

USB Type-C ENGINEERING CHANGE NOTICE

Title: High current, legacy connectors and removing BFSK
Applied to: USB Type-C Specification Release 1.1, April 3rd, 2015

Brief description of the functional changes:

Defining the high current connectors for Standard-A and Standard-B and Micro-B Remove the term PD to 5A plugs and receptacles Removing BFSK from the Type-C spec
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Benefits as a result of the changes:

There is no way to communicate PD between legacy connectors and Type-C connector. This required changes to the PD spec, that invalidated the reference in the Type-C spec makes to the PD spec. This change replaces the references by providing the required information in the Type-C spec.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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No change. The intent remains the same, this just makes it clearer.

An analysis of the hardware implications:
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No impact on hardware, or tooling

An analysis of the software implications:
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None

An analysis of the compliance testing implications:
--

Add verification of 3A and 5A capability using legacy cables and mating connectors as described in paragraph 3.1.1
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Actual Change

Remove references to BFSK:

Table of contents, page 5:

4.6.3 Supporting USB PD **BFSK** in Addition to USB PD BMC 152

Terms and abbreviations, page 15:

BFSK	Binary Frequency Shift Keying used for USB PD communication over V_{BUS} .
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Second to the last paragraph of 2.2, page 20

Where implementations of USB Type-C to USB legacy cables are required to support [USB PD](#) BFSK-based communications, they shall do so by incorporating the required [USB PD](#) plug, incorporating the appropriate V_{BUS} to ground decoupling capacitance, ensuring the V_{BUS} wire is impedance controlled as specified in [USB PD](#), and complying with the cable requirements for the legacy connector end of the cable. USB Type-C to USB legacy adapters do not support [USB PD](#) BFSK-based communications.

The last paragraph of 2.3.5, page 22

The USB Type-C connector solution provides a new path for [USB PD](#) communications. Rather than superimposing a Binary Frequency Shift Keying (BFSK) on V_{BUS} , the [USB PD](#) Bi-phase Mark Coded (BMC) communications are carried on the CC wire. In USB Type-C to legacy applications, the use of [USB PD](#) BFSK is allowed.

The last paragraph of paragraph 3.5, page 58

For all legacy cable assemblies that support [USB PD](#) BFSK usage, the legacy plug shall be the [USB PD](#) version of the plug and appropriate [USB PD](#) cable marking is required.

Paragraph 4.5.3.2.2, page 146

USB Type-C-based products that support [USB PD](#) **BFSK** are responsible for protecting the CC inputs from voltages greater than 5 V – see Section 4.6.2.4.

Paragraph 4.5.3.2.4, page 148

USB Type-C-based products that support [USB PD](#) **BFSK** are responsible for protecting the CC inputs from voltages greater than 5 V – see Section 4.6.2.4.

Paragraph 4.6.3, page 152 & 153

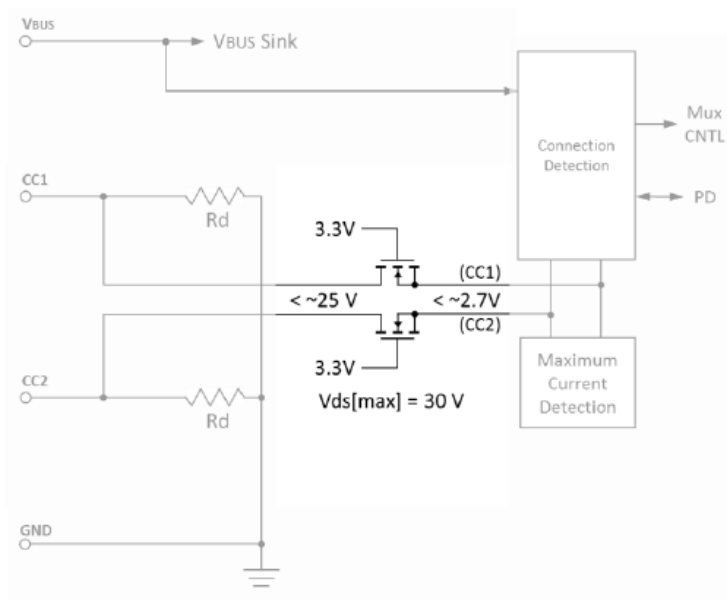
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4.6.3 Supporting USB PD BFSK in Addition to USB PD BMC

For USB Type-C to legacy cables and adapters, two situations exist where [USB PD](#) BFSK may be used to negotiate greater than 5 V: USB Type-C to USB Standard-A PD cable and USB Type-C to USB Micro-B receptacle adapter. In both of these cases, [Rp](#) may be pulled up to a value higher than 5 V because V_{BUS} may range up to 20 V for a [USB PD](#) negotiated contract. USB Type-C-based products that support [USB PD](#) BFSK and request a voltage greater than 5 V shall protect the CC inputs from termination voltages higher than 5 V as some adapters may present an [Rp](#) pulled up to V_{BUS} that may be as high as 20 V.

Figure 4-33 illustrates an example of protecting the CC input from a higher voltage and does so in a manner that does not interfere with *USB PD* BMC communication.

Figure 4-33 Example implementation of CC input protection in a UFP



The [USB PD](#) Binary Frequency Shift Keying (BFSK) on V_{BUS} may in addition be used to communicate with legacy [USB PD](#) products. [USB PD](#) BFSK shall only be used if [USB PD](#) BMC fails to establish PD communication, i.e. fails to receive a [USB PD](#) GoodCRC message in response to a [USB PD](#) Capabilities message following two hard resets. USB Type-C-based UFPs that support [USB PD](#) BFSK and want to request more than 1.5 A shall supply V_{CONN} and confirm that the cable is [electronically marked](#) and capable of the desired current level (see Section 5.2.2).

