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Edition 2.2 2018-03

CONSOLIDATED VERSION

colour inside

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

IEC 61937-2:2007-05+AMD1:2011-10+AMD2:2018-03 CSV(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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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This Consolidated version of IEC 61937-2 bears the edition number 2.2. It consists of the second edition (2007-05) [documents 100/1115/CDV and 100/1221/RVC], its amendment 1 (2011-10) [documents 100/1811/CDV and 100/1884/RVC] and its amendment 2 (2018-03) [documents 100/2944/CDV and 100/3032/RVC]. The technical content is identical to the base edition and its amendments.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. 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 61937-2 has been prepared by technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

a) New audio data-types of enhanced AC-3 data, MPEG-2 AAC low sampling frequency, MPEG-4 AAC, DTS type IV, ATRAC-X, WMA professional and MAT are added.

b) Data-type field in Pc is expanded from bit 0-4 to 0-6.

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

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 the base publication and its amendments 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- withdrawn,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

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 standard specifies burst-info which defines content information about the data contained in the burst payload.

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, *Digital audio interface – Part 1: General*

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

IEC 61937-1:2007, *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*[1]

[1] ~~To be published.~~

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*

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, definitions and abbreviations

3.1 Terms and definitions

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

audio data-burst	data-burst with an encoded audio frame as burst-payload
audio data-word	16-bit data word
audio frame	fixed number of audio samples. The number of samples in an audio frame is dependent on the particular encoding system which is used to encode the audio frame into the encoded audio frame
audio gap	period in the sequence of baseband audio samples where valid samples of audio are not available
bitstream	non-linear PCM encoded audio source, represented in a sequence of bits. In this interface the bitstream consists of a sequence of data-bursts
data-burst	packet of data, including the burst-preamble, to be transmitted across the interface
burst-payload	information content of the data-burst
burst-preamble	header for the data-burst, containing synchronization and information about the data contained in the burst-payload
data-type	reference to the type of payload of the data-bursts
encoded audio frame	minimum decodable unit of an encoded data sequence. Each encoded audio frame is the encoded representation of a fixed number of audio samples (for each original audio channel). The number of samples which are encoded into an encoded audio

	frame depends on the particular encoding system which is used to encode the audio frame into the encoded audio frame
length-code	length of the data-burst-payload in bits, bytes or 8-bytes
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
sampling frequency	sampling frequency of the encoded PCM audio samples (i.e. before encoding and after decoding)
sampling period	period related to the sampling frequency of the PCM audio samples, represented in the encoded bitstream
stuffing	occupying the unused data capacity of the interface
stuffing sub-frame	occupying the unused data capacity in 16-bit audio data words
stream gap	period within the encoded audio bitstream without any audio frame; a discontinuity in the bitstream. 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 is specified in Table 1.

Table 1 – Fields of burst-info

Bits of Pc		Value	Contents
0-6			Data-type (defined in IEC 61937-1)
	0-4		*Conventional* data-type
		0-31	See Table 2
	5-6		Subdata-type
		0-3	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
8-12			Data-type-dependent info
13-15		0-7	Bit-stream-number
NOTE Refer to IEC 61937-1, 6.1.7 and 6.1.7.1.			

4.2 Data-type and subdata-type

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

~~Any combination of data-type and subdata-type which is not defined in Table 2 shall not be transmitted.~~

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.

Table 2 – Data-types

~~Data-type Value of PC bit 0-4~~	~~Subdata-type Value of PC bit 5-6~~	~~Contents~~	~~Reference point R~~	~~Repetition period of data-burst measured in IEC 60958 frames~~
~~0~~	~~0~~	~~Null data~~		~~See Note 1~~
~~1~~	~~0~~	~~AC-3 data~~	~~R AC-3~~	~~1 536~~
~~2~~	~~0 – 3~~	~~Refer to SMPTE 338M~~		
~~3~~	~~0~~	~~Pause~~	~~bit 0 of Pa~~	~~See Note 2~~
~~4~~	~~0~~	~~MPEG-1 layer 1 data~~	~~bit 0 of Pa~~	~~384~~
~~5~~	~~0~~	~~MPEG-1 layer 2 or 3 data or MPEG-2 without extension~~	~~bit 0 of Pa~~	~~1 152~~
~~6~~	~~0~~	~~MPEG-2 data with extension~~	~~bit 0 of Pa~~	~~1 152~~
~~7~~	~~0~~	~~MPEG-2 AAC~~	~~bit 0 of Pa~~	~~1 024~~
~~8~~	~~0~~	~~MPEG-2, layer-1 low sampling frequency~~	~~bit 0 of Pa~~	~~768~~
~~9~~	~~0~~	~~MPEG-2, layer-2 low sampling frequency~~	~~bit 0 of Pa~~	~~2 304~~
~~10~~	~~0~~	~~MPEG-2, layer-3 low sampling frequency~~	~~bit 0 of Pa~~	~~1 152~~
~~11~~	~~0~~	~~DTS type I~~	~~bit 0 of Pa~~	~~512~~
~~12~~	~~0~~	~~DTS type II~~	~~bit 0 of Pa~~	~~1 024~~

