contrast range. High-contrast scenes should be bright, showing good detail. You should be seeing detail in the low-light areas, on the slats in the background shutters, for example. You should also be seeing fine detail in the woman's hair. Should major adjustments be required on one or more controls, either the adjustment procedure must be repeated, or your equipment needs service.

If you have not been hearing music in the background, and your VCR has two audio channels, set your audio channel output switch to the mix position. Music level should be heard under the voice. For the next 15 seconds, the music channel playback will be set at peak operating level, to permit further check out of the distortion and tone quality of your sound system.

Skin tones should appear natural. With the white railing and black-and-white building facades and blue sky, this scene contains the full contrast range.

Segment 5 is a series of test signals and patterns which enable you to check the raster geometry and convergence of your receiver or monitor. This picture should appear uniformly red, the same hue as the red bar in the Segment 3 colorimetry adjustment. If other stationary colors appear on any portion of the screen, screen demagnetization, convergence, or electronics adjustment are required. These dots should appear white in all areas of the screen. If you see significant colored fringes on any dots, convergence adjustment may be required.

The vertical and horizontal lines of the crosshatch pattern should appear sharp and straight and uniformly spaced out to the edges of the screen. Servicing may be required if they are not. However, some sets cannot be adjusted perfectly. A common problem in monitor and receiver performance is horizontal and/or vertical over-scanning. The outline surrounding the words "Safe Title Area" should be centered symmetrically on the screen and well within its edges.

If your picture is properly scanned, you are now seeing all four sides of a larger "Safe Action Area" rectangle. However, some sets do not have adjustment controls for both horizontal and vertical picture size.

This concludes SMPTE Receiver-Monitor Setup Video Cassette No. 3. Duplication is prohibited. For additional copies of this reference tape, call or write SMPTE headquarters.