USB4 1.0 ENGINEERING CHANGE NOTICE FORM

Title: Master Port May Stop Time Sync Handshake
Applied to: USB4 Specification Version 1.0

Brief description of the functional changes:
A Master Port may pause the Time Sync Handshake to stay in CLx states for power reduction

Benefits as a result of the changes:
Power saving when TMU requirements allow (LowRes)

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
Device Routers need to consider this and converge after the pause as if the TMU just enabled.

An analysis of the hardware implications:
Need to detect the pause and start convergence after Time Sync Handshakes resumed.

An analysis of the software implications:
None

An analysis of the compliance testing implications:
Need to add test for pause for Device Routers

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Actual Change

(a). Section 7.3.1.2, Page 251

From Text:

A Master Port shall send a Delay Response to the Slave Port at the interval specified in the *TSPacketInterval* field in the TMU_RTR_CS_3 register in Router Configuration space. A Master Port shall transmit a Follow-Up Packet within SendTimeout after transmitting the associated Delay Response Packet.

To Text:

When the Link is not in a CLx state, a~~A~~ Master Port shall send a Delay Response to the Slave Port at the interval specified in the *TSPacketInterval* field in the TMU_RTR_CS_3 register in Router Configuration space. A Master Port shall transmit a Follow-Up Packet within SendTimeout after transmitting the associated Delay Response Packet.

When the Link is in a CLx state, a Master Port may "pause" Time Sync Handshakes by not sending a Delay Response to the Slave Port. The Master Port may pause Time Sync Handshakes for any period of time while the Link is in CLx state. The Master Port shall resume Time Sync Handshakes upon exiting the CLx state.

IMPLEMENTATION NOTE

Pausing Time Sync Handshakes will affect time synchronization accuracy in a Slave Port. When resuming Time Sync Handshakes, the value of the timestamp in the first Follow Up Packet may not be as expected (for example, the Local Counter may restart from 0 upon exiting CLx state). Accuracy is not guaranteed until tConvergeTime after Time Sync Handshakes are resumed. It is important that a Router implementation take this into consideration when pausing and resuming Time Sync Handshakes in order to not disrupt tunneled traffic.

(b). Section 7.5, Page 267

From Text:

A Router shall reach the required time synchronization accuracy within tConvergeTime after Time Sync Handshakes are enabled.

To Text:

A Router shall reach the required time synchronization accuracy within tConvergeTime after Time Sync Handshakes are enabled.

If Time Sync Handshakes are paused, a Slave Port shall reach the required time synchronization accuracy within tConvergeTime after receiving a Delay Response Packet.