

Recommendation

ITU-T J.298 (06/2024)

SERIES J: Cable networks and transmission of television,
sound programme and other 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

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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

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 all 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 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 is 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. 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.

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| [ITU-T H.262] | Recommendation ITU-T H.262 (2012), <i>Information technology – Generic coding of moving pictures and associated audio information: Video.</i> |
| [ITU-T H.264] | Recommendation ITU-T H.264 (2021), <i>Advanced video coding for generic audiovisual services.</i> |
| [ITU-T H.265] | Recommendation ITU-T H.265 (2023), <i>High efficiency video coding.</i> |
| [ITU-T H.266] | Recommendation ITU-T H.266 (2023), <i>Versatile video coding.</i> |
| [ITU-T J.83] | Recommendation ITU-T J.83 (2007), <i>Digital multi-programme systems for television, sound and data services for cable distribution.</i> |
| [ITU-R BT.1306-7] | Recommendation ITU-R BT.1306-7 (2015), <i>Error-correction, data framing, modulation and emission methods for digital terrestrial television broadcasting.</i> |
| [ITU-R BT.1700] | Recommendation ITU-R BT.1700 (2005), <i>Characteristics of composite video signals for conventional analogue television systems.</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> |
| [ATSC A/300] | ATSC A/300:2023-03, <i>ATSC 3.0 system.</i> |
| [ATSC A/321] | ATSC A/321:2023-03, <i>System discovery and signalling.</i> |
| [ATSC A/322] | ATSC A/322:2023-03, <i>Physical layer protocol.</i> |
| [ATSC A/332] | ATSC A/332:2023-03, <i>Service announcement.</i> |
| [ATSC A/342 Part 1] | ATSC A/342:2023-03, Part 1, <i>Audio common elements.</i> |

[ATSC A/342 Part 2]	ATSC A/342:2023-03, Part 2, <i>AC-4 system</i> .
[ATSC A/342 Part 3]	ATSC A/342:2023-03, Part 3, <i>MPEG-H system</i> .
[ATSC A/344]	ATSC A/344:2023-05, <i>ATSC 3.0 Interactive content</i> .
[ATSC A/53 Part 2]	ATSC A/53, Part 2:2011, <i>RF/Transmission system characteristics</i> .
[ATSC A/53 Part 5]	ATSC A/53, Part 5:2014, <i>AC-3 Audio system characteristics</i> .
[ATSC A/65]	ATSC A/65C with Amendment No. 1:2013, <i>Program and system information protocol for terrestrial broadcast and cable</i> .
[ATSC A/70 Part 1]	ATSC A/70, Part 1:2010, <i>Conditional access system for terrestrial broadcast</i> .
[ATSC A/70 Part 2]	ATSC A/70, Part 2:2011, <i>Conditional access system for terrestrial broadcast service protection using Simulcrypt for IP-delivered services</i> .
[ETSI EN 300 421]	ETSI EN 300 421 V1.1.2 (1997), <i>Framing structure, channel coding and modulation for 11/12 GHz satellite services</i> .
[ETSI EN 300 468]	ETSI EN 300 468 V1.17.1 (2022), <i>Specification for service information (SI) in DVB systems</i> .
[ETSI EN 300 706]	ETSI EN 300 706 (2003), <i>Enhanced Teletext specification</i> .
[ETSI EN 300 743]	ETSI EN 300 743 (2006), <i>Digital Video Broadcasting (DVB) – Subtitling systems</i> .
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[ETSI EN 302 755]	ETSI EN 302 755 V1.4.1 (2015), <i>Digital video broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)</i> .
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[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> .
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[ETSI TS 103 190-1]	ETSI TS 103 190-1 V1.3.1 (2018-02), <i>Digital audio compression (AC-4) standard; Part 1: Channel based coding</i> .
[ETSI TS 103 190-2]	ETSI TS 103 190-2 V1.2.1 (2018-02), <i>Digital audio compression (AC-4) standard; Part 2: Immersive and personalized 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> .

