

IEEE P1722 AVBTP assumptions

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Revision History

Rev	Date	Comments
0.01	2007-06-24	First version using formats and notes based on what probably will start going into the draft P1722 specifications.

References:

- Draft AVBTP over IEEE 802.3 AVB stream data format Version 0.02 (Alan Bartky)
 - <http://www.avbtp.org/contributions/avbtp-bartky-proposed-stream-data-format-v0-02-2007-03-27.pdf>

Design Assumptions

- AVBTP shall use 802.1AS for time base
- AVBTP shall be able to react to change in 802.1AS time (user changing time of day, change in Grandmaster, etc. (see 802.1AS assumptions from AVB document)).
- 61883 format over AVBTP will support presentation time in the same manner as 1394/61883 using the SYT field and in 24.576 MHz cycle time based on 802.1AS clock.
 - 61883-4 & 61883-7: Source Packet Header format with 0-127 seconds, 0-7999 8 kHz cycles, 0-3072 24.576 MHz sub-cycles.
 - All other 61883 encapsulations: CIP header format with 0-15 8 kHz cycles, 0-3072 24.576 MHz sub-cycles.
- AVBTP 61883 presentation time shall be relative to the 802.1AS clock
 - Adapt 1394 AV/C Function Control Protocol (FCP) for use in 61883 over AVBTP.
 - Allow for Proprietary encapsulations via different subtype
 - Allow for other future expansions via different subtypes.

Encapsulation Assumptions

- Approved by Consensus:
 - For AVBTP stream data frames, MAC Destination Addresses shall always be multicast addresses and shall be unique for the Layer 2 network. This address shall be used for stream identification.
 - For AVBTP stream control frames, MAC Destination Address may be unicast, multicast or broadcast depending on the specification of the usage of each AVBTP control frame.
 - Control frames that use a reserved AVB stream multicast destination MAC address must reserve enough bandwidth for the stream to accommodate

Encapsulation Assumptions

- Approved by Consensus:
 - All talkers shall always send stream **data** frames with 1st Ethertype field set to 0x8100 for 802.1 P/Q type.
 - For AVBTP, talkers and controllers are not required to send stream control frames with an 802.1 P/Q tag.
 - **All devices must always be able to accept data and control frames with an 802.1 P/Q tag.**

Encapsulation Assumptions

- Approved by Consensus:
 - VLAN Identifier (VID), 12 bits:
 - The VID is a VLAN and not a Stream Identifier
 - AVBTP stations must support VLAN ID of zero to send or receive.
 - AVBTP stations are recommended to support other VLAN IDs, but it is not required.
 - Receiving AVBTP stations not supporting or configured for a given VLAN shall discard any frames for which it is not a member of the specified VLAN.
 - AVBTP Shall use a unique Ethertype following the 802.1P/Q Ethertype and Data to identify an AVBTP stream.
 - Value of the Ethertype shall be specified at the proper time per IEEE procedures.

Encapsulation Assumptions

- Approved by Consensus:
 - AVBTP subtype field (8 bits):
 - 0x00: “61883 stream type data” (Editor’s note: placeholder name, suggestions welcome)
 - 0x01: “61883 stream type control” (Editor’s note: placeholder name, suggestions welcome)
 - 0x02: AV/C control
 - 0x03-0xFD: Reserved for future protocols
 - 0xFE: Extended OUI type (Vendor specific)
 - 0xFF: Reserved for future version of this standard
 - Subsequent parsing of AVBTP packets shall be based on subtype.

