

USB Power Delivery ENGINEERING CHANGE NOTICE

Title: Require Sinks support Sink Capabilities Extended Applied to: USB Power Delivery Specification Revision 3.0 Version 1.2

Brief description of the functional changes proposed:

As the USB PD charging eco system grows more multi-port chargers and source devices are appearing in the market place. Many of these are shared capacity and/or sources that have limited power capability (e.g., tablets and notebooks).

In order to provide these Sources more information about the Sink's power requirements, the information returned in the Sink_Capabilities_Message is critical as it provides: 1) the minimum power the Sink requires to operate and 2) the power the Sink would like to support its operation and charge its battery as well. The information can be used by the Source to first decide if it has sufficient power to operate the device and secondly how much of its power it is willing to provide to charge the Sink.

Since Sinks with a battery(s) are already required to support Battery_Status and Battery_Capability, Source has that information to Sink's battery's SOC and can make more informed decisions when its ability to supply power is less than the demand. Note this applies to both single port systems (e.g. tablet/notebook) as well as multi-port share capacity chargers. .

Benefits as a result of the proposed changes:

This change will provide sufficient information to the Source about the Sink's power requirements to ensure that it knows the minimum power the Sink required to operate. It also provides information to better manage power that is shared amongst several ports.

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:

Minimal. Support for an additional message and a few bytes of static rom to return the additional data.

An analysis of the software implications:

None.

An analysis of the compliance testing implications:

Minimal. The compliance tests will need to be updated to reflect that this previously optional normative requirement is now normative.

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Actual Change Requested

(a). Section 6.12.1, Table 6-65, Page 226

From Text:

Table 6-65 Applicability of Control Messages

Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug	VPD ¹³
Transmitted Message						
<i>Accept</i>	N	N			N	N
<i>DR_Swap</i>	O	O		N	NA	NA
<i>FR_Swap</i>	NA	NA	R		NA	NA
<i>Get_Country_Codes</i>	CN ¹⁰ /NA	CN ¹⁰ /NA			NA	NA
<i>Get_PPS_Status</i>	NA	CN ⁹			NA	NA
<i>Get_Sink_Cap</i>	R	NA	N		NA	NA
<i>Get_Sink_Cap_Extended</i>	R	NA	R		NA	NA
<i>Get_Source_Cap</i>	NA	R	N		NA	NA
<i>Get_Source_Cap_Extended</i>	NA	R	R		NA	NA
<i>Get_Status</i>	R	R			NA	NA
<i>GoodCRC</i>	N	N			N	N
<i>GotoMin</i>	CN ¹ /O	NA			NA	NA
<i>Not_Supported</i>	N	N			N	NA
<i>Ping</i>	O	NA			NA	NA
<i>PR_Swap</i>	NA	NA	N		NA	NA
<i>PS_RDY</i>	N	CN ⁴ /NA	N		NA	NA
<i>Reject</i>	N	NA	O	O	NA	NA
<i>Soft_Reset</i>	N	N			NA	NA
<i>VCONN_Swap</i>	R	R			NA	NA
<i>Wait</i>	CN ² /O	NA	O	O	NA	NA
Received Message						
<i>Accept</i>	N	N	N	N	I	I
<i>DR_Swap</i>	O/NS	O/NS		N	I	I
<i>FR_Swap</i>	NS	NS	CN ⁷ /NS		I	I
<i>Get_Country_Codes</i>	CN ¹⁰ /NS	CN ¹⁰ /NS			I	I
<i>Get_PPS_Status</i>	CN ⁹ /NS	NS			I	I
<i>Get_Sink_Cap</i>	NS	N	N		I	I
<i>Get_Sink_Cap_Extended</i>	NS	CN ¹¹ /NS	CN ¹¹ /NS		I	I
<i>Get_Source_Cap</i>	N	NS	N		I	I
<i>Get_Source_Cap_Extended</i>	CN ⁵ /NS	NS	CN ⁵ /NS		I	I
<i>Get_Status</i>	CN ⁶ /NS	CN ⁶ /NS	CN ⁶ /NS		CN ¹² /I	I

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Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug	VPD ¹³
<i>GoodCRC</i>	N	N			N	N
<i>GotoMin</i>	NS	R ³			I	I
<i>Not_Supported</i>	N	N			CN ¹² /I	I
<i>Ping</i>	NS	I			I	I
<i>PR_Swap</i>	NS	NS	N		I	I
<i>PS_RDY</i>	CN ⁴ /NS	N	N		I	I
<i>Reject</i>	CN ⁸ /NS	N	N	N	I	I
<i>Soft_Reset</i>	N	N			N	N
<i>VCONN_Swap</i>	CN ⁴ / NS	CN ⁴ / NS			I	I
<i>Wait</i>	CN ⁸ /NS	N	N	N	I	I

Note 1: **Shall** be supported by a Hub with multiple Downstream Ports. **Should** be supported by a Host with multiple Downstream Ports.

