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COST SAVING BY REDUCING ONE OF THE MULTIPLEXERS REQUIRED TO ENABLE DOCKED PRE-BOOT EXTERNAL DISPLAY SUPPORT

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Cost saving by reducing one of the multiplexers required to enable docked pre-boot external display support

Abstract:

Some pre-boot features only work with UMA graphics today on Windows based system. Displays on docks may be driven by either the UMA or Discrete Graphics. In order to support pre-boot features on displays attached through the dock, platforms with discrete GPU will need to switch to UMA graphics during pre-boot. A possible mechanism for this switch is using display multiplexers. We propose a method that reduces the number of required multiplexers, saving cost and board space.

Prior Implementation:

In order to switch between UMA and Discrete GFX, a system may use multiplexer per display outputs. Refer to Figure 1 for prior implementation.

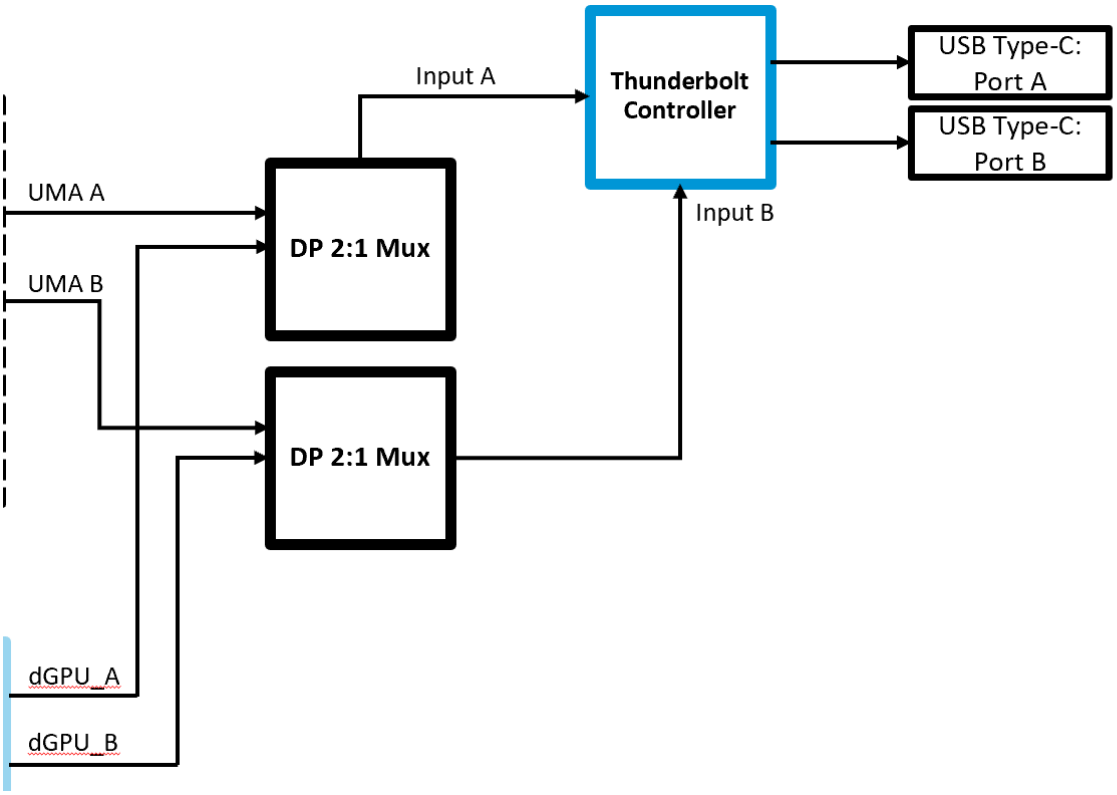

Figure 1: Prior Implementation

Proposed solution:

