

for Television — Serial Data Transport Interface



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Introduction

This revision of SMPTE 305.2M is to document format parameters, and to revise normative references cited in previous revisions. This revision is compatible with previous revisions of the standard. Implementation guidance is given in section 6.2.3 in order to retain interoperability. In table 2 data type 200_h is now defined as invalid data, previous ambiguity has been removed. This revision does not implement the extended payload feature of previous versions.

1 Scope

1.1 This standard specifies a data stream protocol used to transport packetized data. The data packets and synchronizing signals are only compatible with 10-bit operation of SMPTE 259M (SDI) as shown in figure 1. Parameters of the protocol are compatible with the 4:2:2 component SDI format as shown in figure 2.

1.2 The data stream uses the digital television active line for the payload. Ancillary data packets defined by SMPTE 291M in the horizontal blanking interval are used to identify the payload application.

1.3 This standard does not provide the specific protocol for the many SDTI data types. Payload data may be organized in fixed length blocks or variable length blocks. Additional documents will describe particular applications of this standard and will include details of data formatting, data location and other parameters, such as compression and error correction, if applicable.

NOTE – SMPTE 352M labels are not used for SDTI application of SMPTE 259M.

2 Normative references

The following standards contain provisions that, 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 parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI/SMPTE 125M-1995, Television — Component Video Signal 4:2:2- Bit Parallel interface

ANSI/SMPTE 267-1995, Television — Bit Parallel Digital interface — Component Video Signal 4:2:2 16x9 Aspect Ratio

SMPTE 259M, Television — SDTV Digital Signal/Data — Serial Digital Interface

SMPTE 291M-1998, Television — Ancillary Data Packet and Space Formatting

SMPTE 294M-2001, Television — 720x483 Active Line at 59.94-Hz Progressive Scan Production — Bit-Serial Interfaces

SMPTE RP 165, Error Detection Checkwords and Status Flags for Use in Bit-Serial Digital Interfaces for Television

ITU-R BT.601-5 (10/95), Studio Encoding Parameters of Digital Television for Standard 4:3 and Wide-Screen Aspect Ratios.

ITU-R BT.656-4 (02/98), Interfaces for Digital Component Video Signals in 525-Line and 625-Line Television Systems Operating at the 4:2:2 Level of Recommendation of ITU-R BT.601(Part A)

ITU-T X.25 (09/98), Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit

3 Version number

The current version number of this standard is version 3. This version is backwards compatible with the previous published version of SMPTE 305.2M-2000 (version 2). See section 6.2.3 for implementation guidance.