13	0	DTS type III	bit 0 of Pa	2 048
14	0	ATRAC	bit 0 of Pa	512
15	0	ATRAC 2/3	bit 0 of Pa	1 024
16	0	ATRAC-X	bit 0 of Pa	2 048
17	0	DTS type IV	bit 0 of Pa	See IEC 61937-5
18	0	WMA professional type I	bit 0 of Pa *3	2 048
	1	WMA professional type II	bit 0 of Pa	2 048
	2	WMA professional type III	bit 0 of Pa	1 024
	3	WMA professional type IV	bit 0 of Pa	512
19	0	MPEG-2 AAC low sampling frequency	bit 0 of Pa	2 048
	1	MPEG-2 AAC low sampling frequency	bit 0 of Pa	4 096
	2 – 3	MPEG-2 AAC low sampling frequency	reserved	reserved
20	0	MPEG-4 AAC	bit 0 of Pa	1 024
	1	MPEG-4 AAC	bit 0 of Pa	2 048
	2	MPEG-4 AAC	bit 0 of Pa	4 096
	3	MPEG-4 AAC	bit 0 of Pa	512
21	0	Enhanced AC-3	bit 0 of Pa	6 144
	1 – 3	Reserved	reserved	reserved
22	0	MAT	R-MAT	15 360
	1 – 3	Reserved	reserved	reserved
23 – 26	0 – 3	Reserved		
27 – 30	0 – 3	Refer to SMPTE 338M		
31	0 – 3	Extended data-type (not use until defined)		

NOTE 1 Refer to IEC 61937-1, 7.3.
NOTE 2 The repetition period of pause data-bursts depends on the application. The repetition period of pause data-bursts is defined for each audio data-burst.
NOTE 3 Refer to IEC 61937-8, 4.2.

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 – 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

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				
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
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 – 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
25	0	MPEG-H 3D Audio	bit 0 of Pa	See IEC 61937-13	bytes
	1	MPEG-H 3D Audio HBR	bit 0 of Pa	See IEC 61937-13	8-bytes

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				
	2	MPEG-4 ALS in LATM/LOAS	bit 0 of Pa	See IEC 61937-10	8-bytes
	3	Reserved (do not use until defined)			
103 – 107		Reserved (do not use until defined)			
(26)	*(0 – 3)*				
27 – 30	0 – 3	Refer to SMPTE ST 338			bits
31	0 – 3	Extended data-type (do not use until defined)			

[a] Refer to IEC 61937-1:2007, 7.3.

[b] The repetition period of pause data-bursts depends on the application. The repetition period of pause data-bursts is defined for each audio data-burst.

[c] Refer to IEC 61937-8:2006, 4.2.

4.3 Audio data-bursts

4.3.1 General

This subclause specifies the audio data-bursts. Specific properties such as reference points, repetition period, the method of filling stream gaps, and decoding latency are specified for each data-type.

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

4.3.2 AC-3

The AC-3 bitstream consists of a sequence of AC-3-frames. The data-type of an AC-3 data-burst is 1 and the subdata-type of an AC-3 data-burst is 0. An AC-3 frame 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-frame.

The length of the AC-3 data-burst will depend on the encoded bit rate (which determines the AC-3-frame length). The specification for the AC-3 bitstream may be found in ITU-R Recommendation BS.1196; the burst format is specified in IEC 61937-3.

