IEC 60958-3

Edition 3.0 2009-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Digital audio interface – Part 3: Consumer applications

Interface audionumérique – Partie 3: Applications grand public

IEC 60958-3:2006-05/AMD1:2009-10(en-fr)

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FOREWORD

This amendment has been prepared by technical area 4: Digital system interfaces and protocols of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This bilingual version (2014-07) corresponds to the monolingual English version, published in 2009-10.

The text of this amendment is based on the following documents:

CDV	Report on voting
100/1513/CDV	100/1592/RVC

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

The French version of this amendment has not been voted upon.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result 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- withdrawn,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 60958-3 (2006) has become necessary to transmit the audio signal and its information of the current improved audio formats and systems. The revised items apply to the small parts of IEC 60958-3.

Additional sampling frequencies have been defined for the use of audio transmission of IEC 60958 conformant data format for the new formats of the IEC 61937 series.

CGMS-A validity is added to clarify the use of CGMS-A information.

The identification of the embedded MPEG Surround information to LPCM and its normative Annex U are added.

Table 2 includes the new additions and Table 3 has been clarified.

2 Normative references

Insert, in the list of normative references, the following new publication:

ISO/IEC 23003-1, *Information technology – MPEG audio technologies – Part 1: MPEG Surround*

5.2.2 Mode 0 channel status format for digital audio equipment for consumer use

Table 2 – Mode 0 channel status format for consumer use

Replace the entire existing Table 2 by the following new Table 2:

Byte									
0		a = “0”	b = “0”	c	d			Mode = “0 0”	
	bit	0	1	2	3	4	5	6	7
1		Category code							
	bit	8	9	10	11	12	13	14	15
2		Source number				Channel number			
	bit	16	17	18	19	20	21	22	23
3		Sampling frequency				Clock accuracy		Sampling frequency extension	
	bit	24	25	26	27	28	29	30	31
4		Word length				Original sampling frequency			
	bit	32	33	34	35	36	37	38	39
5		CGMS-A		CGMS-A validity		Audio sampling frequency coefficient			
	bit	40	41	42	43	44	45	46	47
6		Information hidden in PCM signal							
	bit	48	49	50	51	52	53	54	55
7									
	bit	56	57	58	59	60	61	62	63
8									
	bit	64	65	66	67	68	69	70	71
9									
	bit	72	73	74	75	76	77	78	79
10									
	bit	80	81	82	83	84	85	86	87
11									
	bit	88	89	90	91	92	93	94	95
12									
	bit	96	97	98	99	100	101	102	103
13									
	bit	104	105	106	107	108	109	110	111
14									
	bit	112	113	114	115	116	117	118	119
15									
	bit	120	121	122	123	124	125	126	127
16									
	bit	128	129	130	131	132	133	134	135
17									
	bit	136	137	138	139	140	141	142	143
18									
	bit	144	145	146	147	148	149	150	151
19									
	bit	152	153	154	155	156	157	158	159
20									
	bit	160	161	162	163	164	165	166	167
21									
	bit	168	169	170	171	172	173	174	175
22									
	bit	176	177	178	179	180	181	182	183
23									
	bit	184	185	186	187	188	189	190	191
		a: use of channel status block. b: linear PCM identification.				c: copyright information. d: additional format information.			

Byte 3: Sampling frequency and clock accuracy

Add, after the existing text defining Bits 28 to 29 and before NOTE 2, the following:

Bits 30 to 31	Sampling frequency extension with sampling frequency bits 24 to 27	
Bit	24 25 26 27 30 31	Sampling frequency
State	"1 0 1 0 0 0"	384 kHz
	"1 0 1 0 1 0"	1 536 kHz
	"1 0 1 0 1 1"	1 024 kHz
	"1 0 1 1 0 0"	352,8 kHz
	"1 0 1 1 0 1"	705,6 kHz
	"1 0 1 1 1 0"	1 411,2 kHz
	"1 1 0 1 0 0"	64 kHz
	"1 1 0 1 0 1"	128 kHz
	"1 1 0 1 1 0"	256 kHz
	"1 1 0 1 1 1"	512 kHz

Replace the entire existing NOTE 2 by the following new NOTE 2:

NOTE 2 The sampling frequency over 192 kHz is not actual. It represents frame rate for compressed audio transmission, and it is used for high bit rate transmission using IEC 60958 protocol. For example, IEC 61883-6 can transmit a high bit rate of IEC 61937 using IEC 60958 comformant format defined in IEC 61883-6.

Byte 4: Word length and original sampling frequency:

Replace the existing text defining Bits 36 to 39 by the following:

Bits 36 to 39	Original sampling frequency	
Bit	36 37 38 39	
State	"1 1 1 1"	44,1 kHz
	"1 1 1 0"	88,2 kHz
	"1 1 0 1"	22,05 kHz
	"1 1 0 0"	176,4 kHz
	"1 0 1 1"	48 kHz
	"1 0 1 0"	96 kHz
	"1 0 0 1"	24 kHz
	"1 0 0 0"	192 kHz
	"0 1 1 1"	128 kHz
	"0 1 1 0"	8 kHz
	"0 1 0 1"	11,025 kHz
	"0 1 0 0"	12 kHz
	"0 0 1 1"	32 kHz
	"0 0 1 0"	64 kHz
	"0 0 0 1"	16 kHz
	"0 0 0 0"	Original sampling frequency not indicated (default)

Notes 4 and 5 remain applicable.

