

SMPTE Universal Leader

While the Universal Leader includes a number of new features, the Subcommittee considered and included the majority of the features of the Society Leader required to permit well-established laboratory and theater projection practices to be followed and at the same time meet the requirements of television film projection.

Major changes, incorporated in the Universal Leader are as follows:

(1) timing or count-down in seconds at 24-frame/sec running speed vs. the present 16-frame, $\frac{2}{3}$ -sec spacing;

(2) introduction of a continuously moving wedge to denote the passage of time;

(3) reduction of the flash at each second, leaving enough to satisfy the projectionist yet reduced to prevent instability in telecine projection;

(4) a reduction in the count-down from the existing 11 to 3 to the proposed new 8 to 2, the latter representing seconds at sound speed running time — the new numbering, by deleting the numeral 9, eliminating the necessity of spelling out nine and six;

(5) use of slightly redesigned 35mm and 16mm sound cues that are more likely to receive international acceptance;

(6) provision of space in the synchronizing section (*C F frames 141 to 146 inclusive*), which may be removed, if required, and replaced by a similar number of Control Frames to provide accurate framing information, technical checking frames or duplicated test frames of the black-and-white or color frames to follow in the "Picture" section;

(7) inclusion of 35mm and 70mm magnetic cue positions;

(8) provision of three successive frames, marked Head, O, and Picture, to guide the printing machine operator when threading up in the darkroom; (The

DOT (O) is his printer start sync mark. Using this as his cue he punches his raw stock and threads on the DOT (O). Later when tracking the sound, he uses the DOT (O) on the sound leader to sync on the same punched hole in the raw stock. The word *Head* before the DOT (O) and the word *Picture* after the DOT (O) provide immediate recognition that he is printing the picture negative from the head end. A similar cue, marked Picture, O, Foot, is provided in the identification section of the trailer.)

(9) retention of the former Small Switching Cue as an indication to a cutter when a particular leader has been used too often, resulting in excessive loss of frames due to splicing; and

(10) addition of a series of X's and O's on separate frames and on opposite sides of the film to provide print-through cues for sound.

Other Considerations

Although it was not to become a part of the leader, in order to standardize on the seconds basis, the spacing of the motor and changeover cues has been reduced from the present 172 frames to 168 frames or 7-sec running time. The Subcommittee had hoped to reduce the changeover cue to 5 sec but yielded to pleas for more time to permit older machines to reach stable operating speeds.

The new Leader should not be difficult to print since the densities of the various sections will prove satisfactory if they approximate those suggested in the standard. No attempt has been made to include accurate framing information as this can be spliced into the control-frame section.

Consideration was given to the difference between American and European television film standards. The one-frame difference in projection speed, 24 frames/sec vs. 25 frames/sec, was not

resolved and it does not appear to be too important.

The length of the new leader has been kept the same as the old one to avoid errors in printing and sound cuing and to permit operators to continue to use well-established practices. The requirements of TV projection alone would have permitted the use of a considerably shorter leader and the immediate development of a short leader for short television commercial spots is recommended.

Acknowledgments

Special thanks are due to C. L. Townsend for his helpful comments on the development of the Society Leader in 1951, and to Edward H. Reichard of Consolidated Film Industries. Mr. Reichard, as the representative of the Laboratory Practice Committee, worked very closely with our Subcommittee and, in cooperation with CFI, produced a number of prototypes of the leader for the Subcommittee and field evaluation. Appreciation is extended also to the Chairman and representatives of the Film-Projection Practice, Laboratory Practice, Television and Standards Committees. Many modifications in the new leader are based on suggestions offered by the Television Film Association and its president, John Ballinger, and the late George Lewin of the Army Pictorial Center.

Subcommittee

| | |
|------------------------------------|-----------------------|
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Proposed American Standard

Proposed American Standard Specifications for Leaders and Cue Marks for 35mm and 16mm Sound Motion-Picture Release Prints, PH22.55, is published here for a trial period and public review. Comments should be addressed to Alex E. Alden, Staff Engineer, at Society Headquarters prior to March 1. If no adverse criticism is received by that date, the proposed standard will be submitted to ASA Sectional Committee PH22 for further processing.

