

SMPTÉ RECOMMENDED PRACTICE

RP 36-1989

Positioning the Headwheel and Adjacent Tape Guides for 2-in Quadruplex Video Magnetic Tape Recorders



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1. Scope

This practice establishes the relative locations of critical elements in the path of the tape between the input and output guides for 2-in (51 mm) quadruplex video magnetic tape recorders operating at 15 and 7.5 in/s (381 and 190.5 mm/s).

2. Definitions

- 2.1 **Tape Input Guide.** The last guiding element encountered by the tape as it approaches the vacuum guide.
- 2.2 **Tape Output Guide.** The first guiding element encountered by the tape after it leaves the vacuum guide.
- 2.3 **Reference Line.** A line which is tangent to both the input guide and the output guide and is perpendicular to the tape neutral plane defined in 2.4.
- 2.4 **Tape Neutral Plane.** A plane which is defined to be tangent to the input guide and output guide and also contains the reference line.

3. Dimensions

- 3.1 **Primary References.** The tape neutral plane, the reference plane, and the pole tip plane shall be the primary references for positioning the elements described in this practice (see Fig. 1).
- 3.2 **Position of Tape Output Guide.** The tape output guide shall be at a distance of 7.50 ± 0.25 in (190.5 ± 6.4 mm) from the pole tip plane (see Dimension B in Fig. 2). The guide may be on either side of the neutral plane.

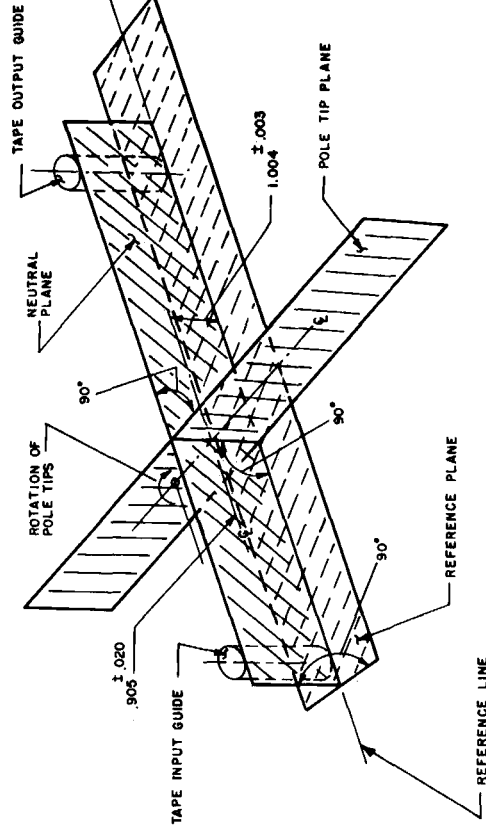


Fig. 1
Relationship Among Tape Neutral Plane, Reference Plane, and Pole Tip Plane

- 3.3 **Position of Tape Input Guide.** The tape input guide shall be at a distance of 7.50 ± 0.35 in (190.5 ± 8.9 mm) from the pole tip plane and shall be located symmetrically with respect to the pole tip plane and tape output guide with a tolerance of 0.3 in (8 mm). (See Dimension A in Fig. 2.) The guide may be on either side of the neutral plane.

- 3.4 **Position of Tape.** When undeflected by the vacuum guide, the tape shall lie in the tape neutral plane with its reference edge coincident with the reference line, and the magnetic surface facing the axis of rotation of the pole tips.

- 3.5 **Position of Axis of Rotation of Pole Tips.** The axis of rotation of the pole tips shall be parallel to the tape neutral plane and 0.905 ± 0.020 in (22.99 ± 0.51 mm) from it. (See Dimension C in Fig. 2.) It shall also be parallel to the reference plane and 1.004 ± 0.003 in (25.50 ± 0.08 mm) from it.