Note 2: **Shall** be supported when transmission of *GotoMin* Messages is supported.

Note 3: **Should** be supported by Sinks which use PD power for charging.

Note 4: **Shall** be supported by any Port that can supply VCONN.

Note 5: **Shall** be supported products that support the *Source_Capabilities_Extended* Message.

Note 6: **Shall** be supported by Sources that support the *Alert* Message.

Note 7: **Shall** be supported when the Fast Role Swap signal is supported.

Note 8: **Shall** be supported when *VCONN_Swap* is supported.

Note 9: **Shall** be supported when PPS is supported.

Note 10: **Shall** be supported when required by a country authority.

Note 11: **Shall** be supported by products that support the *Sink_Capabilities_Extended* Message.

Note 12: **Shall** be supported by Active Cables.

Note 13: VPD includes CT-VPDs when not Connected to a Charger. PD communication with a CT-VPD **Shall** only take place when not Connected to a Charger.

To Text:

Table 6-65 Applicability of Control Messages

Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug
Transmitted Message					
<i>Accept</i>	N	N			N
<i>DR_Swap</i>	O	O		N	NA
<i>FR_Swap</i>	NA	NA	R		NA
<i>Get_Country_Codes</i>	CN ¹⁰ /NA	CN ¹⁰ /NA			NA
<i>Get_PPS_Status</i>	NA	CN ⁹			NA
<i>Get_Sink_Cap</i>	R	NA	N		NA
<i>Get_Sink_Cap_Extended</i>	R	NA	R		NA
<i>Get_Source_Cap</i>	NA	R	N		NA
<i>Get_Source_Cap_Extended</i>	NA	R	R		NA
<i>Get_Status</i>	R	R			NA

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Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug
<i>GoodCRC</i>	N	N			N
<i>GotoMin</i>	CN ¹ /O	NA			NA
<i>Not_Supported</i>	N	N			N
<i>Ping</i>	O	NA			NA
<i>PR_Swap</i>	NA	NA	N		NA
<i>PS_RDY</i>	N	CN ⁴ /NA	N		NA
<i>Reject</i>	N	NA	O	O	NA
<i>Soft_Reset</i>	N	N			NA
<i>VCONN_Swap</i>	R	R			NA
<i>Wait</i>	CN ² /O	NA	O	O	NA
Received Message					
<i>Accept</i>	N	N	N	N	I
<i>DR_Swap</i>	O/NS	O/NS		N	I
<i>FR_Swap</i>	NS	NS	CN ⁷ /NS		I
<i>Get_Country_Codes</i>	CN ¹⁰ /NS	CN ¹⁰ /NS			I
<i>Get_PPS_Status</i>	CN ⁹ /NS	NS			I
<i>Get_Sink_Cap</i>	NS	N	N		I
<i>Get_Sink_Cap_Extended</i>	NS	N	N		I
<i>Get_Source_Cap</i>	N	NS	N		I
<i>Get_Source_Cap_Extended</i>	CN ⁵ /NS	NS	CN ⁵ /NS		I
<i>Get_Status</i>	CN ⁶ /NS	CN ⁶ /NS	CN ⁶ /NS		CN ¹¹ /I
<i>GoodCRC</i>	N	N			N
<i>GotoMin</i>	NS	R ³			I
<i>Not_Supported</i>	N	N			N
<i>Ping</i>	NS	I			I
<i>PR_Swap</i>	NS	NS	N		I
<i>PS_RDY</i>	CN ⁴ /NS	N	N		I
<i>Reject</i>	CN ⁸ /NS	N	N	N	I
<i>Soft_Reset</i>	N	N			N
<i>VCONN_Swap</i>	CN ⁴ / NS	CN ⁴ / NS			I
<i>Wait</i>	CN ⁸ /NS	N	N	N	I

