# Standards and Recommended Practices

### Approved SMPTE Recommended Practices

The Society's Executive Committee for Standards Approval approved two SMPTE Recommended Practices: RP 152-1989, Edge Identification of Leader and Picture for 35-mm Release Prints; and RP 153-1989, Method for Measuring 35- and 70-mm Shutter Efficiency. These and other SMPTE Recommended Practices may be obtained from Society Headquarters for $3.00 each.

### Proposed SMPTE Engineering Guideline

Published here for a trial period and public review is Proposed SMPTE Engineering Guideline EG 23, Transfer of Two-Channel Stereo Audio from Audio Magnetic Film or Tape to Video Tape. The proposal will be submitted to the Society's Executive Committee for Standards Approval if no adverse comments are received from publication. Comments should be addressed to Sherwin H. Becker at Society Headquarters prior to July 1, 1990.

### Proposed Withdrawal of SMPTE Recommended Practice

On the recommendation of the Committee on Television Recording and Reproduction Technology, the Standards Committee has approved withdrawal of SMPTE Recommended Practice RP 57-1974 (R1985), Vertical Interval Reference (VIR) Signal, which was published in the January 1975 issue of the *Journal*. Withdrawal has been initiated because the practice is not used and is invalid for helical VTRs. Comments should be addressed to Sherwin H. Becker at Society Headquarters prior to July 1, 1990. All comments from *Journal* publication will be reviewed prior to submittal of the proposed withdrawal to the Society's Executive Committee for Standards Approval.

### Withdrawn SMPTE Recommended Practice

Withdrawal of an SMPTE Recommended Practice was approved by the Executive Committee for Standards Approval on February 10, 1990: RP 126-1984, Dimensions of Photographic Control and Data Records on 35-mm Motion-Picture Film Perforated 8-mm Type S (1-3-5-7-0) and on 16-mm Motion-Picture Film Perforated 8-mm Type S (1-3) and (1-4). Withdrawal was approved because the practice is not used.

— *Sherwin H. Becker, Director of Engineering*

# SMPTE RECOMMENDED PRACTICE — RP 152–1989

## *Edge Identification of Leader and Picture for 35-mm Release Prints*



1. *Scope*

This practice specifies the content and location of information to appear on the edge of 35-mm release prints. As continuous platters become more prevalent, projectionists sometimes fail to resplice the leader on the appropriate reel, or resplice it on the incorrect reel. This practice provides enough information in the program area for independent reel identification and to identify the type of sound track on the print.

2. *Identification*

2.1 Content. The identification shall include at least the title of the program, the type of sound track, and the specific reel number. Inclusion of the projection aspect ratio is desirable.

2.2 Location. The identification shall appear at least twice on each reel of the release print:

In the program, 6 to 8 feet after the head leader

*In the program, 6 to 8 feet before the tail leader*

A similar identification shall appear in the leader on each reel of the release print.

The identification shall appear between the perforations and the edge of the film on the soundtrack side of the release print, as shown in Fig. 1.

3. *Laboratory Procedure*

The processing laboratory shall place the identification as described in 2.1 and 2.2 on the soundtrack negative before printing (see Fig. 2). The information is then printed on every reel during the release printing operation. In the event that a laboratory has some other system in current use (such as color coding), it is recommended that the marking as indicated in this practice be added.



