

INTERNATIONAL STANDARD

**Digital audio interface –
Part 1: General**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 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 Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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 corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

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 It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00



IEC 60958-1

Edition 3.0 2008-09

INTERNATIONAL STANDARD

**Digital audio interface –
Part 1: General**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

U

ICS 33.160.01

ISBN 2-8318-1000-4

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.....	8
4.1.2 Frame format.....	9
4.2 Channel coding	9
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.....	12
5.4 Category code	12
6 User data	14
6.1 General.....	14
6.2 Applications.....	14
6.2.1 Professional use.....	14
6.2.2 Consumer use	14
7 Electrical requirement.....	14
7.1 Consumer application.....	14
7.1.1 General	14
7.1.2 Timing accuracy	14
7.1.3 Unbalanced line.....	15
7.2 Professional application	18
8 Optical requirements	18
8.1 Consumer application.....	18
8.1.1 Optical specification	18
8.1.2 Optical connector	19
8.2 Professional applications.....	19
Annex A (informative) The use of the validity bit	20
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.....	23
Annex E (informative) The IEC 60958 series conformant data format.....	24
Annex F (informative) Stream change	25
Annex G (informative) Characteristics of optical connection.....	27
Bibliography.....	29
Figure 1 – Sub-frame format (linear PCM application).....	9
Figure 2 – Frame format	9
Figure 3 – Channel coding	10

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 – A relationship of IEC 60958 families	22
Figure F.1 – Audio sources and AV receiver model.....	25
Figure F.2 – Switching from linear PCM to non linear PCM	26
Figure F.3 – Switching from non linear PCM to linear PCM	26
Figure F.4 – Switching from non-linear PCM to non-linear PCM	26
Table 1 – Preamble coding	10
Table 2 – Channel status data format	13
Table B.1 – Application documents and specifications	21
Table G.1 – Characteristics of standard optical connection (optical interface).....	27
Table G.2 – Characteristics of optical transmitter (optical interface).....	27
Table G.3 – Characteristics of optical receiver (optical interface).....	28
Table G.4 – Characteristics of fibre optic cable	28
Table G.5 – Optical power budget for the link with plastic fibre	28

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 dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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.

International Standard 60958-1 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This third edition of IEC 60958-1 cancels and replaces the second edition published in 2004 and constitutes a technical revision.

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 are specified in IEC 60958-1.

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

CDV	Report on voting
100/1252/CDV	100/1337/RVC

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

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

A list of all 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.

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 or signals coded using non-linear PCM. The format specification for these applications is not part of this standard.

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

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

IEC 60874-17, *Connectors for optical fibres and cables – Part 17: Sectional specification for fibre optic connector – Type F-05 (friction lock)*

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

IEC 60958-4, *Digital audio interface – Part 4: Professional applications*

3 Terms and definitions

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

3.1

sampling frequency

frequency of the samples representing an audio signal

NOTE When more than one signal is transmitted through the same interface, the sampling frequencies are identical.