SIST

SLOVENSKI STANDARD
SIST EN 61883-1:1999

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Consumer audio/video equipment - Digital interface -- Part 1: General (IEC 61883-1:1998)

Consumer audio/video equipment - Digital interface -- Part 1: General

Audio/Video-Geräte der Unterhaltungselektronik - Digitale Schnittstelle -- Teil 1: Allgemeines

Matériel audio/vidéo grand public - Interface numérique -- Partie 1: Généralités

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35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment

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English version

Consumer audio/video equipment
Digital interface
Part 1: General
(IEC 61883-1:1998)

Matériel audio/vidéo grand public
Interface numérique
Partie 1: Généralités
(CEI 61883-1:1998)

Audio/Video-Geräte der Unterhaltungselektronik
Digitale Schnittstelle
Teil 1: Allgemeines
(IEC 61883-1:1998)

This European Standard was approved by CENELEC on 1998-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 100C/182/FDIS, future edition 1 of IEC 61883-1, prepared by SC 100C, Audio, video and multimedia subsystems and equipment, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61883-1 on 1998-04-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	1999-01-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2001-01-01

Endorsement notice

The text of the International Standard IEC 61883-1:1998 was approved by CENELEC as a European Standard without any modification.

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Matériel audio/vidéo grand public – Interface numérique –

Partie 1: Généralités

Consumer audio/video equipment – Digital interface –

Part 1: General

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IEC

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONSUMER AUDIO/VIDEO EQUIPMENT – DIGITAL INTERFACE –

Part 1: General

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 cooperation 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.
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International Standard IEC 61883-1 has been prepared by IEC subcommittee 100C: Audio, video and multimedia subsystems and equipment, of IEC technical committee 100: Audio video and multimedia systems and equipment.

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

FDIS	Report on voting
100C/182/FDIS	100C/211/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.

IEC 61883 consists of the following parts under the general title: Consumer audio/video equipment – Digital interface

– Part 1: General
– Part 2: SD-DVCR data transmission
– Part 3: HD-DVCR data transmission
– Part 4: MPEG2-TS data transmission
– Part 5: SDL-DVCR data transmission

Annex A forms an integral part of this standard.

CONSUMER AUDIO/VIDEO EQUIPMENT – DIGITAL INTERFACE –

Part 1: General

1 Scope and object

This part of IEC 61883 specifies a digital interface for consumer electronic audio/video equipment using the IEEE 1394 standard. It describes the general packet format, data flow management and connection management for audiovisual data, and also the general transmission rules for control commands.

The object of this standard is to define the transmission protocol for audiovisual data and control commands which provides for the connectability of digital audio and video equipment, using the IEEE 1394 standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61883. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61883 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintan registers of currently valid International Standards.

ISO/IEC 13213:1994, *Information technology – Microprocessor systems – Control and Status Registers (CSR) Architecture for microcomputer buses*

IEEE 1394:1995, *Standard for a High Performance Serial Bus*

3 Definitions, symbols and abbreviations

For the purpose of this part of IEC 61883, the following abbreviations and definitions of IEEE 1394 apply:

AV/C	audio video control
CHF	CIP header field
CIP	common isochronous packet
CMP	connection management procedures
CSR	command and status register
CTS	command/transaction set
CRC	cyclic redundancy check code
DVCR	digital video cassette recorder
EOH	end of CIP header
FCP	function control protocol
iPCR	input plug control register
iMPR	input master plug register
MPEG	motion picture experts group

oPCR	output plug control register
oMPR	output master plug register
PCR	plug control register
ROM	read only memory

cycle master capable

isochronous resource manager capable

quadlet

S100

S200

S400

4 High performance serial bus layers

4.1 Cable physical layer

All cable physical layer implementations conforming to this standard shall meet the performance criteria specified in IEEE 1394, chapter 4. In addition to the cable and connector defined in IEEE 1394, the AV cable and connector defined in annex A may be used.

For AV devices, it is recommended not to generate a bus reset until access to the bus has been granted as specified in IEEE 1394. Furthermore, it is recommended that AV devices maintain the reset condition on the bus for the minimum time permitted by IEEE 1394.

4.2 Link layer

All link layer implementations conforming to this standard shall meet the performance criteria specified in IEEE 1394, chapter 6.

4.3 Transaction layer

All transaction layer implementations conforming to this standard shall meet the performance criteria specified in IEEE 1394, chapter 7.

5 Serial bus management

5.1 Basic serial bus management

All implementations regarding basic serial bus management conforming to this standard shall meet the performance criteria specified in IEEE 1394, chapter 8.

5.2 Bus management capability

A node shall conform to the following requirements:

- a node shall be cycle master capable. This is because every node has the possibility to be assigned as a root;
- a node shall be isochronous resource manager capable;
- a node which transmits or receives the isochronous packets shall have plug control registers (see 7.2).

5.3 Command and status registers

5.3.1 CSR core registers

This standard uses the standardized CSR architecture. Details of the registers are given in the IEEE 1394 standard. There are no additional requirements for implementations of this standard except for the STATE_CLEAR.cmstr bit.

The STATE_CLEAR.cmstr bit shall be implemented, since a node shall be cycle master capable as described previously. A special emphasis in this standard is that cmstr bit is set automatically by system software or hardware. It shall be executed when a node becomes the new root after the bus reset initialization process is completed. In this manner, it is possible to ensure the fast resumption and continuity of data transmission where the time scale is critical at the level of microseconds.

