AQSUG

Android™ Quick Start Guide

Rev. automotive-10.0.0_1.1.0 — 30 March 2020

User's Guide

Contents

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 8QuadXPlus/8QuadMax (Silicon Revision B0)

Supported boards:

- i.MX 8QuadXPlus/8QuadMax (Silicon Revision B0) MEK Board and Platform

3 Working with the i.MX 8QuadXPlus/8QuadMax MEK Board

3.1 Board hardware

The figures below show the different components of the i.MX 8QuadXPlus/8QuadMax MEK boards.

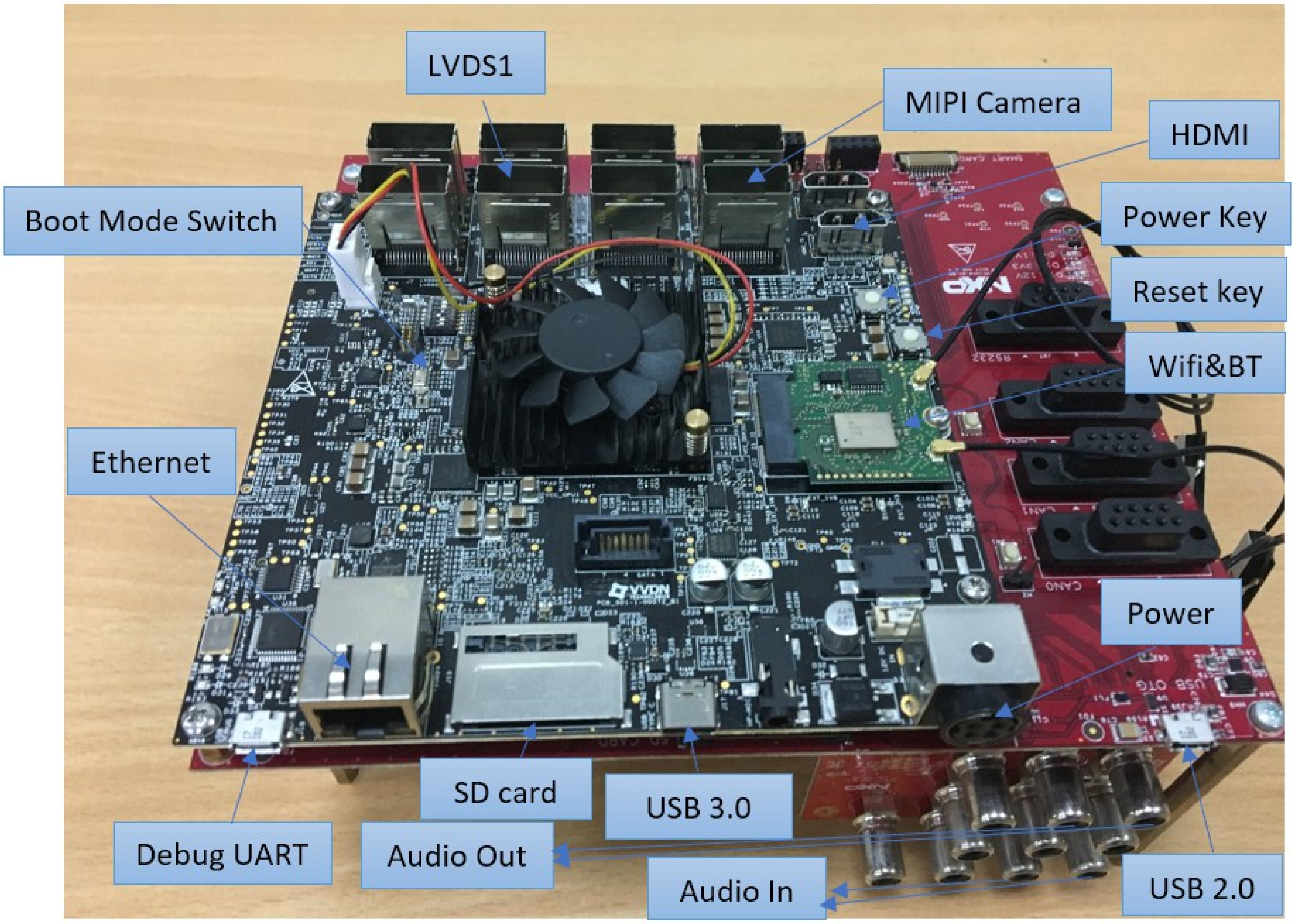

Figure 1. i.MX 8QuadMax MEK board

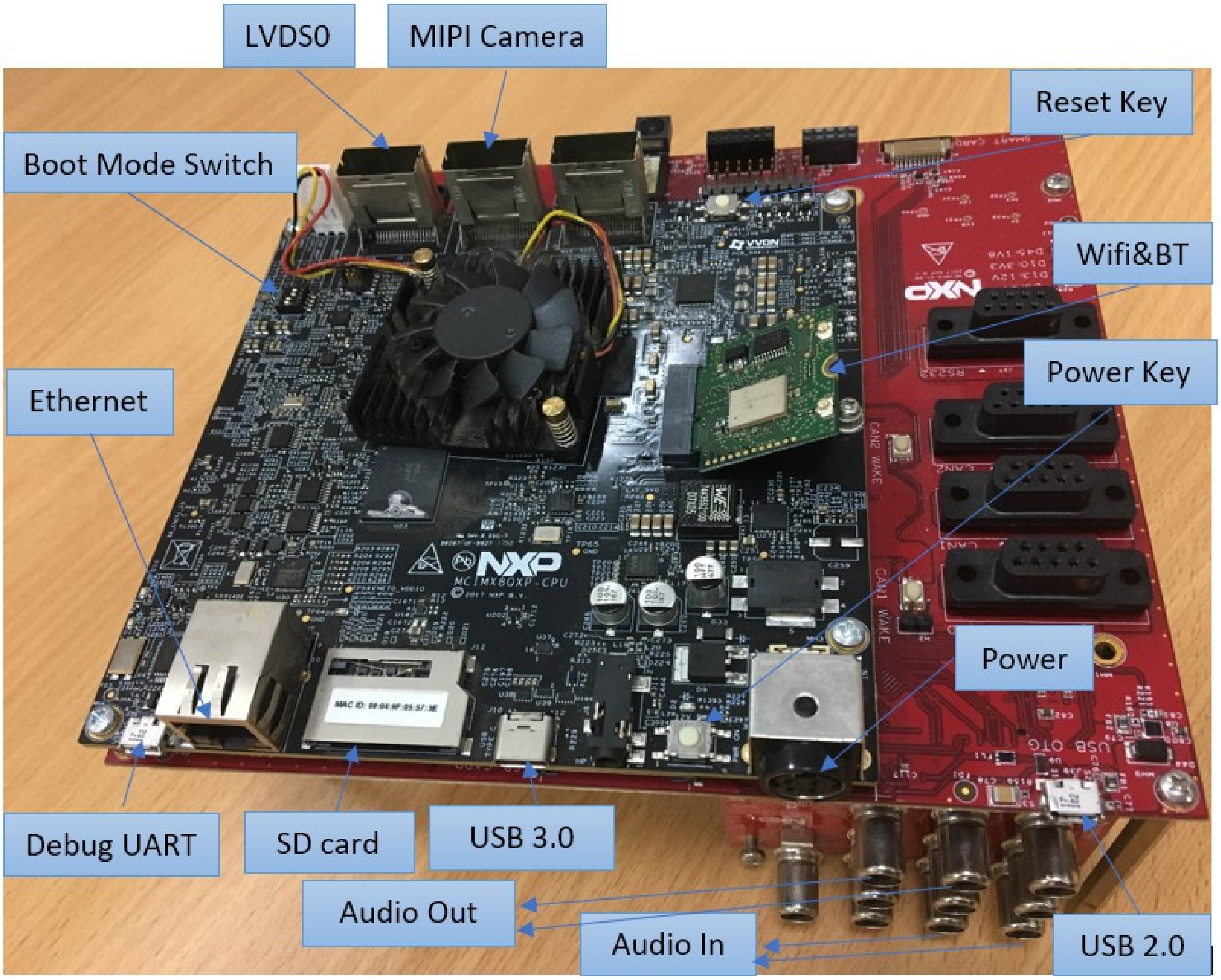

Figure 2. i.MX 8QuadXPlus MEK board

