



Getting Started with i.MX 93 EVK Running Linux OS and IW623 chipset

Rev. 1 — 18 March, 2026 User manual

Document Information

Information	Content
Keywords	i.MX 93 EVK board, production software, Wi-Fi and Bluetooth Linux OS
Abstract	Provides the steps to connect IW623 to i.MX 93 EVK board running Linux OS, transfer the software files, and bring up Wi-Fi or Bluetooth



1 Revision History

Revision History

Rev	Date	Description
v.1	20260318	Initial version



2 About this document

2.1 Purpose

This document explains how to bring up IW623 Wi-Fi and Bluetooth connected to i.MX 93 EVK board running Linux OS.

It covers the following:

- How to set-up IW623 with i.MX 93 EVK board
- How to connect i.MX 93 EVK board to a PC
- How to download and install IW623 software
- How to bring up Wi-Fi
- How to bring up Bluetooth

2.1.1 Module Support

Any module from NXP's key module partners based on the IW623/IW693 family can be leveraged for this demo, and a variety of other modules from different NXP partners are also available, as detailed in the table linked here:

- [Modules based on IW623](#)
- [Modules based on IW693](#)
- [Wi-Fi® + Bluetooth® Partner Modules Overview](#)

2.2 References

IW623 and i.MX 93 product pages at nxp.com are the entry points to access the released documentation and software.

Table 1. References

Reference Type	Description
User manual	Manufacturing Software User Manual for IW623 - User manual (confidential) (link)
User manual	i.MX 93 EVK Quick Start Guide (link)
Web Page	Embedded Linux for i.MX Applications Processors (link)

3 Evaluation kit contents

This section introduces the evaluation kit for i.MX 93.

3.1 i.MX 93 EVK kit

- MCIMX93-EVK board assembled with two separate boards, MCIMX93-SOM (SOM board) and MCIMX93-BB (Base board)
- USB Type-C 45 W Power Delivery Supply, 5 V / 3 A, 9 V / 3 A, 15 V / 3 A, 20 V / 2.25 A supported
- USB 3.0 Type-C Male to Type-A Male assembly cable
- USB 3.0 Type-C Male to Type-A Female adapter
- MCIMX93-EVK Quick Start Guide

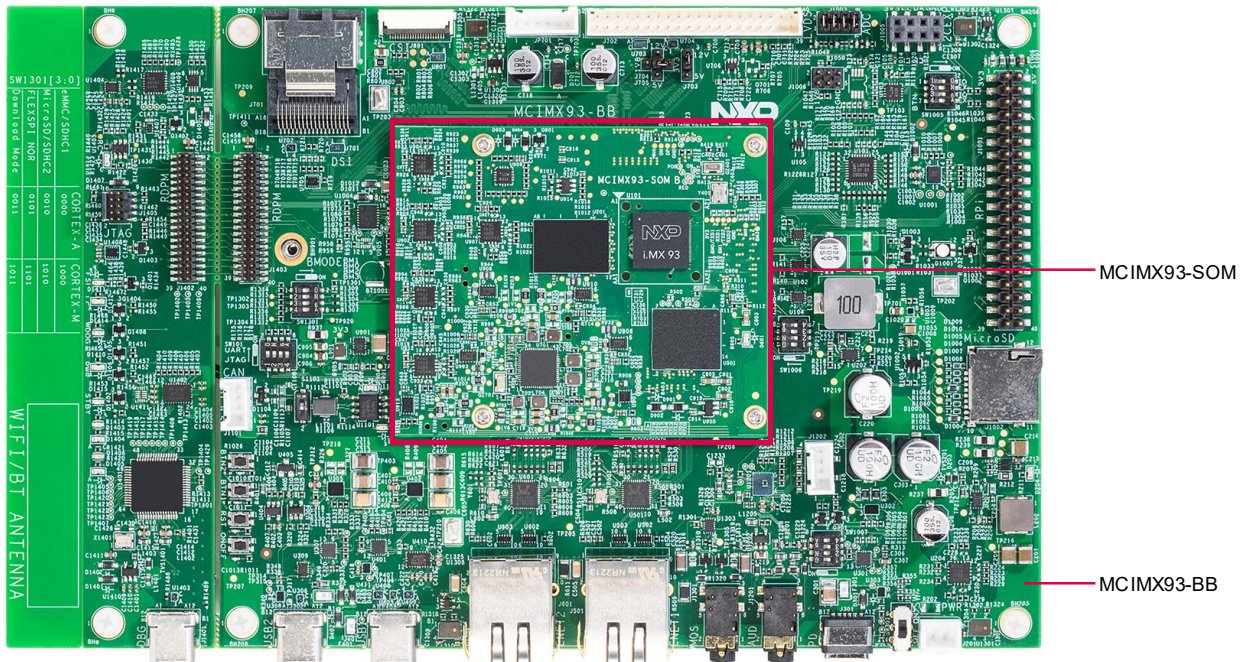


Figure 2. i.MX 93 Development board

4 IW623-based Silex module overview

This section covers the overview of the IW623.

