FRDM IMX93 Board Flashing Guide

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1. Introduction

The FRDM-i.MX93 development board is designed to support advanced applications such as Industrial and Consumer HMI, Edge AI, Interconnected Devices, and High-Performance IoT Solutions. Built with NXP's i.MX 93 applications processor, it offers robust features like efficient machine learning acceleration, enhanced multimedia capabilities, and advanced connectivity options. This document provides a detailed guide on setting up the FRDM-i.MX93 development board. It includes hardware connections, flashing the Linux image, and accessing the debug console for seamless development and prototyping.

2. Required hardware

- Terminal program running on a host computer. (Setting for terminal: Baud rate:115200, Parity: none, Data bits: 8, Stop bits: 1)
- 2 spare USB ports on PC
- 1 x FRDM i.MX93 Development board
- PC with a suitable terminal program.

3. Required Software

1) Terminal Emulator such as PUTTY(Download) or teraterm (Download).

2) MfgtoolV3 (uuu): this tool will be used for installing Linux and Android onto the boards and can be found here. Download the latest Released version.

3) A pre-built Linux image v6.6.36-2.1.0 can be found here. The file contains the demo linux image.

4) Documentation: Download from the link and see the files under the Documentation heading.

5) For Matter and OpenThread support build the image from the link and use that image for OpenThread examples.

4. Initial Setup and Operation

This document will cover the unboxing, initial setup and operation of the EVK.

Figure 1 and 2 shows FRDM-i.MX 93 board overview.

