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MULTIMEDIA SIGNALS

Cable set-top box

Requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport

Recommendation ITU-T J.298



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Requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport

Summary

Recommendation ITU-T J.298 describes the requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport. The main purpose of the Recommendation is to specify minimum and basic requirements for a hybrid set-top box (STB), which meets the requirements of developing countries and regions. The hybrid set-top box has full functionalities for traditional cable broadcasting services based on Recommendation ITU-T J.83, at the same time, satellite or a terrestrial broadcast receiving functions will also be implemented so that the STB is able to receive satellite or terrestrial broadcasting services. The basic functionalities for IP-based interactive video services are also required so that the STB be able to support the latest Internet protocol (IP) interactive services together with legacy cable and satellite/terrestrial services.

History

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Recommendation ITU-T J.298

Requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport

1 Scope

This Recommendation describes the requirements and specifications for a hybrid cable set-top box (STB) compatible with terrestrial and satellite TV transport to be used in developing countries and regions. By combining a mix-mode transmission platform with IP network, the STB can offer new interactive services to cable, satellite and terrestrial TV customers and operators.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T J.83] Recommendation ITU-T J.83 (2007), *Digital multi-programme systems for television, sound and data services for cable distribution*.
- [ITU-T H.262] Recommendation ITU-T H.262 (2012), *Information technology – Generic coding of moving pictures and associated audio information: Video*.
- [ITU-T H.264] Recommendation ITU-T H.264 (2017), *Advanced video coding for generic audiovisual services*.
ISO/IEC 14496-10:2012, *Information technology – Coding of audio-visual objects – Part 10: Advanced Video Coding*
- [ITU-T H.265] Recommendation ITU-T H.265 (2018), *High efficiency video coding*.
- [ITU-R BT.1700] Recommendation ITU-R BT.1700 (2005), *Characteristics of composite video signals for conventional analogue television systems*.
- [ETSI EN 300 421] ETSI EN V1.1.2 (1997), *Framing structure, channel coding and modulation for 11/12 GHz satellite services*.
- [ETSI EN 300 468] ETSI EN 300 468 V1.3.1 (1997), *Specification for Service Information (SI) in DVB systems*.
- [ETSI EN 300 744] ETSI EN 300 744 V1.4.1 (2000), *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television*.
- [ETSI EN 302 307-1] ETSI EN 302 307-1 V1.4.1 (2014), *Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications; Part 1 (DVB-S2)*.
- [ETSI EN 302 755] ETSI EN 302 755 V1.4.1 (2015), *Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)*.

[ETSI TS 100 289]	ETSI TS 100 289 V1.2.1 (2014), <i>Digital Video Broadcasting (DVB); Support for use of the DVB Scrambling Algorithm version 3 within digital broadcasting systems.</i>
[ETSI TS 101 154]	ETSI TS 101 154 V2.2.1 (2016), <i>Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream.</i>
[ETSI TS 102 006]	ETSI TS 102 006 V1.4.1 (2015), <i>Digital Video Broadcasting (DVB); Specification for System Software Update (SSU) in DVB Systems.</i>
[ETSI TS 102 366]	ETSI TS 102 366 V1.2.1 (2008), <i>Digital Audio Compression (AC-3, Enhanced AC-3) Standard.</i>
[IEC 11172-3]	IEC 11172-3:1993, <i>Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 3: Audio.</i>
[IEC 60603-14]	IEC 60603-14:1998, <i>Connectors for frequencies below 3 MHz for use with printed boards – Part 14: Detail specification for circular connectors for low-frequency audio and video applications such as audio, video and audio-visual equipment.</i>
[ISO/IEC 7816-1, 2, 3]	ISO/IEC 7816-1, 2, 3 (2011), <i>Identification cards – Integrated circuit cards: Parts 1, 2, 3.</i>
[ISO/IEC 13818-3]	ISO/IEC 13818-3:1995, <i>Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio.</i>
[ISO/IEC 14496-3]	ISO/IEC 14496-3:2009, <i>Information technology – Coding of audio-visual objects – Part 3: Audio.</i>
[ISO/IEC 60958-1]	ISO/IEC 60958-1:2004, <i>Digital audio interface – Part 1: General.</i>
[ARIB STD-B21]	ARIB STD-B21, <i>Receiver for Digital Broadcasting (Desirable Specifications).</i>
[ARIB STD-B24]	ARIB STD-B24, <i>Data Coding and Transmission Specification for Digital Broadcasting.</i>
[ARIB STD-B31]	ARIB STD-B31, <i>Transmission System for Digital Terrestrial Television Broadcasting.</i>
[TR-069 Amd.5]	Broadband Forum, 2013, <i>CPE WAN Management Protocol, Amendment 5.</i>
[TR-106 Amd.5]	Broadband Forum, 2010, <i>Data Model Template for TR-069-Enabled Devices, Amendment 5.</i>
[TR-135 Amd.1]	Broadband Forum, 2010, <i>Data Model for a TR-069 Enabled STB, Amendment 1.</i>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 conditional access system [b-ITU-T X.1193]: A component of a service and content protection system, the purpose of which is to prevent unauthorized (unentitled) access to a service or to content.

