

TDA4VM: UART Boot

UART Boot: Why is it useful? Pros & Cons

- UART boot is one of the peripheral boot modes supported on TDA4VM
- Very useful when primary boot media like SD interface is not available.
- The UART boot is definitely slow.
- Requires a Linux machine.
- 2 ways to do UART boot
 - a) Manually loading files via minicom.
 - b) Command line interface based using sb command.

UART Boot: Dip switch settings

Switch SW8

1	2	3	4	5	6	7	8
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

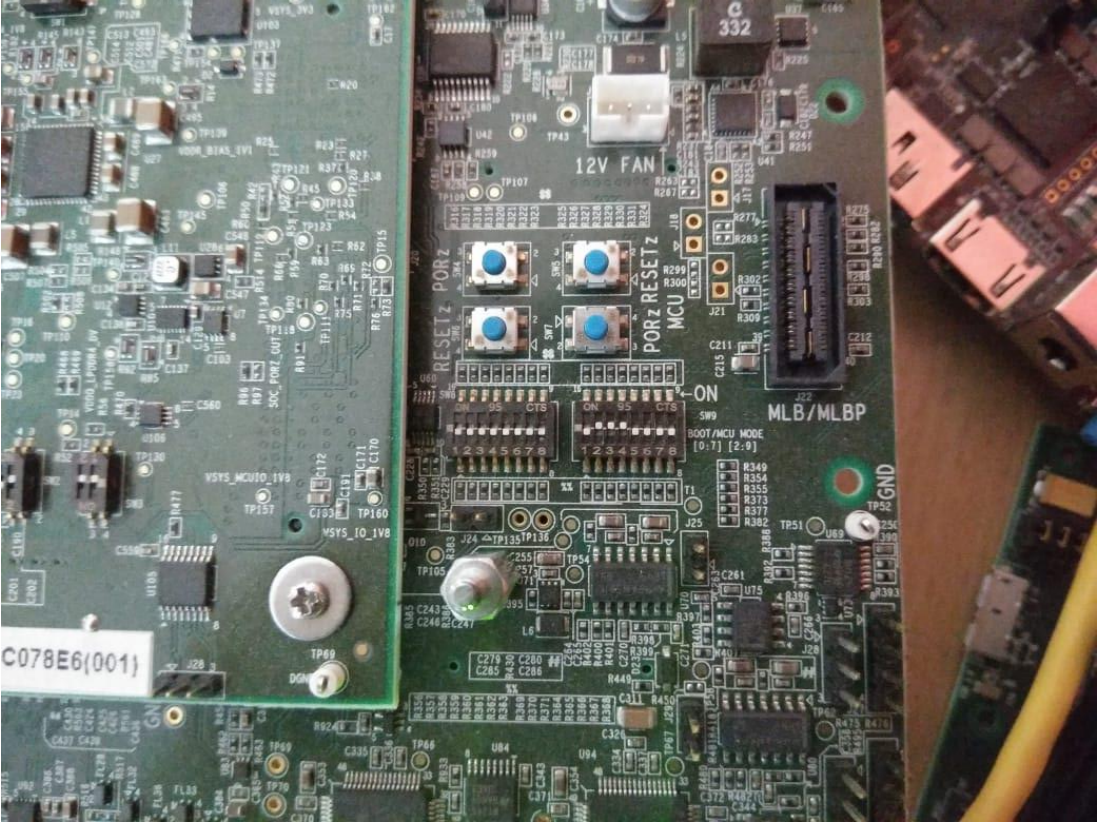
Switch SW9

1	2	3	4	5	6	7	8
OFF	ON	ON	ON	OFF	OFF	OFF	OFF

Switch SW3

1	2	3	4	5	6	7	8	9	10
ON	ON	ON	ON	OFF	OFF	ON	OFF	ON	OFF

UART Boot: Dip switch Image (SW8/SW9)



UART Boot: Dip switch Image (SW3)



