SMPTE ST 338:2010
Revision of
SMPTE 338-2008

# SMPTE STANDARD

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



## Table of Contents





Approved
August 2, 2010

## 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 Part XIII of its Administrative Practices.

This SMPTE Engineering Document 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 Standard. 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.

SMPTE 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 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 337. This field describes data types that may be carried in an AES3 digital audio interface according to SMPTE 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, followed by formal languages, then figures, and then any other language forms.

# 3 Normative Reference

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

SMPTE 340-2008, Format for Non-PCM Audio and Data in AES3 — ATSC A/52B Digital Audio Compression Standard for AC-3 and Enhanced AC-3 Data Types

# 4 Data Types

Table 1 defines the data_type field described in SMPTE 337.

**Table 1 – Data Type Field**

| data_type value | Data type |
|---|---|
| 0 | Null data |
| 1 | ATSC A/52B, (AC-3) data (audio) |
| 2 | Time stamp data |
| 3 | Pause data |
| 4 | MPEG-1 Layer I (audio) data |
| 5 | MPEG-1 Layer II or III (audio) data or<br>MPEG-2 Layer 1, II, or III (audio) data without extension |
| 6 | MPEG-2 Layer I, II, or III (audio) data with extension |
| 7 | MPEG 2 AAC in ADTS |
| 8 | Reserved MPEG-2 Layer I (audio) data low-sampling frequency |
| 9 | Reserved MPEG-2 Layer II or III (audio) data low-sampling frequency |
| 10 | MPEG-4 AAC data in ADTS or LATM/LOAS |
| 11 | MPEG-4 HE-AAC data in ADTS or LATM/LOAS |
| 12–15 | Reserved |
| 16 | ATSC A/52B, (Enhanced AC-3) audio data (professional applications) |
| 17-18 | Reserved |
| 19 | Reserved for MPEG-2 AAC low sampling frequency in ADTS |
| 20 | Reserved |
| 21 | Reserved ATSC A/52B, (Enhanced AC-3) audio data (consumer applications only) |
| 22-25 | Reserved |
| 26 | Utility data type (V sync) |
| 27 | Reserved SMPTE KLV data |
| 28 | Reserved Dolby E (audio) data |
| 29 | Captioning data |
| 30 | User defined data |
| 31 | Reserved |

# 5 Data Type References

This clause provides references to additional standards that describe specific data types and formatting requirements for these data types.

## 5.1 Data Type 0 – Null Data

Reference: SMPTE 339, Generic Data Types.

## 5.2 Data Type 1 – ATSC A/52B (AC-3) (Audio)

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

## 5.3 Data Type 2 – Time Stamp

Reference: SMPTE 339, Generic Data Types.

## 5.4 Data Type 3 – Pause Data

Reference: SMPTE 339, Generic Data Types.

## 5.5 Data Type 4 – MPEG-1 Layer I (Audio) Data

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

## 5.6 Data Type 5 – MPEG-1 Layer II or III (Audio) Data or MPEG-2 Layer I, II, or III (Audio) Data without Extension

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

## 5.7 Data Type 6 – MPEG-2 Layer I, II, or III (Audio) Data with Extension

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

## 5.8 Data Type 7 – MPEG-2 AAC in ADTS

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

## 5.9 Data Type 10 – MPEG-4 AAC Data in ADTS or LATM/LOAS

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

## 5.10 Data Type 11 – MPEG-4 HE-AAC Data in ADTS or LATM/LOAS

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

## 5.11 Data Type 16 – ATSC A/52B Enhanced AC-3 Data Type

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

### 5.12 Data Type 26 – Utility Data (includes V Sync Marker)

Reference: SMPTE 339, Generic Data Types.

### 5.13 Data Type 29 – Captioning Data

Reference: SMPTE 341M, Captioning Data Type.

### 5.14 Data Type 30 – User Data

Reference: SMPTE 339, Generic Data Types.

# Annex A Bibliography (Informative)

SMPTE 337-2008, Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface

SMPTE 339-2008, Format for Non PCM Audio and Data in AES3 — Generic Data Types

SMPTE 341M-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

ATSC A/52B, Digital Audio Compression Standard (AC-3, E-AC-3), Revision B, 14 June 2005

ISO/IEC 11172-3:1993, Information Technology — Coding of Moving Pictures and Associated Audio for Digital Storage Media at up to about 1,5 Mbit/s — Part 3: Audio

ISO/IEC 13818-3:1998, Information Technology — Generic Coding of Moving Pictures and Associated Audio Information — Part 3: Audio

ISO/IEC 13818-7:2006, Information Technology — Generic Coding of Moving Pictures and Associated Audio Information — Part 7: Advanced Audio Coding (AAC)

ISO/IEC 14496-3:2009, Information Technology — Coding of Audio-Visual Objects — Part 3: Audio