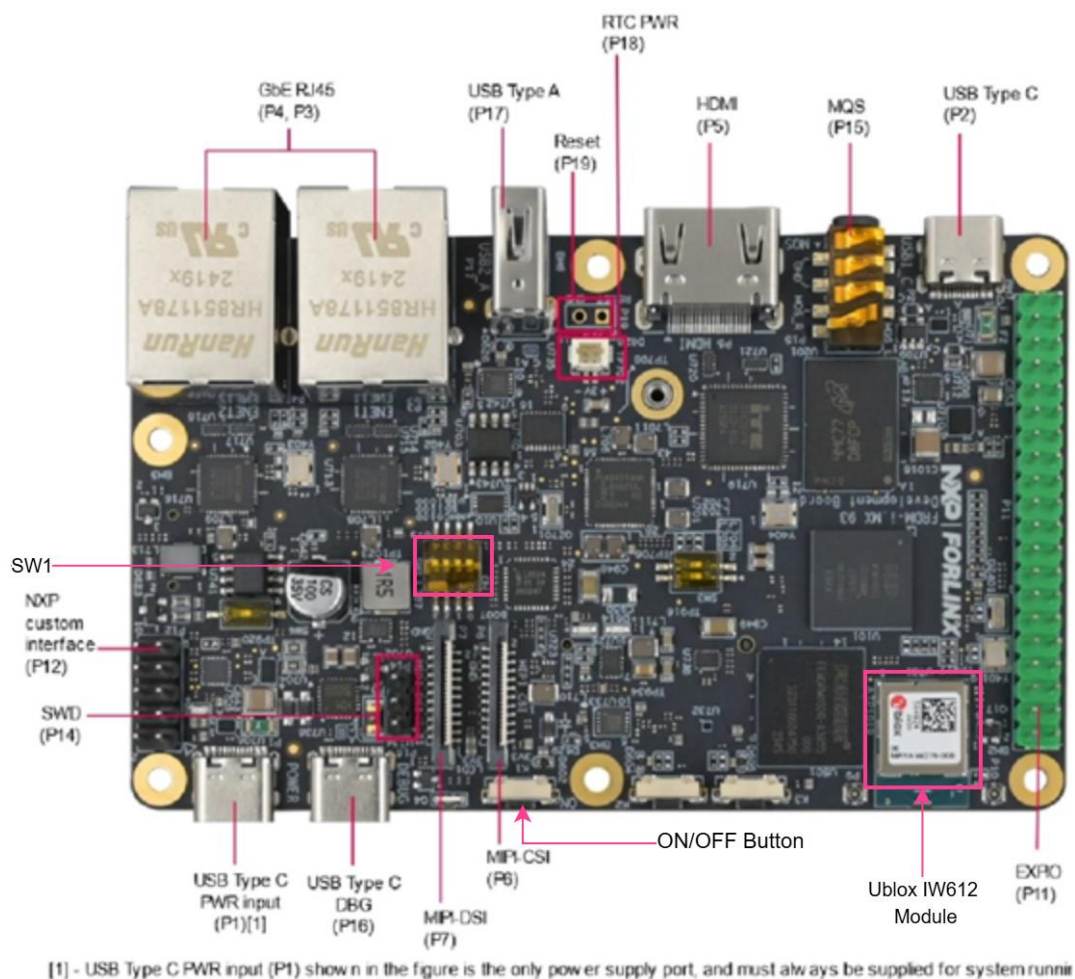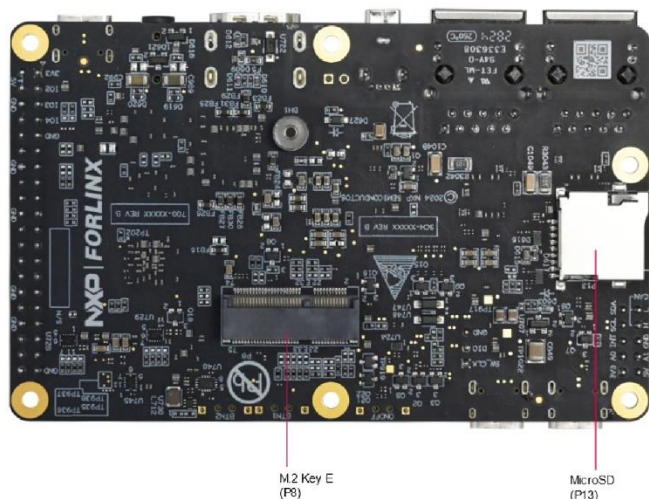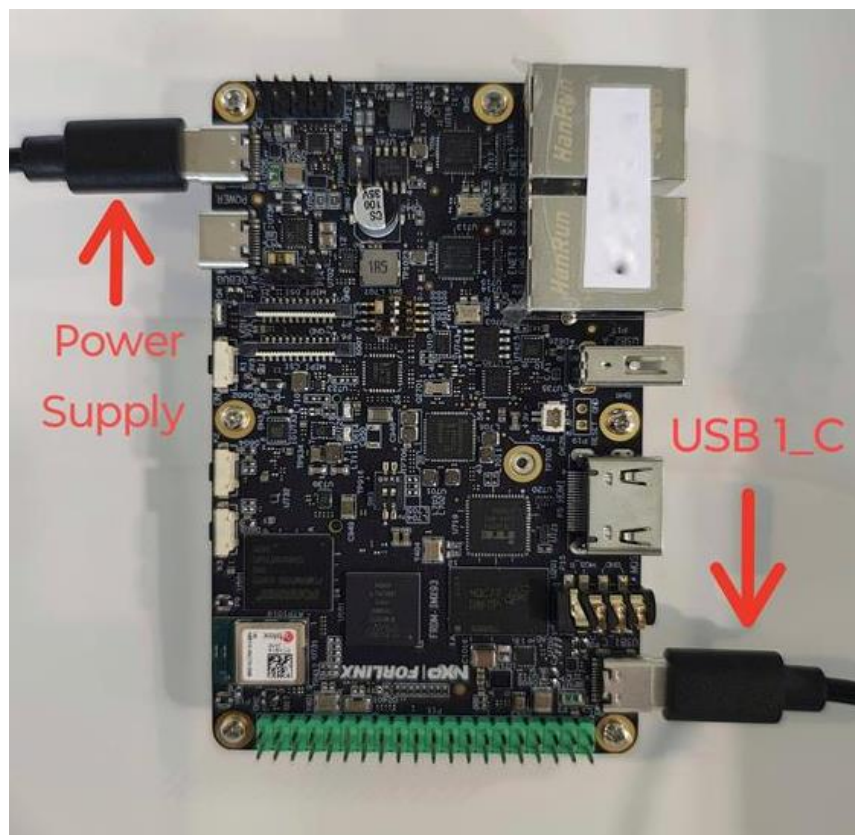Figure 1 shows the front side of the FRDM-i.MX 93 board.

Figure 2 shows the back side of the FRDM-i.MX 93 board.

M.2 Key E
(P8)

MicroSD
(P13)

4.1.   Hardware Connections

Connect the Type-C power supply and USB on FRDM iMX93 board as described below.

