

96Boards UART Adapter User Guide

For versions v1.0 and v1.1 of the UART adapter board

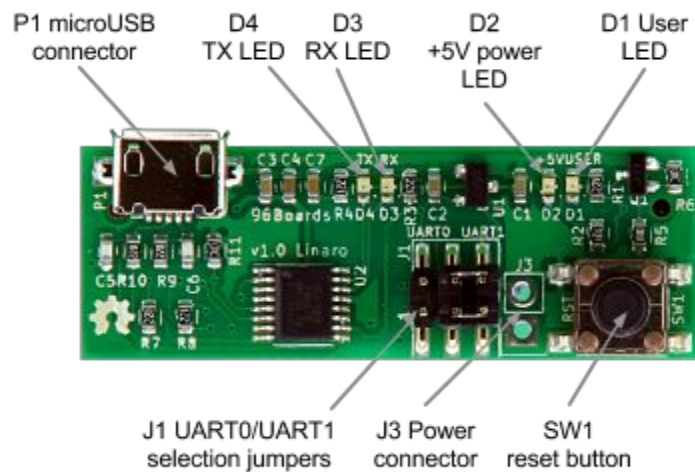


Introduction

This is the user guide for the 96Boards UART adapter board. The board provides a USB to UART adapter to be used with any base board compatible with the 96Boards Consumer Edition or Enterprise Edition specifications¹.

Features

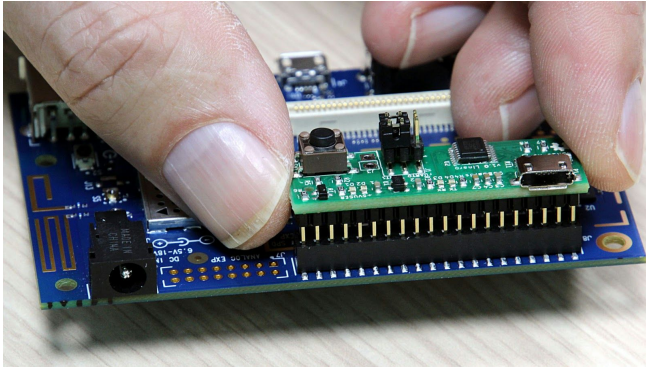
- Attaches to 96Boards LS expansion connector
- FT230X USB to UART adapter chip
- USB bus powered. Doesn't disconnect when base board power is cycled
- Switchable between LS UART0 and UART1. UART1 is the default console
- CTS/RTS when using UART0
- TX and RX LEDs
- Remote control of baseboard reset and power signals
- Base board reset button
- TX and RX LEDs
- User LED connected to GPIOB (GPIOA on v1.0 of the adapter)



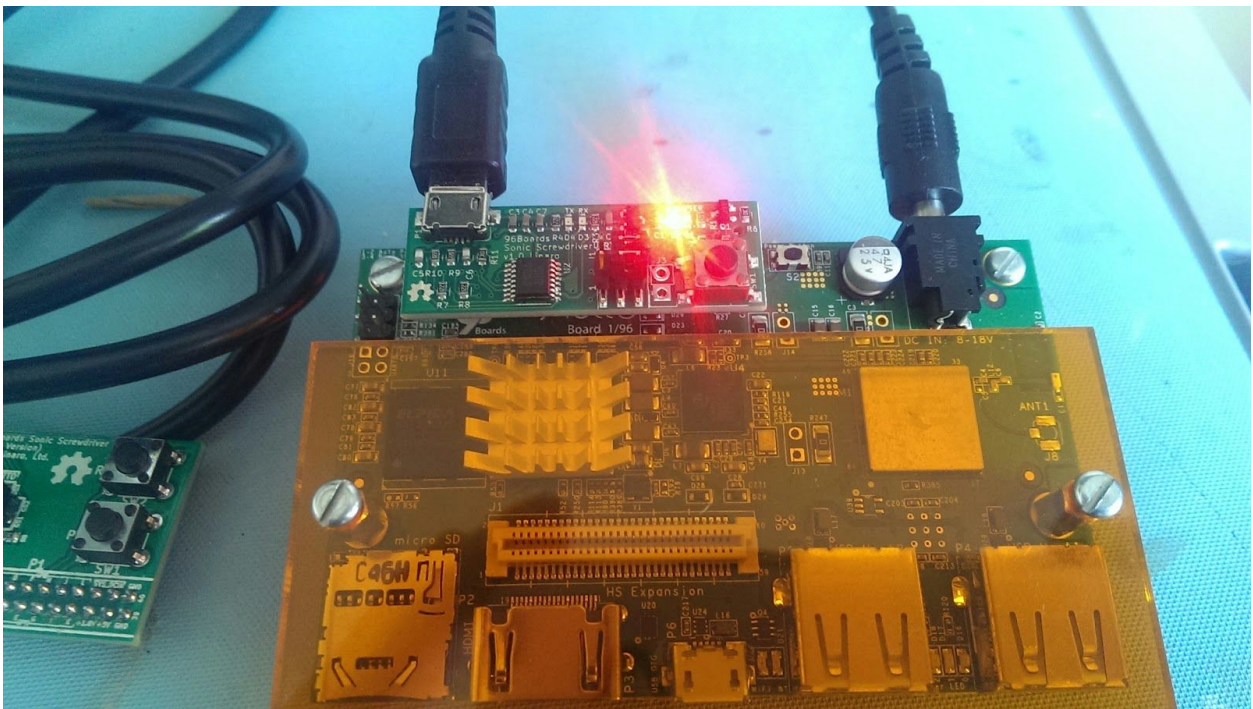
¹ <https://www.96boards.org/>

Installation

Disconnect power from all boards before installing the adapter.



