Standards and Recommended Practices

Approved American National Standards

Two American National Standards were approved by the American National Standards Institute on April 18, 1986: ANSI/SMPTE 159.1-1986, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge, Cartridge-Camera Interface and Take-Up Core Drive; and ANSI/SMPTE 159.2-1986, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge Aperture, Camera Aperture, Profile, Film Position, Pressure Pad and Flatness. Copies of the standards are available for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Approved SMPTE Recommended Practices

The Society's Executive Committee for Standards Approval approved two SMPTE Recommended Practices on May 1, 1986: RP 138-1986, Control Message Architecture; and RP 139-1986, Tributary Interconnection. These and other SMPTE Recommended Practices are available from Society Headquarters for $3.00 each.

Proposed SMPTE Recommended Practices

Published here for a trial period and public review are two SMPTE Recommended Practices approved by the Society's Standards Committee: RP 145, Color Monitor Colorimetry; and RP 146, Transfer of Edit Decision Lists. Copies are available from Society Headquarters for $3.00 each. Comments should be addressed to Barry C. Detwiler, Televison Engineer, at Society Headquarters. The proposals will be submitted to the Executive Committee for Standards Approval if no adverse comments are received by November 1, 1986.

Proposed Editorial Revision

Two Proposed American National Standards are subject to a trial period and public review. The technical content is unaffected because the modifications are editorial in nature. The changes are being published for your information and comment.

SMPTE 119, Motion-Picture Film (65-mm) — 70-mm Film Perforated 65-mm, KS-1870 (revision of ANSI PH22.119-1981 published in the December 1981 *SMPTE Journal*): A frameline identifier to locate audio tracks Nos. 4 and 5 will be made a mandatory part of the standard.

SMPTE 165, Motion-Picture Film (8-mm Type S) — 35-mm Film Perforated 8-mm Type S, 5R (1-3-5-7-0) (revision of ANSI PH22.165-1981 published in the October 1981 *SMPTE Journal*): The tolerance for Dimensions L and L′ will be changed from ± 0.016 to ± 0.017 in., to be in accord with the agreement at the 1982 ISO Berlin meeting. A specification that "notwithstanding accumulation of tolerances, Dimensions A′ and E′ shall be as specified" will be added.

Copies of the proposals are available from Society Headquarters for $3.00 each. The proposals 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 prior to November 1, 1986.

Approved International Standard

An International Standard was approved by the International Organization for Standardization (ISO), the technical content of which is published here for your information. ISO 4834-1986, Cinematography — Magnetic Sound Test Films Excluding Striped Release Prints — Basic Technical Characteristics, is in agreement with the SMPTE Recommended Practices for magnetic test films. This material is reproduced with permission from the ISO and is copyrighted by the American National Standards Institute, 1430 Broadway, New York, NY 10018, from which copies are available.

—Sherwin H. Becker, Manager of Engineering

ANSI/SMPTE 159.1-1986
Revision and Redesignation of
ANSI PH22.159.1-1980

American National Standard

for motion-picture film (8-mm type S)— model 1 camera cartridge, cartridge-camera interface and take-up core drive

Approved April 18, 1986 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the dimensions of the 8-mm Type S motion-picture film camera cartridge and cartridge-camera interface. Also specified are the dimensions of the take-up core drive opening and critical dimensions of the take-up core as well as the driving force, direction of drive, and recommended drive ratio.

2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards:

ANSI/SMPTE 159.2-1986, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge Aperture, Camera Aperture Profile, Film Position, Pressure Pad and Flatness

ANSI PH22.166-1981, Specifications for 8-mm Type S Sound and Silent Motion-Picture Film Camera Cartridge Notches for Exposure Control and Stock Identification

3. Dimensions

3.1 The dimensions shall be as given in the figure and table.

3.2 The dimensions apply to an assembled cartridge with a film load at the time of manufacture.

3.3 Datum Planes B, C, and A are referred to as first, second, and third, respectively. These planes, which are used for dimensioning, are mutually perpendicular and are jointly called a datum reference frame.