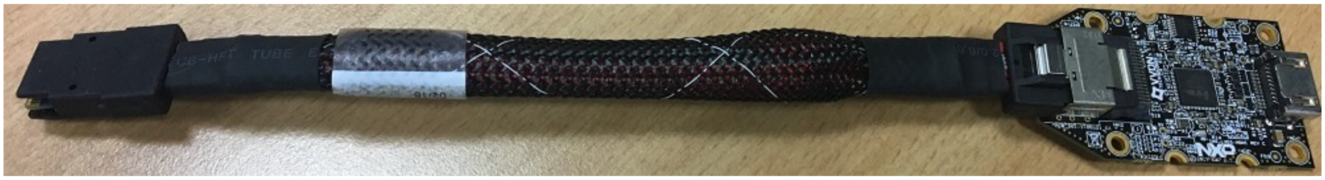

Figure 3. i.MX mini SAS cable with LVDS-to-HDMI adapter

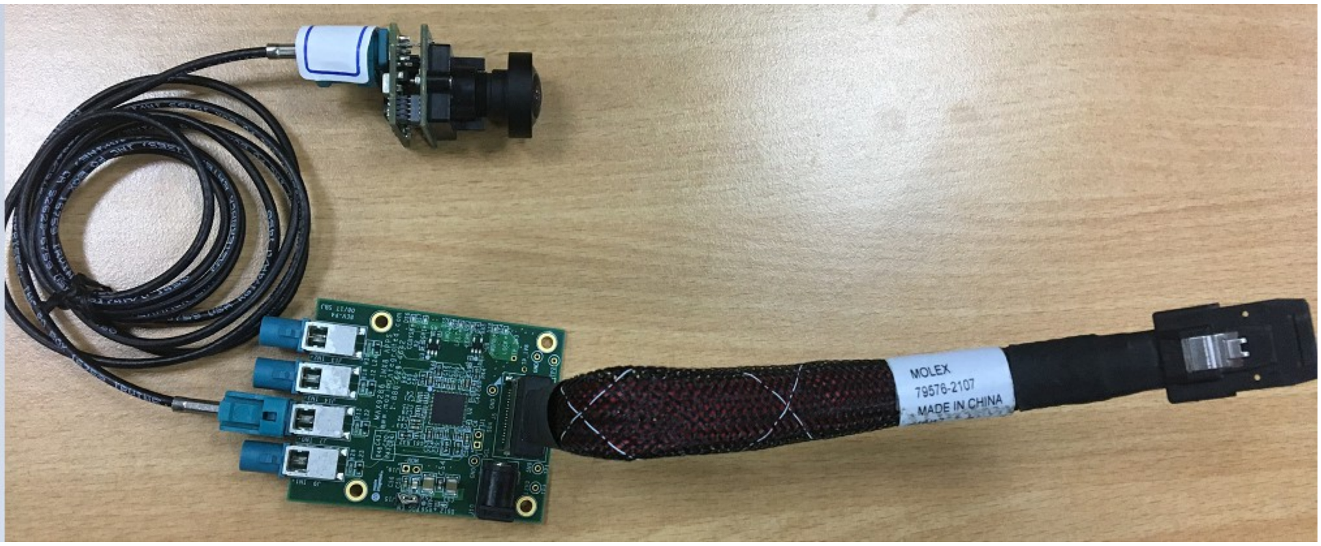

Figure 4. i.MX rearview camera (MAX9286)

NOTE

- To use i.MX rearview camera (MAX9286), connect the two pads of J15.
- i.MX 8QuadMax MEK
    - To test the display, connect the "LVDS1" port to the LVDS-to-HDMI adapter with the i.MX mini SAS cable.
    - To test the rearview camera, connect the "MIPI Camera" port with the i.MX MAX9286 MIPI camera.
- i.MX 8QuadXPlus MEK
    - To test the display, connect the "LVDS0" port to the LVDS-to-HDMI adapter with the i.MX mini SAS cable.
    - To test the rearview camera, connect the "MIPI Camera" port with the i.MX MAX9286 MIPI camera.

3.2 Board images

To test prebuilt images with the EVS function enabled in the Arm Cortex-M4 CPU core, use automotive-10.0.0_1.1.0_image_8qmek.tar.gz. To test prebuilt images without the EVS function enabled in the Arm Cortex-M4 CPU core, use automotive-10.0.0_1.1.0_image_8qmek2.tar.gz. Images are almost the same for the two scenarios, except there is no Xen suppport for automotive-10.0.0_1.1.0_image_8qmek.tar.gz.

The table below describes the location in the board partitions of the software images in automotive-10.0.0_1.1.0_image_8qmek.tar.gz.

