USB Type-C ENGINEERING CHANGE NOTICE

Title: Thunderbolt 3 Compatibility Updates
Applied to: USB Type-C Specification Release 2.0, August 2019

Brief description of the functional changes proposed:
1) Clarification for TBT3 Device Without Predefined Upstream Port at the end, to go through ErrorRecovery on downstream port on connect/disconnect 2) Clarification with Legacy TBT2 and TBT3 working

Benefits as a result of the proposed changes:
1) ErrorRecovery define by the spec rather the written of "Perform a disconnect/reconnect on the port" 2) Enable properly work with TBT2 device using mDP to USB Type-C convertors

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
No existing system or devices

An analysis of the hardware implications:
No HW impact

An analysis of the software implications:
Require update the correct bits to work with TBT2, Require redefine the bits used for sign TBT active/passive

An analysis of the compliance testing implications:
Found by TBT testing

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Actual Change Requested

In section F.1.5 TBT3-Compatible Self-Powered Device Without Predefined Upstream Port at the end
From Text:

F.1.5 TBT3-Compatible Self-Powered Device Without Predefined Upstream Port Rules
A TBT3-compatible device port may behave as either a downstream or upstream port based on its connection state to a TBT3-compatible host as described below.
- When no TBT3-compatible host is connected, the USB Type-C® ports shall:
    - Prefer to be configured as a UFP
    - Implement and use Try.SNK as needed to get into the UFP state
    - If resolved to a DFP, initiate or accept USB PD DR_Swap to switch to the UFP data role
    - Accept USB PD DR_Swap to switch to the DFP data role
    - When resolved to a UFP, identify this port as being connected to the host.
- When a TBT3-compatible host is initially connected, the remaining downstream USB Type-C ports shall:
    - Implement and use Try.SRC as needed to get into the DFP state
    - Issue a Hard Reset if a USB PD DR_Swap is received when both a connection is present and an Alternate Mode is in place
    - Issue a USB PD DR_Swap to switch to the DFP data role if a connection is present but no Alternate Mode has been entered (this includes performing a disconnect/reconnect on the port)
    - Accept USB PD DR_Swap to switch to the DFP data role if a connection is present but no Alternate Mode has been entered (this includes performing a disconnect/reconnect on the port)
- When a TBT3-compatible host is disconnected, the downstream USB Type-C ports shall:
    - Perform a disconnect/reconnect on the port
    - Behave as if no host is connected

To Text:

F.1.5 TBT3-Compatible Self-Powered Device Without Predefined Upstream Port Rules
A TBT3-compatible device port may behave as either a downstream or upstream port based on its connection state to a TBT3-compatible host as described below.
- When no TBT3-compatible host is connected, the USB Type-C® ports shall:
    - Prefer to be configured as a UFP
    - Implement and use Try.SNK as needed to get into the UFP state
    - If resolved to a DFP, initiate or accept USB PD DR_Swap to switch to the UFP data role
    - Accept USB PD DR_Swap to switch to the DFP data role
    - When resolved to a UFP, identify this port as being connected to the host.
        - Enter the remining downstream ports into ErrorRecovery State.
- ~~When~~ After a TBT3-compatible host is initially connected, the remaining downstream USB Type-C ports shall:
    - Implement and use Try.SRC as needed to get into the DFP state
    - Issue a Hard Reset if a USB PD DR_Swap is received when both a connection is present and an Alternate Mode is in place
    - Issue a USB PD DR_Swap to switch to the DFP data role if a connection is present but no Alternate Mode has been entered (this includes performing a disconnect/reconnect on the port)

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- o Accept *USB PD* DR_Swap to switch to the DFP data role if a connection is present but no Alternate Mode has been entered (this includes performing a disconnect/reconnect on the port)
- ~~When a TBT3-compatible host is disconnected, the downstream USB Type-C ports shall:~~
  - o ~~Perform a disconnect/reconnect on the port~~
  - o ~~Behave as if no host is connected~~
- When a TBT3-compatible host that was identity as host is disconnected, the downstream USB Type-C ports shall:
  - o Enter to the ErrorRecovery state
  - o Behave as if no host is connected

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Handle of passive/active and TBT2 (b24/25)

In section F.2.6 TBT3 Cable Discover Mode Responses, table F- 11 TBT3 Cable Discover Mode VDO Responses

From Text:

B31...24	0 00 00 00 0b	Reserved

To Text:

B31..26	0000 00b	Reserved
B25	0 – Passive cable 1 – Active cable	Active_Passive
B24	0	Reserved

In section F.2.5 TBT3 Device Discover Mode Responses, table F- 10 TBT3 Device Discover Mode VDO Responses

From Text:

B16	0b = TBT2 Legacy Adapter 1b = TBT3 Adapter	TBT Adapter

To Text:

B16	0b = TBT3 Adapter 1b = TBT2 Legacy Adapter	TBT_Adapter

In section F.2.8 TBT3 Device Enter Mode Command, table F-13 TBT3 Device Enter Mode Command
From Text:

B25	0b	Reserved
B24	0 = Passive cable 1 = Active cable	Active_Passive

To Text:

B25	0 – Passive cable 1 – Active cable	Active_Passive
B24	0b = TBT3 Adapter 1b = TBT2 Legacy Adapter	TBT_Adapter

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From text:

- B26: return the value received in the B26 field of the TBT3 Device Discover Mode Response.
- B23: if using a TBT3 cable, return the value received in the B23 field of the TBT3 CableDiscover Mode Response, otherwise set to 0.

- **To Text:**
- B26: return the value received in the B26 field of the TBT3 Device Discover Mode Response.
- B25: return the value received in the B25 field of the TBT3 Cable Discover Mode Response.
- B23: if using a TBT3 cable, return the value received in the B23 field of the TBT3 Cable Discover Mode Response, otherwise set to 0.