This proposal is a complete revision of the 1947 issue, which described the Academy Leader. The Universal Leader specified represents the culmination of many years of diligent effort to design a leader which would satisfy both television and motion-picture requirements. Unanimous approval by four SMPTE Engineering Committees, Film-Projection Practice, Laboratory Practice, Television, and Standards, attests to the successful accomplishment of the task.—A.E.A.

Leaders and Cue Marks for 35mm and 16mm Sound Motion-Picture Release Prints

PH22.55

Revision of
Z22.55-1947

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1. Scope

This standard specifies the make-up or assembly of leaders and cue marks for 35mm and 16mm sound motion-picture release prints for use in both motion-picture theaters and television studios.

2. Reduction Ratio

The reduction ratio in the production of the head and foot leaders from 35mm motion-picture film shall be in accordance with American Standard 16-Millimeter Positive Aperture Dimensions and Image Size for Positive Prints Made from 35-Millimeter Negatives, PH22.46-1946 (Reaffirmed 1959).

3. Orientation of Words and Numerals

3.1 Orientation and dimensions of letters and numerals in this standard are with respect to 35mm motion-picture film and are modified proportionally for 16mm prints in accordance with Section 2.

3.2 The third, fourth, and fifth frames of the identification sections containing the title of the film and reel number shall be printed in white letters on a black background so that they are read normally when the reel is uppermost and the leading end or head of the film hangs down ready for threading.

3.3 The words "Type of Sound," "Aspect Ratio," "Picture Title," "Company," "Series," "Reel No.," "Prod. No.," and "Play Date" shall be printed lengthwise with the film in black letters on a white background.

3.4 In sections where information is to be printed lengthwise with the film, light framelines shall be included and all such printing must be placed within the outlined areas so that it can be read on 16mm reduction prints.

3.5 In the trailer (foot leader), the title of the film and the reel number shall be printed so that they appear inverted when the remainder of the reel is uppermost and the film hangs downward as in projection.

4. Head Leader (See Fig. 1)

4.1 Protective Section. The protective section of the 35mm leader shall consist of 8 feet of transparent or raw stock; for 16mm leader, 3¼ feet. When the protective leader has been reduced to a length of 6 feet for 35mm film or 2½ feet for 16mm film, it is to be restored to its original length.

The last frame of this section contains the words "Splice Here" and an arrow pointing to the frameline between this frame and Frame 1 of the identification section. The letters should be at least ⅞ inch high.

4.2 Identification Section. The identification section of the leader shall be 42 frames in length. The frames may be of the 4 x 3 format or of a reduced height.

4.2.1 Since many types of film may be used for leaders, exact densities have not been specified. For the purpose of this standard, the following approximate densities are suggested:

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|------------------------|------|
| White or low density | 0.35 |
| Gray or medium density | 0.65 |
| Black or high density | 1.95 |

4.2.2 The identification section, when viewed as specified in 3.2, shall be made up as follows:

Frames 1-2—Black.

Frame 3—The printed word "Subject" with letters ⅞ inch high at top of frame in upright position, white on black background (4 x 3 format).

Frame 4—The printed word "Length" at top left side of frame and the printed word "Roll" at center of frame on left side. Lettering to be comparable to that in Frame 3 (4 x 3 format).

Frame 5—The printed words "Reel No." at top left side of frame and printed word "Color" at center of frame on left side. Lettering, read upright, to be comparable to that in Frame 3. At bottom of frame printed word "Picture" ⅞ inch high.

Frames 6-10—Five frames of black with light framelines on which the words "Aspect Ratio" and "Type of Sound" are plainly printed lengthwise with the film in ⅞ inch high white letters. Each group of words starting in the 10th frame and in two separate lengthwise lines reading through base of film from left to right with head end of film at right.

Frame 10—Four letter O's vertically in line and opposite the sound track area approximately ⅝ inch from the 35mm camera aperture centerline opposite the sound area. Letters to be ⅞ inch high and ⅞ inch wide, white on black background (4 x 3 format).