Table 1. Board images

Image name	Download target
spl-imx8qm.bin	0 KB offset of MMC for i.MX 8QuadMax.
spl-imx8qxp.bin	32 KB offset of MMC for i.MX 8QuadXPlus.
spl-imx8qm-secure-unlock.bin	0 KB offset of MMC for i.MX 8QuadMax.
spl-imx8qxp-secure-unlock.bin	32 KB offset of MMC for i.MX 8QuadXPlus.

Table continues on the next page...

Table 1. Board images (continued)

bootloader-imx8qm-secure-unlock.img	bootloader_a and bootloader_b partitions for i.MX 8QuadMax.
bootloader-imx8qxp-secure-unlock.img	bootloader_a and bootloader_b partitions for i.MX 8QuadXPlus.
bootloader-imx8qxp.img	bootloader_a and bootloader_b partitions for i.MX 8QuadXPlus.
bootloader-imx8qm-xen.img	bootloader_a and bootloader_b partitions for i.MX 8QuadMax on Xen.
u-boot-imx8qm-mek-uuu.imx	Bootloader used by UUU for i.MX 8QuadMax MEK board. It is not flashed to MMC.
u-boot-imx8qxp-mek-uuu.imx	Bootloader used by UUU for i.MX 8QuadXPlus MEK board. It is not flashed to MMC.
boot.img	boot_a and boot_b partitions to support LVDS-to-HDMI display.
partition-table.img	Program to first 17 KB, and then back up to last 17 KB of the boot storage. GPT table image for 16 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.
vbmeta-imx8qm-md.img	vbmeta_a and vbmeta_b partitions for i.MX 8QuadMax to support multiple displays.
vbmeta-imx8qm-xen.img	vbmeta_a and vbmeta_b partitions for i.MX 8QuadMax to support LVDS-to-HDMI display on Xen.
vbmeta-imx8qxp.img	vbmeta_a and vbmeta_b partitions for i.MX 8QuadXPlus to support LVDS-to-HDMI display.
system.img	system_a and system_b partitions.
vendor.img	vendor_a and vendor_b partitions.
product.img	product_a and product_b partitions.
dtbo-imx8qm.img	dtbo_a and dtbo_b partitions for i.MX 8QuadMax.
dtbo-imx8qm-md.img	dtbo_a and dtbo_b partitions for i.MX 8QuadMax to support multiple displays.
dtbo-imx8qxp.img	dtbo_a and dtbo_b partitions for i.MX 8QuadXPlus.
rpmb_key_test.bin	Prebuilt test RPMB key, which can be used to set the RPMB key as fixed 32 bytes 0x00.
testkey_public_rsa4096.bin	Prebuilt AVB public key. It is extracted from the default AVB private key.

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.

To achieve more flexibility, two script files are provided to invoke UUU to automatically flash all Android images.

- uuu_imx_android_flash.sh for Linux OS
- uuu_imx_android_flash.bat for Windows OS

For this release, these two scripts are validated on UUU 1.3.102 version. Download corresponding version from github:

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

Because the two script files will direclty invoke UUU, make sure that UUU is in a path contained by the system environment variable of "PATH".

Perform the following steps to download the board images:

1. Download the UUU binary file from github as described before. Install UUU into a directory contained by the system environment variable of "PATH".
2. Make the board enter serial download mode.
    - Change the board's SW2 (boot mode) to 001000 (1-6 bit) to enter serial download mode for i.MX 8QuadMax.
    - Change the board's SW2 (boot mode) to 1000 (1-4 bit) to enter serial download mode for i.MX 8QuadXPlus.
3. Power on the board. Use the USB cable on the board USB 3.0 type-c port to connect your PC with the board.

NOTE

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

4. Decompress release_package/automotive-10.0.0_1.1.0_image_8qmek.tar.gz, which contains the image files and UUU scripts.
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 Android Auto images on i.MX 8QuadMax/8QuadXPlus MEK board, related options are described as follows

Table 2. 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". For i.MX 8QuadXPlus, it should be "imx8qxp". 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.
-u uboot_feature	Flashes U-Boot or SPL&bootloader image with "uboot_feature" in their names. For i.MX 8QuadMax MEK and i.MX 8QuadXPlus MEK, it can be "secure-unlock". If this option is not used, defautl "spl-imx8qm.bin" and "bootloader-imx8qm.img" are flashed for i.MX 8QuadMax MEK, and default "spl-imx8qxp.bin" and "bootloader-imx8qxp.img" are flashed for i.MX 8QuadXPlus MEK.
-d dtb_feature	Flashes dtbo and vbmeta images with "dtb_feature" in their names. For i.MX 8QuadMax MEK, it can be "md". For i.MX 8QuadXPlus MEK, do not use this option. If this option is not used, default "dtbo-imx8qm.img" and "vbmeta-imx8qm.img" are flashed for i.MX 8QuadMax MEK.
-e	Erases user data after images are flashed.