4.3.3 MPEG-1 layer-1

An MPEG-1 layer-1 MPEG-frame represents 384 samples of each encoded channel and can be transferred using data-type 4 and the subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 11172-3 and IEC 61937-4.

4.3.4 MPEG-1 layer-2 or layer-3 or MPEG-2 without extension

The burst-payload of MPEG-1 layer-2, or layer-3, or MPEG-2 without extension, represents 1 152 samples of each encoded channel and can be transferred using data-type 5 and sub-data-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 11172-3, ISO/IEC 13818-3 and IEC 61937-4.

4.3.5 MPEG-2 with extension

The burst-payload of MPEG-2 with extension represents 1 152 samples of each encoded channel and can be transferred using data type 6 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.6 MPEG-2 AAC

The payload of MPEG-2 AAC represents 1 024 samples of each encoded channel and can be transferred using data-type 7 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-7 and IEC 61937-6.

4.3.7 MPEG-2 layer-1 low sampling frequency

An MPEG-2 layer-1 frame with low sampling frequency represents 384 samples of each encoded channel and can be transferred using data-type 8 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.8 MPEG-2 layer-2 low sampling frequency

The payload of MPEG-2 layer-2 frame with low sampling frequency represents 1 152 samples of each encoded channel and can be transferred using data-type 9 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.9 MPEG-2 layer-3 low sampling frequency

The payload of MPEG-2 layer-3 frame with low sampling frequency represents 576 samples of each encoded channel and can be transferred using data-type 10 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.10 DTS type I

The payload of DTS type I represents 512 samples of each encoded channel and can be transferred using data-type 11 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.11 DTS type II

The payload of DTS type II represents 1 024 samples of each encoded channel and can be transferred using data-type 12 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.12 DTS type III

The payload of DTS type III represents 2 048 samples of each encoded channel and can be transferred using data-type 13 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.13 DTS type IV

The payload of DTS type IV represents samples of each encoded channel and can be transferred using data-type 17 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.14 ATRAC

The payload of ATRAC represents 512 samples of each encoded channel and can be transferred using data-type 14 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.15 ATRAC 2/3

The payload of ATRAC 2/3 represents 1 024 samples of each encoded channel and can be transferred using data-type 15 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.16 ATRAC-X

The payload of ATRAC-X represents 2 048 samples of each encoded channel and can be transferred using data-type 16 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.17 MPEG-2 AAC low sampling frequency

The payload of MPEG-2 AAC low sampling frequency represents 2 048 samples of each encoded channel and can be transferred using data-type 19 and subdata-type 0 or it represents 4 096 samples of each encoded channel and can be transferred using data-type 19 and subdata-type 1. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-7 and IEC 61937-6.

4.3.18 MPEG-4 AAC

The payload of MPEG-4 AAC represents 1 024 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 0. The payload of MPEG-4 AAC represents 2 048 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 1. The payload of MPEG-4 AAC represents 4 096 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 2. The payload of MPEG-4 AAC represents 512 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 3. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 14496-3 and IEC 61937-6.

4.3.19 Windows Media Audio professional

The payload of WMA professional type I represents 2 048 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 0. The payload of WMA professional type II represents 2 048 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 1. The payload of WMA professional type III represents 1 024 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 2. The payload of WMA professional type IV represents 512 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 3. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-8.

4.3.20 Enhanced AC-3

The enhanced AC-3 bitstream consists of a sequence of enhanced AC-3-frames. The data-type of an enhanced AC-3 data-burst is 21 and the subdata-type of an enhanced AC-3 data-burst is 0. The contents of an enhanced AC-3 data-burst represent 1 536 samples of each encoded audio channel. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-3.

4.3.21 MAT

The MAT bitstream consists of a sequence of frames. The data-type of an MAT data-burst is 22 and the subdata-type is 0. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MAT data shall contain 1 complete

MAT frame. The length of the MAT data-burst depends on the encoded bit rate (which determines the MAT frame length); see IEC 61937-9.

4.3.22 MPEG-4 ALS

The MPEG-4 ALS bitstream consists of a sequence of frames. The data-type of an MPEG-4 ALS data-burst is 23 and the subdata-type is 0. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 ALS data shall contain 1 complete MPEG-4 ALS frame. The length of the MPEG-4 ALS data-burst depends on the encoded bit rate (which determines the MPEG-4 ALS frame length), see IEC 61937-10.

