

SMPTe ENGINEERING GUIDELINE

EG 7-1984

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

Appendix

A1. Centerlines

The centerlines of the image area are given for convenience in interpreting the standard, facilitating such applications as the optical design of equipment and assisting in the understanding of suitable mechanical embodiments related to projectable image area. Note that the centerline of the projectable image area is displaced from the centerline of the film by 0.050 in (1.27 mm) nominal.

A2. Related Standards

ANSI PH22.59-1974 and ANSI PH22.111-1982 define image areas for other important phases of motion-picture operations and are consistent with this standard and with one another under currently acceptable commercial practices.

A3. Image Area for Television

It is recognized that home television receivers are adjusted to show a distribution of picture sizes, ranging downward from the maximum. Guides to picture composition, based upon a statistical survey of receivers in use, are presented in SMPTe RP 27.3-1983. Note that some portion of the audience will see the entire transmitted area, but for certainty in presentation of critical information over broadcast television, such information should be confined to a smaller, central area.

A4. Typical Aspect Ratios for Nonanamorphic Theatrical Projection

For aesthetic and practical reasons, theatrical projection may present 35-mm images in such a manner that the full width of the projectable area is shown but the projected height is less than maximum. Photography designed primarily for theatrical exhibition recognizes this and is composed for the more elongated rectangles. Sev-

eral aspect ratios for the final projected picture are recognized through usage:

Style	Aspect Ratio	Projectable Image Height	
		Inches	Millimeters
A	1.85:1	0.446 Min	11.33 min
A	1.75:1	0.471 ref	11.96 ref
A	1.66:1	0.497 ref	12.62 ref
C	1.37:1	0.602 nom	15.29 nom

In every case, it is intended that the projected area be symmetrically located about the horizontal centerline of the maximum projectable area.

It is recommended that pictures designed to be shown at aspect ratios other than those specified in this standard be so marked in a conspicuous manner. The Universal Leader (described in ANSI PH22.55-1983) provides for aspect ratio identification on frames 6-10.

A5. Image Area on Film

Use of camera aperture dimensions other than those stated in ANSI PH22.59-1974 is discouraged. In particular, the use of "hard matte" with image height on a print of less than 0.602 in (15.29 mm) tends to force de facto acceptance of aspect ratios of 1.85:1 or wider. Film users are reminded that many features composed for a wide screen aspect ratio will be shown later on television. Use of a "hard matte" in the camera or printer will require substantial cropping of the film horizontally when the film is transferred to television, and severely limits use of the print.

Good practice dictates using the 1.37:1 Style A camera aperture of ANSI PH22.59-1974, while composing for the desired theatrical projection aspect ratio. Care should be taken to exclude extraneous items or action from the photographed image area which may show in the television scanned area.

Audio Sync Pulse for 8-mm Type S Cameras, Magnetic Audio Recorders and Rerecording Projectors



1. Scope

This guideline specifies the characteristics of the audio sync pulse for 8-mm Type S cameras and film recorders and for magnetic tape recorders and sound projectors used for transfer of audio records from magnetic tape and film to a magnetic edge stripe on an 8-mm Type S print.

2. Terminology

2.1 Camera and Projector Classes

2.1.1 Class A. Speed controllable (self-resolving)

2.1.2 Class B. Speed uncontrollable

2.2 Sync Signal Phase

2.2.1 Open Shutter Sync. Sync occurs while the shutter is open.

2.2.2 Closed Shutter Sync. Sync occurs while the shutter is closed.

3. Camera Specifications

3.1 Sync Signal. The camera shall provide a sync pulse at frame rate (24 fps nominal) as a voltage pulse, tone burst, or other sync signal.

3.2 Photographic Sync Mark. The photographic sync mark shall be on the edge of the film opposite the sprocket holes and shall be approximately one frame in length.

4. Recorder Specifications

4.1 Location of Sync Signal

4.1.1 Cassette Recorder. The signal shall be located on Track 4 in accordance with IEC and NAB standards for audio-visual cue pulses.

4.1.2 Reel-to-Reel Quarter-Inch Tape Recorders

4.1.2.1 The signal shall be located on Track 3 (right stereo channel) as specified in NAB Standard

Magnetic Tape Recording and Reproducing (Reel-to-Reel), Four-Track Stereophonic Recordings Section.