- 3.6 **Position of Vacuum Guide.** The vacuum guide shall be positioned so that the centerline of the tape when deflected by the vacuum guide is parallel to the reference plane and 1.004 ± 0.003 in (25.50 ± 0.08 mm) from it.

- 3.7 **Relationship Among Pole Tip Plane, Axis of Rotation and Vacuum Guide.** The relationship shall be as specified in SMPTÉ Recommended Practices on Tape Vacuum Guide Configuration and Position for Quadruplex Video Magnetic Tape Recording, RP 11-1984, and Specifications of Tracking Control Record for 2-in Quadruplex Video Magnetic Tape Recordings, RP 16-1988.

- 3.8 **Tape Deformation by Control Track Head.** Deformation of the tape by a control track head shall be limited to 0.020 in (0.51 mm) maximum, in a direction radial from the axis of rotation of the pole tips, at a location between the pole tip plane and the tape output guide, and at a distance 0.700 ± 0.100 in (17.78 ± 2.54 mm) from the pole tip plane and no more than 0.060 in (1.52 mm) from the reference edge of the tape.

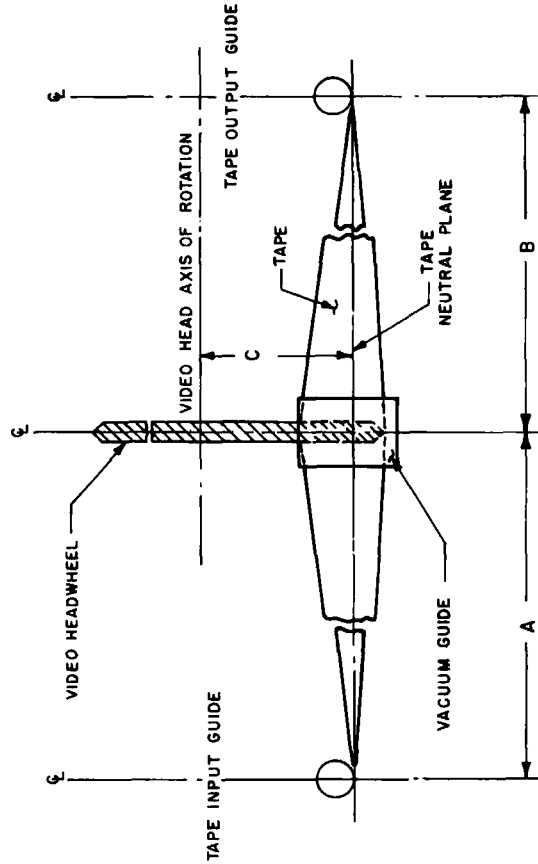


Fig. 2
Position of Tape Guides and Headwheel Assembly

SMPTe RECOMMENDED PRACTICE

Specifications for Deflection Linearity Test Pattern for Television

RP 38.1-1989



Page 1 of 4 pages

1. **Scope**
Format, dimensions, and optical densities are specified for a test pattern transparency to be used in the measurement of geometric distortion of television systems.

2. **Purpose**
The specified test pattern is to be used with a suitable electronically-generated grating signal to facilitate the adjustment of deflection linearity and the measurement of geometric distortion of television cameras and picture display devices. A suitable electronically-generated grating signal is specified in IEEE Std 202-1954 (R1978), Television: Methods of Measurement of Aspect Ratio and Geometric Distortion.

radius of two percent of picture height, are uniformly spaced and arranged to overlay an electronically-generated grating pattern. A black ball having a radius of 0.5 percent of picture height is located in the center of each black ring.

3.3 **Number of Rings.** There are 148 rings arranged in a grid of 17 vertical columns and 14 horizontal rows. Numbers appear from left to right indicating columns 2 through 16 and letters from top to bottom, B through M, indicating rows 2 through 13.

3.4 **Centering.** A black cross is located in the center of the test pattern.

3.5 **Arrows and Border.** The eight boundary arrows and black border define the edge of the test pattern area and the scanned area.