3.3.1 Datum Plane A is coincident with the center of a circle, located from Plane B by the basic Dimension T. The circle is in contact with the edges of the locating slot defined by Dimensions A, O, P, and Q. The diameter of this circle is such that it applies regardless of a feature size (RFS) of the locating slot. (See Appendix A3.)

3.4 Datum Features B, C, and A are primary, secondary, and tertiary, respectively.

3.4.1 Datum Feature B is the unnotched, unlabeled surface of the cartridge. It is the primary datum feature and relates the cartridge to the datum reference frame by having a minimum of three points contact the first datum plane, B.

3.4.2 Datum Feature C is the front seating surface of the cartridge. It is the secondary datum feature and relates the cartridge to the datum reference frame by having a minimum of two points contact the second datum plane, C.

3.5 Dimensions L, M, N, R_3, U, V, and W, measured from Datum Planes A and C to the depth of Dimensions E, as shown in the view of the label side, describe the extent of both triangular re-

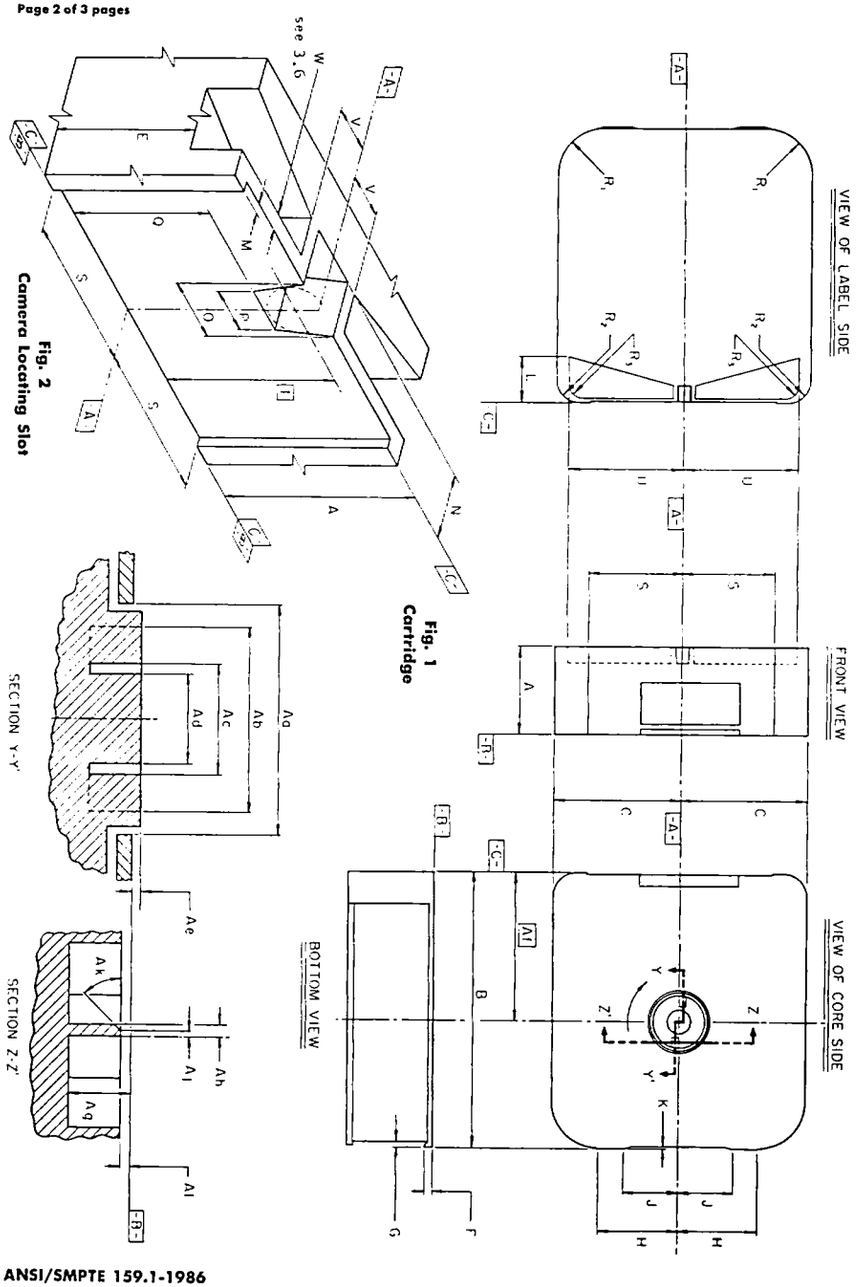

Fig. 2 Camera Locating Slot

Fig. 1 Cartridge

Dimensions	Inches	Millimeters
A	0.954 ± 0.010	24.23 ± 0.25
B	2.99 ± 0.01	75.9 ± 0.3
C	1.390 ± 0.010	35.31 ± 0.25
E	0.780 max	19.81 max
F	0.09 ± 0.01	2.3 ± 0.3
G	0.06 ± 0.01	1.5 ± 0.3
H	0.88 ± 0.03	22.4 ± 0.8
J	0.61 ± 0.03	15.5 ± 0.8
K	0.015 ± 0.010	0.38 ± 0.25
L	0.470 min	11.94 min
M	0.005 ± 0.003	0.13 ± 0.08
N	0.177 min	4.50 min
O	0.154 ± 0.004	3.91 ± 0.10
P	0.142 ± 0.004	3.61 ± 0.10
Q	0.770 ± 0.010	19.56 ± 0.25
R_1	0.50 ± 0.10	12.7 ± 2.5
R_2	0.25 ± 0.05	6.4 ± 1.3
R_3	0.160 max	4.06 max
S	1.02 ± 0.01	25.9 ± 0.3
T	0.870 basic	22.10 basic
U	1.225 min	31.12 min
V	0.125 max	3.18 max
W	See 3.6	
Aa	0.680 max	17.27 max
Ab	0.575 min	14.60 min
Ac	0.327 max	8.31 max
Ad	0.264 max	6.71 max
Ae	0.015 max	0.38 max
Af*	1.608 basic	40.84 basic
Ag	0.100 min	2.54 min
Ah	0.040 ± 0.005	1.02 ± 0.13
Aj	0.020 max	0.51 max
Ak	45° nom	45° nom
Al	0.024 max	0.61 max

*See 3.9.

