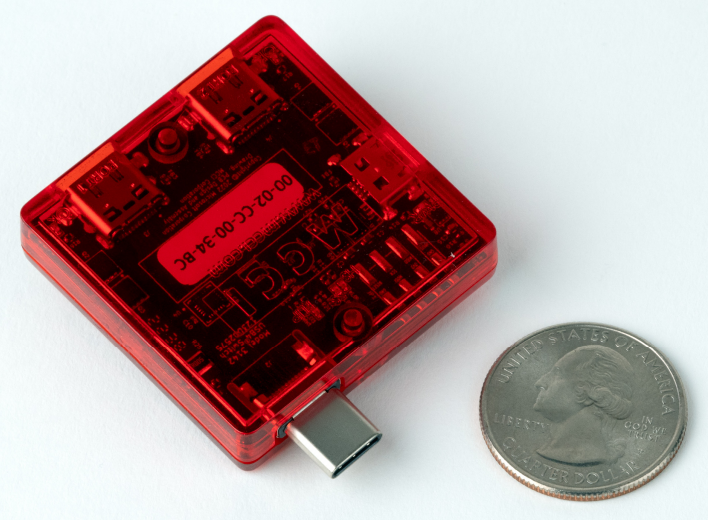
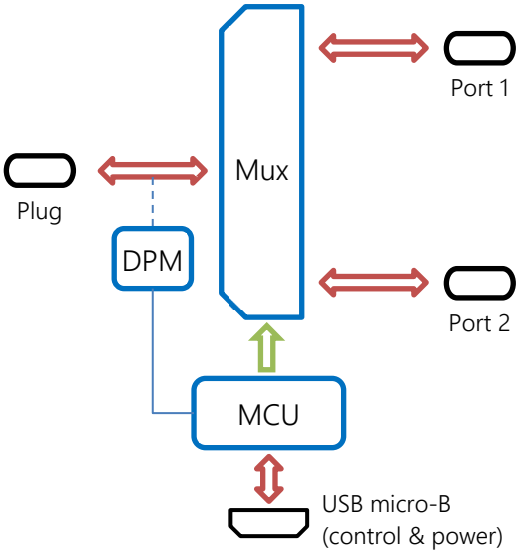
Preliminary Information: Subject to Change

Model 3142 40 Gbps USB4® Switch with EPR

The MCCI® Model 3142 USB4 Switch is a computer-controlled programmable 2:1 switch, connecting two USB Type-C® receptacles to a single Type-C plug. It is compatible with USB4 hosts and devices at signaling rates up to 40 gigabits/second, as well as other protocols such as Thunderbolt™ 4, Thunderbolt™ 3, USB 3.2, USB 2.0, USB Type-C Alternate Modes, and of course USB Power Delivery. It also supports Extended Power Range (EPR) sources and sinks, allowing it to be used with source and sinks at up to 48V at 5A.





The Model 3142 USB4 Switch automates connect/disconnect of one or two devices to a USB Type-C port. It can be used in stress testing, switching between peripherals (for example, a dock and a display), or any automated reconfiguration of a USB Type-C port. It is compatible with the MCCI Model 3201 / Microsoft Type-C ConnEx Connection Exerciser tools and scripts, and integrates with the tools in the Windows Hardware Lab Kit (HLK) to support participation in the Windows Hardware Compatibility Program. It is also fully supported by the MCCI cross-platform Cricket UI.

Beyond formal compatibility testing of your final products, the Model 3142 has value throughout your product development cycle. Long-run randomized switching on a USB Type-C port is highly effective in exposing bugs in the hardware-firmware-software stack on both hosts and devices. Developers can use it with a simple UI on the control computer to connect/reconnect a device under test without physically manipulating cables, reducing wear on fragile prototypes. Continuous integration systems can use it to reproducibly exercise key scenarios of devices under test with a variety of test setups.

Features

- Supports USB4 (up to 40 Gbps), Thunderbolt 4, Thunderbolt 3, USB 3.2 gen2 (x2 and x1), gen 1 (x2 and x1), USB 2.0 high speed, full speed, and low speed, Power Delivery, VCONN-powered devices (up to 0.5A), and alternate modes like DisplayPort™.
- Transparent connection between selected USB-C receptacle and the USB-C plug when in the connected state.
- Impedance controlled, low loss USB data path.
- USB4/SuperSpeed Plus signals are switched by high-speed passive analog switches, 32 Gbps.
- USB2 signals are switched by specialized USB2 switch, 480 Mbps. USB2 signaling can be enabled without USB4.

- CC lines and SBU signals are switched by high-density analog switches
- VBUS power is switched by power FETs, rated for to 48V and 5A on VBUS
- Integrated digital power monitor (DPM) measures VBUS voltage and current
- Accelerometer detects jostling and automatically kills EPR power before arcs can occur.
- AVR 32U4 CPU, with open-source Arduino BSP and firmware.
- Controlled and powered via USB micro-B connector. Standard firmware uses CDC ACM virtual serial port for remote control. Microsoft and MCCI control software provide higher level interfaces for easy, intuitive testing.
- Driverless install on control computers.
- Indication lights for connection indication, enabled speeds, and for cable orientation on receptacles (normal or flipped).
- Tiny form-factor (1.6” by 1.6” / 31mm by 31mm), fully enclosed for safe handling.

Limitations

To keep the 3142 simple and effective for a variety of applications, a few features were specifically omitted. Contact MCCI if you need more information.

- The 3142 handles VCONN powered devices drawing up to 0.5 A of power. Higher power devices are not supported.
- The 3142 does not support automatic Type-C cable flipping.
- For maximum signal integrity, USB 2.0 lines are available only at A6/A7 pins of the Type-C plug. Some systems connect A6/A7 to B6/B7 as shown in figures 4-3 and 4-4 of the USB Type-C specification. These systems operate without restriction; the USB device can be connected in either orientation. Other systems do not connect A6/A7 to B6/B7. These systems require data orientation to follow CC1 orientation. When working with the systems, you must correctly insert devices into the 3142 Type-C receptacles. The cables/devices must be plugged in with A6/A7 matching 3142 A6/17 (not flipped, with A6/A7 matching B6/B7). Indicator lights clearly show the operator when the cables are connected in the direct (not flipped) orientation, and the test control computer can also detect the orientation.

Software requirements

MCCI provides an open-source portable GUI to simplify general purpose testing, available on Windows macOS, Ubuntu, and Raspberry Pi.

For Microsoft Windows HCT system testing, the Model 3142 USB Switch is controlled via a test control computer running Windows, using the Microsoft MUTT ConnEx-C software package. The ConnEx-C package is available from Microsoft via the “Tools in the MUTT Software Package” page.

The Microsoft software package includes utilities to update the firmware, switch between the peripheral ports, and send requests to simulate test cases.

MCCI also supports other test scenarios including remote test, with software available from MCCI, or with customer-written software.

Kit Contents

- Fully assembled and tested Model 3142 USB4 Switch with enclosure.
- USB 2.0 Micro-B cable

Custom Variants

Special variants of the 3142 are available by request. Please write sales@mcci.com with your requirements.

Price and Availability

The Model 3142 will be available in 2022 Q4. It will be available from MCCI’s online store, https://mcci.io/buy-model3142. For more information, please contact MCCI at sales@mcci.com, Twitter @MCCI, https://mcci.com.