

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Digital audio interface –
Part 3: Consumer applications**

**Interface audionumérique –
Partie 3: Applications grand public**



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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
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 It also gives information on projects, replaced and withdrawn publications.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.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC online collection - oc.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60958-3

Edition 4.0 2021-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Digital audio interface –
Part 3: Consumer applications**

**Interface audionumérique –
Partie 3: Applications grand public**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.160.01

ISBN 978-2-8322-1052-4

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	7
1 Scope	9
2 Normative references	9
3 Terms and definitions	9
4 Interface format	9
5 Channel status	9
5.1 General.....	9
5.2 Application.....	10
5.2.1 Channel status general format.....	10
5.2.2 Mode 0 channel status format for digital audio equipment for consumer use	13
5.3 Copyright management guidelines for consumer application of the digital audio interface	18
5.3.1 General	18
5.3.2 Category code groups.....	19
6 User data.....	22
6.1 General.....	22
6.2 Application.....	22
6.2.1 User data bitstream	22
6.2.2 User data message structure	22
6.2.3 Equipment classification	23
6.2.4 User data message length and contents	24
6.3 Information for synchronization	26
6.3.1 General	26
6.3.2 SMPTE time code information.....	26
6.3.3 Latency information	27
6.3.4 Loudness information	28
Annex A (normative) Application of the digital audio interface in the compact disc digital audio system	30
A.1 Overview.....	30
A.2 General: application-specific details.....	30
A.3 Channel status: application-specific details.....	30
A.4 User data: application-specific details	30
Annex B (normative) Application of the digital interface in the 2-channel PCM encoder/decoder.....	32
B.1 Overview.....	32
B.2 General: application-specific details.....	32
B.3 Channel status: application-specific details.....	32
B.4 User data: application-specific details.....	32
Annex C (normative) Application of the digital interface in the 2-channel digital audio tape recorder in the consumer mode	33
C.1 Overview.....	33
C.2 General: application-specific details.....	33
C.3 Channel status: application-specific details.....	33
C.4 User data: application-specific details	34
Annex D (normative) Application of the digital interface in laser optical digital audio systems for which no other category code is defined.....	37

D.1	Overview.....	37
D.2	General: application-specific details.....	37
D.3	Channel status: application-specific details.....	37
D.4	User data: application-specific details.....	37
Annex E (normative)	Application of the digital interface in a digital audio mixer in the consumer mode.....	38
E.1	Overview.....	38
E.2	General: application-specific details.....	38
E.3	Channel status: application-specific details.....	38
E.4	User data: application specific details.....	38
Annex F (normative)	Application of the digital interface with a sampling rate converter in the consumer mode.....	39
F.1	Overview.....	39
F.2	General: application-specific details.....	39
F.3	Channel status: application-specific details.....	39
F.4	User data: application-specific details.....	39
Annex G (normative)	Application of the digital interface with a digital sound sampler in the consumer mode.....	40
G.1	Overview.....	40
G.2	General: application-specific details.....	40
G.3	Channel status: application-specific details.....	40
G.4	User data: application specific details.....	40
Annex H (normative)	Application of the digital interface in a digital broadcast receiver (Japan) in the consumer mode.....	41
H.1	Overview.....	41
H.2	General: application-specific details.....	41
H.3	Channel status: application-specific details.....	41
H.4	User data: application-specific details.....	41
Annex I (normative)	Application of the digital interface in a digital broadcast receiver (Europe) in the consumer mode.....	42
I.1	Overview.....	42
I.2	General: application-specific details.....	42
I.3	Channel status: application-specific details.....	42
I.4	User data: application-specific details.....	42
Annex J (normative)	Application of the digital interface in a digital broadcast receiver (USA) in the consumer mode.....	43
J.1	Overview.....	43
J.2	General: application-specific details.....	43
J.3	Channel status: application-specific details.....	43
J.4	User data: application-specific details.....	43
Annex K (normative)	Application of the digital interface for electronic software delivery in the consumer mode.....	44
K.1	Overview.....	44
K.2	General: application-specific details.....	44
K.3	Channel status: application-specific details.....	44
K.4	User data: application-specific details.....	44
Annex L (normative)	Application of the digital interface in the digital compact cassette system in the consumer mode.....	45
L.1	Overview.....	45
L.2	General: application-specific details.....	45