cessed areas. The inboard wall of the recessed area, defined by Dimensions L and N, shall be a smooth surface and may be tilted sufficiently from the perpendicular to Datum Plane B to allow proper release from a mold, when the cartridge is manufactured in a molding process.

3.6 The thickness of the wall of the cartridge used for notching, Dimension W in Fig. 2, shall be sufficient to withstand a force of at least 1 kgf or 2.2 lbf (10 N) while deflecting no more than 0.04 in (1 mm). (For purposes of measurement, the force is applied by a solid round pin of nominal 0.05-in (1.3-mm) diameter centered 0.03 in (0.8 mm) nominally above or below the film speed or filter notch coincident with Dimension T on Datum Feature C.)

3.7 Dimension A specifies the normal overall thickness of the cartridge.

3.8 Dimensions B and M are measured from Datum Plane C. Dimensions C, H, J, and S are measured from Datum Plane A.

3.9 The take-up core axis shall be located within 0.010 in (0.25 mm) of the true center formed by Datum Plane A and basic Dimension Af.

3.10 Dimensions Aa, Ab, Ac, and Ad are diameters.

4. Take-Up Core Drive

4.1 The direction of rotation for the core shall be clockwise when viewed from the core side of the cartridge.

4.2 After disengagement of any core anti-backup device, the cartridge shall operate with a nominal torque of 0.85 ounce-force inch with a permissible range of 0.5 to 1.5 ozf·in (6.0×10^{-3} newton meters with a permissible range of 3.5×10^{-3} to 10.6×10^{-3} N·m) as applied to the cartridge. (See Appendix A2.)

NOTE 1: Placement of the film data, such as name, number, length of load, and inclusion of any notches, shall be in accordance with ANSI PH22.166-1981.

NOTE 2: Although two driving lugs are shown in the core and are recommended, only one is essential for satisfactory operation.

Appendix

(This Appendix is not part of the American National Standard, but is included for information only.)

A1. In designing the camera driver, consideration should be given to the fact that tooth-on-tooth engagement of the core lug on the camera driver pin is a possibility.

