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INTERNATIONAL STANDARD

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Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 2: Burst-info

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

Part 2: Burst-info

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61937-2:2007+AMD1:2011+AMD2:2018 CSV. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61937-2 has been prepared by technical area 20: Analogue and digital audio, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 2007, Amendment 1:2011 and Amendment 2:2018. This edition constitutes a technical revision.

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

a) new audio data-types of MPEG-D USAC, ACX, ACX HBR2, ACX HBR4 and ACX HBR8 have been added;
b) extended data-type field in Pe has been activated.

The text of this International Standard is based on the following documents:

Draft	Report on voting
100/3459/CDV	100/3541/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The list of all the parts of the IEC 61937 series, 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 this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document 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

The revision of IEC 61937-2 (2007) has become necessary to define additional data-types, in order to be consistent with the data-type field description in IEC 61937-1 and to clarify the rule and definition of this data-type. Amendment 1 contains the following significant technical changes with respect to the base publication (IEC 61937-2, second edition).

– New audio data-types of MPEG-4 ALS, MPEG-4 AAC LC in LATM/LOAS, MPEG-4 HE AAC in LATM/LOAS and DRA are added.

– The description of data-type and subdata-type fields in Pc is clarified.

– A rule has been defined for new data-types.

INTRODUCTION to Amendment 2

The revision of IEC 61937-2:2007 has become necessary to define additional data types. Amendment 2 contains the following significant technical changes with respect to the base publication (IEC 61937-2:2007 and IEC 61937-2:2007/AMD1:2011):

a) new audio data-types of ATRAC-X low latency, MPEG-H 3D Audio, MPEG-H 3D Audio HBR, AC-4, AC-4 HBR4, AC-4 HBR16, AC-4 LD and MPEG-4 ALS in LATM/LOAS are added;

b) units of Pd column is added to Table 2;

c) update SMPTE reference.

In the next full revision of IEC 61937-2, it is planned to relinquish the use of "Conventional data-type" and "Subdata-type", replacing them with "data-type bits 0 to 4" and "data-type bits 5 to 6", respectively.

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

Part 2: Burst-info

1 Scope

This part of IEC 61937 specifies the digital audio interface to convey non-linear PCM encoded audio bitstreams applying IEC 60958-1 and IEC 60958-3. This document specifies burst-info, which defines content information about the data contained in the burst-payload.

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 60958-1, *Digital audio interface – Part 1: General*

IEC 60958-3, *Digital audio interface – Part 3: Consumer applications*

IEC 61937-1:~~2007~~2021, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 1: General*

IEC 61937-3, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 3: Non-linear PCM bitstreams according to the AC-3 format*

IEC 61937-4, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 4: Non-linear PCM bitstreams according to the MPEG audio format*

IEC 61937-5, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 5: Non-linear PCM bitstreams according to the DTS (Digital Theater Systems) format(s)*

IEC 61937-6, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 6: Non-linear PCM bitstreams according to the MPEG-2 AAC and MPEG-4 AAC audio formats*

IEC 61937-7, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 7: Non-linear PCM bitstreams according to the ATRAC, ATRAC2/3 and ATRAC-X formats*

IEC 61937-8~~:2006~~, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 8: Non-linear PCM bitstreams according to the Windows Media Audio (WMA) Professional format*

IEC 61937-9, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 9: Non-linear PCM bitstreams according to the MAT format*

IEC 61937-10, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 10: Non-linear PCM bitstreams according to the MPEG-4 audio lossless coding (ALS) format*

IEC 61937-11, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 11: MPEG-4 AAC and its extensions in LATM/LOAS*

IEC 61937-12, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 12: Non-linear PCM bitstreams according to the DRA formats*

IEC 61937-13, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 13: MPEG-H 3D Audio*

IEC 61937-14, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 14: Non-linear PCM bitstreams according to the AC-4 format*

IEC 61937-15, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 15: Non-linear PCM bit streams according to Auro-Cx format*

~~ISO/IEC 11172-3: *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mb/s – Part 3: Audio*~~

~~ISO/IEC 13818-3, *Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio*~~

~~ISO/IEC 13818-7, *Information technology – Generic coding of moving pictures and associated audio information – Advanced Audio Coding (AAC)*~~

~~ISO/IEC 14496-3, *Information technology – Coding of audio-visual objects – Part 3: Audio*~~

~~ITU-R Recommendation BS.1196, *Audio coding for digital terrestrial television broadcasting*~~

3 Terms and definitions ~~and abbreviations~~

~~3.1 Terms and definitions~~

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
audio data-burst
data-burst with an encoded audio frame as burst-payload

3.2
audio data-word
16-bit data-word

3.3
audio frame
fixed number of audio samples

Note 1 to entry: The number of samples in an audio frame is dependent on the particular encoding system that is used to encode the audio frame into the encoded audio frame.

