

Standards and Recommended Practices

Proposed SMPTE Standards

Two Proposed SMPTE Standards are published for your information:

SMPTE 355M, Television—Format for Non-PCM Audio and Data in AES3—KLV Data Type

SMPTE 358M, Television—Four-Circuit Fiber Optic Connector

SMPTE 355M is available at Society Headquarters for \$24.00 and SMPTE 358M for \$22.00 each.

Approved SMPTE Standards

The Society recently approved three SMPTE Standards:

SMPTE 336M-2001, Television—Data Encoding Protocol using Key-Length-Value

SMPTE 359M-2001, Television and Motion Pictures - Dynamic Documents

SMPTE 360M-2001, Television—General Exchange Format (GXF)

SMPTE 336M and SMPTE 360M are available from Headquarters for \$40.00 each; and SMPTE 359M for \$30.00.

—Carlos V. Girod, Jr., P.E., Director of Engineering

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PROPOSED SMPTÉ STANDARD

for Television — Format for Non-PCM Audio and Data in AES3 — KLV Data Type

1 Scope

This standard specifies data type specific format requirements for SMPTÉ 336M (KLV) data bursts carried within an AES3 interface according to SMPTÉ 337M.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

- SMPTÉ 336M, Television — Data Encoding Protocol using Key-Length-Value
- SMPTÉ 337M-2000, Television — Format for Non-PCM Audio and Data in AES3 Serial Digital Audio Interface
- SMPTÉ 338M-2000, Television — Format for Non-PCM Audio and Data in AES3 — Data Types
- SMPTÉ RP 210, Metadata Dictionary

3 Introduction

This standard describes a means for packing SMPTÉ metadata and/or essence encoded in the SMPTÉ 336M KLV protocol into AES3 serial digital streams. A strong interest exists to carry audio/visual data, metadata, and/or essence within the same digital

into 16-, 20-, or 24-bit data words for mapping into the AES3 subframes of the burst_payload depending on the data_mode specified in the burst_preamble. The first bit of the UL data key shall be placed in time slot 27 of the first AES3 subframe of the burst_payload. Any unused AES3 time slots in the last AES3 subframe of the burst_payload shall be filled with 0 as specified in SMPTÉ 337M. If the size of the KLV packet exceeds the size of the burst_payload in this data burst, the KLV packet shall be continued in subsequent data bursts of the same data_stream_number with the key_flag set to 0 in the additional data bursts. In this way, a single KLV packet may span multiple data bursts. Individual data bursts shall contain no more than one KLV packet.

Other standards or recommended practices may specify additional formatting requirements for data bursts for specific data types carried within the KLV packet.

SMPTÉ 355M

4.3 key_flag

When this flag is set to 1, a universal label key as defined in SMPTÉ 336M (KLV) shall be present at the beginning of the burst_payload indicating that the data burst contains the start of a KLV packet. When this flag is set to 0, no key shall be present in the burst_payload indicating that the data burst is a continuation of a KLV packet.

5 SMPTÉ 336M (KLV) burst_payload

KLV data packets shall be placed into the burst_payload such that the beginning of the KLV packet (starting with a universal label data key) shall be present at the beginning of a burst_payload immediately following preamble word Pd (length_code). The key_flag in the data_type_dependent field of this data burst shall be set to 1 indicating the data burst contains the start of a KLV packet. The KLV packet shall be segmented

stream. The use of one data stream facilitates delivery and synchronization of the overall multimedia presentation to the consumer. Metadata is classified as information about the content or essence. An example of metadata is information such as camera angle, scene identifier, or property rights. Other essence is supplemental content to the audio and video such as closed captioning, sports statistics, or hyperlinked advertisements.

4 SMPTÉ 336M (KLV) burst_preamble

The SMPTÉ 337M protocol describes an interface format for the transport of non-PCM audio or data, using the AES3 serial digital audio interface. The SMPTÉ 336M (KLV) data type is provided for the transmission of non-PCM data formatted according to the SMPTÉ 336M (KLV) protocol.