A2. It is recommended that the core be tendency driven (by some form of slip-drive mechanism) with a drive ratio of at least one turn of the core for every fifteen strokes of the pull-down claw.

A3. To provide a consistent method of measurement, it is recommended that a cartridge gauging fixture be used which incorporates datum surfaces, a locating pin, and means of exerting locating forces on appropriate surfaces of the cartridge.

ANSI/SMPTE 159.2-1986
Revision and Redesignation of
ANSI PH22.159.2-1980

American National Standard for motion-picture film (8-mm type S)—model 1 camera cartridge aperture, camera aperture, profile, film position, pressure pad and flatness

Approved April 18, 1986 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the dimensions and location of the cartridge aperture, pressure pad, and characteristics essential to the appropriate flatness of the cartridge pressure pad. Also specified are the position of the 8-mm Type S motion-picture film and its required clearances in the cartridge aperture.

2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards:

ANSI PH22.156M-1982, Specifications for Camera Usage of 8-mm Type S Motion-Picture Film

ANSI/SMPTE 159.1-1986, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge, Cartridge-Camera Interface and Take-up Core Drive

ANSI PH22.166-1981, Specifications for 8-mm Type S Sound and Silent Motion-Picture Film Camera Cartridge Notches for Exposure Control and Stock Identification

3. Dimensions

3.1 The dimensions shown in Fig. 2 and Table 2 shall apply to an assembled cartridge with a film load at the time of manufacture. The dimensions shown in Figs. 1 and 3 and Tables 1 and 3 shall apply to a cartridge that is fully assembled, but does not contain film.

3.2 The datum planes and datum features used for dimensioning shall be as defined in 3.3, 3.3.1, 3.4, 3.4.1, and 3.4.2 of ANSI/SMPTE 159.1-1986.

3.3 Dimensions T and U denote the lateral location of the film in the cartridge before insertion in the camera. After insertion, Dimension T becomes 0.060 in (1.52 mm) minimum and Dimension U becomes 0.050 in (1.27 mm) minimum.

3.4 All dimensions in Table 1, except Dimensions A and C, apply at the front surface of the pressure pad. A draft of 5 degrees to the recess area shall be permitted as well as an inside or outside radius of 0.005 in (0.13 mm) at all corners to provide satisfactory mold release.

3.5 Dimension A denotes the maximum penetration, from Datum Plane C, of the camera film alignment guide wings or the camera claw into the recessed area of the cartridge pressure pad.

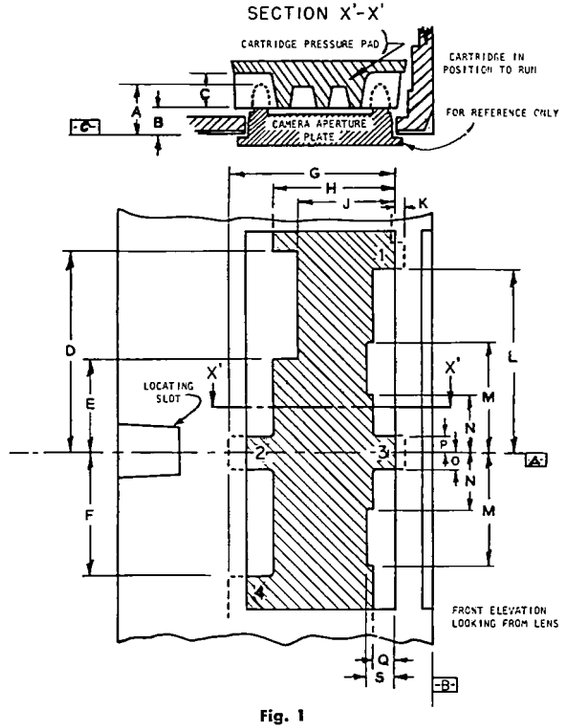

Fig. 1
Cartridge Pressure Pad

Table 1

Dimensions	Inches	Millimeters
A	0.150 max	3.81 max
B	0.077 ± 0.005	1.96 ± 0.13
C	0.090 min	2.29 min
D	0.540 min	13.72 min
E	0.260 max	6.60 max
F	0.360 ± 0.020	9.14 ± 0.51
G	0.455 min	11.56 min
H	0.365 max	9.27 max
J	0.300 max	7.62 max
K	0.000 min	0.00 min
L	0.540 ± 0.020	13.72 ± 0.51
M	0.300 min	7.62 min
N	0.140 max	3.56 max
O	0.058 ± 0.022	1.47 ± 0.56
P	0.038 ± 0.022	0.97 ± 0.56
Q	0.055 min	1.40 min
S	0.090 min	2.29 min