[IEC 61169-2]	IEC 61169-2:2007, <i>Radio-frequency connectors – Part 2: Sectional specification – Radio frequency coaxial connectors of type 9,52.</i>
[IEC 61169-24]	IEC 61169-24:2019, <i>Radio-frequency connectors – Part 24: Sectional specification – Radio frequency coaxial connectors with screw coupling, typically for use in 75 Ω cable networks (type F).</i>
[ISO/IEC 11172-3]	ISO/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>
[ISO/IEC 13818-3]	ISO/IEC 13818-3:1998, <i>Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio.</i>
[ISO/IEC 13818-7]	ISO/IEC 13818-7:2006, <i>Information technology, Generic coding of moving pictures and associated audio information, Part 7: Advanced Audio Coding (AAC).</i>
[ISO/IEC 14496-2]	ISO/IEC 14496-2:2004, <i>Information technology – Coding of audio-visual objects – Part 2: Visual</i>
[ISO/IEC 14496-3]	ISO/IEC 14496-3:2019, <i>Information technology – Coding of audio-visual objects – Part 3: Audio.</i>
[ISO/IEC 23001-7]	ISO/IEC 23001-7:2023, <i>Information technology – MPEG systems technologies – Part 7: Common encryption in ISO base media file format files.</i>
[ISO/IEC 23003-3]	ISO/IEC 23003-3:2020, <i>Information technology – MPEG audio technologies – Part 3: Unified speech and audio coding.</i>
[ISO/IEC 23003-4]	ISO/IEC 23003-4:2020, <i>Information technology – MPEG audio technologies – Part 4: Dynamic range control.</i>
[ISO/IEC 23008-2]	ISO/IEC 23008-2:2023, <i>Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 2: High efficiency video coding.</i>
[ISO/IEC 23008-3]	ISO/IEC 23008-3:2022, <i>Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 3: 3D audio.</i>
[ISO/IEC 60958-1]	ISO/IEC 60958-1:2004, <i>Digital audio interface – Part 1: General.</i>
[ISO/IEC 8859-2]	ISO/IEC 8859-2:1999, <i>Information technology – 8-bit single-byte coded graphic character sets, Part 2: Latin alphabet No. 2.</i>
[TR-069]	Broadband Forum, 2013, <i>CPE WAN management protocol, Amendment 5.</i>
[TR-106]	Broadband Forum, 2010, <i>Data model template for TR-069-enabled devices, Amendment 5.</i>
[TR-135]	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 broadcast transport stream is composed of MPEG-2 TS signals, which have multi-frame architecture using the same frame length as the orthogonal frequency-division multiplexing (OFDM) frame.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 hybrid set-top box: A set-top box 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, ISDB-T/Tb, or ATSC 3.0 standards.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AES	Advanced Encryption Standard
ATIS	Alliance for Telecommunications Industry Solutions
AVC	Advanced Video Coding
CA	Conditional Access
CAS	Conditional Access System

CGMS	Copy Generation Management System
CPE	Customer Premise Equipment
CPU	Central Processing Unit
CSA	Common Scrambling Algorithm
CWMP	Customer premise equipment Wide area network Management Protocol
DC	Direct Current
DDR	Double Data Rate
DHCP	Dynamic Host Configuration Protocol
DiSEqC	Digital Satellite Equipment Control
DMIPS	Dhrystone Million Instructions Per Second
DRM	Digital Rights Management
EEPROM	Erasable Programmable Read-Only Memory
EIT	Event Information Table
EPG	Electronic Programme Guide
FCC	Fast Channel Change
GPU	Graphics Processing Unit
HD	High Definition
HDCP	High Definition Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HEVC	High Efficiency Video Coding
HLS	Hypertext transport protocolLive Streaming
HTML	Hypertext Markup Language
HTTP	Hypertext 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
LNB	Low Noise Block
OS	Operating System
OSD	On-Screen Display
OTA	Over The Air
OTT	Over The Top