



Quick Start Guide Evaluation Kit i.MX 8MQuad EVK CPU Board

Based on i.MX 8MQuad Application Processor



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Preliminary, Subject to Change

Quick Start Guide

GET TO KNOW THE EVK BASED ON i.MX 8MQD APPLICATION PROCESSOR

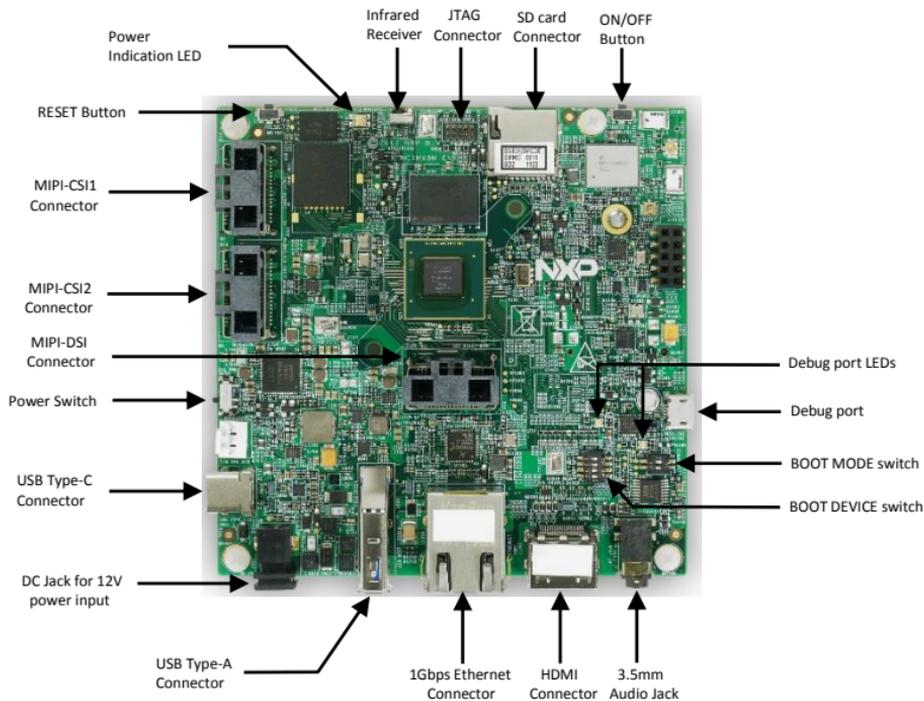


Figure 1: Main interfaces of i.MX 8MQ EVK CPU Board

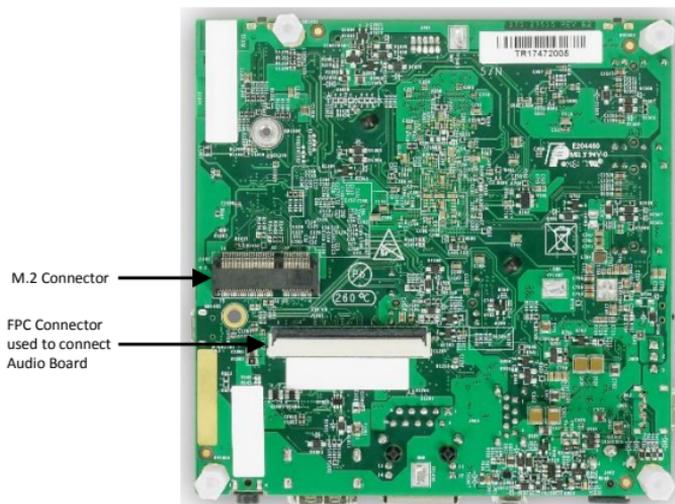


Figure 2 : Bottom View of i.MX 8MQ EVK CPU Board

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ABOUT THE EVALUATION KIT BASED ON THE i.MX 8MQUAD

The Evaluation Kit (EVK) based on i.MX 8MQuad introduces developers to the i.MX 8MQuad application processor. To speed up development, hardware design files, tools and board support packages (BSPs) for Linux[®], FreeRTOS[™] and Android are available for the customers.

The i.MX 8MQuad EVK consists of a CPU board and an audio board (ordered separately).

The audio board is used to support extended audio features.

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FEATURES

The following features are available with the EVK CPU board based on the i.MX 8 MQuad applications processor:

- i.MX 8MQuad processor with 5 cores (4xARM® Cortex®-A53, and 1x Cortex-M4)
- 3GB, 32-bit LPDDR4 with 1.6 GHz clock
- eMMC 5.0, 16GB
- 32MB Octal SPI NOR flash
- Micro SD card connector
- USB3.0 Type-C connector with PD support
- USB3.0 Type-A connector
- HDMI2.0a Type-A connector
- 1Gbps Ethernet
- mini-SAS MIPI-DSI connector
- 2x mini-SAS MIPI-CSI connectors for camera
- USB to serial convertor for debug
- Infrared receiver
- On-board MIMO 2x2 WiFi and BT4.1
- LEDs for power indication and general-purpose use
- M.2 connector for WiFi/BT (PCIe, USB, UART, I2C and I2S)
- 3.5mm Audio Jack for amplified speakers
- JTAG 10-Pin connector

GETTING STARTED

This section describes how to use the EVK and the required accessories to develop applications using the kit.

1 Unpacking the Kit

The EVK is shipped with the items listed in Table 1. Ensure the items are available in the i.MX 8MQuad EVK.

ITEM	DESCRIPTION
CPU board	CPU board with i.MX 8MQuad processor, memory and PMIC
Power supply	Output: DC 12V/5A, Plug: 1.65mm x 5.15mm
USB Type-C Cable	Cable -Assembly, USB 3.0 Type-A Male, USB micro-B Male, Shielded, 1m
USB micro-B Cable	Cable -Assembly, USB 2.0 Type-A Male, USB Type-C Male, Shielded, 1m
Documentation	Quick Start Guide

Table 1: Contents of the i.MX 8MQuad Evaluation Kit

2 Prepare Accessories

The following items in Table 2 are required to run the i.MX 8MQuad EVK.

ITEM	DESCRIPTION
HDMI display and cable	HDMI display and cable is required to run the HDMI
Mouse	Mouse with USB interface

Table 2: Necessary Equipment provided by customer

3 Download Software and Tools

Download installation software and documentation at www.nxp.com/iMX8MQEVK (**address may need to be updated**). The following documents are available on the website:

ITEM	DESCRIPTION
Documentation	<ul style="list-style-type: none">• Schematics, layout and Gerber files• Quick Start Guide
Software Development	Linux BSPs, Android BSPs
Demo Images	Copy of the latest Linux BSP images and Android images that are available to program on to the eMMC

Table 3: Software and documentation available on NXP website

SETTING UP THE SYSTEM

1 Connect USB Debug Cable

Connect the micro-B end of a USB cable into debug port J1701. Connect the other end of the cable to a PC acting as a host terminal. 2 UART connections will appear on the PC. The console print will output on “Enhanced COM port”, which can be found in “Device Manager” of the PC.

Open the terminal window (i.e., Hyper Terminal or Tera Term), choose the COM port number that corresponds to the “Enhanced COM port” and apply the following configuration.

- Baud rate: 115200
- Data bits: 8
- Stop bit: 1
- Parity: None
- Flow control: None

2 Connect HDMI Display

Connect an HDMI cable to the HDMI connector Jack J1001. Connect the other end of the cable to a HDMI display panel.

3 Connect mouse

Connect the mouse to the USB host connector J903.

4 Connect Power Supply

Connect the plug of the 12V power supply to the DC power jack J902.

DIP SWITCH CONFIGURATION

Table 3 shows the switch (SW801) configuration of the boot device for i.MX 8MQuad EVK. MicoSD is chosen as the default.

Table 4 shows the switch (SW802) configuration of the boot mode for i.MX 8MQuad EVK. Internal boot is chosen as the default.

POS-4	POS-3	POS-2	POS-1	BOOT DEVICE
OFF	OFF	ON	ON	microSD
OFF	ON	OFF	OFF	eMMC
OFF	ON	ON	OFF	NAND
ON	OFF	OFF	OFF	QSPI

Table 4: i.MX 8MQuad EVK CPU boot device switch configuration

POS-2	POS-1	BOOT MODE
OFF	OFF	Boot From Fuses
ON	OFF	Serial Downloader
OFF	ON	Internal Boot
ON	ON	Reserved

Table 5: i.MX 8MQuad EVK CPU boot mode switch configuration

Button Functions

Table 5 shows the functions of the push buttons and switches on the board.

ITEM	DESCRIPTION
SW701	Evaluation board power switch <ul style="list-style-type: none">• Switching to the ON position connects the 12V power supply to the EVK main power system.• Switching to the OFF position immediately removes all power from the board.
SW1701	EVK ON/OFF button <ul style="list-style-type: none">• Press and hold for 0.5sec for On, press and hold for 5sec to turn off.
SW1702	EVK RESET button <ul style="list-style-type: none">• Pressing of the button will reset the system and begin a boot sequence

Table 6: EVK board button operations

LED Status

Table 6 shows the status of LEDs on the board

ITEM	DESCRIPTION
D1601/RED	DCDC_3V3 supply ON
D1601/GREEN	General purpose use, controlled by GPIO.
D1702/ORANGE	UART2 Data TX(Pulses when Receiving Data via USB)
D1702/GREEN	UART2 Data RX(Pulses when Transmitting Data via USB)
D1703/ORANGE	UART1 Data TX(Pulses when Receiving Data via USB)
D1703/GREEN	UART1 Data RX(Pulses when Transmitting Data via USB)

Table 7: i.MX 8MQuad EVK CPU – LED Status

Additional Reference

Download BSP Images

The board images can be downloaded to the target board by using the manufacturing tool, named MFGTool, which runs on a computer with the Windows® operating system. The MFGTool zip file can be found at www.nxp.com/iMX8MQEVK (address may need to be updated).

Perform the following steps to download the board images:

1. Unzip the MFGTool file to a selected location. The directory is named MFGTool-Dir in this example.
2. Switch SW802 to OFF, ON (from 1-2 bit) to enter serial download mode as shown in Figure 4.



Figure 4 : SW802 setting for Serial Download Mode

3. Connect the Type-C end of a USB cable into the USB Type-C connector J901. Connect the other end of the cable to the PC.

- Connect the plug of the 12V power supply to the DC power jack J902. Then slide the power switch SW701 to ON. The i.MX 8MQuad will be enumerated as a HID device on PC.
- Double click the file *.vbs according to the image type and target device as shown:

Target Device	Image	VBS file
eMMC	Linux	mfgtool2-yocto-mx8-evk-emmc1.vbs
eMMC	Android	mfgtool2-android-mx8mq-evk-emmc.vbs
MicroSD	Linux	mfgtool2-yocto-mx8-evk-sd2.vbs
MicroSD	Android	mfgtool2-android-mx8mq-evk-sd.vbs

Table 8: Target Device for downloading the image (content may need to be updated)

- For example, we program Linux image, and choose the eMMC as target device. Double click mfgtool2-yocto-mx8-evk-emmc1.vbs (content may need to be updated), and then click “Start” to start downloading images.

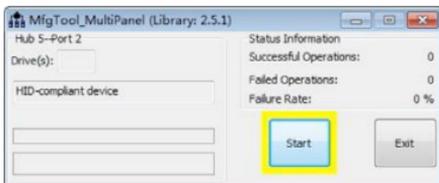


Figure 5 : Starting Download

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The process bar becomes green once the download is complete.

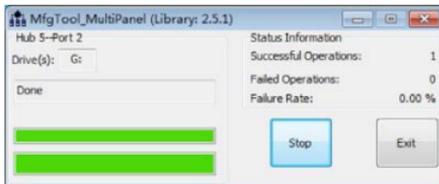


Figure 6 : Download Complete

7. Click "Stop", then "Exit".

Bootup the board

Before power up, Switch SW802 to ON, OFF (from 1-2 bit) to enter internal boot mode as shown in Figure 4.

The default output device is HDMI, resolution is 3840x2160p60, if user use a different display resolution, then need change the resolution setting in the boot args according to table 7, for example, set 1080p60,

```
setenv mmcargs 'setenv bootargs console=${console} root=${mmccroot} video=HDMI-A-1:1920x1080-32@60'
```

Resolution	Uboot Setting
HDMI 1.4 3840x2160p60	default display mode
HDMI 1.4 3840x2160p30	support by adding: video=HDMI-A-1:3840x2160-32@30 to bootargs
HDMI 1.4 1920x1080p60	support by adding: video=HDMI-A-1:1920x1080-32@60 to bootargs
HDMI 1.4 1280x720p60	support by adding: video=HDMI-A-1:1280x720-32@60 to bootargs
HDMI 1.4 720x480p60	support by adding: video=HDMI-A-1:720x480-32@60 to bootargs

Table 9: Resolution Setting

After power up, the serial port will output message, when the following message output, enter 'root' and return, the system will success bootup.

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NXP i.MX Release Distro 4.9.51-mx8-beta imx8mqevk ttyMXC0

imx8mqevk login:root

root@imx8mqevk:~#

Multimedia

i.MX provides audio optimized software codecs, parsers, hardware acceleration units, and associated plugins. The i.MX provides GStreamer plugins to access the i.MX multimedia libraries and hardware acceleration units.

There are three ways to play video and audio

1. `gplay-1.0`

```
gplay-1.0 $filename --audio-sink='alsasink device="hw:X,0"'
```

The audio default output is audio jack, to route to HDMI need set the HDMI sound card X is the sound card number.

User can use `aplay` command to list all the sound card in system.

```
aplay -l
```

2. `playbin`

```
gst-launch-1.0 playbin uri=$file video-sink=$video-sink-plugin audio-sink='alsasink device="hw:X,0"'
```

3. full gstreamer pipeline

```
gst-launch-1.0 filesrc location=$file ! $scapsfilter ! $demux ! queue !
$video_decoder_plugin ! $video_sink_plugin ! $scapsfilter ! $audio_decoder_plugin !
$audiosink
```

MIPI-DSI

Except the HDMI, the display can be configured as MIPI-DSI. On EVK board, it uses MINI-SAS interface J1501, connect MIPI-DSI to HDMI cable for display.

The user can use `fsl-imx8mq-evk-dual-display.dtb` to replace the original dtb file to enable the MIPI-DSI.

MIPI-CSI

The default DTB will support the MIPI-CSI on J1502. To enable the camera on J1503, there need `fsl-imx8mq-evk-mipi-csi2.dtb` to replace the original DTB file.

The camera gstreamer commands as following:

```
gst-launch-1.0 v4l2src ! video/x-raw,width=640,height=480 ! kmssink
gst-launch-1.0 v4l2src ! video/x-raw,width=720,height=480 ! kmssink
gst-launch-1.0 v4l2src ! video/x-raw,width=1280,height=720 ! kmssink
gst-launch-1.0 v4l2src ! video/x-raw,width=1920,height=1080 ! kmssink
    gst-launch-1.0 v4l2src ! video/x-raw,width=2592,height=1944 !
    kmssink
```

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

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SUPPORT

Visit the i.MX community at
www.imxcommunity.org.

WARRANTY

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

www.nxp.com/iMX8MQEVK

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