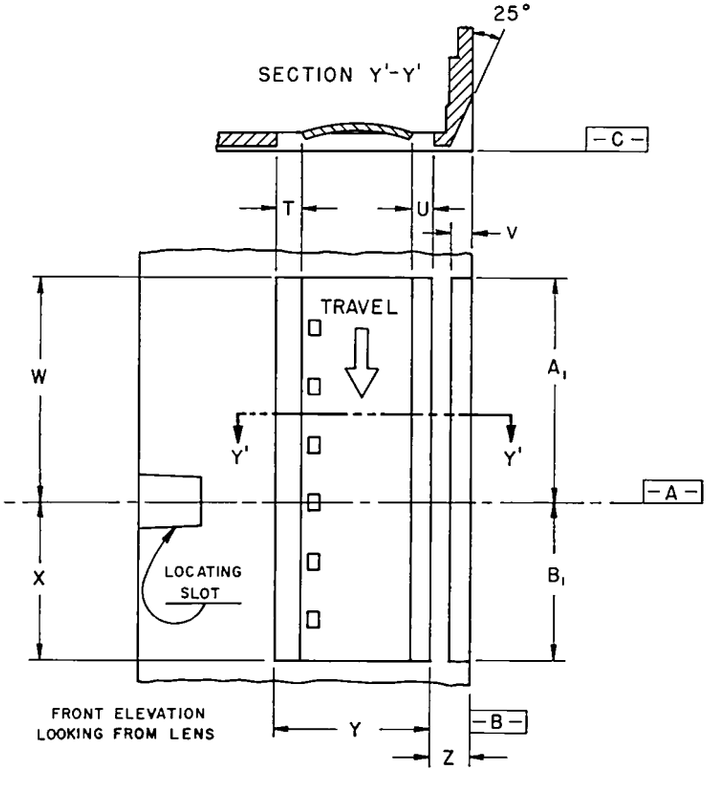

Fig. 2
Cartridge Aperture Opening and Film Position

Table 2

Dimensions	Inches	Millimeters
T	0.050 min	1.27 min
U	0.040 min	1.02 min
V	0.061 ± 0.006	1.55 ± 0.15
W	0.648 ± 0.006	16.46 ± 0.15
X	0.451 ± 0.006	11.46 ± 0.15
Y	0.451 ± 0.004	11.46 ± 0.10
Z	0.111 ± 0.003	2.82 ± 0.08
A_1	0.642 min	16.31 min
B_1	0.445 min	11.30 min