4 General specifications

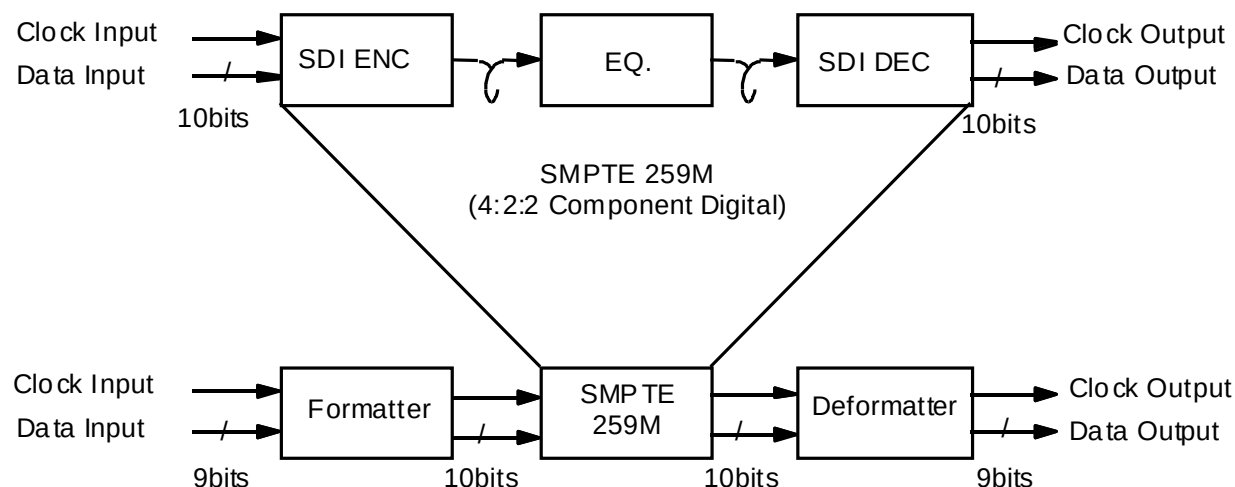


Figure 1 – System block diagram

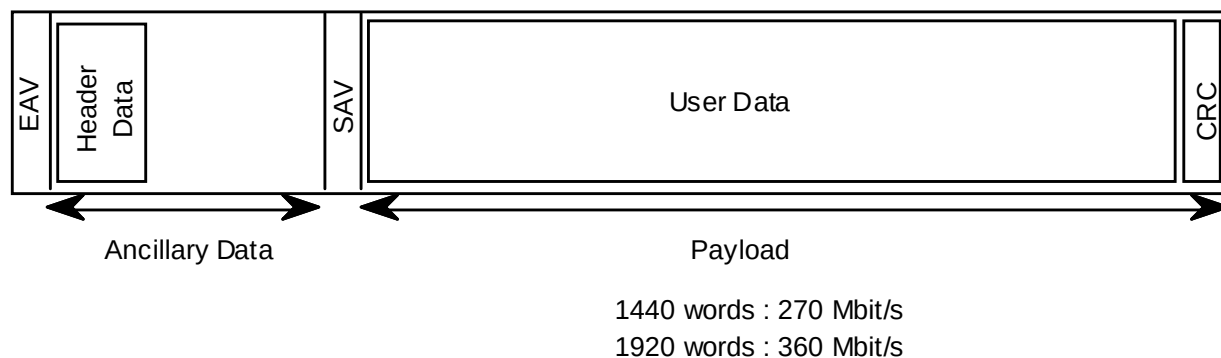


Figure 2 – Signal format (1 line)

4.1 As shown in figure 1, packetized payload data of either 8 or 9 bits is mapped into a stream of 10-bit words compatible with the active line area of standard digital television signals. The resulting word stream shall be formatted, serialized, scrambled, and coded according to SDI standard SMPTE 259M.

4.2 The signal format for one line is shown in figure 2. Header data is contained in an ancillary data packet as described in section 5. The payload consists of user data and the optional CRC described in section 6.

4.3 The following specifications are required for compliance with the SDI standard:

4.3.1 Formatted data word length shall be 10 bits, B0 through B9. B9 is the most significant bit (MSB).

4.3.2 Timing reference signals, end of active video (EAV) and start of active video (SAV), shall occur on every line. Their location will depend on the scanning standard associated with the data type selected from table 2. The locations of EAV and SAV shall conform to ANSI/SMPTE 125M, ANSI/SMPTE 267, SMPTE 294M, or ITU-R BT.656

4.4 For data types using SMPTE 294M, only the first 1920 words of the 2160-word active line are used for payload.

4.5 An ANC data packet forming the header data is placed after EAV, as specified in section 5. All payload is placed between the SAV and EAV. The space after the header data but before SAV is available for ANC data as specified by SMPTE 291M.

NOTE – Some applications may place header data on every line of the relevant SDI interface, regardless if user data are present on the line payload or not. To differentiate such “empty” line from line with user data, the code value of byte 10 of header data is set to 0000_h.

5 Header data

The data structure for the header data shall conform to SMPTE 291M ancillary data packet (type 2). The header data, shown in figure 3, shall be located immediately after the EAV on lines specified in the application document for the data type selected from table 2.

Ancillary data flag (ADF)		53 words
Data ID (DID)		
Secondary data ID (SDID)		
Data count (DC)		
Header data	46	words
Checksum (CS)		

The header data shall include the following:

- Line number (2 words)
- Line number CRC (2 words)
- Code and AAI (1 word)
- Destination address (16 words)
- Source address (16 words)
- Block type (1 word)
- CRC flag (1 word)
- Reserved data (5 words)
- Header CRC (2 words)

