

Android™ Quick Start Guide

1 Overview

This document guides you through the processes of downloading and running this release package. It only explains how to download and run the default release image with default configuration. For details on using the release package, see the *Android™ User's Guide (AUG)* included in this release package.

2 Hardware Requirements

The hardware requirements for using this release package are as follows:

Supported system-on-chips (SoCs):

- i.MX 8M Mini
- i.MX 8M Quad
- i.MX 8QuadMax
- i.MX 8QuadXPlus

Supported boards:

- EVK board and Platform
- MEK board and Platform

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3 Working with the i.MX 8M Mini EVK Board

3.1 Board hardware

The figures below show the different components of the i.MX 8M Mini EVK board.

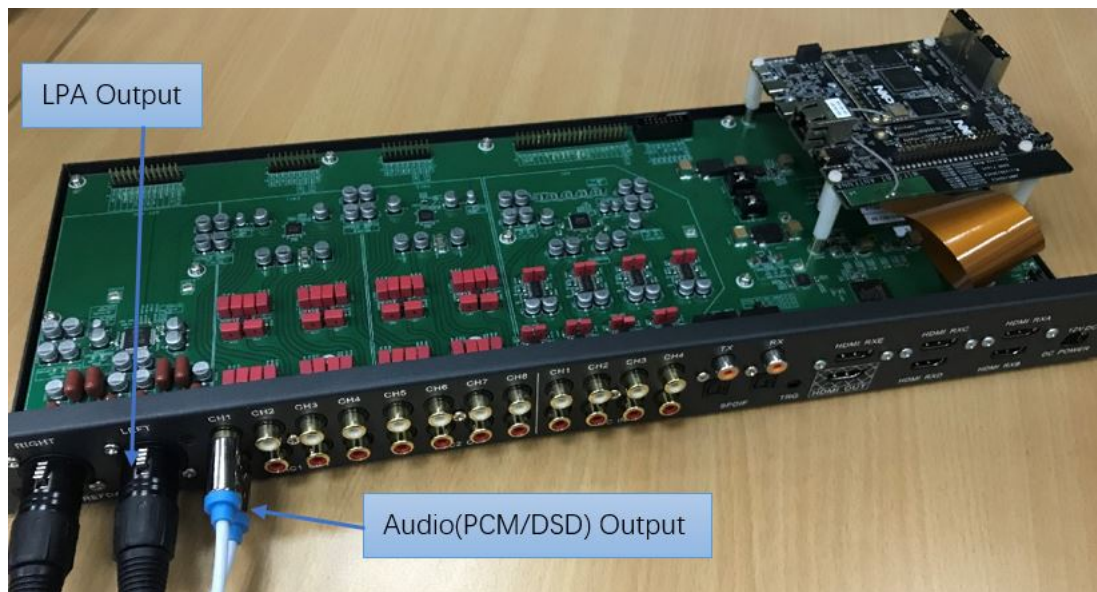


Figure 1. i.MX 8M Mini EVK board

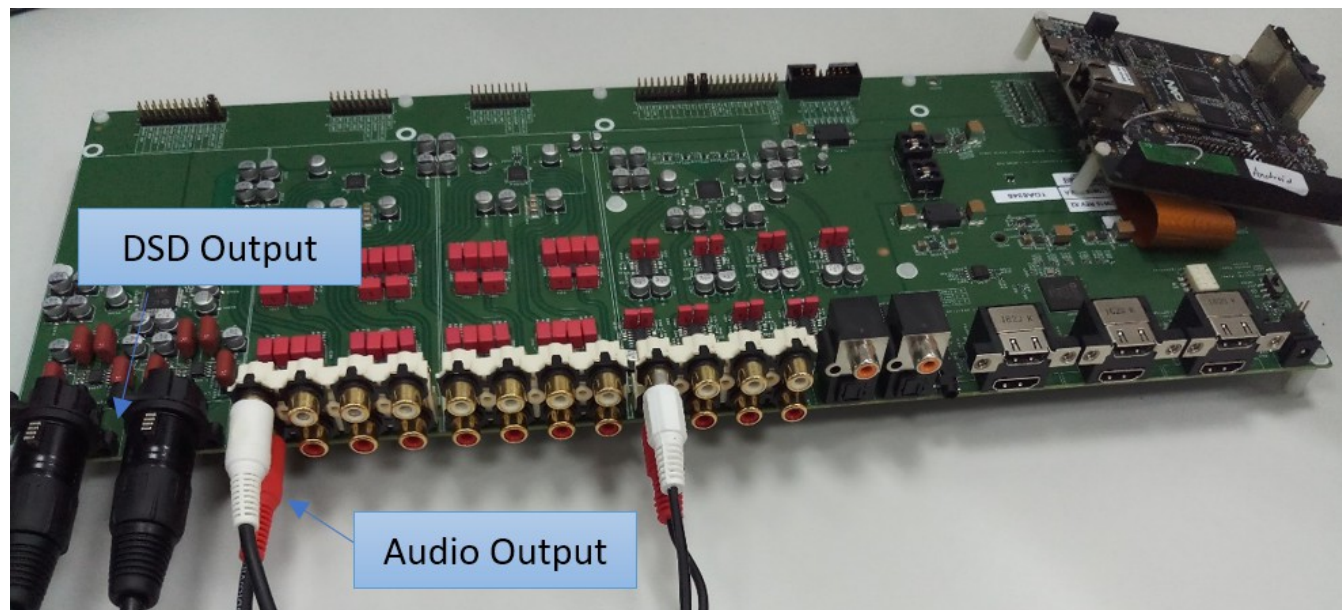


Figure 2. i.MX 8M Mini EVK with audio board



Figure 3. i.MX 8M Mini SAS cable with DSI-to-HDMI adapter



Figure 4. i.MX MIPI panel



Figure 5. i.MX MIPI camera

NOTE

- To test the MIPI-DSI to HDMI display, use the i.MX mini SAS cable to connect the DSI-to-HDMI adapter to the "HDMI DSI" port.
- To test the MIPI panel display, connect the i.MX MIPI panel to the "HDMI DSI" port.
- To test the camera, connect two i.MX MIPI cameras to the "MIPI Camera0" and "MIPI Camera1" ports at the same time.

3.2 Board images

The table below describes the location in the board partitions of the software images in android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz.

Table 1. Board images

Image name	Download target
/u-boot-imx8mm.imx	33 KB offset of MMC.
/u-boot-imx8mm-evk-uuu.imx	Bootloader used by UUU for the i.MX 8M Mini board. It is not flashed to MMC.
/imx8mm_m4_demo.img	5120 KB offset of MMC.
/partition-table.img	0 offset of MMC. If the actually size of the SD card is larger than 13 GB, use the default partition-table.img.
/partition-table-7GB.img	0 offset of MMC. If the actually size of the SD card is larger than 7 GB, use this image as partition-table.img.
/partition-table-28GB.img	0 offset of MMC. If the actually size of the SD card is larger than 28 GB, use this image as partition-table.img.
/boot.img	boot_a and boot_b partitions.
/vbmeta-imx8mm.img	vbmeta_a and vbmeta_b partitions to support MIPI-to-HDMI output and Direct Stream Digital (DSD) audio playback.
/vbmeta-imx8mm-m4.img	vbmeta_a and vbmeta_b partitions to support MIPI-to-HDMI output and audio playback based on Cortex-M4 FreeRTOS.
/vbmeta-imx8mm-mipi-panel.img	vbmeta_a and vbmeta_b partitions to support MIPI panel output.
/system.img	system_a and system_b partitions.
/vendor.img	vendor_a and vendor_b partitions.
/dtbo-imx8mm.img	dtbo_a and dtbo_b partitions to support MIPI-to-HDMI output and DSD audio playback.
/dtbo-imx8mm-m4.img	dtbo_a and dtbo_b partitions to support MIPI-to-HDMI output and audio playback based Cortex-M4 FreeRTOS
/dtbo-imx8mm-mipi-panel.img	dtbo_a and dtbo_b partitions to support MIPI panel output

The table below describes the Universal Update Utility (UUU) scripts in android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz. They are used with the UUU binary file to download the images above into the board. For detailed information on how to download images with UUU, see Section 3.3 "Board images".

Table 2. UUU scripts

UUU script name	Function
uuu-android-mx8mm-evk-emmc.lst	Used with the UUU binary file to download image files into eMMC. The m4_os partition is not flashed.
uuu-android-mx8mm-evk-sd.lst	Used with the UUU binary file to download image files into the SD card. The m4_os partition is not flashed.
uuu-android-mx8mm-evk-emmc-m4.lst	Used with the UUU binary file to download image files into eMMC. The m4_os partition is flashed.
uuu-android-mx8mm-evk-sd-m4.lst	Used with the UUU binary file to download image files into the SD card. The m4_os partition is flashed.

3.3 Flashing board images

The board image files can be flashed into the target board using Universal Update Utility (UUU).

For the UUU binary file, download it from github: [uuu release page on github](#). You can download the latest version (1.2.31 for now).

- For Linux OS, download the file named "uuu".
- For Windows OS, download the file named "uuu.exe".

You can put these files in a path containing the system environment variable "PATH", and then directly call uuu in command line or shell terminal.

There are two ways as follows to use UUU to flash images:

- Directly invoke UUU with the `lst` scripts in the command line to flash images.
- Use the `uuu_imx_android_flash` shell script and Windows batch file to invoke UUU and fastboot tool to flash images.

`uuu_imx_android_flash` is a new tool, which is more flexible. If the users are not familiar with this tool, the way to use UUU with the `lst` scripts is still maintained, and it will be removed in the future.

The two ways are described as follows. Users can choose either of it to flash images.

3.3.1 Directly invoking UUU with the `lst` scripts in command line to flash images

For detailed information on the UUU `lst` scripts used in this way, see Section 3.2 "[Board images](#)".

NOTE

UUU uses the integrated fastboot tool to flash images. Make sure you have fastboot driver software installed on your computer.

Perform the following steps to flash the board images:

1. Download the UUU binary file from github as described above.
2. Change the first two bits of the board's `sw1101` to 10 (1-2 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board's OTG port.
4. Decompress `release_package/android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz`, which contains the image files and UUU scripts. Choose the correct UUU script file as shown in the following table.

Target device and boot storage	UUU script file
i.MX 8M Mini EVK eMMC	<code>uuu-android-mx8mm-evk-emmc.lst</code>
i.MX 8M Mini EVK SD	<code>uuu-android-mx8mm-evk-sd.lst</code>

To test MIPI-DSI to HDMI output and audio playback based on Cortex-M4 FreeRTOS, choose one of the UUU scripts shown in the following table.