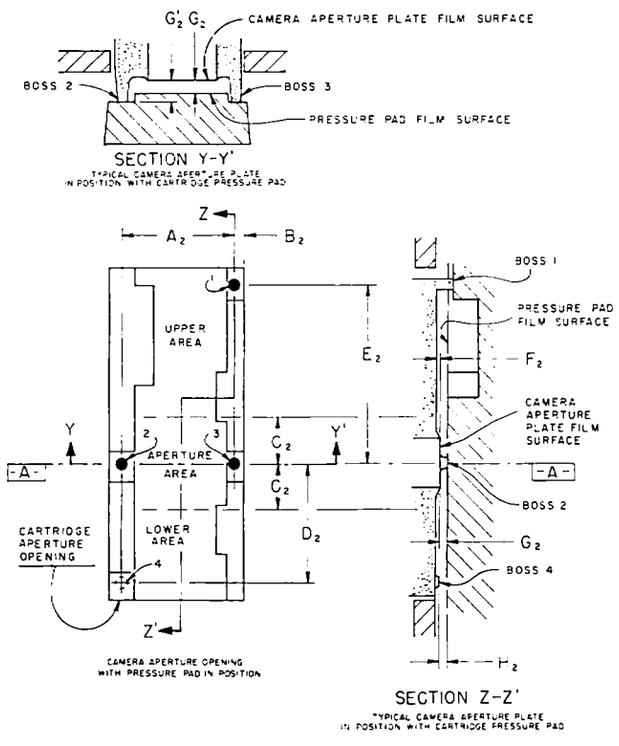

Fig. 3
Pressure Pad Flatness Reference Surfaces

Table 3

Dimensions*	Inches	Millimeters
A_2	0.378 ± 0.001	9.60 ± 0.03
B_2	0.030 +0.002 −0.000	0.76 +0.05 −0.00
C_2	0.153 nom	3.89 nom
D_2	0.393 ± 0.001	9.98 ± 0.03
E_2	0.590 ± 0.001	14.99 ± 0.03
F_2	0.005 min	0.13 min
G_2†	T_2 + 0.0007 min	T_2 + 0.018 min
	T_2 + 0.0012 max	T_2 + 0.030 max
G'_2	0.0065 min	0.165 min
	0.0070 max	0.178 max
H_2	0.004 min	0.10 min

*Dimensions are measured from the zero plane defined by Surfaces 1, 2, and 3. (See 3.7, Fig. 3, and Note 2.)
†See 3.8.

Table 4
Flatness Tolerances on Pressure Pad Film Surface

Areas*	Inches	Millimeters
Aperture Area (within dimension C_2)†	± 0.0058 — T_2 max	± 0.147 — T_2 max
	+ 0.0048 — T_2 min	+ 0.122 — T_2 min
Upper Area†	+ 0.0078 — T_2 max	± 0.198 — T_2 max
	± 0.0038 — T_2 min	+ 0.097 — T_2 min
Lower Area†	+ 0.0078 — T_2 max	+ 0.198 — T_2 max
	+ 0.0018 — T_2 min	+ 0.046 — T_2 min

*Dimensions are measured from the zero plane defined by Surfaces 1, 2, and 3. (See 3.7, Fig. 3, and Note 2.)
†See 3.8.

3.6 Dimension B is measured from Datum Plane C and is the operating position of the cartridge pressure pad.

3.7 Dimensions relative to the surface of the pressure pad are measured from a plane established through Surfaces 1, 2, and 3, as defined by 0.060-in (1.52-mm) diameter circles dimensionally centered. (See Fig. 3.) The actual camera aperture bosses may deviate from this shape.

3.8 Dimensions G_2 specifies the clearance for film in the camera aperture area based on T_2, the thickness of the film in the center of the picture area. (See Note 1.)

3.9 Dimension G'_2 specifies the extension of the camera aperture plate boss points (corresponding to 1, 2, and 3) beyond the aperture plate plane at the aperture opening.

3.10 The upper and lower pad areas extend from Dimension C_2 to the top and bottom of the cartridge pressure pad within the area described by Dimension H minus Dimension Q.

3.11 Dimension H_2 is intended to apply from a plane as described by 3.7.

3.12 The plus values given for the pressure pad film surface flatness tolerances shall be directed toward the lens. (See Note 2.)

3.13 Surface 4 of the cartridge pressure pad and Boss 4 of the camera aperture are delineated to aid in seating the cartridge pressure pad to the camera aperture plate. They serve no function when the pressure pad is in operating position. (See Note 3.)

NOTE 1: It is considered good practice to relieve the camera aperture plate above and below the picture area to allow a clearance for film transport and minimize the possibility of film pinching. Dimension F_2 specifies the amount of recess for this purpose.

NOTE 2: It is intended that the film surface of the cartridge pressure pad be flat, or molded as a flat plane. Pits or depressions, however, which do not interfere with the film flatness are acceptable. Tolerances for the flatness on the 8-mm Type S cartridge pressure pad film surface are specified to account for slight warpage in molding if the pressure pad is made from a plastic material. (See Appendix A3.)

NOTE 3: Three lugs, Nos. 1, 2, and 3, on the pressure pad are intended to touch the camera aperture plate and thereby establish both the film plane alignment and the clearance allowed for film thickness. Lug 4 should not touch the camera aperture plate.

