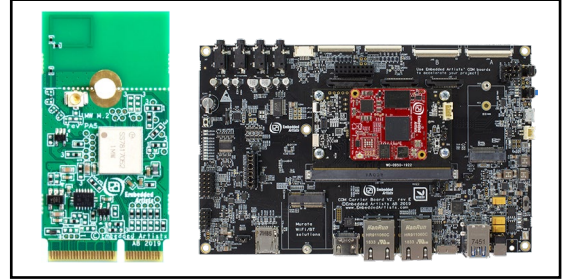


**Murata Wi-Fi/BT (CYW)
Solution for
Embedded Artists' i.MX**

Linux Quick Start Guide



Revision History

Revision	Date	Author	Change Description
1.0	Jan 18, 2021	TF	Initial Release

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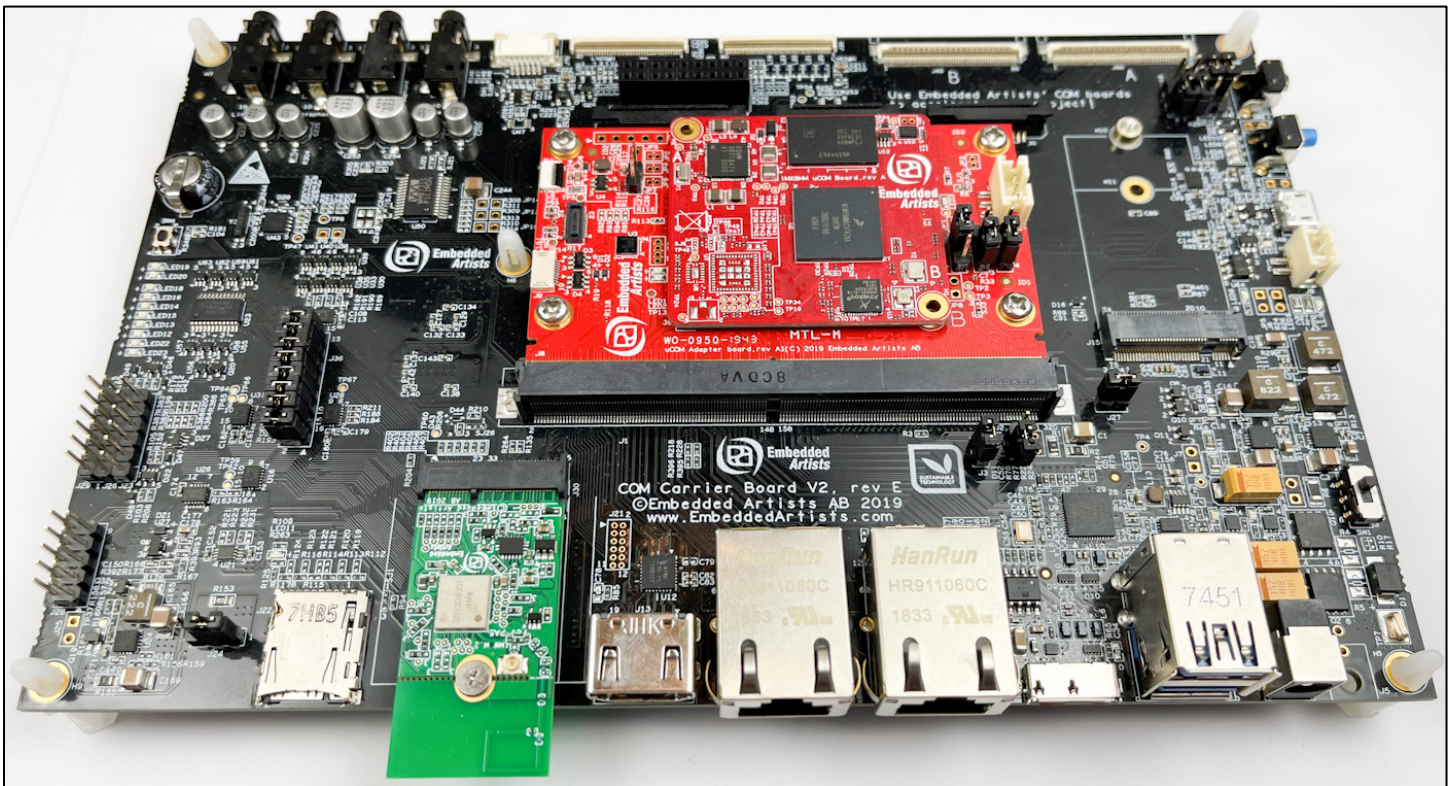
1 Introduction

