

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Transmission of audio and/or video and related signals using infrared  
radiation –**

**Part 8-1: Digital audio and related signals**

**Transmission de signaux audio et/ou vidéo et de signaux similaires par  
rayonnement infrarouge –**

**Partie 8-1: Signaux audio numériques et similaires**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2003 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 la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office  
3, rue de Varembé  
CH-1211 Geneva 20  
Switzerland  
Email: [inmail@iec.ch](mailto:inmail@iec.ch)  
Web: [www.iec.ch](http://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](http://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 It also gives information on projects, withdrawn and replaced publications.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](http://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](http://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](http://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](mailto:csc@iec.ch)

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

## A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

- Catalogue des publications de la CEI: [www.iec.ch/searchpub/cur\\_fut-f.htm](http://www.iec.ch/searchpub/cur_fut-f.htm)

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: [www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: [www.iec.ch/webstore/custserv/custserv\\_entry-f.htm](http://www.iec.ch/webstore/custserv/custserv_entry-f.htm)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: [csc@iec.ch](mailto:csc@iec.ch)

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00



IEC 61603-8-1

Edition 1.0 2003-11

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Transmission of audio and/or video and related signals using infrared  
radiation –**

**Part 8-1: Digital audio and related signals**

**Transmission de signaux audio et/ou vidéo et de signaux similaires par  
rayonnement infrarouge –**

**Partie 8-1: Signaux audio numériques et similaires**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX

XA

ICS 33.040.20; 33.160.99

ISBN 978-2-88912-443-5

## CONTENTS

FOREWORD .....	5
1 Scope .....	7
2 Normative references .....	7
3 Terms, definitions and abbreviations .....	7
3.1 Terms and definitions .....	7
3.2 Abbreviations .....	8
4 System description .....	8
4.1 General .....	8
4.2 Area of application .....	9
4.3 Band allocation .....	9
5 General characteristics .....	11
5.1 Environment conditions for operation .....	11
5.2 Partition of functions between elements of the systems .....	11
6 Specific requirements .....	11
6.1 Block diagram .....	11
6.2 Input and output .....	12
6.3 Carrier .....	12
6.4 Sub-carrier .....	12
6.5 Channel allocation .....	12
6.6 Block structure .....	14
6.7 Source stream .....	14
6.8 Transmission stream .....	19
6.9 Modulation .....	21
7 Characteristics and measurements .....	26
7.1 Test conditions .....	26
7.2 Location .....	26
7.3 Transmitting distance and directivity .....	26
7.4 Spurious level .....	28
7.5 Accuracy of transmission-check frequency .....	28
8 Marking and contents of specifications .....	28
8.1 Marking .....	28
8.2 Contents of specifications .....	28
Annex A (normative) Application of the transmission systems for digital audio and related signals using infrared radiation in the consumer audio mode .....	33
Annex B (normative) Application of the transmission systems for digital audio and related signals using infrared radiation in the professional audio mode .....	42
 Figure 1 – System concept .....	9
Figure 2 – IEC 61603 band allocation .....	10
Figure 3 – Band allocation .....	10
Figure 4 – Transmitter .....	11
Figure 5 – Channel-coding block .....	12
Figure 6 – Channel allocation .....	13
Figure 7 – Block structure .....	14
Figure 8 – Source stream .....	15