Target device and boot storage	UUU script file
i.MX 8M Mini EVK eMMC	<code>uuu-android-mx8mm-evk-emmc-m4.lst</code>
i.MX 8M Mini EVK SD	<code>uuu-android-mx8mm-evk-sd-m4.lst</code>

NOTE

- If your SD card is 16 GB or the on-board eMMC is used as the boot device, to test the MIPI-DSI to HDMI output, you do not need to change the "partition-table.img" part of the UUU script.
- If your SD card is 32 GB, rename partition-table.img to partition-table-28GB.img in the corresponding UUU script.
- If your SD card is 8 GB, rename partition-table.img to partition-table-7GB.img in the corresponding UUU script.
- To test MIPI-DSI to HDMI output, you do not need to rename boot-imx8mm.img and vbmeta-imx8mm.img in the UUU script.
- To test the MIPI panel output, rename boot-imx8mm.img and vbmeta-imx8mm.img to boot-imx8mm-mipi-panel.img and vbmeta-imx8mm-mipi-panel.img in the corresponding UUU script.

5. Use UUU and the proper script file to flash image files.

Execute the following command to invoke the UUU binary file and UUU scripts to flash the image files.

- On a Linux system, open the shell terminal. Execute the command below. `{uuu_script_path}` is the file path (including the name of the UUU script) of the UUU script that is used. It can be a relative path or an absolute path.

```
> sudo uuu {uuu_script_path}
```

- On a Windows system, open the command line interface. Execute the command below. `{uuu_script_path}` is the absolute file path (including the name of the UUU script) of the UUU script.

```
> uuu.exe {uuu_script_path}
```

6. Wait for the script file execution to complete. If there are no errors, you will get information on the command window as follows:

```
C:\Users\user_01\tools\uuu>uuu.exe C:\Users\user_01\images\android_p9.0.0_1.0.0-ga_image_8mmevk\uuu-android-mx8mm-evk-emmc.lst
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.24-0-g0d63ca3
```

```
Powershell: Enjoy auto [tab] command complete by run below command or put into
Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1
Register-ArgumentCompleter -CommandName uuu -ScriptBlock {param($commandName,
$parameterName,$wordToComplete,$commandAst,$fakeBoundParameter); C:\Users\user_01\tools
\uuu>uuu.exe -autocomplete $parameterName }
```

```
Success 1      Failure 0
```

```
2:2      22/22      [Done                ] FB: done
```

As you can see, it is on the Windows system, and the absolute file path of the UUU script is used. For the output information on the command complete feature, it is recommendations given by UUU itself. This feature is not used here.

7. Power off the board.
8. Change the boot device as eMMC or SD card.
 - To boot from eMMC, change sw1101 to 01110010 and change sw1102 to 00101010.
 - To boot from SD card, change sw1101 to 01000110 and change sw1102 to 00110100.

3.3.2 Using the uuu_imx_android_flash tool to invoke UUU and fastboot tool to flash images

The `uuu_imx_android_flash` shell script and windows batch file are provided to flash Android images with much more flexibility.

Perform the following steps to download the board images:

1. Download the UUU binary file from github as described above. Install fastboot into a directory contained by the system environment variable of "PATH".
2. Change the first two bits of board's sw1101 to 10 (1-2 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board OTG port.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz, which contains the image files and uuu_imx_android_flash tool.
5. Execute the uuu_imx_android_flash tool to flash images.
The uuu_imx_android_flash tool can be executed with options to get help information and specify the images to be flashed. For i.MX 8M Mini, related options are described as follows:

Table 3. Options for uuu_imx_android_flash tool

Option	Description
-h	Displays the help information of this tool.
-f soc_name	Specifies the SoC information. For i.MX 8M Mini, it should be "imx8mm". This option is mandatory.
-a	Only flashes slot a. If this option and "-b" option are not used, slots a and b are both flashed.
-b	Only flashes slot b. If this option and "-a" option are not used, slots a and b are both flashed.
-c card_size	Specifies which partition table image file to flash. For i.MX 8M Mini, it can be followed with "7" or "28". If this option is not used, default "partition-table.img" is flashed.
-m	Flashes the Arm Cortex-M4 image. If this option is not used, the Cortex-M4 image is not flashed.
-d dev	Specifies some images with "dev" in its name. For i.MX 8M Mini, it can be "m4", or "mipi-panel". If this option is not used, default dtbo and vbmeta images are flashed.
-e	Erases user data after images are flashed.
-D directory	Specifies the directory in which there are the images to be flashed. If this option is not used, images in the current working directory are flashed.
-t target_dev	Specifies the target device. For i.MX 8M Mini, it can be "emmc" and "sd". If this option is not used, images are flashed to eMMC.

Obviously, "-m" and "-d m4" should be used together.

- On Linux system, open the shell terminal. For example, you can execute a command as follows:

```
> sudo ./uuu_imx_android_flash.sh -f imx8mm -a -e
```

- On Windows system, open the command line interface, the corresponding command is as follows:

```
> .\uuu_imx_android_flash.bat -f imx8mm -a -e
```

When the command above is executed, the default images are flashed into the eMMC slot a for i.MX 8M Mini.

- To flash the SD card, execute the tool with "-t sd". To flash eMMC, it does not need to use the -t option.
- If your SD card is 16 GB or the on-board eMMC is used as the boot device, it does not need to use the -c option.
- If your SD card is 32 GB, execute the tool with "-c 28".
- If your SD card is 8 GB, execute the tool with "-c 7".
- To test MIPI-DSI to HDMI output, it does not need to use the -d option.

- To test MIPI panel output, execute the tool with "-d mipi-panel".
 - To test support MIPI-to-HDMI output and audio playback based on Cortex-M4 FreeRTOS, execute the tool with "-m" and "-d m4".
6. Wait for the uuu_imx_android_flash execution to complete. If there is not any error, you will get information on the command window indicating that images are already flashed.
 7. Power off the board.
 8. Change boot device as eMMC or SD card.
 - To boot from eMMC, change sw1101 to 01110010 and change sw1102 to 00101010.
 - To boot from the SD card, change sw1101 to 01000110 and change sw1102 to 00110100.

3.4 Booting

After downloading the images, reboot the board using the power on/off switch.

3.4.1 Booting with MIPI-to-HDMI or MIPI panel display

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyMXC1,115200 earlycon=ec_imx6q,0x30890000,115200 init=/
init androidboot.console=ttyMXC1 consoleblank=0 androidboot.hardware=freescale cma=800M
androidboot.primary_display=imx-drm firmware_class.path=/vendor/firmware
transparent_hugepage=never
U-Boot > saveenv
```

With the settings above, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

3.4.2 Booting with MIPI-DSI to HDMI display and audio playback based on Cortex-M4 FreeRTOS

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyMXC1,115200 earlycon=ec_imx6q,0x30890000,115200 init=/
init androidboot.console=ttyMXC1 consoleblank=0 androidboot.hardware=freescale cma=800M
androidboot.primary_display=imx-drm firmware_class.path=/vendor/firmware
transparent_hugepage=never
U-Boot > setenv bootcmd "bootmcu && boota mmc0"      # for SD boot
U-Boot > setenv bootcmd "bootmcu && boota mmc1"      # for eMMC boot
U-Boot > saveenv
```

NOTE

To use other boot images, do not add "bootmcu" to "bootcmd". The following command can recover bootcmd:

```
U-Boot > setenv bootcmd "boota mmc0"      # for SD boot
U-Boot > setenv bootcmd "boota mmc1"      # for eMMC boot
U-Boot > saveenv
```

With the settings above, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:


```
U-Boot > setenv append_bootargs androidboot.selinux=permissive  
U-Boot > saveenv
```

3.5 Board reboot

After you have completed download and setup, reboot the board and wait for the Android platform to boot up.

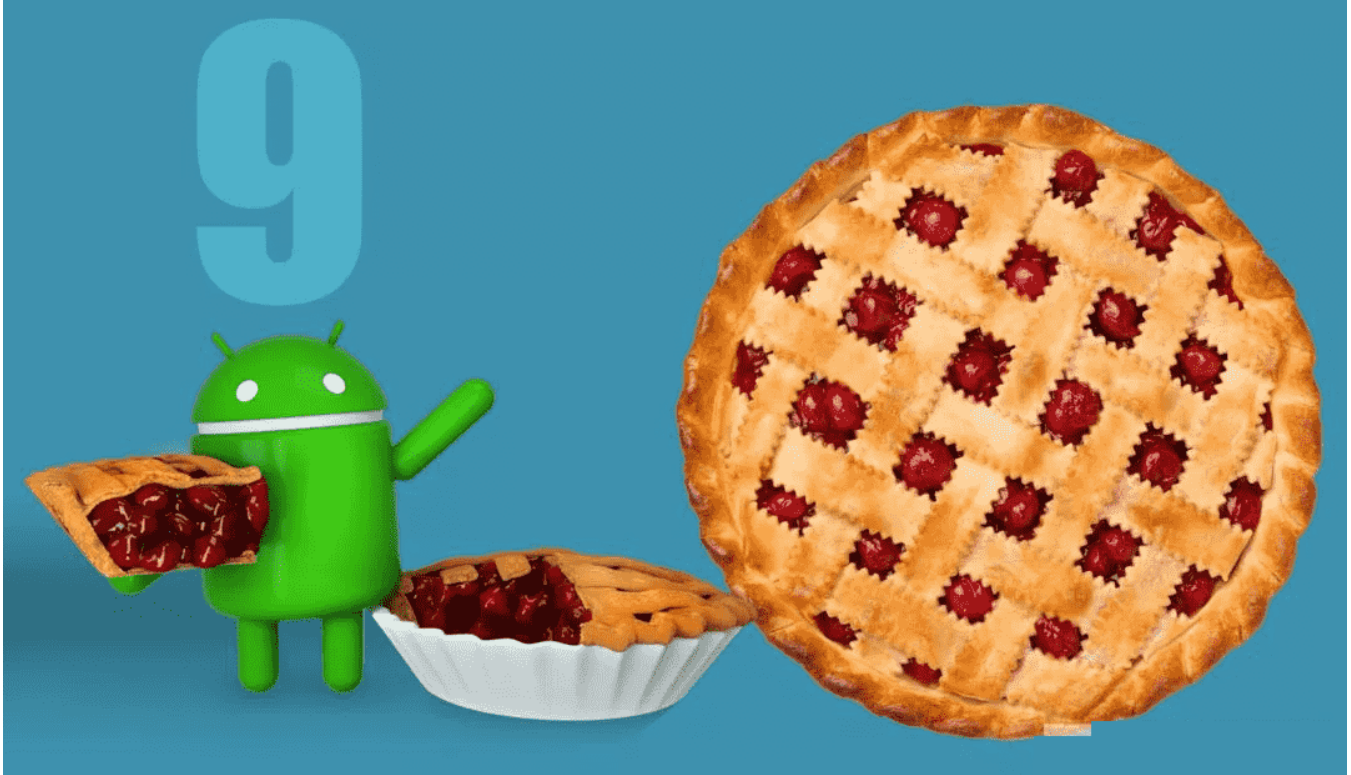


Figure 6. Android Pie image

4 Working with the i.MX 8M Quad EVK Board

4.1 Board hardware

The figures below show the different components of the i.MX 8M Quad EVK board.