Appendix

(This Appendix is not part of the American National Standard, but is included for information only.)

A1. A force of 8 to 14 oz (2.2 to 3.9 N) must be exerted on the pressure pad for proper seating against the camera aperture plate.

A2. The two cut-out areas in the pressure pad permit the use of fingers for side-guiding. A force of 1.5 to 2.5 oz (0.42 to 0.70 N) per finger is adequate to ensure picture steadiness if proper take-up torque is applied to the cartridge.

A3. Although sufficient recess from the front surface of the pressure pad to allow for camera claw and camera aperture guide finger penetration, as defined by Dimension C and 3.5, must be provided, additional portions of the pad surface may be recessed also.

A4. The cartridge pressure pad recess, defined by Dimensions D, E, and J, is available for camera claw film transport engagement. The perforation used for the film vertical registration at its stopping position is specified in ANSI PH22.156M-1982, as minus 2 from the perforation adjacent to the image formed by the camera aperture. The horizontal centerline of the camera aperture should nominally coincide with Datum Plane A.

A5. To provide a consistent method of measurement, it is recommended that a cartridge gauging fixture be used which incorporates datum surfaces, a locating pin, and means for exerting locating forces on appropriate surfaces of the cartridge. For pressure pad measurements, a second fixture, incorporating three 0.060-in (1.52-mm) diameter bosses and a means for exerting the appropriate pressure pad seating force, is recommended.

SMPTE RECOMMENDED PRACTICE

RP 138–1986

Control Message Architecture

1. *General*

1.1 Scope. This practice defines the architecture of the control message language used within a general-purpose communications channel of an interface system which transports data and control signals between equipment utilized in the production, post-production, and/or transmission of visual and aural information.

It is intended that the language described in this practice be utilized when constructing messages used as part of an overall system, allowing interconnection of programmable and nonprogrammable equipment as required to configure an operational system with a defined function, and to allow rapid reconfiguration of a system to provide more than one defined function utilizing a given group of equipment.

1.1.1 Control message language is composed of vocabulary, syntax, and semantics expressed in terms of tokens, rules, and actions, respectively.

1.1.2 The primary intent of this practice is to define the architecture of the messages to be transmitted within the supervisory protocol of the communications channel for the purpose of controlling equipment by external means. Syntax is the set of rules which shall be applied to the vocabulary (tokens) to construct control messages. (The content of the vocabulary and its semantics, being specific to the type of generic equipment, is defined elsewhere.) This practice, or sections thereof, may be applied to the interconnection of elements within an item of equipment.

1.2 Definitions. For the purpose of this practice, the following definitions shall apply:

Virtual Machine: A logical device consisting of a single device or a combination of devices that respond in essence or effect as a generic type of equipment; e.g., VTR, video switcher, telecine, etc.

Virtual Circuit: A transparent, logical, communications connection between virtual machines. The communications path, in reality, passes through other levels and is propagated over a physical medium.

2. *Message Structure*

2.1 Architecture. The message architecture described in this practice is prepared broadly on the principals of communications levels. This architecture follows a logical structure and is defined in terms of a virtual machine. Messages are of variable length according to function. Complex functions may be divided into basic functions, transmitted as a sequence of shorter messages for execution in the virtual machine.

2.2 Virtual Machine. All messages pertaining to generic types of equipment shall be defined in terms of the virtual machine. Utilization of the virtual machine concept in defining messages provides a message architecture that is independent of machine-specific characteristics.

3. *Control Message Classification*

3.1 Control messages are classified in accordance with Fig. 1.

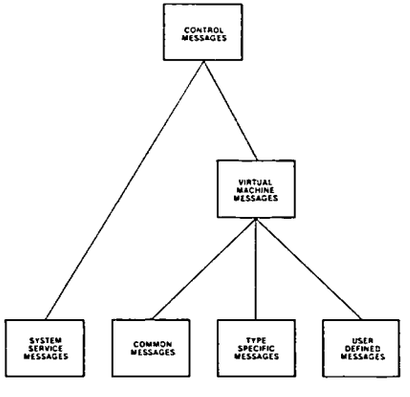

Fig. 1
Message Classification

Approved 1 May 1986