The SX-SDMAX6E is wireless module from Silex based on NXP IW623 wireless device. Silex provides an M.2 interface with SX-SDMAX6E module that is compatible with the i.MX 93 EVK. The module acts as the device on the SDIO bus, and features the following:

- SDIO 3.0 standard
- 1-bit SDIO and 4-bit SDIO transfer modes
- SDIO interface for Wi-Fi
- UART interface for Bluetooth

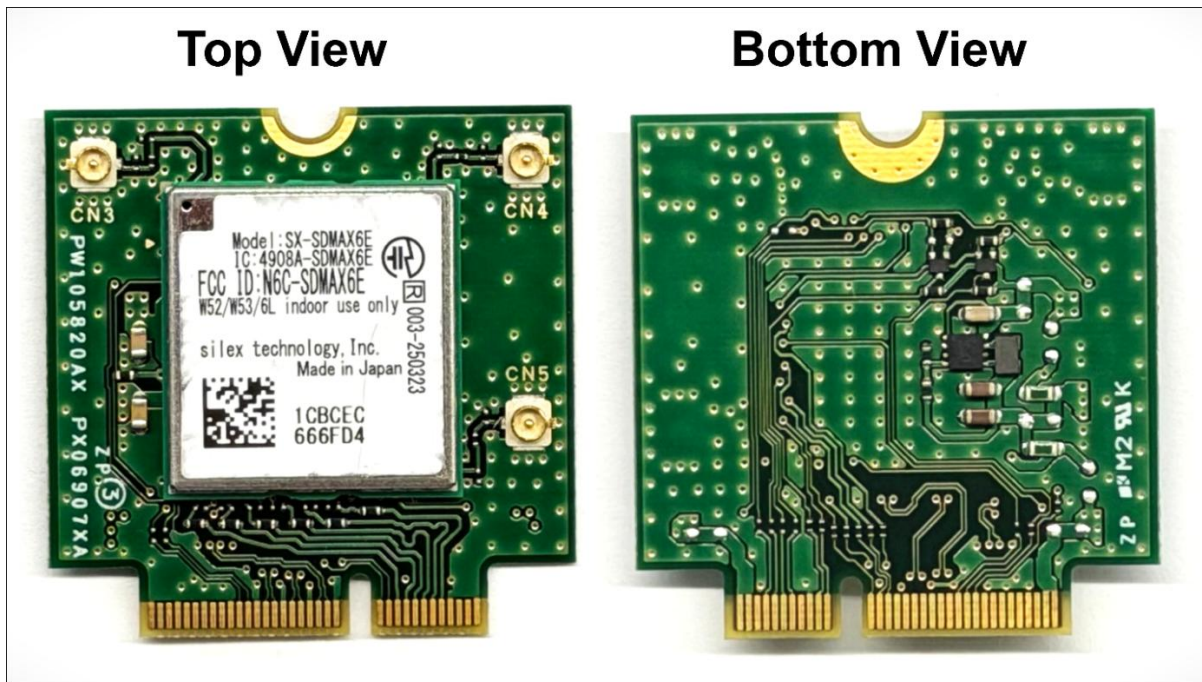


Figure 1. IW623 Silex Module View

4.1 Supported RF standard

Part number	Wi-Fi	Bluetooth
SX-SDMAX6E	1x1 Wi-Fi 6	5.2 ^[1]

4.2 Supported Wi-Fi and Bluetooth features

Refer to [IW623 product brief](#).

5 i.MX 93 EVK board overview

This section describes the peripheral sockets on i.MX 93 EVK board.