This document details enabling [Murata's Wi-Fi/Bluetooth modules](#) on [Embedded Artists' i.MX Developer's Kits / COM boards](#) (running Linux), using [Embedded Artists' Wi-Fi/BT EVB's](#). Murata supports Wi-Fi/Bluetooth on several combinations of Embedded Artists' i.MX Developer's Kits / COM boards and M.2 Wi-Fi/Bluetooth EVB's (running different Linux kernel versions and Cypress "fmac" driver releases). This Quick Start documents a couple of hardware/software configuration to introduce users to the Murata's Wi-Fi/BT modules and demonstrate the ease of getting started with Embedded Artists' hardware. For more details on different configurations supported, please refer to the [Murata Wi-Fi/BT \(CYW\) Solution for i.MX Linux User Guide](#).

The Embedded Artists' Developer's Kits / COM boards currently supported are based on i.MX 8, i.MX 7 and i.MX 6. All platforms have direct M.2 interconnect with following signals supported:

- WLAN-SDIO, WLAN-PCIe
- BT-UART, BT-PCM
- WLAN/BT control signals
- WLAN JTAG and WLAN/BT debug signals

Figure 1: Embedded Artists' i.MX 8M Mini uCOM Developer's Kit with Type 1MW M.2 Module



The following sections describe the process of getting Wi-Fi and Bluetooth up and running on Embedded Artists' [i.MX 8M Mini uCOM Developer's Kit](#) with Murata [Type 1MW](#) module, running [5.4.47](#) kernel release. The document also describes the process of easily switching to Murata [Type 1XA](#) module without any need for complicated hardware changes or software builds.

2 References

2.1 Embedded Artists' M.2 Modules Landing Page

This [website landing page](#) provides latest/comprehensive information on Embedded Artists' M.2 Evaluation Boards which enable Murata Wi-Fi/BT modules for easy evaluation.

2.2 Embedded Artists' Developer's Kits Landing Page

This [website landing page](#) provides latest/comprehensive information on Embedded Artists' i.MX application processor-based Developer's Kits, which enables easy and modular solution for evaluating various processors and Murata Wi-Fi/BT modules.

2.3 Murata's i.MX Wireless Solutions Landing Page

The "Supported Hardware by Embedded Artists" section of this [website landing page](#) provides latest/comprehensive information on Murata's i.MX Wireless solutions so customers can easily evaluate Murata's modules on Embedded Artists i.MX processors.

2.4 Murata's Community Forum Support

Murata's Community provides online support for all of Murata's i.MX Wireless solutions, including separate sections for Embedded Artists solutions. Refer to [this link](#) for the Forum's main Wi-Fi/Bluetooth landing page.

2.5 Murata Wi-Fi/BT (CYW) Solution for i.MX Linux User Guide

This [User Guide](#) details steps to get Murata Wi-Fi/BT (Cypress-based) modules up and running quickly.

3 Interfacing the Wi-Fi/Bluetooth M.2 Module (EVB)

Figure 2 and Figure 3 illustrates how Embedded Artists' 1MW M.2 EVB is easily connected to their i.MX 8M Mini uCOM Developer's Kit in the M.2 slot. No additional cabling is required.

Figure 2: Plug in Type 1MW M.2 EVB on shallow angle, inserting it fully into M.2 Connector

