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SMPTE STANDARD

for Television — Transport of MPEG-2 Recoding Information as Ancillary Data Packets



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1 Scope

This standard specifies the mechanism for the transport of MPEG-2 video recoding information as ancillary data packets in an ancillary data space — for example, through ITU-R BT.656 / SMPTE 259M interfaces.

The video recoding information transported through this mechanism is for the purpose of preserving picture quality at re-encoding stages when cascading MPEG-2 decoders and encoders.

Although the specified mechanism operates on 10-bit digital video interfaces, it is by design transparent to systems limited to 8-bit operation.

2 Normative references

The following standards contain provisions which, 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.

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

SMPTE 327M-2000, Television — MPEG-2 Video Recoding Data Set

SMPTE 329M-2000, Television — MPEG-2 Video Recoding Data Set — Compressed Stream Format

3 General

The principal application of this standard is to allow the preservation of picture quality when cascading video decoders and encoders following ISO/IEC 13818-2.

This standard defines the transport of MPEG-2 video recoding information in the ancillary data space provided by digital video interfaces. In addition, the transport mechanism specified in this standard has been designed so that it can work with digital video systems in which operation is limited to 8-bit resolution.

The following shall apply:

- The transported MPEG-2 video recoding information shall be compliant with the MPEG-2 video recoding data set as defined in SMPTE 327M.
- This data set shall be formatted according to the stream format defined in SMPTE 329M.
- This formatted data set shall be transported in the form of ancillary (ANC) data packets as specified in SMPTE 291M.

The transport mechanism specified in this standard shall be compliant with SMPTE 291M. Part of both the

vertical blanking ancillary data space, V-ANC, and the horizontal blanking ancillary data space, H-ANC, shall be used.

The V-ANC space shall be used to carry picture rate information only. This is the most basic, highest priority, part of the recoding data set. For low bit rate, long GOP applications in particular, it typically brings the largest picture quality improvement step while further refinements are brought when more information is available.

The H-ANC space shall be used to carry the other part of the recoding data set. The use of the reduced bandwidth indicator, as specified in SMPTE 329M, will allow the transmission, more or less, of this part of the recoding data set, depending upon the transmission capacity available in the H-ANC space.

4 Definitions

4.1 aligned (temporally): In the scope of this standard, it means temporally aligned; arranged so that information related to a picture (frame or field) is inserted within the blanking interval of that decoded picture.

4.2 cascading: The process where video that has once been coded (compressed) is subsequently decoded and coded once more. This cascaded step could carry on for any number of generations.

4.3 coding: The process by which an uncompressed video sequence is compressed to a bit stream that conforms to ISO/IEC 13818-2.

4.4 decoder: A compressed bitstream decoder that complies with ISO/IEC 13818-2.

4.5 MPEG profile/level: As defined in ISO/IEC 13818-2.

4.6 MPEG-2 video recoding data stream: A bitstream conveying the MPEG-2 video recoding data set in the compressed stream format as defined in SMPTE 329M.

4.7 picture: As defined in ISO/IEC 13818-2.

4.8 picture rate information: In this standard, this corresponds to the coding information from the ISO/IEC 13818-2 bitstream that relates to the

whole picture, plus some additional information derived from sequence and GOP headers, but excluding slice() and macroblock() information.

4.9 recoding data access unit: A section of the MPEG-2 video recoding data stream which contains in compressed format the recoding data of a single picture including any sequence and GOP headers that could precede that picture.

4.10 recoding data set: As defined in SMPTE 327M.

4.11 transcoding: A conversion within the MPEG-2 video elementary stream domain, such as bit-rate changing or changing the group of pictures (GOP) structure.

4.12 video: In this standard, a signal conforming to ITU-R BT.601.

4.13 video access unit: As defined in ISO/IEC 13818-1.

4.14 video elementary stream: An ordered series of bits conforming to ISO/IEC 13818-2.

5 Ancillary data packet formatting for transport of MPEG-2 video recoding data set

5.1 Ancillary video recoding data packet structure

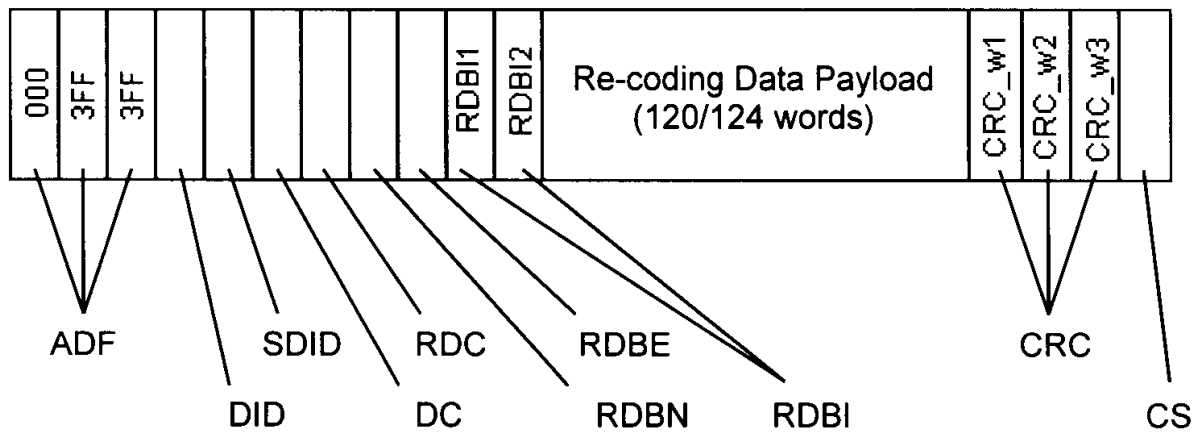
An ancillary video recoding data packet shall be of constant length. It shall contain MPEG-2 video recoding data preformatted as defined in SMPTE 329M.

The ancillary video recoding data packets shall be type 2 and shall be transmitted in the ancillary data space as defined in SMPTE 291M (see figure 1).

5.2 Ancillary video recoding data packet formatting

The ADF, DID, SDID, DC, and CS words shall be compliant with SMPTE 291M.

The recoding data control (RDC), recoding data block number (RDBN), recoding data block extension (RDBE), recoding data bandwidth information (RDBI), and cyclic redundancy check (CRC) words are further defined below (see table 1).



ADF Ancillary Data Flag
 DID Data ID
 SDID Secondary Data ID
 DC Data Count
 RDC Re-coding Data Control
 RDBN Re-coding Data Block Number
 RDBE Re-coding Data Block Extension
 RDBI Re-coding Data Bandwidth Information
 CRC Cyclic Redundancy Check
 CS Checksum

Figure 1 – Structure of the ancillary recoding data packets

Table 1 – Ancillary recoding data packet syntax

Ancillary recoding data packet () {	Number of words
ADF	3
DID	1
SDID	1
DC	1
Recoding data control	1
If (recoding_data_start_flag == 1) {	
Recoding data block number	1
Recoding data block extension	1
Recoding data bandwidth information	2
}	
Recoding data payload()	120 / 124 ¹⁾
CRC()	3
Checksum	1
}	
1) 120 if recoding_data_start_flag is one; 124 otherwise.	