SMPTE STANDARD

Professional Media Over Managed IP Networks: PCM Digital Audio

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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. 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 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.

The capability and capacity of IP networking equipment has improved steadily, enabling the use of IP switching and routing technology to transport and switch video, audio, and metadata essence within television facilities. Existing standards such as SMPTE ST 2022-6 have gained use in this application, but there is a desire in the industry to switch different essence elements separately.

This family of SMPTE engineering documents builds on the work of VSF TR03 and TR04, and of AES67, documenting a system for transporting various essence streams over IP networks, capturing the timing relationships between those streams. The system is intended to be extensible to a variety of essence types.

SMPTE ST 2110-10 covers the system as a whole, the timing model, and common requirements across all essence types.

SMPTE ST 2110-30 (this standard) documents and constrains of use of IP-encapsulated PCM audio in a manner compatible to AES67 in such systems.

1 Scope

This standard specifies the real-time, RTP-based transport of PCM digital audio streams over IP networks by reference to AES67. An SDP-based signaling method is defined for metadata necessary to receive and interpret the stream.

Non-PCM digital audio signals including compressed audio signals are outside the scope of this standard.

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

The following standards contain provisions which, through reference in this text, constitute provisions of this engineering document. At the time of publication, the editions indicated were valid. All standards are subject

to revision, and parties to agreements based on this engineering document are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

AES67-2015 AES standard for audio applications of networks - High-performance streaming audio-over-IP interoperability

Internet Engineering Task Force (IETF) RFC 3190 RTP Payload Format for 12-bit DAT Audio and 20- and 24-bit Linear Sampled Audio [online, viewed 2017-08-10] Available at https://www.ietf.org/rfc/rfc3190.txt

Internet Engineering Task Force (IETF) RFC 4566 SDP: Session Description Protocol [online, viewed 2017-08-10] Available at https://www.ietf.org/rfc/rfc4566.txt

SMPTE ST 2110-10:2017 Professional Media over Managed IP Networks – System Timing and Definitions

SMPTE ST 2036-2 Ultra High Definition Television – Audio Characteristics and Audio Channel Mapping for Program Production

4 Terms and Definitions

The terms and definitions of SMPTE ST 2110-10 apply.

5 Textual Conventions

5.1 SDP Parameters and Values

The names and values of SDP Media Type parameters within the text of this document are formatted using a monospaced font (such as Courier) except when they appear in section headings.

6 Uncompressed PCM Digital Audio RTP Essence Format

6.1 Media Clock, RTP Clock, and RTP Timestamps

The Media Clock and RTP Clock shall comply with SMPTE ST 2110-10 sections 7.3 (titled “Media Clocks”) and 7.4 (titled “RTP Clocks”) respectively. The rate of the Media Clock and RTP Clock shall be the same as the digital audio sampling rate.

The RTP timestamp shall comply with SMPTE ST 2110-10 section 7.5 (titled “RTP Timestamps”).

All senders and receivers of PCM digital audio conforming to this standard shall support a digital audio sampling rate of 48 kHz, and should support digital audio sampling rates of 44.1 kHz and/or 96 kHz. Other sampling rates are out of scope.

All senders and receivers conforming to Levels above level A as defined in Table 2 shall support the sampling rates, packet times, and numbers of channels stated for their level in Table 2.