

SMPTE RECOMMENDED PRACTICE

Requirements for Equipment  
Compatibility with Non-PCM  
AES3 Streams



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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.

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## Introduction

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

The AES3 signal format is generally used to carry two channels of linear PCM audio. The AES3 specification allows the signal to carry other data in place of audio data. In this document, such other data will be referred to as "non-PCM data". SMPTE 337M describes general formatting requirements when carrying non-PCM audio and data in an AES3 digital audio bitstream. When equipment handles AES3 PCM audio, some types of processing of the AES3 payload are often acceptable or even desirable. Examples are sample rate conversion to synchronize the PCM sample rate to a video reference, or dithering when reducing PCM word length. In order for a non-PCM AES3 signal carrying data to successfully traverse an AES3 plant, all equipment in the signal path should deliver the AES3 data payload exactly as received, and not perform any operations on the data which change any of the bit patterns. Equipment which is compliant with this Recommended Practice can be used to handle non-PCM AES3 streams such as those defined in SMPTE 337M and its associated family of standards.

AES3 streams are composed of a sequence of frames. Each frame consists of two interleaved subframes, one for the Channel 1 data and the second for the Channel 2 data. Each subframe consists of a synchronization preamble, a 24-bit data payload, a Validity bit, a User bit, a Channel Status bit and a Parity bit. The payload can carry either linearly coded PCM audio or SMPTE 337M type data.

A sequence of 192 subframes makes up a channel status block of 192 bits (or 24 bytes) containing channel status data. The first bit of channel status data (byte 0, bit 0) indicates Professional use of the data when set to logical one, or consumer use when set to logical zero. The second bit (byte 0, bit 1) indicates whether the contents of the subframe contain linear PCM audio (when set to logical zero) or "Nonaudio" (data) when set to logical one.

The specifications below are intended to ensure that the data contents of a non-PCM AES3 stream<sup>1</sup> are not corrupted by any processes which may be acceptable for PCM signals, and which may be found in many types of equipment. The specifications below are necessary, but not necessarily sufficient, to guarantee successful operation with non-PCM AES3 streams. Annex A provides several examples and explanations to support the requirements of this document.

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<sup>1</sup> AES3 calls non-PCM data "audio sample word(s) used for purposes other than linear PCM samples".