3.6 **Pattern Identification.** The identification number of this document appears on the test pattern.

4. Dimensions

4.1 **Test Pattern.** The dimensions of the test pattern shall be as shown in Figs. 2 through 5, in percentages of frame height (AA).

3.1 **Pattern.** A reproduction of the test pattern is shown in Fig. 1.

3.2 **Black Rings.** Black rings, having an inner radius of one percent of picture height and an outer

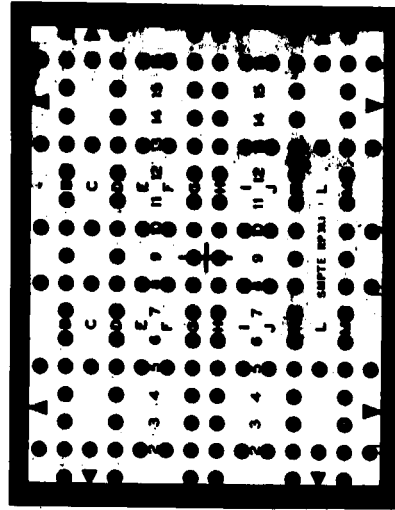


Fig. 1
Reproduction of Test Pattern

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595 West Hartsdale Avenue, White Plains, NY 10607, (914) 761-1100

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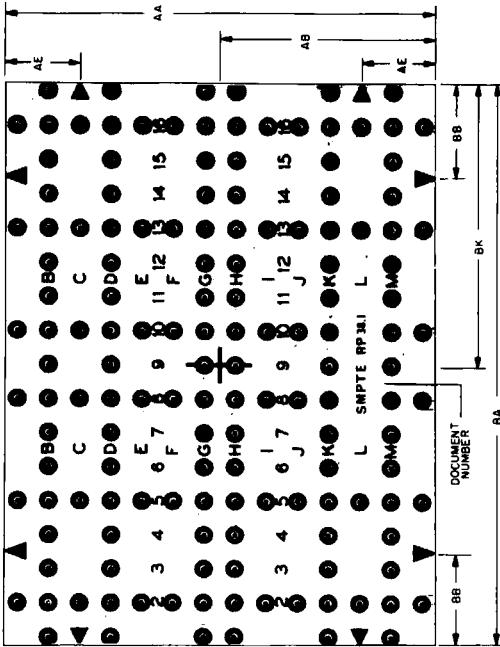


Fig. 2
Location of Boundary Arrows (Fig. 5) and Center-Cross (Fig. 5)

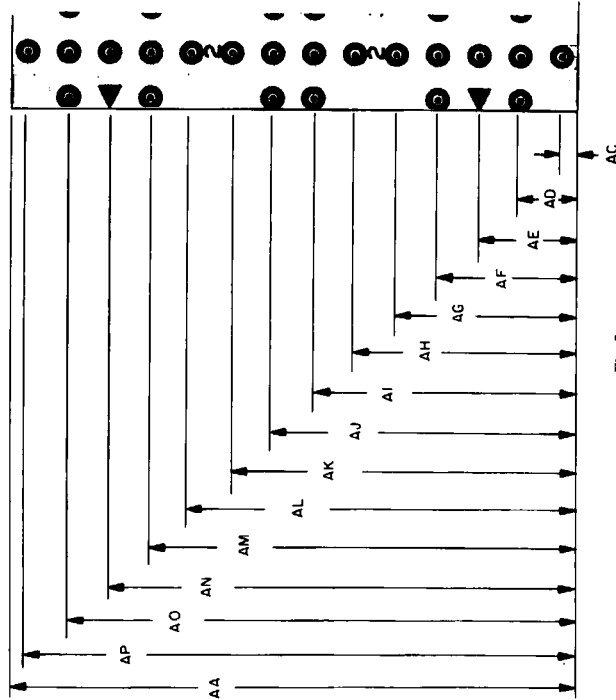


Fig. 3
Location of Horizontal Rows of Circles (Fig. 5)

