USB4 1.0 ENGINEERING CHANGE NOTICE FORM

Title: Sub-MTP TU Packet Rules Clarification
Applied to: USB4 Specification Version 1.0

Brief description of the functional changes:
Clarifies the rules for both zero and non-zero slots. The 4 Data MTPH header is used when the data symbols are not the same, rather than completely different. The 1 K-Symbol, 2 K-Symbol & 3 K-Symbol headers are used when they are followed by a non-K-Symbol header or by slot zero.

Benefits as a result of the changes:
The slot zero and non-zero slot Sub-MTP packet rules are more complete.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
None

An analysis of the hardware implications:
None

An analysis of the software implications:
None

An analysis of the compliance testing implications:
None

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Actual Change

(a). Table 10-18

Table 10-18. Slot Zero Sub-MTP TU Packet Rules

Header Name	Parameter Bytes	Parameter Contents	Conditions When Used
MTPH	0	N/A	Data symbol equal 00h is present on all active lanes.
SR MTPH	0	N/A	SR Control symbol is present on all active lanes.
1 Data MTPH	1	Byte 0 = Dx	The same Data symbol (Dx) which is not equal to 00h, is present on all active lanes.
2 Data MTPH	2	Byte 0 = Dx0 Byte 1 = Dx1	Two different Data symbols, Dx0 and Dx1 are present on lanes 0 and 1 respectively.~~Data symbols differ across the two lanes (Dx0 is present on Lane 0 and Dx1 is present on Lane 1).~~
4 Data MTPH	4	Byte 0 = Dx0 Byte 1 = Dx1 Byte 2 = Dx2 Byte 3 = Dx3	One or more Data symbols are not the same ~~differ~~ across all 4 lanes (Dx0, Dx1, Dx2, Dx3 are present on lanes 0, 1, 2 and 3 respectively).
1 K-Symbol MTPH	1	lower nibble = x upper nibble = 0h	The same K-Symbol Index (Cx) is present on all active lanes.
2 K-Symbol MTPH	1	lower nibble = x0 upper nibble = x1	Two different K-Symbols Indexes, Cx0 and Cx1 are present on lanes 0 and 1 respectively.
4 K-Symbol MTPH	2	Byte 0: lower nibble = x0 upper nibble = x1 Byte 1: lower nibble = x2 upper nibble = x3	One or more K-Symbol Indexes are not the same across all 4 lanes (Cx0, Cx1, Cx2 and Cx3 are present on lanes 0, 1, 2 and 3 respectively).

(b). Table 10-19

Table 10-19. Non-~~-~~Zero Slot Sub-MTP TU Packet Rules

Header Name	Parameter Bytes	Parameter Contents	Conditions When Used
Data	0	N/A	The slot is allocated and has Data Symbols on all active lanes.
Shifting SR	0	N/A	An SR Control symbol is present on all active lanes for the 4th time as described in Section 10.5.2.2.2.
BS	0	N/A	The BS Control Link Symbol Sequence C0-C0-C0-C0 is present in full.

Header Name	Parameter Bytes	Parameter Contents	Conditions When Used
BE	0	N/A	The BE Control Link Symbol Sequence C1-C1-C1-C1 is present in full.
SS	0	N/A	The SS Control Link Symbol Sequence C3-C3-C3-C3 is present in full.
SE	0	N/A	The SE Control Link Symbol Sequence C6-C6-C6-C6 is present in full.
SF	0	N/A	The SF Control Link Symbol Sequence C4-C4-C4-C4 is present in full and the last Sub-MTP TU Header sent was VCPF.
VCPF	0	N/A	The VCPF Control Link Symbol Sequence C0-C1-C2-C3 is present in full.
1 K-Symbol	1	lower nibble = x upper nibble = 0h	A K-Symbol Index (Cx) is followed by either, a non-K-Symbol[1] or slot zero.
2 K-Symbol	1	lower nibble = x0 upper nibble = x1	Two K-Symbols Indexes (Cx0 and Cx1) are followed by either, a non K-Symbol[1] or slot zero.
3 K-Symbol	2	Byte 0: lower nibble = x0 upper nibble = x1 Byte 1: lower nibble = x2 upper nibble = 0h	Three K-Symbols Indexes (Cx0, Cx1 and Cx2) are followed by either, a non-K-Symbol[1] or slot zero.
4 K-Symbol	2	Byte 0: lower nibble = x0 upper nibble = x1 Byte 1: lower nibble = x2 upper nibble = x3	Four K-Symbol Indexes (Cx0, Cx1, Cx2 and Cx3) are present that do not match Types 2 to 7 or Type 13.
Corrupt	0	N/A	Either Data and K-Symbols are present for the same slot or an error indication from the DP PHY Layer is present and cannot be resolved using majority voting as defined in the DisplayPort 1.4a Specification.
EOC	0	N/A	The EOC Control Link Symbol Sequence (C2-C2-C2-C2) is present in full.
Unallocated	0	N/A	Slot is the first Unallocated slot for this MTP.

Notes:

1. An unallocated slot is considered a “non-K-Symbol”