USB Power Delivery ENGINEERING CHANGE NOTICE

Title: SOP vs SOP' Product Type Clarification
Applied to: USB Power Delivery Specification Revision 3.0 Version 2.0

Brief description of the functional changes proposed:
The Product Type field has overlapping values for UFPs and Cable Plugs. This change makes it clear that the field should be decoded based on whether the message is sent over SOP or SOP' while moving VPD into the SOP' group.

Benefits as a result of the proposed changes:
The change ensures that DFPs will properly recognize Discover Identity responses from VPDs.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
There should be no negative repercussions. It is likely that vendors with knowledge of how VPDs operate will already have been decoding the Product Type field in this manner.

An analysis of the hardware implications:

An analysis of the software implications:

An analysis of the compliance testing implications:

USB Power Delivery ENGINEERING CHANGE NOTICE

Actual Change Requested

(a). Section 6.4.4.3.1, Page 140

From Text:

The ***Discover Identity*** Command is provided to enable an Initiator to identify its Port Partner and for an Initiator (VCONN Source) to identify the Responder (Cable Plug). The ***Discover Identity*** Command is also used to determine whether a Cable Plug or VPD is PD-Capable by looking for a ***GoodCRC*** Message Response.

The ***Discover Identity*** Command ***Shall*** only be sent to ***SOP*** when there is an Explicit Contract.

The ***Discover Identity*** Command ***Shall*** be used to determine whether a given Cable Plug or VPD is PD Capable (see Section 8.3.3.20.1 and Section 8.3.3.24.3). In this case a ***Discover Identity*** Command request sent to SOP' ***Shall Not*** cause a Soft Reset if a ***GoodCRC*** Message response is not returned since this can indicate a non-PD Capable cable or VPD. Note that a Cable Plug or VPD will not be ready for PD Communication until tVCONNStable after VCONN has been applied (see ***[USB Type-C 2.0]***). During Cable Plug or VPD discovery, when there is an Explicit Contract, ***Discover Identity*** Commands are sent at a rate defined by the ***DiscoverIdentityTimer*** (see Section 6.6.15) up to a maximum of ***nDiscoverIdentityCount*** times (see Section 6.7.5).

A PD-Capable Cable Plug ***Shall*** return a ***Discover Identity*** Command ACK in response to a ***Discover Identity*** Command request sent to ***SOP'***.

To Text:

The ***Discover Identity*** Command is provided to enable an Initiator to identify its Port Partner and for an Initiator (VCONN Source) to identify the Responder (Cable Plug or VPD). The ***Discover Identity*** Command is also used to determine whether a Cable Plug or VPD is PD-Capable by looking for a ***GoodCRC*** Message Response.

The ***Discover Identity*** Command ***Shall*** only be sent to ***SOP*** when there is an Explicit Contract.

The ***Discover Identity*** Command ***Shall*** be used to determine whether a given Cable Plug or VPD is PD Capable (see Section 8.3.3.20.1 and Section 8.3.3.24.3). In this case a ***Discover Identity*** Command request sent to SOP' ***Shall Not*** cause a Soft Reset if a ***GoodCRC*** Message response is not returned since this can indicate a non-PD Capable cable or VPD. Note that a Cable Plug or VPD will not be ready for PD Communication until tVCONNStable after VCONN has been applied (see ***[USB Type-C 2.0]***). During Cable Plug or VPD discovery, when there is an Explicit Contract, ***Discover Identity*** Commands are sent at a rate defined by the ***DiscoverIdentityTimer*** (see Section 6.6.15) up to a maximum of ***nDiscoverIdentityCount*** times (see Section 6.7.5).

A PD-Capable Cable Plug or VPD ***Shall*** return a ***Discover Identity*** Command ACK in response to a ***Discover Identity*** Command request sent to ***SOP'***.