4.2.   Downloading Software

For the most up to date software image, see the Required Software section above.
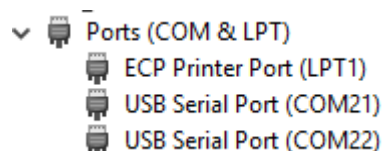
4.3.   Programming the eMMC memory with Linux

To flash the FRDM-i.MX with a Linux image

1) Download Linux image file per the prerequisites section to a directory of your choice.
2) For this instance, we will use the default Linux image file: v6.6.36-2.1.0.
3) Unzip the file into a directory of your choice.
4) Download latest uuu.exe from https://github.com/NXPmicro/mfgtools/releases
   NOTE: uuu.exe is a command line program. Just double clicking on it will not result in a windowed program you can interact with.
5) Copy uuu.exe for windows into the same subdirectory that you have Unzipped the Linux images.
6) Set the boot switches on the board to Serial Download mode.

Boot Mode Switch Settings	
SW1[1:4]	**Boot Mode**
1000	Serial downloader (USB)
0100	uSDHC1 8-bit eMMC 5.1

7) Start your favourite terminal program and connect to the appropriate COM port.
   a) For Windows, check the device manager for the USB Serial Port. The A53 debug port will be the highest of the two numbers. In this case, it will be COM22. The M4 debug port will be enumerated as the lower number.

       ∨ 🖥 Ports (COM & LPT)
           🖭 ECP Printer Port (LPT1)
           🖭 USB Serial Port (COM21)
           🖭 USB Serial Port (COM22)

Note: **If your PC does not detect the connected board, refer to Appendix A and B for further instructions**.

8) Turn on board's power by plugging the Power USB cable.
9) Enter the below command,
   For linux, use below command:

   uuu -b emmc_all imx-boot-imx93frdm-sd.bin-flash_singleboot imx-image-full-imx93frdm.rootfs.wic.zst

   For windows, use below command:

   uuu.exe -b emmc_all imx-boot-imx93frdm-sd.bin-flash_singleboot imx-image-full-imx93frdm.rootfs.wic.zst

   a) The program indicates "Wait for Known USB Device Appear"

```
$ sudo uuu -b emmc_all imx-boot-imx93frdm-sd.bin-flash_singleboot
imx-image-full-imx93frdm.rootfs.wic.zst

[sudo] password for NXP:
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.5.21-0-
g1f42172
```

```
Wait for Known USB Device Appear...
```

NOTE: If you are stuck at this point then the serial drivers are likely not installed follow the steps at Appendix A before coming back here.

b) Then as soon as it recognizes the board is alive it starts programming and reports its status.

```
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.5.21-0-
g1f42172

Success 0    Failure 0
1:2      4/ 8 [=====>             17%                    ] FB: flash -
raw2sparse all imx-image-full-imx93frdm.rootfs.wic
```

You will also see on the serial terminal lots of messages scrolling past as uuu programs the flash.

c) Once uuu is complete it will report Success 1 Failure 0 ….

```
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.5.21-0-
g1f42172

Success 1    Failure 0
1:2      8/ 8 [Done                                      ] FB: done
```

d) Turn off the board.

Reset the boot mode switches to e-mmc boot

Boot Mode Switch Settings	
SW1[1:4]	**Boot Mode**
1000	Serial downloader (USB)
0100	uSDHC1 8-bit eMMC 5.1

e) Remove the USB cable from USB1_C and connect it to the debug port.

f) Turn on the board.

g) Open serial terminal.

10) Login into the board.
You will see many messages scrolling up the serial console on your PC and finally end at a prompt.

```
NXP i.MX Release Distro 6.6-scarthgap imx93frdm ttyLP0

Imx93frdm login:
```

Type **root** <enter>

Congratulations you have successfully flashed Linux into the eMMC on the i.MX 93 EVK.

