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Digitalni zvokovni vmesnik - 1. del: Splošno (TA 20)

Digital audio interface - Part 1: General (TA 20)

Digitalton-Schnittstelle - Teil 1: Allgemeines

Interface audionumérique - Partie 1: Généralités

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ICS:

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35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment

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100/3544/CDV

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IEC TA 20 : ANALOGUE AND DIGITAL AUDIO	
SECRETARIAT: Japan	SECRETARY: Mr Gen Ichimura
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
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TITLE:

Digital audio interface - Part 1: General (TA 20)

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CONTENTS

1		
2		
3	CONTENTS	2
4	FOREWORD	4
5	1 Scope	6
6	2 Normative references	6
7	3 Terms and definitions	6
8	4 Interface format	8
9	4.1 Structure of format	8
10	4.1.1 Sub-frame format	8
11	4.1.2 Frame format	9
12	4.2 Channel coding	10
13	4.3 Preambles	10
14	4.4 Validity bit	11
15	5 Channel status	11
16	5.1 General	11
17	5.2 Applications	11
18	5.3 General assignment of the first and second channel status bits	12
19	5.4 Category code	12
20	6 User data	14
21	6.1 General	14
22	6.2 Applications	14
23	6.2.1 Professional use	14
24	6.2.2 Consumer use	14
25	7 Electrical requirement	14
26	7.1 Consumer application	14
27	7.1.1 General	14
28	7.1.2 Timing accuracy	14
29	7.1.3 Unbalanced line	15
30	7.2 Professional application	18
31	8 Optical requirements	18
32	8.1 Consumer application	18
33	8.1.1 Optical specification	18
34	8.1.2 Optical connector	18
35	8.2 Professional applications	19
36	Annex A (informative) The use of the validity bit	20
37	Annex B (informative) Application documents and specifications	21
38	Annex C (informative) A relationship of the IEC 60958 series families	22
39	Annex D (informative) Transmission of CD data other than linear PCM audio	24
40	Annex E (informative) The IEC 60958 series conformant data format	25
41	Annex F (informative) Stream change	26
42	Annex G (informative) Characteristics of optical connection	28
43	Bibliography	30
44		
45	Figure 1 – Sub-frame format (linear PCM application)	9

46	Figure 2 – Frame format	9
47	Figure 3 – Channel coding	10
48	Figure 4 – Preamble M (shown as 11100010)	11
49	Figure 5 – Simplified example of the configuration of the circuit (unbalanced).....	15
50	Figure 6 – Rise and fall times	16
51	Figure 7 – Intrinsic jitter measurement filter	16
52	Figure 8 – Eye diagram.....	17
53	Figure 9 – Receiver jitter tolerance template	17
54	Figure 10 – Basic optical connection.....	18
55	Figure C.1 – Relationships of the IEC 60958 families.....	22
56	Figure F.1 – Audio sources and AV receiver model.....	26
57	Figure F.2 – Switching from linear PCM to non linear PCM	27
58	Figure F.3 – Switching from non linear PCM to linear PCM	27
59	Figure F.4 – Switching from non-linear PCM to non-linear PCM	27
60		
61	Table 1 – Preamble coding	10
62	Table 2 – Channel status data format	13
63	Table B.1 – Application documents and specifications	21
64	Table C.1 – data_type values and application	23
65	Table G.1 – Characteristics of standard optical connection (optical interface)	28
66	Table G.2 – Characteristics of optical transmitter (optical interface).....	28
67	Table G.3 – Characteristics of optical receiver (optical interface).....	29
68	Table G.4 – Characteristics of fibre optic cable.....	29
69	Table G.5 – Optical power budget for the link with plastic fibre	29
70		
71		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO INTERFACE –

Part 1: General

FOREWORD

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International Standard 60958-1 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 4th edition cancels and replaces the 3.1rd edition published in 2014.

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

- a) The relevant part of IEC 60958-5 is supported.

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

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

126

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

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

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

134 The committee has decided that the contents of this document will remain unchanged until the
135 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
136 the specific document. At this date, the document will be

- 137 • reconfirmed,
- 138 • withdrawn,
- 139 • replaced by a revised edition, or
- 140 • amended.

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DIGITAL AUDIO INTERFACE –

Part 1: General

143
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1 Scope

150 This part of IEC 60958 describes a serial, uni-directional, self-clocking interface for the
151 interconnection of digital audio equipment for consumer and professional applications.

152 It provides the basic structure of the interface. Separate documents define items specific to
153 particular applications.

154 The interface is primarily intended to carry monophonic or stereophonic programmes,
155 encoded using linear PCM and with a resolution of up to 24 bits per sample.