4.3.23 MPEG-4 AAC LC in LATM/LOAS

The MPEG-4 AAC LC in LATM/LOAS bitstream consists of a sequence of frames. The data-type of an MPEG-4 AAC LC in LATM/LOAS data-burst is 23 and the subdata-type is 1. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 AAC LC in LATM/LOAS data shall contain 1 complete MPEG-4 AAC LC in LATM/LOAS frame. The length of the MPEG-4 AAC LC in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 AAC LC in LATM/LOAS frame length), see IEC 61937-11.

4.3.24 MPEG-4 HE AAC in LATM/LOAS

The MPEG-4 HE AAC in LATM/LOAS bitstream consists of a sequence of frames. The data-type of an MPEG-4 HE AAC in LATM/LOAS data-burst is 23 and the subdata-type is 2. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 HE AAC in LATM/LOAS data shall contain 1 complete MPEG-4 HE AAC in LATM/LOAS frame. The length of the MPEG-4 HE AAC in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 HE AAC in LATM/LOAS frame length), see IEC 61937-11.

4.3.25 DRA

The DRA bitstream consists of a sequence of frames. The data-type of a DRA data-burst is 23 and the subdata-type is 3. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of DRA data shall contain 1 complete DRA frame. The length of the DRA data-burst depends on the encoded bit rate (which determines the DRA frame length), see IEC 61937-12.

4.3.26 ATRAC-X low latency

The payload of ATRAC-X represents 512 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 1 to data-type bits 5 to 6, or it represents 256 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 2 to data-type bits 5 to 6, or 128 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 3 to data-type bits 5 to 6. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.27 MPEG-H 3D Audio

The MPEG-H 3D Audio bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an MPEG-H 3D Audio data-burst is 25 and the value of data-type bits 5 to 6 is 0. The value of data-type bits 0 to 4 of an MPEG-H 3D Audio HBR data-burst is 25 and the value of data-type bits 5 to 6 is 1. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-H 3D Audio shall contain one complete MPEG-H 3D Audio frame. The length of the MPEG-H 3D Audio data-burst depends on the encoded bit rate (which determines the MPEG-H 3D Audio frame length); see IEC 61937-13.

4.3.28 AC-4, AC-4 HBR4, AC-4 HBR16 and AC-4 LD

The AC-4 bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an AC-4 data-burst is 24 and the value of data-type bits 5 to 6 is 0. The value of data-type bits 0 to 4 of an AC-4 HBR4 data-burst is 24 and the value of data-type bits 5 to 6 is 1. The value of data-type bits 0 to 4 of an AC-4 HBR16 data-burst is 24 and the value of data-type bits 5 to 6 is 2. The value of data-type of an AC-4 LD data-burst is 24 and the value of data-type bits 5 to 6 is 3. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of AC-4 data shall contain one complete AC-4 frame. The length of the AC-4 data-burst depends on the encoded bit rate (which determines the AC-4 frame length); see IEC 61937-14.

4.3.29 MPEG-4 ALS in LATM/LOAS

The MPEG-4 ALS in LATM/LOAS bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an MPEG-4 ALS in LATM/LOAS data-burst is 25 and the value of data-type bits 5 to 6 is 2. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 ALS in LATM/LOAS data shall contain one complete MPEG-4 ALS frame. The length of the MPEG-4 ALS in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 ALS frame length); see IEC 61937-10.

Bibliography

SMPTE ST 338, *Format for Non-PCM Audio and Data in AES3 – Data Types*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: Burst-info

FOREWORD

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This Consolidated version of IEC 61937-2 bears the edition number 2.2. It consists of the second edition (2007-05) [documents 100/1115/CDV and 100/1221/RVC], its amendment 1 (2011-10) [documents 100/1811/CDV and 100/1884/RVC] and its amendment 2 (2018-03) [documents 100/2944/CDV and 100/3032/RVC]. The technical content is identical to the base edition and its amendments.

This Final version does not show where the technical content is modified by amendments 1 and 2. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 61937-2 has been prepared by technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

a) New audio data-types of enhanced AC-3 data, MPEG-2 AAC low sampling frequency, MPEG-4 AAC, DTS type IV, ATRAC-X, WMA professional and MAT are added.

b) Data-type field in Pc is expanded from bit 0-4 to 0-6.

