STANDARDS AND INFORMATION DOCUMENTS

STANDARDS

AES standard for
digital audio engineering -
Carriage of MPEG Surround
in an AES3 bitstream

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Abstract

MPEG-D is an ISO/IEC standard describing MPEG Surround that extends mono or stereo audio towards multiple channels. The mono or stereo audio channels represent a downmix of the original multi-channel audio that is generated by the MPEG Surround encoder. In addition the MPEG Surround encoder generates spatial side information (MPEG Surround data). An MPEG Surround decoder is able to combine this information with the downmix to result in a multi-channel audio signal. In this way backward compatibility to mono and stereo systems is achieved.

More recently, MPEG-D has been revised to include MPEG SAOC (Spatial Audio Object Coding) that uses the same method to convey the related side information over PCM.

This standard specifies how MPEG Surround or MPEG SAOC shall be carried within an AES3 bitstream where the downmix channels remain in the linear PCM domain and the MPEG Surround or MPEG SAOC data is embedded into the least-significant bits of the PCM audio data.

Contents

Foreword

This foreword is not part of the *AES standard for digital audio engineering - Carriage of MPEG Surround in an AES3 bitstream*, AES55-2007.

This document was developed under project AES-X159. The members of the writing group that developed this document in draft are: R. Caine, C. Cellier, J. Grant, J. Herre, K. Kjörling, W. Oomen, E. Schuijers, J. Woodgate, M. Yonge.

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Foreword to 2012 revision

This revision extends the previous edition to include MPEG Spatial Audio Object Coding (SAOC), and was principally contributed by A. Borsum.

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Note on normative language

In AES standards documents, sentences containing the word "shall" are requirements for compliance with the document. Sentences containing the verb "should" are strong suggestions (recommendations). Sentences giving permission use the verb "may". Sentences expressing a possibility use the verb "can".

AES standard for digital audio engineering - Carriage of MPEG Surround in an AES3 bitstream

0 Introduction

MPEG Surround is an ISO/IEC standard to extend mono or stereo audio towards multiple channels. The mono or stereo audio channels represent a downmix of the original multi-channel audio that is generated by the MPEG Surround encoder. In addition the MPEG Surround encoder generates spatial side information (MPEG Surround data). An MPEG Surround decoder is able to combine this information with the downmix to result in a multi-channel audio signal. In this way backward compatibility to conventional mono and stereo systems is achieved.

MPEG Spatial Audio Object Coding (SAOC) is an ISO/IEC standard to encode, transmit, and interactively render multiple audio objects for playback with various kinds of channel configurations. Side information is conveyed alongside a compatible mix-down of the incoming audio objects which can be rendered by an MPEG SAOC decoder for different reproduction scenarios. As for MPEG Surround, MPEG SAOC provides backward compatibility to mono or stereo systems.

The format of the AES3 interface consists of a sequence of AES3 subframes. Each AES3 subframe is normally used to carry one linear PCM sample. MPEG Surround or SAOC data can be conveyed as buried data over traditional PCM audio channels by adding a noise-like signal with specific characteristics to the less-significant bits of the PCM data. By embedding buried data into the PCM samples, the AES3 format itself is not affected, except for a mechanism to signal the presence of data hidden in the PCM samples using the channel status.

This noise-like signal, which actually is a randomized version of the embedded data, can be rendered inaudible by employing subtractive dithered noise-shaping controlled by the masked threshold.

1 Scope

This standard specifies a means of transport of an MPEG Surround and MPEG SAOC bitstreams over an AES3-compliant transport. The transport method is intended to be compatible with IEC 60958-compliant transport. The standard does not consider compression or processing algorithms associated with MPEG Surround or MPEG SAOC.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60958-1 Ed.3.0: 2008 *Digital audio Interface – Part 1: General*, International Electrotechnical Commission, Geneva, Switzerland. www.iec.ch

AES3-2009, *AES standard for digital audio – Digital input-output interfacing – Serial transmission format for two channel linearly represented digital audio data*, Audio Engineering Society, New York, US. www.aes.org