Remove the term “PD” from table 3-2, page 25:

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Table 3-2 USB Type-C Legacy Cable Assemblies

Cable Ref	Plug 1 ⁴	Plug 2 ⁴	USB Version	Cable Length	Current Rating	USB Type-C Electronically Marked ³
AC2-3	USB 2.0 Standard-A	USB 2.0 Type-C ¹	USB 2.0	≤ 4 m	3 A	Optional
AC2-5	USB 2.0 PD Standard-A				5 A	Required
AC3G2-3	USB 3.1 Standard-A	USB Full-Featured Type-C ¹	USB 3.1 Gen2	≤ 1 m	3 A	Optional
AC3G2-5	USB 3.1 PD Standard-A				5 A	Required
CB2-3	USB 2.0 Type-C ²	USB 2.0 Standard-B	USB 2.0	≤ 4 m	3 A	Optional
CB2-5		USB 2.0 PD Standard-B			5 A	Required
CB3G2-3	USB Full-Featured Type-C ²	USB 3.1 Standard-B	USB 3.1 Gen2	≤ 1 m	3 A	Optional
CB3G2-5		USB 3.1 PD Standard-B			5 A	Required
CmB2	USB 2.0 Type-C ²	USB 2.0 Mini-B	USB 2.0	≤ 4 m	500 mA	Optional
CμB2-3	USB 2.0 Type-C ²	USB 2.0 PD Micro-B	USB 2.0	≤ 2 m	3 A	Optional
CμB3G2-3	USB Full-Featured Type-C ²	USB 3.1 PD Micro-B	USB 3.1 Gen2	≤ 1 m	3 A	Optional

Change note 4 for table 3-2 from page 25:

- Legacy USB plugs used in the USB Type-C cable assemblies shall comply with the low level contact resistance as specified in [USB PD](#) 3.6.1 for 3A or 5A cables as appropriate. Legacy USB plugs shall comply with the contact current rating as specified in [USB PD](#) 3.6.5.1 for 3A current and 3.6.5.2 for 5A current. For USB Type-C to [USB PD](#)-versions of USB Standard-B and USB Micro-B plugs, [USB PD](#) passive marking (cPlug) on the ID pin of the B plug is not required.

To:

- Refer to paragraph 3.1.1.1 for the mated resistance and temperature rise required for the legacy plugs

Remove the column labeled “USB Legacy Receptacle Type” from table 3-2, page 26 :

Table 3-3 USB Type-C Legacy Adapter Assemblies

Adapter Ref	Plug	Receptacle ¹	USB Version	Cable Length	Current Rating	USB Legacy Receptacle Type	USB Type-C Electronically Marked
CμBR2-3	USB 2.0 Type-C ¹	USB 2.0 Micro-B	USB 2.0	≤ 0.15 m	3 A	PD Receptacle Not Allowed	Optional
CAR3G1-3	USB Full-Featured Type-C ²	USB 3.1 Standard-A	USB 3.1 Gen1	≤ 0.15 m	3 A	PD Receptacle Not Allowed	Optional

Change Note 3 of table 3-3 on page 26 from:

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3. Legacy USB receptacles shall to comply with the low level contact resistance as specified in [USB PD](#) 3.6.1 for 3A. Legacy USB receptacles shall comply with the contact current rating specified in [USB PD](#) 3.6.5.1 measured for 3A current.

To:

3. Refer to paragraph 3.1.1.1 for the mated resistance and temperature rise required for the legacy receptacles.

In paragraph 4.5.3.2.1, add “(See Table 4-14)” to page 145, at the end of the statement:

The following describes the behavior when a DFP is connected to a legacy device adapter that has an [Rd](#) to ground so as to mimic the behavior of a UFP.

In paragraph 4.5.3.2.1, add “(See Table 4-14)” to page 147, at the end of the statement:

The following describes the behavior when a DRP is connected to a legacy device adapter that has an [Rd](#) to ground so as to mimic the behavior of a UFP.

Add a paragraph after paragraph 3.1.1, on page 24, describing legacy receptacles used in adapter cables

3.1.1.1 High Current Legacy Connectors for use ONLY in USB Type-C, Legacy cables
As defined in the following specifications:

- a. Standard-A & Standard-B Plugs as defined in USB2.0
- b. Standard-A & Standard-B Plug as defined in USB3.1
- c. Standard-A & Standard-B Receptacles as defined in USB2.0
- d. Standard-A & Standard-B Receptacles as defined in USB3.1
- e. Micro-B Plugs & Micro-B Receptacles as defined in the USB2.0 Micro Spec
- f. Micro-B Plugs & Micro-B Receptacles as defined in USB3.1

3.1.1.2 Change the contact material in the plugs and receptacles to achieve the following Low Level Contact Resistance (EIA 364-23B)

- 20 milliohm (Max) initial for VBus and GND contacts
- Maximum change (delta) of +10 Milliohms fter envoronmental stresses

3.1.1.3 Contact Current Rating

3.1.1.3.1 Micro-B connector Mated Pair (EIA 364-70, Method 2)

When a current of 3.0A is applied to the VBus pin and its corresponding GND pin (i.e., pin 1 and 5 of a Micro-B connector), the delta temperature shall not exceed +30°C at any point on the connectors under test, when measured at an ambient temperature of 25°C.

3.1.1.3.2 Standard-A and Standard -B connectors Mated Pair (EIA 364-70, Method 2)

When a current of 5.0A is applied to the VBus pin and its corresponding GND pin (i.e., pin 1 and 4 in a Standard-A Connector or Standard-B Connector), the delta temperature shall not exceed +30°C at any point on the connectors under test, when measured at an ambient temperature of 25°C.

Note: The Standard-A and Standard-B connectors, rated at 5amps, are used in the 3A cables