

USB 3.1 ENGINEERING CHANGE NOTICE

Title: USB 3.1 wHubDelay

Applied to: USB_3_1r1.0_07_31_2013

Brief description of the functional changes:

Restore original 3.0 definition of wHubDelay so that hubs can report it and system software can use it consistently.

3.0 defined wHubDelay as the delay between receiving a header packet on one side (up or down) as indicated by having received the last symbol of the packet and starting to transmit a header packet on the other side (down or up). 3.1 redefined wHubDelay as the delay between the start of receiving a header packet and the start of transmitting it. In SuperSpeed operation, that's a 40ns difference and unnecessarily complicates hubs and system software that calculates round trip times.

Benefits as a result of the changes:

Simplify hubs and system software that calculates round trip times by using a consistent definition for wHubDelay. A SuperSpeed host that uses wHubDelay will expect it to be reported as it is defined in 3.0; so, a SuperSpeedPlus hub operating in SuperSpeed mode should report the value with that definition in contradiction to 3.1. Restoring the wHubDelay from 3.0 avoids the contradiction, complications and confusion.

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

None. There would be without this change.

An analysis of the hardware implications:

Simplifies design migration from 3.0 to 3.1.

An analysis of the software implications:

Simplifies new software and avoids need to update old software.

An analysis of the compliance testing implications:

TD 10.127 won't have to use different wHubDelay definitions for 3.0 and 3.1

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Actual Change

Table 10-19. Hub Parameters

From Text:

Name	Description	Min	Max	Units
tHubDelay	When both the upstream and the downstream port are operating at the same speed this timing defines the maximum delay in nanoseconds a hub can introduce while forwarding packets in either direction. The time is measured from receipt of the first symbol of the packet by the receiving port until the transmitting port sends the first symbol of the packet, when both the receiving and transmitting links are in U0 and the following conditions are met: <ul style="list-style-type: none">• No Link Commands are in flight.• Remote Rx Header Buffer Credit Count of the transmitting port is not zero.• Tx Header Buffer of the transmitting port is empty. A hub reports the actual delay via the wHubDelay field in Enhanced SuperSpeed Hub Descriptor.		400	ns

To Text:

Name	Description	Min	Max	Units
tHubDelay	When both the upstream and the downstream port are operating at the same speed this timing defines the maximum delay in nanoseconds a hub can introduce while forwarding header packets in either direction. The time is measured from receipt of the last symbol of the header packet by the receiving port until the transmitting port sends the first symbol of the header packet, when both the receiving and transmitting links are in U0 and the following conditions are met: <ul style="list-style-type: none">• No Link Commands are in flight.• Remote Rx Header Buffer Credit Count of the transmitting port is not zero.• Tx Header Buffer of the transmitting port is empty. A hub reports the actual delay via the wHubDelay field in Enhanced SuperSpeed Hub Descriptor.		400	ns