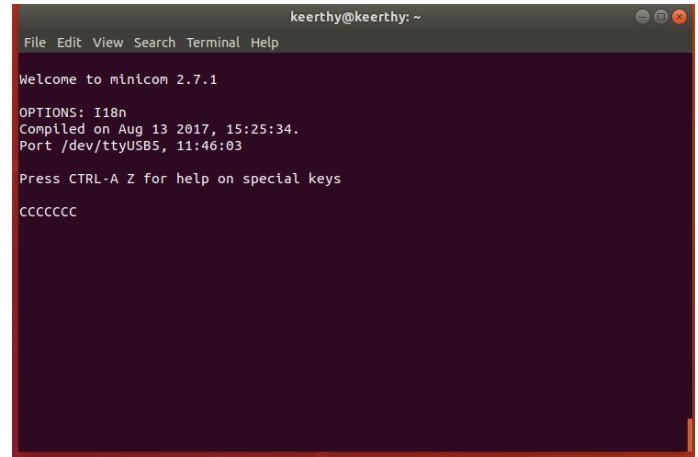
UART Boot: USB Ports

We use 2 micro USB ports on the EVM

- UART Port
 - Enumerates 4 instances of USB.
Ex: /dev/ttyUSB0, /dev/ttyUSB1, /dev/ttyUSB2, /dev/ttyUSB3
 - We use **/dev/ttyUSB0(First Instance)** as the **Main UART**.
- MCU UART Port
 - Enumerates 2 instances of USB.
Ex: /dev/ttyUSB4 & /dev/ttyUSB5
 - We use **/dev/ttyUSB5(Second instance)** as the **MCU UART Port**.

UART Boot: Using minicom

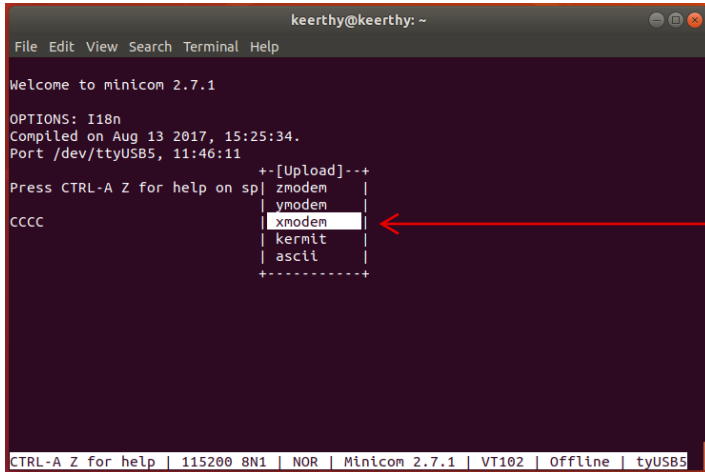
- Set the dip switches as per slide 3 and then power on the board.
- Have two minicom instances ready one connected /dev/ttyUSB0(Main UART) & the other /dev/ttyUSB5(MCU UART).
- If the board is set in the UART boot mode switch settings One should see CCCCCC on the MCU UART minicom window.

A screenshot of a terminal window titled 'keerthy@keerthy: ~'. The terminal shows the output of a minicom instance. The text displayed is: 'Welcome to minicom 2.7.1', 'OPTIONS: I18n', 'Compiled on Aug 13 2017, 15:25:34.', 'Port /dev/ttyUSB5, 11:46:03', 'Press CTRL-A Z for help on special keys', and 'CCCCCC'. A red arrow points from the text 'CCCCCC on the MCU UART minicom window.' in the list above to the 'CCCCCC' output in the terminal.

```
keerthy@keerthy: ~  
File Edit View Search Terminal Help  
Welcome to minicom 2.7.1  
OPTIONS: I18n  
Compiled on Aug 13 2017, 15:25:34.  
Port /dev/ttyUSB5, 11:46:03  
Press CTRL-A Z for help on special keys  
CCCCCC
```


UART Boot: Using minicom

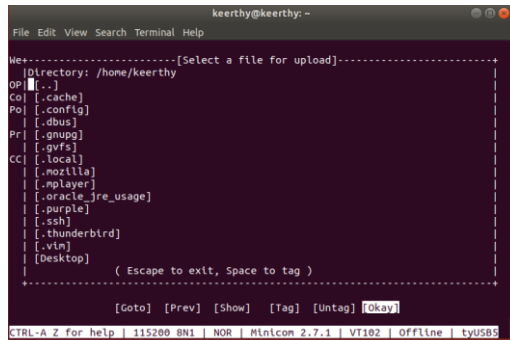
- On the MCU Port minicom window load tiboot3.bin binary using xmodem.
- Only for this step xmodem is employed as the ROM code supports that.
- CTRL + A followed by 's' on minicom gives the modem window choose xmodem and enter.



```
keerthy@keerthy: ~  
File Edit View Search Terminal Help  
Welcome to minicom 2.7.1  
OPTIONS: I18n  
Compiled on Aug 13 2017, 15:25:34.  
Port /dev/ttyUSB5, 11:46:11  
+--[Upload]--+  
Press CTRL-A Z for help on sp| zmodem  
| ymodem  
| xmodem  
| kermit  
| ascii  
+-----+  
CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | tyUSB5
```