(b). Section 6.4.4.3.1.1, Page 141, Table 6-29

From Text:

Table 6-29 ID Header VDO

Bit(s)	Description	Reference
B31	USB Communications Capable as USB Host: • ***Shall*** be set to one if the product is capable of enumerating USB Devices. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.1

Bit(s)	Description	Reference
B30	USB Communications Capable as a USB Device: • ***Shall*** be set to one if the product is capable of being enumerated as a USB Device. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.2
B29…27	Product Type (UFP): • 000b – Undefined • 001b – PDUSB Hub • 010b – PDUSB Peripheral • 011b – PSD • 100b – ***Reserved***, ***Shall Not*** be used. • 101b – Alternate Mode Adapter (AMA) • 110b – VCONN-Powered USB Device (VPD) • 111b – ***Reserved***, ***Shall Not*** be used. Product Type (Cable Plug): • 000b – Undefined • 001b…010b – ***Reserved***, ***Shall Not*** be used. • 011b – Passive Cable • 100b – Active Cable • 101b…111b – ***Reserved***, ***Shall Not*** be used.	Section 6.4.4.3.1.1.3
B26	Modal Operation Supported: • ***Shall*** be set to one if the product supports Modal Operation. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.4
B25…23	Product Type (DFP): • 000b – Undefined • 001b – PDUSB Hub • 010b – PDUSB Host • 011b – Power Brick • 100b - Alternate Mode Controller (AMC) • 101b…111b – ***Reserved***, ***Shall Not*** be used.	
B22…16	***Reserved***. ***Shall*** be set to zero.	
B15…0	USB Vendor ID.	***[USB 2.0]/[USB 3.2]/[USB4]***

To Text:

Table 6-29 ID Header VDO

Bit(s)	Description	Reference
B31	USB Communications Capable as USB Host: • ***Shall*** be set to one if the product is capable of enumerating USB Devices. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.1
B30	USB Communications Capable as a USB Device: • ***Shall*** be set to one if the product is capable of being enumerated as a USB Device. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.2
B29…27	SOP - Product Type (UFP): • 000b – Not a UFP • 001b – PDUSB Hub • 010b – PDUSB Peripheral	Section 6.4.4.3.1.1.3

Bit(s)	Description	Reference
	• 011b – PSD • 100b – ***Reserved***, ***Shall Not*** be used. • 101b – Alternate Mode Adapter (AMA) • ~~110b – VCONN-Powered USB Device (VPD)~~ • 100b…111b – ***Reserved***, ***Shall Not*** be used. SOP' - Product Type (Cable Plug/VPD): • 000b – Undefined • 001b…010b – ***Reserved***, ***Shall Not*** be used. • 011b – Passive Cable • 100b – Active Cable • 101b – ***Reserved***, ***Shall Not*** be used. • 110b – VCONN-Powered USB Device (VPD) • ~~101b…~~111b – ***Reserved***, ***Shall Not*** be used.	
B26	Modal Operation Supported: • ***Shall*** be set to one if the product supports Modal Operation. • ***Shall*** be set to zero otherwise	Section 6.4.4.3.1.1.4
B25…23	SOP - Product Type (DFP): • 000b – Not a DFP • 001b – PDUSB Hub • 010b – PDUSB Host • 011b – Power Brick • 100b - Alternate Mode Controller (AMC) • 101b…111b – ***Reserved***, ***Shall Not*** be used. SOP': ***Reserved***. ***Shall*** be set to zero.	
B22…16	***Reserved***. ***Shall*** be set to zero.	
B15…0	USB Vendor ID.	*[USB 2.0]*/*[USB 3.2]*/*[USB4]*

(c). Section 6.4.4.3.1.1.3, Page 142, Table 6-30

From Text:

Table 6-30 Product Types (UFP)