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Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug
<p>Note 1: Shall be supported by a Hub with multiple Downstream Ports. Should be supported by a Host with multiple Downstream Ports.</p> <p>Note 2: Shall be supported when transmission of GotoMin Messages is supported.</p> <p>Note 3: Should be supported by Sinks which use PD power for charging.</p> <p>Note 4: Shall be supported by any Port that can supply VCONN.</p> <p>Note 5: Shall be supported products that support the Source_Capabilities_Extended Message.</p> <p>Note 6: Shall be supported by Sources that support the Alert Message.</p> <p>Note 7: Shall be supported when the Fast Role Swap signal is supported.</p> <p>Note 8: Shall be supported when VCONN_Swap is supported.</p> <p>Note 9: Shall be supported when PPS is supported.</p> <p>Note 10: Shall be supported when required by a country authority.</p> <p>Note 11: Shall be supported by products that support the Sink_Capabilities_Extended Message.</p> <p>Note 12: Shall be supported by Active Cables</p>					

(b). Section 6.12.3, Table 6-67, Page 228

From Text:

Table 6-67 Applicability of Extended Messages

Message Type	Source	Sink	Dual-Role Power	Cable Plug	VPD ¹³
Transmitted Message					
Battery_Capabilities	CN ¹ /NA	CN ¹ /NA		NA	NA
Country_Codes	CN ¹⁰ /NA	CN ¹⁰ /NA		NA	NA
Country_Info	CN ¹⁰ /NA	CN ¹⁰ /NA		NA	NA
Firmware_Update_Request	CN ⁷ /NA	CN ⁷ /NA		NA	NA
Firmware_Update_Response	CN ⁷ /NA	CN ⁷ /NA		CN ⁷ /NA	NA
Get_Battery_Cap	R	R		NA	NA
Get_Battery_Status	R	R		NA	NA
Get_Manufacturer_Info	R	R		NA	NA
Manufacturer_Info	R	R		R	NA
PPS_Status	CN ⁸ /NA	NA		NA	NA
Security_Request	CN ⁶ /NA	CN ⁶ /NA		NA	NA
Security_Response	CN ⁶ /NA	CN ⁶ /NA		CN ⁶ /NA	NA
Sink_Capabilities_Extended	NA	R	R	NA	NA
Source_Capabilities_Extended	R	NA	R	NA	NA
Status	R	R	R	CN ¹² /NA	NA
Received Message					
Battery_Capabilities	CN ⁴ /NS	CN ⁴ /NS	CN ⁴ /NS		I
Country_Codes	CN ¹⁰ /NS	CN ¹⁰ /NS	CN ¹⁰ /NS		I
Country_Info	CN ¹⁰ /NS	CN ¹⁰ /NS	CN ¹⁰ /NS		I
Firmware_Update_Request	CN ⁷ /NS	CN ⁷ /NS	CN ⁷ /NS		I

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Message Type	Source	Sink	Dual-Role Power	Cable Plug	VPD ¹³
<i>Firmware_Update_Response</i>	CN ⁷ /NS	CN ⁷ /NS	CN ⁷ /NS		I
<i>Get_Battery_Cap</i>	CN ¹ /NS	CN ¹ /NS	CN ¹ /NS		I
<i>Get_Battery_Status</i>	CN ¹ /NS	CN ¹ /NS	CN ¹ /NS		I
<i>Get_Manufacturer_Info</i>	R/NS	R/NS	R/NS		I
<i>Manufacturer_Info</i>	CN ⁵ /NS	CN ⁵ /NS	CN ⁵ /NS		I
<i>PPS_Status</i>	NS	NS	CN ⁹ /NS		I
<i>Security_Request</i>	CN ⁶ /NS	CN ⁶ /NS	CN ⁶ /NS		I
<i>Security_Response</i>	CN ⁶ /NS	CN ⁶ /NS	CN ⁶ /NS		I
<i>Sink_Capabilities_Extended</i>	CN ¹¹ /NS	CN ¹¹ /NS	NS	CN ¹¹ /NS	I
<i>Source_Capabilities_Extended</i>	NS	NS	CN ² /NS	CN ² /NS	I
<i>Status</i>	CN ³ /NS	CN ³ /NS	CN ³ /NS		I

Note 1: **Shall** be supported by products that contain batteries.

Note 2: **Shall** be supported by products that can transmit the *Get_Source_Cap_Extended* Message.

Note 3: **Shall** be supported by products that can transmit the *Get_Status* Message.

Note 4: **Shall** be supported by products that can transmit the *Get_Battery_Cap* Message.

Note 5: **Shall** be supported by products that can transmit the *Get_Manufacturer_Info* Message

Note 6: **Shall** be supported by products that support USB security communication as defined in *[USBTypeCAuthentication 1.0]*

Note 7: **Shall** be supported by products that support USB firmware update communication as defined in *[USBPD FirmwareUpdate 1.0]*

Note 8: **Shall** be supported when PPS is supported.