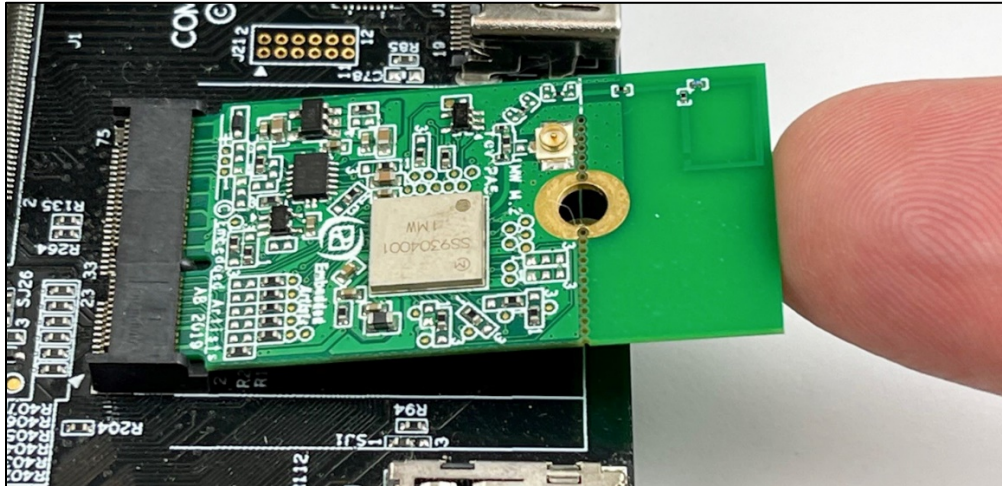
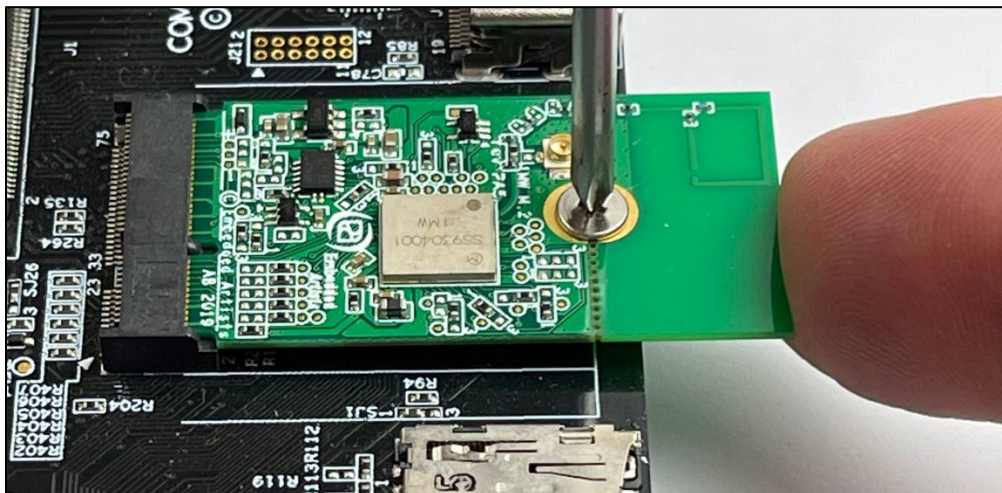


Figure 3: Continue pushing with finger (for snug fit) while securing M.2 EVB with screw



4 Download Prebuilt Linux Image and Flash Platform

Embedded Artists provide prebuilt Linux images for users to quickly download and start evaluating. These are available at [Embedded Artists i.MX Related Resources](#) page. The following steps showcase the process of downloading and flashing the image for the Linux kernel 5.4.47. The host system being used is running Windows® 10.

1. Download 5.4.47 Linux image for Embedded Artists' i.MX 8M Mini uCOM Board / Kit, from [Embedded Artists i.MX Related Resources](#) page as shown in **Figure 4**.

Figure 4: Embedded Artists i.MX Related Resources page

Resource	Description	Updated	Size (MB)
uuu_imx8mm_ucom_5.4.47.zip	UUU tool including bootloader, kernel (5.4.47) and file system images	2021-01-22	159.0
uuu_imx8mm_ucom_5.4.24.zip	UUU tool including bootloader, kernel (5.4.24) and file system images	2021-01-25	160.5

2. Extract the downloaded archive. This will extract both the image as well as the UUU application that can be used to flash the board.
3. Set up the Developer's Kit and the console by following the online [Getting Started](#).
4. Put the Developer's Kit into OTG mode to download the image, by closing the J2 jumper as shown in **Figure 5**.

Figure 5: J2 jumper (closed for flashing mode) on Developer's Kit



5. Power on the Developer's Kit.
6. Open a command prompt, navigate to the folder where the downloaded zip file was extracted and run the UUU tool.

```
C:\> cd c:\temp\uuu_imx8mq_com_5.4.24
C:\temp\uuu_imx8mq_com_5.4.24> uuu.exe full_tar.uuu
```

7. The terminal will show the download progress.

```
D:\temp\uuu_imx8mm_ucom_5.4.47>uuu.exe full_tar.uuu
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.3.191-0-g4fe24b9

Success 0      Failure 0

1:12      26/29 [=====>          23%          ] FBK: ucp files/ea-image-base-imx8mmea-ucom.tar.bz2 t:-
```

8. Wait till the download is complete.

```
D:\temp\uuu_imx8mm_ucom_5.4.47>uuu.exe full_tar.uuu
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.3.191-0-g4fe24b9

Success 1    Failure 0

1:12    29/29 [Done]    ] FBK: DONE
```

9. Power off the Developer's Kit.

10. Put the Developer's Kit into eMMC boot mode, by opening the J2 jumper.

11. Power on and boot the Developer's Kit. Entering the following strings for username/password:

- Username: "root"
- Password: "pass"

