CCSDS

The Consultative Committee for Space Data Systems

Draft Recommendation for
Space Data System Standards

AOS SPACE DATA LINK PROTOCOL

DRAFT RECOMMENDED STANDARD

CCSDS 732.0-B-1.3

PINK SHEETS

September 2005

DOCUMENT CONTROL

Document	Title and Issue	Date	Status
CCSDS 732.0-B-1	AOS Space Data Link Protocol, Issue 1	September 2003	Original Issue
CCSDS 732.0-P-1.1	AOS Space Data Link Protocol, Draft Issue 1.1	May 2004	Draft Update (superseded). Modifies the M_PDU header as follows: - eliminates 5-bit Reserved Spare field; - defines new 4-bit Virtual Channel Frame Count Cycle field; - increases First Header Pointer field size from 11 to 12 bits.
CCSDS 732.0-P-1.2	AOS Space Data Link Protocol, Draft Issue 1.2	May 2005	Draft Update (superseded). Modifies the M_PDU header as follows: - eliminates the 5-bit Reserved Spare field; - defines a new optional 4-bit Virtual Channel Frame Count Cycle field; - defines a new mandatory 1-bit VC Frame Count Cycle Use flag.
CCSDS 732.0-P-1.3	AOS Space Data Link Protocol, Draft Issue 1.3	September 2005	Current Draft Update. Modifies the Signaling Field in the Transfer Frame Primary Header as follows: - reduces number of reserved spare bits from 7 to 2; - defines two new subfields, a mandatory Virtual Channel (VC) Frame Count Cycle Use Flag, and an optional Virtual Channel Frame Count Cycle subfield. Reverts changes proposed in previous draft updates to Issue-1 Blue Book text.

4.1.2 TRANSFER FRAME PRIMARY HEADER

4.1.2.1 General

The Transfer Frame Primary Header is mandatory and shall consist of five fields, positioned contiguously, in the following sequence:

   a) Master Channel Identifier (10 bits; mandatory);

   b) Virtual Channel Identifier (6 bits; mandatory);

   c) Virtual Channel Frame Count (3 octets; mandatory);

   d) Signaling Field (1 octet; mandatory);

   e) Frame Header Error Control (2 octets, optional).

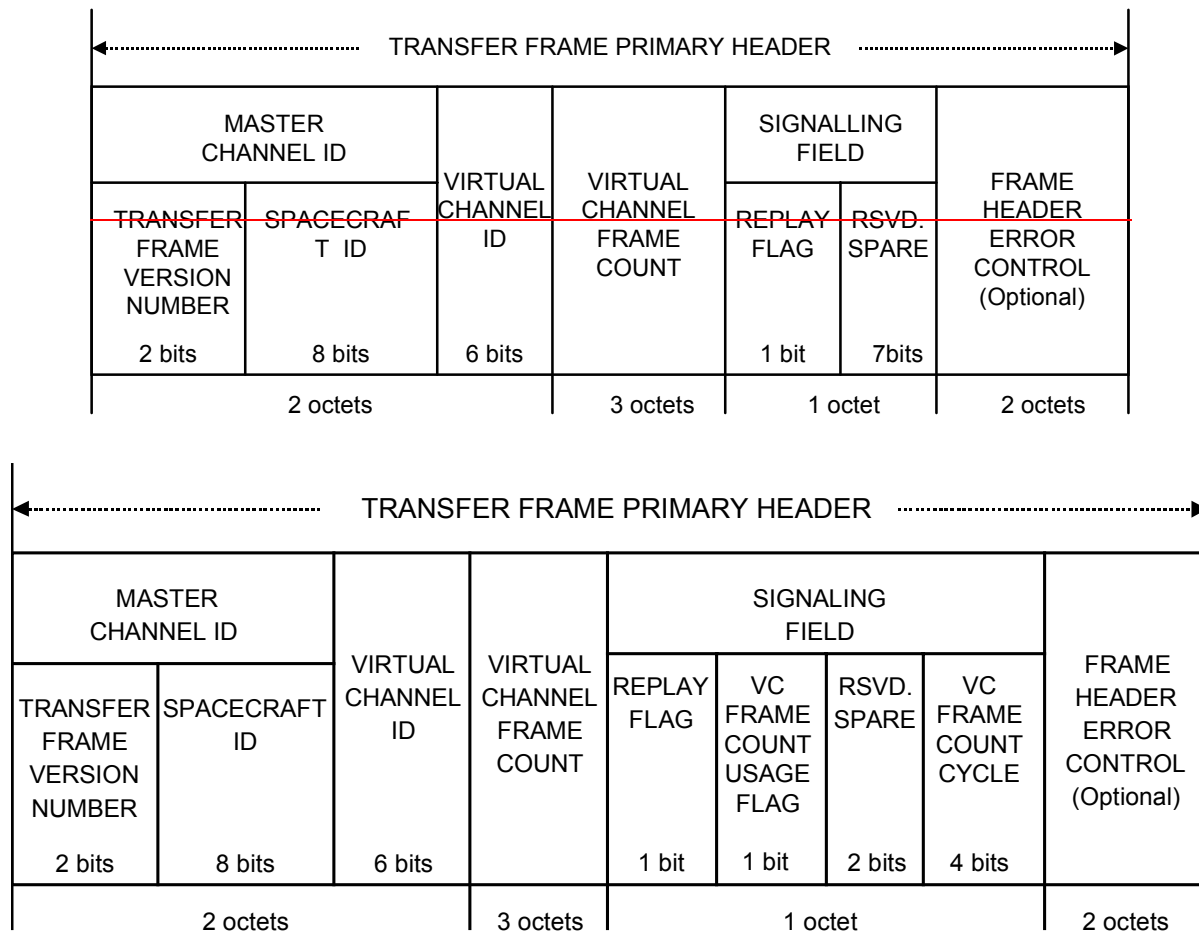The format of the Transfer Frame Primary Header is shown in figure 4-2.