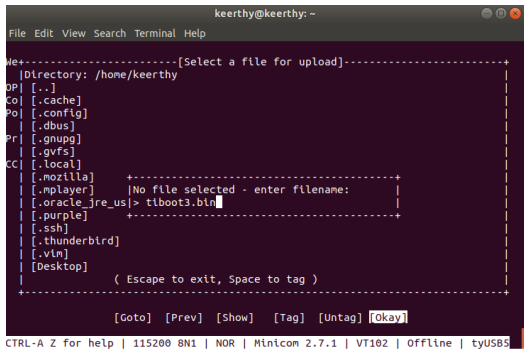
UART Boot: Using minicom

- Keep the tiboot3.bin in the home folder as the minicom window picks up from home folder by default.



```
keerthy@keerthy: ~
File Edit View Search Terminal Help
-----[Select a file for upload]-----
|Directory: /home/keerthy
|OP| [..]
|Co| [.cache]
|Po| [.config]
|Pr| [.dbus]
|   | [.gnupg]
|   | [.gvfs]
|CC| [.local]
|   | [.mozilla]
|   | [.nplayer]
|   | [.oracle_jre_usage]
|   | [.purple]
|   | [.ssh]
|   | [.thunderbird]
|   | [.vtn]
|   | [Desktop]
|-----+-----
| ( Escape to exit, Space to tag )
|-----+-----
|[Goto] [Prev] [Show] [Tag] [Untag] [Okay]
```

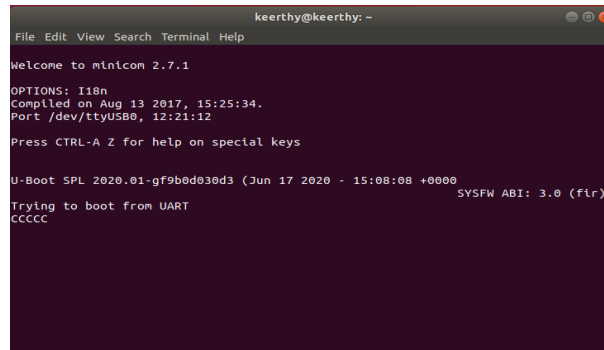
- Enter once and then type the file name tiboot3.bin



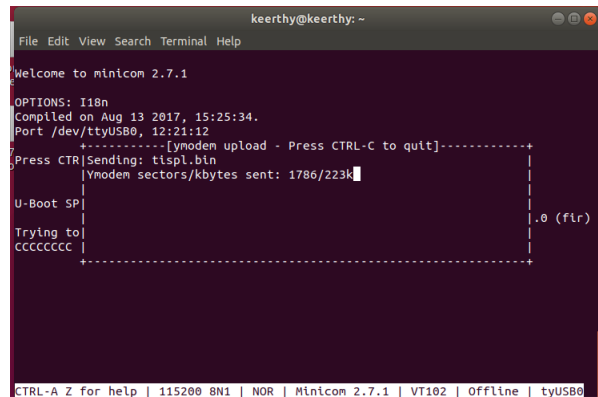
```
keerthy@keerthy: ~
File Edit View Search Terminal Help
-----[Select a file for upload]-----
|Directory: /home/keerthy
|OP| [..]
|Co| [.cache]
|Po| [.config]
|Pr| [.dbus]
|   | [.gnupg]
|   | [.gvfs]
|CC| [.local]
|   | [.mozilla]
|   | [.nplayer]
|   | [.oracle_jre_us]
|   | [.purple]
|   | [.ssh]
|   | [.thunderbird]
|   | [.vtn]
|   | [Desktop]
|-----+-----
| ( Escape to exit, Space to tag )
|-----+-----
|[Goto] [Prev] [Show] [Tag] [Untag] [Okay]
```


UART Boot: Using minicom

- Once sysfw.itb loading is complete on the MCU minicom window press enter and now shift to Main UART minicom window. You should be observing the r5 SPL prints already on the Main minicom window and character stream CCCCCC.
- On the Main UART minicom window Follow the same procedure to get to modem window and choose ymodem and get to the filename window and type tisp1.bin and press enter.



```
keerthy@keerthy: ~  
File Edit View Search Terminal Help  
Welcome to minicom 2.7.1  
OPTIONS: I18n  
Compiled on Aug 13 2017, 15:25:34.  
Port /dev/ttyUSB0, 12:21:12  
Press CTRL-A Z for help on special keys  
U-Boot SPL 2020.01-gf9bd036d3 (Jun 17 2020 - 15:08:08 +0000) SYSFW ABI: 3.0 (fir)  
Trying to boot from UART  
CCCCC
```



```
keerthy@keerthy: ~  
File Edit View Search Terminal Help  
Welcome to minicom 2.7.1  
OPTIONS: I18n  
Compiled on Aug 13 2017, 15:25:34.  
Port /dev/ttyUSB0, 12:21:12  
+-----[ymodem upload - Press CTRL-C to quit]-----+  
Press CTRL Sending: tisp1.bin  
|ymodem sectors/kbytes sent: 1786/223k|  
U-Boot SP | .0 (fir)  
Trying to  
CCCCCCCC |  
+-----+  
CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | OffLine | ttyUSB0
```

