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**Digital Video Service Multiplex
and Transport System Standard
for Cable Television**

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DIGITAL VIDEO SERVICE MULTIPLEX AND TRANSPORT SUBSYSTEM STANDARD FOR CABLE TELEVISION

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DIGITAL VIDEO SERVICE MULTIPLEX AND TRANSPORT SUBSYSTEM STANDARD FOR CABLE TELEVISION

1. SCOPE

This document describes the transport subsystem characteristics and normative specifications of the in-band Service Multiplex and Transport Subsystem Standard for Cable Television.¹

2. REFERENCES

2.1 Normative References

The following documents contain provisions which in whole or in part, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision; and while parties to any agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents may not be compatible with the referenced version.

1. ANSI/SCTE 128-1 (2013) AVC Video Constraints for Cable Television Part 1: Coding
2. ATSC A/52:2012, Digital Audio Compression (AC-3, E-AC-3) Standard.
3. ATSC A/53 Part 3:2013, Service Multiplex and Transport Subsystem Characteristics
4. ANSI/SCTE 194-1 (2013) DTS-HD Audio System – Part 1: Coding Constraints for Cable Television
5. ANSI/SCTE 194-2 (2014) DTS-HD Audio System – Part 2: Constraints for Carriage over MPEG-2 Transport
6. SCTE 193-1 (2014) MPEG-4 AAC Family Audio System – Part 1 Coding Constraints for Cable Television
7. SCTE 193-2 (2014) MPEG-4 AAC Family Audio System – Part 2 Constraints for Carriage over MPEG-2 Transport
8. ATSC A/53 Part 4:2009, MPEG-2 Video System Characteristics
9. ATSC A/65: 2013, Program and System Information Protocol (PSIP) for Terrestrial Broadcast and Cable.
10. ISO/IEC 13818-1, (2013), “Information Technology—Generic coding of moving pictures and associated audio—Part1: Systems.”
11. ISO/IEC IS 13818-2, (2013), “Information Technology—Generic coding of moving pictures and associated audio—Part 2: Video.”

¹ Informative note: This standard applies only to Transport Streams transmitted on cable using 64-QAM or 256-QAM in accordance with ANSI/SCTE 07 2000 *Digital Video Transmission Standard for Cable Television*.

12. ANSI-J-STD-42B-(2013), Emergency Alert Messaging for Cable.
13. ATSC A/53 Part 5:2014, AC-3 Audio System Characteristics
14. ATSC A/53 Part 6:2013, Enhanced AC-3 Audio System Characteristics

2.2 Informative References

15. ANSI/SCTE 07 2013, Digital Video Transmission Standard for Cable Television
16. ANSI/SCTE 128-2 (2013) AVC Video Constraints for Cable Television Part 2: Transport
17. ANSI/CEA-766-D (2013), U.S. and Canadian Rating Region Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC Program and System Information Protocol (PSIP).
18. ATSC A/71:2012 Parameterized Services Standard
19. ATSC Code Point Registry, available at <http://www.atsc.org/cms/index.php/standards/other-technical-documents/78-atsc-code-point-registry>

3. DEFINITIONS

3.1 Compliance notation

As used in this document, “*shall*” denotes a mandatory provision of the standard. “*Should*” denotes a provision that is recommended but not mandatory. “*May*” denotes a feature whose presence does not preclude compliance that may or may not be present at the option of the implementer.

3.2 Abbreviations

The following abbreviations are used within this specification:

64-QAM	64-state quadrature amplitude modulation
256-QAM	256-state quadrature amplitude modulation
AAC	advanced audio coding
AC-3	Audio Codec 3 or Advanced Codec 3 (also Dolby Digital)
ADTS	audio data transport stream
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ATSC	Advanced Television Systems Committee
AVC	advanced video coding
bps	bits per second
CA	conditional access
CEA	Consumer Electronics Association
CM	complete main [audio service]
CRC	cyclic redundancy check
CVCT	cable virtual channel table
E-AC-3	Enhanced AC-3 (also Dolby Digital Plus)
ECM	entitlement control message

e.g.	for example (<i>exempli gratia</i>)
EIT	event information table
ES	elementary stream
ETT	extended text table
ID	identifier
i.e.	that is (<i>id est</i>)
IEC	International Electrotechnical Commission
ITU-T	ITU Telecommunication Standardization Sector
IS	international standard
ISO	International Organization for Standardization
LATM	low overhead audio transport multiplex
LBR	low bit rate
LLC	limited liability company
LOAS	low overhead audio stream
Mbps	megabits per second
ME	music and effects
MGT	master guide table
MPEG	Moving Picture Experts Group
MRD	MPEG-2 registration descriptor
ms	millisecond
Msp	megasymbols per second
PAT	program association table
PES	packetized elementary stream
PID	packet identifier
PMT	program map table (more properly, TS_program_map_section())
PSI	program specific information
PSIP	program and system information protocol
PTS	presentation time stamp
QAM	quadrature amplitude modulation
RRT	rating region table
SCTE	Society of Cable Telecommunications Engineers
SI	service information
SMPTE	Society of Motion Picture and Television Engineers
STT	system time table
TS	transport stream
T-STD	transport stream system target decoder
TVCT	terrestrial virtual channel table

4. SYSTEM OVERVIEW

The transport format and protocol for the Service Multiplex and Transport Subsystem Standard for Cable Television is a compatible subset of the MPEG-2 Systems specification defined in ISO/IEC 13818-1. It is based on a fixed-length packet Transport Stream approach which has been defined and optimized for digital television delivery applications.

As illustrated in Figure 4.1, the transport function resides between the application (e.g., audio or video) encoding and decoding functions and the transmission subsystem. The encoder's transport subsystem is responsible for formatting the coded elementary streams and multiplexing