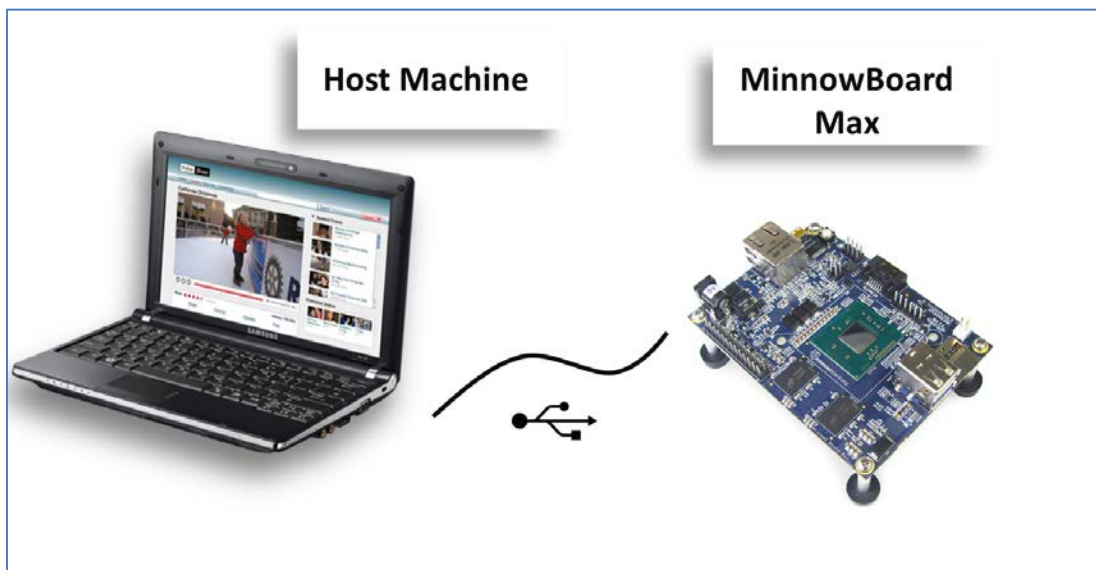


Two-Way Serial Communication with MinnowBoard Max in Linux

This tutorial explains how to set up two-way serial communication between a MinnowBoard Max and a host computer running a Linux operating system. These instructions are based upon Ubuntu Linux and the serial terminal application 'screen', but other Linux environments and serial terminal applications with comparable functionality are also available to perform the same tasks.

Connection between Host and Target



Serial Cable to USB

1. You must have the appropriate USB 6 pin header cable to connect to the MinnowBoard Max. This is a USB to 3.3V TTL Header. You can purchase on the web by searching for the following part number: SS-TTL3VT . The cost is approximately \$20 USD.



To install screen

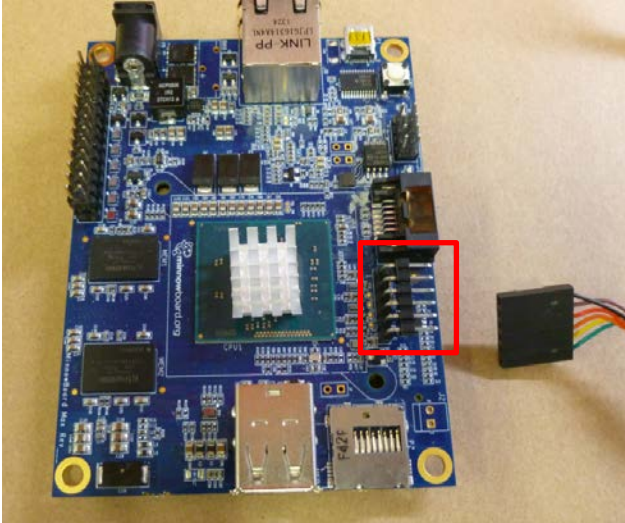
2. With root user permissions run the Advanced Packaging Tool to download and install the screen by running the following command from a terminal:

```
sudo apt-get install screen
```

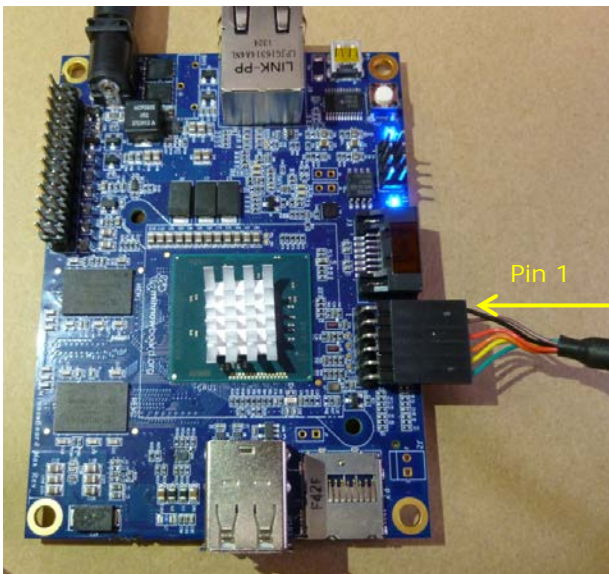
```
$sudo apt-get install screen
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  byobu
The following NEW packages will be installed:
  screen
0 upgraded, 1 newly installed, 0 to remove and 41 not upgraded.
Need to get 0 B/598 kB of archives.
After this operation, 906 kB of additional disk space will be used.
Selecting previously unselected package screen.
(Reading database ... 186003 files and directories currently installed.)
Unpacking screen (from ../screen_4.0.3-14ubuntu9_i386.deb) ...
Processing triggers for man-db ...
Processing triggers for install-info ...
Processing triggers for ureadahead ...
Setting up screen (4.0.3-14ubuntu9) ...
$
```

3. The 6 pin header on the MinnowBoard Max serves as the serial port output:

- **Connect the other end (USB Type A) to the USB port of your computer.**



- Note: Pin 1 of the Header is closest to the SATA connector. Pin 1 of the SS-TTL3VT cable is the Black lead wire.



