i.MX 8QXP MEK Display Selection Guide

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1. Introduction

This document describes the i.MX 8QXP MEK mini-SAS connectors features on Linux and Android use cases, covering since the daughter cards supported by the board to the process to change Device Tree (DTS) files or Boot images, and enable these different display options on the i.MX 8QXP MEK board.

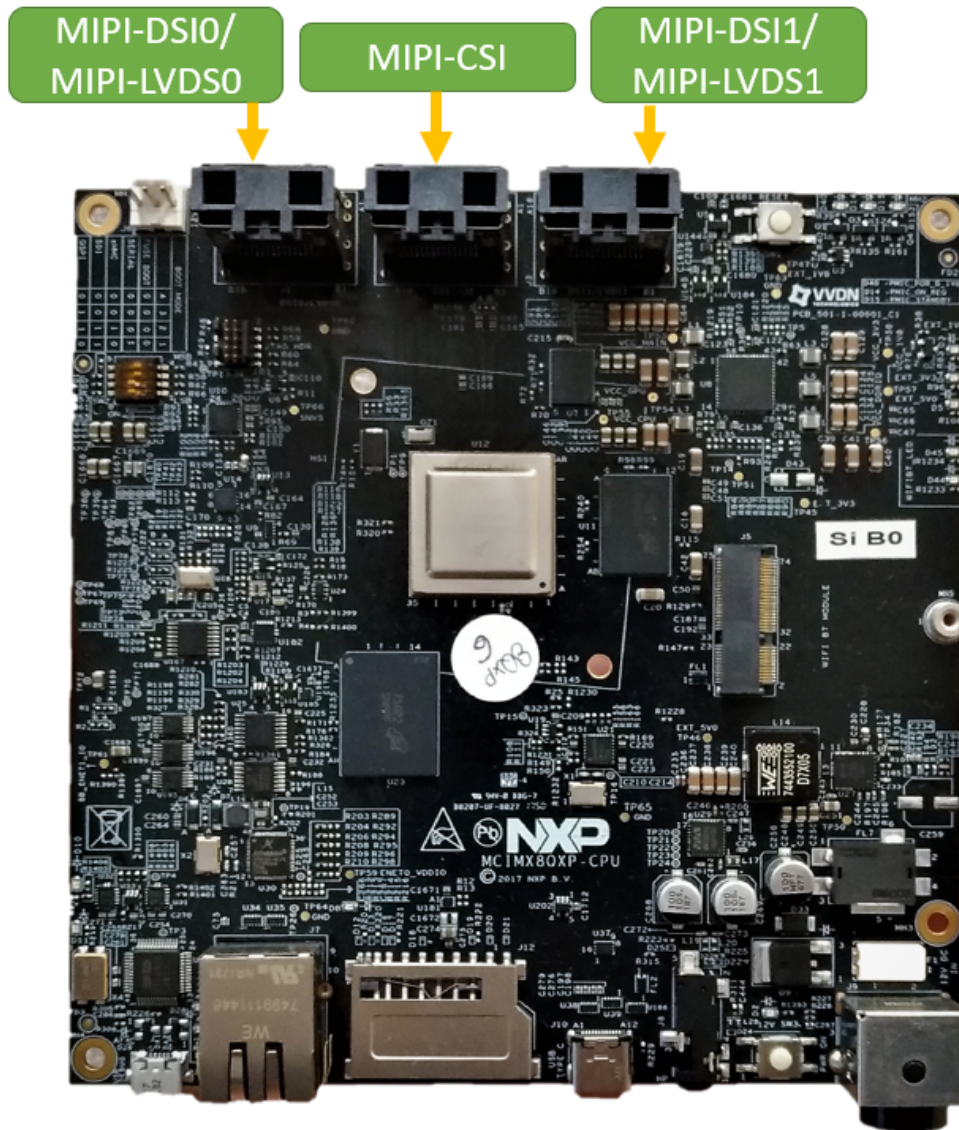This guide is based on the L4.14.62_1.0.0-beta release and O8.1.0_1.2.0_8QXP-beta2 release.

Figure 1. i.MX 8QXP MEK mini-SAS connectors

The document covers the following:

- Obtaining a Linux L4.14.62_1.0.0-beta and an Android O8.1.0_1.2.0_8QXP-beta2 Image release
- Changing the DTS files or Boot images to define imx8qxp display options
- i.MX 8QXP MEK daughter cards
- i.MX 8QXP MEK Display features

2. Obtaining a Linux L4.14.62_1.0.0-beta Image

There are two methods available to install the L4.14.62_1.0.0-beta onto the i.MX 8QXP MEK board:

2.1. i.MX BSP Releases

Prebuilt Images can be downloaded from the NXP i.MX developer resources webpage. These images are composed by a Linux Kernel, ATF, SC firmware and U-Boot, and can be directly written to a SDCard. This SDCard can be then placed in the SDCard slot on the i.MX 8QXP MEK and booted.

2.2. The Yocto Project Build

To build an Yocto Image from the source code, please refer to the "i.MX Yocto Project User's Guide" for detailed information.

3. Obtaining an Android O8.1.0_1.2.0_8QXP-beta2 Image

There are two methods available to install the O8.1.0_1.2.0_8QXP-beta2 onto the i.MX 8QXP MEK board:

3.1. i.MX BSP Releases

Prebuilt Images can be downloaded from the NXP i.MX developer resources webpage. These Images are composed of U-Boot, SDCard partition table file, system, and vbmeta. It can be written using the mfgtool2-android-mx8qxp-mek-sd.vbs and a SDCard. Please, refer to the "Android User's Guide" for more details.

3.2. Android Build

To build an Android Image from the source code, please refer to the "Android User's Guide" for detailed information.

4. Changing DTS files on Linux

The L4.14.62_1.0.0-beta release for i.MX 8QXP MEK has some Device Tree files available. These DTS files affect the behavior of the displays connected to the mini-SAS connectors, which expand your multimedia experience in combination with the range of daughter cards available for the i.MX 8QXP MEK.

Table 1. i.MX 8QXP MEK DTB files available

DTB Name	Supported outputs	daughter card	Max Resolution
fsl-imx8qxp-mek.dtb	MIPI-DSI/LVDS	IMX-MIPI-HDMI/IMX-LVDS-HDMI	2x 1920x1080@60fps
fsl-imx8qxp-mek-dsi-rm67191.dtb	MIPI-DSI-OLED display	MIPI-DSI-OLED	1920x1080@60fps
fsl-imx8qxp-mek-jdi-wuxga-lvds0-panel.dtb	DUAL-LVDS-LCD panel	DUAL-LVDS-LCD	1920x1200@60fps

To change the DTB files on Linux, follow the steps below. Please ensure you have an image loaded into a SDCard and that your board successfully boots U-Boot and Kernel:

Step 1: Reboot the board and press any key to stop the boot process at U-Boot.

Step 2: Type the desired DTB file following the example command line below to modify the default DTB by changing the file name to match to one of the DTB files listed above:

```
=> setenv fdt_file 'fsl-imx8qxp-mek.dtb'
```

Step 3: Save the environment variable:

```
=> saveenv
```

Step 4: Boot the Linux Kernel by resetting the board:

```
=> boot
```

5. Changing Boot images on Android

The O8.1.0_1.2.0_8QXP-beta2 release for i.MX 8QXP MEK has some Boot images available. These Boot images were created to avoid any undesired change in the boot args commands and are composed by kernel information, device name and boot parameters. The dts file and Boot image can affect the behavior of the displays. They can also expand the user multimedia experience when combined with the range of daughter cards available for the i.MX 8QXP MEK.

Table 2. i.MX 8QXP MEK Boot images available

Boot Image	Supported outputs	daughter card	Max Resolution
boot-imx8qxp.img	MIPI-DSI/LVDS	IMX-MIPI-HDMI/IMX-LVDS-HDMI	2x 1920x1080@60fps

To replace the Boot Image on Android, before to create the SDCard image, change the boot-imx8qxp.img and vbmeta-imx8qxp.img for the desired display option.

For example, to test the MIPI camera, replace:

- boot-imx8qxp-ov5640mipi.img to boot-imx8qxp.img;
- vbmeta-imx8qxp-ov5640mipi.img to vbmeta-imx8qxp.img;

Create the Android image and boot the board. Please, refer to the "Android User's Guide" for more details.

6. i.MX 8QXP MEK daughter cards

The i.MX 8QXP MEK has a set of expanding boards that can be purchased separately to improve the user experience. Refer to the next section for more information on the different type of daughter cards.

6.1. LVDS to HDMI converter board

The IMX-LVDS-HDMI converter board allows 1 HDMI output via the LVDS interface. This board connects to the MIPI-LVDS connector through the mini-SAS cable.
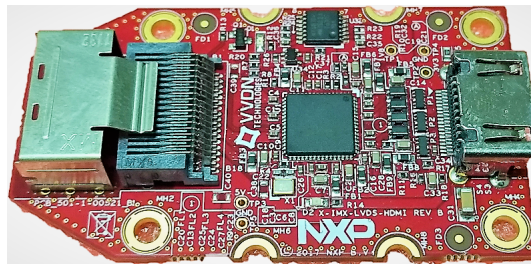

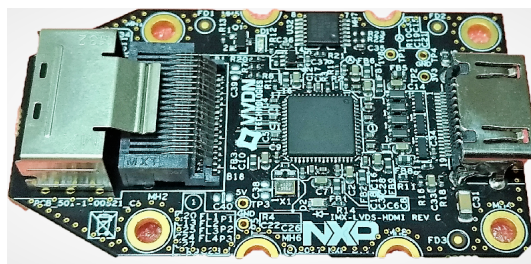*Figure 2. IMX-LVDS-HDMI Rev B converter board*