Frame 11—The printed word "Head" not less than ⅜ inch high in inverted black letters on white or low-density background.

Frame 12—A ⅛-inch diameter black dot in center of 4 x 3 format. White or low-density background with narrow black framelines.

Frame 13—The printed word "Picture" not less than ⅜ inch high in inverted black letters on white or low-density background.

Frames 14-15—Two frames in which the words "SMPTE Universal Leader" shall be printed. Letters to be not less than ⅞ inch high. Inverted white letters on a black background (4 x 3 format).

Frame 16—Four letter X's vertically in line adjacent to sound track area approximately ⅝ inch from the 35mm camera aperture centerline toward sound area. Letters to be ⅞ inch high and ⅞ inch wide, white in black background (4 x 3 format).

Frames 17-18—Same as Frames 14-15.

Frames 19-26—Eight frames of black with light framelines on which the words "Reel No.," "Prod. No.," and "Play Date" are printed lengthwise with the film in ⅞ inch high white letters in Frame 20. In Frame 26, on three lines lengthwise, reading left to right through film base with head of leader to right, the words "Picture," "Company," and "Series," using the same format as that in Frame 20.

Frames 27-42—Sixteen frames of part titles are to be inserted here. In each frame (1) the reel number (Arabic numeral not less than ¼ of frame height) and (2) the picture title shall be printed in black letters on a white background. If part titles are not available, these frames should be black of medium density with narrow framelines.

4.3 Synchronizing Section. The synchronizing section of the leader shall be 218 frames in length.

4.3.1 The cross-hair lines shall be black and the two large circles shall be white. Seconds count-down numerals shall project right side up.