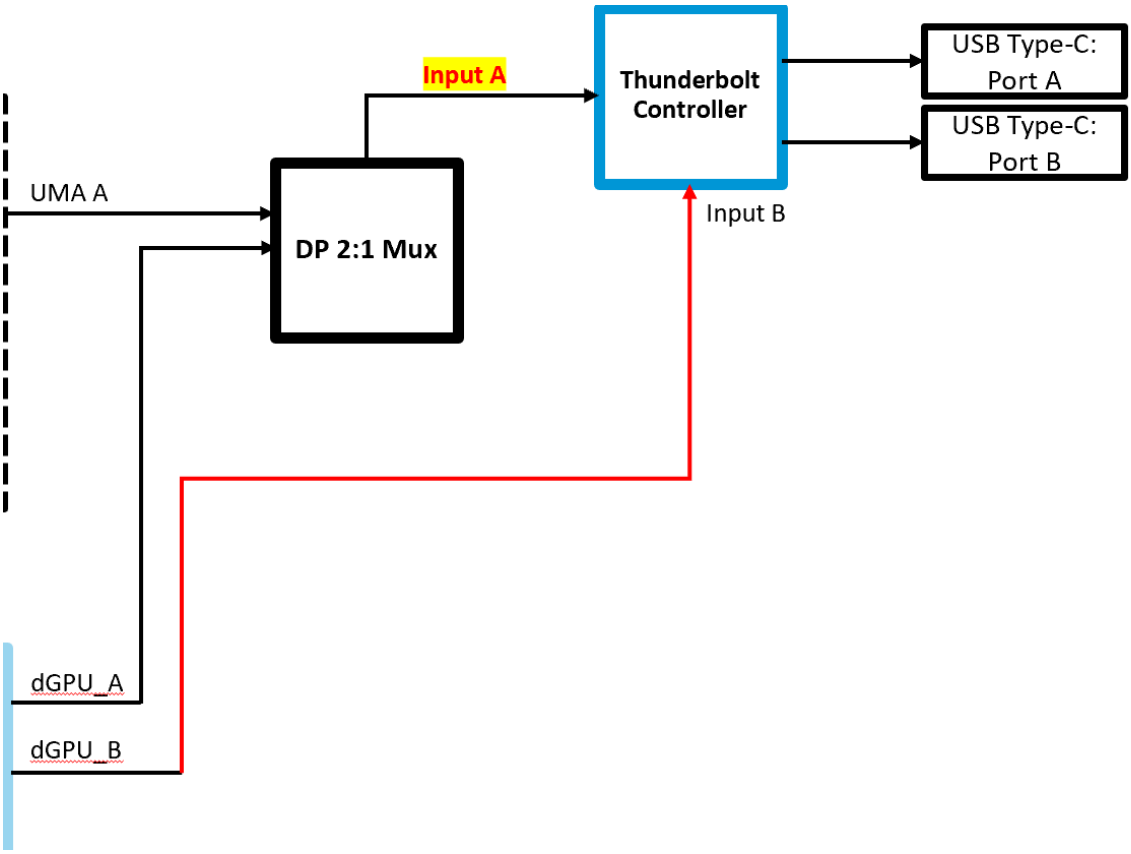

Figure 2: One less multiplexer design to enable docked pre-boot external display support

We propose to update the notebook's Thunderbolt 3 controller's firmware to prioritizes Input A for any display connected to through either of the Type-C ports (refer to Figure 2). This change will allow the use of only one multiplexer in order to enable pre-boot external display support through for both Type-C Ports, on a first come first serve basis (refer to Figure 2).

Additionally, this solution could also be extended to other Type-C high speed protocol crossbar switches, multiplexers or hubs, so that the same benefits can be extended to Type-C DP Multifunction Notebooks & Desktops (non-Thunderbolt notebooks & desktops).

Benefits and advantages:

This solution allows for cost saving and relaxes the board space constraints while maintaining support for external displays during pre-boot on host platforms with discrete GFX.

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