Using TSCS for SMPTE ANC Data

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SMPTE Meta Data

- SMPTE meta data is all data which can be embedded in traditional SDI
  - Closed Captioning
  - Teletext
  - Sub-titling
  - Vendor specific data
  - ..
- SMPTE Meta data Format according to SMPTE-S291m

- SMPTE meta data is important in Broadcast infrastructures
- RAW video (Active Picture only) does not contain SMPTE meta data.

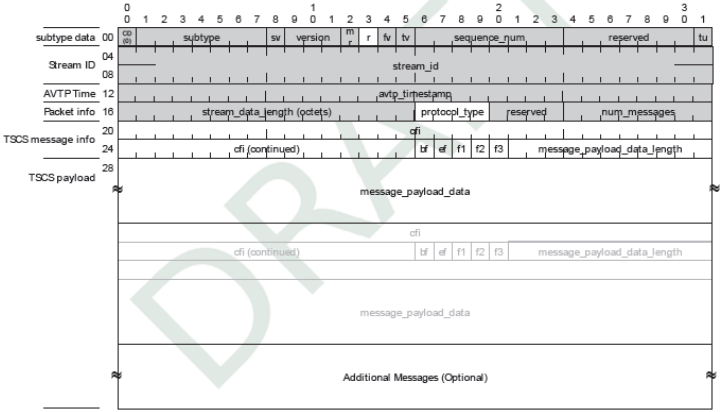
SMPTE Meta data Format

- SMPTE Meta data Format

- ADF : Ancillary data flag (30 bits)
- DID : Data ID identifier for type of Meta data (10 bits)
- SDID : Second Data ID, which distinguishes successive ancillary packets with a common data ID (10 bits)
- DC : Data count number word which defines the quantity of user data words in the ancillary packet (10 bits)
- DATA: 256 bytes max (10 bits)
- CS : Checksum (10 bits)

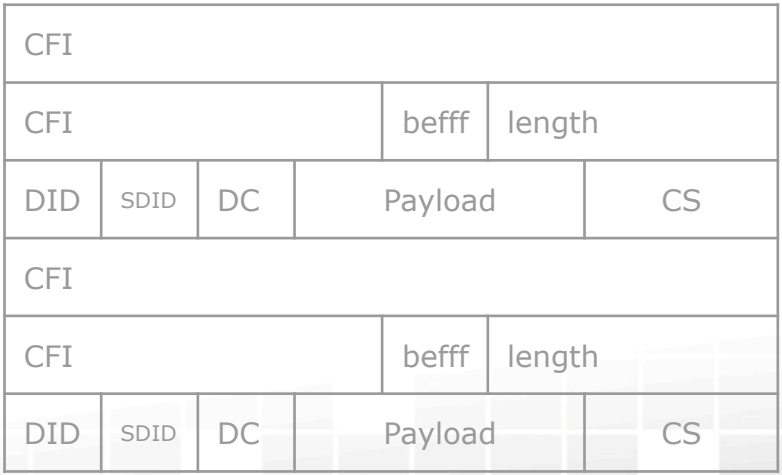
Encapsulating in TSCS

- —cfi (control format identifier): 48 bits
  - 90-e0-f0-00-YY-00
  - Not sure how to set the p and d flag
- —bf (begin frame flag): 1 bit
  - Almost always 1 for short payloads
- —ef (end frame flag): 1 bit
  - Almost always 1 for short payloads
  - bf and ef set at the same time
- —f1 (flag 1): 1 bit
  - reserved
- —f2 (flag 2): 1 bit
  - reserved
- —f3 (flag 3): 1 bit
  - reserved



Payload

- —message_payload_data_length : 11 bits
  - ADF removed from ANC packet
  - Multiple ANC packets combined
  - When ANC Packets exceed packet size boundary, use bf and ef flag accordingly.



Payload continued

SMPTE s291 describes also 10 bit modes. However 95% of ANC standards is covered by an 8 bits implementation.

In 10 bits, a parity and a inverted parity is added on top of the original 8 bits

- **8 bit mode:** Use flag 1=0 to indicate 8bit mode
  - DID: In 8 bits mode parity and inverse parity bit are stripped to fit in 8bits
  - SDID: In 8 bits mode parity and inverse parity bit are stripped to fit in 8bits
  - DC: DID: In 8 bits mode parity and inverse parity bit are stripped to fit in 8bits
  - Payload: 8bits. Standards mapped into this payload are again using parity and inverse parity on top of 8bit data. So the 2 MSB's can be removed. However this depends on the standard used.
  - CS: use 2 bytes no change there since CS = 9 bits.

- **10 bit mode:** Use flag 1=1 to indicate 10bit mode
  - All data (also DID and SDID) are 10 bit and remapped into bytes. Padding is needed to fit in byte boundaries.

Open issues

- **avtp_timestamp field:** What represents the timestamp?
  - Start of the line in which the ANC data was embedded? This is easier for multiple packets per line.
- **P D flags:** ?? How to use these?
- **CFI:** What would be the correct CFI? Should we add a SMPTE label to table 1722a-5.2.1 (eg 0A = SMPTE-ANC or 0A = SMPTE-s291)
- **Multicast:** can these TSCS be multicast transmitted?
- **SRP**: Need for bandwidth reservation?