Sam-Ba:

SAM-BA software provides an open set of tools for in-system programming of internal and external memories connected to our 32-MCUs and MPUs. You can program your device through the JTAG, debug UART or USB interfaces.

Downloading Sam-Ba:

Use the given link to download the Sam-Ba 3.3.1 : ***https://github.com/atmelcorp/sam-ba/releases***

Steps for installing Sam-Ba:

Extract the tar file that we downloaded using the above link.

- ➢ ***sudo tar -xvf sam-ba_3.3.1-linux_x86_64.tar.gz***

Steps for NOR flashing using Sam-Ba :

Go inside the Sam-Ba directory:

- ➢ ***cd sam-ba_3.3.1***

Create a folder inside this directory and keep all your images in that folder:

- ➢ ***mkdir images_rba5d2x***

Now, connect the board to pc with the help of micro-usb cable, but before connecting the board to pc slide the onboard boot switch to ON.

Then, after connecting the board to pc run 'dmesg' command to check the device is detected or not.

- ➢ ***dmesg***

Below image shows that the device is detected message you will able to see when you give dmesg command.

```
[ 1490.056297] ftdi_sio 1-1:1.0: device disconnected
[ 1492.018611] usb 1-1: new full-speed USB device number 16 using xhci_hcd
[ 1492.175296] usb 1-1: New USB device found, idVendor=0403, idProduct=6015, bcdDevice=10.00
[ 1492.175305] usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 1492.175310] usb 1-1: Product: FT230X Basic UART
[ 1492.175314] usb 1-1: Manufacturer: FTDI
[ 1492.175318] usb 1-1: SerialNumber: D3074M8O
[ 1492.179917] ftdi_sio 1-1:1.0: FTDI USB Serial Device converter detected
```

Now give below commands one by one to flash the images :

Note: When you give this erase command given below you will notice a connection opened message at the terminal, at that time slide the onboard boot switch to OFF.

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c erase
Opening serial port 'ttyUSB0'
Connection opened.
```

1) ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c erase

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c erase
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'erase'
Erased 65536 bytes at address 0x00000000 (0.20%)
Erased 65536 bytes at address 0x00010000 (0.39%)
Erased 65536 bytes at address 0x00020000 (0.59%)
Erased 65536 bytes at address 0x00030000 (0.78%)
Erased 65536 bytes at address 0x00040000 (0.98%)
```

2) ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c writeboot:images_rba5d2x/BOOT.BIN

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c writeboot:images_rba5d2x/BOOT.BIN
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'writeboot:images_rba5d2x/BOOT.BIN'
Appending 64 bytes of padding to fill the last written page
Wrote 12800 bytes at address 0x00000000 (100.00%)
Connection closed.
```

3) ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/u-boot.bin:0x20000

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/u-boot.bin:0x20000
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'write:images_rba5d2x/u-boot.bin:0x20000'
Appending 163 bytes of padding to fill the last written page
Wrote 89600 bytes at address 0x00020000 (20.49%)
Wrote 89600 bytes at address 0x00035e00 (40.98%)
Wrote 89600 bytes at address 0x0004bc00 (61.48%)
Wrote 89600 bytes at address 0x00061a00 (81.97%)
Wrote 78848 bytes at address 0x00077800 (100.00%)
Connection closed.
```

4) *./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/a5d2x-rugged_board.dtb:0xA0000*

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/a5d2x-rugged_board.dtb:0xA0000
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'write:images_rba5d2x/a5d2x-rugged_board.dtb:0xA0000'
Appending 193 bytes of padding to fill the last written page
Wrote 33792 bytes at address 0x000a0000 (100.00%)
Connection closed.
```

5) *./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/zImage:0xB0000*

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/zImage:0xB0000
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'write:images_rba5d2x/zImage:0xB0000'
Appending 192 bytes of padding to fill the last written page
Wrote 89600 bytes at address 0x000b0000 (2.21%)
Wrote 89600 bytes at address 0x000c5e00 (4.41%)
Wrote 89600 bytes at address 0x000dbc00 (6.62%)
Wrote 89600 bytes at address 0x000f1a00 (8.82%)
Wrote 89600 bytes at address 0x00107800 (11.03%)
Wrote 89600 bytes at address 0x0011d600 (13.23%)
Wrote 89600 bytes at address 0x00133400 (15.44%)
```

6) *./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/rb-nor-core-image-minimal-ruggedboard-a5d2x.squashfs:0x5B0000*

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/rb-nor-core-image-minimal-rugged-board-a5d2x.squashfs:0x5B0000
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'write:images_rba5d2x/rb-nor-core-image-minimal-rugged-board-a5d2x.squashfs:0x5B0000'
Wrote 89600 bytes at address 0x005b0000 (0.41%)
Wrote 89600 bytes at address 0x005c5e00 (0.82%)
Wrote 89600 bytes at address 0x005dbc00 (1.23%)
Wrote 89600 bytes at address 0x005f1a00 (1.63%)
Wrote 89600 bytes at address 0x00607800 (2.04%)
Wrote 89600 bytes at address 0x0061d600 (2.45%)
Wrote 89600 bytes at address 0x00633400 (2.86%)
Wrote 89600 bytes at address 0x00649200 (3.27%)
Wrote 89600 bytes at address 0x0065f000 (3.68%)
```

7) *./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/data-image-rootfs.jffs2:0x01BB0000*

```
root@shailesh:/home/lenovo/rb_a5d2x/sam_ba/sam-ba_3.3.1# ./sam-ba -p usb -b sama5d27-som1-ek1 -a qspiflash -c write:images_rba5d2x/data-image-rootfs.jffs2:0x01BB0000
Opening serial port 'ttyUSB0'
Connection opened.
Detected memory size is 33554432 bytes.
Page size is 256 bytes.
Buffer is 89600 bytes (350 pages) at address 0x0022a160.
Supported erase block sizes: 4KB, 32KB, 64KB
Executing command 'write:images_rba5d2x/data-image-rootfs.jffs2:0x01BB0000'
Wrote 89600 bytes at address 0x01bb0000 (22.79%)
Wrote 89600 bytes at address 0x01bc5e00 (45.57%)
Wrote 89600 bytes at address 0x01bdbc00 (68.36%)
Wrote 89600 bytes at address 0x01bf1a00 (91.15%)
Wrote 34816 bytes at address 0x01c07800 (100.00%)
Connection closed.
```

The Below two commands is for configuring the boot registers and for providing flash media access respectively.

1) *./sam-ba -p usb -b sama5d27-som1-ek1 -a bootconfig -c writecfg:bscr:valid,burge0*
2) *./sam-ba -p usb -b sama5d27-som1-ek1 -a bootconfig -c writecfg:burge0:ext_mem_boot,sdmmc1,sdmmc0_disabled,nfc_disabled,spi1_disabled,spi0_disabled,qspi1_ioset2,qspi0_disabled*