4.1 data_type

The data_type shall have a value of 27.

4.2 data_type_dependent

The burst_preamble for a SMPTÉ 336M (KLV) type data burst shall include a data_type_dependent field encoded as shown in table 1.

Table 1 – Values of data_type_dependent field for SMPTÉ 336M (KLV) data type

data_type_dependent bit number	Meaning
0-3	Reserved, shall be set to 0000
4	key_flag

**Annex A (informative)
Organization of references**

The organization of SMPTE standards and recommended practices addressing the coding of individual data items such as essence and metadata are illustrated in figure A.1. No single standard can contain all of the information needed to describe and encode all data. The encoding protocol standard (SMPTE 336M) and the metadata dictionary document

(SMPTE RP 210) form the SMPTE normative standards for defining metadata and its coding. Informative SMPTE documents supplement the standards for encoding with examples and administrative instructions on managing the data standardization and registration process.

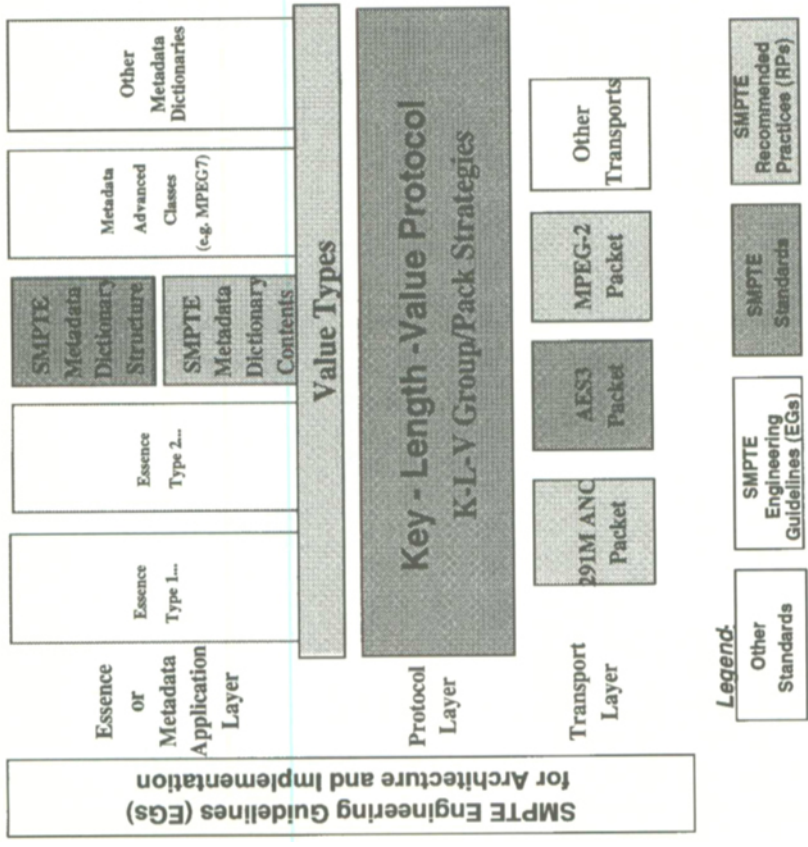


Figure A.1 – Organization of references

**Annex B (informative)
KLV data packets**

KLV data packets consist of a 16 octet (byte) universal label data key segment (key), a length segment, and a value segment. The key segment consists of a number of subsegments as shown in figure B.1.

When conveying KLV data on the AES3 interface, the KLV packet is first mapped into the burst_payload section of one or more data bursts as defined in SMPTE 337M and this standard (see figure B.2). Should the length of the KLV packet exceed the size of the burst_payload section of a data burst, then the KLV packet is continued in subsequent data bursts (see key_flag designator above).