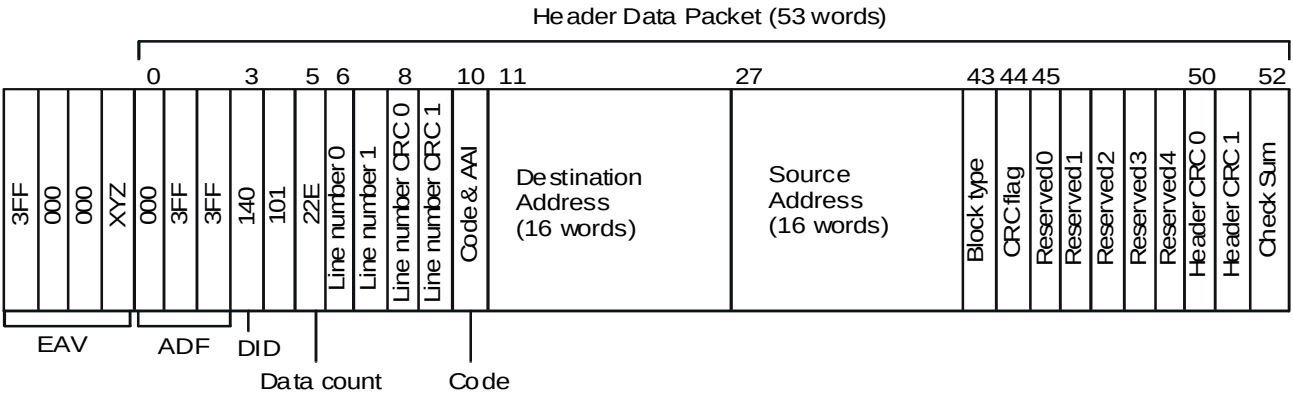


Figure 3 -- Header data structure

NOTE – Byte 43 block type, should be considered as block type (size).

5.1 Ancillary data formatting

The ADF, DID, SDID, DC, and CS shall conform to SMPTE 291M.

5.1.1 Data ID (DID)

The data ID shall have the value of (40_h) for B7 through B0.

- B8 is even parity for B7 through B0
- B9 is the complement of B8

5.1.2 Secondary data ID (SDID)

The secondary data ID shall have the value of (01_n) for B7 through B0.

- B8 is even parity for B7 through B0
- B9 is the complement of B8

5.1.3 Data count (DC)

The data count shall specify 46 words for the header with the value $(2E_n)$ for B7 through B0.

- B8 is even parity for B7 through B0
- B9 is the complement of B8

5.2 Line number

5.2.1 The line number shall represent the number from 1 through 525 for 525 systems, and 1 through 625 for 625 systems in order to check the data continuity. The line numbering is defined in SMPTE 125M and ITU-R BT.601.

5.2.2 The line number shall be contained within L9 through L0. R5 through R0 are reserved and set to zero (see figure 4).

- EP1 is even parity for L7 through L0
- EP2 is even parity for R5 through R0, L9, L8

5.3 Line number CRC

Following each line number, a line number CRC shall be inserted. The line number CRC applies to the data ID through the line number for the entire ten bits (see figure 5). The generator polynomial for the line number CRC shall be $G(X) = X^{18} + X^5 + X^4 + 1$, which conforms to ITU-T X.25 (see figure 6).

Line number CRC shall be contained in C17 through C0, and the initial value shall be set to all ones.

5.4 Code and AAI (Authorized address identifier)

Both code and AAI shall consist of four bits (see figure 7).

- Code: B3 through B0
- AAI: B7 through B4
- B8 is even parity for B7 through B0
- B9 is the complement of B8

5.4.1 Code

The code is intended to identify the length of the payload with the following values. The payload shall be contained in the area between SAV and EAV.

Description	B3	B2	B1	B0
Reserved for SDI:	0	0	0	0
1440 word payload:	0	0	0	1
1920 word payload:	0	0	1	0

NOTES

- 1 Code = '0000' is used where uncompressed 4:2:2 data are transmitted in the line containing the header. However, uncompressed video signals and compressed video signals should not be mixed in the same line or block.
- 2 Code = '1000' is reserved for 143 Mb/s applications.

5.4.2 AAI

The AAI specifies the format of the destination and source address words.

Description	B7	B6	B5	B4
Unspecified format:	0	0	0	0
IPv6 address:	0	0	0	1

The value (0_n) is reserved for applications where no source and destination address format is specified.

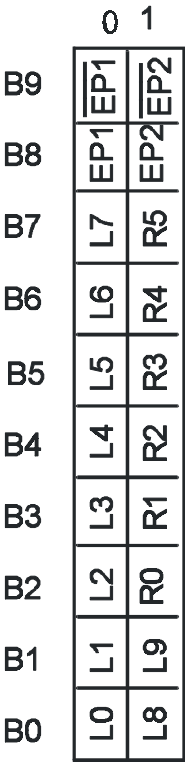


Figure 4 – Line number

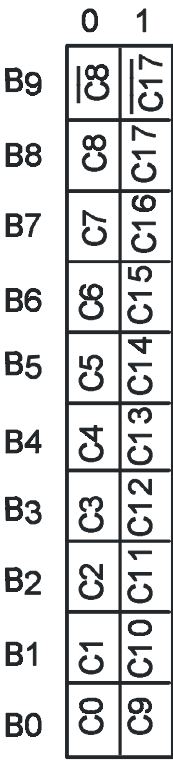


Figure 5 – Line number CRC