

USB 3.1 ENGINEERING CHANGE NOTICE

Title: USB3.1 tHubDriveResume
Applied to: USB_3_1r1.0_07_31_2013

Brief description of the functional changes:

Add new parameter tHubDriveResume to use in place of tHubDriveRemoteWakeDownstream for initiating U3 exit, resume, on downstream ports. This new parameter has a much larger max value.

Benefits as a result of the changes:

Reusing the remote wake parameter for resume resulted in unnecessary restriction on resume timing. Need reasonable value that is testable for compliance. While in U3 a port will likely enter pipe pwrdown state of P3 with a low frequency suspend clock. In order to meet the required 20ns delay between signaling LFPS for Ux exit and the start of SS signaling for recovery (defined in 6.9.2), designs will also likely switch back to the SS clock before starting to signal LFPS. The time to return to the SS clock depends on how slow the suspend clock is. For example, given 5 clocks at a 32kHz rate for the process return to P0, switch clocks and start U3 exit signaling would take over 156us. Though such a large delay has not been observed, there is no need to prevent it and doing so could enable greater power savings in future products by use of an even slower clock.

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

No effect on use of u3 exit request for normal operation. Already observed that up to an additional 9us to exit U3 has not impacted efficient and robust return to U0 when a DSP is directed to exit U3.

An analysis of the hardware implications:

None. Whereas, requiring compliance to original value would have.

An analysis of the software implications:

None

An analysis of the compliance testing implications:

Update test TD 10.115.

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Actual Change

Table 10-19. Hub Parameters

To Text: add parameter

Name	Description	Min	Max	Units
tHubDriveResume	Time from receiving a SetPortFeature(PORT_LINK_STATE) U0 for a downstream port with a link in U3 to driving resume signaling on the link.	0	400	μs

10.10 Suspend and Resume

From Text:

When a hub upstream port's link is in the U3 state and it receives wakeup signaling from its link partner on the hub upstream port's link, the hub shall automatically drive remote wakeup to any downstream ports that are in U3 and have received remote wakeup signaling since entering U3.

To Text:

When a hub upstream port's link is in the U3 state and it receives wakeup signaling from its link partner on the hub upstream port's link, the hub shall automatically drive remote wakeup handshake or resume to any downstream ports that are in U3 and have received remote wakeup signaling since entering U3.

From Text:

When the hub receives a SetPortFeature(PORT_LINK_STATE) U0 for a downstream port with a link in U3, the hub shall drive remote wakeup signaling on the link in tHubDriveRemoteWakeDownstream.

To Text:

When the hub receives a SetPortFeature(PORT_LINK_STATE) U0 for a downstream port with a link in U3, the hub shall drive resume signaling on the link in tHubDriveResume.