SMPTE ST 338:2015
Revision of
SMPTE ST 338:2010

SMPTE STANDARD

Format for Non-PCM Audio and Data in AES3 — Data Types

Table of Contents

Approved
March 27, 2015

Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in its Standards Operations Manual.

SMPTE ST 338 was prepared by Technology Committee 32NF.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

An associated standard, SMPTE ST 337, describes general formatting requirements when carrying non-PCM data in an AES3 digital audio bit stream. Data are formatted into data bursts each consisting of a burst_preamble and a burst_payload. The data_type field in the burst_preamble of each data burst defines the type of non-PCM data carried within the burst_payload of the data burst. Each data type includes additional formatting requirements not defined in SMPTE ST 337.

This standard maps the value of the data_type field to specific data types and references additional standards that contain data type specific formatting requirements and information. No specific formatting information is contained in this standard.

Some data types are mapped directly to data_type values. Specific references are included for these data types.

1 Scope

This standard describes the data_type field defined in SMPTE ST 337. This field describes data types that may be carried in an AES3 digital audio interface according to SMPTE ST 337. This standard defines supported data types, but does not cover formatting that may be required for each data type. References are included for additional standards that describe data type specific formatting requirements.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; then formal languages; then figures; and then any other language forms.

3 Normative References

There are no normative references.

4 Data Types

Table 1 defines the data_type field described in SMPTE ST 337. See IEC 61937-2 for IEC-specific references.

Table 1 – Data Type Field

data_type value	Data type (Common Industry Format Name)	SMPTE Defining Document (informative)	IEC 61937-2 allocation (informative)
0	Null data	ST 339	Same data
1	AC-3 data (audio)	ST 340	Same data
2	Time stamp data	ST 339	Reserved for SMPTE
3	Pause data	ST 339	Same data
4	MPEG-1 Layer I (audio) data	ST 2041-1	Same data
5	MPEG-1 Layer II or III (audio) data or MPEG-2 Layer 1, II, or III (audio) data without extension	ST 2041-1	Same data
6	MPEG-2 Layer I, II, or III (audio) data with extension	ST 2041-1	Same data
7	MPEG 2 AAC in ADTS	ST 2041-2	MPEG 2 AAC
8	Reserved for compatibility with IEC		MPEG-2 Layer I (audio) data low-sampling frequency
9	Reserved for compatibility with IEC		MPEG-2 Layer II (audio) data low-sampling frequency
10	MPEG-4 AAC data in ADTS or LATM/LOAS	ST 2041-2	MPEG-2 Layer III (audio) data low-sampling frequency
11	MPEG-4 HE-AAC data in ADTS or LATM/LOAS	ST 2041-2	DTS type I
12	Reserved for compatibility with IEC		DTS type II
13	Reserved for compatibility with IEC		DTS type III
14	Reserved for compatibility with IEC		ATRAC
15	Reserved for compatibility with IEC		ATRAC 2/3
16	Enhanced AC-3 audio data (professional applications)	ST 340	ATRAC -X
17	Reserved for compatibility with IEC		DTS type IV
18	Reserved for compatibility with IEC		WMA professional
19	Reserved for compatibility with IEC		MPEG-2 AAC low sampling frequency
20	Reserved for compatibility with IEC		MPEG-4 AAC
21	Reserved for compatibility with IEC		Enhanced AC-3 / Reserved (depends on IEC 61937-2 sub data-type)
22	Reserved for compatibility with IEC		MAT / Reserved (depends on IEC 61937-2 sub data-type)

data_type value	Data type (Common Industry Format Name)	SMPTE Defining Document (informative)	IEC 61937-2 allocation (informative)
23	Reserved for compatibility with IEC		MPEG-4 ALS, AAC, and DRA
24	Reserved		Reserved
25	Reserved		Reserved
26	Utility data type (V sync)	ST 339	Reserved
27	SMPTE KLV data	ST 355	Reserved for SMPTE
28	Dolby E (audio) data	RDD 33	Reserved for SMPTE
29	Captioning data	ST 341	Reserved for SMPTE
30	User defined data	ST 339	Reserved for SMPTE
31	Data Type in Extended Code Space	ST 337	Same function

5 Extended Data Types

SMPTE ST 337 makes provision for identification of additional data types when all of the codes in Table 1 have been allocated. This information is conveyed in burst preamble Pe as extended_data_type.

The values of Pe shall be as defined in Table 2.

Note: SMPTE ST 337 defines the range of Pe as 0x0000 to 0xFFFF. When working in 20 bit or 24 bit mode, this requires that the additional higher significance bits are set to 0.

Table 2 – Extended Data Types

data_type value (hexadecimal)	Data type (Common Industry Format Name)	SMPTE Defining Document
0x0000 – 0x4E1E	Reserved by SMPTE for future allocation	
0x4E1F	Forbidden (to avoid false Pb sync triggering)	
0x4E20 – 0xF871	Reserved by SMPTE for future allocation	
0xF872	Forbidden (to avoid false Pa sync triggering)	
0xF873 – 0xFFFF	Reserved by SMPTE for future allocation	

Annex A Bibliography (Informative)

SMPTE ST 337:2015, Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface

SMPTE ST 339:2015, Format for Non-PCM Audio and Data in AES3 — Generic Data Types

SMPTE ST 340:2015, Format for Non-PCM Audio and Data in AES3 — ATSC A/52 Digital Audio Compression Standard for AC-3 and Enhanced AC-3 Data Types

SMPTE ST 341:2000, Television — Format for Non-PCM Audio and Data in AES3 — Captioning Data Type

SMPTE ST 2041-1:2010, Format for Non-PCM Audio in AES3 — MPEG Layer I, II and III Audio

SMPTE ST 2041-2:2010, Format for Non-PCM Audio in AES3 — MPEG-2 AAC and HE AAC Audio in ADTS

SMPTE ST 2041-3:2010, Format for Non-PCM Audio and Data in AES3 — MPEG-4 AAC and HE AAC Compressed Digital Audio in ADTS and LATM / LOAS Wrappers

SMPTE RDD 33, Format for Non-PCM Audio and Data in AES3 — Dolby-E® Data Type

IEC 61937-2 (2007-5), Digital Audio – Interface for Non-Linear PCM Encoded Audio Bitstreams Applying IEC 60958 — Part 2: Burst-info