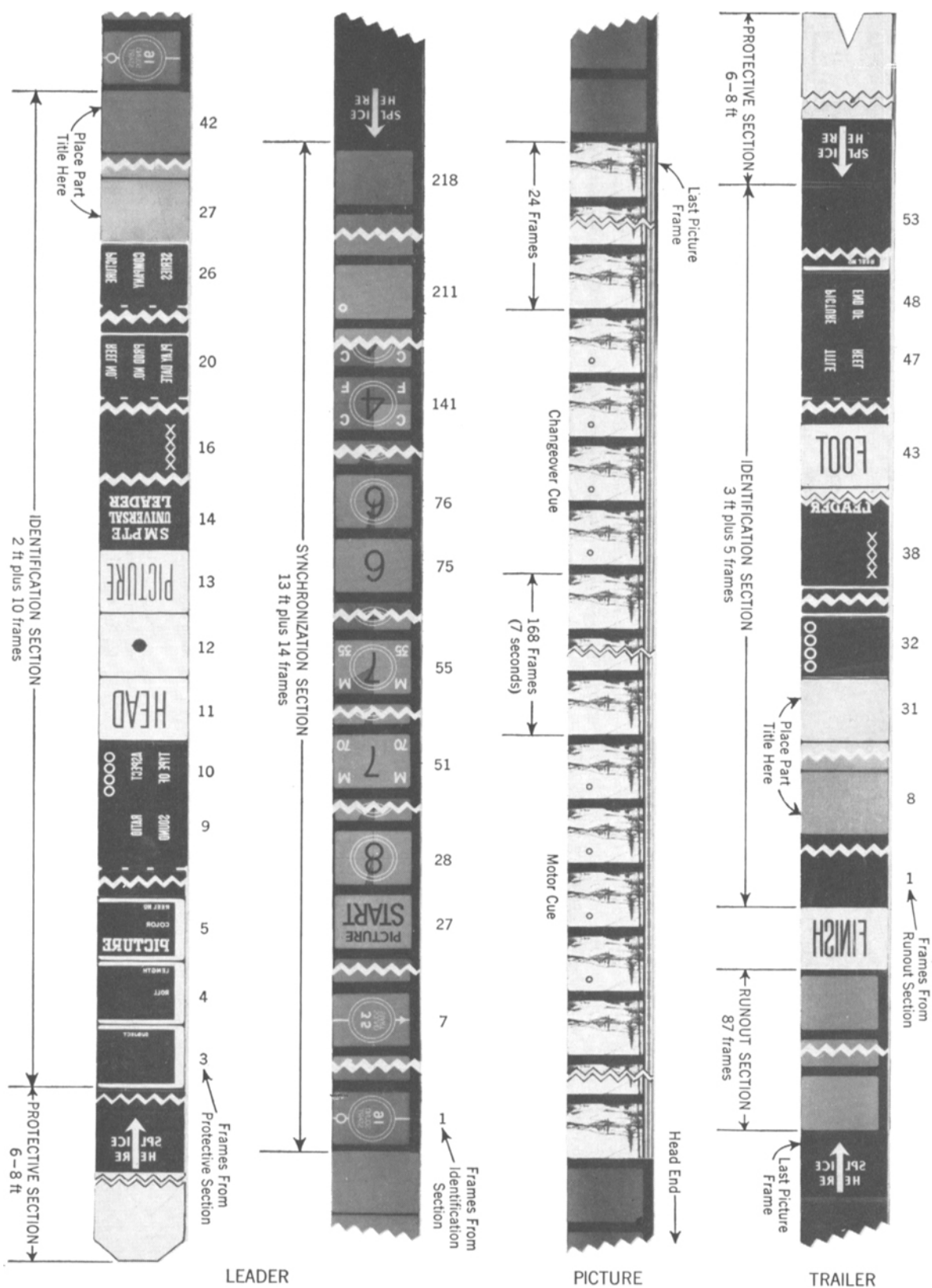


Fig. 1. Figure shows 35mm film with sound track on right edge as seen from the light source in the projector. The sound track is on the left edge of 16mm film.

4.3.2 The synchronizing section, when viewed as specified in 3.2, shall be made up as follows:

Frame 1—The 16mm sound start indication shall be printed in white letters on a medium-density background as shown in Fig. 2.

Frames 2-6—Five frames of medium density.

Frame 7—The 35mm sound start indication shall be printed in white letters on a medium-density background as shown in Fig. 3.

Frames 8-16—Nine frames of medium density.

Frame 17—The 16mm sound indication shall be printed similar to Frame 1, except that the word "Start" is eliminated.

Frames 18-22—Five frames of medium density.

Frame 23—The 35mm sound indication shall be printed similar to Frame 7, except that the word "Start" is eliminated.

Frames 24-26—Three frames of medium density.

Frame 27—The words "Picture Start" shall be printed in black on a low-density background, the letters in the word "Picture" to be not less than 1/8 inch high and in "Start" not less than 1/4 inch high.

Frame 28—The start of the visual count-down, in seconds, commences with the figure "8" in black within a circle of low density on an over-all low-density background with a 15-degree wedge of medium density on the right of top center, as projected. In each succeeding frame, the wedge increases in 15-degree steps, moving clockwise when projected. See Fig. 4.

Frame 33—The 16mm sound indication shall be printed replacing the numeral in this frame which otherwise retains the wedge. See Fig. 5.

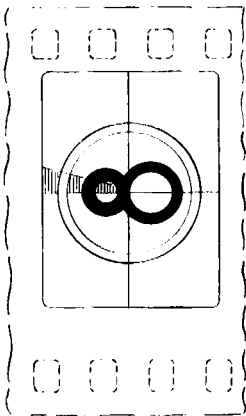


Fig. 4. Start of Visual Countdown.

NOTE: Section within frame lines as seen when projected.

Frame 39—The 35mm sound indication shall be printed replacing the numeral in this frame which otherwise retains the wedge.

Frame 50—All background, except for a 15-degree wedge at the top left center, is of medium density.

Frame 51—The numeral changes to "7" in black on a low-density background. On each side of the "7," there shall be in letters 1/8 inch high, white on a low-density background, "M" and "70" vertically to indicate 70mm magnetic sound start.

Frame 52—The wedge again appears.

