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Vmesniki za DVB-IRD

Interfaces for DVB-IRD

Schnittstellen für DVB-IRD

Interfaces pour décodeur DVB intégré

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Interfaces for DVB-IRD

Interfaces pour décodeur DVB intégré Schnittstellen für DVB-IRD

This European Standard was approved by CENELEC on 2000-04-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard was prepared by the DVB-TM Ad hoc group on Physical Interfaces, together with the former Technical Committee CENELEC TC 203, Electronic entertainment and educational systems for household and similar use (in July 1998, TC 203 has become part of TC 206, Consumer equipment for entertainment and information and related sub-systems).

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50201 on 2000-04-01.

This European Standard supersedes EN 50201:1998.

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) 2002-07-01

- latest date by which national standards conflicting with the EN have to be withdrawn (dow) 2003-04-01

Annexes designated "informative" are given for information only.
In this standard, annexes A and B are informative.

1 Scope

This European Standard is an application standard, identifying recommended interfaces for connections of digital video broadcast integrated receiver decoder (DVB-IRD) equipment. If a recommended interface is supported, then the full specification of that interface, which may include options, applies. Interfaces not mentioned in this document are not excluded and especially interfaces which are under development at the time of writing of this document may be added at a later stage.

For mechanical and electrical details of the interfaces, reference is made to existing standards of IEC or CENELEC wherever possible, or standards which are known to be in an advanced state of development.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

2.1 IEC Publications

IEC 60807-9	Rectangular connectors for frequencies below 3 MHz - Part 9: Detail specification for a range of peritelevision connectors
IEC 60933-1	Audio, video and audiovisual systems - Interconnections and matching values Part 1: 21-pin connector for video systems – Application No. 1

2.2 CENELEC Publications

EN 50049-1	Domestic and similar electronic equipment interconnection requirements: Peritelevision connector
EN 50157-1	Domestic and similar electronic equipment interconnection requirements: AV.link Part 1: General
EN 50157-2-1	Part 2-1: Signal quality matching and automatic selection of source devices
EN 50221	Common interface specification for conditional access and other digital video broadcasting decoder applications
EN 60169-24	Radio-frequency connectors – Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F) (IEC 60169-24)
EN 60933-5	Audio, video and audiovisual systems – Interconnections and matching values Part 5: Y/C connector for video systems – Electrical matching values and description of the connector (IEC 60933-5)
EN 60958	Digital audio interface (IEC 60958)
EN 61030	Audio, video and audiovisual systems - Domestic Digital Bus (D2B) (IEC 61030)
EN 61076-4-105	Connectors with assessed quality, for use in d.c., low frequency analogue and in digital high-speed data applications Part 4: Printed board connectors - Section 105: Detail specification for 9 mm circular connector with 3 to 8 contacts for use in a wide range of applications including the telecommunication and audio industry (IEC 61076-4-105)
EN 61319-1 + A11	Interconnections of satellite receiving equipement – Part 1: Europe (IEC 61319-1)
EN 61883 Series	Consumer audio/video equipment – Digital interface (IEC 61883 Series)
EN 61937	Digital audio - Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 (IEC 61937)

EN 61938	Audio, video and audiovisual systems - Interconnections and matching values - Preferred matching values of analogue signals (IEC 61938)
HD 134.2	Radio-frequency connectors – Part 2: coaxial unmatched connector (IEC 60169-2:1965 + A1:1982)
HD 369.3	Audiovisual, video and television equipment and systems - Part 3: Connectors for the interconnection of equipment in audio-visual systems (IEC 60574-3)
HD 483.11	Sound system equipment - Part 11: Application of connectors for the interconnection of sound system components (IEC 60268-11:1987 + A1:1989 + A2:1991)

2.3 Publications by ETSI

ETR 154:1997	Digital Video Broadcasting (DVB) - Implementation guidelines for the use MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications
ETS 300473	Digital Video Broadcasting (DVB) - Satellite Master Antenna Television (SMATV) distribution systems
ETS 300784	Satellite Earth Stations and Systems (SES); Television Receive-Only (TVRO) satellite earth stations operating in the 11/12 GHz frequency bands

2.4 Industrial publications

PCMCIA	PC Card Standard, release 3, Personal Computer Memory Card International Association, Sunnyvale, Cal.
IEEE 1394	IEEE standard for a high performance serial bus
IEEE 1284:1994	IEEE standard signalling method for a bidirectional parallel peripheral interface for personal computers
ANSI/EIA RS232	Interface between data terminal equipment and data-circuit terminating equipment employing serial binary data interchange NOTE The latest version of this standard is published as RS232E (1991).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

3.1.1
Community Antenna Television system
a system designed primarily to provide sound and television signals to communities

3.1.2
Satellite Master Antenna Television system
a system designed to provide sound and television signals to the households of a building or group of buildings
Two system configurations are defined in ETS 300473 as follows:

- SMATV system A, based on transparent transmodulation of QPSK satellite signals into QAM signals to be distributed to user;
- SMATV system B, based on direct distribution of QPSK signals to the user, with two options
  - SMATV-IF distribution on the satellite IF band (above 950 MHz),
  - SMATV-S distribution on the VHF/UHF band, for example the extended S-band (230 MHz - 470 MHz).

