

USB Power Delivery ENGINEERING CHANGE NOTICE

Title: tRetry Relaxation

**Applied to: USB Power Delivery Specification Revision 3.0
Version 1.2**

Brief description of the functional changes proposed:
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This ECN increases tRetry (max) from 75us to 195us. The value 195us was chosen to align with tTransmit.

Benefits as a result of the proposed changes:
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tRetry specifies when the transmitter shall start the re-transmission when no GoodCRC is received. In some scenarios the 75us timing can be difficult to meet and doing so increases complexity unnecessarily. This relaxation therefore can lead to reduced complexity. The other way implementations can meet the spec is to set the CRCReceiveTimer on the lower end of the allowed range, but for this to be beneficial the accuracy of the clock needs to be tightened which adds complexity.
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An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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None, it is a relaxing of the spec.

It does increase the total time a retransmission sequence may take to terminate from 29.66ms to 30.14ms, which is a negligible difference.
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Details of timing calculation:

Before a hard reset is triggered there are a total of four retries, and the proposal increases this time by $4 \times (195 - 75) = 480\text{us}$.
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The total time from message failure to hard reset is: $(t_{\text{Receive}} + t_{\text{Retry}} + t_{\text{CtrlMsg}}) + (t_{\text{Receive}} + t_{\text{Retry}} + t_{\text{CtrlMsg}}) + (t_{\text{Receive}} + t_{\text{SoftReset}} + t_{\text{CtrlMsg}}) + (t_{\text{Receive}} + t_{\text{Retry}} + t_{\text{CtrlMsg}}) + (t_{\text{Receive}} + t_{\text{Retry}} + t_{\text{CtrlMsg}}) + (t_{\text{Receive}} + t_{\text{HardReset}}) = 6 \times t_{\text{Receive}} + 4 \times t_{\text{Retry}} + 5 \times t_{\text{CtrlMsg}} + t_{\text{SoftReset}} + t_{\text{HardReset}}$. tCtrlMsg is the time a control message takes on the CC line (552us). The maximum this value could be is 29.66ms (with tRetry=75us).
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An analysis of the hardware implications:
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None, it is a relaxation. It may allow for reduced complexity implementations.
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An analysis of the software implications:
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None.

An analysis of the compliance testing implications:
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The test specification will need to relax its check for tRetry per the new max value.

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Actual Change Requested

(a). Section 6.6.19, Table 6-57, Page 191

From Text:

<i>tRetry</i>		75	μs	Section 6.6.1
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To Text:

<i>tRetry</i>		195	μs	Section 6.6.1
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