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INTERNATIONAL STANDARD

Digital audio interface –
Part 3: Consumer applications

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INTERNATIONAL
STANDARD

Digital audio interface –
Part 3: Consumer applications

INTERNATIONAL
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DIGITAL AUDIO INTERFACE –

Part 3: Consumer applications

FOREWORD

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International Standard IEC 60958-3 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This consolidated version of IEC 60958-3 consists of the third edition (2006) [documents 100/1009/CDV and 100/1070/RVC] and its amendment 1 (2009) [documents 100/1513/CDV and 100/1592/RVC].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 3.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

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

– Electrical and optical requirements are removed from IEC 60958-3; they should be specified in IEC 60958-1. The third edition of IEC 60958-1 will include these.

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

The list of all the parts of the IEC 60958 series, under the general title *Digital audio interface*, can be found on the IEC website.

The committee has decided that the contents of this 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- withdrawn;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.

A bilingual version of this publication may be issued at a later date.

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.

DIGITAL AUDIO INTERFACE –

Part 3: Consumer applications

1   Scope

This part of IEC 60958 specifies the consumer application of the interface for the inter-connection of digital audio equipment defined in IEC 60958-1.

NOTE   When used in a consumer digital processing environment, the interface is primarily intended to carry stereophonic programmes, with a resolution of up to 20 bits per sample, an extension to 24 bits per sample being possible.

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 60841:1988, *Audio recording – PCM encoder/decoder system*

IEC 60908:1999, *Audio recording – Compact disc digital audio system*

IEC 60958-1:2004, *Digital audio interface – Part 1: General*

IEC 61119-1:1992, *Digital audio tape cassette system (DAT) – Part 1: Dimensions and characteristics*

IEC 61119-6:1992, *Digital audio tape cassette system (DAT) – Part 6: Serial copy management system*

IEEE 1394:2004, *IEEE standard for high-performance serial bus bridges*

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

3   Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60958-1 apply.

4   Interface format

The interface format as defined in IEC 60958-1 shall be used.

Unless otherwise specified in the annexes, the following specification is applicable.

- Audio sample word has a length of 20 bits/sample. The auxiliary sample bits are an optional expansion of the audio sample, if not used = "0".
- User data is not used, all bits = "0".
- Channel status is identical for both subframes of the interface, with the exception of the channel number, if that is not equal to zero.

5   Channel status

5.1   General

For every subframe, the channel status bit provides information related to the audio channel that is carried in that same subframe.

Channel status information is organized in a 192-bit block, subdivided into 24 bytes, numbered 0 to 23 (see Table 1). The first bit of each channel status block is carried in the frame with preamble "B".

The individual bits of a channel status block are numbered 0 to 191.

The primary application is indicated by channel status bit 0.

As stated in IEC 60958-1, for the consumer digital audio applications described in this standard, this first channel status bit equals "0".

NOTE   As stated in IEC 60958-1, for professional application this first channel status bit equals "1".

Secondary applications may be defined within the framework of these primary applications.

5.2   Application

5.2.1   Channel status general format

For each channel, the channel status block provides the information described in this clause and summarized in Table1.

Table 1– Channel status general format for consumer use

Byte		a = "0"	b	c	d			Mode	
0	bit	0	1	2	3	4	5	6	7
1	bit	8	9	10	11	12	13	14	15
2	bit	16	17	18	19	20	21	22	23
3	bit	24	25	26	27	28	29	30	31
4	bit	32	33	34	35	36	37	38	39
5	bit	40	41	42	43	44	45	46	47
6	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　　c: copyright information
b: linear PCM identification　　d: additional format information

Byte 0: General control and mode information

Control:

Bit 0   "0"   Consumer use of channel status block (Notes 1 and 2)

NOTE 1   The significance of byte 0, bit 0 is such that transmission from an interface conforming to IEC 60958-4 can be identified.

Bit 1   "0"   Audio sample word represents linear PCM samples (Note 2)

"1"   Audio sample word used for other purposes

NOTE 2   The functions of channel status bits 0 and 1 are defined in IEC 60958-1.

Bit 2   "0"   Software for which copyright is asserted (Note 3)

"1"   Software for which no copyright is asserted

NOTE 3   Bit 2 is referred to as the "Cp-bit". It should indicate whether copyright protection has been asserted.

The copyright status may be unknown for certain applications. The above interpretation is therefore not valid in combination with some category codes (as indicated in the annex associated with the category code). The Cp-bit can alternate between 0 and 1 at a rate between 4 Hz and 10 Hz (see Annex A).

Bits 3 to 5   Additional format information, meaning depends on bit 1.

When bit 1 = "0", linear PCM audio mode:

Bit   3 4 5

State   "0 0 0"   2 audio channels without pre-emphasis

"1 0 0"   2 audio channels with 50 µs /15 µs pre-emphasis

"0 1 0"   Reserved (for 2 audio channels with pre-emphasis)

"1 1 0"   Reserved (for 2 audio channels with pre-emphasis)

All other states of bits 3 to 5 are reserved and shall not be used until further defined.

NOTE 4   The single and dual channel operating modes are defined with the frame format in IEC 60958-1.

When bit 1 = "1", other than linear PCM applications:

Bit   3 4 5

State   "0 0 0"   Default state for applications other than linear PCM

All other states of bits 3 to 5 are reserved and shall not be used until further defined.

Bits 6 and 7   Channel status mode, indicates one of four possible channel status formats (bytes 1 to 23). There are four possible modes for each of the states of bit 1.

Bit   6 7

State   "0 0"   Mode 0, refer to 5.2.2

All other states of bits 6 and 7 are reserved and shall not be used until further defined.

The contents of bits 8 to 191 depend on the mode as indicated by bits 6 and 7. If not defined otherwise, the default value is "0".

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

When the audio sample word represents linear PCM and the channel status mode is mode 0, the channel status format shown in Table 2 should be applied.

Table 2 – Mode 0 channel status format for consumer use

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.