

USB4 Re-timer 0.96 ENGINEERING CHANGE NOTICE FORM

Title: LFPS Response Timing Requirement

Applied to: USB4 Re-timer Specification Version 0.96

Brief description of the functional changes:

Adds a timing requirement for the LFPS response when exiting CL1 and CL2.

Benefits as a result of the changes:

Limiting CL1/2 exit latency.

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

An analysis of the hardware implications:
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None

An analysis of the software implications:
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None

An analysis of the compliance testing implications:
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Add a timing requirement for LFPS response
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Actual Change

(a). 4.2.4.3.1 CL0s Exit, Page 39

To Text:

When a Re-timer detects an LFPS burst on one of its receivers, the Re-timer shall:

1. Send a Low Frequency Periodic Signaling (LFPS) burst from the Corresponding Transmitter. The duration of the LFPS burst shall be at least 16 LFPS cycles and no more than $t_{LFPSDuration}$. A Cable Re-timer shall send the first LFPS within $t_{LFPSResponse}$ from receiving LFPS. It is recommended that an On-board Re-timer will send the first LFPS within $t_{LFPSResponse}$ from receiving LFPS.

(b). 4.2.4.3.2.1 CL1/CL2 Exit – Phase 1, Page 40

To Text:

When a Re-timer detects an LFPS burst of 2 cycles on one of its Lane Adapters, it shall do the following:

1. Send LFPS as follows:
 - The Lane Adapter that detected the LFPS shall send LFPS for at least 5 LFPS cycles and no more than $t_{LFPSDuration}$. A Cable Re-timer shall send the first LFPS within $t_{LFPSResponse}$ from receiving LFPS. When exiting CL1, an On-board Re-timer shall send the first LFPS within $t_{WarmUpCL1}$ from receiving LFPS. When exiting CL2, an On-board Re-timer shall send the first LFPS within $t_{WarmUpCL2}$ from receiving LFPS.
 - The Corresponding Adapter shall send LFPS until it detects LFPS. A Cable Re-timer shall send the first LFPS within $t_{LFPSResponse}$ from receiving LFPS. It is recommended that an On-board Re-timer will send the first LFPS within $t_{LFPSResponse}$ from receiving LFPS.



IMPLEMENTATION NOTE

A Router Assembly that uses On-board Re-timers that forward LFPS after more than $t_{LFPSResponse}$ should compensate on the Re-timer forwarding time or consider the extended exit latency from CL0s/1.

(c). Table 4-6 Re-timer Timing Parameters, Page 41

To Text:

$t_{LFPSResponse}$	The time to response for LFPS detection.	--	1	μs
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Note: $t_{WarmUpCL1}$, $t_{WarmUpCL2}$, $t_{LFPSDuration}$ and $t_{EnterLFPS1}$ are defined in the USB4 Specification.