Attach the UART adapter's large 40-pin header (J2) to the LS expansion connector on a 96Boards base board. The connector is oriented with pin 1 beside the USB connector, and pin 40 next to the reset button. **DO NOT INSTALL BACKWARDS.** The board should be oriented so that the Micro USB connector is facing away from the center of the base board and the edge of the adapter is flush with the baseboard edge.



Connect a micro USB cable between P1 and a computer.

Connect power to the 96Boards base board as normal.

WARNING: Do not insert backwards. Doing so will connect the 96Boards +8-18V power supply rail directly to the FT230X UART IO pins and will destroy your UART adapter. It may also damage your base board.

Usage

The adapter will show up as a normal USB-UART device. On a Linux machine, this will probably appear as a `/dev/ttyUSB*` device file. It can be connected to using normal terminal applications.

The reset button behaves as one would expect and resets the board.

Power and reset can be controlled using the '96boardsctl' utility which can be found in the design files repository (see the end of this file). (Currently 96boardsctl is only supported under Linux)

96boardsctl will simulate a power or reset button press.

Building 96boardsctl

```
$ git clone https://git.linaro.org/people/grant.likely/96boards-uart.git
$ cd 96boards-uart/96boardsctl
$ mkdir build
$ cd build
$ cmake ..
$ make
```

Using 96boardsctl

Running 96boardsctl without any arguments will output the following help text:

```
Usage: ./96boardsctl [OPTION]... command
Control the power button and reset lines with a 96boards USB console adaptor

-h, --help                Display this help and exit
-o, --old                 Using old v0.3 prototype board
-l, --list                List available devices and exit
-L, --long                Use long 5s pulse, useful to force board to power off
-p, --pulse-width=TIME   Length of signal pulse in ms
-s, --serial <serial>   Specify device to open by serial number
```

```
Commands:
  power                Pulse the power button signal
  reset                Pulse the reset button signal
```

This program causes the kernel's `ftdi_sio` driver to disconnect from the UART device. It can be reconnected by echoing the device name into `/sys/bus/usb/drivers/ftdi_sio/bind`

To list available console devices:

```
$ 96boardsctl -l
```

To send a reset button push:

```
$ 96boardsctl reset
```

The `-p` flag can be used to change the pulse length. The default pulse for a reset or power button push is 1s. The `-s` flag can be used to choose between multiple uart adapters

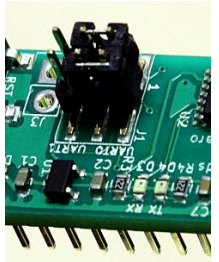
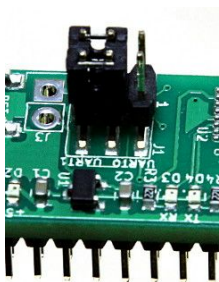
Unfortunately, the `96boardsctl` program causes the kernel driver to be disconnected from board, which disconnects the console feed. Work is being done to solve this by moving the GPIO control into the kernel driver instead of using `libftdi`.

Components

| | |
|-----|---------------------------------|
| J1 | UART0/UART1 selection jumper. |
| J2 | 96Boards LS expansion connector |
| J3 | Power connector |
| P1 | MicroUSB connector |
| SW1 | Baseboard reset button |
| D1 | User LED |
| D2 | +5V power LED |
| D3 | RX LED |
| D4 | TX LED |

J1 Description

6 pin header with 2mm pin pitch. The jumpers on J1 select between UART0 and UART1 on the LS expansion connector. UART1 is the default console serial port. UART0 provides CTS/RTS support.

| | |
|---|--|
| <p>To select UART0: place jumpers between pins 1-3 and 2-4:</p> |  |
| <p>To select UART1: place jumpers between pins 3-5 and 4-6:</p> |  |

| Pin | Signal |
|-----|-----------|
| 1 | UART0 RX |
| 2 | UART0 TX |
| 3 | FT230X TX |
| 4 | FT230X RX |
| 5 | UART1 RX |
| 6 | UART1 TX |

J2 Description

See 96Boards specification documents for details on the LS expansion connector. This board connects to the UART0 and UART1, reset, power, GPIOB (GPIOA on v1.0) signals and +5V power.

J3 Description

Unpopulated 2 pin 0.1" pitch header connector. Used to access the GND and +1.8V power rails on the UART board.

Please Note: This is the UART adapter's 1.8V power rail provided by the on-board regulator and supplied by the USB bus. It does not provide access to the base board's 1.8V power rail.

| Pin | Signal |
|-----|--------|
| 1 | GND |
| 2 | +1.8V |

Design files

The UART adapter board is an entirely Open Hardware, designed using KiCad, and with all of the design files provided under a BSD license. The files can be found on GitHub:

<https://github.com/96boards/96boards-uart>

```
$ git clone https://github.com/96boards/96boards-uart.git
```