Byte 5: CGMS-A

Add, after Bits 40 to 41 and before NOTE 6, the following new text:

Bit 42	CGMS-A validity	
Bit	42	
State	“0”	No indication
	“1”	CGMS-A valid

Bits 44 to 47	Audio sampling frequency coefficient	
Bit	44 45 46 47	
State	“0 0 0 0”	No indication
	“0 0 0 1”	Equal to transmission sampling frequency
	“0 0 1 0”	1/2
	“0 0 1 1”	1/4
	“0 1 0 0”	1/8
	“0 1 0 1”	1/16
	“0 1 1 0”	1/32
	“0 1 1 1”	Reserved
	“1 0 0 0”	Reserved
	“1 0 0 1”	Reserved
	“1 0 1 0”	Reserved
	“1 0 1 1”	x32
	“1 1 0 0”	x16
	“1 1 0 1”	x8
	“1 1 1 0”	x4
	“1 1 1 1”	x2

Add, after existing NOTE 6, the following new paragraph:

Byte 6: Information hidden in PCM signal

Bit 48	Information hidden in PCM signal	
Bit	48	
State	“0”	No indication
	“1”	Additional information in LSB
Bit 49 to 55	“0 0 0 0 0 0 0”	Reserved

NOTE 7 Bit 48 refers to information within the audio sample word, not in the AUX bits.

NOTE 8 When bit 48 is set to 1, processing of the audio signal (such as redithering, sample rate conversion, and change in level) should be avoided. A receiver may also use this state as a hint that it should look for extra information (such as MPEG Surround transmitted over PCM channels as specified in ISO/IEC 23003-1, see Annex U) in the low bits of the signal.

Table 3 – Category code groups

Replace the entire Table 3 by the following new Table 3:

Bits 8 to 15	Category
“000 00000”	General. Used temporarily
“100 XXXXL”	Laser optical products
“010 XXXXL”	Digital/digital converters and signal processing products
“110 XXXXL”	Magnetic tape or disc based products
“001 XXXXL” and “011 1XXXL”	Broadcast reception of digitally encoded audio signals with or without video signals
“101 XXXXL”	Musical instruments, microphones and other sources without copyright information
“011 00XXL”	Analogue/digital converters for analogue signals without copyright information
“011 01XXL”	Analogue/digital converters for analogue signals which include copyright information in the form of “Cp-bit and L-bit status”
“000 1XXXL”	Solid state memory based products
“000 0001L”	Experimental products not for commercial sale, and other products of these groups and/or experimental products
“111 XXXXL”	Not defined. Reserved
“000 0XXXL”	Not defined. Reserved, except “000 00000” and “000 0001L”

Insert, after Annex T, the following new Annex U.

Annex U
(normative)

MPEG Surround over PCM

U.1 Format of MPEG Surround buried data frames

MPEG Surround bit-stream data should be embedded in conformity with ISO/IEC 23003-1, 7.3. An MPEG Surround buried data frame contains MPEG Surround bit-stream data embedded in the less significant bits of the audio sample words of IEC 60958-3 frames. Figure U.1 illustrates the relation between an MPEG Surround buried data frame and an IEC 60958-3 frame. An MPEG surround buried data frame corresponds to a number of (bsBDFramelength+1) × 64 IEC 60958-3 frames (see ISO/IEC 23003-1, 7.3.3 for definition of bsBDFramelength).

Figure U.1 – Relation between MPEG Surround buried data frame and IEC 60958-3 frame

When embedding MPEG Surround into PCM data in the IEC 60958-3 interface, bit 48 of the channel status shall be set to '1', indicating the presence of hidden information. Furthermore, bits 33, 34 and 35 of the channel status shall be set to indicate the audio word length, that is, have a value different from '000'. In this case, the MPEG Surround buried data shall be embedded starting from the LSB that corresponds to an audio sample word with the length indicated by bits 33, 34 and 35 of the channel status, that is, starting from time slot '28-w' of the subframe, where w represents the audio sample word length. The MPEG Surround buried data sync word bsBDSyncword, defined in ISO/IEC 23003-1, 7.3, shall be embedded in the LSB that corresponds to an audio sample word with the length indicated by bits 33, 34 and 35 of the channel status, that is, in time slot '28-w' of the subframe.

U.2 MPEG Surround detection

When bit 48 of the channel status is set to '1' and bits 33, 34 and 35 of the channels status are set to a value different from '000' and MPEG Surround bit-stream data is to be retrieved, the MPEG Surround buried data sync word bsBDSyncword shall be searched at the LSB corresponding to an audio sample word with the length indicated by bits 33, 34 and 35 of the channel status, that is, at time slot '28-w' of the subframe, where w represents the audio sample word length.

When bit 48 of the channel status is set to '1' and bits 33, 34 and 35 of the channels status are set to '000' and MPEG Surround bit-stream data is to be retrieved, the MPEG Surround buried data sync word bsBDSyncword shall be searched at least at the LSB corresponding to the maximum audio sample word length wmax, which is indicated by bit 32 of the channel

status, that is, at time slot ’28-wmax’ of the subframe, and at the LSB corresponding to an audio sample word length of 16 bits, that is, at time slot 12 of the subframe.

When bit 48 of the channel status is set to ‘0’ and MPEG Surround bit-stream data is to be retrieved, the MPEG Surround buried data sync word bsBDSyncword shall be searched at least at the LSB corresponding to an audio sample word length of 16 bits and an audio sample word length of 20 bits, that is, at time slot 12 and 8 of the subframe respectively.

Bibliography

Insert the following into the bibliographical references.

IEC 60958 (all parts), *Digital audio interface*

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