Amendment 1:2013 to
SMPTE ST 2051:2010

SMPTE STANDARD

Two-Frame Marker for 50-Hz and 60(/1.001)-Hz Progressive Digital Video Signals on 1.5 Gb/s and 3 Gb/s Interfaces — Amendment 1

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Approved
August 29, 2013

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 2051:2010 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. Documentation for Progressive Segmented Frame and dual-link interlace transports are also added.

This amendment also updates the references to the current versions.

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

1 Amendment of Title

Change the title to:

Two-Frame Marker for 48(/1.001)-Hz, 50-Hz and 60(/1.001)-Hz Progressive Digital Video Signals on 1.5 Gb/s and 3 Gb/s Interfaces

2 Amendment of Foreword

Replace the 3rd paragraph with the following:

SMPTE Standard ST 2051~~M~~ was prepared by Technology Committee 33TS~~S22~~.

3 Amendment of Introduction

Replace the second paragraph with the following sentence:

Problems can arise in video formats of frame rate Fr that transport Fr/2 ancillary data services; 48(/1.001)-Hz, 50-Hz, and 60(/1.001)-Hz progressive video signals are examples of such formats and are the subject of the provisions of this Standard.

4 Amendment of Section 1 Scope

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

This standard defines a Two-Frame Marker for progressive Digital Cinematography and HDTV video formats at 48/1.001(47.95)-Hz, 48-Hz, 50-Hz, 60/1.001(59.94)-Hz, and 60-Hz frame rates.

Replace Note 2 and Note 3 of the scope with the following:

Note2: Use of the Two-Frame Marker is optional with progressive video streams at 48/1.001(47.95)-Hz, 48-Hz, 50-Hz, 60/1.001(59.94)-Hz, and 60-Hz frame rates mapped to dual link interlaced serial interfaces at 24/1.001(23.98)-Hz, 24-Hz, 25-Hz, 30/1.001(29.97)-Hz, and 30-Hz frame rates, respectively.

Note3: Use of the Two-Frame Marker is optional with progressive segmented frame video streams at 24/1.001(23.98)-Hz, 24-Hz, 25-Hz, 30/1.001(29.97)-Hz, and 30-Hz frame rates mapped to interlaced serial interfaces at 24/1.001(23.98)-Hz, 24-Hz, 25-Hz, 30/1.001(29.97)-Hz, and 30-Hz frame rates, respectively.

5 Amendment of Section 3 Normative References

Replace the normative references section with the following section

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 ST 12-2:2008, Television — Transmission of Time Code in the Ancillary Data Space

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

SMPTE ST 274:2008, Television — 1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates

SMPTE ST 291-1:2011, Television — Ancillary Data Packet and Space Formatting

SMPTE ST 296:2012, Television — 1280 x 720 Progressive Image Sample Structure – Analog and Digital Representation and Analog Interface

SMPTE ST 318:1999, Television and Audio — Synchronization of 59.94- or 50-Hz Related Video and Audio Systems in Analog and Digital Areas — Reference Signals

SMPTE ST 337:2008, Television — Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface

SMPTE ST 2048-2:2011, 2048 × 1080 Digital Cinematography Production Image FS/709 Formatting for Serial Digital Interface

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

6 Amendment of Section 4 Definitions

Replace the definition of TFM and Two-Frame Alignment with the following definitions:

TFM: Two-Frame Marker; SMPTE ST 291-1~~M~~-compliant packet containing a flag to identify the first frame and the second frame of a Frame Pair for a 48(/1.001)-Hz, 50-Hz or 60(/1.001)-Hz progressive digital video signal with frame rate Fr.

Two-Frame Alignment: The start of the first frame of a progressive video Frame Pair with frame rate Fr is aligned with the start of the first field of an interlaced or progressive segmented frame video signal or the frame start of an ancillary data service having frame rate Fr/2. For Progressive video streams with frame rate Fr mapped to dual link interlace transports having frame rates Fr/2, the start of the first frame of a progressive video Frame Pair with frame rate Fr is aligned with the start of the first field of its interlaced transport.

7 Amendment of Section 5.1 Two-Frame Marker Packet Specification

Change the first line to the following

The Two-Frame Marker shall be a SMPTE ST 291-1~~M~~ Type 2 formatted packet with the following structure:

8 Amendment of Section 5.2 Placement of the Ancillary Data Packet

Change the first paragraph to the following

The Two-Frame Marker packet shall be placed in the luminance (Y') data stream of the horizontal ancillary data space (HANC) defined by the relevant image formatting document for progressive video formats with 48/1.001, 48, 50, 60/1.001, or 60-Hz frame rate, (SMPTE ST 274~~M~~ System #1, 2, or 3; or SMPTE ST 296~~M~~ System #1, 2, or 3, or SMPTE ST 2048-2 System#1 to 5).

9 Amendment of Section 6.2 Conditions for Two-Frame Capability (Normative)

Change the second sentence of the first paragraph to the following:

This reference signal can be either a SMPTE ST 318~~M~~ composite analog video signal, or a tri-level sync signal derived from a either a SMPTE ST 274~~M~~ system #4, 5, or 6 digital video stream or from a SMPTE ST 274 or ST 2048-2 Progressive Segmented Frame digital video stream.

10 Amendment of Section 6.3 Examples of Use of the Two-Frame Marker (Informative)

Change the second paragraph to the following:

The interfaces transporting the progressive video may also be transporting various types of ancillary data, per SMPTE ST 291-1~~M~~ provisions. The following are examples of alignment criteria between the ancillary data and the progressive video stream.

11 Amendment of Section 6.4 Processing Equipment Actions on Fr/2 Services in Fr Progressive Video (Informative)

Change the two paragraphs and note under Table 1 to the following:

If the TFM packet is not detected on the 48(/1.001)-Hz, 50-Hz, or 60(/1.001)-Hz progressive video input, the equipment can insert the TFM packet into that digital serial stream with Two-Frame Alignment.

Note: Examples of this condition are found with video inputs VI1, VI3, and VI4 in Figure 1.

If the TFM packet is present on the 48(/1.001)-Hz, 50-Hz, or 60(/1.001)-Hz progressive video input, the equipment can pass or transcode the TFM packet into the output serial stream.

12 Amendment of Annex A Bibliography (Informative)

Change the reference to SMPTE 12M-1-2008 to:

SMPTE ST 12-1:2008, Time and Control Code

Add the following reference

Amendment 1:2013 to SMPTE ST 12-1:2008, Time and Control Code – Amendment 1

13 Amendment of Annex B Description of Two Frame Marker Issue (Informative)

Amend the first paragraph as follows:

Problems can arise in video formats of frame rate Fr that transport Fr/2 ancillary data services; 48(/1.001)-Hz, 50-Hz, and 60(/1.001)-Hz progressive video signals are examples of such formats and are the subject of the provisions of this Standard.

Amend the last sentence in the second paragraph to read as follows:

This relationship was defined for time and control code in SMPTE ST 12~~M~~-1 and was extended to Ancillary Time Code (ATC) in SMPTE ST 12~~M~~-2.

Amend the first line of the caption for Figure B.1a as follows:

Figure B.1a: Example of Progressive Video at 48(/1.001) Hz, 50 Hz, or 60(/1.001) Hz Frame Rate

Amend the first line of the caption for Figure B.1b as follows:

Figure B.1b: Frame/Field Alignment Example for Progressive Video at 48(/1.001) Hz, 50 Hz, or 60(/1.001) Hz Frame Rate