Encapsulation Assumptions

- Approved by Consensus:
 - AVBTP/61883 stream data “other” field (8 bits):
 - >> least significant bit for Timestamp valid
 - >> other bits reserved.
 - AVBTP/61883 source timestamp field (32 bits)
 - Data field shall express time related to the 802.1AS Global Clock
 - Format TBD (based on decision from 802.1AS)
 - Full resolution target at ~1 second.
 - Stream Data Length Field 16 bits
 - Same as used in 1394/61883 CIP header

Encapsulation Assumptions

- Approved by Consensus:
 - 61883 over AVBTP shall support the same fields using by IEEE 1394 Isochronous data packets
 - Length Field 16 bits
 - Isochronous Data Format (tag) field, 2 bits:
 - Supported by AVBTP:
 - » 00 binary, “data field unformatted” (used by Instrumentation & Industrial Digital Camera (I IDC) 1394 trade association specification)
 - » 01 binary, CIP header is present
 - Not supported by AVBTP:
 - » 10 binary: Reserved by IEEE 1394
 - » 11 binary: Global asynchronous stream packet (GASP) format (Used in 1394 for Serial Bus to Serial Bus bridges)
 - Type code (tcode), 4 bits:
 - Shall be fixed value of 1010 binary (same as 1394 Isochronous packet format)
 - » Set to 0xA on transmit
 - » Ignore on receive

Encapsulation Assumptions

- Approved by Consensus:
 - CIP header 1st quadlet indicator, 2 bits
 - Fixed at 00 binary
 - Data Block Size (DBS), 8 bits
 - Same definition as currently in 61883, size of Data Blocks in Quadlets
 - 0: 256 quadlets
 - 1-255: 1-255 quadlets
 - Quadlet Padding Count (QPC), 3 bits
 - For all types of 61883 as defined today, this field is always zero.

Encapsulation Assumptions

- Approved by Consensus:
 - Source Packet Header (SPH) indicator, 1 bit
 - If one
 - Then AVBTP packet contains 61883-4 or 61883-7 (or future) source packets.
 - If zero
 - Then AVBTP packet does not contain source packets (contains integer number of Data Blocks)
 - Reserved (Rsv), 2 bits
 - Reserved (currently not used by 1394/61883), set to zero, ignore on receive.
 - Data Block Count, 8 bits
 - Sequence number of 1st Data Block in the packet
 - Same meaning as in 61883 over 1394

Encapsulation Assumptions

- Approved by Consensus:
 - CIP header 2nd quadlet indicator, 2 bits
 - Fixed at 10 binary
 - Stream Format, 6 bits
 - Same values as currently defined for 61883
 - Format Dependent Field (FDF), 8 bits if SPH=0, 24 bits if SPH=1
 - Same values as currently defined for 61883
 - SYT field (1394 cycle time based presentation time for SPH field equals 0)
 - Mandatory for use by AVBTP end stations
 - Same as 1394/61883

Encapsulation Assumptions

- Approved by Consensus:
 - CIP header 2nd quadlet
 - Channel ID (0-63)
 - 0-30 & 32-63: originating channel ID from 1394 network.
 - 31: originating source is on AVB network (native AVB)
 - Source ID (0-63)
 - 0-62 originating Source ID from IEEE 1394 network
 - 63 originating source is on AVB network
 - Reserved (2 bits)
 - Same as 1394/61883
 - » Set to 0 on transmit
 - » Ignore on receive.
 - “sy” field (4 bits) (currently used by 1394 for Digital rights management).
 - Same as 1394/61883

Encapsulation Assumptions

- Proposals:
 - For all class 5 traffic, limit maximum transmission unit size in order to limit total transmission time on and 802.3 100 megabit (including preamble and inter-frame gap to 75% of 125 μ s)
 - For all 61883 type traffic, limit maximum data payload to 256 quadlets (1024 bytes)
 - >> Editor's note: Needs work. Current consensus to break on event boundaries:
 - Data Blocks
 - Source Packets