3.4
audio gap
period in the sequence of baseband audio samples where valid samples of audio are not available

3.5
bitstream
non-linear PCM encoded audio source, represented in a sequence of bits

Note 1 to entry: In this interface, the bitstream consists of a sequence of data-bursts.

3.6
data-burst
packet of data, including the burst-preamble, to be transmitted across the interface

3.7
burst-payload
information content of the data-burst

3.8
burst-preamble
header for the data-burst, containing synchronization and information about the data contained in the burst-payload

3.9
data-type
reference to the type of payload of the data-bursts

3.10
encoded audio frame
minimum decodable unit of an encoded data sequence

Note 1 to entry: Each encoded audio frame is the encoded representation of a fixed number of audio samples (for each original audio channel). The number of samples that are encoded into an encoded audio frame depends on the particular encoding system used to encode the audio frame into the encoded audio frame.

3.11
length-code
length of the data-burst-payload in bits, bytes or ~~8-bytes~~ 8 byte units

3.12
repetition period
period between the reference point of the current data-burst, and the reference point of the immediately following data-burst of the same data-type

3.13
sampling frequency
~~sampling~~ frequency of the encoded PCM audio samples (i.e. before encoding and after decoding)

3.14
sampling period
period related to the sampling frequency of the PCM audio samples, represented in the encoded bitstream

3.15
stuffing
~~occupying~~ occupation of the unused data capacity of the interface

3.16
stuffing sub-frame
~~occupying~~ occupation of the unused data capacity in 16-bit audio data-words

3.17
stream gap
period within the encoded audio bitstream without any audio frame; a discontinuity in the bitstream

Note 1 to entry: Typically, a stream gap will occur between encoded audio frames.

~~3.2 Abbreviations~~

~~ATRAC~~	~~Adaptive TRansform Acoustic Coding~~
~~ATRAC2~~	~~Adaptive TRansform Acoustic Coding 2~~
~~ATRAC3~~	~~Adaptive TRansform Acoustic Coding 3~~
~~ATRAC2/3~~	~~ATRAC2 and/or ATRAC3~~
~~ATRAC-X~~	~~Adaptive TRansform Acoustic Coding-X~~
~~ATSC~~	~~Advanced Television Systems Committee~~
~~IEC~~	~~International Electrotechnical Commission~~
~~ISO/IEC MPEG~~	~~Moving Pictures Expert Group, a joint committee of ISO and IEC~~
~~ITU-R~~	~~International Telecommunication Union, Radiocommunication Bureau~~
~~MPEG~~	~~Motion Pictures Expert Group, a joint committee of ISO and IEC~~
~~SMPTE~~	~~Society of Motion Picture and Television Engineers~~

4 Burst-info

4.1 General

The 16-bit burst-info contains information about the data ~~which will be~~ found in the data-burst. Fields of burst-info are specified in Table 1.

Table 1 – Fields of burst-info

Bits of Pc		Value	Contents
0 to 6			Data-type (defined in IEC 61937-1)
	0 to 4		*Conventional* data-type
		0 to 31	See Table 2
	5 to 6		Subdata-type
		0 to 3	See Table 2
7			Error-flag
		0	Error-flag indicating a valid burst-payload
		1	Error-flag indicating that the burst-payload may contain errors
~~8 to 12~~ 8 to 2			Data-type-dependent info
13 to 15		0 to 7	Bit-stream-number
NOTE Refer to IEC 61937-1:2021, ~~6.1.7~~ 6.1.8.1 and ~~6.1.7.1~~ 6.1.8.2.			

4.2 Data-type, subdata-type and extended data-type

Data-type defined in Pc bits 0-6 in IEC 61937-1 consists of conventional data-type (0 to 4) and sub-data-type (5 to 6) for historical reasons. All conventional data-types and subdata-types are defined in Table 2.