Figure 9 – Source_block stream.....	15
Figure 10 – Source_info stream .....	16
Figure 11 – Block alignment.....	17
Figure 12 – Parity check matrix.....	18
Figure 13 – Error correction code block .....	19
Figure 14 – Transmission stream .....	19
Figure 15 – The order bytes in Tr_section .....	20
Figure 16 – Modulation block .....	21
Figure 17 – Byte to symbol conversion.....	22
Figure 18 – XOR gates .....	22
Figure 19 – Scramble pattern generator.....	23
Figure 20 – QPSK mapping.....	24
Figure 21 – Baseband filter characteristics .....	25
Figure 22 – Transmission chain .....	29
Figure 23 – Location for measurements .....	29
Figure 24 – Transmitting distance .....	29
Figure 25 – Angle of half optical radiant intensity.....	29
Figure 26 – Optical axis of the transmitter.....	30
Figure 27 – Optical axis of the receiver .....	30
Figure 28 – Characteristics of the transmitter.....	30
Figure 29 – Directivity characteristics of the transmitter .....	31
Figure 30 – Characteristics of the receiver .....	31
Figure 31 – Directivity characteristics of the receiver .....	32
Figure 32 – Measuring system for spurious emission .....	32
Figure A.1 – Source_info structure.....	33
Figure A.2 – crc_area .....	38
Figure A.3 – Linear feedback shift register circuit .....	38
Figure A.4 – Sub-frame structure of full-band mode .....	39
Figure A.5 – Sub-frame structure of half-band mode .....	41
Figure B.1 – Source_info structure.....	42
Figure B.2 – CRC area .....	46
Figure B.3 – Linear feedback shift register circuit .....	47
Figure B.4 – Sub-frame structure of full-band mode .....	47
Figure B.5 – Sub-frame structure of half-band mode .....	50
Table 1 – Analogue audio channel allocation .....	10
Table 2 – Sub-carrier frequency.....	12
Table 3 – Maximum source stream bit rate.....	13
Table 4 – Bit rate of digital audio .....	13
Table 5 – Byte values in a transmission_info .....	16
Table 6 – Reed-Solomon code parameter .....	17
Table 7 – Header bit field.....	20
Table 8 – Marking and contents of specifications .....	28

Table A.1 – crc_flag .....	35
Table A.2 – Valid_flag .....	35
Table A.3 – Data_type .....	35
Table A.4 .....	36
Table A.5 – Mode_extension_code .....	36
Table A.6 – pro_flag .....	36
Table A.7 – pcm_id .....	36
Table A.8 – Copyright_flag .....	37
Table A.9 – Emphasis .....	37
Table A.10 – fs_code .....	37
Table A.11 – Mode_extension_code .....	40
Table B.1 – Crc_flag .....	44
Table B.2 – Valid_flag .....	44
Table B.3 – Data_type .....	44
Table B.4 – Coding_mode .....	44
Table B.5 – Mode_extension_code .....	45
Table B.6 – pro_flag .....	45
Table B.7 – pcm_id .....	45
Table B.8 – Emphasis .....	45
Table B.9 – fs_code .....	46
Table B.10 – Mode_extension_code .....	49

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**TRANSMISSION OF AUDIO AND/OR VIDEO  
AND RELATED SIGNALS USING INFRARED RADIATION –****Part 8-1: Digital audio and related signals****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.

International Standard IEC 61603-8-1 has been prepared by technical area 3, Infrared systems and applications, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This part of IEC 61603 replaces 6.8.3 of IEC 61603-2.

This bilingual version, published in 2011-04, corresponds to the English version.

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

FDIS	Report on voting
100/628/FDIS	100/706/RVD

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.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

## TRANSMISSION OF AUDIO AND/OR VIDEO AND RELATED SIGNALS USING INFRARED RADIATION –

### Part 8-1: Digital audio and related signals

#### 1 Scope

This part of IEC 61603 specifies the characteristics and measuring methods for digital audio signal transmission systems using infrared radiation with sub-carrier of the frequency ranges 3 MHz to 6 MHz. It describes systems with different economic uses of the available bandwidth in order to obtain minimum interference and maximum compatibility.

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

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

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

IEC 61603-1:1997, *Transmission of audio and/or video and related signals using infra-red radiation – Part 1: General*

IEC 61603-2:1997, *Transmission of audio and/or video and related signals using infra-red radiation – Part 2: Transmission systems for audio wide band and related signals*

IEC 61937:2000, *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958*

IEC 61938, *Audio and audiovisual systems – Interconnections and matching values – Preferred matching values of analogue signals*

#### 3 Terms, definitions and abbreviations

##### 3.1 Terms and definitions

For the purposes of this part of IEC 61603, the definitions given in Part 1 together with the following apply.

###### 3.1.1

###### **source stream**

source\_block stream with a corresponding source\_info stream and transmission\_info stream

###### 3.1.2

###### **block\_structure**

structure of data and parties for transmission