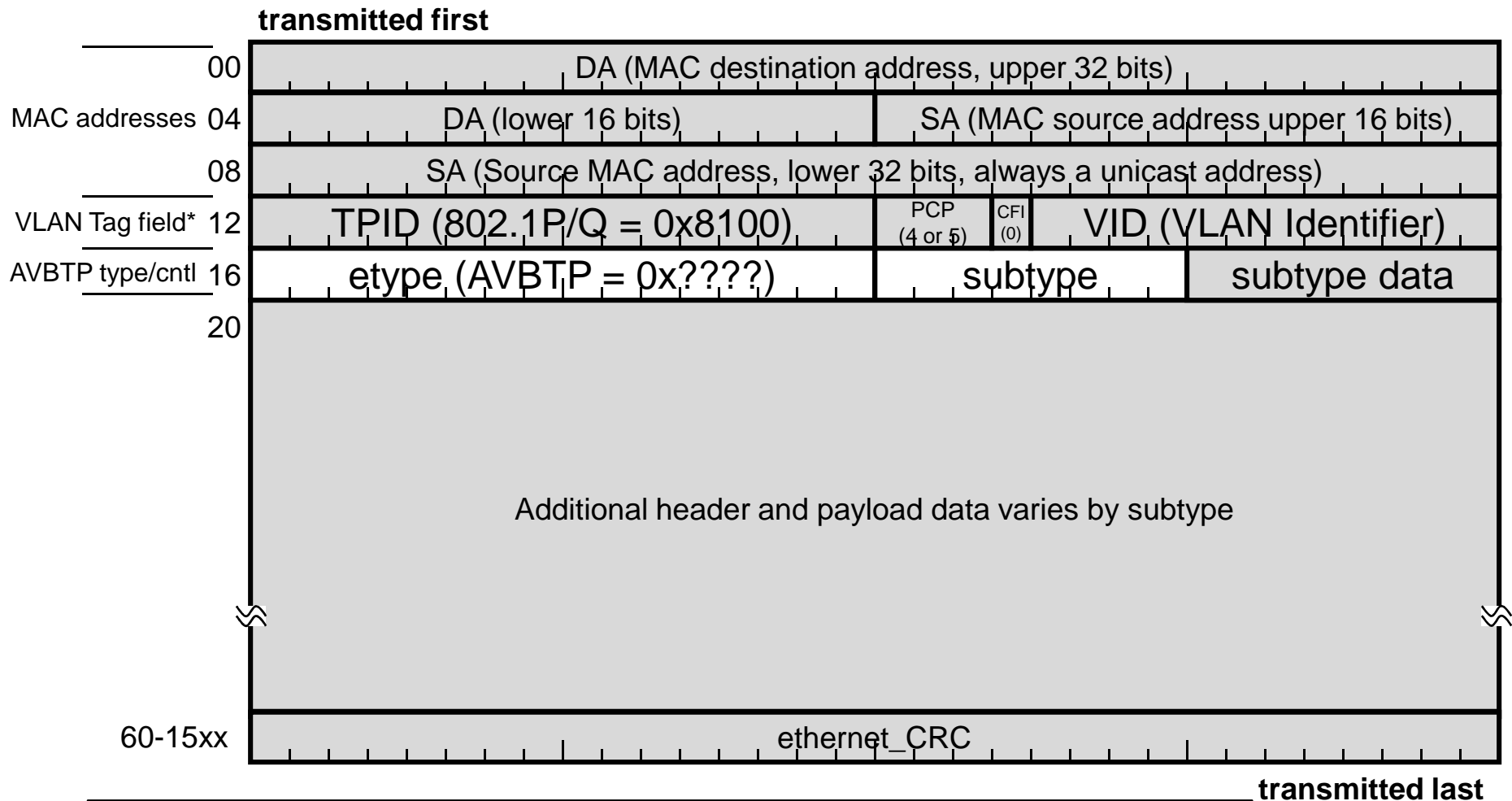
Encapsulation Assumptions

- Questions:
 - Closed
 - Should we standardize the length field for all AVBTP formats?
 - Consensus: No, all data after the subtype field shall be subtype dependent.
 - Is there other control traffic that will need other encapsulation options?
 - *Consensus: Yes, 61883 over AVBTP will need one for stream control and one for AVC. See current encapsulation proposal for details. Other future protocols over AVBTP will need them as well.*

