RP 215-2009
Revision of RP 215-2001

SMPTE RECOMMENDED PRACTICE

Vertical Ancillary Data Mapping of Film Transfer and Video Production Information

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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 Administrative Practices.

SMPTE Recommended Practice RP 215 was prepared by Technology Committee 22TV.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Recommended Practice. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this document.

During the telecine transfer of film originated material to high definition video, the video and production time code and film edge number information, as well as other production metadata is collected for later use during the high definition post production work flow. This document provides the mapping of this data into the high definition video bit stream using SMPTE 291M ancillary data packets. The mapping in this document has been designed to have a maximum data rate requirement of 255 bytes per field (per frame for progressive and segmented frame video formats) and this has been found to be appropriate for all existing equipment.

During the post-production process when high-definition video is down converted to standard definition video, it is often necessary to map the video and production time code and film edge number information carried in the HD ancillary data into vertical interval time code according to SMPTE RP 201. Informative Annex E shows how the RP 201 data maps into the mapping method specified in this document.

The data described in this recommended practice can also be transported using the SMPTE K-L-V data mapping protocol. Informative Annex F shows how the mapping method specified in this document maps into K-L-V format.

1 Scope

This recommended practice specifies a method of mapping video time code, film edge numbers, production audio time code and other production data into the Vertical Ancillary (VANC) Data Space of a bit-serial high-definition component television signal in accordance with SMPTE 291M. This recommended practice is intended for use in postproduction as a means of conveying the essential elements that define the film to tape transfer. It also specifies an alternate mapping for video originated production information. Normally this information is not intended for inclusion in the released program.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this recommended practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this recommended practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 12M-1-2008, Television — Time and Control Code

SMPTE 254-2008, Motion-Picture Film (35-mm) — Manufacturer-Printed Latent Image Identification Information

SMPTE 270-2008, Motion-Picture Film (65-mm) — Manufacturer-Printed Latent Image Identification Information — 80 Perforation Repeat

SMPTE 271-2008, Motion-Picture Film (16-mm) — Manufacturer-Printed Latent Image Identification Information

SMPTE 291M-2006, Television — Ancillary Data Packet and Space Formatting

SMPTE 309M-1999, Television — Transmission of Date and Time Zone Information in Binary Groups of Time and Control Code

SMPTE 313-2008, Motion-Picture Film (65-mm) — Manufacturer-Printed Latent Image Identification Information — 120 Perforation Repeat

SMPTE RP 135-2004, Use of Binary User Groups in Motion Picture Time and Control Codes

SMPTE RP 168-2002, Definition of Vertical Interval Switching Point for Synchronous Video Switching

SMPTE RP 195-2004, Use of the Reference Mark in Manufacturer-Printed Latent Image Key Numbers for Unambiguous Film Frame Identification

SMPTE RP 201-2008, Encoding Film Transfer Information Using Vertical Interval Time Code

ISO/IEC 646:1991, Information Technology — ISO 7-Bit Coded Character Set For Information Exchange

ISO/IEC 2022:1999, Information Technology —- Character Code Structure and Extension Techniques

IEEE 754-2008, Standard for Binary Floating-Point Arithmetic

4 Format of VANC Data Packets

Each data packet shall comply with the format defined in SMPTE 291M for a type 2 ANC packet. It consists of the ancillary data flag (ADF), the data ID (DID), the secondary data ID (SDID), the data count (DC), the user data words (UDW), and the checksum (CS). The DID shall be set to the value 51h. The SDID shall be set to the value 01h. The ADF and CS are defined in SMPTE 291M.

4.1 UDW format

The ancillary space packet UDW shall be a sequence of 10-bit words. The film transfer or video production information is transmitted in bits b7 through b0 of the 10-bit data word. Bit b8 is even parity for bits b7 through b0 of the 10-bit data word, and bit b9 equals not bit b8.

4.2 Overview of the Film Transfer Descriptor Packet

The payload of the Film Transfer Descriptor packet consists of several groups of individual data items that are defined below. Each group consists of a one byte Key that identifies the group, a one byte Length, and one or more data items of a similar type which are placed in a specific sequence within the group. The last two bytes of the payload are a 16-bit CRC that serves to identify when bit errors have occurred in the transmission of the packet. The Film Transfer Descriptor packet shall contain at least the Temporal_F group and CRC. Carriage of each of the remaining groups is optional. Decoders should parse the individual group Keys to determine if the data is of interest and skip the number of bytes identified by the group Length byte +1 to find the start of the next group. Table 1 shows the possible groups in the Film Transfer Descriptor packet with their respective Keys and Length values.