L.3	Channel status: application-specific details	45
L.4	User data: application-specific details	45
L.4.1	General	45
L.4.2	Marker mode	45
L.4.3	Extended mode.....	46
Annex M (normative)	Application of the digital interface in the mini-disc system in the consumer mode	50
M.1	Overview.....	50
M.2	General: application-specific details	50
M.3	Channel status: application-specific details	50
M.4	User data: application-specific details	50
Annex N (normative)	Application of the digital interface in a digital sound processor in the consumer mode	51
N.1	Overview.....	51
N.2	General: application-specific details	51
N.3	Channel status: application-specific details	51
N.4	User data: application-specific details	51
Annex O (normative)	Application of the digital interface in the digital versatile disc system (DVD) in the consumer mode	52
O.1	Overview.....	52
O.2	General: application-specific details	52
O.3	Channel status: application-specific details	52
O.4	User data: application-specific details	52
Annex P (informative)	Use of original sampling frequency, sampling frequency and clock accuracy	53
Annex Q (normative)	Application of the digital interface in magnetic disc digital audio systems in the consumer mode	55
Q.1	Overview.....	55
Q.2	General: application-specific details	55
Q.3	Channel status: application-specific details	55
Q.4	User data: application-specific details	55
Annex R (normative)	Explanations of category code implementation.....	56
R.1	Multi-media player	56
R.2	Home-recorded medium player	56
R.3	Monitoring output from a recorder	57
R.3.1	Real-time monitoring (direct monitoring)	57
R.3.2	Monitoring after recording.....	57
R.4	Integrated products.....	58
R.5	Implementation rule of category code groups for digital/digital converter and signal-processing products	58
R.5.1	Discrete product worked as a digital/digital converter or a signal processing unit	58
R.5.2	Integrated product including a digital/digital converter or a signal processing unit	58
R.6	Magnetic disc recorder unit inside an integrated product.....	59
R.7	Category code assignment.....	59
R.7.1	No category code in a corresponding category code group	59
R.7.2	No category code group for a corresponding product.....	59
R.8	Other assignment of integrated products.....	60

Annex S (informative) Application of the digital audio interface for synchronization of audio, video and multi-media equipment	61
S.1 General.....	61
S.2 Lip-sync system model.....	61
S.3 How to compensate lip-sync	61
S.3.1 General	61
S.3.2 Detection methods.....	62
S.4 Use of time code.....	63
S.5 Use of latency information.....	64
S.6 Example of latency parameter transmission method with TL_V	64
S.6.1 An example for solving lip-sync problems	64
S.6.2 Another example for solving lip-sync problems	65
Annex T (normative) MPEG Surround over PCM.....	66
T.1 Format of MPEG Surround buried data frames.....	66
T.2 MPEG Surround detection.....	66
Bibliography.....	67
Figure 1 – Example of message structure using information units	23
Figure 2 – First UI contents.....	24
Figure 3 – Second UI contents.....	24
Figure 4 – Third UI contents.....	25
Figure 5 – User information.....	25
Figure 6 – SMPTE time code information	26
Figure 7 – LTC information alignment	26
Figure 8 – VITC information alignment.....	27
Figure 9 – Latency information.....	27
Figure 10 – Latency information alignment.....	28
Figure 11 – Loudness information	28
Figure 12 – Loudness information alignment.....	29
Figure C.1 – Example of different combinations of start-ID and shortening-ID	36
Figure L.1 – Marker mode.....	45
Figure L.2 – Extended mode	46
Figure P.1 – Player and interface model	53
Figure R.1 – Multi-media player	56
Figure R.2 – Home-recorded medium player.....	57
Figure R.3 – Direct monitoring	57
Figure R.4 – Monitoring after recording.....	57
Figure R.5 – Integrated product	58
Figure R.6 – Digital/digital converter	58
Figure R.7 – Integrated product including digital/digital converter	59
Figure R.8 – Integrated product including magnetic disc recorder	59
Figure S.1 – Lip-sync system model.....	61
Figure S.2 – Lip-sync compensation	62
Figure S.3 – Time-code transmission	62
Figure S.4 – Latency parameter transmission	63

Figure S.5 – Latency parameter transmission with TLv	63
Figure S.6 – Example of latency parameter transmission	64
Figure S.7 – Another example for solving lip-sync problems	65
Figure T.1 – Relation between MPEG Surround buried data frame and IEC 60958-3 frame	66
Table 1 – Channel status general format for consumer use	11
Table 2 – Mode 0 channel status format for consumer use	13
Table 3 – Category code groups	19
Table 4 – Category code groups for laser optical products	20
Table 5 – Category code groups for digital/digital converter and signal-processing products	20
Table 6 – Category code groups for magnetic tape or magnetic disc based products	20
Table 7 – Category code groups for broadcast reception of digitally encoded audio with/without video signals	21
Table 8 – Category code groups for musical instruments, microphones and other sources that create original sound	21
Table 9 – Category code groups for A/D converters for analogue signals without copyright information	21
Table 10 – Category code groups for A/D converters for analogue signals with copyright information	21
Table 11 – Category code groups for solid state memory based products	22
Table A.1 – Example of 2-channel compact disc format	31
Table C.1 – Use of Cp-bit, L-bit and category code for DAT	33
Table C.2 – User data application in the DAT system	35
Table L.1 – Layout of message number "000000"	46
Table L.2 – Deck status codes	47
Table L.3 – ITTS packet extended message example	48
Table P.1 – Term definitions	53
Table P.2 – Cases	54
Table P.3 – Example	54

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO INTERFACE –**Part 3: Consumer applications****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 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 60958-3 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 2006, Amendment 1:2009 and Amendment 2:2015. 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
100/3543/CDV	100/3594/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 in the IEC 60958 series, published 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 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 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 60958-1, *Digital audio interface – Part 1: General*

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

3 Terms and definitions

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

4 Interface format

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

Unless otherwise specified in Annex A to Annex T, 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.