
**Information technology — Generic coding
of moving pictures and associated audio
information: Systems**

**AMENDMENT 1: Transport of MPEG-4
streaming text and MPEG-4 lossless audio
over MPEG-2 systems**

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*Technologies de l'information — Codage générique des images
animées et des informations sonores associées: Systèmes*

ISO/IEC 13818-1:2007/Amd 1:2007

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**AMENDEMENT 1: Transport de texte en flux MPEG-4 et d'audio sans
perte MPEG-4 sur des systèmes MPEG-2**

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Published in Switzerland

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Amendment 1 to ISO/IEC 13818-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. H.222.0 (2006)/Amd.1 (01/2007).

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INTERNATIONAL STANDARD
ITU-T RECOMMENDATIONInformation technology – Generic coding of moving pictures
and associated audio information: Systems

Amendment 1

Transport of MPEG-4 streaming text and MPEG-4 lossless audio over MPEG-2 systems

1) Subclause 1.2.3

Add the following references to subclause 1.2.3:

- ISO/IEC 14496-3:2005/Amd.1:2007, *Low delay AAC profile*.
- ISO/IEC 14496-17:2006, *Information technology – Coding of audio-visual objects – Part 17: Streaming text format*.

2) Subclause 2.1.1

Replace, in the definition for *access unit* in subclause 2.1.1:

In the case of audio, an access unit is the coded representation of an audio frame.

by:

In the case of audio, an access unit is the coded representation of an audio frame, whereby each audio frame carries data from one or more audio channels; an audio frame may carry for example one mono channel, or two stereo channels or seven surround sound channels.

In the case of an ISO/IEC 14496-17 text stream, see ISO/IEC 14496-17 for the definition of an access unit.

3) New subclause 2.4.2.9

Add, after subclause 2.4.2.8:

2.4.2.9 T-STD extensions for carriage of ISO/IEC 14496-17 text streams

To define the decoding in the T-STD of ISO/IEC 14496-17 text streams carried in a Transport Stream, the T-STD model needs to be extended. The T-STD extension and T-STD parameters for decoding of ISO/IEC 14496-17 text streams are defined in 2.15.3.1.

4) Subclause 2.4.3.5

Replace, in the semantics of "discontinuity indicator" under subclause 2.4.3.5 starting from the 5th paragraph:

For the purpose of this clause, an elementary stream access point is defined as follows:

- ISO/IEC 11172-2 video and ITU-T Rec. H.262 | ISO/IEC 13818-2 video – The first byte of a video sequence header.
- ISO/IEC 14496-2 visual – The first byte of the visual object sequence header.
- ITU-T Rec. H.264 | ISO/IEC 14496-10 video – The first byte of an AVC access unit. The SPS and PPS parameter sets referenced in this and all subsequent AVC access units in the coded video stream shall be provided after this access point in the byte stream and prior to their activation.
- Audio – The first byte of an audio frame.

by:

For the purpose of this clause, an elementary stream access point is defined as follows:

- ISO/IEC 11172-2 video and ITU-T Rec. H.262 | ISO/IEC 13818-2 video – The first byte of a video sequence header.
- ISO/IEC 14496-2 visual – The first byte of the visual object sequence header.
- ITU-T Rec. H.264 | ISO/IEC 14496-10 video – The first byte of an AVC access unit. The SPS and PPS parameter sets referenced in this and all subsequent AVC access units in the coded video stream shall be provided after this access point in the byte stream and prior to their activation.
- Audio – The first byte of an audio frame.
- ISO/IEC 14496-17 text stream – The first byte of a text access unit. In case in-band sample descriptions are used, each in-band sample description shall be provided in the ISO/IEC 14496-17 stream after this access point and prior to its use by an access unit.

5) Subclause 2.4.3.7

a) In subclause 2.4.3.7, replace Table 2-27:

Table 2-27 – Stream_id_extension assignments

stream_id_extension	Note	stream coding
000 0000	1	IPMP Control Information stream
000 0001	2	IPMP stream
000 0010 ... 011 1111		reserved_data_stream
100 0000 ... 111 1111		private_stream
NOTE 1 – PES packets of stream_id_extension 0b000 0000 (IPMP Control Information Stream) have a unique syntax specified in ISO/IEC 13818-11 (MPEG-2 IPMP).		
NOTE 2 – PES packets of stream_id_extension 0b000 0001 (IPMP Stream) have a unique syntax specified in ISO/IEC 13818-11 (MPEG-2 IPMP).		

