USB Power Delivery ENGINEERING CHANGE NOTICE

Title: Remove UFP VDO2
Applied to: USB Power Delivery Specification Revision 3.0 Version 2.0

Brief description of the functional changes proposed:
The information in this VDO in part duplicates the information in the Sink_Capabilities_Extended message. If in fact separate information needed for power consumption for USB 3.2 versus USB4 operation is really needed, then it is better placed as an addition it to the Sink_Capabilities_Extended message.

Benefits as a result of the proposed changes:
Removed duplicated information and will allow a dual-role data product that supports an alternate mode to report in its response to the Discover Identity message the AMA VDO, UFP VDO, and DFP VDO in the three VDO slots of the Discover Identity response.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
Hopefully we have caught this before any USB4 products are released that support the UFP VDO2. If not, we have purposefully padded the object in slot 2 with a reserved VDO of all 0s, so that the DFP VDO will end up in Slot 3, where the prior version of the spec positioned it. This should preserve backward compatibility for initiators that are looking to read the DFP VDO from a DRD.

An analysis of the hardware implications:
None.

An analysis of the software implications:

An analysis of the compliance testing implications:

USB Power Delivery ENGINEERING CHANGE NOTICE

Actual Change Requested

(a). 6.4.4.3.1 Discover Identity

From:

If the product is a DRD both a Product Type (UFP) and a Product Type (DFP) are declared in the ID Header. These products ***Shall*** set both the PDUSB Host and PDUSB Peripheral bits in the ID Header and ***Shall*** return Product Type VDOs for both the PDUSB Peripheral and PDUSB Host beginning with the UFP VDOs followed by the DFP VDO as shown in Figure 6-16.

Figure 6-16 Discover Identity Command response for a DRD

Header No. of Data Objects = 7	VDM Header	ID Header VDO	Cert Stat VDO	Product VDO	Product Type VDO(s)		
					UFP1	UFP2	DFP

To:

If the product is a DRD both a Product Type (UFP) and a Product Type (DFP) are declared in the ID Header. These products ***Shall*** set both the PDUSB Host and PDUSB Peripheral bits in the ID Header and ***Shall*** return Product Type VDOs for both UFP and DFP beginning with the UFP VDO, then by a 32-bit Pad Object (defined as all '0's), followed by the DFP VDO as shown in Figure 6-16.

Figure 6-16 Discover Identity Command response for a DRD

Header No. of Data Objects = 7	VDM Header	ID Header VDO	Cert Stat VDO	Product VDO	Product Type VDO(s)		
					UFP	Pad	DFP

(b). Section 6.4.4.3.1.4 UFP VDOs
From:

UFP VDOs

The UFP VDOs defined in this section ***Shall*** be returned by Ports capable of operating as a UFP including traditional USB peripherals, USB hub's upstream Port and DRD capable host Ports. The UFP VDOs defined in this section ***Shall*** be sent when the Product Type (UFP) field in the ID Header VDO is given as a PDUSB Peripheral or PDUSB Hub. Table 6-35 and 6-36 define the UFP VDOs that ***Shall*** be sent based on the Product Type.

A ***[USB4]*** UFP ***Shall*** support the Structured VDM ***Discover Identity*** Command.

Table 6-35 UFP VDO 1

<table>
<tr><th>Bit(s)</th><th>Field</th><th>Description</th></tr>
<tr><td>B31…29</td><td>UFP VDO Version</td><td>Version Number of the VDO (not this specification Version):
• Version 1.1 = 001b
Values 010b…111b are ***Reserved*** and ***Shall Not*** be used</td></tr>
<tr><td>B28</td><td>***Reserved***</td><td>***Shall*** be set to zero.</td></tr>
<tr><td>B27…24</td><td>Device Capability</td><td><table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>***[USB 2.0]*** Device Capable</td></tr><tr><td>1</td><td>***[USB 2.0]*** Device Capable (Billboard only)</td></tr><tr><td>2</td><td>***[USB 3.2]*** Device Capable</td></tr><tr><td>3</td><td>***[USB4]*** Device Capable</td></tr></table></td></tr>
<tr><td>B23…22</td><td>Connector Type</td><td>00b = ***Reserved***, ***Shall Not*** be used
01b = ***Reserved***, ***Shall Not*** be used
10b = USB Type-C Receptacle
11b = USB Type-C Captive Plug</td></tr>
<tr><td>B21…6</td><td>***Reserved***</td><td>***Shall*** be set to zero.</td></tr>
<tr><td>B5…3</td><td>Alternate Modes</td><td><table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>***Supports [TBT3] Alternate Mode***</td></tr><tr><td>1</td><td>Supports Alternate Modes that reconfigure the signals on the ***[USB Type-C 2.0]*** connector – except for ***[TBT3]***.</td></tr><tr><td>2</td><td>***Supports Alternate Modes that do not reconfigure the signals on the [USB Type-C 2.0] connector***</td></tr></table></td></tr>
<tr><td>B2…0</td><td>USB Highest Speed</td><td>000b = ***[USB 2.0]*** only, no SuperSpeed support
001b = ***[USB 3.2]*** Gen1
010b = ***[USB 3.2]***/***[USB4]*** Gen2
011b = ***[USB4]*** Gen3
100b…111b = ***Reserved***, ***Shall Not*** be used</td></tr>
</table>