Dimensions	Percentage	8 x 10	2 x 2	35-mm	16-mm
AA	100.0000	6.300	0.8130	0.5940	0.2760
AB	30.0000	3.150	0.3215	0.2970	0.1380
AC	2.8986	0.183	0.0244	0.0172	0.0080
AD	10.1449	0.639	0.0856	0.0603	0.0280
AE	17.3913	1.096	0.1466	0.1033	0.0480
AF	24.6377	1.552	0.2077	0.1463	0.0680
AG	31.8841	2.009	0.2688	0.1894	0.0880
AH	39.1304	2.465	0.3299	0.2324	0.1080
AI	46.3768	2.922	0.3910	0.2755	0.1280
AJ	53.6232	3.378	0.4520	0.3185	0.1480
AK	60.8696	3.835	0.5131	0.3616	0.1680
AL	68.1159	4.291	0.5742	0.4046	0.1880
AM	75.3623	4.748	0.6353	0.4477	0.2080
AN	82.6087	5.204	0.6964	0.4907	0.2280
AO	89.8551	5.661	0.7575	0.5337	0.2480
AP	97.1014	6.117	0.8186	0.5768	0.2680
RA	133.3333	8.400	1.1240	0.7920	0.3680
BB	21.88618	1.379	0.1815	0.1300	0.0604
BC	1.62602	0.102	0.0137	0.0097	0.0049
BD	9.75610	0.615	0.0822	0.0580	0.0269
BE	17.88618	1.127	0.1508	0.1062	0.0494
BF	26.01626	1.639	0.2193	0.1545	0.0718
BG	34.14634	2.151	0.2879	0.2028	0.0942
BH	42.27642	2.663	0.3564	0.2511	0.1167
BI	50.40650	3.176	0.4249	0.2994	0.1391
BJ	58.53658	3.688	0.4935	0.3477	0.1616
BK	66.66666	4.200	0.5620	0.3960	0.1840
BL	74.79674	4.712	0.6305	0.4443	0.2064
BM	82.92682	5.224	0.6991	0.4926	0.2289
BN	91.05690	5.737	0.7676	0.5409	0.2513
BO	99.18698	6.249	0.8361	0.5892	0.2738
BP	107.31706	6.761	0.9047	0.6375	0.2962
BQ	115.44714	7.273	0.9732	0.6858	0.3186
BR	123.57722	7.785	1.0418	0.7340	0.3411
BS	131.70730	8.298	1.1103	0.7823	0.3635
CA	0.3500	0.022	0.0030	0.0021	0.0010
CB	7.6000	0.479	0.0641	0.0451	0.0210
CC	4.0000	0.252	0.0337	0.0238	0.0110
CD	4.0000	0.252	0.0337	0.0238	0.0110
CE	0.0100	0.006	0.0001	0.0001	0.00003
CF	2.0000	0.126	0.0169	0.0119	0.0055
CG	1.0000	0.063	0.0084	0.0059	0.0028
CH	0.50000	0.032	0.0042	0.0030	0.0014

American National Standard for Motion-Picture Film (16-mm)—Camera Aperture Image and Usage, ANSI/SMPTE 7-1988.

5. Optical Densities

5.1 Optical Densities. All optical densities shall be measured in accordance with American National Standard for Photography—Density Measurement—Geometric Conditions for Transmission Density, ANSI PH2.19-1986.

5.2 Background. The density of the background shall be 0.6 ± 0.2 .

5.3 Pattern. The black border, arrows, rings, centering cross, and lettering shall have a density greater than 1.9.

NOTE 1: The emulsion position shall correspond to the one normally used for the specific format.

NOTE 2: Test material conforming to this practice is available from the Society of Motion Picture and Television Engineers.

4.2.2 35-mm test films shall have image dimensions in accordance with American National Standard for Motion-Picture Film (35-mm)—Television Image Area, ANSI/SMPTE 95-1984.