Figure 3. IMX-LVDS-HDMI Rev C converter board

6.2. MIPI-DSI to HDMI converter board

The IMX-MIPI-HDMI converter board allows 1 HDMI output via the MIPI DSI interface. This board connects to the MIPI-DSI connector through the mini-SAS cable.
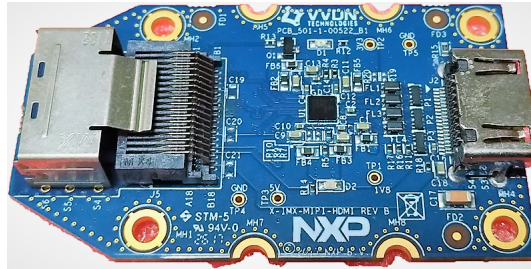
Figure 4. IMX-MIPI-HDMI converter board

6.3. MX8 DSI OLED display

The MX8-DSI-OLED, is a MIPI-DSI OLED display with touch screen support.

Key specification / features:

- 5.49" FHD (1920x1080@60fps) AMOLED display
- 16.7M (RGB*8bits) display color
- Touch screen
- 4-lane MIPI-DSI interface for display
- I2C interface for touch and control

Figure 5. MX8-DSI-OLED display panel

6.4. MX8 DLVDS LCD

The MX8-DLVDS-LCD, is a WUXGA dual channel LVDS panel for the i.MX 8 family of boards.

Key specification / features:

- 10.1" WUXGA (1920x1200@60fps) TFT LCD panel

Figure 6. MX8-DLVDS-LCD

Figure 7. MX8-DUAL-CHANNEL-LVDS panel connectors

7. i.MX 8QXP MEK Display features

This section shows in details what can be expected when combined the DTS files and daughter cards available for i.MX 8QXP MEK.

7.1. MIPI-DSI0/LVDS0 and MIPI-DSI1/LVDS1 HDMI displays

Using the IMX-MIPI-HDMI and/or IMX-LVDS-HDMI (rev B or rev C) daugter-boards, the user can connect up to two HDMI monitors by default and reach up to 1080@60fps on each output images on either Linux or Android.
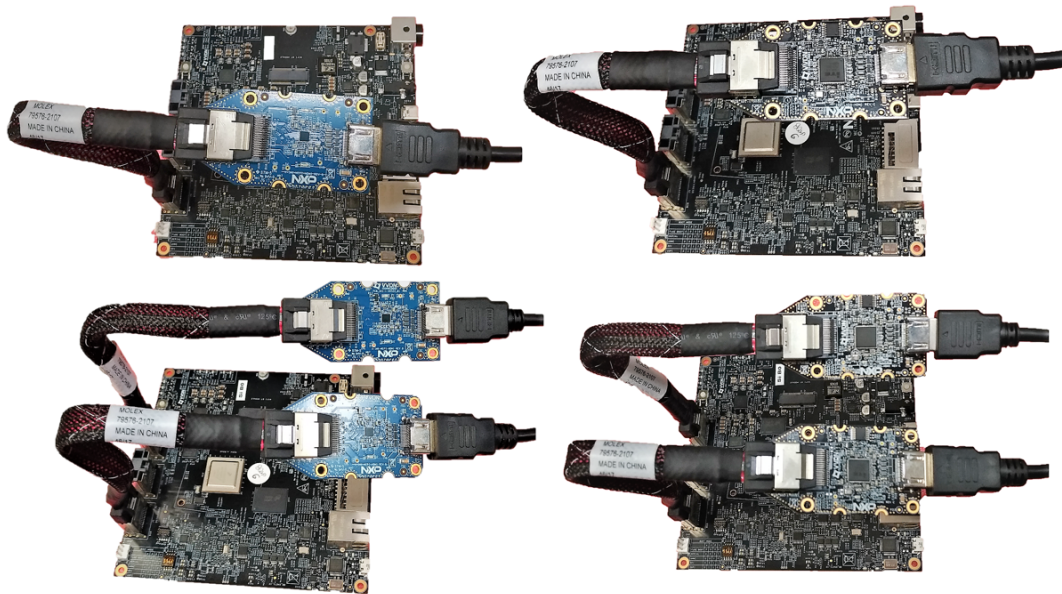
Figure 8. MIPI-DSI/LVDS connection options example

7.2. OLED display panel

Other way to reach up to 1080p@60fps on i.MX 8QXP MEK is by using the OLED display panel. This accessory can be connected to the MIPI-DSI connector in combination with the fsl-imx8qxp-mek-dsi-rm67191.dtb.

Figure 9. DSI OLED display example

7.3. Dual-channel LVDS panel

The i.MX 8QXP MEK has support for dual-channel LVDS panel. This accessory can be connected through the MIPI-DSI/LVDS combo ports in combination with the fsl-imx8qxp-mek-jdi-wuxga-lvds0-panel.dtb and reach up to 1920x1200@60fps.

Figure 10. Dual-channel LVDS panel example