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

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 the base publication and its amendments 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.

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 standard specifies burst-info which defines content information about the data contained in the burst payload.

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, *Digital audio interface – Part 1: General*

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

IEC 61937-1:2007, *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*

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, definitions and abbreviations

3.1 Terms and definitions

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

audio data-burst	data-burst with an encoded audio frame as burst-payload
audio data-word	16-bit data word
audio frame	fixed number of audio samples. The number of samples in an audio frame is dependent on the particular encoding system which is used to encode the audio frame into the encoded audio frame
audio gap	period in the sequence of baseband audio samples where valid samples of audio are not available
bitstream	non-linear PCM encoded audio source, represented in a sequence of bits. In this interface the bitstream consists of a sequence of data-bursts
data-burst	packet of data, including the burst-preamble, to be transmitted across the interface
burst-payload	information content of the data-burst
burst-preamble	header for the data-burst, containing synchronization and information about the data contained in the burst-payload
data-type	reference to the type of payload of the data-bursts
encoded audio frame	minimum decodable unit of an encoded data sequence. Each encoded audio frame is the encoded representation of a fixed number of audio samples (for each original audio channel). The number of samples which are encoded into an encoded audio

	frame depends on the particular encoding system which is used to encode the audio frame into the encoded audio frame
length-code	length of the data-burst-payload in bits, bytes or 8-bytes
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
sampling frequency	sampling frequency of the encoded PCM audio samples (i.e. before encoding and after decoding)
sampling period	period related to the sampling frequency of the PCM audio samples, represented in the encoded bitstream
stuffing	occupying the unused data capacity of the interface
stuffing sub-frame	occupying the unused data capacity in 16-bit audio data words
stream gap	period within the encoded audio bitstream without any audio frame; a discontinuity in the bitstream. 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 is specified in Table 1.

Table 1 – Fields of burst-info

Bits of Pc		Value	Contents
0-6			Data-type (defined in IEC 61937-1)
	0-4		*Conventional* data-type
		0-31	See Table 2
	5-6		Subdata-type
		0-3	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
8-12			Data-type-dependent info
13-15		0-7	Bit-stream-number
NOTE Refer to IEC 61937-1, 6.1.7 and 6.1.7.1.			

4.2 Data-type and subdata-type

Data-type defined in PC bits 0-6 in IEC 61937-1 consists of *conventional* data-type (0-4) and subdata-type (5-6) 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.

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 – 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
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 – 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

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				
	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
25	0	MPEG-H 3D Audio	bit 0 of Pa	See IEC 61937-13	bytes
	1	MPEG-H 3D Audio HBR	bit 0 of Pa	See IEC 61937-13	8-bytes
	2	MPEG-4 ALS in LATM/LOAS	bit 0 of Pa	See IEC 61937-10	8-bytes
	3	Reserved (do not use until defined)			
103 – 107		Reserved (do not use until defined)			
(26)	*(0 – 3)*				
27 – 30	0 – 3	Refer to SMPTE ST 338			bits
31	0 – 3	Extended data-type (do not use until defined)			

[a] Refer to IEC 61937-1:2007, 7.3.

[b] The repetition period of pause data-bursts depends on the application. The repetition period of pause data-bursts is defined for each audio data-burst.

[c] Refer to IEC 61937-8:2006, 4.2.

4.3 Audio data-bursts

4.3.1 General

This subclause specifies the audio data-bursts. Specific properties such as reference points, repetition period, the method of filling stream gaps, and decoding latency are specified for each data-type.

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

4.3.2 AC-3

The AC-3 bitstream consists of a sequence of AC-3-frames. The data-type of an AC-3 data-burst is 1 and the subdata-type of an AC-3 data-burst is 0. An AC-3 frame 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-frame.

The length of the AC-3 data-burst will depend on the encoded bit rate (which determines the AC-3-frame length). The specification for the AC-3 bitstream may be found in ITU-R Recommendation BS.1196; the burst format is specified in IEC 61937-3.

4.3.3 MPEG-1 layer-1

An MPEG-1 layer-1 MPEG-frame represents 384 samples of each encoded channel and can be transferred using data-type 4 and the subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 11172-3 and IEC 61937-4.