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by:

Table 2-27 – Stream_id_extension assignments

stream_id_extension	Note	stream coding
000 0000	1	IPMP Control Information stream
000 0001	2	IPMP stream
000 0010 ... 000 1111		ISO/IEC 14496-17 text stream
001 0000 ... 011 1111		reserved_data_stream
100 0000 ... 111 1111		private_stream
NOTE 1 – PES packets of stream_id_extension 0b000 0000 (IPMP Control Information Stream) have a unique syntax specified in ISO/IEC 13818-11 (MPEG-2 IPMP).		
NOTE 2 – PES packets of stream_id_extension 0b000 0001 (IPMP Stream) have a unique syntax specified in ISO/IEC 13818-11 (MPEG-2 IPMP).		

b) Replace, in the semantics of PTS in subclause 2.4.3.7:

The presentation time $t_{pn}(k)$ shall be equal to the decoding time $t_{dn}(k)$ for:

- audio access units;
- access units in ITU-T Rec. H.262 | ISO/IEC 13818-2 or ISO/IEC 14496-2 low delay video sequences;
- B-pictures in ISO/IEC 11172-2, ITU-T Rec. H.262 | ISO/IEC 13818-2 or ISO/IEC 14496-2 video streams.

by:

In the case of an ISO/IEC 14496-17 text stream, if a PTS is present in PES packet header, it shall refer to the first text access unit commencing in the PES packet. A text access unit commences in a PES packet if the first byte of the text access unit is present in the PES packet.

The presentation time $t_{pn}(k)$ shall be equal to the decoding time $t_{dn}(k)$ for:

- audio access units;
- access units in ITU-T Rec. H.262 | ISO/IEC 13818-2 or ISO/IEC 14496-2 low delay video sequences;
- B-pictures in ISO/IEC 11172-2, ITU-T Rec. H.262 | ISO/IEC 13818-2 or ISO/IEC 14496-2 video streams;
- text access units in ISO/IEC 14496-17.

6) Subclause 2.4.4.9

a) Replace Table 2-34 in subclause 2.4.4.9 with the following:

Table 2-34 – Stream type assignments

Value	Description
0x00	ITU-T ISO/IEC Reserved
0x01	ISO/IEC 11172-2 Video
0x02	ITU-T Rec. H.262 ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream
0x03	ISO/IEC 11172-3 Audio
0x04	ISO/IEC 13818-3 Audio
0x05	ITU-T Rec. H.222.0 ISO/IEC 13818-1 private_sections
0x06	ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data
0x07	ISO/IEC 13522 MHEG
0x08	ITU-T Rec. H.222.0 ISO/IEC 13818-1 Annex A DSM-CC
0x09	ITU-T Rec. H.222.0
0x0A	ISO/IEC 13818-6 type A
0x0B	ISO/IEC 13818-6 type B
0x0C	ISO/IEC 13818-6 type C
0x0D	ISO/IEC 13818-6 type D
0x0E	ITU-T Rec. H.222.0 ISO/IEC 13818-1 auxiliary
0x0F	ISO/IEC 13818-7 Audio with ADTS transport syntax
0x10	ISO/IEC 14496-2 Visual
0x11	ISO/IEC 14496-3 Audio with the LATM transport syntax as defined in ISO/IEC 14496-3/Amd.1
0x12	ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in PES packets
0x13	ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in ISO/IEC 14496_sections
0x14	ISO/IEC 13818-6 Synchronized Download Protocol
0x15	Metadata carried in PES packets
0x16	Metadata carried in metadata_sections
0x17	Metadata carried in ISO/IEC 13818-6 Data Carousel
0x18	Metadata carried in ISO/IEC 13818-6 Object Carousel
0x19	Metadata carried in ISO/IEC 13818-6 Synchronized Download Protocol
0x1A	IPMP stream (defined in ISO/IEC 13818-11, MPEG-2 IPMP)
0x1B	AVC video stream as defined in ITU-T Rec. H.264 ISO/IEC 14496-10 Video
0x1C	ISO/IEC 14496-3 Audio, without using any additional transport syntax, such as DST, ALS and SLS
0x1D	ISO/IEC 14496-17 Text
0x1E-0x7E	ITU-T Rec. H.222.0 ISO/IEC 13818-1 Reserved
0x7F	IPMP stream
0x80-0xFF	User Private

b) Add below Table 2-34 the following clarifying text:

In the above table various stream types are assigned for carriage of audio signals, with or without a transport syntax. Typically, the transport syntax is used for providing sync words. The use of a specific transport syntax, if at all, is specified in the clauses in this Specification specifying the transport of the various audio signals.

7) Subclause 2.5.2.4

Replace, in subclause 2.5.2.4 "PES streams":

Buffer sizes BS_n in the PES-STD model are defined as follows:

- For ITU-T Rec. H.262 | ISO/IEC 13818-2 video:

$$BS_n = VBV_{\max}[\text{profile, level}] + BS_{\text{oh}}$$

$BS_{\text{oh}} = (1/750)$ seconds $\times R_{\max}[\text{profile, level}]$, where $VBV_{\max}[\text{profile, level}]$ and $R_{\max}[\text{profile, level}]$ are the maximum VBV size and bit rate per profile, level, and layer as defined in Tables 8-13 and 8-14, respectively, of ITU-T Rec. H.262 | ISO/IEC 13818-2. BS_{oh} is allocated for PES packet header overhead.

