USB PD ENGINEERING CHANGE NOTICE

Title: Multi-drop Collision Avoidance
Applied to: USB Power Delivery Revision 2.0, Version 1.0, 11 August 2014

Brief description of the functional changes:

Power Delivery communication is intended to be biased such that communication between port partners takes priority over communication with the cable. The issue is that the interpacket gap is 25us which is the delay between messages in an ongoing communication. For a new communication the UFP for example needs to wait an additional 12us.

The changes in this ECN ensure that messages sent using SOP' or SOP'' have at least 750us between them to allow a gap for communication. An additional retry is also needed since, if there is only a 25us gap between a message and the GoodCRC an additional retry may occur.

Benefits as a result of the changes:

Greatly reduced potential for collisions. Avoids UFP generating Soft/Hard Reset in cases where there is ongoing communication with the cable and it needs to send an asynchronous message.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

Pacing needed for communication from both the DFP and to the cable. Additional retry needed in the protocol layer.

An analysis of the hardware implications:

May impact implementations of Protocol State machine due to additional retry. Cable implementations may also have the message timing in hardware.

An analysis of the software implications:

Additional message timing for SOP'/SOP'' messages.

An analysis of the compliance testing implications:

Add test for SOP'/SOP'' message timing and retries on idle.

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Actual Change

(a). New Section 6.5.14, Page 188

To Text:

6.5.14 tCableMessage

The sender of an SOP' or SOP'' packet (either a DFP or Cable Plug), that is not a ***GoodCRC*** message, shall wait ***tCableMessage*** after the last bit of the EOP of the GoodCRC received in response to the SOP' or SOP'' packet before sending another SOP' or SOP'' packet. This ensures that there is sufficient idle time between packets for a UFP to generate an asynchronous message.

(a). New Parameter, Table 6-30, Page 189

To Text:

Table 6-30 Time Values

Parameter	Value (min)	Value (max)	Units	Section
tCableMessage	750		µs	6.5.14

(a). Section 6.6.6, Table 6-32, Page 192

From Text:

Table 6-33 lists the counters used in this section and Table 6-32 shows the corresponding parameters.

Table 6-32 Counter parameters

Parameter	Value	Section
nCapsCount	50	6.6.4
nHardResetCount	2	6.6.3
nMessageIDCount	7	6.6.1
nRetryCount	2	6.6.2

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Parameter	Value	Section
nCapsCount	50	6.6.4
nHardResetCount	2	6.6.3
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nRetryCount	3	6.6.2