- a. If you are running Linux in a virtual machine be sure that the virtual machine USB connection is active.
- b. Run the `dmseg` command from a terminal to determine which tty is created (typically `ttyUSB0`).
- c. Look for the FT230x Basic UART.
- d. Find the line that says `FTDI USB Serial Device Converter now attached to ttyUSBX`, where X is the assigned number.

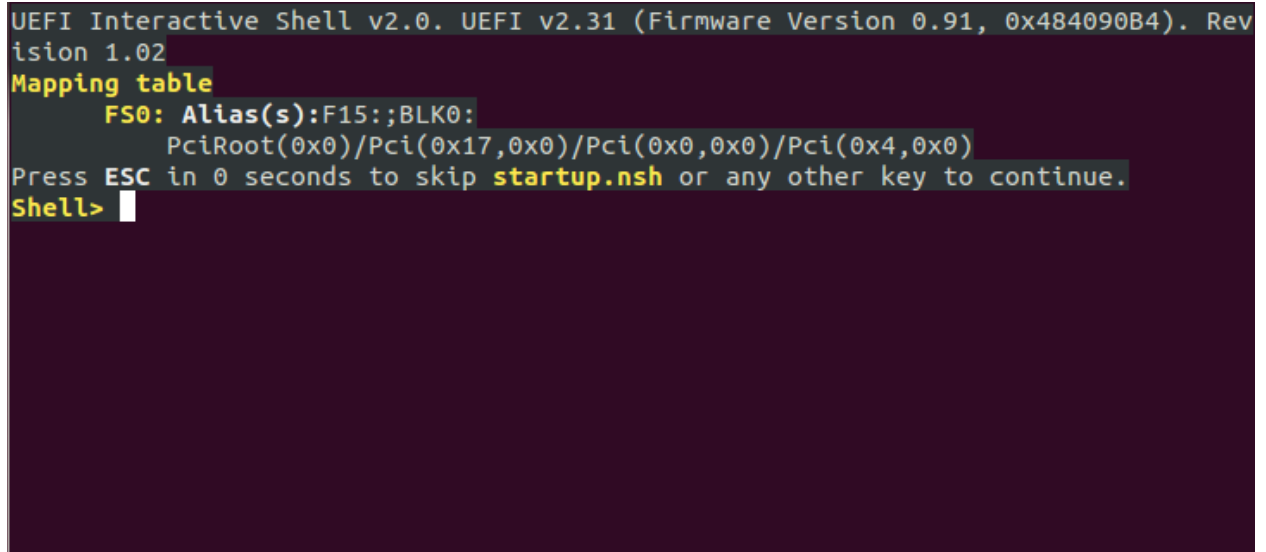
```
[ 306.764271] usb 1-2: new full-speed USB device number 3 using ohci_hcd
[ 307.034097] usb 1-2: New USB device found, idVendor=0403, idProduct=6015
[ 307.034118] usb 1-2: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 307.034134] usb 1-2: Product: FT230X Basic UART
[ 307.034149] usb 1-2: Manufacturer: FTDI
[ 307.034191] usb 1-2: SerialNumber: DAWHKB35
[ 307.285867] usbcore: registered new interface driver usbserial
[ 307.285907] usbcore: registered new interface driver usbserial_generic
[ 307.285928] USB Serial support registered for generic
[ 307.285935] usbserial: USB Serial Driver core
[ 307.323677] usbcore: registered new interface driver ftdi_sio
[ 307.323703] USB Serial support registered for FTDI USB Serial Device
[ 307.323757] ftdi_sio 1-2:1.0: FTDI USB Serial Device converter detected
[ 307.323889] usb 1-2: Detected FT-X
[ 307.323896] usb 1-2: Number of endpoints 2
[ 307.323904] usb 1-2: Endpoint 1 MaxPacketSize 64
[ 307.323911] usb 1-2: Endpoint 2 MaxPacketSize 64
[ 307.323918] usb 1-2: Setting MaxPacketSize 64
[ 307.348821] usb 1-2: FTDI USB Serial Device converter now attached to ttyUSB0
[ 307.349103] ftdi_sio: v1.6.0:USB FTDI Serial Converters Driver
[ 863.885338] hrtimer: interrupt took 8194523 ns
```

To start screen for MinnowBoard Max serial communication purposes

1. Make sure to have root user permission and execute the command:

```
screen /dev/ttyUSBX 115200
```

- a. Replace the X of USBX with the actual assigned tty number found during the previous step. The 115200 indicates the baud rate for the serial data transfer.



```
UEFI Interactive Shell v2.0. UEFI v2.31 (Firmware Version 0.91, 0x484090B4). Revision 1.02
Mapping table
FS0: Alias(s):F15:;BLK0:
PciRoot(0x0)/Pci(0x17,0x0)/Pci(0x0,0x0)/Pci(0x4,0x0)
Press ESC in 0 seconds to skip startup.nsh or any other key to continue.
Shell> |
```

Two-way serial communication should now be established between the MinnowBoard Max and host computer. Type into the terminal to communicate with the MinnowBoard Max UEFI Shell.