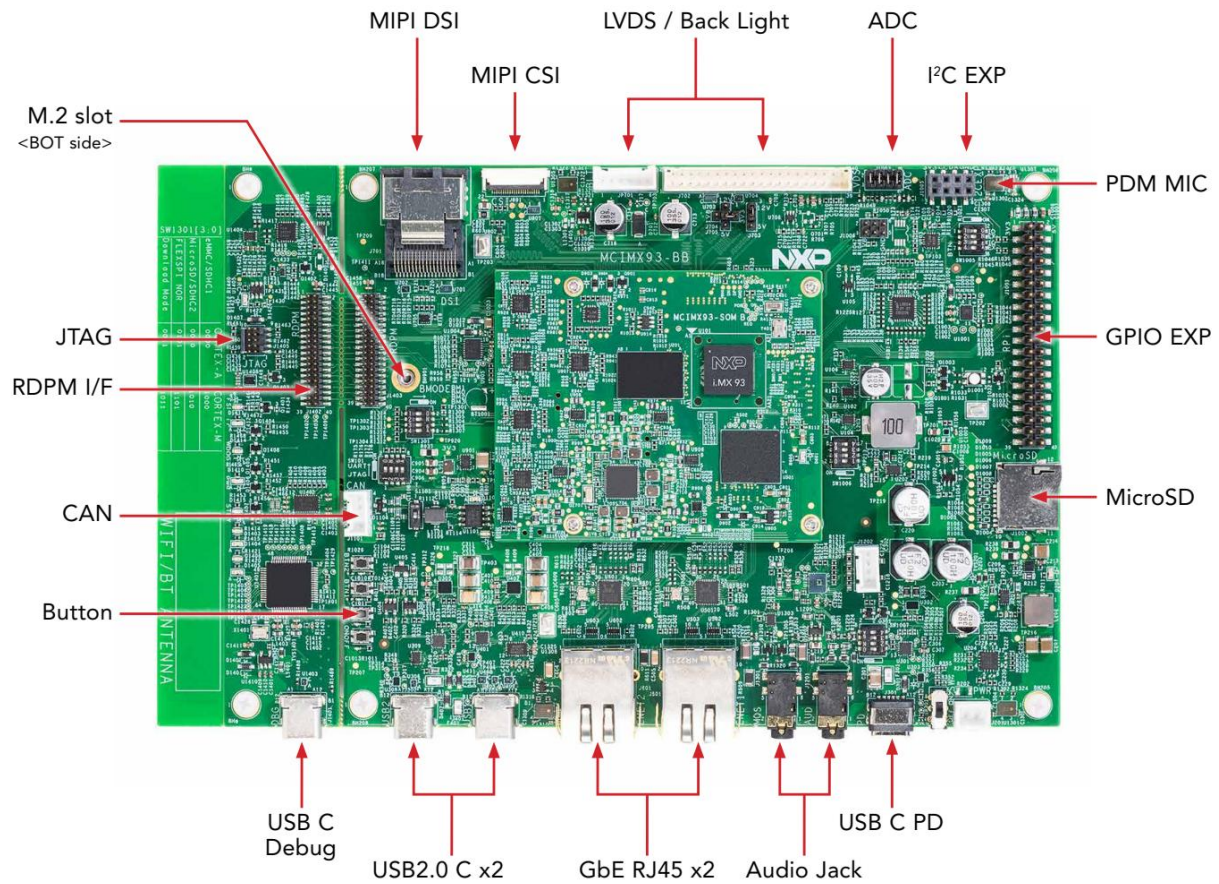


Figure 3. i.MX 93 peripheral sockets(Front-side)

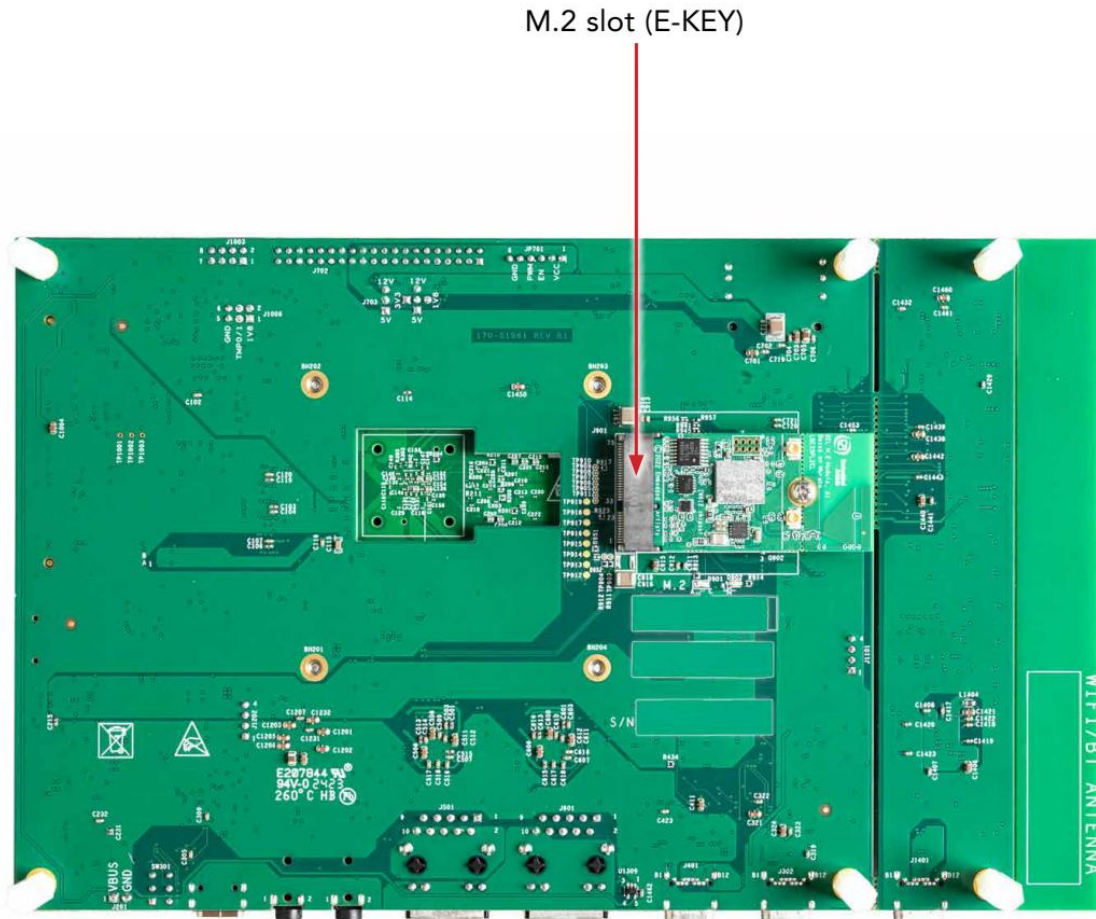


Figure 4. i.MX 93 peripheral sockets(Back-side)

Table 2. i.MX 93 peripheral usage

Peripheral	Usage
Debug interface	<ul style="list-style-type: none"> • USB-to-UART/MPSS ICs device, FT4232H • One USB 2.0 Type-C connector (J1401) of FT4232H provides four COM ports: <ul style="list-style-type: none"> ➤ Two COM ports are used for Cortex A55 and Cortex M33 system debug ➤ Two COM ports are used for remote debug of JTAG, boot mode, ONOFF, SYS_nRST, and power measurement board communication



USB interface	Two USB 2.0 Type C connectors
uSDHC	<ul style="list-style-type: none"> 16 GB eMMC5.1 (SanDisk SDINBDA6-16G-I(3D TLC)) MicroSD card connector (SD3.0 supported)
Two Ethernet port	<ul style="list-style-type: none"> 10/100/1000 Mbit/s RGMII Ethernet with one RJ45 connector with TSN support (J501) connected with external PHY, RTL8211 10/100/1000 Mbit/s RGMII Ethernet with one RJ45 connector (J601) connected with external PHY, RTL8211
Micro-SD slot	MicroSD card connector (SD3.0 supported)
On-Off switch	To turn ON and OFF i.MX 93 platform
MIPI DSI	x4 data lane MIPI DSI interface, mini-SAS connector, J701
One LVDS	x4 data lane LVDS interface, 2x20 2.0 mm header, J702
MIPI CSI	Camera interface(One CSI (x2 data lane) interface, J801 FPC cable connector (XF2M-2215-1A) AR0144 camera module by default)
Sensors(I2C/I3C)	LSM6DSO iNEMO Inertial module—a 3D digital accelerometer and gyroscope
Wi-Fi/Bluetooth interface	<ul style="list-style-type: none"> One M.2/NGFF Key E mini card 75-pin connector, J901, supporting SDIO, I2S, UART, I2C, and Vendor-defined SPI interfaces Silex SX-SDMAX6E module. It is based on NXP IW623 SoC, which supports dual-band (2.4 GHz /5 GHz) 1x1 Wi-Fi 6, Bluetooth 5.4
EXPI	One 2x20-pin expansion interface for I2S, UART, I2C, and GPIO expansion
MQS	MQS support Audio
SAI/I2S	<ul style="list-style-type: none"> 3.5 mm audio jack for headset, microphone, headphone output support, J1201 Audio codec WM8962B (U1201) can support 24-bit I2S data and 48 kHz sampling rate <p>Note: Codec WM8960 is used only for board rev A Codec WM8962B is used on board rev B</p>
PDM	<ul style="list-style-type: none"> Four onboard PDM microphone support 3.5 mm audio jack for headset, microphone, headphone output support, J1301
USB Type A	USB 2.0 high-speed host and device controller
I/O expanders	<ul style="list-style-type: none"> One I/O expander to provide remote I/O expansion for the target processor via the I2C-bus interface One I/O expander to provide I/O expansion for FT4232H device for boot config, ONOFF, POR_B, and SYS_nRST
Power	<ul style="list-style-type: none"> One USB 2.0 Type-C connector for power delivery only PCA9451AHNY PMIC Discrete DCDC/LDO

CaN interface	One 4-pin CAN FD connector
DRAM controller and PHY	2 GB LPDDR4X (Micron MT53E1G16D1ZW-046 AAT:C)
Battery backed non-secure module (BBNSM)	x2 Tamper function support

6 Board set-up

This section details the set-up of IW623 connected on i.MX 93 EVK board.

6.1 i.MX 93 EVK

Refer to [Get Started with the i.MX 93 EVB](#) for a video tutorial and additional information.

Step 1 – Change the boot mode switch to Serial Download.

- Table 3. Boot Mode Switch

BOOT_MODE [3:0]	Boot Mode
0011	Serial downloader (USB)
0000	SDHC1 / eMMC
0010	SDHC2 / MicroSD
0101	FLEXSPI NOR



Figure 6. i.MX93 EVK Boot switch



Step 2 – Connect the board to the PC

- Plug one end of the USB Type-C cable to the USB1 slot of the i.MX93 EVK board and the other end of the cable to the PC

Step 3 - Download Linux BSP and *uuu.exe*.

- For linux OS installation, go to [Embedded Linux for i.MX Application Processors page](#) and download the latest linux BSP.
- 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.
- Issue the command to flash the full pre-compiled BSP

```
uuu.exe <Linux_BSP.zip>
```

Step 4 – Flash the Linux image.

- To start the flashing process, turn ON the board

The flashing will take around 5 minutes.

Output example

```
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
```

Step 5 - Turn off the board's power switch.

- Reset the boot mode switches to e-mmc boot

BOOT_MODE [3:0]	Boot Mode
0011	Serial downloader (USB)
0000	SDHC1 / eMMC
0010	SDHC2 / MicroSD
0101	FLEXSPI NOR

Table 4. Boot Mode Switch

Step 6 - Set up debug access.

- Connect the supplied USB Type-C cable to the debug UART port J1401, then connect the other end of the cable to a host computer.

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- Four UART connections will appear on the host computer. The third port is for A55 core, and the fourth port is for M33 core system debugging.
- Download the Serial Terminal program
 - Windows:**
 - PUTTY ([Download link](#)) or teraterm([Download link](#))
 - USB Device driver ([Download link](#))
 - Linux:**
 - Minicom (Command to download the tool: `sudo apt-get install minicom`)
- Check the baud rate and other serial port settings on the PC (Setting for terminal: Baud rate:115200, Parity: none, Data bits: 8, Stop bits: 1)

Step 7 – Login console (enter “root” for login).

```
root
```

7 IW623 software

7.1 Download

IW623 software is available for download in the Design resource section of IW623 product page at nxp.com.

- Go to IW623 product page
- Click **Design Resources**

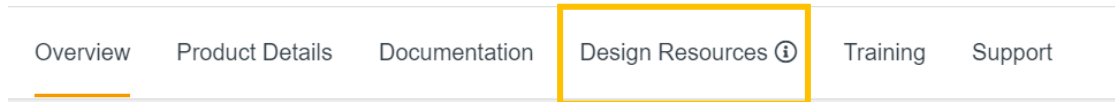


Figure 7 Design resources tab.

- Sign in to access the secure files
- Select **Design Resources**
- Scroll down to **Software** and select **Embedded Software** BSP, Drivers, and Middleware

Software

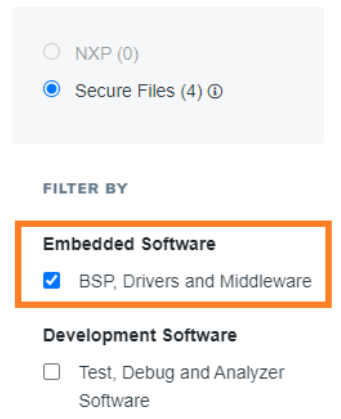


Figure 8 software on IW623 page.

- Look for the latest release of IW623 software and click **Download** (Sign-in required):

BSPS AND DEVICE DRIVERS

SD-WLAN-UART-BT-IW693-LNX-18.99.2.p145.181-18.99.2.p145.181-MM6X18542.p17.1_V1-MGPL NEW

ZIP Rev 18.99.2.p145.181-18.99.2.p145.181 Mar 5, 2026 6.92 MB

SD-WLAN-UART-BT-IW693-LNX-MM6X18542.p17.1_V1-MGPL



Figure 9 IW623 software download.



7.2 Content

Table 5 examples of software package release contents.

Type	Name	Description
Directory	bin_wlan	Pre-compiled driver modules for Linux 6.6.36 Kernel
Directory	FWImage	Combo and standalone Wi-Fi and Bluetooth Firmware for PCIe and UART interface
Directory	bin_btapp	Bluetooth application
Directory	License	License file
PDF file	RELEASE NOTES	Release note

7.3 Firmware Type

Table 6 shows firmware type and its corresponding Wi-Fi and Bluetooth firmware name.

Firmware Type	Firmware Name
Combo (Wi-Fi + Bluetooth)	sduartaw693_combo_v1.bin.se
Standalone Wi-Fi	sdaw693_wlan_v1.bin.se
Standalone Bluetooth	uartaw693_bt_v1.bin.se



8 Software installation

This section explains how to install IW623 software.

- The software is downloaded on the host PC and copied to i.MX93 EVK evaluation board running Linux OS.
- The host interfaces between IW623 and i.MX93 EVK boards are used to install the software on IW623.

Note: The pre-built image comes with the required drivers and firmware for the IW623. Proceed with the section 8 and 9 only if you need to update or modify the firmware.

8.1 File transfer to i.MX 93 EVK board.

This section explains the two methods to transfer files from the host PC to i.MX 93 EVK board. Refer to [Section 7](#) for details on the software release content.

- One method uses USB-C to USB adapter (recommended)
- The other method uses SCP utility

8.1.1 USB-C to USB-A adapter

The procedure to use USB-C to USB adapter to transfer files is as follows:

Step 1 - Hardware connections

- Plug the USB-C to USB adapter to the “Download” slot on i.MX 93 EVK board
- Plug the USB flash drive containing the downloaded IW623 software ([software](#)) to the other USB end of the adapter

Note: *Linux supports FAT32 and exFAT USB formats. Other formats may run into an error.*



Figure 10 shows USB-C to USB-A adapter connections.



Step 2 - Debug access

- Refer to [Section 6.1](#) to bring up i.MX 93 EVK board.

Step 3 - File transfers

- Issue the command to locate the USB flash drive content

```
lsblk
```

Example of command output:

```
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sda 8:0 1 59.6G 0 disk
`-sda1 8:1 1 59.6G 0 part /run/media/sda1
mmcblk0 179:0 0 28.9G 0 disk
|-mmcblk0p1 179:1 0 332.8M 0 part /run/media/boot-mmcblk0p1
`-mmcblk0p2 179:2 0 5.1G 0 part /
mmcblk0boot0 179:32 0 4M 1 disk
mmcblk0boot1 179:64 0 4M 1 disk
```

The content of the USB flash drive is located in the directory `/run/media/sda1`.

- Move to USB flash drive directory

```
cd <USB directory>
```

- Copy the files to `/home/root`

```
cp -r /bin_wlan /home/root
cp -r /FWImage /home/root
```

8.1.2 SCP utility (optional)

This section explains how to use SCP utility to transfer files from the host PC to i.MX 93 EVK board via Ethernet. Refer to [Section 7](#) for details on the software release content.

Step 1 - Set up the Ethernet interface

To connect the two interfaces on the same network:

- Attach one end of the ethernet cable to i.MX 93 Ethernet port and the other end to the host PC

Note: The ethernet port is used either to transfer files or for debug access (SSH).

- Get the IP address of the connected PC

```
ifconfig
```

- Assign the IP address of i.MX 93 on eth0 interface

```
ifconfig eth0 192.168.1.100 up
```

- Check if eth0 interface is up

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```
ifconfig eth0
```

Example of output with matching IP addresses for the connected PC and i.MX93 EVK board:

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.1.100 netmask 255.255.255.0 broadcast 192.168.1.255
inet6 fe80::204:9fff:fe07:1230 prefixlen 64 scopeid 0x20<link>
ether 00:04:9f:07:12:30 txqueuelen 1000 (Ethernet)
RX packets 1817 bytes 2605025 (2.4 MiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 272 bytes 32259 (31.5 KiB)
```

Step 2 - Copy the Wi-Fi module directory

- Copy the Wi-Fi driver module directory (*Drivers*) to i.MX93 EVK board

```
scp -r / bin_wlan root@192.168.1.100:/home/root
```

Note: For Bluetooth over UART, use the native UART driver included in the Linux Kernel.