Encapsulation Assumptions

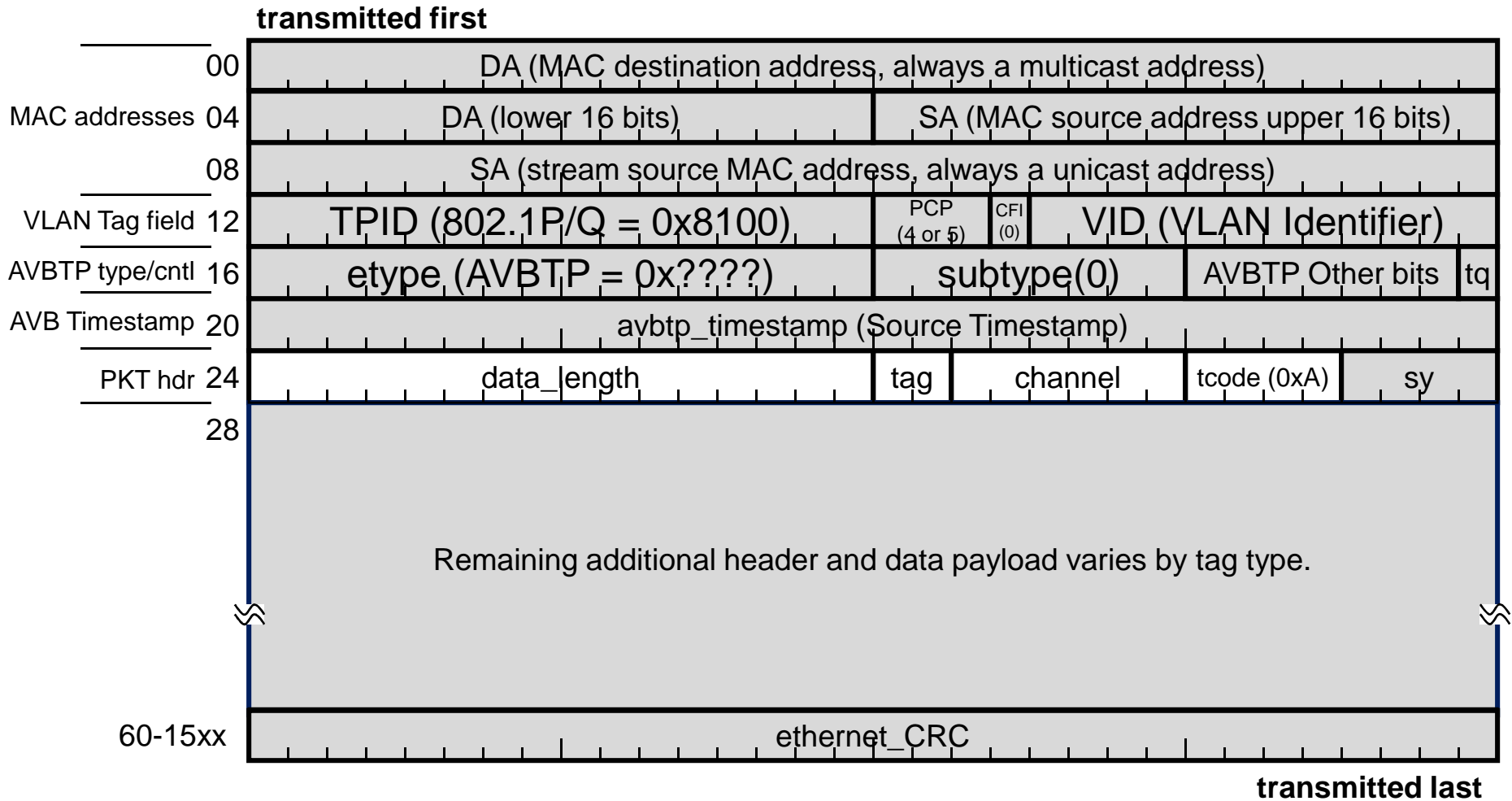
- Work Items:
 - Need to come up with format to allow proprietary encapsulations (define subtype and any fields we deem necessary to ensure consistency)
 - >> Alan to come up with initial proposal for 64 bit Extended OUI and subtype of 0xFE

Draft AVBTP packet

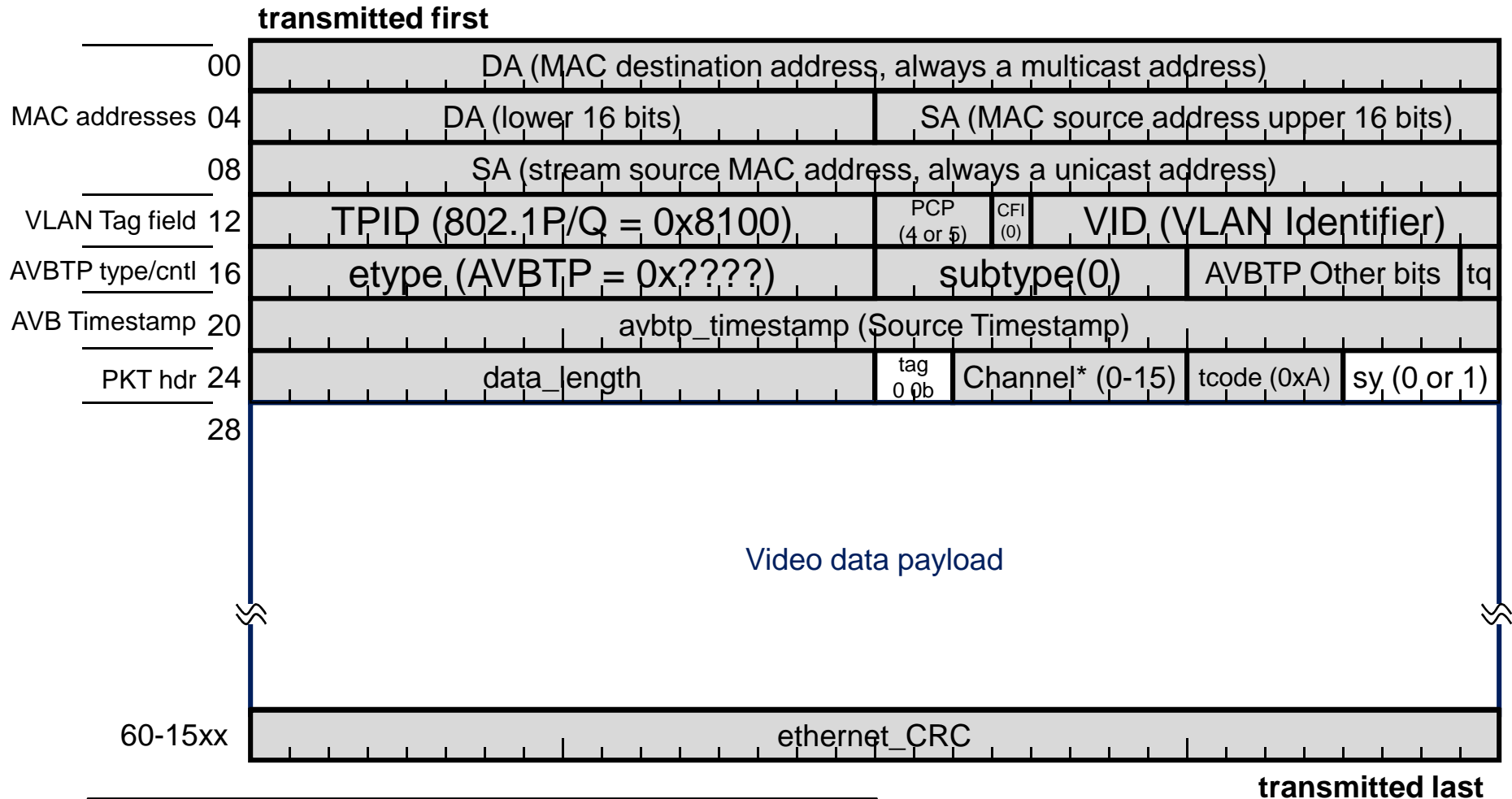


***Note: VLAN Tag field is mandatory for some subtypes and optional for others**

Draft AVBTP Subtype 0, 61883/IIDC data packet