4.3.4 MPEG-1 layer-2 or layer-3 or MPEG-2 without extension

The burst-payload of MPEG-1 layer-2, or layer-3, or MPEG-2 without extension, represents 1 152 samples of each encoded channel and can be transferred using data-type 5 and sub-data-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 11172-3, ISO/IEC 13818-3 and IEC 61937-4.

4.3.5 MPEG-2 with extension

The burst-payload of MPEG-2 with extension represents 1 152 samples of each encoded channel and can be transferred using data type 6 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.6 MPEG-2 AAC

The payload of MPEG-2 AAC represents 1 024 samples of each encoded channel and can be transferred using data-type 7 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-7 and IEC 61937-6.

4.3.7 MPEG-2 layer-1 low sampling frequency

An MPEG-2 layer-1 frame with low sampling frequency represents 384 samples of each encoded channel and can be transferred using data-type 8 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.8 MPEG-2 layer-2 low sampling frequency

The payload of MPEG-2 layer-2 frame with low sampling frequency represents 1 152 samples of each encoded channel and can be transferred using data-type 9 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.9 MPEG-2 layer-3 low sampling frequency

The payload of MPEG-2 layer-3 frame with low sampling frequency represents 576 samples of each encoded channel and can be transferred using data-type 10 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-3 and IEC 61937-4.

4.3.10 DTS type I

The payload of DTS type I represents 512 samples of each encoded channel and can be transferred using data-type 11 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.11 DTS type II

The payload of DTS type II represents 1 024 samples of each encoded channel and can be transferred using data-type 12 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.12 DTS type III

The payload of DTS type III represents 2 048 samples of each encoded channel and can be transferred using data-type 13 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.13 DTS type IV

The payload of DTS type IV represents samples of each encoded channel and can be transferred using data-type 17 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-5.

4.3.14 ATRAC

The payload of ATRAC represents 512 samples of each encoded channel and can be transferred using data-type 14 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.15 ATRAC 2/3

The payload of ATRAC 2/3 represents 1 024 samples of each encoded channel and can be transferred using data-type 15 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.16 ATRAC-X

The payload of ATRAC-X represents 2 048 samples of each encoded channel and can be transferred using data-type 16 and subdata-type 0. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.17 MPEG-2 AAC low sampling frequency

The payload of MPEG-2 AAC low sampling frequency represents 2 048 samples of each encoded channel and can be transferred using data-type 19 and subdata-type 0 or it represents 4 096 samples of each encoded channel and can be transferred using data-type 19 and subdata-type 1. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 13818-7 and IEC 61937-6.

4.3.18 MPEG-4 AAC

The payload of MPEG-4 AAC represents 1 024 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 0. The payload of MPEG-4 AAC represents 2 048 samples of each encoded channel and can be transferred using data-type 20 and sub-data-type 1. The payload of MPEG-4 AAC represents 4 096 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 2. The payload of MPEG-4 AAC represents 512 samples of each encoded channel and can be transferred using data-type 20 and subdata-type 3. The data-burst is headed with a burst-preamble, followed by the burst-payload; see ISO/IEC 14496-3 and IEC 61937-6.

4.3.19 Windows Media Audio professional

The payload of WMA professional type I represents 2 048 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 0. The payload of WMA professional type II represents 2 048 samples of each encoded channel and can be

transferred using data-type 18 and subdata-type 1. The payload of WMA professional type III represents 1 024 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 2. The payload of WMA professional type IV represents 512 samples of each encoded channel and can be transferred using data-type 18 and subdata-type 3. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-8.

4.3.20 Enhanced AC-3

The enhanced AC-3 bitstream consists of a sequence of enhanced AC-3-frames. The data-type of an enhanced AC-3 data-burst is 21 and the subdata-type of an enhanced AC-3 data-burst is 0. The contents of an enhanced AC-3 data-burst represent 1 536 samples of each encoded audio channel. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-3.

4.3.21 MAT

The MAT bitstream consists of a sequence of frames. The data-type of an MAT data-burst is 22 and the subdata-type is 0. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MAT data shall contain 1 complete MAT frame. The length of the MAT data-burst depends on the encoded bit rate (which determines the MAT frame length); see IEC 61937-9.

