

USB Type-C ENGINEERING CHANGE NOTICE

Title: USB4™ UFP-DFP Training Clarifications
Applied to: USB Type-C Specification Release 2.0,
August 2019

Brief description of the functional changes proposed:
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Clarifies USB4™ UFP and DFP port behavior with regarding to when to train USB 3.2 and USB4 during connection set up. DFP behavior regarding USB 3.2 training will be left to implementation choice (as opposed to mandating immediate training once VBUS is exposed). UFP behavior however requires that USB 3.2 terminations be deferred until after determination that it won't be making a USB4 connection with its upstream partner.
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Benefits as a result of the proposed changes:
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Makes the connection behavior more deterministic.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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No existing systems or devices.

An analysis of the hardware implications:
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Requires circuit to hold off on USB 3.2 terminations in UFPs until proper conditions are met (as opposed to simply enabling based on VBUS presense.

An analysis of the software implications:
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No specific impact to software, should be consistent with existing USB 3.2 and USB4 behavior.

An analysis of the compliance testing implications:
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Probably some minor adjustments to USB Type-C functional testing since the training sequence might vary between implementations.
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Proposed changes to Chapter 5 sections using mark-up text:

Section 5.4.1:

5.4.1 USB Type-C Initial Connection

For a [USB4](#)-capable port, prior to initiating [USB4](#) cable and device discovery, a valid Source-to-Sink connection shall exist and the USB Type-C connection state machine of the port shall either be in the [Attached.SRC](#) or [Attached.SNK](#) state.

When two [USB4](#) dual-role-data (DRD) products are connected together, e.g. two [USB4](#) hosts, USB Type-C connection process will establish the initial data roles between the port partners.

Once the initial data roles are established, the ~~USB4 DFP USB Type-C connection will~~ may immediately proceed to train the link for ~~both USB 3.2 and USB 2.0. Once the USB4 DFP completes the training of the links, it shall hold off on enabling the USB 3.2 and USB 2.0 enumeration of the attached UFP to allow for the completion of the USB4 discovery and entry process.~~ If a UFP is USB4 capable, it shall hold off exposing SuperSpeed USB terminations until the completion of the USB4 discovery and entry process or tUSB4Timeout. Once the [USB4](#) discovery and entry process has completed, the ~~DFP-UFP~~ will enable SuperSpeed USB device ~~enumeration terminations on the USB 3.2~~ (either via the [USB4](#) SuperSpeed USB tunnel or natively depending on ~~if whether the completed~~ port connection is [USB4](#) or [USB 3.2](#), respectively) ~~and USB 2.0 data paths that are established with its UFP port partner at that time.~~

Final text after edit:

Once the initial data roles are established, the [USB4](#) DFP may immediately proceed to train the link for [USB 3.2](#). If a UFP is [USB4](#) capable, it shall hold off exposing SuperSpeed USB terminations until the completion of the [USB4](#) discovery and entry process or tUSB4Timeout. Once the [USB4](#) discovery and entry process has completed, the UFP will enable SuperSpeed USB device terminations either via the [USB4](#) SuperSpeed USB tunnel or natively depending on whether the completed port connection is [USB4](#) or [USB 3.2](#), respectively.