The data bursts containing the KLV packets must then be subsegmented and mapped into AES3 subframes. AES3 subframes consist of 32 bits (time slots) of which 16, 20, or 24 bits may be used to carry data, depending on the data

mode that is selected. This mapping is illustrated in figure B.3. As shown, the most significant bit (MSB) of each 16-, 20-, or 24-bit subsegment will map to time slot 27 of the AES3 subframe. The least significant bit (LSB) will map to time slot 12, 8, or 4 depending on the data mode.

Figures B.4-B.6 illustrate a detailed mapping of the burst_preamble and burst_payload segments to AES3 time slots. Since the burst_preamble is defined to always occupy four AES3 subframes independent of the data_mode, the start of the burst_payload and, therefore, the start of the KLV data will always begin in time slot 27 of an AES3 subframe. Note that in the 20-bit mode, some bytes will be split between AES3 subframes with 4 bits in one AES3 subframe and 4 bits in the following AES3 subframe (as shown in figure B.5).

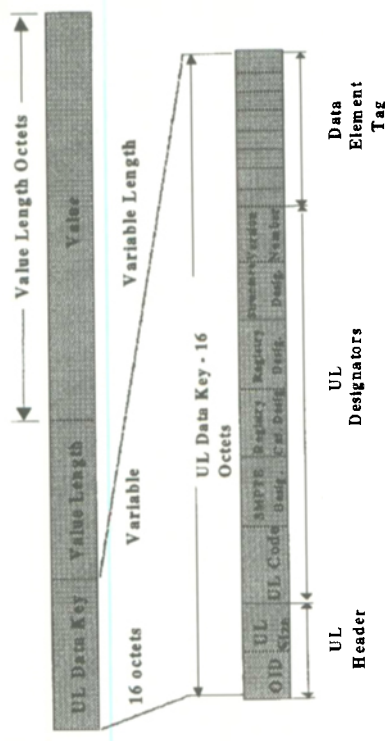


Figure B.1 – SMPTE KLV data packet

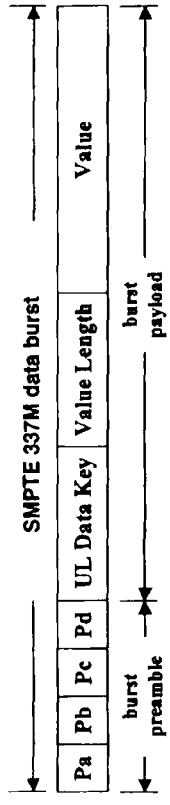