Product Type	Description	Product Type VDO	Reference
Undefined	***Shall*** be used where no other Product Type value is appropriate.	None	
PDUSB Hub	***Shall*** be used when the Product is a PDUSB Hub.	UFP VDO	Section 6.4.4.3.1.4
PDUSB Peripheral	***Shall*** be used when the Product is a PDUSB Device other than a PDUSB Hub.	UFP VDO	Section 6.4.4.3.1.4
PSD	***Shall*** be used when the Product is a PSD, e.g. power bank.	None	
Alternate Mode Adapter	***Shall*** be used when the Product is a PDUSB Device that supports one or more Alternate Modes.	AMA VDO	Section 6.4.4.3.1.8
VCONN Powered USB Device	***Shall*** be used when the Product is a PDUSB VCONN Powered USB Device.	VPD VDO	Section 6.4.4.3.1.9

To Text:

Table 6-30 Product Types (UFP)

Product Type	Description	Product Type VDO	Reference
Undefined	***Shall*** be used where no other Product Type value is appropriate.	None	
PDUSB Hub	***Shall*** be used when the Product is a PDUSB Hub.	UFP VDO	Section 6.4.4.3.1.4
PDUSB Peripheral	***Shall*** be used when the Product is a PDUSB Device other than a PDUSB Hub.	UFP VDO	Section 6.4.4.3.1.4
PSD	***Shall*** be used when the Product is a PSD, e.g. power bank.	None	
Alternate Mode Adapter	***Shall*** be used when the Product is a PDUSB Device that supports one or more Alternate Modes.	AMA VDO	Section 6.4.4.3.1.8
~~VCONN Powered USB Device~~	~~***Shall*** be used when the Product is a PDUSB VCONN Powered USB Device.~~	~~VPD VDO~~	~~Section 6.4.4.3.1.9~~

(d). Section 6.4.4.3.1.1.4, Page 142, Table 6-31

From Text:

Table 6-31 Product Types (Cable Plug)

Product Type	Description	Product Type VDO	Reference
Undefined	***Shall*** be used where no other Product Type value is appropriate.	None	
Active Cable	***Shall*** be used when the Product is a cable that incorporates signal conditioning circuits.	Active Cable VDO	Section 6.4.4.3.1.7
Passive Cable	***Shall*** be used when the Product is a cable that does not incorporate signal conditioning circuits.	Passive Cable VDO	Section 6.4.4.3.1.6

To Text:

Table 6-31 Product Types (Cable Plug/VPD)

Product Type	Description	Product Type VDO	Reference
Undefined	***Shall*** be used where no other Product Type value is appropriate.	None	
Active Cable	***Shall*** be used when the Product is a cable that incorporates signal conditioning circuits.	Active Cable VDO	Section 6.4.4.3.1.7
Passive Cable	***Shall*** be used when the Product is a cable that does not incorporate signal conditioning circuits.	Passive Cable VDO	Section 6.4.4.3.1.6
VCONN Powered USB Device	***Shall*** be used when the Product is a PDUSB VCONN Powered USB Device.	VPD VDO	Section 6.4.4.3.1.9

(e). Section 6.4.4.3.1.1.6, Page 142-143

From Text:

The Product Type (DFP) field indicates the type of Product when in DFP Data Role, whether a VDO will be returned and if so the type of VDO to be returned. The Product Type indicated in the Product Type (DFP) field ***Shall*** be the closest categorization of the main functionality of the Product in DFP Data Role or "Undefined" when there is no suitable category for the product. For DRD Products this field ***Shall*** always indicate the Product Type when in DFP role regardless of the present Data Role. Table 6-32 defines the Product Type VDOs which ***Shall*** be returned.

To Text:

The Product Type (DFP) field indicates the type of Product when in DFP Data Role, whether a VDO will be returned and if so the type of VDO to be returned. The Product Type indicated in the Product Type (DFP) field ***Shall*** be the closest categorization of the main functionality of the Product in DFP Data Role or "Undefined" when there is no suitable category for the product. For DRD Products this field ***Shall*** always indicate the Product Type when in DFP role regardless of the present Data Role. Table 6-32 defines the Product Type VDOs which ***Shall*** be returned.

In SOP' Communication (Cable Plugs and VPDs) this bit field is ***Reserved*** and ***Shall*** be set to zero.