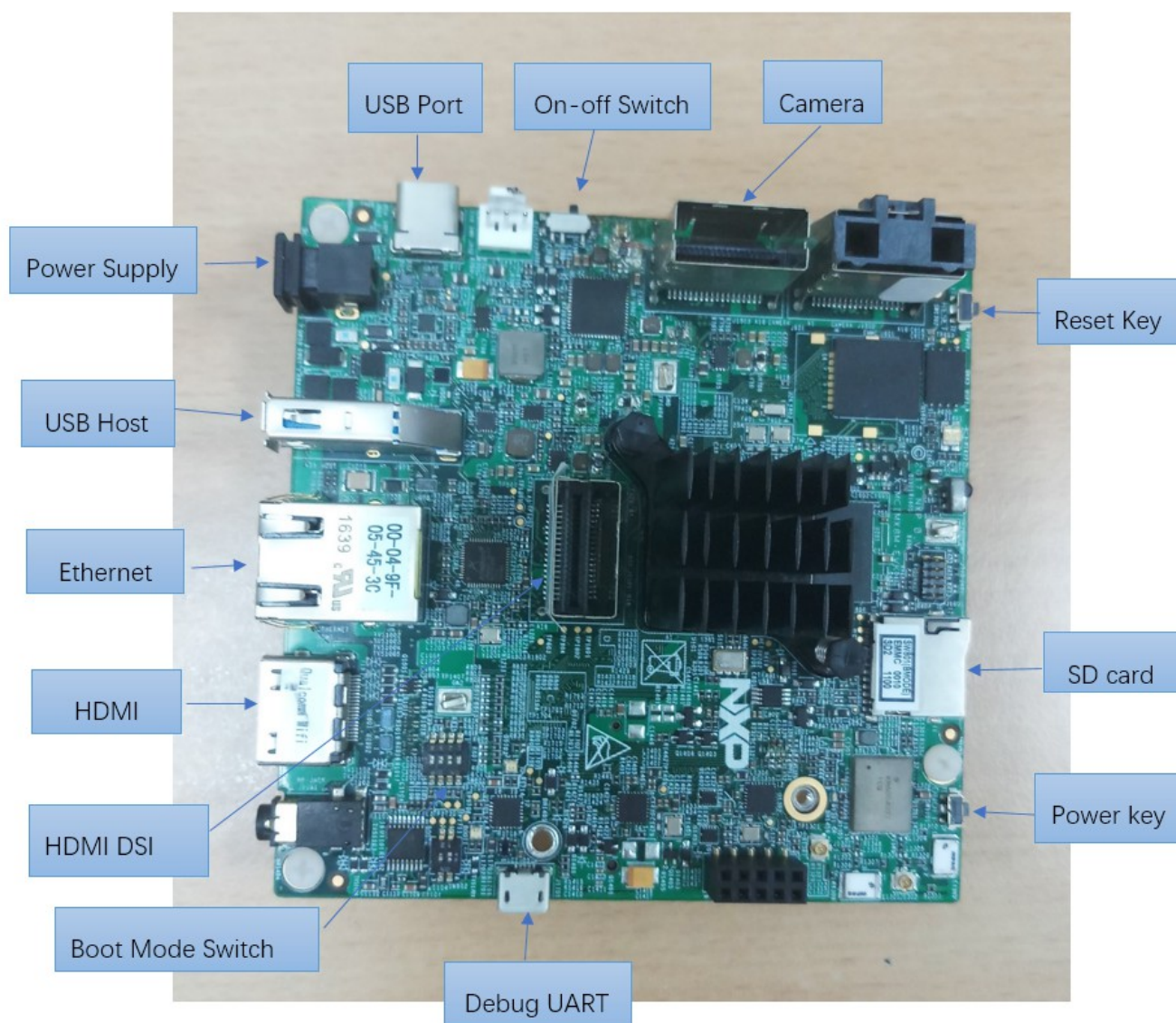


Figure 7. i.MX 8M Quad EVK board

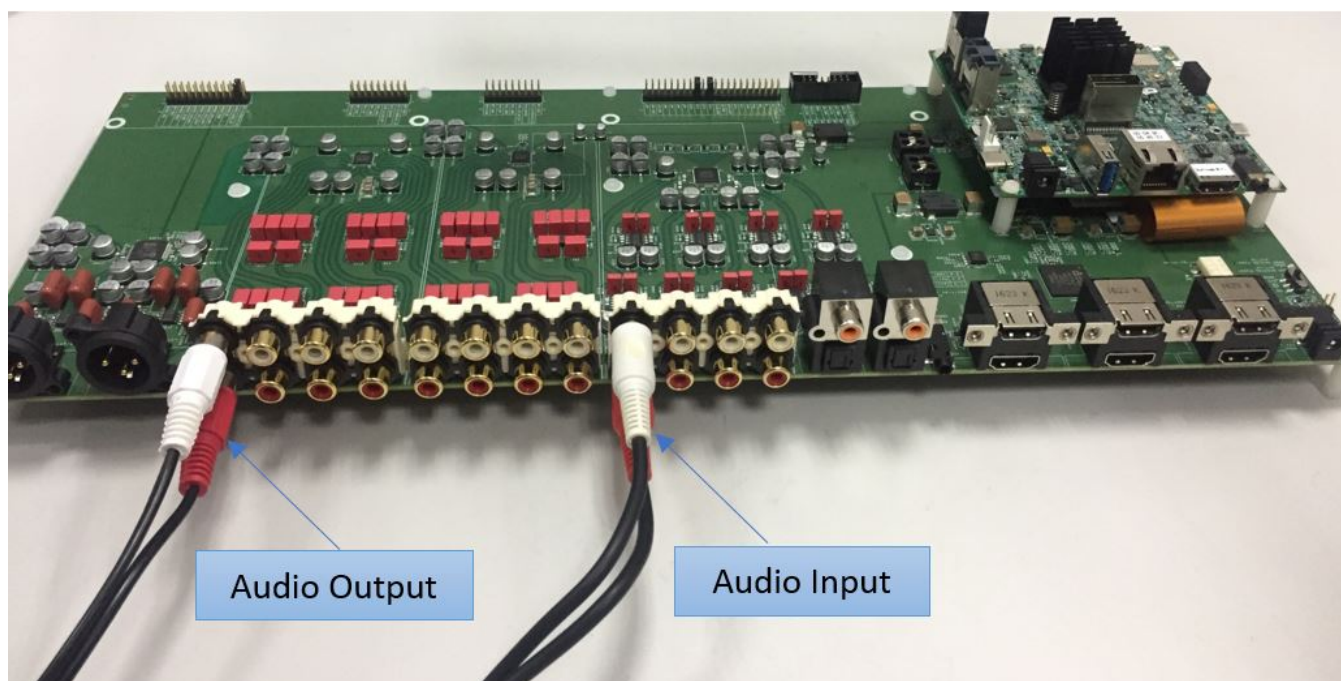


Figure 8. i.MX 8M Quad EVK with audio board



Figure 9. i.MX mini SAS cable with DSI-to-HDMI adapter



Figure 10. i.MX MIPI panel



Figure 11. i.MX MIPI camera

NOTE

- To test the MIPI-DSI to HDMI display, use the i.MX mini SAS cable to connect the DSI-to-HDMI adapter to the "HDMI DSI" port.
- To test the MIPI panel display, connect the i.MX MIPI panel to the "HDMI DSI" port.
- To test the camera, connect the i.MX CSI MIPI Camera to the "Camera" port.

4.2 Board images

The table below describes the location in the board partitions of the software images in android_p9.0.0_1.0.0-ga_image_8mqevk.tar.gz.

Table 4. Board images

Image name	Download target
/u-boot-imx8mq.imx	33 KB offset of MMC
/u-boot-imx8mq-evk-uuu.imx	Bootloader used by UUU for the i.MX 8MQuad board. It is not flashed to MMC
/partition-table.img	0 offset of MMC. If the actually size of the SD card is larger than 13 GB, use the default partition-table.img
/partition-table-7GB.img	0 offset of MMC. If the actually size of the SD card is larger than 7 GB, use this image as partition-table.img
/partition-table-28GB.img	0 offset of MMC. If the actually size of the SD card is larger than 28 GB, use this image as partition-table.img
/boot.img	boot_a and boot_b partitions
/vbmeta-imx8mq-dsd.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B4 board HDMI output and DSD playback
/vbmeta-imx8mq-mipi.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B4 board MIPI-to-HDMI output
/vbmeta-imx8mq-dual.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B4 board HDMI and MIPI-to-HDMI dual output
/vbmeta-imx8mq-mipi-panel.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B4 board MIPI panel output
/vbmeta-imx8mq-b3.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B3 board HDMI output
/vbmeta-imx8mq-mipi-b3.img	vbmeta_a and vbmeta_b partitions to support i.MX 8M Quad B3 board MIPI-to-HDMI output
/vbmeta-imx8mq-mipi-panel-b3.img	vbmeta_a and vbmeta_b partitions to support i.MX 8MQuad B3 board MIPI panel output
/system.img	system_a and system_b partitions
/vendor.img	vendor_a and vendor_b partitions
/dtbo-imx8mq.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B4 board HDMI output
/dtbo-imx8mq-dsd.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B4 board HDMI output and DSD playback
/dtbo-imx8mq-mipi.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B4 board MIPI-to-HDMI output
/dtbo-imx8mq-dual.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B4 board HDMI and MIPI-to-HDMI dual output
/dtbo-imx8mq-mipi-panel.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B4 board MIPI panel output
/dtbo-imx8mq-b3.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B3 board HDMI output
/dtbo-imx8mq-mipi-b3.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B3 board MIPI-to-HDMI output
/dtbo-imx8mq-mipi-panel-b3.img	dtbo_a and dtbo_b partitions to support i.MX 8M Quad B3 board MIPI panel output

The table below describes UUU scripts in android_p9.0.0_1.0.0-ga_image_8mqevk.tar.gz. They are used with the UUU binary file to download the images above into the board. For detailed information on how to download images with UUU, see Section 4.3 "Flashing board images".

Table 5. UUU scripts

UUU script name	Function
uuu-android-mx8mq-evk-emmc.lst	Used with the UUU binary file to download image files into eMMC.
uuu-android-mx8mq-evk-sd.lst	Used with the UUU binary file to download image files into the SD card.

4.3 Flashing board images

The board image files can be flashed into the target board using Universal Update Utility (UUU).

For the UUU binary file, download it from github: [uuu release page on github](#). You can download the latest version (1.2.31 for now).

- For Linux OS, download the file named "uuu".
- For Windows OS, download the file named "uuu.exe".

You can put these files in a path containing the system environment variable "PATH", and then directly call uuu in command line or shell terminal.

There are two ways as follows to use UUU to flash images:

- Directly invoke UUU with the lst scripts in the command line to flash images.
- Use the uuu_imx_android_flash shell script and Windows batch file to invoke UUU and fastboot tool to flash images.

uuu_imx_android_flash is a new tool, which is more flexible. If the users are not familiar with this tool, the way to use UUU with the lst scripts is still maintained, and it will be removed in the future.

The two ways are described as follows. Users can choose either of it to flash images.

4.3.1 Directly invoking UUU with the lst scripts in command line to flash images

For detailed information on the UUU lst scripts used in this way, see Section 4.2 "[Board images](#)".

