Document Number: ARN
Rev. O8.1.0_2.0.0-beta, 01/2019

Android™ Release Notes

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1 Release Description

The i.MX Android™ O8.1.0_2.0.0-beta release is a PRC/Beta release for the Android 8.1 Oreo (O) platform on the i.MX 8QuadMax and i.MX 8QuadXPlus MEK board applications processors.

i.MX Android O8.1.0_2.0.0-beta release includes all necessary code, documents, and tools to assist users in building and running the Android 8.1 platform on the i.MX 8QuadMax and i.MX 8QuadXPlus MEK boards from scratch. Pre-built images are also included for a quick trial on the following platforms:

- i.MX 8QuadXPlus MEK B0 Board and Platform
- i.MX 8QuadMax MEK B0 Board and Platform

This release includes all porting and enhancements based on the Android open source code.

Most of the deliveries in this release are provided in source code with the exception of some proprietary modules/libraries from third parties.

2 Supported Hardware SoC/ Boards

The supported hardware system-on-chip (SoCs)/boards are listed as follows:

- i.MX 8QuadXPlus MEK B0 Board and Platform
- i.MX 8QuadMax MEK B0 Board and Platform

3 Release Package Contents

The O8.1.0_2.0.0-beta release package includes the following software and documents.

Table 1. Release package contents

i.MX Android proprietary source code package	• imx-o8.1.0_2.0.0-beta.tar.gz: i.MX Android proprietary source code package to enable the Android platform on i.MX boards.
Documents	The following documents are included in android_o8.1.0_2.0.0-beta_docs.zip: • *Android™ Quick Start Guide* (AQSUG): A document that explains how to run the Android platform on an i.MX board using prebuilt images. • *Android™ User's Guide* (AUG): A document describing procedures for configuring and building this release package. • *Android™ Release Notes* (ARN): A document that introduces key updates and known issues in this release. • *i.MX Android™ Extended Codec Release Notes* (IMXACRN): A document that provides the extended codec information. • *Android™ Frequently Asked Questions* (AFAQ): A document that contains the answers to the Frequently Asked Questions (FAQs). • *i.MX Graphics User's Guide* (IMXGRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.
Tools	Tools in android_o8.1.0_2.0.0-beta_tools.tar.gz • VivanteVTK-v6.2.4.p1.1.7.5.tgz: GPU tools for VeriSilicon GPU 6.2.4.p1 driver. For more information about these tools, see *i.MX Graphics User's Guide* (IMXGRAPHICUG). • fsl-sdcard-partition.sh: tool to make partition and flash Android images. • fastboot_imx_flashall.sh: A script for Linux system. It invokes fastboot tool to automatically flash Android images. • fastboot_imx_flashall.bat: A batch file for Windows system. It invokes fastboot tool to automatically flash Android images. • uuu_imx_android_flash.sh: A script for Linux system. It invokes UUU and fastboot tool to automatically flash Android images. • uuu_imx_android_flash.bat: A batch file for Windows system. It invokes UUU and fastboot tool to automatically flash Android images.
Prebuilt images	You can test the Android platform with a prebuilt image on an i.MX reference board before building any code: • android_o8.1.0_2.0.0-beta_image_8qmek.tar.gz: Prebuilt images with NXP extended features for the i.MX 8QuadMax/8QuadXPlus MEK board. The extended features include additional multimedia format support. All prebuilt images are in a separate package. See the *Android™ Quick Start Guide* (AQSUG) and *Android™ User's Guide* (AUG) to choose the appropriate image.

4 Features

This section contains features in this package.

Table 2. Features

Feature	i.MX 8QuadMax/ 8QuadXPlus MEK	Remarks
Google Oreo 8.1 release	Y	Based on android-8.1.0_r51 release.
Linux 4.14.78 kernel (merged with AOSP kernel)	Y	Based on Linux® OS BSP L4.14.78-1.0.0_ga release.
U-Boot	Y	v2018.03.
Graphic-HW	Y	For i.MX 8QuadMax, VeriSilicon GC7000XSVX GPU with 6.2.4.p2 driver. For i.MX 8QuadXPlus, VeriSilicon GC7000L GPU with 6.2.4.p2 driver.
Graphic-HW 3D acceleration	Y	For i.MX 8QuadMax, OpenGL ES 1.1/2.0/3.1/3.2 through GC7000XSVX. For i.MX 8QuadXPlus, OpenGL ES 1.1/2.0/3.1 through GC7000L.
Graphic-HW accelerated UI surface composition	Y	For i.MX 8QuadMax, OpenGL ES 3.2 through GC7000XSVX. For i.MX 8QuadXPlus, OpenGL ES 3.1 through GC7000L.
Boot source	SD/eMMC	-
Splash Screen for LVDS	N	-
UI (input)	Y	-
UI (display)	HDMI/MIPI panel display	i.MX 8QuadMax supports the LVDS-to-HDMI/MIPI-to-HDMI/ MIPI panel display and physical HDMI display. i.MX 8QuadXPlus supports the LVDS-to-HDMI/MIPI-to-HDMI display.
UI (dual display, HDMI+HDMI, UI mirror displayed on second device)	Y	Supports dual LVDS-to-HDMI display.
UI (brightness control)	N	-
Storage - External Media	Y	The USB 2.0 port supports udisk, but the USB 3.0 port does not support udisk.
Connectivity - Ethernet	Y	-
Connectivity - Bluetooth® wireless technology	Y	Qualcomm QCA6174A. Profiles: A2DP Source, AVRCP, BLE Host, HSP, HID Host, HID Device, PAN, and OPP.
Connectivity - Wi-Fi	Y	Qualcomm QCA6174A. Features: AP mode, STA mode, and Wi-Fi Direct.
Connectivity - USB Tethering	Y	Supports Wi-Fi and Ethernet as upstream
Power - CPU Freq	Y	-
Power - Bus Freq	Y	-
Media - Music Play	Y	ESAI+CS42888 (supports multichannel)

Table continues on the next page...