3.1.2 cable television [b-ITU-T J.142]: Communications systems distributes broadcast and non-broadcast signals, as well as a multiplicity of satellite signals originating programming and other signals by means of coaxial cable and/or optical fibre.

3.1.3 electronic programme guide [b-ITU-T J.90]: A structured multimedia database, intended to provide information on programmes to be broadcast or cablecast.

3.1.4 Hypertext transfer protocol (HTTP) [b-IETF RFC 2616]: An application-layer protocol used to transmit data over the World-Wide Web.

3.1.5 network [b-ITU-T J.94]: A collection of MPEG-2 Transport Stream (TS) multiplexes transmitted on a single delivery system, e.g., all digital channels on a specific cable system.

3.1.6 service information (SI) [b-ITU-T J.94]: Digital data describing the delivery system, content, and scheduling/timing of broadcast data streams etc. It includes MPEG-2 Programme Specific Information (PSI) together with independently defined extensions.

3.1.7 user interface [b-ITU-T F.902]: Software and hardware components through which a user can interact with a system.

3.1.8 video on demand (VOD) [b-ITU-T Y.1910]: A service in which the end user can, on demand, select and view video content and where the end user can control the temporal order in which the video content is viewed (e.g., the ability to start the viewing, pause, fast forward, rewind, etc.).

3.1.9 JavaScript [b-ITU-T J.296]: JavaScript is a scripting language for a Web browser. JavaScript is an implementation of the ECMAScript language standard and is primarily used in the form of client-side JavaScript, implemented as part of a Web browser in order to provide enhanced-user interfaces and dynamic websites.

3.1.10 subtitle [b-ITU-T J.296]: A service of superimposing related text on a TV video broadcast.

3.1.11 transport stream (TS) [b-ITU-T J.296]: The transport stream defined by the MPEG-2 system standard (in digital terrestrial television broadcasting, one TS is assigned to a master transmitter).

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 hybrid STB: A hybrid set-top box (STB) is a STB that uses multiple methods of receiving transmission signals with video and audio content.

NOTE – For the purposes of this Recommendation, the dual streams will be IP based via the Internet protocols and cable, satellite and terrestrial television, based on the ITU-T J.83, DVB-S/S2, DVB-T/T2 or ISDB-T/Tb standards.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AES	Advanced Encryption Standard
API	Application Program Interface
ATIS	Alliance for Telecommunications Industry Solutions
BAT	Bouquet Association Table
BGA	Ball Grid Array
CAS	Conditional Access System
CGMS	Copy Generation Management System

CWMP	CPE WAN Management Protocol
CPE	Customer Premise Equipment
CPU	Central Processing Unit
CSA	Common Scrambling Algorithm
DC	Direct Current
DDR	Double Data Rate
DHCP	Dynamic Host Configuration Protocol
DiSEqC	Digital Satellite Equipment Control
DMA	Direct Memory Access
DMIPS	Dhrystone Million Instructions per Second
DRM	Digital Rights Management
DTCP	Digital Transmission Content Protection
EIT	Event Information Table
EPG	Electronic Programme Guide
FCC	Fast Channel Change
FEC	Forward Error Correction
FHD	Full High Definition
GPU	Graphics Processing Unit
HD	High Definition
HDCP	High Definition Content Protection
HDD	Hard Disk Drive
HDMI	High-Definition Multimedia Interface
HFC	Hybrid Fibre/Coax
HLS	HTTP Live Streaming
HTML	Hypertext Mark-up Language
HTTP	Hyper Text Transport Protocol
ICMP	Internet Control Messages Protocol
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPTV	Internet Protocol Television
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
LAN	Local Area Network
LCN	Logical Channel Number
LED	Light Emitting Diode
LNB	Low Noise Block
OS	Operating System