4.2.3 16-mm test films shall have image dimensions in accordance with American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, ANSI PH22.96-1982.

4.3 Black Border. The dimensions of the black border shall be as follows:

4.3.1 The dimensions (AA and BA) of the black border for 2x2 in. slides are specified as the transmitted image in ANSI/SMPTE 94-1985.

4.3.2 For 35-mm motion-picture films, the black border shall extend to the dimensions specified by Style A in American National Standard for Motion-Picture Film (35-mm)—Camera Aperture Images, ANSI/SMPTE 59-1989.

4.3.3 For 16-mm motion-picture films, the black border shall extend to the dimensions specified in

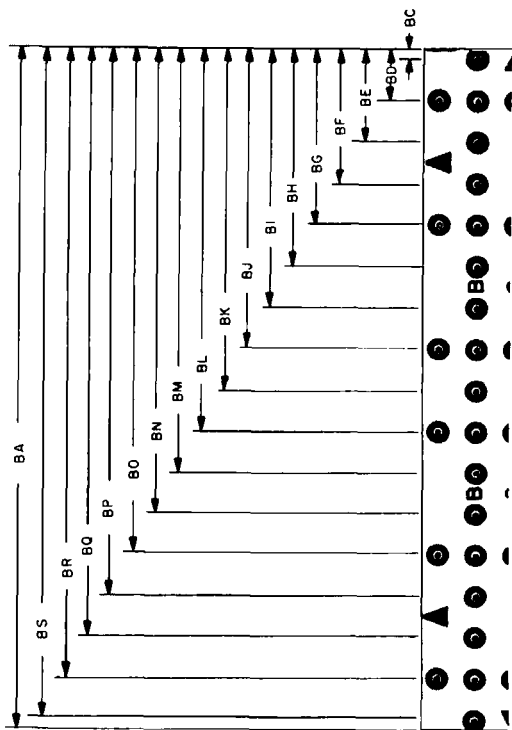


Fig. 4 Location of Vertical Rows of Circles (Fig. 5)

4.1.1 Circular Targets (Figs. 3 and 4). The tolerance on the dimensions for the location of these targets is to be ± 0.02 percent of picture height (AA). The tolerance on the radii of the circles is ± 0.1 percent of picture height.

4.1.2 Central Cross (Fig. 2). The tolerance on the dimensions locating the central cross is ± 0.02 percent of picture height. The tolerance on the dimensions of the cross is ± 0.1 percent of picture height.

4.1.3 Boundary Arrows (Fig. 2). The tolerance on the dimensions for the location of the boundary arrows is ± 1 percent of picture height (AA). The tolerances of the dimensioning of the arrows are ± 1 percent and ± 1 degree.

4.1.4 Row and Column Identification. The identification numbering and lettering for the rows and columns, respectively, is to be in bold type of approximately the size shown.

4.1.5 Pattern Identification. The SMPTE identification number shall be centrally located in the lower portion of the pattern approximately as shown. Bold type shall be used.

4.2 Image Size. The size of the scanned area as indicated by the boundary arrows shall be as follows:

4.2.1 2x2 in. test slides shall have dimensions as specified in American National Standard for Television—Image Areas and Mounts for Slides and Opaques, ANSI/SMPTE 94-1985.

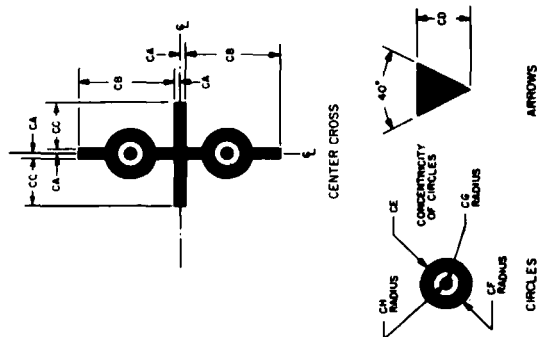


Fig. 5 Details of Figures on Pattern