*Approved November 3, 1989*





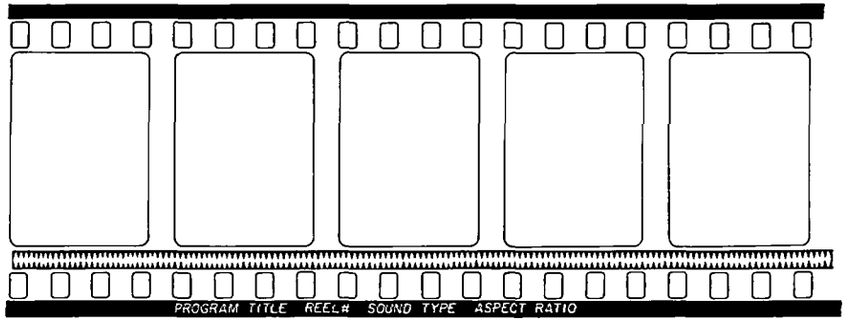


**Fig. 1**
**Release Print**

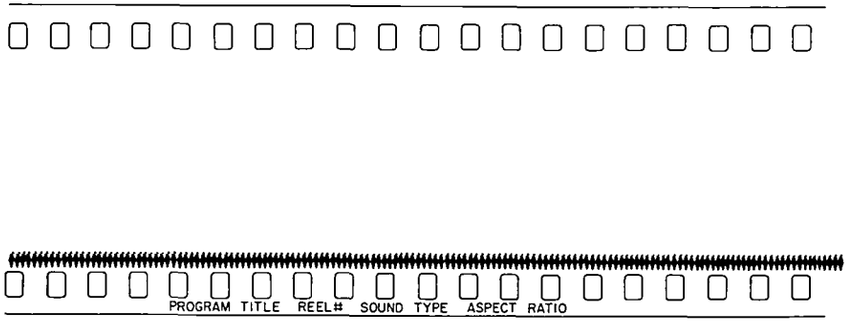


**Fig. 2**
**Sound-Track Negative**

# SMPTE RECOMMENDED PRACTICE — RP 153-1989

## *Method for Measuring 35- and 70-mm Shutter Efficiency*

1. *Scope*

This practice specifies the method and factors to be considered when measuring and reporting the comparative shutter efficiency (remaining useful light) of 35- and 70-mm projectors.

2. *Purpose*

The purpose of this practice is to provide guidelines for the evaluation of projector shutter performance, either in an operating movie theater or in a test laboratory.

3. *General Method*

The general test method is to arrange test equipment for light measurements and take two readings in each point of the pattern described in 5.2, the first with the shutter in normal operation and the second with the shutter stationary in the full open position.

4. *Test Instruments*

4.1 The meters employed must be linear over the range of the readings to be taken, and not sensitive to shutter frequency.

4.2 In a theater, the usual test equipment is a precision foot-lambert meter which is calibrated.

4.3 In a test laboratory, the usual test equipment is a precision foot-candle meter which is calibrated.

5. *Test Set-Up and Pattern*

5.1 The test instrument described above is to be mounted in a fixed manner; i.e., the foot-lambert meter should be on a sturdy tripod, or the foot-candle meter mounted in a fixed mount or pole so that the test location of the reading is identical in the two cases specified in Sec. 3.

5.2 The test pattern should be the nine-point group as specified in American National Standard for Audio-Visual Systems — Front Projection Equipment — Method for Measuring Screen Illumination. ANSI PH7.201-1983 (R1988). This is recommended so that efficiency in different, but important, regions of the screen can be determined.

6. *Calculations*

6.1 Test readings are to be taken at each of the nine points, first with the shutter fixed open (see Appendix A2), and then immediately with the shutter in normal running condition.

6.2 Divide the second reading for each point (shutter running) by the first reading for the same point (shutter fixed open). The result is a percentage of shutter efficiency for that point. The nine points must be considered separately, so that variations can be found. For simplicity, the nine readings can be averaged completely, or into three groups — the left three, the center three, and the right three — and reported as an average percentage of shutter efficiency.

### Appendix

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

A1. With standard and generic projector shutters functioning in the 50% range (two-bladed shutters), it is expected that all results will fall in the range of 40 to 60%. Results over 55% and below 45% should be considered suspect and be double-checked.

A2. Note that operation of a projector without film in the gate and with the shutter in a stationary open position may allow sufficient heat build-up in the lens system to endanger the lens. Therefore, it is recommended that this condition be allowed for only a few seconds at a time, and that measurements be made very quickly under such conditions.