Figure B.2 – KLV mapping to AES3 data bursts

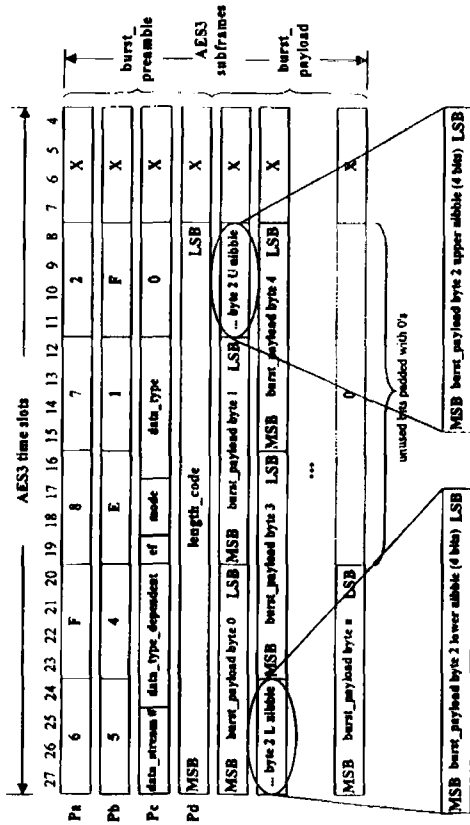


Figure B.3 – Mapping data burst segments to AES3 subframes

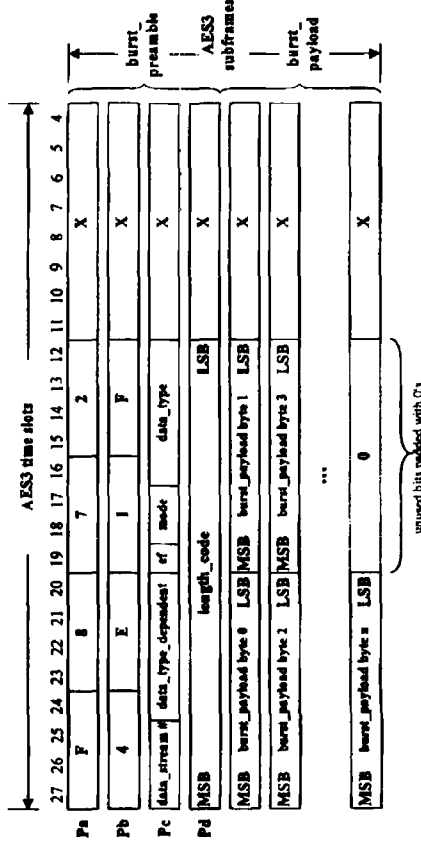


Figure B.4 – Mapping data burst segments to AES3 time slots (16-bit mode)

Figure B.5 – Mapping data burst segments to AES3 time slots (20-bit mode)

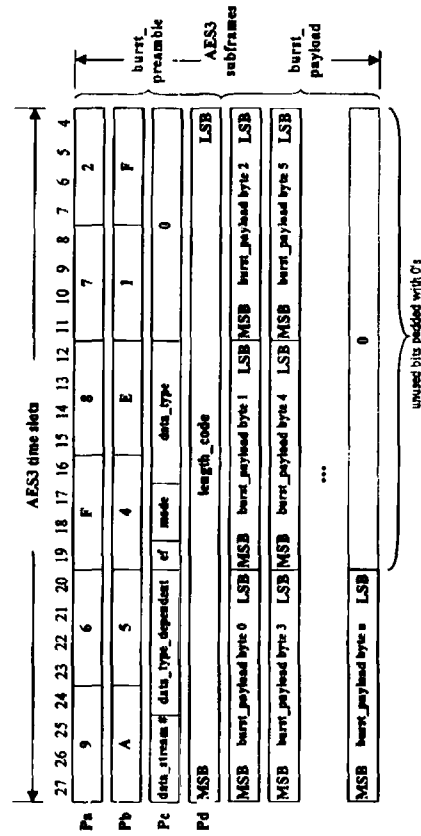


Figure B.6 – Mapping data burst segments to AES3 time slots (24-bit mode)

PROPOSED SMPTE STANDARD

for Television — Four-Circuit Fiber Optic Connector

Annex C (informative) Example

As an example of mapping KLV packets into the AES3 interface, consider a KLV packet with a key as shown in figure C.1.

data_stream_number = 0
data_type_dependent = 0 x 10 (key_flag is set indicating key is present)
error_flag = 0

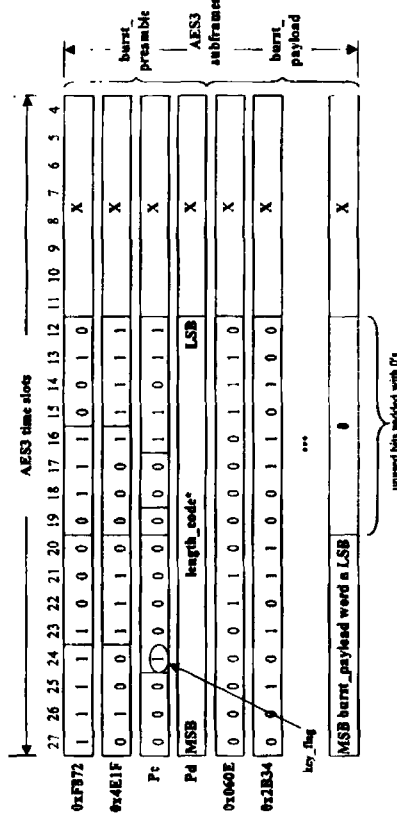
In this example, the KLV packet is to be carried in the AES3 interface in the 16-bit mode in a single AES3 data burst identified as stream #0. Therefore, the values of the fields in the burst_info header of the AES3 burst_preamble are:

data_mode = 0
data_type = 0 x 1 B

Therefore, the mapping of the KLV packet to the AES3 data burst is as shown in figure C.2.

