

SMPTE STANDARD

Format for Non-PCM Audio
in AES3 —
MPEG-2 AAC and HE AAC
Audio in ADTS



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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 Part XIII of its Administrative Practices.

This SMPTE ST 2041-2 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.

The MPEG Committee of ISO/IEC has produced a number of different audio compression technologies. Each of these is nominally an "emission" codec, which means that its design does not include consideration for maintaining audio quality in multiple decode – re-encode cycles. As a result many operators will desire to keep the original compressed bitstream intact while routing, switching, and other baseband manipulations are done with associated video signals.

The first of these codecs, MPEG-1 Layer I and II audio (documented in ISO/IEC 11172-3) and MPEG-2 Layers I, II, and III audio (documented in ISO/IEC 13818-3) were intended to be bit-wise compatible within Layers I and II, while MPEG-2 Layer III used "Non-Backwards Compatible" extensions. MPEG-2 Layer III audio has not been widely used in broadcast, however some recent extensions to it have been added via ISO/IEC 14496-3 Subpart 9 which may result in wider use.

The second of these codecs, MPEG-2 AAC (documented in ISO/IEC 13818-7) is intentionally non-compatible with Layer I, II, or III, and is known as "Advanced Audio Coding." A second set of documents, which extended MPEG-2 AAC were documented as a part of MPEG-4 in ISO/IEC 14496-3. Although MPEG-4 AAC was intended to be backwards compatible with MPEG-2 AAC, no assumption should be made that an MPEG-2 decoder can decode an MPEG-4 AAC bitstream (largely due to the different transport wrappers). When the SBR tool was added to AAC, creating "HE AAC," it was documented in Amendments to both ISO/IEC 13818-7 and ISO/IEC 14496-3.

It should be noted that there are two alternative "wrappers" standardized for AAC/HE AAC, one called ADTS (widely used in Japanese Digital Broadcasting) and the other known as LATM/LOAS, since the MPEG-4 (ISO/IEC 14496-3) AAC codecs introduced new features and capabilities that require a transport format which can signal their contents. In order to be able to pass the audio bitstream without the necessity to do partial decoding to locate flags the wrapper was devised. LATM/LOAS is specified as the wrapper for MPEG-4

AAC/HE AAC audio streams within DVB transport stream broadcasting applications. As a result, this suite of SMPTE standards will document carriage of both.

The following suite of SMPTE standards defines the carriage of MPEG compressed audio bitstreams within an AES3 carrier bitstream:

SMPTE ST 2041-1, Format for Non-PCM Audio in AES3 – MPEG-1/MPEG-2 Layers I, II, and III Audio

SMPTE ST 2041-2, Format for Non-PCM Audio in AES3 – MPEG-2 AAC/HE AAC Audio in ADTS

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

The bitstreams defined in this standard can be carried independently of video as AES3 bitstreams or embedded into SDI or HD-SDI bitstreams in the normal manner specified by other SMPTE standards.