To:

UFP VDO~~s~~

The UFP VDO~~s~~ defined in this section ***Shall*** be returned by Ports capable of operating as a UFP including traditional USB peripherals, USB hub's upstream Port and DRD capable host Ports. The UFP VDO~~s~~ defined in this section ***Shall*** be sent when the Product Type (UFP) field in the ID Header VDO is given as a PDUSB Peripheral or PDUSB Hub. Table 6-35 ~~and 6-36~~ define~~s~~ the UFP VDO~~s~~ that ***Shall*** be sent based on the Product Type.

A ***[USB4]*** UFP ***Shall*** support the Structured VDM ***Discover Identity*** Command.

Table 6-35 UFP VDO ~~1~~

<table>
<tr><th>Bit(s)</th><th>Field</th><th>Description</th></tr>
<tr><td>B31…29</td><td>UFP VDO Version</td><td>Version Number of the VDO (not this specification Version):
• Version 1.2 = 010b
Values 011b…111b are Reserved and Shall Not be used</td></tr>
<tr><td>B28</td><td>Reserved</td><td>Shall be set to zero.</td></tr>
<tr><td>B27…24</td><td>Device Capability</td><td><table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>[USB 2.0] Device Capable</td></tr><tr><td>1</td><td>[USB 2.0] Device Capable (Billboard only)</td></tr><tr><td>2</td><td>[USB 3.2] Device Capable</td></tr><tr><td>3</td><td>[USB4] Device Capable</td></tr></table></td></tr>
<tr><td>B23…22</td><td>Connector Type</td><td>00b = Reserved, Shall Not be used
01b = Reserved, Shall Not be used
10b = USB Type-C Receptacle
11b = USB Type-C Captive Plug</td></tr>
<tr><td>B21…6</td><td>Reserved</td><td>Shall be set to zero.</td></tr>
<tr><td>B5…3</td><td>Alternate Modes</td><td><table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>Supports [TBT3] Alternate Mode</td></tr><tr><td>1</td><td>Supports Alternate Modes that reconfigure the signals on the [USB Type-C 2.0] connector – except for [TBT3].</td></tr><tr><td>2</td><td>Supports Alternate Modes that do not reconfigure the signals on the [USB Type-C 2.0] connector</td></tr></table></td></tr>
<tr><td>B2…0</td><td>USB Highest Speed</td><td>000b = [USB 2.0] only, no SuperSpeed support
001b = [USB 3.2] Gen1
010b = [USB 3.2]/[USB4] Gen2
011b = [USB4] Gen3
100b…111b = Reserved, Shall Not be used</td></tr>
</table>

Table 6-36 UFP VDO 2

Bit(s)	Field	Description
B31…30	***Reserved***	***Shall*** be set to zero.
B29…23	USB4 Min Power	Minimum power in Watts required to function in ***[USB4]*** operation.
B22…16	USB4 Max Power	Power in Watts required for full functionality excluding any power required for battery charging or for redistribution in ***[USB4]*** operation.
B15…14	***Reserved***	***Shall*** be set to zero.
B13…7	USB3 Min Power	Minimum power in Watts required to function in ***[USB 3.2]*** operation.
B6…0	USB3 Max Power	Power in Watts required for full functionality excluding any power required for battery charging or for redistribution in ***[USB 3.2]*** operation.

1.1.1.1.1.1.1 USB4 Min Power Field

The USB4 Min Power field ***Shall*** contain the minimum amount of power, rounded-up the next integer value, a device operating in ***[USB4]*** needs to function. Minimally at this power level the device can be enumerated and at least one of its functions must operate although this may be at reduced performance.

1.1.1.1.1.1.2 USB4 Max Power Field

The USB4 Max Power field ***Shall*** contain the amount of power, rounded-up the next integer value, a device operating in ***[USB4]*** needs to be fully functional at maximum performance. However, this does not include any additional power required for charging a battery or for redistribution such as using some of the power to supply power to another port on a hub.

1.1.1.1.1.1.3 USB3 Min Power Field

The USB3 Min Power field ***Shall*** contain the minimum amount of power rounded-up the next integer value a device operating in ***[USB 3.2]*** needs to function. Minimally at this power level the device can be enumerated and at least one of its functions must operate although this may be at reduced performance.

1.1.1.1.1.1.4 USB3 Max Power Field

The USB3 Max Power field ***Shall*** contain the amount of power a device, rounded-up the next integer value, operating in ***[USB 3.2]*** needs to be fully functional at maximum performance. However, this does not include any additional power required for charging a battery or for redistribution such as using some of the power to supply power to another port on a hub.