Step 3 - Copy the firmware binaries

Copy FWImage directory to i.MX93 EVK board:

```
scp -r /FWImage root@192.168.1.100:/home/root
```

List the content of FWImage directory

```
ls
```

Command output:

```
sdaw693_wlan_v1.bin.se sduartaw693_combo_v1.bin.se uartaw693_bt_v1.bin.se
```

File Name	Created	Type	Size
sdaw693_wlan_v1.bin.se	2/6/2026 2:34 PM	SE File	791 KB
uartaw693_bt_v1.bin.se	2/6/2026 2:34 PM	SE File	339 KB
sduartaw693_combo_v1.bin.se	2/6/2026 2:33 PM	SE File	1,130 KB

Figure 11 contents of FWImage



9 Firmware download onto IW623

This section provides the commands to:

- Copy the firmware to i.MX93 EVK board
- Load the module drivers and firmware on IW623

9.1 Combo Wi-Fi and Bluetooth

Step 1 Copy the firmware binary.

- Go to the firmware directory.

```
cd /lib/firmware
```

- Create *nxp* directory inside the firmware directory.

```
mkdir nxp
```

- Copy the combo firmware.

```
cp FwImage/sduartaw693_combo_v1.bin.se /lib/firmware/nxp
```

Step 2 Load the module drivers and firmware.

- Go to the directory with the software file.

```
cd ../bin_wlan
```

- Use the *insmod* command to load the drivers

```
insmod mlan.ko  
insmod moal.ko fw_name=nxp/sduartaw693_combo_v1.bin.se  
cfg80211_wext=0xf cal_data_cfg=none auto_ds=2 ps_mode=2 host_mlme=1
```

Step 3 – Verify that the Wi-Fi interfaces are up.

```
ifconfig -a
```

Example output -

```
can0: flags=128<NOARP> mtu 16  
    unspec 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00 txqueuelen 10 (UNSPEC)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0
```

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```
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
device interrupt 119
```

```
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
ether 00:04:9f:08:48:f8 txqueuelen 1000 (Ethernet)
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 10.13.96.96 netmask 255.255.254.0 broadcast 10.13.97.255
inet6 fe80::204:9fff:fe08:48f7 prefixlen 64 scopeid 0x20<link>
ether 00:04:9f:08:48:f7 txqueuelen 1000 (Ethernet)
RX packets 1943734 bytes 204568931 (195.0 MiB)
RX errors 0 dropped 39393 overruns 0 frame 0
TX packets 3029 bytes 285823 (279.1 KiB)
TX errors 0 dropped 8 overruns 0 carrier 0 collisions 0
device interrupt 108
```

```
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 425 bytes 31132 (30.4 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 425 bytes 31132 (30.4 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
mlan0: flags=4098<BROADCAST,MULTICAST> mtu 1500
ether 1c:bc:ec:66:6f:d4 txqueuelen 1000 (Ethernet)
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
uap0: flags=4098<BROADCAST,MULTICAST> mtu 1500
ether 1e:bc:ec:66:70:d4 txqueuelen 1000 (Ethernet)
```



```
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
wfd0: flags=4098<BROADCAST,MULTICAST> mtu 1500
ether 1e:bc:ec:66:6f:d4 txqueuelen 1000 (Ethernet)
RX packets 0 bytes 0 (0.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Step 4 – Bring up the Bluetooth interface.

- Invoke the below command to initialize the “hci0” interface.

```
modprobe btnxpuart
```

- use the below command to up the *hci0* interface.

```
modprobe btnxpuart
hciconfig -a
```

Example output -

```
hci0: Type: Primary Bus: UART
BD Address: 20:BA:36:5C:A9:14 ACL MTU: 1021:7 SCO MTU: 120:6
UP RUNNING PSCAN
RX bytes:1599 acl:0 sco:0 events:103 errors:0
TX bytes:1328 acl:0 sco:0 commands:102 errors:0
Features: 0xbf 0xfe 0x8f 0xfe 0xdb 0xff 0x7b 0x87
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3
Link policy: RSWITCH SNIFF
Link mode: PERIPHERAL ACCEPT
Name: 'imx93'
Class: 0x200000
Service Classes: Audio
Device Class: Miscellaneous,
HCI Version: 5.4 (0xd) Revision: 0x8300
LMP Version: 5.4 (0xd) Subversion: 0x1015
Manufacturer: NXP Semiconductors (formerly Philips Semiconductors) (37)
```

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9.2 Standalone W-Fi

Step 1 Copy the firmware binary.

- Go to the firmware directory.

```
cd /lib/firmware
```

- Create *nxp* directory inside the firmware directory.

```
mkdir nxp
```

- Copy the standalone Wi-Fi firmware.

```
cp FwImage/sdaw693_wlan_v1.bin.se /lib/firmware/nxp
```

Step 2 Load the module drivers and firmware.

- Go to the directory with the software file.

```
cd ../bin_wlan
```

- Use the `insmod` command to load the Wi-Fi only drivers

```
insmod  
insmod moal.ko fw_name=nxp/sdaw693_wlan_v1.bin.se  
cfg80211_wext=0xf cal_data_cfg=none auto_ds=2 ps_mode=2 host_mlme=1
```

Step 3 – Verify that the Wi-Fi interfaces are up.

```
ifconfig -a
```

Example output -

```
mlan0: flags=4098<BROADCAST,MULTICAST> mtu 1500  
ether 00:00:00:00:00:00 txqueuelen 1000 (Ethernet)  
RX packets 0 bytes 0 (0.0 B)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 0 bytes 0 (0.0 B)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

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9.3 Standalone Bluetooth

Step 1 Copy the firmware binary.

- Go to the firmware directory.

```
cd /lib/firmware
```

- Create *nxp* directory inside the firmware directory.

```
mkdir nxp
```

- Copy the standalone Bluetooth firmware(*uartaw693_bt_v1.bin.se*).