Frame 55—The white "M35" appears in the same format as the "M70" appears in Frame 51.

Frames 56-140—The sequence of numerals marking the seconds of film running time at 24 fps (frames per second) continues to Frame 140.

Frames 141-146—The moving wedge and numeral appear on Frames 141-146 but with the addition of the Gothic letters "C" and "F" on the

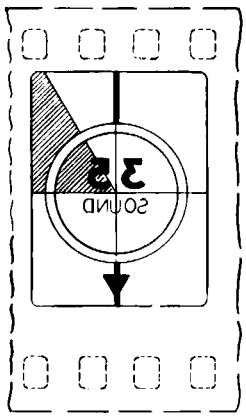


Fig. 5. 16mm Sound Identification frame.

NOTE: Section within frame lines as seen when projected.

left- and right-hand side of the circle, respectively, to indicate the position in the leader where one to six frames may be removed and a similar number of control frames spliced in.

Frames 147-170—The sequence of numerals and moving wedge marking the seconds of film running time continues through to Frame 170.

Frame 171—The numeral "2" in black on a low-density background appears ending the visual count-down.

Frames 172-210—Thirty-nine frames of diffuse density 1.0 to 1.2 maximum.

Frame 211—A single transparent dot shall be located as specified in 5.2.

Frames 212-218—Seven frames of diffuse density 1.0 to 1.2 maximum.

4.3.3 One additional frame follows with the words "Splice Here" and an arrow pointing to the frameline between Frame 218 and this frame. The letters should be at least 1/8 inch high.

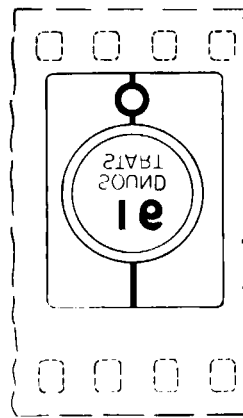


Fig. 2. 16mm Sound Start Identification Frame.

NOTE: Section within frame lines as seen when projected.

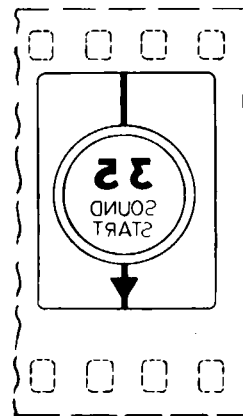


Fig. 3. 35mm Sound Start Identification Frame.

NOTE: Section within frame lines as seen when projected.

5. Picture Section (See Fig. 1)

5.1 Picture. It is recommended that picture action start and finish on fades wherever possible. Otherwise, significant sound should be kept at least five feet for 35mm prints and two feet for 16mm prints from the start and finish of the picture.

5.2 Motor Cue. The motor cue shall consist of an opaque circular dot with a transparent outline or a transparent circular dot with an opaque outline, printed from a 35mm negative which has had four consecutive frames punched with a die 0.094 inch in diameter. The position of this cue mark for release prints with aspect ratios up to 1.85:1 shall be as shown in Fig. 6. The position of the cue mark for release prints with aspect ratios from 2.35:1 to 2:1 shall be as shown in Fig. 7.

Following the four frames containing the motor cue, there shall be 168 frames, or seven seconds running time, to the beginning of the changeover cue.

5.3 Changeover Cue. The changeover cue shall consist of four frames containing circular dots of the same dimensions and position on the frame as those in the motor cue.

Following the four frames of the changeover cue, there shall be 24 frames, or one second running time, to the beginning of the runoff section of the trailer.

6. Trailer (Foot Leader) (See Fig. 1)

6.1 Additional Frame. One additional frame follows with the words "Splice Here" and an arrow pointing to the frameline between the picture section and the trailer. The letters should be at least 1/8 inch high.

6.2 Runout Section. The runoff section of the trailer shall consist of 88 frames, 87 of which are to be of diffuse density 1.0 to 1.2 maximum. Frame 88 shall have the printed word "Finish" not less than 3/8 inch high in upright black letters on white or low-density background.

