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SMPTE STANDARD

for Television — Type D-10 Stream Specifications — MPEG-2 4:2:2P @ ML for 525/60 and 625/50



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1 Scope

This standard specifies the compression constraints and bit-stream characteristics of an MPEG-2 video elementary stream operating at bit rates up to 50 Mb/s. One of the intended applications is to provide a bit stream compatible with the type D-10 format digital recorder. The video compression format defined and constrained by this standard is fully compliant with the MPEG-2 video standard (ISO/IEC 13818-2 [4:2:2P @ ML]).

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 305.2M-2000, Television — Serial Data Transport Interface (SDTI)

SMPTE 326M-2000, Television — SDTI Content Package Format (SDTI-CP)

SMPTE 328M-2000, Television — MPEG-2 Video Elementary Stream Editing Information

ISO/IEC 13818-2:2000, Information Technology — Generic Coding of Moving Pictures and Associated Audio Information: Video (MPEG-2 [Clause 6.1 describes the structure of coded video data along with a cross reference to ISO/IEC 13818-1])

3 Specification of the type D-10 MPEG-2 4:2:2P @ ML elementary stream

3.1 General characteristics

The video-ES bit stream, as defined in this standard, shall comply with the syntax of SMPTE 328M, MPEG-2 video elementary stream editing information.

In order to provide accurate editing, playback in slow-motion, and variable-speed replay including pictures in shuttle, this clause defines encoding parameter specifications suitable for the type D-10 format capable of recording MPEG video-ES streams at bit rates up to 50 Mb/s. The MPEG-2 video-ES bit stream constrained to these parameter specifications is fully compliant with the MPEG-2 video-ES syntax and can be successfully decoded by a compliant MPEG-2 4:2:2P @ ML level decoder.

3.2 MPEG compression parameter constraints

The compression scheme is fully compliant with ISO 13818-2, 4:2:2P @ ML. In addition, the following defined constraints shall apply:

The `bit_rate_value` in `sequence_header` shall be set with a value up to 50 Mb/s.

The `sequence_extension` parameter shall be set with the following value:

`sequence_extension: bit_rate_extension = 0h`

See table 1.

Table 1 – Basic bit stream constraints

Source format	SDTV 525/60/1.001 and 625/50
Bit rate	Up to 50 Mb/s constrained bytes per GOP (CBG)
GOP structure	I-picture only
Maximum coded frame size	Up to 208,541 bytes net (30/1.001 I-frames/s) Up to 250,000 bytes net (25 I-frames/s)

3.3 VBV_delay constraint

The `vbv_delay` parameter shall be constrained to a 1-frame delay for each GOP by defining the following values:

525/60 systems

– `picture_header: vbv_delay = 0BBBh`

625/50 systems

– `picture_header: vbv_delay = 0E10h`

3.4 4:2:2 profile @ main level

The `sequence_extension` parameters shall be constrained to the following values:

- `sequence_extension: profile_and_level_indication = 85h` (4:2:2P @ ML)
- `sequence_extension: chroma_format = 2h` (4:2:2 format)

3.5 All I-picture encoding

The `picture_header` parameter shall be constrained to the following values:

- `picture_header: temporal_reference = 0h` (1 picture in a GOP)
- `picture_header: picture_coding_type = 1h` (I-picture only)