NOTE

UUU uses the integrated fastboot tool to flash images. Make sure you have fastboot driver software installed on your computer.

Perform the following steps to flash the board images:

1. Download the UUU binary file from github as described above.
2. Change the board's sw802 (boot mode) to 01 (1-2 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 port.

NOTE

- There are two USB ports on the i.MX 8M Quad EVK board: USB-to-UART and USB 3.0. The USB-to-UART port is known as debug UART, and the USB 3.0 port is known as USB in the hardware image above. The debug UART can be used to watch the log of the hardware boot processing.
 - The SD card must be plugged in after the board is powered on.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz, which contains the image files and UUU scripts. Choose the correct UUU script file as shown in the following table.

Target device and boot storage	UUU script file
i.MX 8MQuad EVK SD	uuu-android-mx8mq-evk-sd.lst
i.MX 8MQuad EVK eMMC	uuu-android-mx8mq-evk-emmc.lst

NOTE

- If the SD card is 16 GB or the on-board eMMC is used as the boot device, you do not need to change the "partition-table.img" part of the UUU script.
- If the SD card is 32 GB, change partition-table.img to partition-table-28GB.img in the corresponding UUU script.
- If the SD card is 8 GB, change partition-table.img to partition-table-7GB.img in the corresponding UUU script.
- To test the feature on the i.MX 8M Quad B4 board:
 - To test the HDMI output, you do not need to change the "vbmeta-imx8mq.img and dtbo-imx8mq.img" part of the UUU script.
 - To test the MIPI-to-HDMI output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-mipi.img and dtbo-imx8mq-mipi.img in the corresponding UUU script.
 - To test the MIPI panel output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-mipi-panel.img and dtbo-imx8mq-mipi-panel.img in the corresponding UUU script.
 - To test the HDMI and MIPI-to-HDMI dual output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-dual.img and dtbo-imx8mq-dual.img in the corresponding UUU script.
 - To test the HDMI output and DSD playback, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-dsd.img and dtbo-imx8mq-dsd.img in the corresponding UUU script.
- To test the feature on the i.MX 8M Quad B3 board:
 - To test the HDMI output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-b3.img and dtbo-imx8mq-b3.img in the corresponding UUU script.
 - To test the MIPI-to-HDMI output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-mipi-b3.img and dtbo-imx8mq-mipi-b3.img in the corresponding UUU script.
 - To test the MIPI panel output, change vbmeta-imx8mq.img and dtbo-imx8mq.img to vbmeta-imx8mq-mipi-panel-b3.img and dtbo-imx8mq-mipi-panel-b3.img in the corresponding UUU script.

5. Use UUU and the proper script file to flash image files.

Execute the following command to invoke the UUU binary file and UUU scripts to flash the image files.

- On a Linux system, open the shell terminal. Execute the command below. `{uuu_script_path}` is the file path (including the name of the UUU script) of the UUU script that is used. It can be a relative path or an absolute path.

```
> sudo uuu {uuu_script_path}
```

- On a Windows system, open the command line interface. Execute the command below. `{uuu_script_path}` is the absolute file path (including the name of the UUU scripts) of the UUU script.

```
> uuu.exe {uuu_script_path}
```

6. Wait for the script file execution to complete. If there are no errors, the command line interface displays the following information:

```
PS C:\Users\user_01\tools\uuu> uuu.exe C:\Users\user_01\images
\android_p9.0.0_1.0.0-ga_image_8mqevk\uuu-android-mx8mq-evk-sd.lst
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.24-0-g0d63ca3
```

```

Powershell: Enjoy auto [tab] command complete by run below command or put into
Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1
Register-ArgumentCompleter -CommandName uuu -ScriptBlock {param($commandName,
$parameterName,$wordToComplete,$commandAst,$fakeBoundParameter); C:\Users\user_01\tools
\uuu>uuu.exe -autocomplete $parameterName }

```

```

Success 1      Failure 0

```

```

2:2    20/20    [Done                                ] FB: done

```

As you can see, it is on the Windows system, and the absolute file path of the UUU script is used. For the output information on the command complete feature, it is recommendations given by UUU itself. This feature is not used here.

7. Power off the board.
8. Change the boot device as eMMC or SD card. Change the board's sw802 (boot mode) to 10 (1-2 bit) to exit serial download mode.
 - Change SW801 to switch the board back to 1100 (SD boot mode).
 - Change SW801 to switch the board back to 0010 (eMMC boot mode).

Problems may be encountered when using UUU:

- If the partition table image file being used needs a larger storage capacity than what is really on the board, for example, the default partition table image file needs more than 13 GB storage capacity, and a 8 GB target SD card device is plugged after power-on, the command line interface prompts as follows:

```

2:2    5/19    [write backup GPT image fail ] FB[-t 600000]: flash gpt partition-
table.img

```

- If the data speed of the target device is too slow, the command line interface prompts as follows when flashing system.img. In this situation, you may use an SD card with high data speed, or just modify the UUU script file, changing the number after "-t" to a larger value. Currently, it is 200000, as shown in the following prompt:

```

2:2    9/19    [Bulk read failure           ] FB[-t 200000]: flash system_a system.img

```

4.3.2 Using the uuu_imx_android_flash tool to invoke UUU and fastboot tool to flash images

The uuu_imx_android_flash shell script and windows batch file are provided to flash Android images with much more flexibility.

Perform the following steps to download the board images:

1. Download the UUU binary file from github as described above. Install fastboot into a directory contained by the system environment variable of "PATH".
2. Change the board's sw802 (boot mode) to 01 (1-2 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 port.

NOTE

- There are two USB ports on the i.MX 8M Quad EVK board: USB-to-UART and USB 3.0. The USB-to-UART port is known as debug UART, and the USB 3.0 port is known as USB in the hardware image above. The debug UART can be used to watch the log of the hardware boot processing.
 - The SD card must be plugged in after the board is powered on.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8mmevk.tar.gz, which contains the image files and uuu_imx_android_flash tool.
 5. Execute the uuu_imx_android_flash tool to flash images.

The `uuu_imx_android_flash` tool can be executed with options to get help information and specify the images to be flashed. For i.MX 8M Quad, related options are described as follows:

Table 6. Options for `uuu_imx_android_flash` tool

Option	Description
-h	Displays the help information of this tool.
-f soc_name	Specifies the SoC information. For i.MX 8M Quad, it should be "imx8mq". This option is mandatory.
-a	Only flashes slot a. If this option and "-b" option are not used, slots a and b are both flashed.
-b	Only flashes slot b. If this option and "-a" option are not used, slots a and b are both flashed.
-c card_size	Specifies which partition table image file to flash. For i.MX 8M Quad, it can be followed with "7" or "28". If this option is not used, default "partition-table.img" is flashed.
-d dev	Specifies some images with "dev" in its name. For i.MX 8M Quad, it can be "b3", "dsd", "dual", "mipi-b3", "mipi-panel-b3", "mipi-panel", or "mipi". If this option is not used, default dtbo and vbmeta images are flashed.
-e	Erases user data after images are flashed.
-D directory	Specifies the directory in which there are the images to be flashed. If this option is not used, images in the current working directory are flashed.
-t target_dev	Specifies the target device. For i.MX 8M Quad, it can be "emmc" and "sd". If this option is not used, images are flashed to eMMC.

- On Linux system, open the shell terminal. For example, you can execute a command as follows:

```
> sudo ./uuu_imx_android_flash.sh -f imx8mq -a -e
```

- On Windows system, open the command line interface, the corresponding command is as follows:

```
> .\uuu_imx_android_flash.bat -f imx8mq -a -e
```

When the command above is executed, the default images are flashed into the eMMC slot a for i.MX 8M Quad.

- To flash the SD card, execute the tool with "-t sd". To flash eMMC, it does not need to use the -t option.
 - If your SD card is 16 GB or the on-board eMMC is used as the boot device, it does not need to use the -c option.
 - If your SD card is 32 GB, execute the tool with "-c 28".
 - If your SD card is 8 GB, execute the tool with "-c 7".
 - To test feature on the i.MX 8M Quad B4 board:
 - To test HDMI output, it does not need to use the -d option.
 - To test MIPI-to-HDMI output, execute the tool with "-d mipi".
 - To test MIPI panel output, execute the tool with "-d mipi-panel".
 - To test HDMI and MIPI-to-HDMI dual output, execute the tool with "-d dual".
 - To test MIPI-DSI to HDMI output and DSD playback, execute the tool with "-d dsd".
 - To test feature on the i.MX 8M Quad B3 board:
 - To test HDMI output, execute the tool with "-d b3".
 - To test MIPI-to-HDMI output, execute the tool with "-d mipi-b3".
 - To test MIPI panel output, execute the tool with "-d mipi-panel-b3".
6. Wait for the `uuu_imx_android_flash` execution to complete. If there is not any error, you will get information on the command window indicating that images are already flashed.
 7. Power off the board.

8. Change boot device as eMMC or SD card. Change the board's sw802 (boot mode) to 10 (1-2 bit) to exit serial download mode.
 - Change SW801 to switch the board back to 1100 (SD boot mode).
 - Change SW801 to switch the board back to 0010 (eMMC boot mode).

4.4 Booting

After downloading the images, boot the board by connecting it to the power supply.

4.4.1 Booting with single display: HDMI display

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttymx0,115200 earlycon=imxuart,0x30860000,115200 init=/
init androidboot.gui_resolution=1080p androidboot.console=ttymx0 consoleblank=0
androidboot.hardware=freescale cma=1280M androidboot.primary_display=imx-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never
androidboot.fbTileSupport=enable
U-Boot > saveenv
```

With above settings, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

4.4.2 Booting with single display: MIPI-to-HDMI display

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttymx0,115200 earlycon=imxuart,0x30860000,115200 init=/
init androidboot.lcd_density=160 androidboot.console=ttymx0 consoleblank=0
androidboot.hardware=freescale cma=1280M androidboot.primary_display=mxsfb-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never
U-Boot > saveenv
```

With the settings above, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

4.4.3 Booting with dual displays: HDMI and MIPI-to-HDMI displays

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttymx0,115200 earlycon=imxuart,0x30860000,115200 init=/
init androidboot.gui_resolution=1080p androidboot.console=ttymx0 consoleblank=0
androidboot.hardware=freescale cma=1280M androidboot.primary_display=imx-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never
U-Boot > saveenv
```

With above settings, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:


```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

4.4.4 Booting with single display: MIPI panel

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyMXC0,115200 earlycon=imxuart,0x30860000,115200 init=/
init androidboot.console=ttyMXC0 consoleblank=0 androidboot.hardware=freescale cma=1280M
androidboot.primary_display=imx-drm firmware_class.path=/vendor/firmware
transparent_hugepage=never
U-Boot > saveenv
```

With the settings above, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

4.5 Board reboot

After you have completed download and setup, reboot the board and wait for the Android platform to boot up.

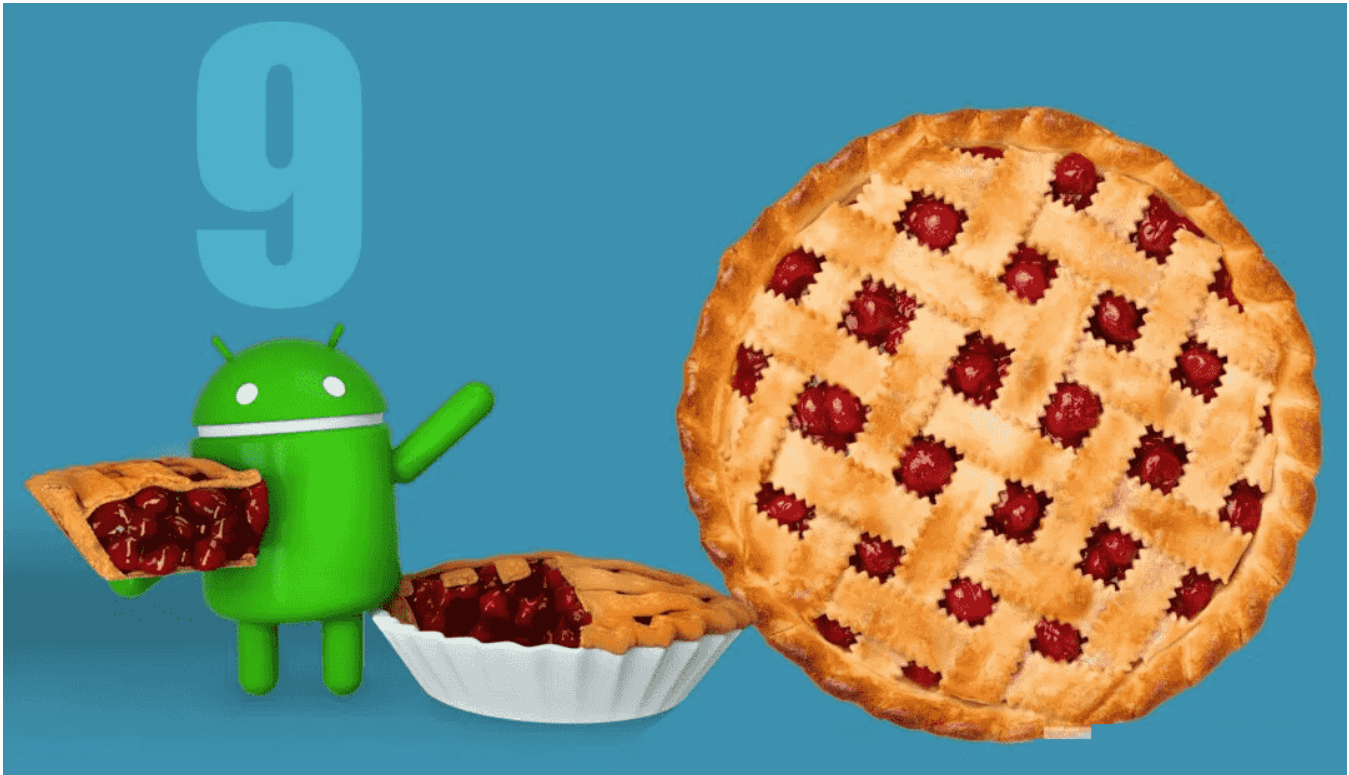


Figure 12. Android Pie image

5 Working with the i.MX 8QuadMax MEK Board

5.1 Board hardware

The figures below show the different components of the i.MX 8QuadMax MEK board.

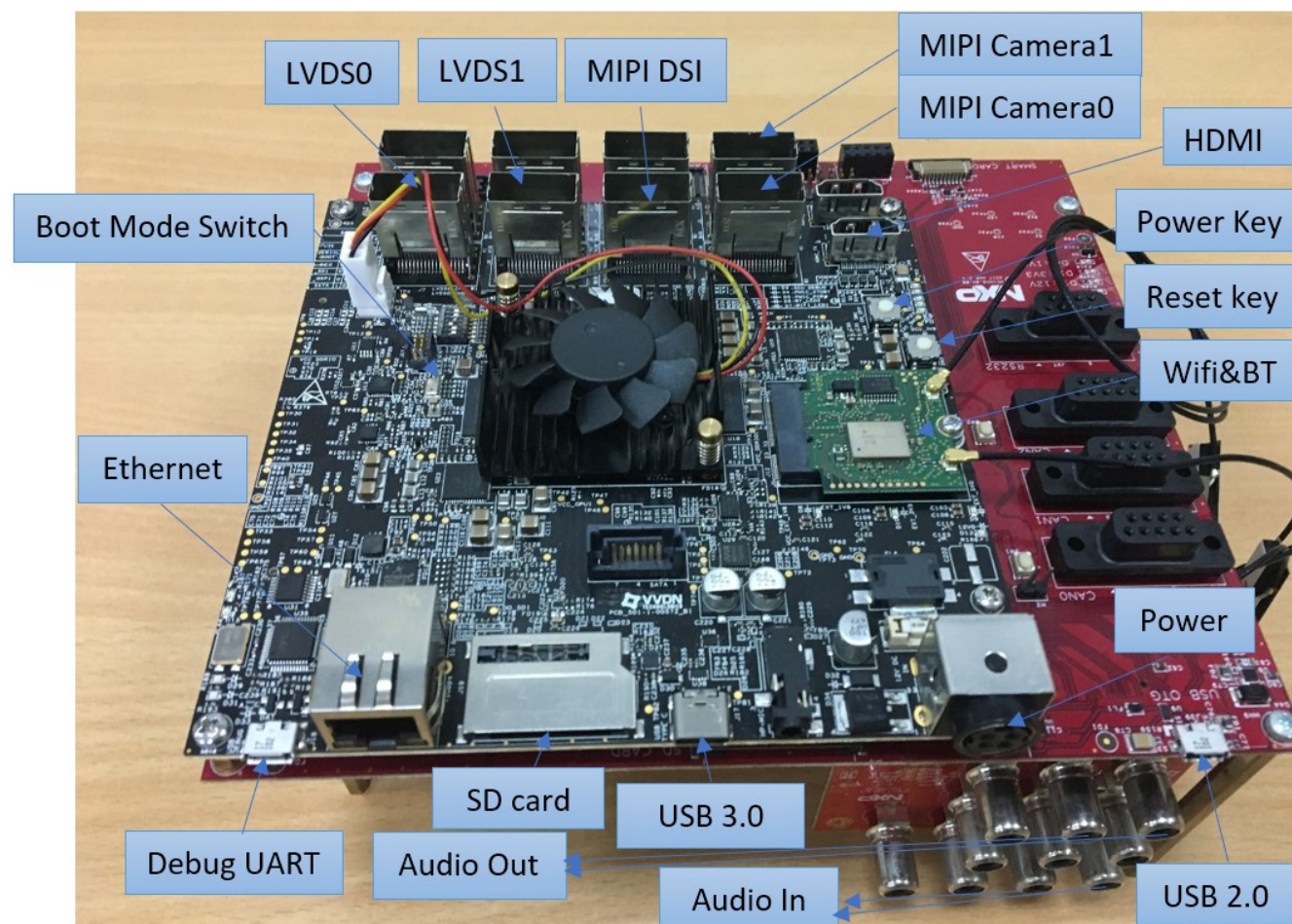


Figure 13. i.MX 8QuadMax MEK board



Figure 14. i.MX mini SAS cable with DSI-to-HDMI adapter



Figure 15. i.MX mini SAS cable with LVDS-to-HDMI adapter



Figure 16. i.MX MIPI panel



Figure 17. i.MX MIPI camera

NOTE

- To test the MIPI-DSI to HDMI display, use the i.MX mini SAS cable to connect the DSI-to-HDMI adapter to the "HDMI DSI" port.
- To test the LVDS-to-HDMI display, use the i.MX mini SAS cable to connect the LVDS-to-HDMI adapter to the "LVDS0/LVDS1" port.
- To test the camera, connect two i.MX MIPI cameras to the "MIPI Camera0" and "MIPI Camera1" ports.
- To test the MIPI panel display, connect the i.MX MIPI panel to the "MIPI DSI" port.

5.2 Board images

The table below describes the location in the board partitions of the software images in android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz.

Table 7. Board images

Image name	Download target
/u-boot-imx8qm.img	0 KB offset of eMMC and 32 KB offset of SD card.
u-boot-imx8qm-mek-uuu.img	Bootloader used by UUU for i.MX 8QuadMax MEK board. It is not flashed to MMC.
/partition-table.img	Program to the first 17 KB, and then back up to the last 17 KB of the boot storage. GPT table image for 16 GB boot storage.
/partition-table-7GB.img	Program to the first 17 KB, and then back up to last 17 KB of the boot storage. GPT table image for 8 GB boot storage.
/partition-table-28GB.img	Program to first 17 KB, and then back up to last 17 KB of the boot storage. GPT table image for 32 GB boot storage.
/boot.img	boot_a and boot_b partitions
/vbmeta-imx8qm.img	vbmeta_a and vbmeta_b partitions to support LVDS-to-HDMI/MIPI-to-HDMI display.
/vbmeta-imx8qm-hdmi.img	vbmeta_a and vbmeta_b partitions to support physical HDMI display.
/vbmeta-imx8qm-mipi-panel.img	vbmeta_a and vbmeta_b partitions to support MIPI panel display.
/system.img	system_a and system_b partitions.
/vendor.img	vendor_a and vendor_b partitions.
/dtbo-imx8qm.img	dtbo_a and dtbo_b partitions to support LVDS-to-HDMI/MIPI-to-HDMI display.
/dtbo-imx8qm-hdmi.img	dtbo_a and dtbo_b partitions to support physical HDMI display.
dtbo-imx8qm-mipi-panel.img	dtbo_a and dtbo_b partitions to support MIPI panel display.

The table below describes UUU scripts in android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz. They are used with the UUU binary file to download the images above into the board. For detailed information on how to download images with UUU, see Section 5.3 "Flashing board images".

Table 8. UUU scripts

UUU script name	Function
uuu-android-mx8qm-mek-emmc.lst	Used with the UUU binary file to download image files into eMMC.
uuu-android-mx8qm-mek-sd.lst	Used with the UUU binary file to download image files into the SD card.

5.3 Flashing board images

The board image files can be flashed into the target board using Universal Update Utility (UUU).

For the UUU binary file, download it from github: [uuu release page on github](#). You can download the latest version (1.2.31 for now).

- For Linux OS, download the file named "uuu".
- For Windows OS, download the file named "uuu.exe".

You can put these files in a path containing the system environment variable "PATH", and then directly call uuu in command line or shell terminal.

There are two ways as follows to use UUU to flash images:

- Directly invoke UUU with the `lst` scripts in the command line to flash images.
- Use the `uuu_imx_android_flash` shell script and Windows batch file to invoke UUU and fastboot tool to flash images.

`uuu_imx_android_flash` is a new tool, which is more flexible. If the users are not familiar with this tool, the way to use UUU with the `lst` scripts is still maintained, and it will be removed in the future.

The two ways are described as follows. Users can choose either of it to flash images.

5.3.1 Directly invoking UUU with the `lst` scripts in command line to flash images

For detailed information on the UUU `lst` scripts used in this way, see Section 5.2 "[Board images](#)".

NOTE

UUU uses the integrated fastboot tool to flash images. Make sure you have fastboot driver software installed on your computer.

Perform the following steps to flash the board images:

1. Download the UUU binary file from github as described above.
2. Change the board's SW2 (boot mode) to 001000 (1-6 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 type-C port.

NOTE

- There are three USB ports on the i.MX 8QuadMax MEK board: USB-to-UART, USB 2.0, and USB 3.0.
- The USB-to-UART port is known as debug UART, and can be used to watch the log of the hardware boot processing.
- USB 2.0 is USB Host and USB 3.0 is USB OTG.

4. Decompress `release_package/android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz`, which contains the image files and UUU scripts. Choose the correct UUU script file as shown in the following table.

Target device and boot storage	UUU script file
i.MX 8QuadMax MEK SD	<code>uuu-android-mx8qm-mek-sd.lst</code>
i.MX 8QuadMax MEK eMMC	<code>uuu-android-mx8qm-mek-emmc.lst</code>

NOTE

- If your SD card is 16 GB or the on-board eMMC is used as the boot device, you do not need to change the "partition-table.img" part of the UUU script.
- If your SD card is 32 GB, change `partition-table.img` to `partition-table-28GB.img` in the corresponding UUU script.
- If your SD card is 8 GB, change `partition-table.img` to `partition-table-7GB.img` in the corresponding UUU script.
- To test the LVDS-to-HDMI/MIPI-to-HDMI display, you do not need to change the "dtbo-imx8qm.img and vbmeta-imx8qm.img" part of the UUU script.
- To test the physical HDMI display, change `dtbo-imx8qm.img` and `vbmeta-imx8qm.img` to `dtbo-imx8qm-hdmi.img` and `vbmeta-imx8qm-hdmi.img` in the corresponding UUU script.

5. Use UUU and the proper script file to flash image files.

Execute the following command to invoke the UUU binary file and UUU scripts to flash the image files.

- On a Linux system, open the shell terminal. Execute the command below. `{uuu_script_path}` is the file path (including the name of the UUU script) of the UUU script that is used. It can be a relative path or an absolute path.

