

USB Type-C ENGINEERING CHANGE NOTICE

Title: SBU Termination Clarification

Applied to: USB Type-C Specification Release 2.3, Oct 2023

Brief description of the functional changes proposed:
<p>The existing requirement for SBU termination in Section 4.3 is potentially unclear to developers. Generally, most developers likely understand that it should be either an open circuit or have a weak pull-down when the SBUs are not otherwise being used (USB4 operation or an Alternate Mode operation) but the requirement as written seems to imply to some that the requirement only applies when in USB 3.2 and USB 2.0.</p> <p>This ECR intends to clarify the applicability of the termination requirement to all forms of implementations, whether they use SBU during data modes or not.</p>

Benefits as a result of the proposed changes:
<p>Only intends to clarify the spec, does not actually change the requirement as generally interpreted.</p>

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
<p>No impact.</p>

An analysis of the hardware implications:
<p>No impact unless existing hardware terminates SBU improperly.</p>

An analysis of the software implications:
<p>No impact.</p>

An analysis of the compliance testing implications:
<p>No impact.</p>

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Actual Change Requested

(a). Section 4.3, Page 144

From Text:

4.3 Sideband Use (SBU)

The Sideband Use pins (SBU1 and SBU2) are limited to the uses as defined by this specification and additional functionality defined in the **USB4** Specification. See Appendix E for use of the SBU pins in [Alternate Modes](#).

The SBU pins on a port **shall** either be open circuit or have a weak pull-down to ground no stronger than [zSBU Termination](#) when in **USB 3.2** or **USB 2.0**.

These pins are pre-wired in the standard USB Full-Featured Type-C cable as individual single-ended wires (SBU_A and SBU_B). Note that SBU1 and SBU2 are cross-connected in the cable.

When operating in **USB4**, these pins are used as the **USB4** Sideband Channel with SBU1 mapping to SBTX and SBU2 mapping to SBRX. SBTX and SBRX functional requirements are as defined in the **USB4** specification. When a port determines that the locally-inserted plug is flipped (i.e., CC1 is open, CC2 is terminated), the **USB4** specification (reference Sideband Channel Lane Reversal) dictates that the port flip the SBTX and SBRX mappings to SBU1 and SBU2 in order to assure proper sideband transmit-to-receive end-to-end operation.

To Text:

4.3 Sideband Use (SBU)

The Sideband Use pins (SBU1 and SBU2) are limited to the uses as defined by this specification and [including](#) additional functionality defined in the **USB4** Specification, [liquid detection, and Alternate Modes](#). See Appendix E for use of the SBU pins in [Alternate Modes](#).

[The SBU pins on a port that does not implement either USB4 or Alternate Modes shall either be open circuit or have a weak pull-down to ground no stronger than zSBU Termination.](#)

The SBU pins on a port [that implements either USB4 or an Alternate Mode that utilize the SBU pins shall](#) either be open circuit or have a weak pull-down to ground no stronger than [zSBU Termination](#) ~~when in USB 3.2 or USB 2.0 prior to completing USB4 or Alternate Mode entry.~~

[The SBU pins shall meet the USB Safe State electrical requirements \(see Table E-1\) when transitioning to or from liquid detection, open circuit or zSBU Termination, USB4 operation, or Alternate Modes.](#)

[Note: When SBU pins are used for liquid detection, an attached cable or port partner may introduce loading that interferes with the liquid detection method therefore, using SBU pins for liquid detection may only be practical in an unattached state.](#)

These pins are pre-wired in the standard USB Full-Featured Type-C cable as individual single-ended wires (SBU_A and SBU_B). Note that SBU1 and SBU2 are cross-connected in the cable.

When operating in **USB4**, these pins are used as the **USB4** Sideband Channel with SBU1 mapping to SBTX and SBU2 mapping to SBRX. SBTX and SBRX functional requirements are as defined in the **USB4** specification. When a port determines that the locally-inserted plug is flipped (i.e., CC1 is open, CC2 is terminated), the **USB4** specification (reference Sideband Channel Lane Reversal) dictates that the port flip the SBTX and SBRX mappings to SBU1 and SBU2 in order to assure proper sideband transmit-to-receive end-to-end operation.