USB4 1.0 ENGINEERING CHANGE NOTICE FORM

Title: *Router Ready* Bit
Applied to: USB4 Specification Version 1.0

Brief description of the functional changes:
The *Router Ready* bit is set following Router enumeration and once the Router completes certain operations.

Benefits as a result of the changes:
Clearer definition of when to set the *Router Ready* bit.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
None

An analysis of the hardware implications:
None. This is a clarification.

An analysis of the software implications:
None.

An analysis of the compliance testing implications:
None.

USB4 1.0 ENGINEERING CHANGE NOTICE FORM

Actual Change

(a). Section 6.7 Router Enumeration

From Text:

Router enumeration is the process by which a Connection Manager detects a connected Router and assigns it a TopologyID. After A Connection Manager enumerated a Router, the Router is part of the Connection Manager's Domain.

To Text:

Router enumeration is the process by which a Connection Manager detects a connected Router and assigns it a TopologyID. After A Connection Manager enumerated a Router, the Router is part of the Connection Manager's Domain.

> 🖉 **CONNECTION MANAGER NOTE**

A USB4 Connection Manager sets the Connection Manager USB4 Version field to indicate rev. 1.0 support. The below assumes that the Connection Manager USB4 Version field is set to indicate rev. 1.0 support.

On transition to Uninitialized state, a TBT3-compatible Router shall:

- Expose USB4 Ports and PCIe Adapters as defined in Section 13.3.1.

- Set its sleep and wake behavior as defined in Section 13.2.4.

- Expose the additional registers defined in Section 13.6.

When the *TopologyID Valid* bit is set to 1b, the Router is enumerated, and a TBT3-compatible Router shall:

- Expose all its USB4 Ports and PCIe Adapters (if any) to the Connection Manager.

- Set the *Lock* bit to 1b on all Downstream Facing Ports.

- Set its sleep and wake behavior as defined in Section 4.5

- Disable access to the additional registers defined in Section 13.6.

The Router shall then set the *Router Ready* bit to 1b.

On transition to Uninitialized state, a Router that is not TBT3-compatible shall:

- Expose all its USB4 Ports and PCIe Adapters (if any) to the Connection Manager.

- Set the *Lock* bit to 1b on all Downstream Facing Ports.

- Set sleep and wake behavior to default as defined in Section 4.5.

The Router shall then set the *Router Ready* bit to 1b.

USB4 1.0 ENGINEERING CHANGE NOTICE FORM

(b). Section 6.7 Router Enumeration

From Text:

- *The Connection Manager shall use a single Write Request to enumerate a Router. The Write Request sets the Depth field, the TopologyID field, the Connection Manager USB4 Version field, and the Valid bit (the latter to 1b).*

To Text:

- *The Connection Manager shall use a single Write Request to enumerate a Router. The Write Request sets the Depth field, the TopologyID field, the Connection Manager USB4 Version field, and the TopologyID Valid bit (the latter to 1b).*

(c)   Table 8-3. Router Configuration Space Basic Attributes

From Text:

Router Ready (RR)

After setting this bit to 1b, a Router shall operate according to the lowest common USB4 Specification version in the USB4 Version field and the Connection Manager USB4 Version field.

To Text:

Router Ready (RR)

~~After setting this bit to 1b, a Router shall operate according to the lowest common USB4 Specification version in the USB4 Version field and the Connection Manager USB4 Version field.~~

A Router sets this bit to 1b after configuring any hardware based on the value of the *Connection Manager USB4 Version* field. See Section 6.7 and Section 13.4.1.

