USB Power Delivery ENGINEERING CHANGE NOTICE

Title: Timer Descriptions Corrections
Applied to: USB Power Delivery Specification Revision 3.1 Version 1.5

Brief description of the functional changes proposed:

Further corrections to specification of timers based on the Policy Engine receiving a message.
(Message is only seen by Policy Engine at end of following GoodCRC)

Existing textual description of timers relying on the reception of a message were in some cases being incorrectly timed from the end of the message rather than the end of the following GoodCRC. The Protocol Layer State diagrams make it clear that a received message is only passed up to the Policy Engine after the GoodCRC has been sent.

Benefits as a result of the proposed changes:

Makes the timer's textual description match the state diagrams.

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

Should make no change to implementations that follow the normative state diagrams.

An analysis of the hardware implications:

Should be none.

An analysis of the software implications:

Should be none.

An analysis of the compliance testing implications:

Minor. May require examination of timing analysis algorithms. Could be causing a maximum error of around 0.5ms.

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Actual Change Requested

(a). Section 6.6.2, Page 217

From Text:

The ***SenderResponseTimer*** ***Shall*** be stopped when the last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the expected response Message, has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tReceiverResponse*** in order to ensure that the sender's ***SenderResponseTimer*** does not expire.

The ***tReceiverResponse*** time ***Shall*** be measured from the time the last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the expected response Message, has been received by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

To Text:

The ***SenderResponseTimer*** ***Shall*** be stopped when the last bit of the ***EOP*** of the ***GoodCRC*** Message corresponding to the expected response Message has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tReceiverResponse*** in order to ensure that the sender's ***SenderResponseTimer*** does not expire.

The ***tReceiverResponse*** time ***Shall*** be measured from the time the last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the expected request Message, has been transmitted by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

(b). Section 6.6.12.1, Page 223

From Text:

The ***VDMResponseTimer*** ***Shall*** be stopped when the last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the expected VDM Command response, has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tVDMReceiverResponse*** in order to ensure that the sender's ***VDMResponseTimer*** does not expire.

The ***tVDMReceiverResponse*** time ***Shall*** be measured from the time the last bit of the Message ***EOP*** has been received by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

To Text:

The ***VDMResponseTimer*** ***Shall*** be stopped when the last bit of the ***EOP*** of the ***GoodCRC*** Message, corresponding to the expected VDM Command response, has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tVDMReceiverResponse*** in order to ensure that the sender's ***VDMResponseTimer*** does not expire.

The ***tVDMReceiverResponse*** time ***Shall*** be measured from the time the last bit of the Message ***EOP*** has been transmitted by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

(c). Section 6.6.12.2, Page 223

From Text:

The ***VDMModeEntryTimer*** ***Shall*** be stopped when the last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the expected Structured VDM Command response (ACK, NAK or BUSY), has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tVDMEnterMode*** in order to ensure that the sender's ***VDMModeEntryTimer*** does not expire.

The ***tVDMEnterMode*** time ***Shall*** be measured from the time the last bit of the Message ***EOP*** has been received by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

To Text:

The ***VDMModeEntryTimer*** ***Shall*** be stopped when the last bit of the ***EOP*** of the ***GoodCRC*** Message, corresponding to the expected Structured VDM Command response (ACK, NAK or BUSY), has been transmitted by the Physical Layer.

The receiver of a Message requiring a response ***Shall*** respond within ***tVDMEnterMode*** in order to ensure that the sender's ***VDMModeEntryTimer*** does not expire.

The ***tVDMEnterMode*** time ***Shall*** be measured from the time the last bit of the ***EOP*** of the ***GoodCRC*** Message, corresponding to VDM Command Request, has been transmitted by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

(d). Section 6.6.18.2, Page 226

From Text:

The ***ChunkSenderRequestTimer*** ***Shall*** be stopped when:

- The last bit of the Chunk Request Message ***EOP*** is received by the Physical Layer.
- A Message other than a Chunk Request is received from the Protocol Layer Rx.

The receiver of a Chunk Response requiring a Chunk Request ***Shall*** respond with a Chunk Request within ***tChunkReceiverRequest*** in order to ensure that the sender's ***ChunkSenderRequestTimer*** does not expire.

The ***tChunkReceiverRequest*** time ***Shall*** be measured from the time the last bit of the Message ***EOP*** has been received by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

To Text:

The ***ChunkSenderRequestTimer*** ***Shall*** be stopped when:

- The last bit of the ***EOP*** of the ***GoodCRC*** Message corresponding to the Chunk Request Message is transmitted by the Physical Layer.
- A Message other than a Chunk Request is received from the Protocol Layer Rx.

The receiver of a Chunk Response requiring a Chunk Request ***Shall*** respond with a Chunk Request within ***tChunkReceiverRequest*** in order to ensure that the sender's ***ChunkSenderRequestTimer*** does not expire.

The ***tChunkReceiverRequest*** time ***Shall*** be measured from the time the last bit of the ***EOP*** of the ***GoodCRC*** Message, corresponding to the Chunk Response Message, has been transmitted by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

(d). Section 6.6.18.3, Page 226

From Text:

The ***ChunkSenderResponseTimer*** ***Shall*** be stopped when:

- The last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the Chunk Response Message, is transmitted by the Physical Layer.
- A Message other than a Chunk is received from the Protocol Layer.

The receiver of a Chunk Request requiring a Chunk Response ***Shall*** respond with a Chunk Response within ***tChunkReceiverResponse*** in order to ensure that the sender's ***ChunkSenderResponseTimer*** does not expire. The ***tChunkReceiverResponse*** time ***Shall*** be measured from the time the last bit of the Message ***EOP*** has been received by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.

To Text:

The ***ChunkSenderResponseTimer*** ***Shall*** be stopped when:

- The last bit of the ***GoodCRC*** Message ***EOP***, corresponding to the Chunk Response Message, is transmitted by the Physical Layer.
- A Message other than a Chunk is received from the Protocol Layer.

The receiver of a Chunk Request requiring a Chunk Response ***Shall*** respond with a Chunk Response within ***tChunkReceiverResponse*** in order to ensure that the sender's ***ChunkSenderResponseTimer*** does not expire. The ***tChunkReceiverResponse*** time ***Shall*** be measured from the time the last bit of the ***EOP*** of the ***GoodCRC*** Message, corresponding to the Chunk Request Message, has been transmitted by the Physical Layer until the first bit of the response Message Preamble has been transmitted by the Physical Layer.