~~Further definition of data-type in the reserved area of Table 2 shall be allocated in PC bits 0-6, in ascending order and without skipping gap.~~

Extended data-type is defined in Pe bits 0 to 15 in IEC 61937-1. All extended data-types are defined in Table 3.

Table 2 – Data-types

Data-type value of Pc bit 0 to 6		Contents	Reference point R	Repetition period of data-burst measured in IEC 60958 frames	Units of Pd
Conventional data-type Value of data-type bits 0 to 4	Subdata-type Value of data-type bits 5 to 6				
0	0	Null data		[a]	
1	0	AC-3 data	R-AC-3	1 536	bits
2	0 to 3	Refer to SMPTE ST 338			bits
3	0	Pause	bit 0 of Pa	[b]	bits
4	0	MPEG-1 layer 1 data	bit 0 of Pa	384	bits
5	0	MPEG-1 layer 2 or 3 data or MPEG-2 without extension	bit 0 of Pa	1 152	bits
6	0	MPEG-2 data with extension	bit 0 of Pa	1 152	bits
7	0	MPEG-2 AAC	bit 0 of Pa	1 024	bits
8	0	MPEG-2, layer-1 low sampling frequency	bit 0 of Pa	768	bits
9	0	MPEG-2, layer-2 low sampling frequency	bit 0 of Pa	2 304	bits
10	0	MPEG-2, layer-3 low sampling frequency	bit 0 of Pa	1 152	bits
11	0	DTS type I	bit 0 of Pa	512	bits

Data-type value of Pc bit 0 to 6		Contents	Reference point R	Repetition period of data-burst measured in IEC 60958 frames	Units of Pd
Conventional data-type **Value of data-type bits** **0 to 4**	**Subdata-type** **Value of data-type bits** **5 to 6**				
12	0	DTS type II	bit 0 of Pa	1 024	bits
13	0	DTS type III	bit 0 of Pa	2 048	bits
14	0	ATRAC	bit 0 of Pa	512	bits
15	0	ATRAC 2/3	bit 0 of Pa	1 024	bits
16	0	ATRAC-X	bit 0 of Pa	2 048	bits
	1	ATRAC-X low latency	bit 0 of Pa	512	bits
	2	ATRAC-X low latency	bit 0 of Pa	256	bits
	3	ATRAC-X low latency	bit 0 of Pa	128	bits
17	0	DTS type IV	bit 0 of Pa	See IEC 61937-5	bytes
18	0	WMA professional type I	bit 0 of Pa[c]	2 048	bits
	1	WMA professional type II	bit 0 of Pa	2 048	bits
	2	WMA professional type III	bit 0 of Pa	1 024	bits
	3	WMA professional type IV	bit 0 of Pa	512	bits
19	0	MPEG-2 AAC low sampling frequency	bit 0 of Pa	2 048	bits
	1	MPEG-2 AAC low sampling frequency	bit 0 of Pa	4 096	bits
	2 to 3	MPEG-2 AAC low sampling frequency	reserved	reserved	bits
20	0	MPEG-4 AAC	bit 0 of Pa	1 024	bits
	1	MPEG-4 AAC	bit 0 of Pa	2 048	bits
	2	MPEG-4 AAC	bit 0 of Pa	4 096	bits
	3	MPEG-4 AAC	bit 0 of Pa	512	bits
21	0	Enhanced AC-3	bit 0 of Pa	6 144	bytes
22	0	MAT	R-MAT	15 360	bytes
23	0	MPEG-4 ALS	bit 0 of Pa	See IEC 61937-10	8-bytes
	1	MPEG-4 AAC LC in LATM/LOAS	bit 0 of Pa	See IEC 61937-11	bits
	2	MPEG-4 HE AAC in LATM/LOAS	bit 0 of Pa	See IEC 61937-11	bits
	3	DRA	bit 0 of Pa	See IEC 61937-12	bits
24	0	AC-4	bit 0 of Pa	See IEC 61937-14	bytes
	1	AC-4 HBR4	bit 0 of Pa	See IEC 61937-14	bytes
	2	AC-4 HBR16	bit 0 of Pa	See IEC 61937-14	8-bytes
	3	AC-4 LD	bit 0 of Pa	See IEC 61937-14	bytes