



Edition 4.0 2021-09

INTERNATIONAL STANDARD

Digital audio interface – Part 1: General





THIS PUBLICATION IS COPYRIGHT PROTECTED Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office 3, rue de Varembé CH-1211 Geneva 20 Switzerland Tel.: +41 22 919 02 11 info@iec.ch www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.





Edition 4.0 2021-09

INTERNATIONAL STANDARD

Digital audio interface – Part 1: General

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.160.01

ISBN 978-2-8322-1017-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

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

Figure 4 – Preamble M (shown as 11100010)	11
Figure 5 – Simplified example of the configuration of the circuit (unbalanced)	15
Figure 6 – Rise and fall times	16
Figure 7 – Intrinsic jitter measurement filter	16
Figure 8 – Eye diagram	17
Figure 9 – Receiver jitter tolerance template	17
Figure 10 – Basic optical connection	18
Figure C.1 – Relationships of the IEC 60958 families	22
Figure F.1 – Audio sources and AV receiver model	26
Figure F.2 – Switching from linear PCM to non linear PCM	26
Figure F.3 – Switching from non linear PCM to linear PCM	27
Figure F.4 – Switching from non-linear PCM to non-linear PCM	27

Table 1 – Preamble coding	10
Table 2 – Channel status data format	13
Table B.1 – Application documents and specifications	21
Table C.1 – data_type values and application	23
Table G.1 – Characteristics of standard optical connection (optical interface)	28
Table G.2 – Characteristics of optical transmitter (optical interface)	28
Table G.3 – Characteristics of optical receiver (optical interface)	29
Table G.4 – Characteristics of fibre optic cable	29
Table G.5 – Optical power budget for the link with plastic fibre	29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO INTERFACE –

Part 1: General

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject deall with may participate in this preparatory work. International, governmental and non-governmental organizations for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 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 fourth edition cancels and replaces the third edition published in 2008, and Amendment 1:2014. This edition constitutes a technical revision.

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

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

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

Draft	Report on voting
100/3544/CDV	100/3593/RVC

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

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

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

DIGITAL AUDIO INTERFACE -

Part 1: General

1 Scope

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

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

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

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

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

2 Normative references

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

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

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

IEC 60958-4 (all parts), Digital audio interface - Part 4: Professional applications

IEC 60958-5, Digital audio interface – Part 5: Consumer application enhancement

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp