

SMPTE STANDARD

Time and Control Code — Amendment 1



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Operations Manual.

Amendment 1 to SMPTE ST 12-1:2008 was prepared by Technology Committee 33TS.

Introduction

The purpose of this amendment is to add support for Progressive video systems with 48 and 48/1.001 Hz frame rates. The techniques described in this amendment follow the same rules used in SMPTE ST 12-1 for Progressive video systems with 50, 60 and 60/1.001 Hz frame rates.

This amendment also updates the normative references to the current versions.

Change instructions are shown in *italics*. Inserted text is shown thus. Deleted text is shown ~~thus~~.

1 Amendment of Foreword

Replace the 3rd paragraph with the following:

SMPTE Standard [ST 12M-1](#) was prepared by Technology Committee [33TS22](#).

2 Amendment of Introduction

Replace the final sentence in the second paragraph with the following:

The actual transport of the codewords for digital systems varies significantly from the transport methods defined for analog systems, and is defined in the associated document, SMPTE [ST 12M-2](#).

Do not change the 6th paragraph's reference to "prior SMPTE 12M-1999"

Amend the final paragraph and sub-items as follows:

The time code documents have been restructured and organized into a suite of documents:

SMPTE [ST 12M-1](#) (previously SMPTE 12M), including the revisions described above.

SMPTE [ST 12M-2](#) (previously SMPTE RP 188), Ancillary Time Code.

3 Amendment of Section 1 Scope

Replace the first sentence of section 1 with the following sentence:

This Standard specifies a time and control code for use in television and accompanying audio systems operating at nominal rates¹ of 60, 59.94, 50, [48, 47.95](#), 30, 29.97, 25, 24, and 23.98 frames per second.

Replace the Note in the scope with the following:

Note: The digital representation of analog VITC (D-VITC) is specified in SMPTE [ST 266M](#) and is defined for 525/59.94 and 625/50 digital component systems only. High Definition formats, such as those documented in [SMPTE ST 2048-2](#), SMPTE [ST 274M](#) and SMPTE [ST 296M](#), ~~should~~ use Ancillary Time Code (ATC) as specified in SMPTE [ST 12M-2](#) (formerly SMPTE RP 188) for transport of time code in the digital video data stream.

4 Amendment of Section 3 Normative References

Replace the references to SMPTE 309M-1999 and SMPTE RP168-2002 with the following references:

SMPTE ST 309:2012, Transmission of Date and Time Zone Information in Binary Groups of Time and Control Code

SMPTE RP 168:2009, Definition of Vertical Interval Switching Point for Synchronous Video Switching

Amend the reference to ITU-R BT.1700 as follows:

[Recommendation](#) ITU-R BT.1700-~~4~~ (2005), ~~Annex—2~~ Characteristics of composite video signals for conventional analogue television systems, [Annex 1 Part B, PAL signal format and specification](#)

5 Amendment to Section 4 Definitions and Acronyms

Modify the first paragraph of Section 4.4 as follows:

The acronym ATC refers to ancillary packets carried in the Ancillary space (VANC or HANC) of a digital television data stream, as described in SMPTE [ST 12M-2](#) (formerly SMPTE RP 188), and payloads of these packets convey LTC or VITC codeword data.

After Section 4.9, insert a new section for the definition of Frame Pair as follows:

4.10 Frame Pair:

Two time-consecutive frames of a video signal for which there is a first frame and a second frame.

6 Amendment of Section 5.1.2 Definition of NTSC Time

Replace the first sentence of the first note with the following sentence:

There are other television systems (such as some HDTV systems) which operate at 24/1.001, 30/1.001, [48/1.001](#), or 60/1.001 frames per second.

Replace the third sentence of the second note with the following sentence:

In a similar manner, it is common to abbreviate 24/1.001 as 23.98, [48/1.001 as 47.95](#), and 60/1.001 as 59.94.

7 Amendment of Section 7 Time Representation in 24 Frames-Per-Second Systems

Change the section title to

Time Representation in 24 [and 48](#) Frames-Per-Second Systems

7.1 Amendment of Section 7.1.1 Definition of real time

Add the following sentence at the end of the current sentence:

In a system operating at a frame rate of 48 frames per second, exactly one second of real time elapses during the duration of 48 frames.

7.2 Amendment of Section 7.2 Time Address of a Frame

Replace the first sentence in the first paragraph with the following sentences:

For systems operating at 24 or 24/1.001 frames per second, each~~Each~~ frame shall be identified by a unique and complete address consisting of an hour, minute, second, and frame number. For systems operating at 48 or 48/1.001 frames per second, each frame pair shall be identified by a unique and complete address consisting of an hour, minute, second, and frame number.

Replace the last sentence in the first paragraph with the following sentence:

The frames (or frame pairs for 48 or 48/1.001 frames per second systems) shall be numbered successively 00 through 23.

8 Amendment of Section 11.3

In Table 11 within Section 11.3, change the heading of the rightmost column to read

24-frame
[48-frame](#)

9 Amendment of Section 12 Progressive Systems with Frame Rates Greater than 30 Frames Per Second

9.1 Repair of typo in Section 12 Header

Amend the Section title as follows:

Progressive Systems with Frame Rates ~~s~~f Greater than 30 Frames Per Second

9.2 Amendment of Section 12.1 Time Address of a Frame Pair in 50 and 60 Frames-Per-Second Progressive Systems

Change the section title to

Time Address of a Frame Pair in [48](#), 50 and 60 Frames-Per-Second Progressive Systems

Change the first sentence to the following:

Since the frame rate of [48](#), 50 and 60 frames-per-second progressive systems exceeds the frame count capacity of the time address, the count shall be constrained to increment only every other frame (as shown in Figure 9). This results in an edit resolution of two frames.

Change the caption for Figure 9 to:

Example of frame labeling for [48](#), 50 and 60 frames-per-second progressive systems.

10 Amendment of Annex C Bibliography (Informative)

Replace the references to SMPTE 12M-2-2008, SMPTE 266M-2002, SMPTE 292-2008, and SMPTE EG 40-2002 with the following references:

SMPTE [ST 12-~~M~~-2:2008](#), Television — Transmission of Time Code in the Ancillary Data Space

SMPTE [ST 266~~M~~:2002](#) [12 4:2:2-SD](#) Digital Component Systems — Digital Vertical Interval Time Code

SMPTE [ST 292~~M~~-1:2008](#) [12](#), 1.5 Gb/s Signal / Data Serial Interface

SMPTE EG 40-2001 [12](#), Conversion of Time Values Between SMPTE 12-[1~~M~~](#) Time Code, MPEG-2 PCR Time Base and Absolute Time

After the reference to SMPTE 12-2:2008 add the following reference

[Amendment 1:2013 to SMPTE ST 12-2:2008, Transmission of Time Code in the Ancillary Data Space — Amendment 1](#)

Remove the reference to ITU-R BT.470-6

Amend the reference to ITU-R BT.1366 as shown:

[Recommendation](#) ITU-R BT.1366-[2](#) (~~1998-R-2003~~ [2009](#)) Transmission of Time Code and Control Code in the Ancillary Data Space of a Digital Television Stream According to Recommendations ITU-R BT.656, ITU-R BT.799 and ITU-R BT.1120

11 Amendment of Annex D Time Code System "Roadmap" (Informative)

Replace the "Roadmap" drawing with the following:

