USB Type-C® ENGINEERING CHANGE NOTICE FORM

Title: Relaxing Error Recovery requirements

Applied to: USB Type-C® Specification Release 2.0, August 2019

Brief description of the functional changes proposed:
Allow the Sink to limit the voltage at the CC-pin to 2.9V. This voltage is well above the open threshold voltage.

Benefits as a result of the proposed changes:
A number of designs are based on low voltage technology where reaching 3.3V tolerance is difficult and 5.5V is nearly impossible. This change will allow these devices to limit the voltages seen by the internal transistors to a voltage that is consistent with the normal process parameters resulting in cheaper devices.

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, the voltage threshold is already defined to be lower than the proposed clamping voltage.

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Actual Change Requested

(a). Section 4.5.1.3.1, Page 154

From Text:

Referring to Figure 4-7, a port that behaves as a Source has the following functional characteristics:

1. The Source uses a FET to enable/disable power delivery across VBUS and initially the Source has VBUS disabled.
2. The Source supplies pull-up resistors (Rp) on CC1 and CC2 and monitors both to detect a Sink. The presence of an Rd pull-down resistor on either pin indicates that a Sink is being attached. The value of Rp indicates the initial USB Type-C Current level supported by the host.
3. The Source uses the CC pin pull-down characteristic to detect and establish the correct routing for the SuperSpeed USB data path and determine which CC pin is intended for supplying VCONN.
4. Once a Sink is detected, the Source enables VBUS and VCONN.
5. The Source can dynamically adjust the value of Rp to indicate a change in available USB Type-C Current to a Sink.
6. The Source monitors the continued presence of Rd to detect Sink detach. When a detach event is detected, the Source removes, if supplied, VBUS and VCONN, and returns to step 2.
7. If the Source supports advanced functions (*USB Power Delivery* and/or Alternate Modes), *USB PD* communication is required.

To Text:

Referring to Figure 4-7, a port that behaves as a Source has the following functional characteristics:

1. The Source uses a FET to enable/disable power delivery across VBUS and initially the Source has VBUS disabled.
2. The Source supplies pull-up resistors (Rp) on CC1 and CC2 and monitors both to detect a Sink. The presence of an Rd pull-down resistor on either pin indicates that a Sink is being attached. The value of Rp indicates the initial USB Type-C Current level supported by the host.
3. The Source can optionally clamp the voltage on either of its CC pins. The minimum clamping voltage shall be vCC-Clamp. The clamp is intended to protect the Source circuitry associated with CC functionality.
4. The Source uses the CC pin pull-down characteristic to detect and establish the correct routing for the SuperSpeed USB data path and determine which CC pin is intended for supplying VCONN.
5. Once a Sink is detected, the Source enables VBUS and VCONN.
6. The Source can dynamically adjust the value of Rp to indicate a change in available USB Type-C Current to a Sink.
7. The Source monitors the continued presence of Rd to detect Sink detach. When a detach event is detected, the Source removes, if supplied, VBUS and VCONN, and returns to step 2.
8. If the Source supports advanced functions (*USB Power Delivery* and/or Alternate Modes), *USB PD* communication is required.

(b). Section 4.5.1.3.2, Page 155

From Text:

Referring to Figure 4-9, a port that behaves as a Sink has the following functional characteristics:

1. The Sink terminates both CC1 and CC2 to GND using pull-down resistors.
2. The Sink determines that a Source is attached by the presence of power on VBUS.
3. The Sink uses the CC pin pull-up characteristic to detect and establish the correct routing for the SuperSpeed USB data path.
4. The Sink can optionally monitor CC to detect an available higher USB Type-C Current from the Source. The Sink shall manage its load to stay within the detected Source current limit.
5. If the Sink supports advanced functions (USB Power Delivery and/or Alternate Modes), USB PD communication is required.

Figure 4-10 illustrates the functional model for CC1 and CC2 for a Sink that supports USB PD PR_Swap and supports USB PD VCONN_Swap prior to attach.

To Text:

Referring to Figure 4-9, a port that behaves as a Sink has the following functional characteristics:

1. The Sink terminates both CC1 and CC2 to GND using pull-down resistors.
2. The Sink determines that a Source is attached by the presence of power on VBUS.
3. The Sink uses the CC pin pull-up characteristic to detect and establish the correct routing for the SuperSpeed USB data path.
4. The Sink can optionally monitor CC to detect an available higher USB Type-C Current from the Source. The Sink shall manage its load to stay within the detected Source current limit.
5. The Sink can optionally clamp the voltage on either of its CC pins. The minimum clamping voltage shall be vCC-Clamp. The clamp is intended to protect the Sink circuitry associated with CC functionality.
6. If the Sink supports advanced functions (USB Power Delivery and/or Alternate Modes), USB PD communication is required.

Figure 4-10 illustrates the functional model for CC1 and CC2 for a Sink that supports USB PD PR_Swap and supports USB PD VCONN_Swap prior to attach.

(c). Section 4.11.3, Page 240

Add text in table 4-27:

Z-open SHALL only be evaluated below vCC-Clamp.

(c). Section 4.11.3, Page 240

Add text and table before table 4-28:

Table 4-xx Provides the clamping voltage that any port (Source, Sink or DRP) may clamp its CC pins to in order to protect from damage. The inclusion of clamping shall not impact the functionality when the CC pin is functioning as VCONN Source or Sink.

CC pin clamping voltage	Min voltage
vCC-Clamp	2.9V