*Approved November 3, 1989*

# PROPOSED
# SMPTE ENGINEERING GUIDELINE — EG 23

## *Transfer of Two-Channel Stereo Audio from Audio Magnetic Film or Tape to Video Tape*



1. *Scope*

1.1 This guideline specifies the handling of volume range issues when transfering two-channel stereo audio from 35-mm or 16-mm magnetic film, or other audio tape formats utilizing time-code based methods of synchronization, to any video recording media.

1.2 Among the volume range issues are both objective and subjective ones, including:

Most end users will usually adjust loudness so that dialog is reproduced at a normalized level (despite how loud or soft other parts of the program may be) for best intelligibility.

Dubbing stages and monitor theaters are often operated at higher reference sound pressure levels than the end video consumer will use.

Commercials may well be intercut with program material, creating the potential for abrupt level changes among video sources.

Many of the video formats have reduced audio dynamic range capability when compared to magnetic audio-only masters.

Video transmission involves at least a 75 μs pre-emphasis network in the transmitter, and often much more nonstandardized audio signal processing, which has an impact on the volume range relationships within the program material.

1.3 The guideline also specifies certain labeling requirements for audio masters.

2. *References*

ANSI/SMPTE 20M-1985, Video Recording — 1-in Type C Recorders and Reproducers—Frequency Response and Reference Level

SMPTE RP 150-1988, Channel Assignments and Test Leader for Magnetic Film Masters Intended for Transfer to Video Media Having Stereo Audio

SMPTE EG 9-1985, Audio Recording Reference Level for Post-Production of Motion-Picture Related Materials

3. *Definitions*

Volume Range: The range along an intensity scale occupied by pragram material; volume range is taken to be from the highest peaks of the program to the lowest signal intended to be audible.

Dynamic Range: The range along an intensity scale of which a medium is capable; measured from a maximum point of stated distortion to a background noise level. Dynamic range varies frequency-by-frequency, but is often expressed as a single number from the mid-band defined distortion level to the psychoacoustically weighted noise level, e.g., "the dynamic range was 72 dB (3% THD to CCIR-ARM noise)."

4. *Identification*

4.1 The audio film or tape shall be clearly marked with the title and reel number of the program and identified as a two-channel stereo recording. If the medium is capable of more than two audio records, then the channels containing the left and right audio master information shall be indicated.

4.2 If proprietary noise-reduction companding is employed on the master, the type of noise reduction, and, if required, the reference fluxivity for setting the operating point of the noise reduction system, shall be indicated.

5. *Use of Noise Reduction*

5.1 If the program material has been encoded for a proprietary companding noise-reduction system, then corresponding noise reduction decoders must be engaged. If external to the video recorder, such decoders shall be included in the signal path immediately after the audio film or tape playback preamplifier, and before any other audio signal processing.

5.2 If the video master is to employ external noise-reduction *encoding*, then the noise reduction encoder shall be included in the signal path after all other audio processing, immediately before the video recorder.

6. *Reference Levels and Their Usage*

6.1 Reference fluxivity for film masters is given in SMPTE EG 9-1985 as 185 nWb/m. Reference fluxivity for 1-in C-format video tape is given in ANSI/SMPTE 20M-1985 as 100 nWb/m. Reference fluxivity on tape masters may range from 185 to 320 nWb/m, depending on the practice of the studio making the master and so must be indicated on the label. Even though reference fluxivity on tape masters may range from 185 to 320 nWb/m, the peak level used for program material is usually within a smaller range, since metering practice (vu vs peak) dictates that vu meters are used with lower reference levels, and peak meters with higher ones.

6.2 Normal practice is to set the audio reproduction and recording chain gain structure such that the reference fluxivity used in the source medium is copied to the reference fluxivity of the recording medium. For media wherein reference fluxivity does not apply as a level-determining mechanism, such as ½-in "hi-fi" recording by way of audio on FM carriers on the video tracks, a combination of setting the level using meter readings on the recorder while playing the source material, and sample recordings, are the best way of determining the correct recording level.