```
cp FwImage/uartaw693_bt_v1.bin.se /lib/firmware/nxp
```

Step 2 – Bring up the Bluetooth interface.

- Invoke the below command to initialize the “*hci0*” interface.

```
modprobe btnxpuart
```

- use the below command to up the *hci0* interface.

```
modprobe btnxpuart  
hciconfig -a
```

Example output -

```
hci0: Type: Primary Bus: UART  
BD Address: 20:BA:36:5C:A9:14 ACL MTU: 1021:7 SCO MTU: 120:6  
UP RUNNING PSCAN  
RX bytes:1599 acl:0 sco:0 events:103 errors:0  
TX bytes:1328 acl:0 sco:0 commands:102 errors:0  
Features: 0xbf 0xfe 0x8f 0xfe 0xdb 0xff 0x7b 0x87  
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3  
Link policy: RSWITCH SNIFF  
Link mode: PERIPHERAL ACCEPT  
Name: 'imx93'  
Class: 0x200000  
Service Classes: Audio  
Device Class: Miscellaneous,  
HCI Version: 5.4 (0xd) Revision: 0x8300  
LMP Version: 5.4 (0xd) Subversion: 0x1015  
Manufacturer: NXP Semiconductors (formerly Philips Semiconductors) (37)
```

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10 Bring-Up of Wi-Fi

This section shows how to bring up Wi-Fi in STA and uAP modes.

To bring up the Wi-Fi:

Step 1: Use the command below to load the modules in the kernel.

```
insmod mlan.ko
insmod moal.ko fw_name=nxp/sduartaw693_combo_v1.bin.se
cfg80211_wext=0xf cal_data_cfg=none auto_ds=2 ps_mode=2 host_mlme=1
```

Step 2: Invoke the command below to initialize `mlan0` interface.

```
ifconfig mlan0 up
ifconfig mlan0
```

Command output example:

```
mlan0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
  ether 20:ba:36:5c:ce:11 txqueuelen 1000 (Ethernet)
  RX packets 0 bytes 0 (0.0 B)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 0 bytes 0 (0.0 B)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Step 3: Invoke the command below to initialize `uap0` interface.

```
ifconfig uap0 up
ifconfig uap0
```

Command output example:

```
uap0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
  ether 1e:bc:ec:66:70:d4 txqueuelen 1000 (Ethernet)
  RX packets 0 bytes 0 (0.0 B)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 0 bytes 0 (0.0 B)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

10.1 STA mode

Step 1: Open configuration file `/etc/wpa_supplicant.conf` which includes the network details, Update the Ext-AP details (Here Ext-AP could be your home/office Wi-Fi router or Mobile hotspot) that you want

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to connect to.

For example, below configuration file shows the network details of the Ext-AP with SSID “NXP_Demo” along with WPA2 security. User needs to replace the ssid and psk field with their own Ext-AP credentials.

- a. Open /etc/wpa_supplicant.conf file using nano editor tool and copy the below given configurations.
- b. Press "ctrl + shift + v" to paste the copied configuration and press "Ctrl-X" key to quit from nano editor mode.
- c. Type “Y” and “Enter” to save the file and quit from nano editor.

```
nano /etc/wpa_supplicant.conf

ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1
network={
    ssid="NXP_Demo"
    key_mgmt=WPA-PSK
    psk="123456789"
}
```

Step 2: Make sure to stop any running instance of the wpa_supplicant to avoid failures. Use following command to kill already running wpa_supplicant process. Please ignore the output “wpa_supplicant: no process found” for below command if observed.

```
killall wpa_supplicant
wpa_supplicant: no process found
```

Step3: Use following command to start wpa_supplicant in background.

```
wpa_supplicant -i wlan0 -Dnl80211 -c/etc/wpa_supplicant.conf -B
```

Step 4: start the udhcp client by using the following command to get the dynamic IP address from the Ext-AP.

```
udhcpc -i wlan0

udhcpc: started, v1.36.1
udhcpc: broadcasting discover
udhcpc: broadcasting select for 192.168.86.74, server
192.168.86.214
```

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```
udhcpc: lease of 192.168.86.74 obtained from 192.168.86.214,  
lease time 3599  
/etc/udhcpc.d/50default: Adding DNS 192.168.86.214
```

Step 5: Verify IP address assigned to STA device interface using following command.

```
ifconfig wlan0  
  
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
inet 192.168.1.1 netmask 255.255.255.0 broadcast 192.168.101.255  
inet6 fe80::22ba:36ff:fe5c:e6c9 prefixlen 64 scopeid 0x20<link>  
ether 1c:bc:ec:66:6f:d4 txqueuelen 1000 (Ethernet)  
RX packets 1425 bytes 66510 (64.9 KiB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 47 bytes 6258 (6.1 KiB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions
```

10.2 AP mode

This section describes configuration for the AP mode on the iMX-91 board using the `/etc/hostapd.conf` configuration file.

Step 1: Use the following command to take the backup of the default configuration file to `/etc/hostapd-default.conf`.

```
mv /etc/hostapd.conf /etc/hostapd-default.conf
```

Step 2: Create new configuration file `/etc/hostapd.conf` with WPA2 security and AP 5GHz band profile configuration. It is simply a text based configuration file.

