INTERNATIONAL STANDARD



First edition 2003-05

Transmission systems of audio and/or video and related signals using infra-red radiation –

<text>



Reference number IEC 61603-7:2003(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

IEC Web Site (www.iec.ch) .

Catalogue of IEC publications

The on-line catalogue on the IEC web site (http://www.iec.ch/searchpub/cur fut.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

IEC Just Published

This summary of recently issued publications (http://www.iec.ch/online news/ justpub/jp entry.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

Customer Service Centre

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

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

INTERNATIONAL STANDARD



First edition 2003-05

Transmission systems of audio and/or video and related signals using infra-red radiation –

Part 7: Digital audio signals for conference and similar applications

© IEC 2003 — Copyright - all rights reserved

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 the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale International Electrotechnical Commission Международная Электротехническая Комиссия



IJ

For price, see current catalogue

CONTENTS

| | 1 | | |
|--|--|--|--------------------------------------|
| FOI | REWO | DRD | 4 |
| 1 | Scop | e | 5 |
| 2 | Norm | ative references | 5 |
| 3 | Term | s and definitions | 5 |
| 4 | Abbre | eviations | 5 |
| 5 | Expla | anation of terms and general information | 6 |
| 6 | | em considerations | |
| 7 | • | system concept | |
| 8 | | pcol | |
| | 8.1 | System context | |
| | 8.2 | Physical layer | |
| | 8.3 | Data link layer1 | 3 |
| | 8.4 | Detailed overview of audio frame structures1 | |
| 9 | Data | protocol | |
| | 9.1 | General | |
| | 9.2 | Data messages | |
| | 9.3 | Data packet structure2 | 1 |
| ۸nr | | (normative) Definition of prototype filter23 | S |
| | | (informative) Example of $\lambda l f$ diagram in the user area conference | |
| | | (informative) Provision for future developments | |
| | | | J |
| Bib | lioorar | phy20 | 6 |
| | • • | | |
| Fig | ure 1 - | – System | 7 |
| Fig | ure 2 - | – Conceptual model | 7 |
| Fig | ure 3 - | - Band allocation for 6 modulated sub-carriers | В |
| Fig | ure 4 - | - (D)QPSK constellation and differential decoding algorithm | |
| Fig | ure 5 - | Pulse response of a raised cosine channel filter1 | 9 |
| Fig | ure 6 - | | |
| Fig | | – Scrambler1 | 0 |
| | ure 7 - | – Scrambler1 – Block diagram of sub-band APCM encoder1 | 0 1 |
| Fig | | | 0 1 2 |
| | ure 8 - | – Block diagram of sub-band APCM encoder1 | 0 1 2 3 |
| Fig | ure 8 - ure 9 - | Block diagram of sub-band APCM encoder11 Quantization of sub-band samples | 0 1 2 3 4 |
| Fig Fig | ure 8 - ure 9 - ure 10 | Block diagram of sub-band APCM encoder | 0 1 2 3 4 |
| Fig Fig Fig | ure 8 - ure 9 - ure 10 ure 11 | Block diagram of sub-band APCM encoder | 0 1 2 3 4 5 |
| Fig Fig Fig Fig | ure 8 - ure 9 - ure 10 ure 11 ure 12 | Block diagram of sub-band APCM encoder | 0 1 2 3 4 5 5 |
| Figi Figi Figi Figi Figi | ure 8 - ure 9 - ure 10 ure 11 ure 12 ure 13 | Block diagram of sub-band APCM encoder | 0 1 2 3 4 5 5 6 |
| Fig Fig Fig Fig Fig | ure 8 - ure 9 - ure 10 ure 11 ure 12 ure 13 ure 14 | Block diagram of sub-band APCM encoder Quantization of sub-band samples Superframe structure RS frame structure Audio block structure CRC calculation Audio block structure for medium quality | 0 1 2 3 4 5 5 6 |
| Fig Fig Fig Fig Fig Fig | ure 8 - ure 9 - ure 10 ure 11 ure 12 ure 13 ure 14 ure 15 | Block diagram of sub-band APCM encoder Quantization of sub-band samples Superframe structure RS frame structure Audio block structure CRC calculation Audio block structure for medium quality Bit-pool sample structure for medium quality | 012344556666 |

