USB Type-C™ and Power Delivery dual port interface board with automotive-grade STUSB1702Y USB Type-C controller

Features
- Both ports acting as Provider role
- Type-C attach and cable orientation detection
- High voltage protections on VBUS and CC lines
- VBUS switch gate drivers
- VBUS monitoring and discharge path
- A current sensing circuit for each port on VBUS line
- Power connector to interface with external power boards (not included)
- Total board dimensions: 85 mm x 81 mm
- RoHS compliant

Description
The AEK-USB-2TYPEC1 automotive grade USB Type-C and Power Delivery dual port expansion board is part of the ST AutoDevKit development initiative. It embeds two STUSB1702Y USB Type-C™ port controllers for a two-port Provider solution.

Each STUSB1702Y USB Type-C port controller includes a fully-featured USB type-C state machine for attach/detach and cable orientation detection, a USB PD PHY and BMC transceiver, high voltage (20 V) technology VBUS voltage monitoring, 600 mA VCONN power switch, VBUS and VCONN discharge paths, 22 V CC line protection, VBUS switch gate drivers and data role configuration (not used in this case).

The two USB Type-C ports have USB 2.0 data lines that are accessible through onboard connectors J101 and J102. The same connectors may be used to redirect the data from one of the two USB 2.0 ports to the 4x20 pass-through connector.

The board also has a power status LED and three status LEDs to signal what each Type-C port is advertising: power role, VBUS negotiation status and CC line orientation (direct or flipped). Two alternate function connectors (not mounted) are available for extension or future developments.

The AEK-USB-2TYPEC1 board is designed to be connected to a SPC58 Chorus 4 MB flash discovery board (SPC58EC-DISP) equipped with a 32-bit Power Architecture® microcontroller for automotive ASIL-B applications. The AEKD-USBTYPEC1 kit consists of two boards and a USB-PD firmware package, so you can develop application based on the USB-PD Provider role.

The AEK-USB-2TYPEC1 embeds a connector for an external power board, which would allow the system to deliver output voltage profiles up to 20 V and satisfy various power requests according to the USB Power Delivery specification.
Figure 2. AEK-USB-2TYPEC1 board schematic 1 - block diagram

Figure 3. AEK-USB-2TYPEC1 board schematic 2 - connectors
Figure 4. AEK-USB-2TYPEC1 board schematic 3 - power supply

The power board plugged on top of the Type-C expansion board will close this jumper.

Figure 5. AEK-USB-2TYPEC1 board schematic 4 - Type-C control port 0
Figure 6. AEK-USB-2TYPEC1 board schematic 5 - Type-C connector port 0

Figure 7. AEK-USB-2TYPEC1 board schematic 6 - current sensor port 0
Figure 10. AEK-USB-2TYPEC1 board schematic 9 - current sensor port 1
## Revision history

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>06-Sep-2018</td>
<td>1</td>
<td>Initial release.</td>
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