- Create `/etc/hostapd.conf` file using nano editor tool and copy the below given configurations.
- Press "ctrl + shift + v" to paste the copied configuration and press "Ctrl-X" key to quit from nano editor mode.
- Type "Y" and "Enter" to save the file and quit from nano editor.

```
nano /etc/hostapd.conf  
  
interface=uap0  
hw_mode=a  
channel=0  
country_code=US
```



```
ssid=NXP_Demo
auth_algs=1
ieee80211n=1
wpa=2
wpa_key_mgmt=WPA-PSK
rsn_pairwise=CCMP
wpa_passphrase=123456789
```

Step 3: Make sure to stop any running instance of the hostapd to avoid failures. Use the following command to kill already running hostapd process. Please ignore the output “hostapd: no process found” for below command if observed.

```
killall hostapd
```

Step 4: Assign IP address to the AP interface using the following command.

```
ifconfig uap0 192.168.1.2 netmask 255.255.255.0
```

Step 5: Verify the IP address and netmask assigned to the uap0 interface using the following command.

```
ifconfig uap0
uap0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.1.2 netmask 255.255.255.0 broadcast 192.168.1.255
    ether ba:f4:4f:ab:44:61 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Step 6: Start the udhcp server to assign the IP address to the client devices that are getting connected to the created AP.

```
udhcpd /etc/udhcpd.conf
```

Step 7: Use the following command to start hostapd in the background.

```
hostapd /etc/hostapd.conf -B
```

Output Example:



```
uap0: interface state UNINITIALIZED->COUNTRY_UPDATE
[ 5228.355165] wlan: uap0 START SCAN
[ 5229.422504] wlan: SCAN COMPLETED: scanned AP count=21
[ 5229.423305] wlan: uap0 START SCAN
[ 5229.860649] wlan: SCAN COMPLETED: scanned AP count=21
[ 5229.861706] wlan: uap0 START SCAN
[ 5230.298647] wlan: SCAN COMPLETED: scanned AP count=21
[ 5230.299325] wlan: uap0 START SCAN
[ 5230.736356] wlan: SCAN COMPLETED: scanned AP count=21
[ 5230.737445] wlan: uap0 START SCAN
[ 5231.174323] wlan: SCAN COMPLETED: scanned AP count=21
[ 5231.195669] wlan: uap0 Starting AP
[ 5231.212550] wlan: uap0 AP started
```



11 Bring Up of Bluetooth

To bring up the Bluetooth on the IW623:

Step 1: Use below command to load the modules in the kernel.

```
insmod mlan.ko
insmod moal.ko fw_name=nxp/sduartaw693_combo_v1.bin.se
cfg80211_wext=0xf cal_data_cfg=none auto_ds=2 ps_mode=2 host_mlme=1
```

Step 2: Invoke the below commands to initialize the “hci0” interface.

```
modprobe btnxpuart
hciconfig hci0 reset
```

Step 3: Issue hciconfig command to verify that *hci0* interface is up and running

```
hciconfig -a
```

Command output example -

```
hci0: Type: Primary Bus: UART
BD Address: 20:BA:36:5C:A9:14 ACL MTU: 1021:7 SCO MTU: 120:6
UP RUNNING PSCAN
RX bytes:1599 acl:0 sco:0 events:103 errors:0
TX bytes:1328 acl:0 sco:0 commands:102 errors:0
Features: 0xbf 0xfe 0x8f 0xfe 0xdb 0xff 0x7b 0x87
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3
Link policy: RSWITCH SNIFF
Link mode: PERIPHERAL ACCEPT
Name: 'imx93'
Class: 0x200000
Service Classes: Audio
Device Class: Miscellaneous,
HCI Version: 5.4 (0xd) Revision: 0x8300
LMP Version: 5.4 (0xd) Subversion: 0x1015
Manufacturer: NXP Semiconductors (formerly Philips Semiconductors) (37)
```

Step 4: Change the Bluetooth device (BD) address

- Use hcitool command to change the BD address

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```
hcitool -i hci0 cmd 3f 22 fe 06 23 22 21 43 50 00
```

Command output example -

```
< HCI Command: ogf 0x3f, ocf 0x0022, plen 8  
FE 06 23 22 21 43 50 00  
> HCI Event: 0x0e plen 4  
01 22 FC 00
```

Step 5: Reset *hci0* interface

```
hciconfig hci0 reset
```

Step 6: Check the configuration

```
hciconfig
```

Command output example -

```
hci0: Type: Primary Bus: UART  
BD Address: 00:50:43:21:22:23 ACL MTU: 1021:7 SCO MTU: 120:6  
UP RUNNING  
RX bytes:3115 acl:0 sco:0 events:181 errors:0  
TX bytes:4989 acl:0 sco:0 commands:181 errors:0  
Features: 0xbf 0xfe 0x8f 0xfe 0xdb 0xff 0x7b 0x87  
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3  
Link policy: RSWITCH SNIFF  
Link mode: PERIPHERAL ACCEPT  
Name: 'imx93'  
Class: 0x200000  
Service Classes: Audio  
Device Class: Miscellaneous,  
HCI Version: 5.4 (0xd) Revision: 0x8300  
LMP Version: 5.4 (0xd) Subversion: 0x1017  
Manufacturer: NXP Semiconductors (formerly Philips Semiconductors) (37
```



Appendix A: Video Labs for Hands-On Demonstration

For detailed video labs related to the demos covered in this guide, refer to the links below:

Labs

- [Lab 1: Wi-Fi Basic Hands-On](#)
- [Lab 2: Bluetooth A2DP Source and Sink Profile Demo](#)
- [Lab 3: Wi-Fi and Bluetooth Coexistence \(COEX\) Demo](#)

These labs provide step-by-step guidance and practical demonstrations to complement the procedures described in this Getting Started Guide.