5.3.2 Serial bus node registers

Implementation requirements for bus-dependent registers in this standard conform to IEEE 1394. A node shall have the following registers:

CYCLE_TIME register

BUS_TIME register

BUS_MANAGER_ID register

BANDWIDTH_AVAILABLE register

CHANNELS_AVAILABLE register

5.3.3 Configuration ROM requirements

A node shall implement the general ROM format as defined in ISO/IEC 13213 and IEEE 1394. Additional information required for implementations of this standard shall be included in one of the unit directories. Figure 1 shows an example of the configuration ROM implementation for this standard.

5.3.3.1 Bus_Info_Block entry

Implementation requirements for bus_info_block in this standard conform to IEEE 1394. The Node_Unique_Id shall be present in the bus_info_block.

5.3.3.2 Root directory

The following entries shall be present:

– Module_Vendor_Id;
– Node_Capabilities;
– Node_unique_id offset;
– Unit_Directory offset for this standard.

Other entries can be implemented in addition to the above required entries.

5.3.3.3 Unit directory

The following entries shall be present:

– Unit_Spec_Id;
– Unit_Sw_Version.

The value of the Unit_Spec_Id and the Unit_Sw_Version for this standard are given as follows:

Unit_Spec_Id:	First octet	= 00_{16}
	Second octet	= $A0_{16}$
	Third octet	= $2D_{16}$
Unit_Sw_Version:	First octet	= 01_{16}

The second and third octets are reserved for this standard and indicate capabilities for command/transaction sets. The 4-bit CTS (see 9.3) allows 16 command/transaction sets. Each bit of the second and third octets corresponds to one command/transaction set. The least significant bit corresponds to CTS code = 0000_2. The most significant bit corresponds to CTS code = 1111_2. When a node supports a CTS, the node shall set the corresponding bit to 1. A node may support more than one (plural) CTS.

6 Real time data transmission protocol

6.1 Common isochronous packet (CIP) format

6.1.1 Isochronous packet structure

The structure of the isochronous packet for this standard is as illustrated in figure 2. The packet header and header CRC are placed as the first two quadlets of an IEEE 1394 isochronous packet. The CIP header is placed at the beginning of the data field of an IEEE 1394 isochronous packet, immediately followed by zero or more data blocks.

6.1.2 Packet header structure

The packet header consists of the following items as specified in IEEE 1394.

Data_length: specifies the length of the data field of the isochronous packet in bytes, which is determined as follows:

CIP header size + signal data size

Tag: provides a high level label for the format of data carried by the isochronous packet.

00_2 = No CIP header included

01_2 = CIP header included as specified in 6.1.3

10_2 = Reserved

11_2 = Reserved

Channel: specifies the isochronous channel number for the packet.

Tcode: specifies the packet format and the type of transaction that shall be performed (fixed at 1010_2).

Sy: Application-specific control field.

6.1.3 CIP header structure

The CIP header is placed at the beginning of the data field of an IEEE 1394 isochronous packet. It contains information on the type of the real time data contained in the data field following it. The structure of the CIP header is shown in figure 3.

The definitions of the fields are given as follows:

EOH_n (End of CIP header): means the last quadlet of a CIP header.

0 = Another quadlet will follow

1 = The last quadlet of a CIP header

Form_n: in combination with EOH, shows the additional structure of CHF_n.

CHF_n (CIP header field): CIP header field of n^{th} quadlet. The additional structure of CHF_n depends on EOH_0, form_0, EOH_1, form_1, ... EOH_n, and form_n.

6.2 Transmission of fixed length source packet

This protocol transfers a stream of source packets from an application on a device to an application on other device(s). A source packet is assumed to have a fixed length, which is defined for each type of data. The data rate can be variable.

A source packet may be split into 1, 2, 4 or 8 data blocks, and zero or more data blocks are contained in an IEEE 1394 isochronous packet. A receiver of the packet shall collect the data blocks in the isochronous packet and combine them to reconstruct the source packet to send to the application.

A model complying with above statement is shown in figure 4.

6.2.1 Two-quadlet CIP header (form_0=0, form_1=0)

This standard defines the two-quadlet CIP header for a fixed length source packet. There are two types for the structure of the two quadlet CIP header as shown in figure 5. One is the CIP header with SYT field (figure 5a), and the other is the CIP header without SYT field (figure 5b). If a device transmits real time data (identified by FMT) and requires time stamp in the CIP header, it shall use the SYT format.

The definitions of the fields are given as follows.

- SID: Source node ID (node ID of transmitter)
- DBS: Data block size in quadlets

DBS field is 8 bits because 256 quadlets is the maximum payload size for S100 mode. When 8 bits are all 0, it means 256 quadlets; and 00000001_2 to 11111111_2 means 1 quadlet to 255 quadlets accordingly.

00000000_2 = 256 quadlets

00000001_2 = 1 quadlet

00000010_2 = 2 quadlets

....

11111111_2 = 255 quadlets

Several data blocks may be put into a bus packet, which is a packet to be transmitted on the bus, if higher bandwidth is required for S200 and S400 mode.

NOTE – S100, S200, S400 are transmission modes as defined in IEEE 1394.