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ADSL	Asymmetric Digital Subscriber Loop
BSS	Broadcast Satellite Services
CA	Conditional Access
CATV	Community Antenna Television system
CENELEC	European Committee for Electrotechnical Standardization
CTS	Clear To Send
CVBS	Composite Video, Blanking and Sync
DTE/DCE	Data Terminal Equipment/Data Communication Equipment
DVB	Digital Video Broadcast
DVC	Digital Video Cassette
ECP	Enhanced Capability Port
EPP	Enhanced Parallel Port
ETSI	European Telecommunications Standards Institute
FM	Frequency Modulation
FSS	Fixed Satellite Services
GSTN	General Switched Telephone Network
IEC	International Electrotechnical Commission
IRD	Integrated Receiver Decoder
LNB	Low Noise Block converter
OSD	On Screen Display
PCM	Pulse Code Modulation
PSTN	Public Switched Telephone Network
QAM	Quadrature Amplitude Modulation
QPSK	Quadruple Phase Shift Keying
RTS	Request to Send
SMATV	Satellite Master Antenna Television
UHF	Ultra-High Frequency (300 MHz ... 3000 MHz)
VBI	Vertical Blanking Interval
VGA	Video Graphics Adapter
VHF	Very High Frequency (30 MHz .. 300 MHz)
VOD	Video On Demand
VPS	Video Programming System

4 Interface requirements for DVB-IRDs

4.1 RF input in the satellite IF range

This clause specifies the interface in case of individual dish antenna or SMATV-IF (analogue and digital) installations.

4.1.1 Polarization switch, LNB's band and first IF input selection

The control signal to switch the polarisation, the control signal to select the upper or lower band of the LNB and the 1st IF input from the LNB to the DVB-IRD shall be as specified in EN 61319-1, clause 5. The connector is specified in EN 60169-24 (also known as the F-connector), the impedance is 75 Ω and output return losses are specified in ETS 300784.

4.1.2 Azimuth control of a polar mount dish antenna

The control signal for the azimuth control of a polar mount dish antenna shall be as specified in EN 61319-1, clause 6.

4.2 RF I/O in the VHF/UHF range

4.2.1 RF input

The RF input in the case of CATV installations, SMATV System A or SMATV-S installations, or in the case of terrestrial reception shall be as follows:

- covers the VHF/UHF frequency bands (47 MHz - 862 MHz);
- 75 Ω coaxial;
- connector HD 134.2 (IEC 60169-2), female connector on the DVB-IRD.

4.2.2 RF output

The interface for RF output signals shall be as specified in 4.2.1 except for the connector which is HD 134.2 (IEC 60169-2) male version. RF output shall support either loop through only, RF modulated output from the DVB-IRD or both. In case of loop through, the modulator should output the VHF/UHF frequency bands as specified in 4.2.1. The channel to be used for RF modulated output depends on local circumstances, i.e. occupation of available channels by either terrestrial or cable programs (see informative Annex B). It is recommended to support the channel range 21 to 69 in UHF.

4.3 Modem interface

4.3.1 PSTN modem

A PSTN modem interface provides a low bit rate data channel.

4.3.1.1 External modem

4.3.1.1.1 DTE/DCE interface

The modem shall support

a) an interface lead with a 9 pin D-type connector with male shell and female contacts, using RS232C interface levels. The DVB-IRD is seen as the Data Terminal Equipment (DTE) and shall be equipped with the mating connector. The pin arrangement shall be as follows:

Pin number	Name	Function	Source
1	DCD	Carrier Detection	modem
2	RXD	Receive Data	modem
3	TXD	Transmit Data	IRD
4	DTR	Data Terminal Ready	IRD
5	GND	Signal Ground	
6	DSR	Data Set Ready	modem
7	RTS	Request To Send	IRD
8	CTS	Clear To Send	modem
9	RI	Ring Indicator	modem

b) automode selection ITU-T V.21, V.23 (1200/75), V.22 or V.22 bis transmission protocols (one of these as a minimum). Asynchronous working with one or two stop bits and with or without parity shall be possible. It is recommended that V.32, V.32 bis and V.34 support is included and that the design does not preclude the addition of future enhancements,

c) hardware flow control (RTS/CTS) in addition to XON/XOFF flow control,

d) control by the Hayes AT command set,

e) autocalling, ITU-T V.25 autoanswering and an autologon feature,

f) ITU-T V.42 error correction and V.42 bis data compression.

