USB-SD-Mux FAST

Introduction

The USB-SD-Mux FAST allows changing the contents of a Micro SD-Card while it is inserted into a DUT (Device under test). To do so the USB-SD-Mux FAST is inserted between the Micro SD-Card and the SD-Card socket of the DUT.

The USB-SD-Mux FAST contains a high bandwidth switch, that connects the Micro SD-Card to either the DUT or the on-board card reader. The device is controlled via an USB-C port. Additionally the USB-SD-Mux FAST provides two *open drain* outputs to control external signals, such as resets or card detects [1].

A Linux-only software allows controlling the device from a host computer.

The USB-SD-Mux FAST is an improved version of the first generation USB-SD-Mux, now called the USB-SD-Mux Classic.

The USB-SD-Mux FAST is a drop-in replacement for the USB-SD-Mux Classic.

Typical Use Cases

- **Automated Testing of Embedded Devices**
  The USB-SD-Mux FAST is used to deploy a new operating system to a DUT during automated testing.
- (**Remote) Deployment of Embedded Devices**
  Engineers can use the USB-SD-Mux FAST to deploy images to their DUTs during development – eliminating the need to handle Micro SD-Card on each boot.
- **Automation of Data Logging Equipment**
  The USB-SD-Mux FAST can be used to automate the collection of data from logging equipment, that can only write to Micro SD-Cards.
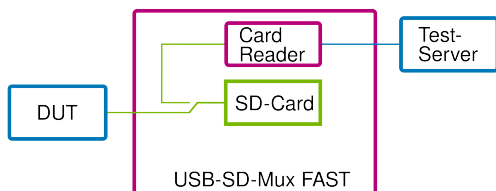

Figure 1: Signal flow

Technical Highlights

- Test server connection: USB-C
- Uses USB Mass-Storage profile - No extra drivers needed
- Mico SD-Card speeds up to UHS-I / SD104
- Unique serial number for easy identification
- Two open drain general purpose outputs
- Reads SD-Cards status registers SCR, CID and CSD
- High reliability thanks to EMI compatibility testing according to DIN EN 55032: 2022-08 and DIN EN 55035: 2018-04
- Status LEDs for power and modes on both sides
- Power up behaviour: Connect SD-Card to DUT

Technical Data

Card Reader	Microchip USB2642
SD-Card: Bandwidth	Approx 1.95 GHz analog bandwidth for digital signals (-3dB, S12)
SD-Card: Vcc Switch	On Resistance: 120 mΩ @ 25 °C Can handle 3.3 V and 1.8 V modes.
Open Drain Outputs	2 Outputs [1] On Resistance: 100 mΩ @ 25°C non isolated
Test Server Connection	USB-C device port (with USB 2.0)

This datasheet is subject to change without notice.

System Requirements

- Linux system with kernel 4.* or higher
- Git, Python 3
- USB 2.0 port

Customization Services

In case the USB-SD-Mux FAST does not fully fit your needs we provide customized hardware and software solutions based on our existing ecosystem.

One of our focuses for the design of our software and hardware is the integration of labgrid.
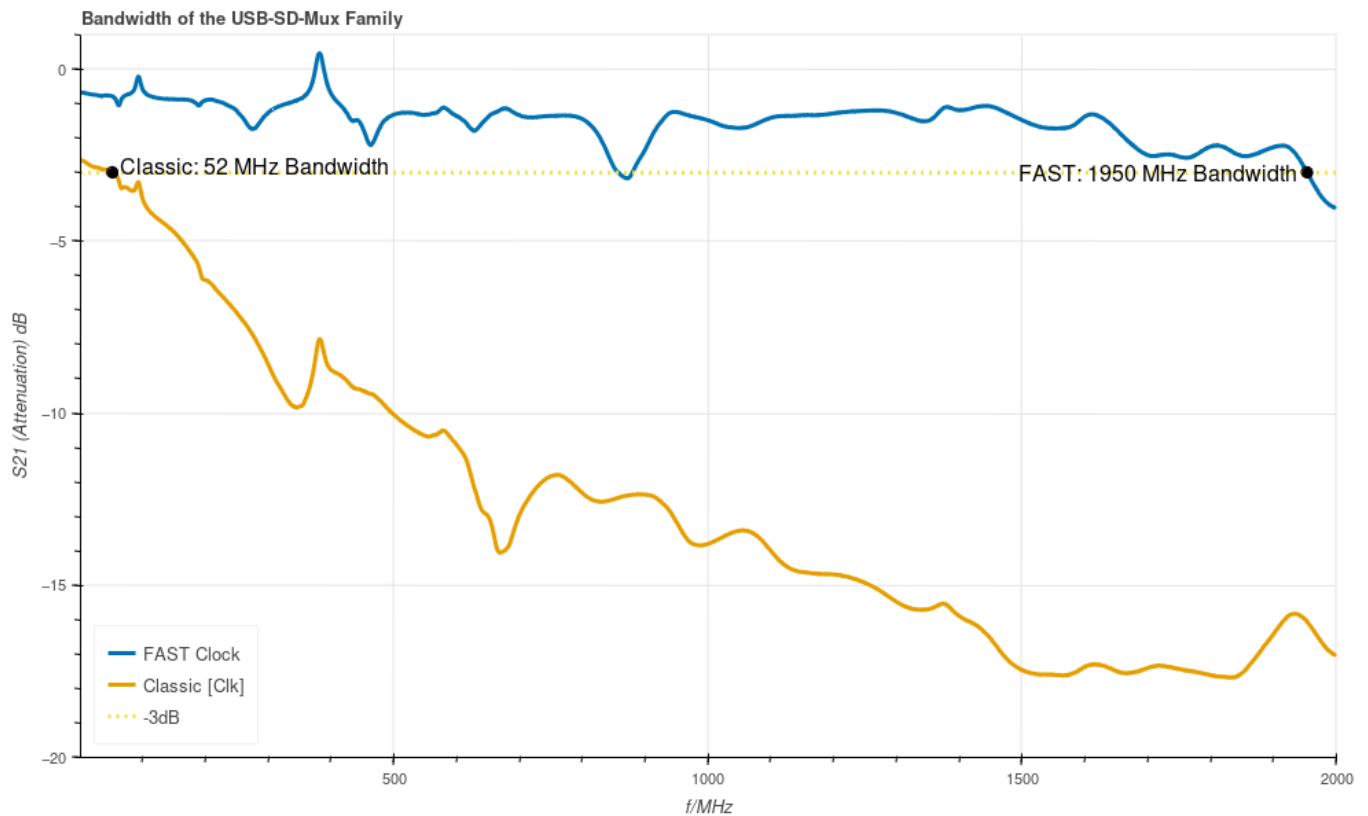
[1] A pin header for these signals must be soldered by the customer. This way the type of header and it's orientation can match the intended purpose.

Bandwidth of the USB-SD-Mux Family

Figure 2: Bandwidth of the USB-SD-Mux Family.
Measured: Clock-Signal, Micro SD-Card slot to DUT port, device powered and switched to DUT

Further Links

- **Handbook**

https://www.linux-automation.com/usbsdmux-M01/

- **Control Software**

https://github.com/linux-automation/usbsdmux/