06.0E.2B.34.01.01.01.01.07.09.02.02.02.00.00

Figure C.1 - Example universal label data key



*Length_code indicates the length of burst_payload (in bits) which in this example will equal the size of the entire KLV packet.

Figure C.2 - Example mapping of KLV data burst to AES3 time slots

Annex D (informative) Bibliography

- AES3-1992, Digital Audio Engineering — Serial Transmission Format for Two-Channel Linearly Represented Digital Audio Data
- ANSI/SMPTE 285M-1997, Television — Universal Labels for Unique Identification of Digital Data

ANSI/TIA/EIA-455-B-98, Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components

3 Connector specifications

3.1 Construction

The connector for terminating a four-fiber cable shall be a hermetic cable plug. The jam-nut mount receptacle shall accept four individual single-channel cables. The hermetic cable plug shall feature a threaded coupling ring which when backed off shall expose a male threaded end which in turn shall be capable of mating to a like cable plug with the coupling ring in the forward position.

The connector cable plug shall strain-relieve a single-jacket multifiber cable. Each connector shall accommodate a total of four contacts — two pins and two sockets.

Single mode connectors shall have a durable yellow marking, visible before and after mating, to give an indication of the fiber type inside the connector. Multimode connectors shall not require any special marking.

3.2 Contacts

The optical contacts shall meet the requirements of this standard (see figures 4 and 5) when retained inside connectors as described herein. The optical contacts shall have cylindrical abutting ceramic ferrules. For single mode applications, optical ferrules shall be physical contact (PC) polished or for

1 Scope

This standard describes an interface for a general purpose fiber optic connector for interconnection of television equipment. For information on testing for physically demanding applications, the reader is directed to the informative references listed in annex B. The connectors may find use in a variety of other signal transmission applications. The design accommodates both single mode and multimode optical fibers.

The standard defines connectors that are hermetic by construction, allowing cable plugs to mate with like cable plugs as well as bulkhead receptacles, while maintaining polarization.

Separate physical packaging design objectives will result in the availability of both cable and bulkhead connectors for installation in harsh environments.

Connector and optical termini adhering to the limits of the interfacial dimensions of this standard will intermate. Applicable tolerances to the basic dimensions shall be such that the combined value of these tolerances shall not exceed the limit described in note 5.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

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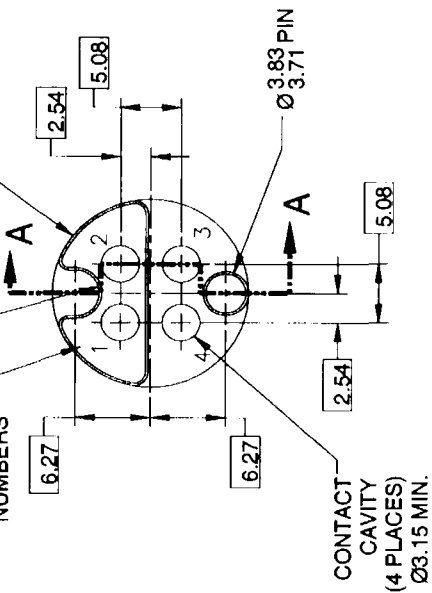


Figure 3 - Face view (see figures 1 and 2 for view A-A)