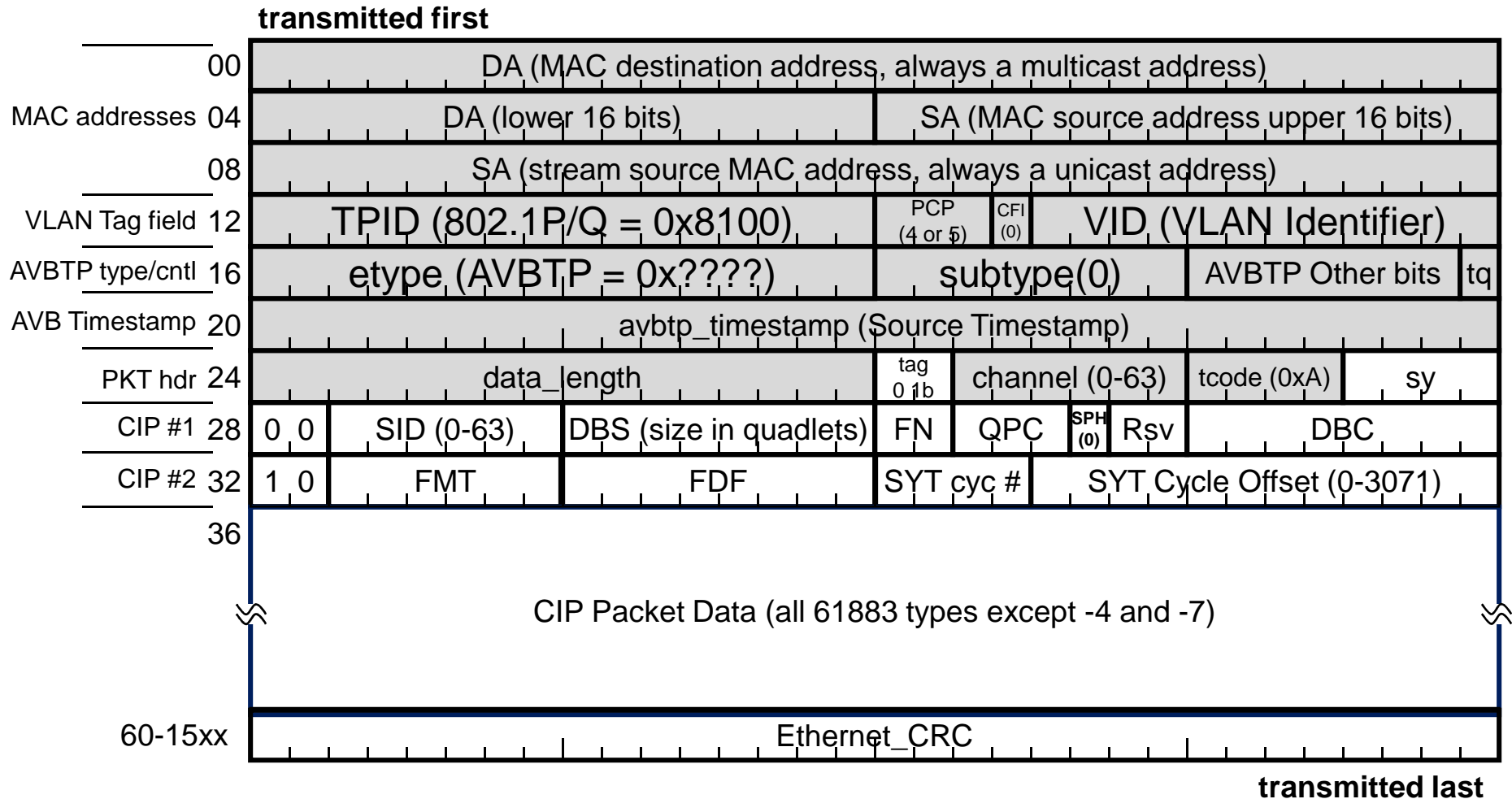


Draft AVBTP IIDC Stream Data packet



***Note: Current standard for IIDC restricts channel ID**

Draft AVBTP CIP Stream Data packet, SPH(0)



Draft AVBTP CIP Stream Data packet, SPH(1)