6.3 If the video recorder has a compressor or limiter as a part of its circuitry, the compressor or limiter should be switched off, if possible.

7. *Need for Volume-Range Reduction*

7.1 The combination of the subjective and objective factors given in the scope often leads to the need for reducing the volume range of source material, when copying from audio masters to video tape.

7.2 Measurements of contemporary magnetic film and 1-in video tape on recorders set to all the relevant standards show video tape to have 8 dB less headroom for equal distortion to magnetic film at 200 Hz, but equal headroom at 10 kHz. In addition, video tape is some 10 dB noisier in the psychoacoustically important 2-3 kHz region.

7.3 Differing conditions outlined in the scope lead to a range of solutions, so that no one set of rules can be developed. On the other hand, examples can be given for various transfer conditions, and are shown in the next section. General principles are:

It is important to monitor the program under conditions as like those as encountered by the final user as possible, so that volume range judgments are not obscured by other factors. These conditions include reference sound pressure level and frequency response of monitoring, background noise level of the listening room, choice of stereo vs monaural monitoring, and the like.

It is important to monitor the *output* from the recording media, rather than simply its input, to check the generation loss due to the transfer process. If the recorder does not provide playback off the tape simultaneously while recording, then a sample recording should be synchronized to the audio master, and A/B compared.

Limiting may be preferred to compression as producing the better artistic representation of the program material on the recording medium (i.e., limiting can have fewer audible side effects than compression). The amount of limiting is usually kept to the range of about 6 dB on the peaks of program.

8. *Examples*

8.1 *Problem:* A 35-mm magnetic master intended for transfer to a stereo optical track of a theatrical motion picture is to be transferred to 1-in C-format video tape for playback on commercial television. The picture is action-oriented, containing loud sound effects and music.

*Discussion:* There are a number of factors stated in the problem that influence the amount of volume range modification necessary:

The fact that the master has been prepared for transfer to optical film means that the volume range has probably already been limited, since conventional optical tracks have less dynamic range than do magnetic ones.

The statement that the picture contains loud sound effects and music implies that the dialog level is relatively low, compared to the maximum levels, for this example.

The reference sound pressure level in motion-picture theaters has been observed to be about 6 dB greater than that used by the majority of listeners in the home environment.

The statement that the program will be played over commercial television means that low dialog level will be much more noticeable than if there were no commercials, since listeners will adjust the volume for a normalized level of dialog during the program, and if the program dialog level is low, will find the commercials too loud.

The first factor implies little volume-range modification is necessary, but, on the other hand, the other three factors, especially taken together, call for a reduction of the volume range.

*Solution:* Use a limiter set so that the program peaks cause 6 dB of limiting.

8.2 *Problem:* the same master as in 8-1 is to be transferred to a wide dynamic range digital recording for use as a running master in duplicating ½-in "hi-fi" format video tapes.



*Discussion:* The emphasis in maintaining the full dynamics of the master are more important for the "hi-fi" part of the market than they are for commercial television, due to the rising popularity of home use of VCRs with attached stereo audio systems. The use of a wide dynamic range running master is essential since the dynamic range performance of the "hi-fi" recording is greater than that of 1-in C-format video tape, even if noise reducing companding is employed on the video tape.

*Solution:* Use no limiting or compression to make the running master. (Note: It may be necessary for the *duplicator* to employ compression or limiting of the signal sent to the conventional longitudinal track, if both the "hi-fi" and conventional tracks are to be optimized simultaneously.)

8.3 *Problem:* A monaural DME (having dialog, music and effects on separate channels of a 3-track magnetic film) is to be transferred to ¾-in video tape. The program material is a documentary in which narration is the loudest part of the program.

*Discussion:* Despite the probable low volume range of the original, some limiting may be necessary due to the low audio dynamic range of the ¾-in video medium compared to the audio film source.

*Solution:* Use a limiter with a maximum gain reduction of about 6 dB.