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INTERNATIONAL STANDARD

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Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 –
Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats

IEC 61937-3:2017-07+AMD1:2020-09 CSV(en)

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61937-3 edition 3.1 contains the third edition (2017-07) [documents 100/2720/CDV and 100/2934/RVC] and its amendment 1 (2020-09) [documents 100/3392/CDV and 100/3456/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61937-3 has been prepared by subcommittee technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This third edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) removal of support for enhanced AC-3 bitstreams with a sampling frequency of 32 kHz;

b) updates to normative and informative references;

c) clarification of pause data-burst usage for enhanced AC-3 bitstreams.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61973 series, published under the general title *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION to Amendment 1

This amendment to 61937-3:2017 is necessary to remove the last paragraph from the Enhanced AC-3 provisions that does not apply to Enhanced AC-3. It only applies to AC-3 and was inadvertantly copied when Enhanced AC-3 was authored.

DIGITAL AUDIO – INTERFACE FOR NON-LINEAR PCM ENCODED AUDIO BITSTREAMS APPLYING IEC 60958 –

Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats

1 Scope

This part of IEC 61937 describes the method used to convey non-linear PCM bitstreams encoded according to the AC-3 and enhanced AC-3 formats.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61937-1:2007, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-1:2007/AMD1:2011, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-2, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 2: Burst-info*

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
block identification flag
flag used to indicate that the first audio block of an enhanced AC-3 syncframe with a stream type value of two formed the first audio block in the AC-3 syncframe from which it was converted

3.2
converter synchronization flag
flag used for synchronization by a device that converts an enhanced AC-3 bitstream to a bitstream compliant with an AC-3 decoder and indicates that the first block in this enhanced AC-3 syncframe will form the first block of the AC-3 syncframe output by the conversion process

3.3
latency
delay time of an external audio decoder to decode an AC-3 or enhanced AC-3 data-burst, defined as the sum of two values: the receiving delay time and the decoding delay time

3.4
stream type
parameter of an enhanced AC-3 syncframe identifying the type of substream of which the syncframe is a part

Note 1 to entry: An enhanced AC-3 bitstream is constructed from one or more substreams, with each substream being constructed from a sequence of syncframes.

3.5
substream identification
parameter of an enhanced AC-3 syncframe which, in conjunction with the stream type parameter, identifies the substream in the bitstream of which the syncframe is a part

3.6
syncframe
minimum portion of the AC-3 or enhanced AC-3 audio serial bitstream capable of being fully decoded, also known as a synchronization frame

3.7 Abbreviated terms

ATSC Advanced Television Systems Committee

ETSI European Telecommunications Standards Institute

4 Mapping of the audio bitstream on to IEC 61937-1

4.1 General

The coding of the bitstream and data-burst is in accordance with IEC 61937-1, IEC 61937-1:2007/AMD1:2011 and IEC 61937-2, including field names such as "Pc", "Pa" and "R".

4.2 AC-3 and enhanced AC-3 burst-info

The 16-bit burst-info contains information about the data that will be found in the data-burst (see Table 1).

Table 1 – Fields of burst-info

Bits of Pc	Data-type bits 0-4	Data-type bits 5-6	Contents	Reference point R	Repetition period of data-burst measured in IEC 60958 frames
0 to 6	1	0	AC-3	R-AC-3	1 536
		1 to 3	Reserved		
	2 to 20	According to IEC 61937			
	21	0	Enhanced AC-3	Bit 0 of Pa	6 144
		1 to 3	According to IEC 61937		
	22 to 31	According to IEC 61937			
7 to 15	According to IEC 61937				

5 Format of AC-3 and enhanced AC-3 data-bursts

5.1 General

This clause specifies the audio data-bursts AC-3 and enhanced AC-3. Specific properties such as reference points, repetition periods, the method of filling stream gaps and decoding latency are specified.

The decoding latency (or delay), indicated for the data-type bits 0-4, should be used by the transmitter to schedule data-bursts as necessary to establish synchronization between picture and decoded audio.

5.2 Pause data-burst

Pause data-bursts for AC-3 and enhanced AC-3 are given in Table 2.

Table 2 – Repetition period of the pause data-bursts

Data-type bits 0-4 of audio data-burst	Repetition period of pause data-burst	
	Mandatory	Recommended
AC-3	-	3 IEC 60958 frames
Enhanced AC-3	-	4 IEC 60958 frames

5.3 Audio data-bursts

5.3.1 AC-3 data

The AC-3 bitstream consists of a sequence of AC-3 syncframes. The data-type bits 0-4 of an AC 3 data-burst is 1. An AC-3 syncframe represents 1 536 samples of each encoded audio channel (left, centre, etc.). The data-burst is headed with a burst-preamble followed by the burst-payload. The burst-payload of each data-burst of AC-3 data shall contain one complete AC-3 syncframe. Figure 1 shows the structure of the AC-3 data-burst.

The length of the AC-3 data-burst will depend on the encoded bit rate (which determines the AC-3 syncframe size). The AC-3 bitstream is specified in ETSI TS 102 366 (see also ATSC A/52:2012).

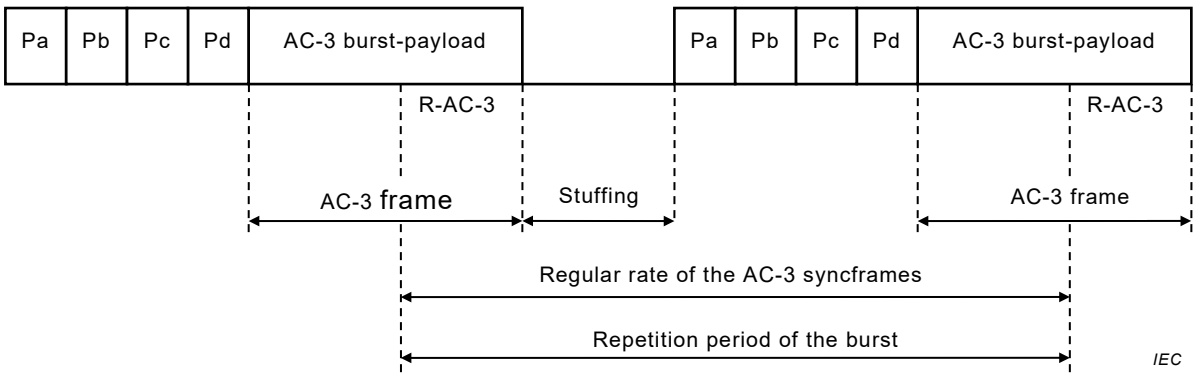

Figure 1 – AC-3 data-burst, with reference point R

The data-type-dependent info for bits 0-4 of AC-3 is given in Table 3.