5. Appendix A: Installing USB to Serial Drivers

If you have never used uuu.exe before then you will need to install some USB to Serial drivers on your machine. There are 2 drivers available today depending on the USB manufacturer chipset on your Development board.
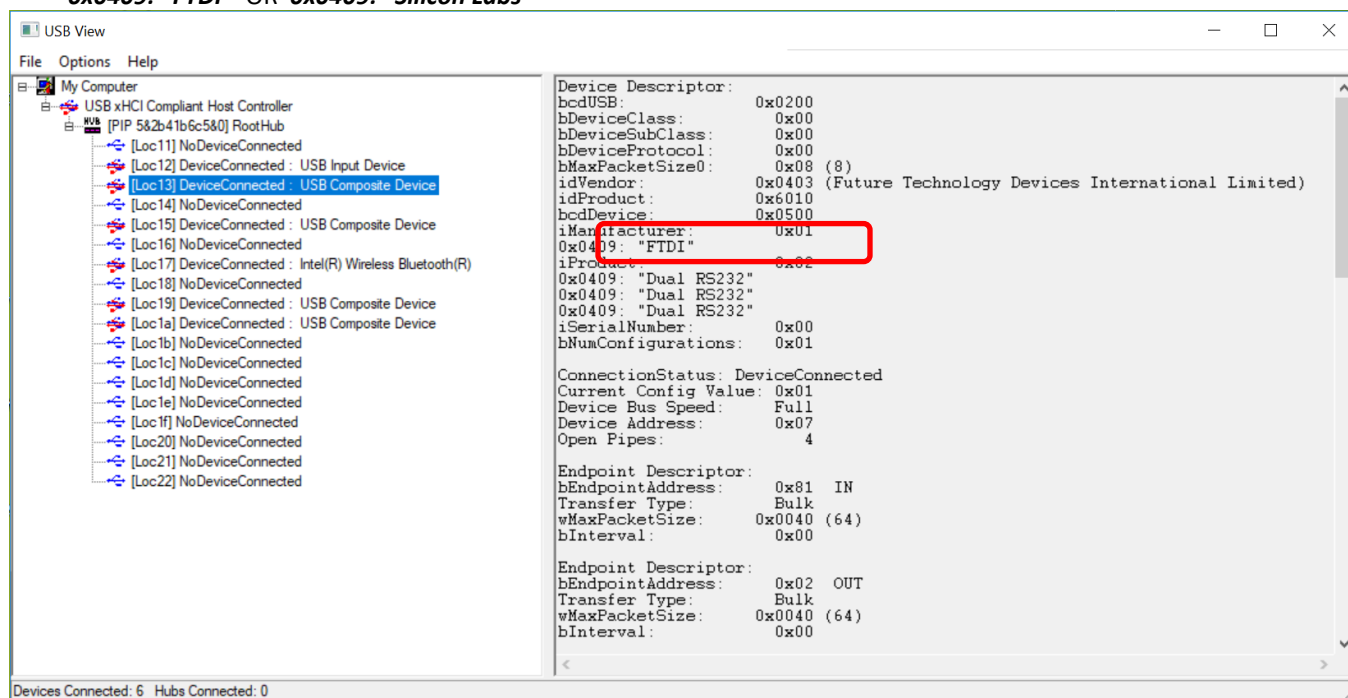
On the github repository there is a page "How to install USB to Serial Driver on Windows"

NOTE: The files required have been pre-downloaded and placed on the USB Key for ease of use in class. (See the uuu folder)
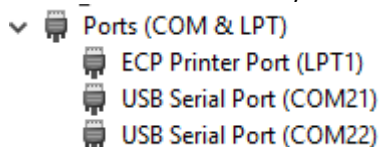
Connect the board as per section 4.1**Error! Reference source not found.**.

NOTE: Turn on the board's power switch.

1) Allow the board to enumerate on the PC.
   a) If you have never used uuu on this PC before
      OR
   b) Never installed any of the below drivers before to use with another evaluation board.
      Then the boards serial ports will appear in Device Manager under Other Devices as there is no driver loaded.
2) Start the program USBView which is a free USB Port viewer program from Microsoft.
   a) The program interrogates all USB ports and reports back information on them from the USB Chipset.
   b) Ignore any devices that display as a USB Input Device (this will not be your board)

   c) Look for ports where there is a Red colour on the USB symbol indicating something is connected

   d) Click on each of these Connected USB Composite devices and for each one look for the iManufacturer details. You are looking for one of these Composite devices to report the following Manufacturer code
   0x0409: "FTDI" OR *0x0409: "Silicon Labs"*

3) If the USB manufacturer of the target is reported as **0x0409: "Silicon Labs"** then download the driver from here or use the one on the USB Key in folder uuu\Silabs Chipset.

4) If the USB manufacturer is reported as **0x0409: "FTDI"** download the driver from here or use the one on the USB Key in folder uuu\FTDI Chipset.

5) Once installation of the drivers is complete - Check Windows Device Manager to ensure that the serial ports have enumerated correctly and shows under the COM Ports as shown below.