6.3 Identification Section. The identification section of the trailer shall consist of 53 frames.

6.3.1 The identification section shall be made up as follows:

Frames 1-7—Seven frames of black opaque without framelines.

Frames 8-31—Twenty-four frames of part titles are to be inserted here. In each frame (1) the end of reel, (2) the reel number (Arabic numeral not less than 1/4 of frame height), and (3) the picture title shall be printed in black letters on a white background. If part titles are not available, these frames shall be blank of medium density with narrow framelines.

Frame 32—Four letter O's vertically in line and opposite the sound track area approximately 3/8 inch from the 35mm camera aperture centerline opposite the sound area. Letters to be 1/8 inch high and 1/8 inch wide, white on black background (4 x 3 format).

Frames 33-37—Five frames opaque with light framelines for writing information.

Frame 38—Opaque with four X's adjacent to the sound track, similar to Frame 16 of the head leader identification section.

Frames 39-40—Similar to Frames 14-15 of head leader identification section with words "SMPTE Universal Leader," except that the words are upright.

Frame 41—Similar to Frame 13 of head leader identification section, except that the word "Picture" is upright (not inverted).

Frame 42—Dot similar to that in Frame 12 of head leader identification section.

Frame 43—Similar to Frame 11 of head leader identification section, except printed word is "Foot" which is upright (not inverted).

Frames 44-48—Five blank frames of opaque with light framelines upon which the words (1) "Picture Title" and (2) "End of Reel" are printed lengthwise with the film in 1/8 inch high white letters on black background.

Frames 49-51—Three frames identical to Frames 5, 4, and 3, respectively, of head leader identification section, except that the letters are inverted.

Frames 52-53—Two black frames.

6.3.2 One additional frame follows with the words "Splice Here" and an arrow pointing to the frameline between this frame and Frame 53 to indicate where the protective section joins the trailer.

6.4 Protective Section. The protective section of the trailer shall consist of 8 feet of transport or raw stock for 35mm prints and 3 1/4 feet for 16mm prints.

NOTE: The Society of Motion Picture and Television Engineers makes available leaders in accordance with this standard. Supplied on master positive motion-picture stock in 16mm and 35mm sizes, intended for reproduction as negatives, they are identified as SMPTE Universal Leaders.

Appendix

(This Appendix is not a part of Proposed American Standard Specifications for Leaders and Cue Marks for 35mm and 16mm Sound Motion Picture Release Prints, PH22.55, but is included to facilitate its use.)

A1. The difference between projection rates of 24 and 25 frames per second is negligible in the normal usage of the leader.

A2. Logos, trademarks, or other extraneous material, if absolutely necessary, should be inserted in the leader prior to the 16mm sound start cue or just preceding Frame 32 of the trailer identification section or both.

A3. The outside diameter of the large white circle indicates the height of the television safe action area specified in SMPTE Recommended Practice, RP 13-1963, Safe Action Area for TV Transmission, Society of Motion Picture and Television Engineers.

A4. The outside diameter of the small white circle is equivalent to the height of a projector aperture having an aspect ratio of 1.85:1.

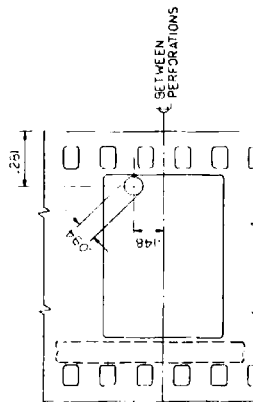


Fig. 6. Position of Cue Marks for Release Prints with Aspect Ratios up to 1.85:1.

NOTE: Image as seen on the screen.

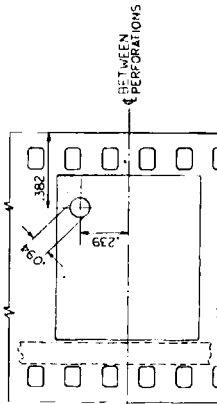


Fig. 7. Position of Cue Marks for Release Prints with Aspect Ratios from 2.35:1 to 2:1.

NOTE: Image as seen on the screen.