NOTE V.25 and V.42 are optional extras for a modem interface.

4.3.1.1.2 PSTN link interface

The modem shall be equipped with RJ 11 (6 contact) female connector with pin arrangement as follows:

Pin number	Name	Function
1		
2		
3	PSTN	electrical connection
4	PSTN	electrical connection
5		
6		

NOTE 1 PSTN (GSTN) working implies using a PSTN interface cable terminating in a plug which meets national connection requirements given in ETS 300001 (NET4). The compliance to this interface implies the need for the product to be subjected to type approval by the National regulatory body.

NOTE 2 Approval under the Terminal Equipment Directive 91/263/EEC.

4.3.1.2 Integrated modem

The internal modem shall meet the same requirements as the external modem as specified in 4.3.1.1, with the exception of providing the 9 pin interface connector as specified in 4.3.1.1.1 a).

4.3.2 CATV and SMATV modem

A CATV/SMATV modem interface provides a bi-directional data channel. The suitable data rate and the kind of operation depends on the performance of the service.

4.3.2.1 DTE/DCE interface

An external modem shall be equipped with an interface lead with a 9 pin D-type connector with male shell and female contacts, using RS232 interface levels. The DVB-IRD is the Data Terminal Equipment (DTE) and shall be equipped with the mating connector. The pin arrangement shall be as follows:

Pin number	Name	Function	Source
1			
2	RXD	Receive Data	modem
3	TXD	Transmit Data	IRD
4			
5	GND	Signal Ground	
6			
7			
8			
9			

4.3.2.2 RF interface to CATV/SMATV network

The RF interface for both an internal and an external modem shall be as follows:

- impedance 75 Ω;
- connector HD 134.2 (IEC 60169-2), female on the modem.

It is recommended to use, for the carrier in the forward direction

a) for CATV, SMATV System A and SMATV-S modem, the range of 47 MHz to 862 MHz,

b) for SMATV-IF modem, the range above 850 MHz.

It is recommended to use, for the carrier of the return path, the range of 5 MHz to 65 MHz (to be confirmed).

The choice of carrier frequencies depends on the design of the CATV/SMATV network.

4.4 Video signals

Analogue video signal output can be either baseband in RGB, Y/C (S-VHS) or CVBS format or modulated on an RF carrier. The MPEG2 Transport Stream is used to transmit the digital video signals on a high performance serial interface, see 4.6.3.

4.4.1 Baseband signals

Matching values for analogue baseband signals 1 V_{pp}. For detailed specifications see any one of the following standards:

- EN 61938: Preferred matching values of analogue signals;
- IEC 60933-1: 21 contact connector;
- EN 50049-1: Peritelevision connector;
- EN 50157-1: AV.link.

NOTE 1 All CVBS related features from PAL services (like VPS, teletext) which are available on the Peritelevision connector should be made available as usual.

For teletext, there are two possibilities:

- the set top box contains a teletext decoder and provides teletext output as OSD in RGB output signals;
- the set top box does not contain a teletext decoder, in which case teletext information is provided in the VBI of the CVBS output signal.

NOTE 2 The DVB standard also provides 2.21:1 (20:9) aspect ratio as an option for the receiver. While displays will only support 4:3 or 16:9, the aspect ratio 2.21:1 will result in a letterbox format. The Peritelevision connector provides following options to deal with aspect ratio 2.21:1 (20:9):

- 6 V signal level on function switch contact 8 is specified to correspond to 16:9 aspect ratio (see EN 50049-1). For optional 20:9 signals, the IRD should apply suitable processing as detailed in ETSI ETR 154 third edition for display on 4:3 and 16:9 display units;
- the protocol on contact 10 (see EN 50157-2-1) includes the option to signal ">16:9". This, when used by the DVB-IRD, will result in proper handling by 16:9 display unit.

Connectors:

- peritelevision connector, see IEC 60807-9,
- phono connector,
- 4 contact connector, see EN 60933-5.

4.4.2 RF modulated signals

Video output is also implied in the RF modulated output as described in 4.2.2.

4.5 Audio signals

Audio signal output can be in either analogue or digital format, or modulated on RF carrier.

4.5.1 Analogue audio signals

Matching values: see EN 50049-1.