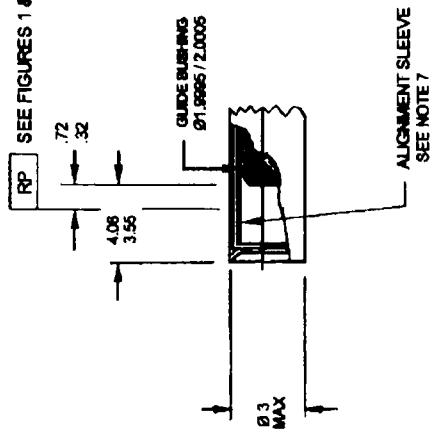


Figure 4 - Socket contact

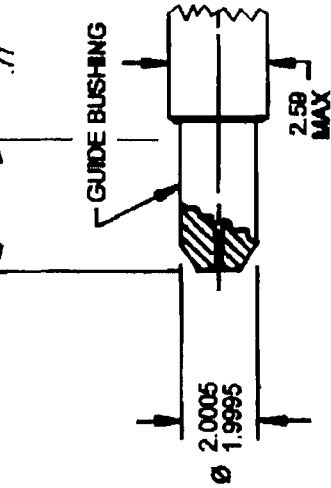


Figure 5 - Pin terminus

Annex A (informative)
Channel Integrity

In order to achieve channel integrity with hermaphroditic connectors, proper channel-to-channel wiring should be observed (see figure A.1).

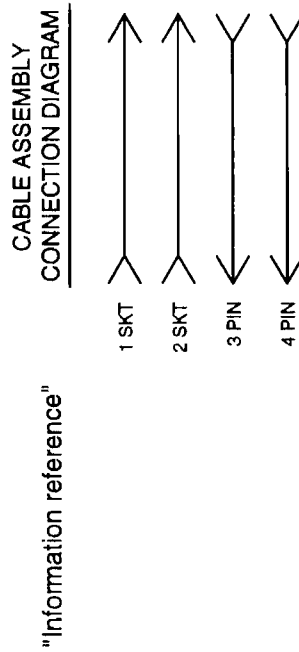


Figure A.1 - Channel-to-channel wiring

Annex B (informative) Bibliography

- ANSI/EIA-364-26B-99, TP-26B — Salt Spray Test Procedure for Electrical Connectors, Contacts and Sockets
- ANSI/EIA-455-4B-93, FOTP-4 — Fiber Optic Component Temperature Life Test
- ANSI/EIA-455-21A-88, FOTP-21 — Mating Durability for Fiber Optic Interconnecting Devices
- ANSI/EIA-455-28A-85 (R96), FOTP-28 — Crush Resistance of Fiber Optic Interconnecting Devices
- ANSI/EIA/TIA-455-6B-92, FOTP-6 — Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices
- ANSI/EIA/TIA-455-12A-89, FOTP-12 — Fluid Immersion Test for Fiber Optic Components
- ANSI/TIA/EIA-455-2C-96, FOTP-2 — Impact Test Measurements for Fiber Optic Devices
- ANSI/TIA/EIA-455-3A-89, FOTP-3 — Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components
- ANSI/TIA/EIA-455-5B-94, FOTP-5 — Humidity Test Procedure for Fiber Optic Components
- ANSI/TIA/EIA-455-11B-94, FOTP-11 — Vibration Test Procedure for Fiber Optic Components and Cables
- ANSI/TIA/EIA-455-13A-96, FOTP-13 — Visual and Mechanical Inspection of Fiber Optic Components, Devices, and Assemblies
- ANSI/TIA/EIA-455-34A-86 (R86), FOTP-34 — Interconnection Device Insertion Loss Test
- ANSI/TIA/EIA-455-56B-95 (R99), FOTP-56 — Test Method for Evaluating Fungus Resistance of Optical Fiber and Cable
- ANSI/TIA/EIA-455-107A-89, FOTP-107 — Determination of Component Reflectance or Link/System Return Loss Using a Loss Test Set
- TIA/EIA-455-36A-86, FOTP-36 — Twist Test for Fiber Optic Connecting Devices