4.1.2.2 The signal shall be located on Track 4 of the four-channel quadraphonic recorders and stereo recorders with an extra sync head.

4.1.3 Full-Coat Film Recorders. The signal shall be located in the sound record position as specified in American National Standard Position, Dimensions and Reproducing Speed of Magnetic Sound Record on 8-mm Type S Motion-Picture Film, ANSI PH22.164-1982, on recorders using 8-mm Type S full-coat magnetic stock.

4.2 Recorded Signal Level. The signal shall be recorded at 10 dB below the reference level of 185 nWb/m at 315 Hz.

5. Projector Specifications

5.1 Sync Signal. The projector shall provide a sync pulse at frame rate (24 fps nominal) as a voltage pulse or a tone burst.

5.2 Sync Signal Phase. The sync pulse shall be generated immediately following the first shutter opening of a new frame.

NOTE: Socket-Pin Connections. Use of the 8-pin miniature socket (IEC Type 130-9-21) is recommended since it offers enough connections to accomplish all sync camera requirements. The connections shall be:

Pin 1. Camera chassis ground (sync circuit common)

Pin 2. 1/F (1-pulse-per-frame) signal

Pin 3. 1/4F (1-pulse-per-4-frames) signal

Pin 4. Motor circuit, positive speed control

Pin 5. Motor circuit, negative speed control

Pin 6. Tape recorder start/stop normally closed

Pin 7. Tape recorder start/stop insulated common

Pin 8. Tape recorder start/stop normally open

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SMPTE ENGINEERING GUIDELINE

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Projection for Technical Conferences



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1. Scope

This guideline specifies the minimum conditions and parameters for effective presentation of papers at technical conferences.

2. Auditorium

- 2.1 The ambient light shall meet the requirements specified in 3.1.
- 2.2 The room shall be of sufficient dimension to permit an image size large enough to meet the requirements specified in Section 5.
- 2.3 There shall be no obstruction to projection or viewing of the projected image as viewed from the normal seating area.

3. Projection

- 3.1 Ambient Light. The ambient light level in the seating area during projection shall be in accord with local codes and, if needed for note-taking, approximately 54 lx (5 fc).
- 3.2 Stray Light. There shall be no direct stray light from any source or reflection falling on the screen or in direct view to the point that it interferes with viewing the projected image. The ambient light on the screen shall be as low as practicable.
- 3.2.1 Entrance to the projection area shall be masked to prevent stray light from falling on the projection screen and other disturbances.
- 3.3 House Lights. House lights shall be controllable by the projectionists.

4. Projected Image

- 4.1 Luminance Level. The luminance at the center of the screen shall be $55 \pm 7 \text{ cd/m}^2$ ($16 \pm 2 \text{ fL}$) for all motion-picture formats.
- 4.1.1 The luminance of the projector shall not be increased to overcome ambient light to the point of objectionable flicker.
- 4.2 Luminance Distribution. The image shall be free of hot spots. Illumination at the edges shall be within 75% of that specified in 4.1.

4.3 Slides. Slides shall be projected at an image light level (center) of at least 35 cd/m^2 (16 fL) or approximately 60 times the ambient light level on the screen, whichever is higher. (See Appendix A4.)

4.4 Steadiness. The image shall have vertical and horizontal steadiness better than 0.25% of image height (see Appendix A1), as per SMPTE Recommended Practice on Method of Determining the Degree of Jump and Weave in 70-mm, 85-mm and 16-mm Motion-Picture Projected Images, RP 105-1981.

4.5 Matched Projection. In presentations requiring matched projection for product comparisons, the brightness shall be matched to within $\pm 7 \text{ cd/m}^2$ ($\pm 2 \text{ fL}$) and color to within an 05 CC color-correcting filter. Distribution of light for each projector shall be matched.

4.6 Color Temperature. With no film or slide in the gate, the color temperature of the light reflected from the screen shall be $5400 \text{ K} \pm 400 \text{ K}$, the use of a xenon short-arc lamp being assumed.