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Table 2. Options for uuu_imx_android_flash tool (continued)

Option	Description
-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.
-daemon	Run UUU in Daemon mode. This option is used to flash multiple boards of the same type.
-i	If the script is executed with this option, no images will be flashed. The script loads U-Boot to RAM and executes to fastboot mode. this option is used for development.
-dryrun	Only generates a UUU script but not executes UUU with this script.

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

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

- On Windows system, open the command line interface in administrator mode. The corresponding command is as follows:

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

When the command above is executed, the default images will be flashed into eMMC both slot a and slot b for i.MX 8QuadMax and all user data will be erased.

NOTE

- uuu_imx_android_flash.bat generates a temporary file under the current working directory. Make sure you have Write permission under the current working directory.
- If uuu_imx_android_flash.bat is used to flash images on a remote server through samba, you need to map the remote resource to the local environment first. Take the following command as an example:

  ```
  > net use z: \\192.168.1.1\daily_images
  ```

  "z" in the command represents an available drive letter. It can be other available drive letter.
- Do not flash Automotive images with "-t sd", because Automotive images can only boot from eMMC.
- To test the demostration implementation of secure unlock, execute the tool with "-u secure-unlock". For secure unlock details, see the *i.MX Android Security User's Guide* (ASUG).
- To test multiple displays on i.MX 8QuadMax MEK with images in automotive-10.0.0_1.1.0_image_8qmek.tar.gz, execute the tool with "-d md".
- To test multiple displays on i.MX 8QuadMax MEK with images in automotive-10.0.0_1.1.0_image_8qmek2.tar.gz, execute the tool with "-u md -d md".

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.
   - Change SW2 to switch the board back to 000100 (1-6 bit) to enter eMMC boot mode for i.MX 8QuadMax.
   - Change SW2 to switch the board back to 0100 (1-4 bit) to enter eMMC boot mode for i.MX 8QuadXPlus.

3.4 Booting with LVDS-to-HDMI display

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

```
U-Boot > setenv bootargs console=ttyLP0,115200 earlycon=lpuart32,0x5a060000,115200
androidboot.console=ttyLP0 androidboot.xen_boot=default init=/init androidboot.hardware=freescale
androidboot.fbTileSupport=enable cma=800M@0x960M-0xe00M galcore.contiguousSize=33554432
androidboot.primary_display=imx-drm firmware_class.path=/vendor/firmware transparent_hugepage=never
video=HDMI-A-2:d androidboot.wificountrycode=CN androidboot.lcd_density=213
```

To disable selinux for userdebug/eng build mode images, "androidboot.selinux=permissive" needs to be appended to the U-Boot's bootargs. Boot environment variables are as follows:

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

NOTE

i.MX 8QuadXPlus/8QuadMax MEK supports LVDS-to-HDMI display. They share the same bootargs.

To shorten the boot time of Android Auto, some U-Boot commands including "saveenv" are removed. After you set the preceding U-Boot environment variables, execute the following command to boot the system:

```
U-Boot > boota
```

Then wait for the Android platform to boot up.

4 Revision History

Table 3. Revision history

Revision number	Date	Substantive changes
O8.1.0_1.1.0_AUTO-EAR	02/2018	Initial release
O8.1.0_1.1.0_AUTO-beta	05/2018	i.MX 8QuadXPlus/8QuadMax Beta release
P9.0.0_1.0.2-AUTO-alpha	11/2018	i.MX 8QuadXPlus/8QuadMax Automotive Alpha release
P9.0.0_1.0.2-AUTO-beta	01/2019	i.MX 8QuadXPlus/8QuadMax Automotive Beta release
P9.0.0_2.1.0-AUTO-ga	04/2019	i.MX 8QuadXPlus/8QuadMax Automotive GA release
P9.0.0_2.1.0-AUTO-ga	08/2019	Updated the location of the SCFW porting kit.
automotive-10.0.0_1.1.0	03/2020	i.MX 8QuadXPlus/8QuadMax MEK (Silicon Revision B0) GA release
automotive-10.0.0_1.1.0	03/2020	Deleted the Android 10 image.

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