12. Set up the Developer's Kit for working with the Type 1MW (and other SDIO-based) EVB, by invoking the `switch_module.sh` script as shown below. Once that is done reboot the Dev Kit.

```
$ switch_module.sh cyw-sdio
$ switch_module.sh off
$ reboot
```

13. The Developer's Kit should boot with the "fmac" driver loaded automatically. To verify, you can issue "dmesg" command and search on "brcm" string. Expected log results are included.

```
$ dmesg | grep brcm

brcmfmac: brcmf_fw_alloc_request: using cypress/cyfmac43455-sdio for chip BCM4345/6
usbcore: registered new interface driver brcmfmac
brcmfmac: brcmf_fw_alloc_request: using cypress/cyfmac43455-sdio for chip BCM4345/6
brcmfmac: brcmf_c_preinit_dcmds: Murata Customized Version: imx-zeus-zigra_r1.0;
brcmfmac: brcmf_c_preinit_dcmds: Firmware: BCM4345/6 wl0: May 22 2020 21:24:34 version
7.45.214 (9c83742 CY) FWID 01-59feefd4
```

5 Enable Wi-Fi

1. Ensure the interface is up by issuing "ifconfig wlan0".

```
$ ifconfig wlan0
wlan0    Link encap:Ethernet  HWaddr 00:9D:6B:A6:EE:76    ← WLAN MAC Address
         UP BROADCAST MULTICAST  MTU:1500  Metric:1    ← "wlan0" interface is UP
         RX packets:0 errors:0 dropped:0 overruns:0 frame:0
         TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

2. Scan for available Wi-Fi networks.

```
$ iw dev wlan0 scan
```

3. Connect to an unsecured Access Point (AP) “Murata_5G”.

```
$ iw dev wlan0 connect Murata_5G
$ iw dev wlan0 link
Connected to 84:1b:5e:f6:a7:60 (on wlan0)
  SSID: Murata_5G
  freq: 5180
  RX: 1944 bytes (8 packets)
  TX: 0 bytes (0 packets)
  signal: -44 dBm
  tx bitrate: 24.0 MBit/s
  bss flags:
  dtim period: 1
  beacon int: 100
```

4. Run DHCP client to get IP address.

```
$ udhcpc -i wlan0
```

5. Ping AP (IP address 192.168.10.1) to check connectivity.

```
$ ping 192.168.10.1
```

6 Enable Bluetooth

1. Enable the Bluetooth interface by issuing the following command (“bluetooth_up.sh” script invokes **hciattach**, **hciconfig up**, **hcitool scan**). The Linux BlueZ stack is used for Bluetooth operations.

```
$ /opt/ea/bluetooth_up.sh
```

2. To repeat scanning Bluetooth devices.

```
$ hcitool scan
```

7 Switch Wi-Fi/BT M.2 Module to Type 1XA

The modular design of Embedded Artists’ Developer’s Kits and the industry standard M.2 interface of the Embedded Artists’ Wi-Fi/BT Modules allow users to quickly switch wireless solutions. The steps below describe the process of switching out the Type 1MW module used in the previous steps with the Type 1XA module. Note that Type 1XA is WLAN-PCIe/BT-UART whereas Type 1MW is WLAN-SDIO/BT-UART. The Embedded Artists’ M.2 interface provides these interconnect options, making it very customer friendly.

The Embedded Artists' solution makes switching wireless solutions quite simple by merely running the "switch_module.sh" script. This feature is consistent with Embedded Artists' overall approach to their hardware/software solutions: lowering the bar for customers so they can quickly get their desired software applications up and running. To quickly switch from Type 1MW to Type 1XA solutions:

1. Issue "halt" command and power off the Developer's Kit.

```
$ halt
```

2. Unscrew and Disconnect the Type 1MW M.2 EVB from the Developer's Kit and connect the Type 1XA M.2 EVB.
3. Power on and boot the Developer's Kit.
4. Set up the Developer's Kit for working with the Type 1XA (and other PCIe-based) EVB, by invoking the switch_module.sh script and rebooting the platform as shown below.

```
switch_module.sh cyw-pcie  
switch_module.sh off  
reboot
```

5. The Developer's Kit should boot with and bring up Type 1XA's WLAN interface automatically. The same steps to enable/test Wi-Fi/Bluetooth can be repeated.

8 Murata Community Forum

Murata supports our Wi-Fi/BT modules on all Embedded Artists' Developer Kits using our Community Forum. Go to Murata's Wireless Community Forum at <https://community.murata.com/>.

Figure 6: Links to Adapter and more Wi-Fi/BT M.2 EVB's