4.7 Image Quality. Using appropriate test films for evaluation, resolution shall be at least 56 lines per millimeter in the center and 48 lines per millimeter at the edges of the projected image for both slides and motion pictures. The image shall be essentially free of obvious optical defects such as color fringing, geometric distortion, etc. (See SMPTE RP 105-1981.)

5. Image Size

- 5.1 Picture height shall be the same for all formats. For normal presentation a 1.37:1 aspect ratio is preferred for motion pictures. (See American National Standard for Motion-Picture Film (35-mm)—Projectable Image Area—Motion-Picture Prints, ANSI PH22.195-1984, Style C; and Dimensions of Projectable Image Area on 16-mm Motion-Picture Film, ANSI PH22.8-1981.)
- 5.2 Seating areas shall be within a distance of 5 ± 3 picture heights from the screen.

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5.3 Slide projection shall be set up assuming horizontal slides ($24 \times 36\text{-mm}$ image area) in 2-in square mounts.

5.4 Keystone distortion shall be kept to a minimum and in no case shall the projection axes be more than 10° off center.

5.5 The screen, when illuminated by white light from the projector, shall show no visible defect due to seams, wrinkles, scratches, discolorations, etc.

6. Equipment

6.1 Projection equipment shall be operable throughout the conference period.

6.2 The equipment shall not generate objectionable noise or interfere with the speaker (see 6.5).

6.3 Projection equipment shall be installed so as to block the least number of seats. Sufficient clearance shall be provided so that no shadows will be cast onto the screen.

6.4 Projection equipment preferably shall be installed in a permanent projection booth.

6.5 If installation in a permanent projection booth is impracticable, projection equipment shall be installed behind the rear-most seats. In such a case, the projection equipment and operators shall be shielded from the audience by a suitable sound and light baffle or heavy drapes. An over-tread projector may be operated by the speaker in front of the audience.

6.6 Slide projectors shall be activated by remote control if requested by the speaker.

6.7 A projected-light pointer shall be available to the speaker.

Appendix

(The Appendix is not a part of this SMPTE Engineering Guideline, but is included for information purposes only.)

A1. All specifications given in this guideline are in accordance with the following documents:

- American National Standard Screen Luminance and Viewing Conditions for Indoor Theater Projection of Motion-Picture Prints, ANSI PH22.195-1978
- SMPTE Recommended Practice on Color and Luminance of Review Room Screens for Viewing Motion-Picture Materials Intended for Slides or Film Strips, RP 59-1975 (R1980)

A2. The presentation of papers at conferences should be considered as a remote production. The responsibility for the overall production should be assigned to a director or producer to ensure that a professionally coordinated presentation is realized. In addition, it is recommended that

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6.8 Temporary wiring and installation for control, sound, or power service shall be installed in accordance with local codes, and shall be positioned and mechanically and electrically protected with regard to the safety of those in the room.

6.9 Prior to the papers session, all projection equipment shall be correctly aligned and checked using the appropriate test materials to ensure the correct sound levels, aperture plates, light levels, etc.

6.10 Signal lights shall be used by the chairman to notify the speaker two minutes before and at the end of his allotted time.

6.11 The number of the paper being given shall be displayed both inside and outside the auditorium.

6.12 Television monitors shall be located along the left- and right-hand sides of the seating area, and shall be positioned so they are not hidden by a standing person or block the speaker from view.

6.12.1 Color monitors capable of accepting a base-band video signal are preferred over RF-only receivers. Combination monitor-receivers are the most desirable choice. Color monitors shall be set up and matched according to applicable standards for color, brightness, etc.

6.13 Two-way communication by telephone or headset should be provided between the projectionist and the session chairman and speakers' lounge.

7. Projectionists

An appropriate number of qualified projectionists shall be available as may be needed for each technical session.

a qualified technical supervisor be assigned to assemble a professional crew to undertake the setup, testing, and operation of the audio-visual facilities.

A3. Test films suitable for checking the parameters specified in this guideline are available from the Society of Motion Picture and Television Engineers.

A4. By maintaining the same brightness for all formats, including slides, photography of the screen by the audience is simplified and adaptation is less of a problem.

A5. Slide projectors in the speakers' lounge shall represent the exact type being used in the projection area to prevent incompatibility with trays or other slide carriers.