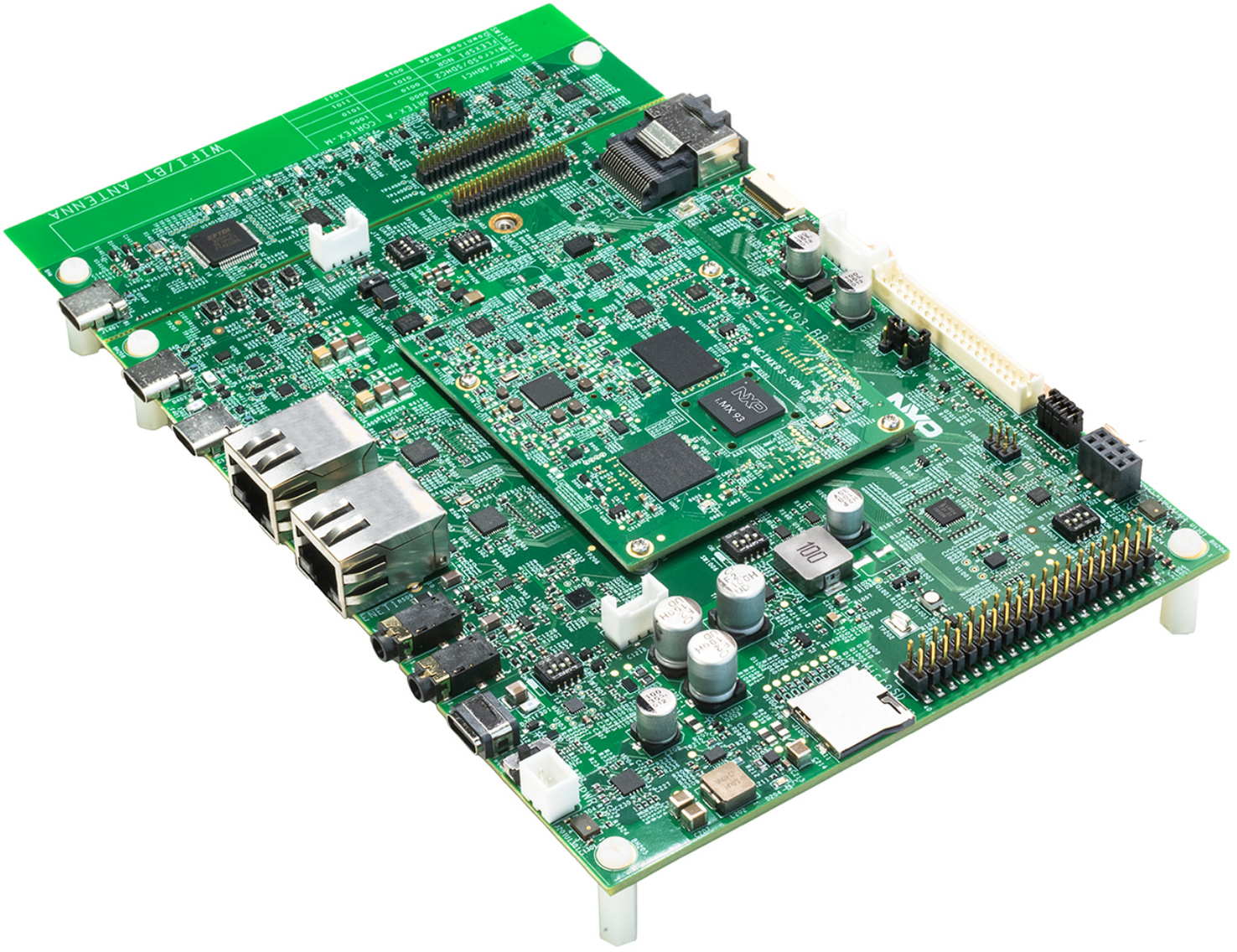
Quick Start Guide

MCIMX93-EVKPF09

i.MX 93 applications processor

i.MX 93 EVKPF09 applications processor QSG



About the i.MX 93 EVKPF09

The i.MX 93 applications processor is the latest member of the i.MX 9 family. It excels in machine learning, vision, advanced multimedia and industrial IoT applications. Elevating edge intelligence, i.MX 93 processors are the solid foundation for products built for smart homes, smart cities, and industrial applications.

Features

SOM Module

- i.MX 93 applications processor with:
  - 2x Arm® Cortex®-A55
  - 1× Arm® Cortex®-M33
  - 0.5 TOPS NPU
- LPDDR4X 16-bit 2GB
- eMMC 5.1, 32GB
- Power Management IC (PMIC)
- Power Measurement ADC

Base Board

- MicroSD 3.0 card slot
- Two USB 2.0 C connector
- One USB 2.0 C for Debug
- One USB C PD only
- M.2 Key-E for Wi-Fi/BT/802.15.4
- One MIPI-CSI connector
- One CAN port
- Four channels for ADC
- 6-axis IMU w/ I3C support
- I2C Expansion connector
- Two 1 Gbps Ethernet
  - Port1 supports TSN
  - Port2 supports ETER
- Multiple display interface:
  - MIPI-DSI connector
  - 1x4 data lane LVDS w/ Backlight
- Audio Codec Support
- PDM MIC array support
- External RTC w/ coin cell
- 2X20 Pin Expansion I/O

Get to know the i.MX 93 EVKPF09

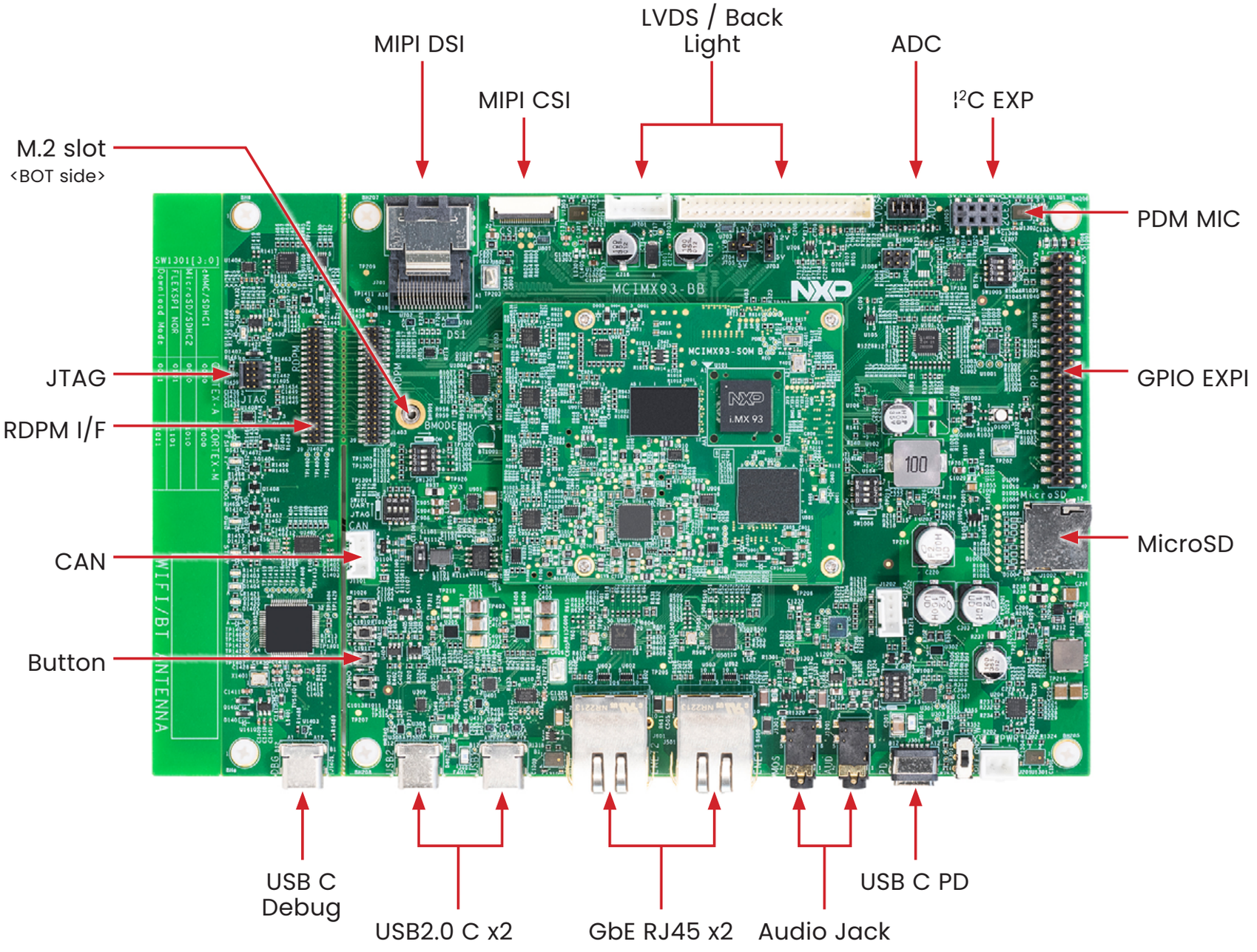


Figure 1: Top view i.MX 93 11x11 EVKPF09 board

Get to know the i.MX 93 EVKPF09 Continued

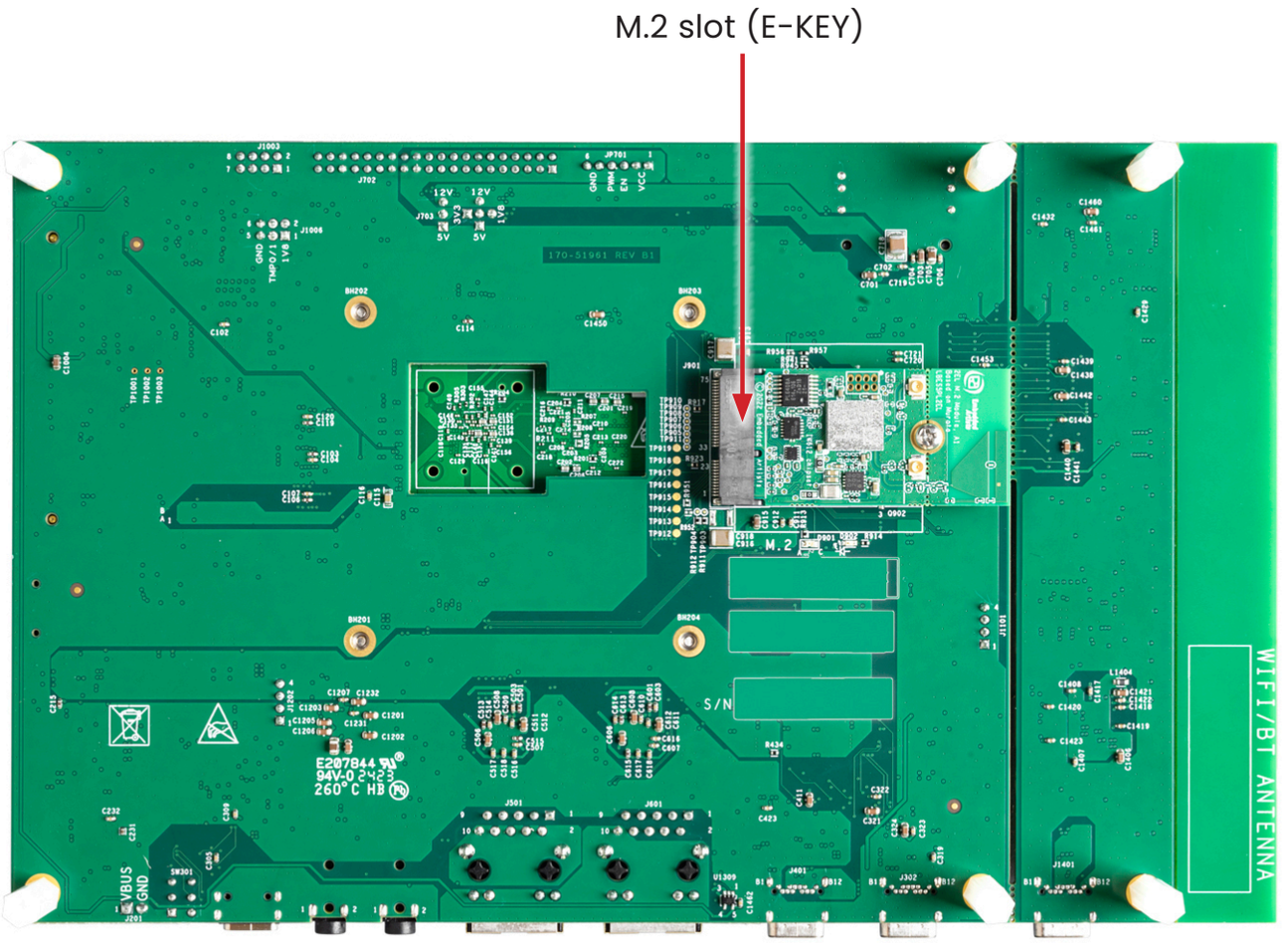


Figure 2: Back view i.MX 93 11x11 EVKPF09 board

Getting started

Unpack the Kit

The MCIMX93-EVKPF09 is shipped with the items listed in Table 1.

Table 1 — Kit Contents

Item	Description
MCIMX93-EVKPF09	i.MX 93 11X11 EVKPF09 board
Power Supply	USB C PD 45W, 5V/3A; 9V/3A; 15V/3A; 20V/2.25A supported
USB Type-C Cable	USB 2.0 C Male to USB 2.0 A Male
Software	Linux BSP image programmed in eMMC
Documentation	Quick Start Guide
M.2 Module	PN: LBES5PL2EL; Wi-Fi 6 / BT 5.2 / 802.15.4 support

Prepare Accessories

The following items in Table 2 are recommended to run the MCIMX93-EVKPF09.

Table 2 — Customer Supplied Accessories

Item	Description
IMX-MIPI-HDMI	MIPI-DSI to HDMI adapter board
LVDS LCD	12.1” TFT LCD, 1280x800 RGB
RPi-CAM-MIPI	IAS camera to 22 Pin / 0.5mm pitch FPC camera adapter (AR0144 sensor)
Audio HAT	Audio expansion board with most of audio features

Getting started Continued

Download Software and Tools

Installation software and documentation are available at www.nxp.com/imx93. The following are available on the website:

Table 3 — Software and Tools

Item	Description
Documentation	Schematics, layout and Gerber files Quick Start Guide Hardware Design Guide i.MX 93 EVKPF09 Board User Manual Power Consumption Measurement
Software Development	Linux BSPs
Demo Images	Copy of the latest Linux® images that are available to program on to the eMMC MCIMX93-EVKPF09 software can be found at nxp.com/imxsw

Setting up the system

The following will describe how to run the pre-loaded Linux image on the MCIMX93-EVKPF09 (i.MX 93).

1 Confirm Boot Switches

The boot switches should be set to boot from “eMMC”, SW1301[1-4] (Figure 1) are used for boot, See table below:

BOOT Device	SW1301[1-4]
eMMC/uSDHC1	0000

2 Connect USB Debug Cable

Connect the UART cable into the port JP1401 (Figure 1). Connect the other end of the cable to a PC acting as a host terminal. UART connections will appear on the PC, this will be used as A55 and M33 core system debugging.

Open the terminal window (i.e., Hyper Terminal or Tera Term), choose the right COM port number and apply the following configuration.

- Baud rate: 115200bps
- Data bits: 8
- Parity: None
- Stop bits: 1

3 Connect LVDS panel Display

Connect an LVDS panel with J702 2x20 PIN header through cable. Make sure jumpers on J703 (P2-P3) and J704 (P2-P1) have been installed.

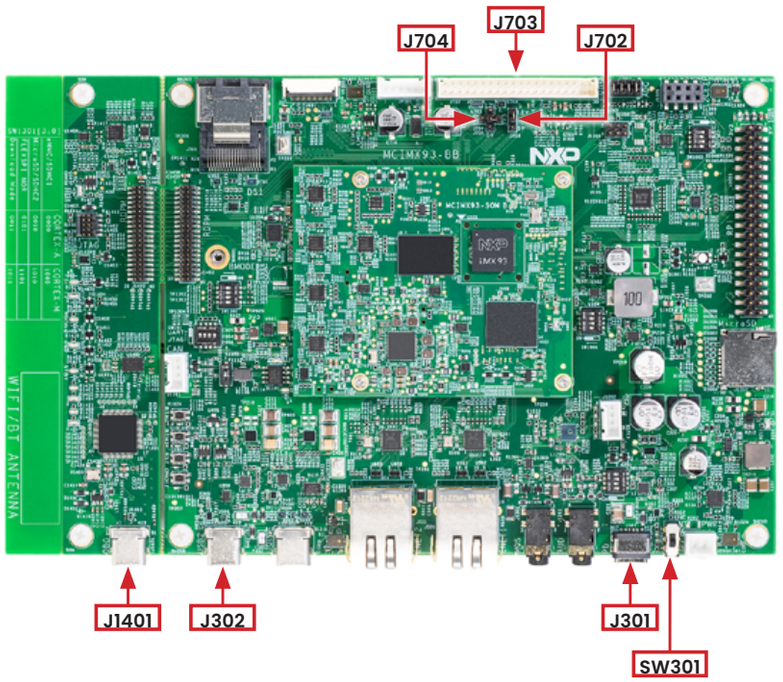
4 Connect Mouse

Connect the mouse to the USB2 C port connector J302 through USB C OTG cable.

Setting up the system Continued

5 Connect Power Supply

Connect the USB C PD power supply to J301, then power up the board by SW301 switch.



6 Board Boot Up

As the board boots up, you will see 4 penguins appear in the upper left-hand corner of the monitor, and then you will see the Linux terminal Icon on the top left and timer on right top corner. Congratulations, you are up and running.

Run “NXP Demo Experience” application to explore the preinstalled demos. The NXP Logo is displayed on the top left-hand corner of screen, start the demo launcher by clicking this logo. Refer to user guide for details — https://www.nxp.com/docs/en/user-guide/DEXPUG.pdf.

Additional information

Boot Switches
SW1301[1-4] is the boot configuration switch, the default boot device is eMMC/ uSDHC1, as shown in Table 4. If you want to try other boot devices, you need to change the boot switches to corresponding values as listed in Table 4.

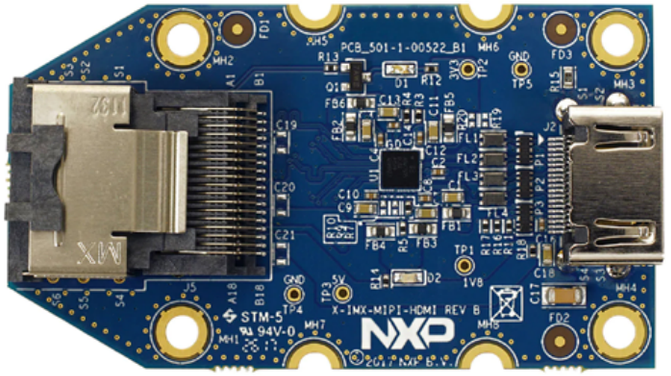
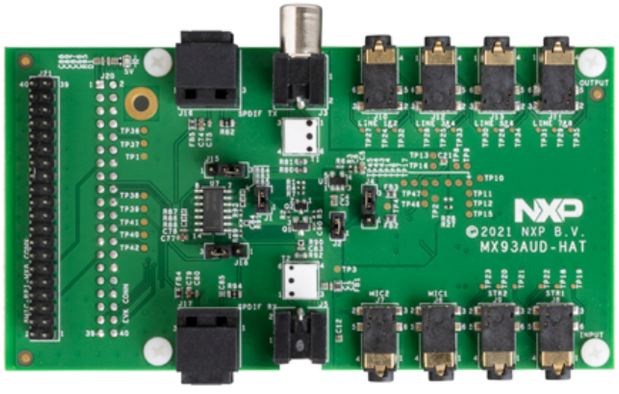
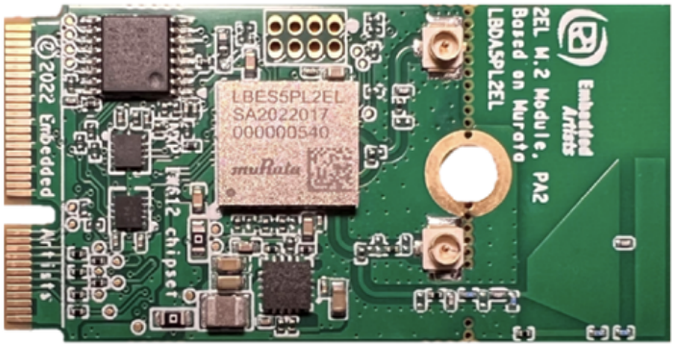
Note: 1 = ON 0 = OFF

Table 4 — boot device settings

Boot mode	Boot core	SW1301-4	SW1301-3	SW1301-2	SW1301-1
From internal fuses	Cortex-A55	0	0	0	1
Serial downloader	Cortex-A55	0	0	1	1
USDHC1 8-bit eMMC 5.1	Cortex-A55	0	0	0	0
USDHC2 4-bit SD3.0	Cortex-A55	0	0	1	0
FlexSPI serial NOR	Cortex-A55	0	1	0	1
FlexSPI serial NAND 2K page	Cortex-A55	0	1	1	1
Infinite loop	Cortex-A55	0	1	0	0
Test Mode	Cortex-A55	0	1	1	0
From internal fuses	Cortex-M33	1	0	0	1
Serial downloader	Cortex-M33	1	0	1	1
USDHC1 8-bit eMMC 5.1	Cortex-M33	1	0	0	0
USDHC2 4-bit SD3.0	Cortex-M33	1	0	1	0
FlexSPI serial NOR	Cortex-M33	1	1	0	1
FlexSPI serial NAND 2K page	Cortex-M33	1	1	1	1
Infinite loop	Cortex-M33	1	1	0	0
Test mode	Cortex-M33	1	1	1	0

Additional information

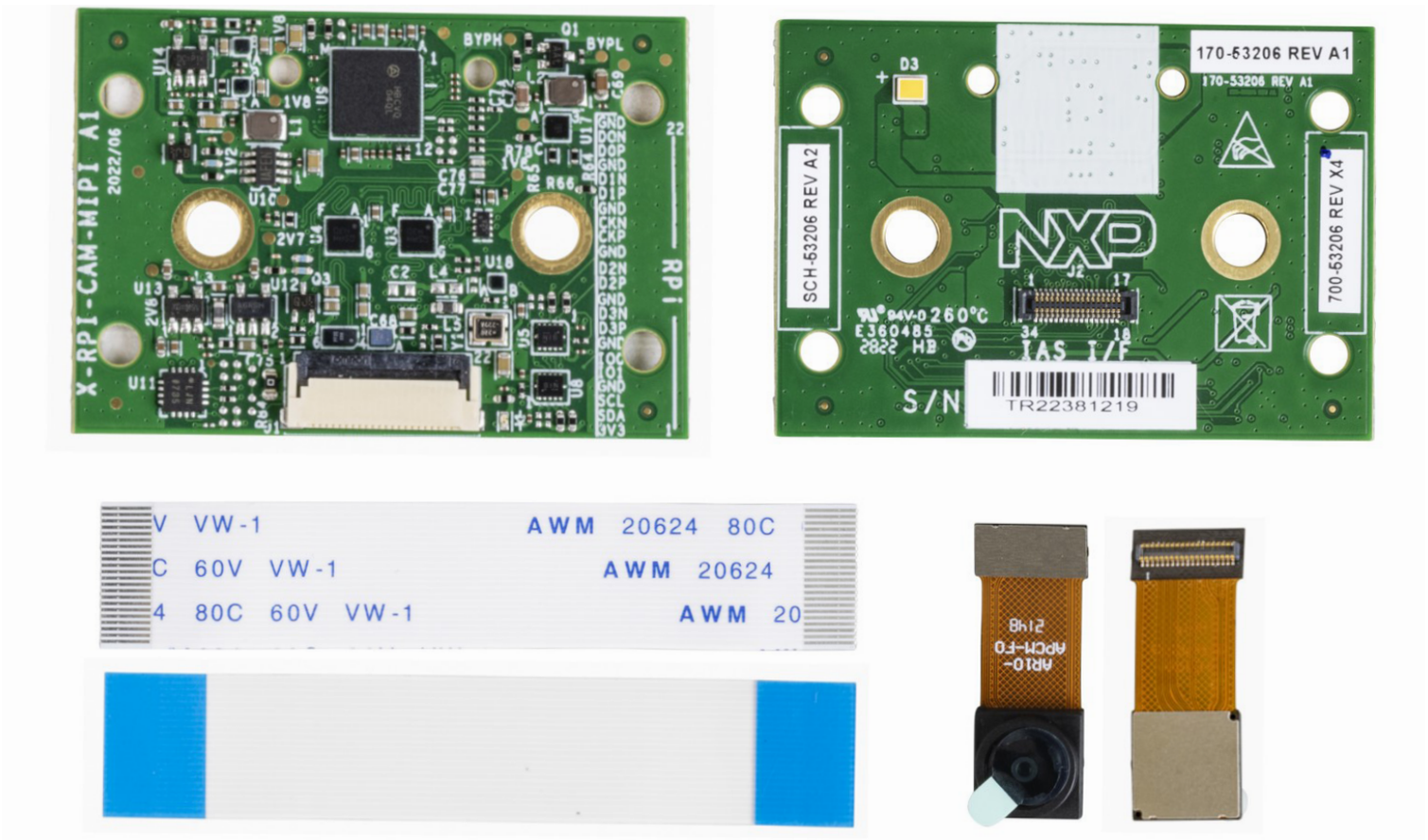
Do more with Accessory Boards

LVDS LCD: DY1212W-4856 12.1" (WXGA) TFT LCD (BOE EV121WXM-N10-1850) 1280*800 RGB with Capacitive Touch Panel (CTP)	IMX-MIPI-HDMI MIPI DSI output to HDMI adapter board
	
Audio Board: MX93AUD-HAT Audio expansion board with most of audio features	WiFi/BT M.2 Module (LBES5PL2EL) Wi-Fi 6, IEEE 802.11a/b/g/n/ac + Bluetooth 5.2 BR/EDR/LE, NXP IW612 chipset
	

Additional information Continued

RPi-CAM-MIPI

IAS camera to 22 Pin / 0.5mm pitch FPC camera adapter (AR0144 sensor)



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Note: This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined
by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.
This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.
The following information is provided per Article 10.8 of the Radio Equipment Directive 2014/53/EU:
(a) Frequency bands in which the equipment operates.
(b) The maximum RF power transmitted.

PN	RF technology	(a) Frequency ranges (EU)	(b) Max transmitted power
EAR00409	Bluetooth BR/EDR/LE	2400 MHz – 2484 MHz	2.6 dBm
EAR00409	Wi-Fi IEEE 802.11b/g/n	2400 MHz – 2484 MHz	2.6 dBm
EAR00409	Wi-Fi IEEE 802.11a/n/ac/ax	5150 MHz – 5850 MHz	3.64 dBm

EUROPEAN DECLARATION OF CONFORMITY (Simplified DoC per Article 10.9 of the Radio Equipment Directive 2014/53/EU)
This apparatus, namely 8MNANOLPD4-EVK, conforms to the Radio Equipment Directive 2014/53/EU.
The full EU Declaration of Conformity for this apparatus can be found at this location: www.nxp.com/i.MX8MNANO

Support

Visit **www.nxp.com/support** for a list of phone numbers within your region.

Warranty

Visit **www.nxp.com/warranty** for complete warranty information.

www.nxp.com/iMX93EVKPF09

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