- For ISO/IEC 11172-2 video:

$$BS_n = VBV_{\max} + BS_{\text{oh}}$$

$BS_{\text{oh}} = (1/750)$ seconds $\times R_{\max}$, where R_{\max} and vbv_{\max} refer to the maximum bitrate and maximum vbv_buffer_size for a constrained parameter bitstream in ISO/IEC 11172-2 respectively.

- For ISO/IEC 11172-3 or ISO/IEC 13818-3 audio:

$$BS_n = 2848 \text{ bytes}$$

- For ITU-T Rec. H.264 | ISO/IEC 14496-10 video:

$$BS_n = 1200 \times \text{MaxCPB}[\text{level}] + BS_{\text{oh}}$$

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where $\text{MaxCPB}[\text{level}]$ is defined in Table A.1 (Level Limits) in ITU-T Rec. H.264 | ISO/IEC 14496-10 for each level.

by:

As a PES stream only carries a single elementary stream, the buffer sizes in the PES-STD do not account for multiplexing with other elementary streams, but only for multiplexing of the elementary stream carried in the PES stream with PES headers, pack headers and system headers. The buffer sizes BS_n in the PES-STD model are defined as follows:

- For ITU-T Rec. H.262 | ISO/IEC 13818-2 video:

$$BS_n = VBV_{\max}[\text{profile, level}] + BS_{\text{oh}}$$

$BS_{\text{oh}} = (1/750)$ seconds $\times R_{\max}[\text{profile, level}]$, where $VBV_{\max}[\text{profile, level}]$ and $R_{\max}[\text{profile, level}]$ are the maximum VBV size and bit rate per profile, level, and layer as defined in Tables 8-13 and 8-14, respectively, of ITU-T Rec. H.262 | ISO/IEC 13818-2. BS_{oh} is allocated for PES packet header overhead.

- For ISO/IEC 11172-2 video:

$$BS_n = VBV_{\max} + BS_{\text{oh}}$$

$BS_{\text{oh}} = (1/750)$ seconds $\times R_{\max}$, where R_{\max} and vbv_{\max} refer to the maximum bitrate and maximum vbv_buffer_size for a constrained parameter bitstream in ISO/IEC 11172-2 respectively.

- For ISO/IEC 11172-3 or ISO/IEC 13818-3 audio:

$$BS_n = 2848 \text{ bytes}$$

- For ISO/IEC 13818-7 ADTS audio:

$BS_n = 2848$ bytes if 1-2 channels
 $BS_n = 7200$ bytes if 3-8 channels
 $BS_n = 10800$ bytes if 9-12 channels
 $BS_n = 43200$ bytes if 13-48 channels

Note that the above numbers differ from the BS_n numbers specified in 2.4.3.2 due to the fact that a PES stream carries a single elementary stream only.

- For ISO/IEC 14496-3 audio, except for ISO/IEC 14496-3 DST, ALS and SLS:

$BS_n = 2848$ bytes if 1-2 channels
 $BS_n = 7200$ bytes if 3-8 channels
 $BS_n = 10800$ bytes if 9-12 channels
 $BS_n = 43200$ bytes if 13-48 channels

Note that the above numbers differ from the BS_n numbers specified in 2.11.2.2 due to the fact that a PES stream carries a single elementary stream only.

- For ISO/IEC 14496-3 DST-64 audio:

$BS_n = 5000 \times (\text{number of channels})$ bytes; hence for stereo $BS_n = 10\ 000$ bytes
 and for 5.1 surround sound audio $BS_n = 30\ 000$ bytes

- For ISO/IEC 14496-3 DST-128 audio:

$BS_n = 10\ 000 \times (\text{number of channels})$ bytes; hence for stereo $BS_n = 20\ 000$ bytes
 and for 5.1 surround sound audio $BS_n = 60\ 000$ bytes

- For ISO/IEC 14496-3 DST-256 audio:

$BS_n = 20\ 000 \times (\text{number of channels})$ bytes; hence for stereo $BS_n = 40\ 000$ bytes
 and for 5.1 surround sound audio $BS_n = 120\ 000$ bytes

- For ISO/IEC 14496-3 ALS and SLS audio:

$BS_n = 33\ 000 \times (\text{number of channels})$ bytes; hence for stereo $BS_n = 66\ 000$ bytes
 and for 5.1 surround sound audio $BS_n = 198\ 000$ bytes

- For ITU-T Rec. H.264 | ISO/IEC 14496-10 video:

$$BS_n = 1200 \times \text{MaxCPB}[\text{level}] + BS_{oh}$$

where $\text{MaxCPB}[\text{level}]$ is defined in Table A.1 (Level Limits) in ITU-T Rec. H.264 | ISO/IEC 14496-10 for each level.

8) New subclause 2.5.2.8

Add, after subclause 2.5.2.7:

2.5.2.8 P-STD extensions for carriage of ISO/IEC 14496-17 text streams

For decoding of ISO/IEC 14496-17 text streams carried in a Program Stream in the P-STD model, see 2.15.3.2.