Table 2. Features (continued)

Feature	i.MX 8QuadMax/ 8QuadXPlus MEK	Remarks
Media - Sound Record	Y	ESAI+CS42888
Media - Video Play	Y	-
Media - Camera	Y	OV5640MIPI
Media - TVIN	N/A	PAL/NTSC
Media - Dual Camera	Y	i.MX 8QuadMax supports dual OV5640MIPI. i.MX 8QuadXPlus supports OV5640MIPI&OV5640CSI.
Media - Camcorder	N	-
Media - USB Camera	N	-
Media - USB Mic	Y	-
Media - HDMI audio output	N	-
Misc - ADB over USB	Y	-
Misc - Fastboot utility	Y	-
Misc - SW update and factory reset	Y	-
Sensor - Magnetometer	Y	FXOS8700
Sensor - Accelerometer	Y	FXOS8700
Sensor - Gyroscope	Y	FXAS2100
Sensor - Light	Y	ISL29023
Sensor - Pressure	Y	MPL3115
Sensor - Temperature	Y	MPL3115
File Based Encryption	Y	-
USB Accessory	Y	Google AOA v2.0
Ethernet APK	Y	-
webGL	Y	-
OTA for A/B	Y	-
Vulkan	Y	-
USB TYPEC PD	Y	-
DM verity	Y	-

5 Multimedia Codecs

For multimedia codecs and features, see Section 5 in the Android 8.1 Compatibility Definition Document(CDD).

6 Extended Feature Packages

The release extends the default AOSP Android version with the following features. For more information about the features below, contact "L2manager-android@nxp.com". For detailed extended and additional features, see *i.MX Android™ Extended Codec Release Notes* (IMXACRN).

7 Change Log

Compared to the O8.1.0_1.2.0_8QXP-beta2 release, this release has the following major changes:

- Upgraded the Android code base from 8.1.0_r23 to 8.1.0_r51.
- Upgraded the kernel from v4.9.105 to v4.14.78.
- Upgraded U-Boot from v2017.03 to v2018.03.

8 Known Issues and Limitations

The known issues about the hardware and hardware rework instructions are not included in this document. Read all hardware-related reference material and ensure the necessary hardware modifications have been made before using the software.

Table 3. Known issues and limitations

Issue description	Remarks
The Google USB driver must be installed multiple times for the MTP, PTP, MTP&ADB, PTP&ADB, and ADB function settings.	Some Windows XP environments may display MTP and PTP windows even with only PTP enabled in the device.
U-Boot will hang when erasing Kingston's SD card.	U-Boot will hang when sending the erasing command on some Kingston SD cards.

The display is sometimes black on both i.MX 8QuadMax MEK and i.MX 8QuadXPlus MEK boards.	• The display is sometime black without any abnormal log or with the following log on both the i.MX 8QuadMax and i.MX 8QuadXPlus MEK board.
	`imx-dpu-crtc imx-dpu-crtc.4: flush - wait for content shdld done timeout.`
	• It is caused by the hardware PMIC issue on both the i.MX 8QuadMax and i.MX 8QuadXPlus board.
	• The workaround is as follows:
	Disable selinux and switch to root user by `su`.
	`echo performance > /sys/devices/system/cpu/cpufreq/policy4/scaling_governor.`

The resolution of the screen recorded video is different from the one specified by the recording command, and the color of the video is different from the screen color.	Android platform needs RGBA format output, but the V4L2 framework does not support this format. To support RGBA format output in the mem2mem driver, the V4L2 format needs to be extended.
For i.MX 8QuadXPlus, it fails to boot from some types of eMMC.	In the default settings, the UUU script burns the boot image into eMMC Boot Partition with 32KB offset. Although it works properly on the MEK board, it fails to read the boot image on some types of eMMC.

Table 3. Known issues and limitations

Issue description	Remarks
	There are two possible solutions: • Download flash.bin in the eMMC Boot Partition + 0KB offset + eMMC fastboot enabled in fuse. • Download flash.bin in the eMMC User Partition + 32KB offset (eMMC fastboot can be either enabled or disabled in fuse). For more information, see https://community.nxp.com/docs/DOC-342285.

9 Revision History

Table 4. Revision history

Revision number	Date	Substantive changes
O8.0.0_1.2.0_8QXP-EAR	12/2017	Initial release
O8.1.0_1.2.0_8QXP-PRC	03/2018	i.MX 8QuadXPlus PRC/Beta release
O8.1.0_1.2.0_8QXP-beta2	08/2018	i.MX 8QuadXPlus Beta2 release
O8.1.0_2.0.0-beta	01/2019	i.MX 8QuadXPlus/8QuadMax Beta release

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Document Number ARN
Revision O8.1.0_2.0.0-beta, 01/2019