| Figure 19 – Configuration message structure 1 Figure 20 – Display message structure for ASCII display data 2 Figure 21 – Display message structure for bitmap display data 2 Figure 22 – Segmentation of data messages 2 Figure 23 – Data packets fitted on to the superframe structure 2 Table 1 – Sub-carrier centre frequencies 2 Table 2 – Phase transitions of the differential encoding algorithm 1 Table 3 – Characteristics of sub-band APCM encoder 1 Table 5 – Audio blocks and audio quality 1 Table 6 – Data message identifier definition 1 Table 7 – SCI definition 1 | 20 21 22 8 9 |
|---|--------------------------|
| Figure 21 – Display message structure for bitmap display data 2 Figure 22 – Segmentation of data messages 2 Figure 23 – Data packets fitted on to the superframe structure 2 Table 1 – Sub-carrier centre frequencies 2 Table 2 – Phase transitions of the differential encoding algorithm 1 Table 3 – Characteristics of sub-band APCM encoder 1 Table 4 – Definition of audio mode bits 1 Table 5 – Audio blocks and audio quality 1 Table 6 – Data message identifier definition 1 | 21 21 22 8 9 |
| Figure 22 – Segmentation of data messages 2 Figure 23 – Data packets fitted on to the superframe structure 2 Table 1 – Sub-carrier centre frequencies 2 Table 2 – Phase transitions of the differential encoding algorithm 1 Table 3 – Characteristics of sub-band APCM encoder 1 Table 4 – Definition of audio mode bits 1 Table 5 – Audio blocks and audio quality 1 Table 6 – Data message identifier definition 1 | 21 22 8 9 |
| Figure 23 – Data packets fitted on to the superframe structure 2 Table 1 – Sub-carrier centre frequencies 2 Table 2 – Phase transitions of the differential encoding algorithm 2 Table 3 – Characteristics of sub-band APCM encoder 1 Table 4 – Definition of audio mode bits 1 Table 5 – Audio blocks and audio quality 1 Table 6 – Data message identifier definition 1 | 22 8 9 |
| Table 1 – Sub-carrier centre frequencies. Table 2 – Phase transitions of the differential encoding algorithm Table 3 – Characteristics of sub-band APCM encoder Table 4 – Definition of audio mode bits Table 5 – Audio blocks and audio quality Table 6 – Data message identifier definition | 8 9 |
| Table 2 – Phase transitions of the differential encoding algorithmTable 3 – Characteristics of sub-band APCM encoderTable 4 – Definition of audio mode bitsTable 5 – Audio blocks and audio qualityTable 6 – Data message identifier definition | 9 |
| Table 2 – Phase transitions of the differential encoding algorithmTable 3 – Characteristics of sub-band APCM encoderTable 4 – Definition of audio mode bitsTable 5 – Audio blocks and audio qualityTable 6 – Data message identifier definition | 9 |
| Table 3 – Characteristics of sub-band APCM encoder 1 Table 4 – Definition of audio mode bits 1 Table 5 – Audio blocks and audio quality 1 Table 6 – Data message identifier definition 1 | |
| Table 4 – Definition of audio mode bits1Table 5 – Audio blocks and audio quality1Table 6 – Data message identifier definition1 | 0 |
| Table 5 – Audio blocks and audio quality1 Table 6 – Data message identifier definition1 | |
| Table 6 – Data message identifier definition 1 | |
| | 7 |
| Table 7 SCI definition | 8 |
| | 9 |
| Table 8 – Channel allocation table 1 | 9 |
| Table 9 – Audio quality mode (AQM) to number of audio blocks used2 | |
| Table C.1 – Sub-carrier allocation | 25 |
| | |
| | |
| | |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TRANSMISSION SYSTEMS OF AUDIO AND/OR VIDEO AND RELATED SIGNALS USING INFRA-RED RADIATION –

Part 7: Digital audio signals for conference and similar applications

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61603-7 has been prepared by Technical Area 3, Infrared systems and applications, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This first edition cancels and replaces 2.6.2 of IEC 61603-3 (1997).

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

| FDIS | Report on voting |
|--------------|------------------|
| 100/649/FDIS | 100/676/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 2005. At this date, the publication will be

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

TRANSMISSION SYSTEMS OF AUDIO AND/OR VIDEO AND RELATED SIGNALS USING INFRA-RED RADIATION –

Part 7: Digital audio signals for conference and similar applications

1 Scope

This part of IEC 61603 describes the characteristics of a digital multiple channel, multiple carrier audio transmission system as an extension to conference interpretation or similar systems using the frequency ranges 45 kHz to 1 MHz and 2 MHz to 6 MHz.

NOTE These frequency ranges are also covered by analogue pulse systems used for the same applications. Interference is not expected because both transmission systems are normally not applied at the same time in the same room.

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

IEC 61603-3:1997, Transmission of audio and/or video and related signals using infrared radiation – Part 3: Transmission systems for audio signals for conference and similar systems

IEC 61920, Infrared transmission systems – Free air applications¹

ISO/IEC 7498-1:1994, Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model

62 TZ-5

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61603-1 apply.

4 Abbreviations

- APCM Adaptive pulse code modulation
- AQM Audio quality mode
- CAT Channel allocation table
- CM Configuration message
- CRC Cyclic redundancy check

DCI Display changed identifier

DM Display message

DM-CRC Data message CRC

¹ To be published. For the purposes of the reference in C.1, IEC 61920:1998 is equally valid.