SMPTE REGISTERED DISCLOSURE DOCUMENT

Carriage of Live Production Metadata

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Errors in this document should be reported to the proponent identified below, with a copy to eng@smpte.org.

All other inquiries in respect of this document, including inquiries as to intellectual property requirements that may be attached to use of the disclosed technology, should be addressed to the proponent identified below.

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Introduction

The Live Production Metadata is introduced for the purpose of providing value-added functions or improving convenience and efficiency in live video production workflow, and it is transmitted using the vertical ancillary data space using the data packet format defined in SMPTE ST 291-1.

A variety of live production applications can use the mechanism of the Live Production Metadata by defining the application metadata.

1 Scope

This document describes the data structure of the Live Production Metadata and its carriage in the vertical ancillary data space using the data packet format defined in SMPTE ST 291-1.

2 Normative References

The following standard contains provisions which, through reference in this text, constitute provisions of this registered disclosure document. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this registered disclosure document are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

SMPTE ST 291-1:2011 – Ancillary Data Packet and Space Formatting

3 Conventions

Numbers in decimal notation are represented as a sequence of decimal digits with no suffix.

Numbers in hexadecimal notation are represented as a sequence of hexadecimal digits suffixed by “h”.

4 Live Production Metadata Structure

The Live Production Metadata is carried in the ancillary data packet defined in SMPTE ST 291-1. The Type 2 ancillary data packet is used where 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) are stored in an ancillary data packet. The values of ADF, DC and CS are defined in SMPTE ST 291-1.

The Live Production Metadata is required to be carried in the vertical ancillary data space (VANC) and stored in bits b7 through b0 of the 10-bit user data words. The bit b8 is even parity for bits b7 through b0 and bit b9 equals not bit b8. The first and second words are assigned to the LPM Number, the third word is assigned to the LPM Flags and any latter words are assigned to the Main Data.

The DID word is set to the value 53h. This value is in the User Applications range.

The SDID word is set to a value from 01h to 0Fh which is defined by a Live Production Metadata application, depending on the group of the metadata.

The LPM Number consists of 2 bytes and its value is defined by a Live Production Metadata application to identify the kind of the metadata.

The LPM Flags are defined as follows.

- Bit 7: History flag (0: Default, 1: History) specifies that the metadata was applied in the past and is carried just as a historical information if the value is 1. If otherwise or this flag is not used, then the value is set to 0.
- Bit 6: Instancy flag (0: Default, 1: Instancy) specifies that the metadata is required to be processed instantly if the value is 1. If otherwise or this flag is not used, then the value is set to 0.
- Bit 5: Single flag (0: Default, 1: Single) specifies that the metadata is discontinuous with that in the previous video frames if the value is 1. If otherwise or this flag is not used, then the value is set to 0.
- Bit 4, Bit 3, Bit 2 and Bit 1 are reserved and are set to 0.
- Bit 0 is reserved and is set to 1.

The length of the Main Data words is 252 bytes or less, and the structure of the Main Data is defined by a Live Production Metadata application.

Figure 1 shows how the Live Production Metadata is stored in the VANC data packet.

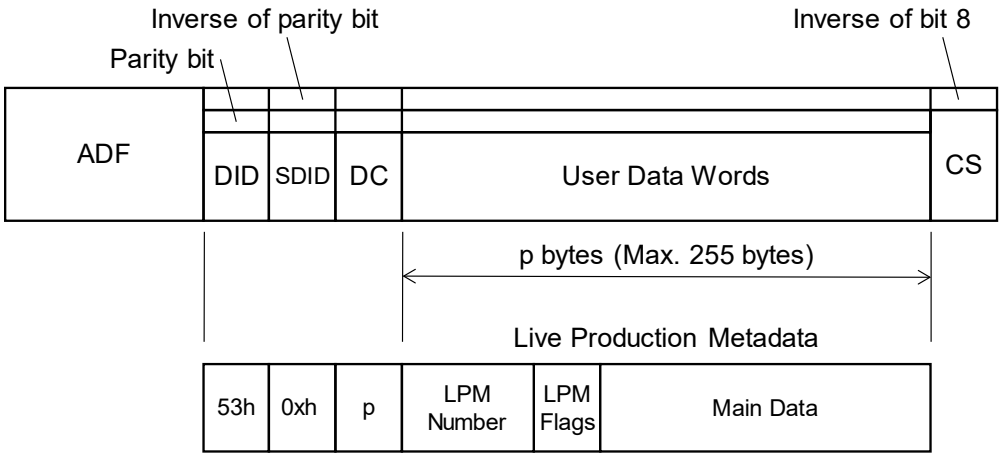

Figure 1 – Live Production Metadata in VANC Data Packet

Live Production Metadata is applicable to the progressive and interlaced 1920 x 1080 image formats specified in SMPTE ST 274 and to the progressive 3840 x 2160 image format specified in SMPTE ST 2036-1.

5 Live Production Metadata Examples

5.1 Application of HDR SDR Relation Table

For the application of the HDR SDR Relation Table, the values in the VANC data packet are as follows.

- DID: 53h
- SDID: 01h
- LPM Number: 02h, 00h
- LPM Flags: as defined in section 4

- Main Data: HDR SDR Relation Table

In an SDI signal, it is recommended to embed the metadata on line 14 and, if the signal is interlaced, also on line 577. Receivers are expected to handle the metadata on whichever line it is embedded.

The HDR SDR Relation Table can be embedded in the video signal as a set of data which describes the relation between HDR and SDR video signals in the SR Live workflow introduced by Sony.

5.2 Application of Camera Paint Data Table

For the application of the Camera Paint Data Table, the values in the VANC data packet are as follows.

- DID: 53h
- SDID: 02h
- LPM Number: 01h, 00h
- LPM Flags: as defined in section 4
- Main Data: Camera Paint Data Table

In an SDI signal, it is recommended to embed the metadata on line 15 and, if the signal is interlaced, also on line 578. Receivers are expected to handle the metadata on whichever line it is embedded.

5.3 Application of Video Information Data Table

For the application of the Video Information Data Table, the values in the VANC data packet are as follows.

- DID: 53h
- SDID: 03h
- LPM Number: 10h, 01h - 04h
- LPM Flags: as defined in section 4
- Main Data: Video Information Data Table 1 - 4, corresponding to the value of the LPM Number byte 2

In an SDI signal, it is recommended to embed the metadata on line 16 and, if the signal is interlaced, also on line 579. Receivers are expected to handle the metadata on whichever line it is embedded.

Annex A Bibliography (Informative)

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

SMPTE ST 2036-1:2014 — Ultra High Definition Television — Image Parameter Values for Program Production