UART Boot: Using minicom

- Once tisp1.bin is loaded you should be seeing the A72 SPL prints and also the character stream CCCCC increasing waiting for the next image to be loaded.
- On the Main UART minicom window Follow the same procedure to get to modem window and choose ymodem and get to the filename window and type u-boot.img and press enter.

```
keerthy@keerthy:~$ minicom
File Edit View Search Terminal Help
Port /dev/ttyUSB0, 12:21:12
Press CTRL-A Z for help on special keys

U-Boot SPL 2020.01-gf9b0d030d3 (Jun 17 2020 - 15:08:08 +0000)
SYSFW ABI: 3.0 (ftr)
Trying to boot from UART
CCCCCCCCLoaded 687160 bytes
Loading Environment from MMC... *** Warning - No MMC card found using default env
init_env from device 7 not supported!
Loading rproc fw image from device 7 not supported!
Loading rproc fw img from device 7 not supported!
Starting ATF on ARMv8 core...
NOTICE: BL31: v2.3():07.00.00.005-dirty
NOTICE: BL31: Built : 14:33:55, Jun 17 2020

U-Boot SPL 2020.01-gf9b0d030d3 (Jun 17 2020 - 14:34:25 +0000)
SYSFW ABI: 3.0 (firmware rev 0x0014 '20.04.1-v2020.04a (Triflic Lla)')
Detected: J7X-BASE-CPB rev E3
Detected: J7X-V5C8S14-ETH rev E2
Trying to boot from UART
CCCCCCC
```

```
keerthy@keerthy:~$ minicom
File Edit View Search Terminal Help
Port /dev/ttyUSB0, 12:21:12
Press CTRL-A Z for help on special keys

U-Boot SPL 2020.01-gf9b0d030d3 (Jun 17 2020 - 15:08:08 +0000)
+++++[y]modem upload - Press CTRL-C to quit]-----t.0 (ftr)
Trying to|Sending: u-boot.img
CCCCCCCC|Ymodem sectors/kbytes sent: 1546/193K|
Loading E|
init_env|
Loading r|
Loading r|
Loading r|
Starting|
NOTICE: BL31: v2.3():07.00.00.005-dirty
NOTICE: BL31: Built : 14:33:55, Jun 17 2020

U-Boot SPL 2020.01-gf9b0d030d3 (Jun 17 2020 - 14:34:25 +0000)
SYSFW ABI: 3.0 (firmware rev 0x0014 '20.04.1-v2020.04a (Triflic Lla)')
Detected: J7X-BASE-CPB rev E3
Detected: J7X-V5C8S14-ETH rev E2
Trying to boot from UART
CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | tyUSB0
```

UART Boot: Using minicom

- Be watchful when the u-boot.img file is getting loaded and at the end a message to hit enter shows up. Please hit enter and you should be at the u-boot prompt. That completes UART boot.

```
keerthy@keerthy: ~  
File Edit View Search Terminal Help  
Detected: J7X-BASE-CPB rev E3  
Detected: J7X-VSC8514-ETH rev E2  
Trying to boot from UART  
CCCCCCCCLoaded 1025720 bytes  
  
U-Boot 2020.01-gf9b0d030d3 (Jun 17 2020 - 14:34:25 +0000)  
SoC: J721E SR1.0  
Model: Texas Instruments K3 J721E SoC  
Board: J721-PM2-SOM rev E6  
DRAM: 4 GiB  
not found for dev hmc-mux  
Flash: 0 Bytes  
MMC: sdhci@4f80000: 0, sdhci@4fb00: 1  
Loading Environment from MMC... OK  
In: serial@2800000  
Out: serial@2800000  
Err: serial@2800000  
Detected: J7X-BASE-CPB rev E3  
Detected: J7X-VSC8514-ETH rev E2  
Net: eth0: ethernet@046000000  
Hit any key to stop autoboot: 0  
=>  
=> |
```


UART Boot: Using sb command (CLI)

- The sb method is very well documented here:
https://software-dl.ti.com/jacinto7/esd/processor-sdk-linux-jacinto7/latest/exports/docs/linux/Foundational_Components_U-Boot.html#uart
- **NOTE Of caution: The above does not seem to be working on the ubuntu virtual machines.**
Prefer the minicom method to try out UART Boot first.

Thank You