(d) Table 8 9. Adapter Configuration Space Basic Attributes

From Text:

DW	Register Name	Bit(s)	Field Name and Description	Type	Default Value
4	ADP_CS_4	31	**Lock (LCK)** This bit controls whether or not a Connection Manager can access a Router that is downstream of the Adapter. This bit is only used for the Adapters in a Downstream Facing Port. When the bit is 1b, the Adapter is "locked", which means that Control Packets are not forwarded to the downstream Router. When the bit is 0b, the Adapter is "unlocked" and Control Packets can be forwarded to the downstream Router.	R/W	0b

USB4 1.0 ENGINEERING CHANGE NOTICE FORM

DW	Register Name	Bit(s)	Field Name and Description	Type	Default Value
			An Adapter shall set this bit to 1b after a Connection Manager writes a value greater than 0 to the *Connection Manager USB4 Version* field in the Router Configuration Space. An Adapter shall set this bit to 1b after the Adapter goes through a disconnect and the value in the *Connection Manager USB4 Version* field is greater than 0. An Adapter shall ignore a write to this bit if the Adapter does not have a Router connected downstream. Note: A TBT3 Connection Manager does not use this bit and the Adapter remains "unlocked" by default.		

To Text:

DW	Register Name	Bit(s)	Field Name and Description	Type	Default Value
4	ADP_CS_4	31	**Lock (LCK)** This bit controls whether or not a Connection Manager can access a Router that is downstream of the Adapter. This bit is only used for the Adapters in a Downstream Facing Port. When the bit is 1b, the Adapter is "locked", which means that Control Packets are not forwarded to the downstream Router. When the bit is 0b, the Adapter is "unlocked" and Control Packets can be forwarded to the downstream Router. ~~An Adapter shall set this bit to 1b after a Connection Manager writes a value greater than 0 to the *Connection Manager USB4 Version* field in the Router Configuration Space.~~ An Adapter shall set this bit to 1b after the Adapter goes through a disconnect ~~and the value in the Connection Manager USB4 Version field is greater than 0~~. An Adapter shall ignore a write to this bit if the Adapter does not have a Router connected downstream. ~~Note: A TBT3 Connection Manager does not use this bit and the Adapter remains "unlocked" by default.~~ See Section 6.7 for additional functionality of this bit.	R/W	0b

(e) 13.4 Configuration Layer

From Text:

USB4 1.0 ENGINEERING CHANGE NOTICE FORM

This section only applies to Device Routers.

To Text:

This section only applies to Device Routers.

13.4.1 Router Enumeration

On transition to Uninitialized state, the Router shall:

- Expose USB4 Ports and PCIe Adapters as defined in Section 13.3.1.

- Set its sleep and wake behavior as defined in Section 13.2.4.

- Expose the additional registers defined in Section 13.6.

The Router is enumerated when the *TopologyID Valid* bit is set to 1b.

Following enumeration, if the *Connection Manager USB4 Version* field is set to indicate a TBT3 Connection Manager, then the Router shall maintain the configuration listed above. The Router may set the *Router Ready* bit to 1b.

Following enumeration, if the *Connection Manager USB4 Version* field is set to indicate rev. 1.0 support, then the Router shall follow Section 6.7.

(f) Table 13-19. Adapter Configuration Space Basic Attributes

From Text:

DW	Register Name	Bit(s)	Field Name and Description	Type	Default Value
4	ADP_CS_4	29:20	**Max Credits** This field shall be equal to the *Total Buffers* Field.	RO	Vendor Defined

To Text:

DW	Register Name	Bit(s)	Field Name and Description	Type	Default Value
4	ADP_CS_4	29:20	**Max Credits** This field shall be equal to the *Total Buffers* Field.	RO	Vendor Defined

		31	**Lock (LCK)**	R/W	0b
			This bit controls whether or not a Connection Manager can access a Router that is downstream of the Adapter. This bit is only used for the Adapters in a Downstream Facing Port.		
			When the bit is 1b, the Adapter is "locked", which means that Control Packets are not forwarded to the downstream Router. When the bit is 0b, the Adapter is "unlocked" and Control Packets can be forwarded to the downstream Router.		
			If the value in the *Connection Manager USB4 Version* field is greater than 0, an Adapter shall set this bit to 1b after the Adapter goes through a disconnect.		
			If the value in the *Connection Manager USB4 Version* field is 0, an Adapter shall keep this bit set to 0b.		
			An Adapter may ignore a write to this bit if the Adapter does not have a Router connected downstream.		
			Note: A TBT3 Connection Manager does not use this bit and the Adapter remains "unlocked" by default.		