```
> sudo uuu {uuu_script_path}
```

- On a Windows system, open the cmd interface. Execute the command below. `{uuu_script_path}` is the absolute file path (including the name of the UUU scripts) of the UUU script.

```
> uuu.exe {uuu_script_path}
```

6. Wait for the script file execution to complete. If there are no errors, you will get information on the command window as follows:

```
PS C:\Users\user_01\tools\uuu> uuu.exe C:\Users\user_01\images
\android_p9.0.0_1.0.0-ga_image_8qmek\uuu-android-mx8qm-mek-sd.lst
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.24-0-g0d63ca3

Powershell: Enjoy auto [tab] command complete by run below command or put into
Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1
Register-ArgumentCompleter -CommandName uuu -ScriptBlock {param($commandName,
$parameterName,$wordToComplete,$commandAst,$fakeBoundParameter); C:\Users\user_01\tools
\uuu>uuu.exe -autocomplete $parameterName }

Succuess 1      Failure 0

      1/ 0      [
2:2    20/20    [Done          ] FB: done
```

As you can see, it is on the Windows system, and the absolute file path of the UUU script is used. The target device is the SD card. For the output information on the command complete feature, it is recommendations given by UUU itself. This feature is not used here.

7. Power off the board.
8. Change the boot device as eMMC or SD card.
 - Change SW2 to switch the board back to 000100 (1-6 bit) to enter eMMC boot mode.
 - Change SW2 to sithch the board back to 001100 (1-6 bit) to enter SD boot mode.

Problems may be encountered when using UUU:

- If the partition table image file being used needs a larger storage capacity than what is really on the board, for example, the default partition table image file needs more than 13 GB storage capacity, and a 8 GB target SD card device is plugged after power-on, the command line interface prompts as follows:

```
2:2    5/19    [write backup GPT image fail ] FB: flash gpt partition-table.img
```

- If the data speed of the target device is too slow, the command line interface prompts as follows when flashing system.img. In this situation, you may use an SD card with high data speed, or just modify the UUU script file, changing the number after "-t" to a lager value. Currently, it is 100000, as shown in the following prompt:

```
2:2    14/19    [Bulk read failure          ] FB[-t 100000]: flash system_a system.img
```

5.3.2 Using the uuu_imx_android_flash tool to invoke UUU and fastboot tool to flash images

The uuu_imx_android_flash shell script and windows batch file are provided to flash Android images with much more flexibility.

Perform the following steps to download the board images:

1. Download the UUU binary file from github as described above. Install fastboot into a directory contained by the system environment variable of "PATH".
2. Change the board's SW2 (boot mode) to 001000 (1-6 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 type-C port.

NOTE

- There are three USB ports on the i.MX 8QuadMax MEK board: USB-to-UART, USB 2.0, and USB 3.0.
 - The USB-to-UART port is known as debug UART, and can be used to watch the log of the hardware boot processing.
 - USB 2.0 is USB Host and USB 3.0 is USB OTG.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz, which contains the image files and uuu_imx_android_flash tool.
 5. Execute the uuu_imx_android_flash tool to flash images.
The uuu_imx_android_flash tool can be executed with options to get help information and specify the images to be flashed. For i.MX 8QuadMax, related options are described as follows:

Table 9. Options for uuu_imx_android_flash tool

Option	Description
-h	Displays the help information of this tool.
-f soc_name	Specifies the SoC information. For i.MX 8QuadMax, it should be "imx8qm". This option is mandatory.
-a	Only flashes slot a. If this option and "-b" option are not used, slots a and b are both flashed.
-b	Only flashes slot b. If this option and "-a" option are not used, slots a and b are both flashed.
-c card_size	Specifies which partition table image file to flash. For i.MX 8QuadMax, it can be followed with "7" or "28". If this option is not used, default "partition-table.img" is flashed.
-d dev	Specifies some images with "dev" in its name. For i.MX 8QuadMax, it can be "hdmi" or "mipi-panel". If this option is not used, default dtbo and vbmeta images are flashed.
-e	Erases user data after images are flashed.
-D directory	Specifies the directory in which there are the images to be flashed. If this option is not used, images in the current working directory are flashed.
-t target_dev	Specifies the target device. For i.MX 8QuadMax, it can be "emmc" and "sd". If this option is not used, images are flashed to eMMC.

- On Linux system, open the shell terminal. For example, you can execute a command as follows:

```
> sudo ./uuu_imx_android_flash.sh -f imx8qm -a -e
```

- On Windows system, open the command line interface, the corresponding command is as follows:

```
> .\uuu_imx_android_flash.bat -f imx8qm -a -e
```

When the command above is executed, the default images are flashed into the eMMC slot a for i.MX 8QuadMax.

- To flash the SD card, execute the tool with "-t sd". To flash eMMC, it does not need to use the -t option.
- If your SD card is 16 GB or the on-board eMMC is used as the boot device, it does not need to use the -c option.
- If your SD card is 32 GB, execute the tool with "-c 28".

- If your SD card is 8 GB, execute the tool with "-c 7".
 - To test the LVDS-to-HDMI/MIPI-to-HDMI display, it does not need to use the -d option.
 - To test MIPI panel output, execute the tool with "-d mipi-panel".
 - To test the physical HDMI display, execute the tool with "-d hdmi".
6. Wait for the uuu_imx_android_flash execution to complete. If there is not any error, you will get information on the command window indicating that images are already flashed.
 7. Power off the board.
 8. Change boot device as eMMC or SD card.
 - To boot from eMMC, change SW2 to switch the board back to 000100 (1-6 bit).
 - To boot from the SD card, change SW2 to switch the board back to 001100 (1-6 bit).

5.4 Booting

After downloading the images, boot the board by connecting it to the power supply.

5.4.1 Booting with LVDS-to-HDMI/MIPI-to-HDMI display

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyLP0,115200 earlycon=lpuart32,0x5a060000,115200 init=/
init androidboot.console=ttyLP0 consoleblank=0 androidboot.hardware=freescale
androidboot.fbTileSupport=enable cma=800M@0x960M-0xe00M androidboot.primary_display=imx-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never swiotlb=49152
U-Boot > saveenv
```

With above settings, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

5.4.2 Booting with physical HDMI display

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyLP0,115200 earlycon=lpuart32,0x5a060000,115200 init=/
init androidboot.console=ttyLP0 consoleblank=0 androidboot.hardware=freescale
androidboot.fbTileSupport=enable cma=1184M@0x960M-0xe00M androidboot.primary_display=imx-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never swiotlb=49152
U-Boot > saveenv
```

With the settings above, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

5.5 Board reboot

After you have completed download and setup, reboot the board and wait for the Android platform to boot up.

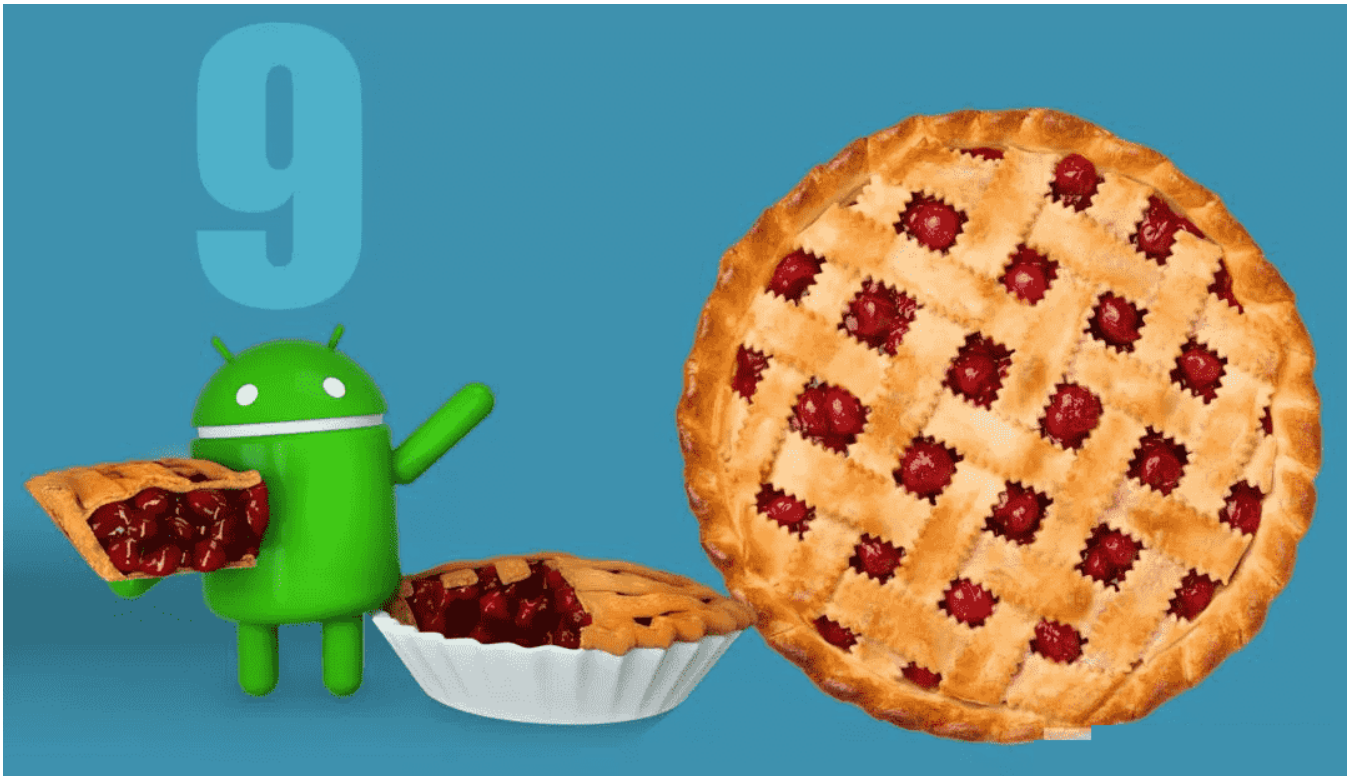


Figure 18. Android Pie image

6 Working with the i.MX 8QuadXPlus MEK Board

6.1 Board hardware

The figures below show the different components of the i.MX 8QuadXPlus MEK board.

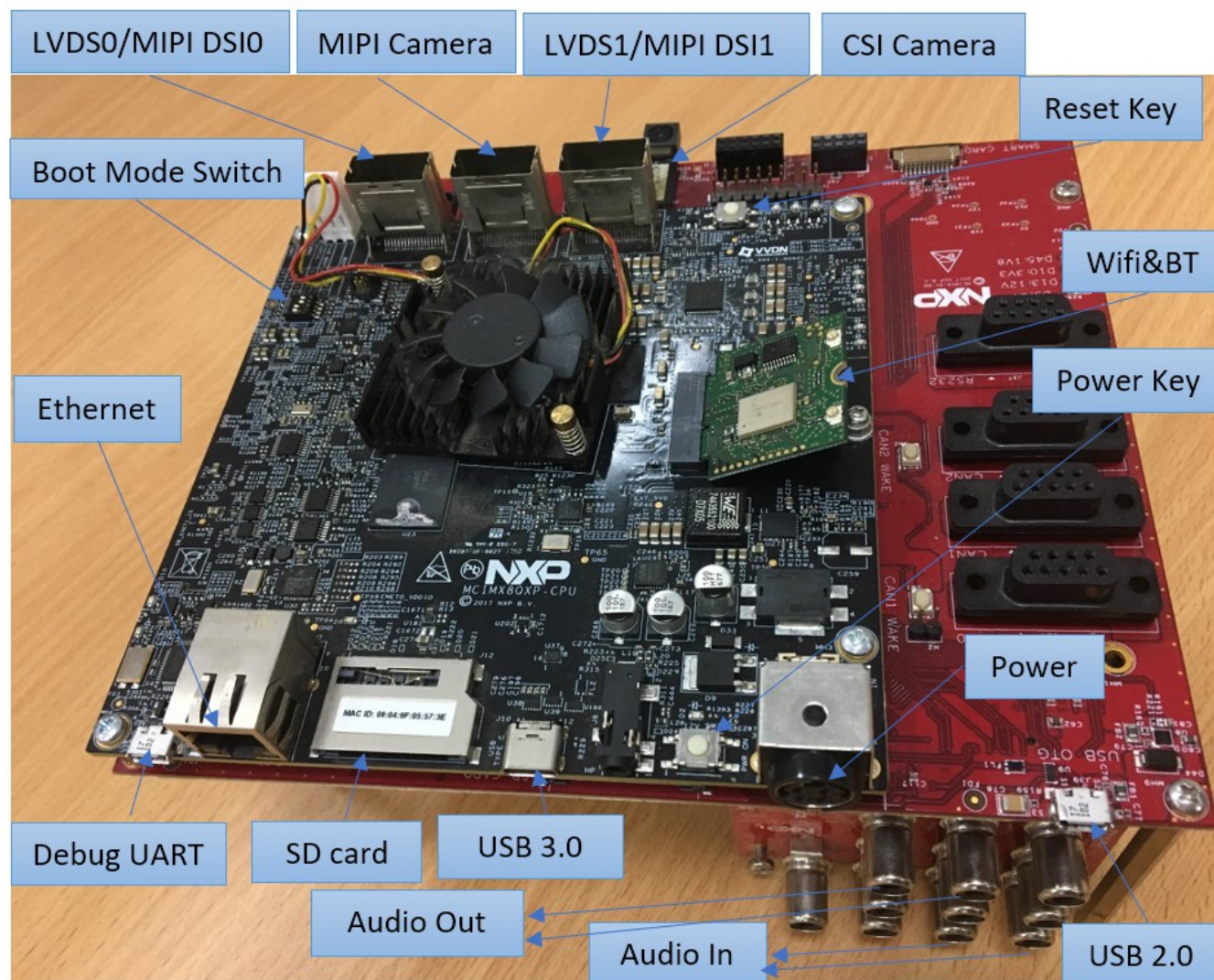


Figure 19. i.MX 8QuadXPlus MEK board



Figure 20. i.MX mini SAS cable with DSI-to-HDMI adapter

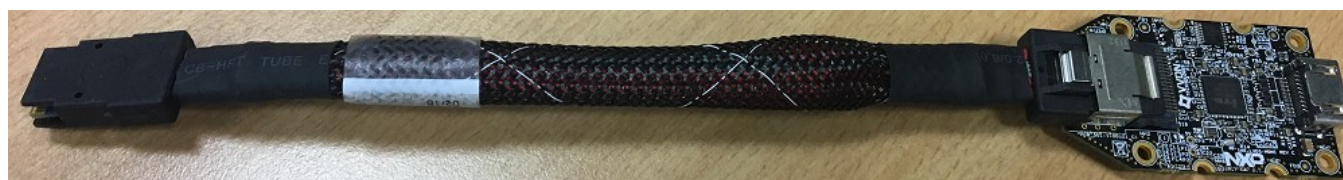


Figure 21. i.MX mini SAS cable with LVDS-to-HDMI adapter



Figure 22. i.MX MIPI camera

NOTE

- To test the MIPI-DSI to HDMI display, use the i.MX mini SAS cable to connect the DSI to HDMI adapter to the "MIPI DSI" port.
- To test the LVDS-to-HDMI display, use the i.MX mini SAS cable to connect the LVDS-to-HDMI adapter to the "LVDS0/LVDS1" port.
- To test the camera, connect the i.MX MIPI camera to the "MIPI Camera" port and connect the OV5640 camera to the "CSI Camera" port at the same time.

6.2 Board images

The table below describes the location in the board partitions of the software images in android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz.

Table 10. Board images

Image name	Download target
/u-boot-imx8qxp.imx	32 KB offset of MMC.
/u-boot-imx8qxp-mek-uuu.imx	Bootloader used by UUU for the i.MX 8QuadMax MEK board. It is not flashed to MMC.
/partition-table.img	Program to the first 17 KB, and then back up to the last 17 KB of the boot storage. GPT table image for 16 GB boot storage.
/partition-table-7GB.img	Program to the first 17 KB, and then back up to last 17 KB of the boot storage. GPT table image for 8 GB boot storage.
/partition-table-28GB.img	Program to first 17 KB, and then back up to last 17 KB of the boot storage. GPT table image for 32 GB boot storage.
/boot.img	boot_a and boot_b partitions
/vbmeta-imx8qxp.img	vbmeta_a and vbmeta_b partitions to support single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI display with dual-camera support.
/vbmeta-imx8qxp-ov5640mipi.img	vbmeta_a and vbmeta_b partitions to support single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI displays with single MIPI camera support.
/system.img	system_a and system_b partitions
/vendor.img	vendor_a and vendor_b partitions
/dtbo-imx8qxp.img	dtbo_a and dtbo_b partitions to support single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI displays with dual-camera support.
/dtbo-imx8qxp-ov5640mipi.img	dtbo_a and dtbo_b partitions to support single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI displays with single MIPI camera support.

The table below describes UUU scripts in android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz. They are used with the UUU binary file to download the images above into the board. For detailed information on how to download images with UUU, see Section 6.3 "Flashing board images".

Table 11. UUU scripts

UUU script name	Function
uuu-android-mx8qxp-mek-emmc.lst	Used with the UUU binary file to download image files into eMMC.
uuu-android-mx8qxp-mek-sd.lst	Used with the UUU binary file to download image files into the SD card.

6.3 Flashing board images

The board image files can be flashed into the target board using Universal Update Utility (UUU).

For the UUU binary file, download it from github: [uuu release page on github](#). You can download the latest version (1.2.31 for now).

- For Linux OS, download the file named "uuu".
- For Windows OS, download the file named "uuu.exe".

You can put these files in a path containing the system environment variable "PATH", and then directly call uuu in command line or shell terminal.

There are two ways as follows to use UUU to flash images:

- Directly invoke UUU with the lst scripts in the command line to flash images.
- Use the uuu_imx_android_flash shell script and Windows batch file to invoke UUU and fastboot tool to flash images.

uuu_imx_android_flash is a new tool, which is more flexible. If the users are not familiar with this tool, the way to use UUU with the lst scripts is still maintained, and it will be removed in the future.

The two ways are described as follows. Users can choose either of it to flash images.

6.3.1 Directly invoking UUU with the lst scripts in command line to flash images

For detailed information on the UUU lst scripts used in this way, see Section 6.2 "Board images".

NOTE

UUU uses the fastboot tool to flash images. Make sure you have fastboot driver software installed on your computer.

Perform the following steps to flash the board images:

1. Download the UUU binary file from github as described above.
2. Change the board's SW2 (boot mode) to 1000 (1-4 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 type-C port.

NOTE

- There are three USB ports on the i.MX 8QuadXPlus MEK board: USB-to-UART, USB 2.0, and USB 3.0.

- The USB-to-UART port is known as debug UART, and can be used to watch the log of the hardware boot processing.
 - USB 2.0 is USB Host and USB 3.0 is USB OTG.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz, which contains the image files and UUU scripts. Choose the correct UUU script file as shown in the following table.

Target device and boot storage	UUU script file
i.MX 8QuadXPlus MEK SD	uuu-android-mx8qxp-mek-sd.lst
i.MX 8QuadXPlus MEK eMMC	uuu-android-mx8qxp-mek-emmc.lst

NOTE

- If your SD card is 16 GB or the on-board eMMC is used as the boot device, you do not need to change the "partition-table.img" part of the UUU script.
 - If your SD card is 32 GB, change partition-table.img to partition-table-28GB.img in the corresponding UUU script.
 - If your SD card is 8 GB, change partition-table.img to partition-table-7GB.img in the corresponding UUU script.
 - To test the single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI display with dual-camera support, you do not need to change the "dtbo-imx8qxp.img and vbmeta-imx8qxp.img" part of the UUU script.
 - To test the single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI display with single MIPI camera support, change dtbo-imx8qxp.img and vbmeta-imx8qxp.img to dtbo-imx8qxp-ov5640mipi.img and vbmeta-imx8qxp-ov5640mipi.img.
5. Use UUU and the proper script file to flash image files.
- Execute the following command to invoke the UUU binary file and UUU scripts to flash the image files.
- On a Linux system, open the shell terminal. Execute the command below. `{uuu_script_path}` is the file path (including the name of the UUU script) of the UUU script that is used. It can be a relative path or an absolute path.
- ```
> sudo uuu {uuu_script_path}
```
- On a Windows system, open the command line interface. Execute the command below. `{uuu_script_path}` is the absolute file path (including the name of the UUU scripts) of the UUU script.
- ```
> uuu.exe {uuu_script_path}
```
6. Wait for the script file execution to complete. If there are no errors, the command line interface displays the following information:

```
PS C:\Users\user_01\tools\uuu> uuu.exe C:\Users\user_01\images
\android_p9.0.0_1.0.0-ga_image_8qmek\uuu-android-mx8qxp-mek-sd.lst
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.24-0-g0d63ca3

Powershell: Enjoy auto [tab] command complete by run below command or put
into Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1
Register-ArgumentCompleter -CommandName uuu -ScriptBlock {param($commandName,
$parameterName,$wordToComplete,$commandAst,$fakeBoundParameter); C:\Users\user_01\tools
\uuu>uuu.exe -autocomplete $parameterName }

Succuess 1      Failure 0

2:2    20/20    [Done                                ] FB: done
```

As you can see, it is on the Windows system, and the absolute file path of the UUU script is used. The target device is the SD card. For the output information on the command complete feature, it is recommendations given by UUU itself. This feature is not used here.

7. Power off the board.
8. Change the boot device as eMMC or SD card.
 - Change SW2 to switch the board back to 0100 (1-4 bit) to enter eMMC boot mode
 - Change SW2 to switch the board back to 1100 (1-4 bit) to enter SD boot mode.

Problems may be encountered when using UUU:

- If the partition table image file being used needs a larger storage capacity than what is really on the board, for example, the default partition table image file needs more than 13 GB storage capacity, and a 8 GB target SD card device is plugged after power-on, the command line interface prompts as follows:

```
2:2    5/19    [write backup GPT image fail ] FB: flash gpt partition-table.img
```

- If the data speed of the target device is too slow, the command line interface prompts as follows when flashing system.img. In this situation, you may use an SD card with high data speed, or just modify the UUU script file, changing the number after "-t" to a larger value. Currently, it is 100000, as shown in the following prompt:

```
2:2    13/19    [Bulk read failure                ] FB[-t 100000]: flash system_a system.img
```

6.3.2 Using the uuu_imx_android_flash tool to invoke UUU and fastboot tool to flash images

The uuu_imx_android_flash shell script and windows batch file are provided to flash Android images with much more flexibility.

Perform the following steps to download the board images:

1. Download the UUU binary file from github as described above. Install fastboot into a directory contained by the system environment variable of "PATH".
2. Change the board's SW2 (boot mode) to 1000 (1-4 bit) to enter serial download mode.
3. Power on the board. Connect the PC with the board using the USB cable on the board USB 3.0 type-C port.

NOTE

- There are three USB ports on the i.MX 8QuadXPlus MEK board: USB-to-UART, USB 2.0, and USB 3.0.
 - The USB-to-UART port is known as debug UART, and can be used to watch the log of the hardware boot processing.
 - USB 2.0 is USB Host and USB 3.0 is USB OTG.
4. Decompress release_package/android_p9.0.0_1.0.0-ga_image_8qmek.tar.gz, which contains the image files and uuu_imx_android_flash tool.
 5. Execute the uuu_imx_android_flash tool to flash images.
- The uuu_imx_android_flash tool can be executed with options to get help information and specify the images to be flashed. For i.MX 8QuadXPlus, related options are described as follows:

Table 12. Options for uuu_imx_android_flash tool

Option	Description
-h	Displays the help information of this tool.
-f	Specifies the SoC information. For i.MX 8QuadXPlus, it should be "imx8qxp". This option is mandatory.

Table continues on the next page...

**Table 12. Options for uuu_imx_android_flash tool
(continued)**

Option	Description
soc_name	
-a	Only flashes slot a. If this option and "-b" option are not used, slots a and b are both flashed.
-b	Only flashes slot b. If this option and "-a" option are not used, slots a and b are both flashed.
-c card_size	Specifies which partition table image file to flash. For i.MX 8QuadXPlus, it can be followed with "7" or "28". If this option is not used, default "partition-table.img" is flashed.
-d dev	Specifies some images with "dev" in its name. For i.MX 8QuadXPlus, it can be "ov5640mipi". If this option is not used, default dtbo and vbmeta images are flashed.
-e	Erases user data after images are flashed.
-D directory	Specifies the directory in which there are the images to be flashed. If this option is not used, images in the current working directory are flashed.
-t target_dev	Specifies the target device. For i.MX 8QuadXPlus, it can be "emmc" and "sd". If this option is not used, images are flashed to eMMC.

- On Linux system, open the shell terminal. For example, you can execute a command as follows:

```
> sudo ./uuu_imx_android_flash.sh -f imx8qxp -a -e
```

- On Windows system, open the command line interface, the corresponding command is as follows:

```
> uuu_imx_android_flash.bat -f imx8qxp -a -e
```

When the command above is executed, the default images are flashed into the eMMC slot a for i.MX 8QuadXPlus.

- To flash the SD card, execute the tool with "-t sd". To flash eMMC, it does not need to use the -t option.
 - If your SD card is 16 GB or the on-board eMMC is used as the boot device, it does not need to use the -c option.
 - If your SD card is 32 GB, execute the tool with "-c 28".
 - If your SD card is 8 GB, execute the tool with "-c 7".
 - To test single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI display with dual camera support, it does not need to use the -d option.
 - To test single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI display with single MIPI camera support, execute the tool with "-d ov5640mipi".
6. Wait for the uuu_imx_android_flash execution to complete. If there is not any error, you will get information on the command window indicating that images are already flashed.
 7. Power off the board.
 8. Change boot device as eMMC or SD card.
 - Change SW2 to switch the board back to 0100 (1-4 bit) to enter eMMC boot mode.
 - Change SW2 to switch the board back to 1100 (1-4 bit) to enter SD boot mode.

6.4 Booting

After downloading the images, boot the board by connecting it to the power supply.

6.4.1 Booting with single LVDS-to-HDMI/MIPI-to-HDMI or dual LVDS-to-HDMI displays

In the U-Boot prompt, set the U-Boot environment variables as follows:

```
U-Boot > setenv bootargs console=ttyLP0,115200 earlycon=lpuart32,0x5a060000,115200 init=/
init androidboot.console=ttyLP0 consoleblank=0 androidboot.hardware=freescale
androidboot.fbTileSupport=enable cma=800M@0x960M-0xe00M androidboot.primary_display=imx-drm
firmware_class.path=/vendor/firmware transparent_hugepage=never swiotlb=49152
U-Boot > saveenv
```

With above settings, the Android platform does not start the shell console. To disable selinux, append "androidboot.selinux=permissive" to the U-Boot's bootargs. Boot environment variables are as follows:

```
U-Boot > setenv append_bootargs androidboot.selinux=permissive
U-Boot > saveenv
```

6.5 Board reboot

After you have completed download and setup, reboot the board and wait for the Android platform to boot up.

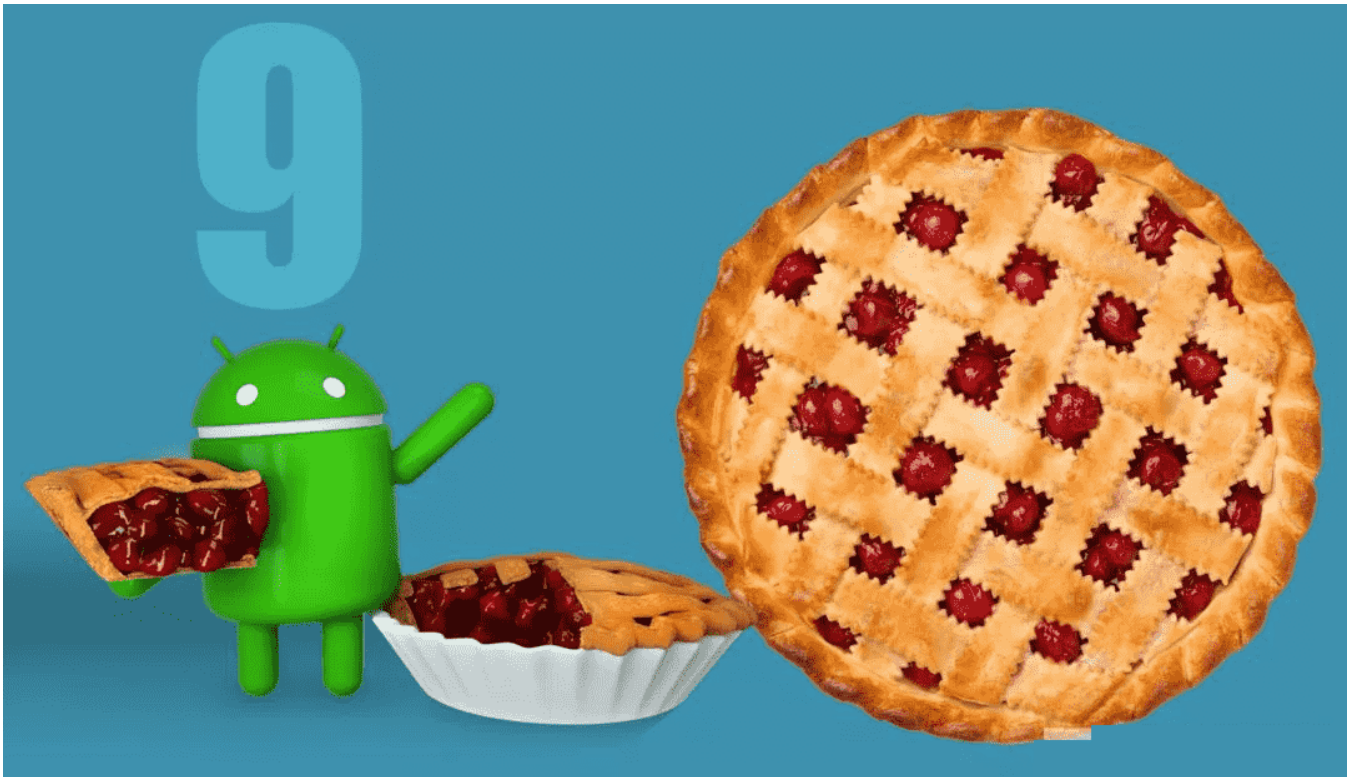


Figure 23. Android Pie image

7 Revision History

Table 13. Revision history

Revision number	Date	Substantive changes
P9.0.0_1.0.0-beta	11/2018	Initial release
P9.0.0_1.0.0-ga	01/2019	

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