4.3.22 MPEG-4 ALS

The MPEG-4 ALS bitstream consists of a sequence of frames. The data-type of an MPEG-4 ALS data-burst is 23 and the subdata-type is 0. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 ALS data shall contain 1 complete MPEG-4 ALS frame. The length of the MPEG-4 ALS data-burst depends on the encoded bit rate (which determines the MPEG-4 ALS frame length), see IEC 61937-10.

4.3.23 MPEG-4 AAC LC in LATM/LOAS

The MPEG-4 AAC LC in LATM/LOAS bitstream consists of a sequence of frames. The data-type of an MPEG-4 AAC LC in LATM/LOAS data-burst is 23 and the subdata-type is 1. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 AAC LC in LATM/LOAS data shall contain 1 complete MPEG-4 AAC LC in LATM/LOAS frame. The length of the MPEG-4 AAC LC in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 AAC LC in LATM/LOAS frame length), see IEC 61937-11.

4.3.24 MPEG-4 HE AAC in LATM/LOAS

The MPEG-4 HE AAC in LATM/LOAS bitstream consists of a sequence of frames. The data-type of an MPEG-4 HE AAC in LATM/LOAS data-burst is 23 and the subdata-type is 2. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 HE AAC in LATM/LOAS data shall contain 1 complete MPEG-4 HE AAC in LATM/LOAS frame. The length of the MPEG-4 HE AAC in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 HE AAC in LATM/LOAS frame length), see IEC 61937-11.

4.3.25 DRA

The DRA bitstream consists of a sequence of frames. The data-type of a DRA data-burst is 23 and the subdata-type is 3. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of DRA data shall contain 1 complete DRA frame. The length of the DRA data-burst depends on the encoded bit rate (which determines the DRA frame length), see IEC 61937-12.

4.3.26 ATRAC-X low latency

The payload of ATRAC-X represents 512 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 1 to data-type bits 5 to 6, or it represents 256 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 2 to data-type bits 5 to 6, or 128 samples of each encoded channel and can be transferred by assigning 16 to data-type bits 0 to 4 and 3 to data-type bits 5 to 6. The data-burst is headed with a burst-preamble, followed by the burst-payload; see IEC 61937-7.

4.3.27 MPEG-H 3D Audio

The MPEG-H 3D Audio bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an MPEG-H 3D Audio data-burst is 25 and the value of data-type bits 5 to 6 is 0. The value of data-type bits 0 to 4 of an MPEG-H 3D Audio HBR data-burst is 25 and the value of data-type bits 5 to 6 is 1. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-H 3D Audio shall contain one complete MPEG-H 3D Audio frame. The length of the MPEG-H 3D Audio data-burst depends on the encoded bit rate (which determines the MPEG-H 3D Audio frame length); see IEC 61937-13.

4.3.28 AC-4, AC-4 HBR4, AC-4 HBR16 and AC-4 LD

The AC-4 bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an AC-4 data-burst is 24 and the value of data-type bits 5 to 6 is 0. The value of data-type bits 0 to 4 of an AC-4 HBR4 data-burst is 24 and the value of data-type bits 5 to 6 is 1. The value of data-type bits 0 to 4 of an AC-4 HBR16 data-burst is 24 and the value of data-type bits 5 to 6 is 2. The value of data-type of an AC-4 LD data-burst is 24 and the value of data-type bits 5 to 6 is 3. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of AC-4 data shall contain one complete AC-4 frame. The length of the AC-4 data-burst depends on the encoded bit rate (which determines the AC-4 frame length); see IEC 61937-14.

4.3.29 MPEG-4 ALS in LATM/LOAS

The MPEG-4 ALS in LATM/LOAS bitstream consists of a sequence of frames. The value of data-type bits 0 to 4 of an MPEG-4 ALS in LATM/LOAS data-burst is 25 and the value of data-type bits 5 to 6 is 2. The data-burst is headed with a burst-preamble, followed by the burst-payload. The burst-payload of each data-burst of MPEG-4 ALS in LATM/LOAS data shall contain one complete MPEG-4 ALS frame. The length of the MPEG-4 ALS in LATM/LOAS data-burst depends on the encoded bit rate (which determines the MPEG-4 ALS frame length); see IEC 61937-10.

Bibliography

SMPTE ST 338, *Format for Non-PCM Audio and Data in AES3 – Data Types*

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