156 When used for other purposes, the interface is able to carry audio data coded other than as
157 linear PCM coded audio samples. Provision is also made to allow the interface to carry data
158 related to computer software, multimedia technologies or signals coded using non-linear PCM.
159 The format specification for these applications is not part of this standard.

160 The interface is intended for operation at audio sampling frequencies of 32kHz and above.
161 Auxiliary information is transmitted along with the programme.

2 Normative references

[oSIST prEN IEC 60985-1:2021](https://standards.iteh.ai/catalog/standards/sist/b6ff1710-ade7-4b3a-bddb-1032070168/c/sist-pr-en-iec-60985-1-2021)

[https://standards.iteh.ai/catalog/standards/sist/b6ff1710-ade7-4b3a-bddb-](https://standards.iteh.ai/catalog/standards/sist/b6ff1710-ade7-4b3a-bddb-1032070168/c/sist-pr-en-iec-60985-1-2021)

163 The following documents are referred to in the text in such a way that some or all of their
164 content constitutes requirements of this document. For dated references, only the edition
165 cited applies. For undated references, the latest edition of the referenced document (including
166 any amendments) applies.

167 IEC 60268-11:1987, *Sound system equipment – Part 11: Application of connectors for the*
168 *interconnection of sound system components*

169 IEC 60958-3:2021, *Digital audio interface – Part 3: Consumer applications*

170 IEC 60958-4(all subparts):2016, *Digital audio interface – Part 4: Professional applications*

171 IEC 60958-5:2020 (in preparation), *Digital audio interface – Part 5: Consumer application*
172 *enhancement*

3 Terms and definitions

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

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

- 177 • IEC Electropedia: available at <http://www.electropedia.org/>
- 178 • ISO Online browsing platform: available at <http://www.iso.org/obp>

179 **3.1**
180 **sampling frequency**
181 frequency of the samples representing an audio signal

182 Note 1 to entry: When more than one signal is transmitted through the same interface, the sampling frequencies
183 are identical.

184 **3.2**
185 **audio sample word**
186 value of a digital audio sample; representation is linear in 2's complement binary form

187 Note 1 to entry: Positive numbers correspond to positive analogue voltages at the input of the analogue-to-digital
188 converter (ADC).

189 **3.3**
190 **auxiliary sample bit**
191 four least significant bits (LSBs) which can be assigned as auxiliary sample bits and used for
192 auxiliary information when the number of audio sample bits in the main data field is less than
193 or equal to 20

194 **3.4**
195 **validity bit**
196 bit indicating whether the main data field bits in the sub-frame (time slots 4 to 27 or 8 to 27,
197 depending on the audio word length as described in 4.1.1) are reliable or not

198 **3.5**
199 **channel status**
200 data carrying, in a fixed format, information associated with each main data field channel
201 which is decodable by any interface user

202 Note 1 to entry: Examples of information to be carried in the channel status are: length of audio sample words,
203 pre-emphasis, sampling frequency, time codes, alphanumeric source and destination codes.

204 **3.6**
205 **user data**
206 data providing to carry any other information

207 **3.7**
208 **parity bit**
209 bit provided to permit the detection of an odd number of errors resulting from malfunctions in
210 the interface

211 **3.8**
212 **preamble**
213 specific patterns used for synchronization

214 Note 1 to entry: There are three different preambles (see 10).

215 **3.9**
216 **sub-frame**
217 fixed structure used to carry information (see 4.1.1 and 4.1.2)

218 **3.10**
219 **frame**
220 sequence of two successive and associated sub-frames

221 **3.11**
222 **block**
223 group of 192 consecutive frames

224 Note 1 to entry: The start of a block is designated by a special sub-frame preamble (see 10).

225 **3.12**

226 **channel coding**

227 coding method by which the binary digits are represented for transmission through the
228 interface

229 **3.13**

230 **unit interval (UI)**

231 shortest nominal time interval in the coding scheme

232 Note 1 to entry: There are 128 UI in a sample frame.

233 **3.14**

234 **interface jitter**

235 deviation in the timing of interface data transitions (zero crossings) when compared with an
236 ideal clock

237 **3.15**

238 **intrinsic jitter**

239 output interface jitter of a device that is either free-running or is synchronized to a jitter-free
240 reference

241 **3.16**

242 **jitter gain**

243 ratio of the amplitude of jitter components at the output to their amplitude at the
244 synchronization input to the device under test

245 **4 Interface format**

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246 **4.1 Structure of format** [1013206ff683/osist-pren-iec-60985-1-2021](https://standards.iteh.ai/catalog/standards/sist/b6ff1710-ade7-4b3a-bddb-1013206ff683/osist-pren-iec-60985-1-2021)

247 **4.1.1 Sub-frame format**

248 Each sub-frame is divided into 32 time slots, numbered from 0 to 31 (see Figure 1).

249 Time slots 0 to 3 (preambles) carry one of the three permitted preambles (see 4.1.2 and 4.3;
250 also see Figure 2).

251 Time slots 4 to 27 (main data field) carry the audio sample word in linear 2's complement
252 representation. The most significant bit (MSB) is carried by time slot 27.