Figure 4-2: Transfer Frame Primary Header

4.1.2.5   Signaling Field

4.1.2.5.1   General

4.1.2.5.1.1   Bits 40–47 of the Transfer Frame Primary Header shall contain the Signaling Field.

4.1.2.5.1.2   The Signaling Field shall be used to alert the receiver of the Transfer Frames with respect to functions that: (a) may change more rapidly than can be handled by management, or; (b) provide a significant cross-check against manual or automated setups for fault detection and isolation purposes.

4.1.2.5.1.3   This 8-bit field shall be subdivided into ~~two~~four sub-fields as follows:

   a)   Replay Flag (1 bit, mandatory);

   ~~b)   Reserved Spares (7 bit, mandatory).~~
   b)   Virtual Channel (VC) Frame Count Cycle Use Flag (1 bit, mandatory);

   c)   Reserved Spares (2 bits, mandatory);

   d)   Virtual Channel Frame Count Cycle (4 bits, optional).

4.1.2.5.2   Replay Flag

4.1.2.5.2.1   Bit 40 of the Transfer Frame Primary Header shall contain the Replay Flag.

4.1.2.5.2.2   Recognizing the need to store Transfer Frames during periods when the space link is unavailable, and to retrieve them for subsequent replay when the link is restored, this flag shall alert the receiver of the Transfer Frames with respect to its 'realtime' or 'replay' status.   Its main purpose is to discriminate between realtime and replay Transfer Frames when they both may use the same Virtual Channel.

4.1.2.5.2.3   The Replay Flag is interpreted as follows:

   a)   '0' = Realtime Transfer Frame;

   b)   '1' = Replay Transfer Frame.

NOTES

1   Owing to the wide spectrum of onboard storage and retrieval technology options, the exact interpretation of this Flag is necessarily the subject of negotiation between projects and cross-support organizations.   For instance, it may be interpreted to indicate that the value of the Virtual Channel Frame Count field on the replayed VC decreases, rather than increases, as a function of reverse playback.

2   If Transfer Frames are stored after encoding by the Channel Coding Sublayer, they must be re-encoded if the status of the Replay Flag is altered after retrieval.

4.1.2.5.3 Reserved Spare

4.1.2.5.3.1 Bits 41-47 of the Transfer Frame Primary Header shall contain Reserved Spare.

4.1.2.5.3.2 This seven-bit Reserved Spare field shall be reserved by CCSDS for potential future signaling applications and in the interim shall, by convention, be set to the value 'all zeros'.

4.1.2.5.3 Virtual Channel (VC) Frame Count Cycle Use Flag

4.1.2.5.3.1 Bit 41 of the Transfer Frame Primary Header shall contain the VC Frame Count Cycle Use Flag.

4.1.2.5.3.2 This one-bit field shall indicate whether the VC Frame Count Cycle field is used; its value shall be interpreted as follows:

   a) '0' = VC Frame Count Cycle field is not used and shall be ignored by the receiver;

   b) '1' = VC Frame Count Cycle field is used and shall be interpreted by the receiver.

4.1.2.5.4 Reserved Spare

4.1.2.5.4.1 Bits 42-43 of the Transfer Frame Primary Header shall contain the reserved spare.

4.1.2.5.4.2 This 2-bit field is reserved for future definition by CCSDS and shall be set to '00'.

4.1.2.5.5 Virtual Channel (VC) Frame Count Cycle

4.1.2.5.5.1 If used, bits 44-47 of the Transfer Frame Primary Header shall contain the Virtual Channel Frame Count Cycle field.

4.1.2.5.5.2 Each time the Virtual Channel Frame Count returns to zero, the VC Frame Count Cycle shall be incremented.

NOTE – The VC Frame Count Cycle effectively extends the Virtual Channel Frame Count from 24 to 28 bits.

4.1.2.5.5.3 If not used, bits 44 through 47 of the Transfer Frame Primary Header shall be set to 'all zeros'.