Note 9: **Shall** be supported by products that can transmit the *Get_PPS_Status*.

Note 10: **Shall** be supported when required by a country authority.

Note 11: **Shall** be supported by products that can transmit the *Get_Sink_Cap_Extended* Message.

Note 12: **Shall** be supported by Active Cables.

Note 13: VPD includes CT-VPDs when not Connected to a Charger. PD communication with a CT-VPD **Shall** only take place when not Connected to a Charger.

To Text:

Table 6-67 Applicability of Extended Messages

Message Type	Source	Sink	Dual-Role Power	Cable Plug
Transmitted Message				
<i>Battery_Capabilities</i>	CN ¹ /NA	CN ¹ /NA		NA
<i>Country_Codes</i>	CN ¹⁰ /NA	CN ¹⁰ /NA		NA
<i>Country_Info</i>	CN ¹⁰ /NA	CN ¹⁰ /NA		NA
<i>Firmware_Update_Request</i>	CN ⁷ /NA	CN ⁷ /NA		NA
<i>Firmware_Update_Response</i>	CN ⁷ /NA	CN ⁷ /NA		CN ⁷ /NA
<i>Get_Battery_Cap</i>	R	R		NA
<i>Get_Battery_Status</i>	R	R		NA
<i>Get_Manufacturer_Info</i>	R	R		NA

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Message Type	Source	Sink	Dual-Role Power	Cable Plug
<i>Manufacturer_Info</i>	R	R		R
<i>PPS_Status</i>	CN ⁸ /NA	NA		NA
<i>Security_Request</i>	CN ⁶ /NA	CN ⁶ /NA		NA
<i>Security_Response</i>	CN ⁶ /NA	CN ⁶ /NA		CN ⁶ /NA
<i>Sink_Capabilities_Extended</i>	NA	N	N	NA
<i>Source_Capabilities_Extended</i>	R	NA	R	NA
<i>Status</i>	R	R	R	CN ¹² /NA
Received Message				
<i>Battery_Capabilities</i>	CN ⁴ /NS	CN ⁴ /NS		I
<i>Country_Codes</i>	CN ¹⁰ /NS	CN ¹⁰ /NS		I
<i>Country_Info</i>	CN ¹⁰ /NS	CN ¹⁰ /NS		I
<i>Firmware_Update_Request</i>	CN ⁷ /NS	CN ⁷ /NS		CN ⁷ /I
<i>Firmware_Update_Response</i>	CN ⁷ /NS	CN ⁷ /NS		I
<i>Get_Battery_Cap</i>	CN ¹ /NS	CN ¹ /NS		I
<i>Get_Battery_Status</i>	CN ¹ /NS	CN ¹ /NS		I
<i>Get_Manufacturer_Info</i>	R/NS	R/NS		R
<i>Manufacturer_Info</i>	CN ⁵ /NS	CN ⁵ /NS		I
<i>PPS_Status</i>	NS	CN ⁹ /NS		I
<i>Security_Request</i>	CN ⁶ /NS	CN ⁶ /NS		CN ⁶ /I
<i>Security_Response</i>	CN ⁶ /NS	CN ⁶ /NS		I
<i>Sink_Capabilities_Extended</i>	CN ¹¹ /NS	NS	CN ¹¹ /NS	I
<i>Source_Capabilities_Extended</i>	NS	CN ² /NS	CN ² /NS	I
<i>Status</i>	CN ³ /NS	CN ³ /NS		I
<p>Note 1: Shall be supported by products that contain batteries.</p> <p>Note 2: Shall be supported by products that can transmit the <i>Get_Source_Cap_Extended</i> Message.</p> <p>Note 3: Shall be supported by products that can transmit the <i>Get_Status</i> Message.</p> <p>Note 4: Shall be supported by products that can transmit the <i>Get_Battery_Cap</i> Message.</p> <p>Note 5: Shall be supported by products that can transmit the <i>Get_Manufacturer_Info</i> Message</p> <p>Note 6: Shall be supported by products that support USB security communication as defined in [USBTypeCAuthentication 1.0]</p> <p>Note 7: Shall be supported by products that support USB firmware update communication as defined in [USBPDFirmwareUpdate 1.0]</p> <p>Note 8: Shall be supported when PPS is supported.</p> <p>Note 9: Shall be supported by products that can transmit the <i>Get_PPS_Status</i>.</p> <p>Note 10: Shall be supported when required by a country authority.</p> <p>Note 11: Shall be supported by products that can transmit the <i>Get_Sink_Cap_Extended</i> Message.</p> <p>Note 12: Shall be supported by Active Cables</p>				