USB Type-C ENGINEERING CHANGE NOTICE

Title: Rp Rd Connect Detect Time
Applied to: USB Type-C Specification Release 1.3, July 14, 2017

Brief description of the functional changes proposed:

Define a detection time for Rp and Rd in the Unattached.SRC and Unattached.SNK states for Sources, Sinks and DRPs. The USB Type-C connector can be plugged in at any point during a DRP transition and so the Rp or Rd value may be missed the first time. Change is to allow up to 5ms when neither port partner is toggling, up to 80ms when one port partner is toggling and up to 500ms when both port partners are toggling.

Benefits as a result of the proposed changes:

Detection time is bounded and not assumed to be an "instantaneous" 0ms i.e. manufacturers get a minimum amount of guaranteed time to make the detection.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

Should be none.

An analysis of the hardware implications:

None

An analysis of the software implications:

None

An analysis of the compliance testing implications:

Aligned with current testing practice so none expected.

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Actual Change Requested

(a). Section 4.5.2.2.3.2,Exiting from Unattached.SNK state, Page 152

From Text:

If the port supports USB PD or accessories, the port shall transition to AttachWait.SNK when a Source connection is detected, as indicated by the SNK.Rp on at least one of its CC pins.

To Text:

If the port supports USB PD or accessories, the port shall transition to AttachWait.SNK, when ~~a Source connection is detected~~ the SNK.Rp state is present on at least one of its CC pins.

The maximum times that a Port shall take to transition to AttachedWait.SNK are the following:

- **tNoToggleConnect** when neither Port Partner is toggling

- **tOnePortToggleConnect** when one Port Partner only is toggling

When both Port Partners are toggling, a Port should take **tTwoPortToggleConnect** to transition to AttachedWait.SNK. Note that when both Port Partners are DRPs it is indeterminate whether the local port will transition to AttachedWait.SRC or AttachedWait.SNK.

Note, the times tOnePortToggleConnect and tTwoPortToggleConnect relate to how long toggling ports may take to sync and detect a connection.

(b). Section 4.5.2.2.7.2, Exiting from Unattached.SRC state,Page 156

From Text:

The port shall transition to AttachWait.SRC when:

- The SRC.Rd state is detected on either CC1 or CC2 pin or

- The SRC.Ra state is detected on both the CC1 and CC2 pins.

Note: A cable without an attached device can be detected, when the SRC.Ra state is detected on one of the CC1 or CC2 pins and the other CC pin is SRC.Open. However in this case, the port shall not transition to AttachWait.SRC.

To Text:

The port shall transition to AttachWait.SRC when:

- The SRC.Rd state is ~~detected~~present on either the CC1 or CC2 pin or

- The SRC.Ra state is ~~detected~~present on both the CC1 and CC2 pins.

The maximum times that a Port shall take to transition to AttachedWait.SRC are the following:

- **tNoToggleConnect** when neither Port Partner is toggling

- **tOnePortToggleConnect** when one Port Partner only is toggling

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When both Port Partners are toggling, a Port should take **tTwoPortToggleConnect** to transition to AttachedWait.SNK. Note that when both Port Partners are DRPs it is indeterminate whether the local port will transition to AttachedWait.SRC or AttachedWait.SNK.

Note, the times tOnePortToggleConnect and tTwoPortToggleConnect relate to how long toggling ports may take to sync and detect a connection.

Note: A cable without an attached device can be detected, when the SRC.Ra state is detected on one of the CC1 or CC2 pins and the other CC pin is SRC.Open. However in this case, the port shall not transition to AttachWait.SRC.

(c). Section 4.5.2.2.14.2, Exiting from Unattached.Accessory State, Page 160

From Text:

A port that supports Audio Adapter Accessory Mode shall transition to AttachWait.Accessory when the state of both CC pins is SRC.Ra.

A port that supports VCONN-Powered Accessories also shall transition to AttachWait.Accessory when the state of either CC1 or CC2 pin is SRC.Ra and the other CC pin is SRC.Rd.

Otherwise, the port shall transition to Unattached.SNK within tDRPTransition after dcSRC.DRP · tDRP, or if directed.

To Text:

A port that supports Audio Adapter Accessory Mode shall transition to AttachWait.Accessory when the state of both CC pins is SRC.Ra.

A port that supports VCONN-Powered Accessories also shall transition to AttachWait.Accessory, when the state of either CC1 or CC2 pin is SRC.Ra and the other CC pin is SRC.Rd.

The maximum time the local port shall take to transition from Unattached.Accessory to the AttachWait.Accessory state when an Audio Adapter Accessory or VCONN-Powered Accessory is present is **tOnePortToggleConnect**.

Otherwise, the port shall transition to Unattached.SNK within tDRPTransition after dcSRC.DRP · tDRP, or if directed.

(d). Section 4.11.2, Table 4-27, Page 201

To Text:

Table 4-22 CC Timing

	Minimum	Maximum	Description
tNoToggleConnect	0ms	5ms	Time to detect connection when neither Port Partner is toggling.
tOnePortToggleConnect	0ms	80ms	Time to detect connection when one Port Partner is toggling (0ms…dcSRC.DRP max*tDRP max + 2*tNoToggleConnect).

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tTwoPortToggleConnect	0ms	510ms	Time to detect connection when both Port Partners are toggling (0ms…5*tDRP max + 2*tNoToggleConnect).