253 When a 24-bit coding range is used, the LSB is in time slot 4 (see Figure 1).

254 When a 20-bit coding range is used, time slots 8 to 27 carry the audio sample word with
255 the LSB in time slot 8. Time slots 4 to 7 may be used for other applications. Under
256 these circumstances, the bits in the time slots 4 to 7 are designated auxiliary sample bits (see
257 Figure 1).

258 If the source provides fewer bits than the interface allows (either 20 or 24), the unused LSBs
259 are set to a logical "0".

260 For a non-linear PCM audio application or a data application the main data field may carry
261 any other information.

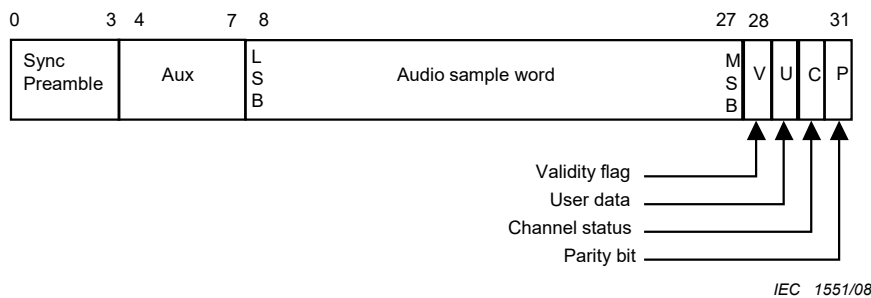
262 Time slot 28 (validity bit) carries the validity bit associated with the main data field (see 4.4).

263 Time slot 29 (user data bit) carries 1 bit of the user data channel associated with the main
 264 data field channel transmitted in the same sub-frame. For the applications, refer to the other
 265 parts of IEC 60958.

266 Time slot 30 (channel status bit) carries 1 bit of the channel status information associated with
 267 the main data field channel transmitted in the same sub-frame. For details refer to the other
 268 parts of IEC 60958.

269 Time slot 31 (parity bit) carries a parity bit such that time slots 4 to 31 inclusive carry an even
 270 number of ones and an even number of zeroes (even parity).

271 NOTE The preambles have even parity as an explicit property.



IEC 1551/08

272
 273 **Figure 1 – Sub-frame format (linear PCM application)**

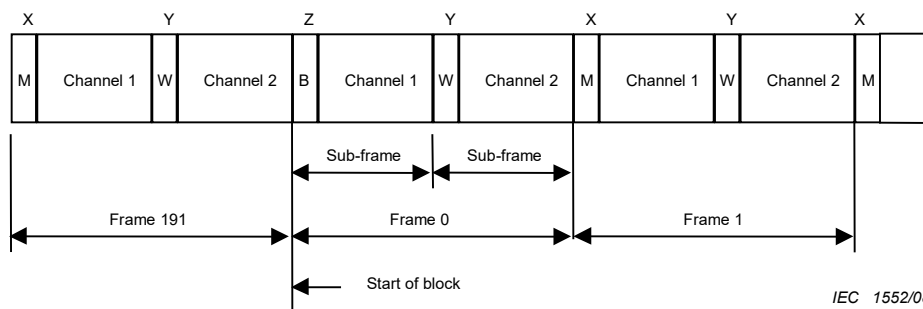
274 **4.1.2 Frame format**

275 A frame is uniquely composed of two sub-frames (see Figure 2). For linear coded audio
 276 applications, the rate of transmission of frames normally corresponds exactly to the source
 277 sampling frequency.

278 In 2-channel operation mode, the samples taken from both channels are transmitted by time
 279 multiplexing in consecutive sub-frames. The first sub-frame (left or "A" channel in
 280 stereophonic operation and primary channel in monophonic operation) normally starts with
 281 preamble "M". However, the preamble changes to preamble "B" once every 192 frames to
 282 identify the start of the block structure used to organize the channel status information. The
 283 second sub-frame (right or "B" channel in stereophonic operation and secondary channel in
 284 monophonic operation) always starts with preamble "W".

285 In single channel operation mode in a professional application, the frame format is the same
 286 as in the 2-channel mode. Data is carried in the first sub-frame and may be duplicated in the
 287 second sub-frame. If the second sub-frame is not carrying duplicate data, then time slot 28,
 288 (validity flag) shall be set to logical "1".

289 NOTE For historical reasons preambles "B", "M" and "W" are, for use in professional applications, referred to as
 290 "Z", "X" and "Y", respectively.



IEC 1552/08

291
 292 **Figure 2 – Frame format**