> Ports (COM & LPT)
>   ECP Printer Port (LPT1)
>   USB Serial Port (COM21)
>   USB Serial Port (COM22)

NOTE: *Turn off the board's power switch.*

Now return to the lab you were working on and continue from there.

6. Appendix B: Windows 7 USB Driver Issues

When programming an SD Card using uuu.exe the FRDM i.MX93 board will enumerate as a USB Gadget. On some Windows 7 machines the board fails to enumerate at all due to an outdated .inf file and you will need to follow the steps below in order to get windows to recognise the board.
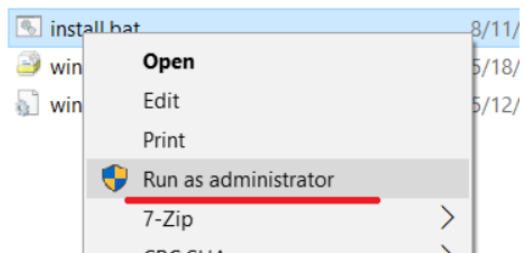
Taken from WIN7 User Guide.

Win7 ships with correct 'winusb.sys' file. but is missing an updated **'.inf'** that associates with **"usb\ms_comp_winusb"** devices. Normally if the USB device supports Microsoft OS descriptors, then it will allow Windows to automatically install the WinUSB driver. This mechanism is supported **"in-box"** for Win8 and newer. For Win7 the mechanism is supported through Windows update. Depending on the update policy for the Win7 machine, the appropriate driver may or may not be already available on the machine. If it is not already on the machine, user can use the following manual procedure to install the driver if necessary. (copy from here)
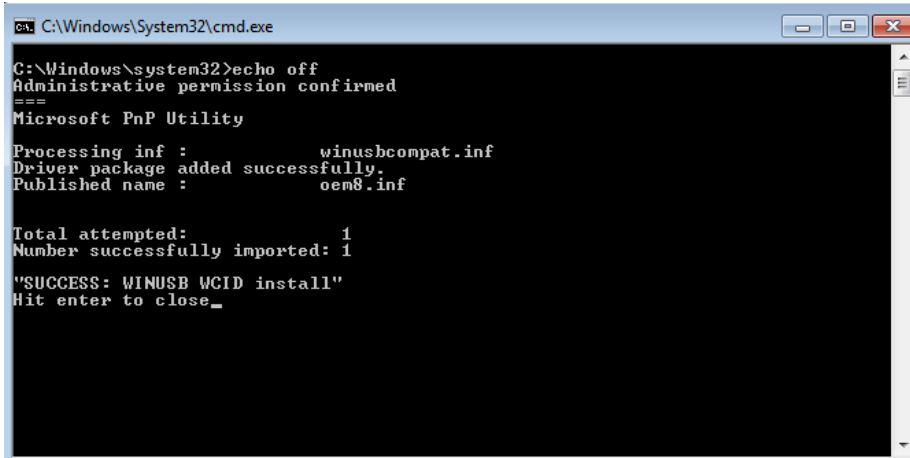
Some windows updates included updated *.inf* file but it is unclear which ones. Certainly we have come across several PCs where the *.inf* file was old.

You can try to run uuu per the lab instructions to see what happens. If windows reports "*can't install driver*", that means your system missed this update file OR If uuu reports "*Wait for Known USB Device Appear*" then the USB drivers for the board will not have been installed at all.

Install updated winusb inf file

- Download package from here.

- Unzip the file to a temporary directory

- Run the **install.bat** as administrator. (Right click the file name and select "*Run as administrator*")

Once the above steps are complete Check that your connections are as section 4.1 and run uuu.exe again.

uuu.exe will fail to run to completion **HOWEVER** Windows will now recognise a new USB device and begin installing a driver for a device called **SE BLANK nnnn** (where nnnn is a number).

Wait for the driver to complete installation.

Run uuu.exe again – it will fail to run to completion **HOWEVER** Windows will now recognise another new USB device and begin installing a driver for a device called **USB Gadget**

Wait for the driver to complete installation.

Run uuu.exe again – it **may** fail to run to completion HOWEVER Windows will now recognise one last USB device and begin installing a driver for it.

Wait for the driver to complete installation.

Finally the board will be recognised correctly and uuu.exe will now run to completion.

NOTE: *All of these issues are not seen in Windows 8 or 10 as the USB drivers are fixed and in the OS by default.*

7. References

Detail	Provided by	Links
i.MX 93 details	NXP	https://www.nxp.com/i.MX 93