

Android™ Release Notes

1 Release Description

The i.MX Android™ O8.1.0_2.1.0-AUTO-ga release is an Android Automotive GA (RFP) release on NXP's i.MX 8QuadXPlus/8QuadMax MEK board and platform, which is based on Oreo 8.1. It supports the device type In-vehicle infotainment defined in <https://source.android.com/devices/automotive/>.

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

- i.MX 8QuadXPlus/8QuadMax MEK 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.

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2 Supported Hardware SoC/Boards

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

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

3 Release Package Contents

The O8.1.0_2.1.0-AUTO-ga release package includes the following software and documents.

Table 1. Release package contents

i.MX Android proprietary source code package	<ul style="list-style-type: none"> • imx-o8.1.0_2.1.0-auto-ga.zip: i.MX Android Automotive proprietary source code package to enable Android Automotive on i.MX boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration, etc.
Documents	<p>The following documents are included in android_o8.1.0_2.1.0-auto-ga_docs.tar.gz:</p> <ul style="list-style-type: none"> • <i>Android™ Quick Start Guide (AQSUG)</i>: A document that explains how to run Android Automotive on an i.MX board using prebuilt images. • <i>Android™ User's Guide (AUG)</i>: A document describing procedures for configuring and building this release package. • <i>Android™ Release Notes (ARN)</i>: A document that introduces key updates and known issues in this release. • <i>i.MX Android™ Extended Codec Release Notes (IMXACRN)</i>: A document that provides the extended codec information. • <i>i.MX Android™ Security User's Guide (ASUG)</i>: A document that describes how to do customization work on security features supported by i.MX Android software. • <i>i.MX Graphics User's Guide (IMXGRAPHICUG)</i>: A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.
Prebuilt images	<p>You can test Android Automotive with a prebuilt image on i.MX reference board before building any code:</p> <ul style="list-style-type: none"> • android_o8.1.0_2.1.0-auto-ga_image_8qmek.tar.gz: Prebuilt-image and UUU script files for i.MX 8QuadXPlus/8QuadMax MEK board with EVS function enabled in the Arm Cortex-M4 CPU core, which includes NXP extended features. • android_o8.1.0_2.1.0-auto-ga_image_8qmek2.tar.gz: Prebuilt-image and UUU script files for i.MX 8QuadMax/8QuadXPlus MEK board without EVS function enabled in the Arm Cortex-M4 CPU core, which includes NXP extended features. <p>All prebuilt images are in a separate package. See the <i>Android™ Quick Start Guide (AQSUG)</i> and <i>Android™ User's Guide (AUG)</i> to choose the appropriate image.</p>

NOTE

VivanteVTK tool is no longer provided in the Android release package. It is available on <https://www.nxp.com/imx6tools> (for example: Tools -> Vivante VTK -> VivanteVTK-v6.2.4.p4.1.7.8).

4 Features

This section contains features in this package.

Table 2. Features

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
Google Oreo 8.1 release	Y	Based on android-8.1.0_r60 release.
Linux 4.14.98 kernel (merged with the AOSP kernel)	Y	Based on Linux® OS BSP L4.14.98-2.0.0_ga release.
U-Boot	Y	v2018.03.
Graphics-HW	Y	VeriSilicon GC7000L GPU for 8QuadXPlus, GC7000XSVX GPU for 8QuadMax with 6.2.4.p4 driver.
Graphics-HW 3D acceleration	Y	OpenGL ES 1.1/2.0/3.1 through GC7000L for i.MX 8QuadXPlus, OpenGL ES 1.1/2.0/3.1/3.2 through GC7000XSVX for i.MX 8QuadMax.
Graphics-HW accelerated UI surface composition	Y	OpenGL ES 3.1 through GC7000L for i.MX 8QuadXPlus, OpenGL ES 3.2 through GC7000XSVX for i.MX 8QuadMax.
Boot source	eMMC	-
Splash Screen	Y	Supports USB mouse.
UI (input)	Y	-
UI (display)	HDMI display	Supports LVDS-to-HDMI display.
UI (brightness control)	N	-
Storage - External Media	Y	-
Connectivity - Ethernet	N	-
Connectivity - Bluetooth® wireless technology	Y	Qualcomm 1CQ QCA6174A. Profiles: A2DP Sink, AVRCP, BLE Host, HFP, PBAPClient, MAPMCE, PAN, HID Device.
Connectivity - Wi-Fi	Y	Qualcomm 1CQ QCA6174A. Features: STA mode, AP mode, Wi-Fi Direct, AP/STA Concurrency.
Connectivity - USB Tethering	Y	Supports Wi-Fi as upstream.
Power - CPU Freq	Y	-
Power - Bus Freq	Y	-
Media - Music Play	Y	ESAI+CS42888 (no support for multichannel).
Media - HDMI audio output	N	-
Misc - ADB over USB	Y	-
Misc - Fastboot utility	Y	-
Misc - SW update and factory reset	Y	-
File-based Encryption	Y	-
Ethernet APK	N	-
webGL	Y	-

Table continues on the next page...

Table 2. Features (continued)

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
USB TYPEC PD	Y	-
OTA for A/B	Y	-
TEE backed Keymaster HAL	Y	This is based on i.MX Trusty OS TEE firmware.
TEE backed AVB	Y	This is based on i.MX Trusty OS TEE firmware and secure storage of eMMC chip. In this release, the RPMB part needs to be initialized manually.
Media rearview camera	Y	MAX9286 camera.

5 Multimedia Codecs

For multimedia codecs and features, see Section 5 in the [Google Oreo 8.1 Compatibility Definition Document \(CDD\)](#).

6 Extended Feature Packages

An enhanced multimedia experience is available for the Android platform.

This release delivers an error-resilient, feature-rich multimedia solution by extending the existing multimedia features of the Android platform and introduces additional features. For more information and details, contact "L2manager-android@nxp.com"

7 Change Log

Compared to the O8.1.0_2.0.0_AUTO-beta release, this release has the following major changes:

- Upgraded the Android code base from android-8.1.0_r51 to android-8.1.0_r60.
- Upgraded the kernel from 4.14.78 to 4.14.98.
- Added keystore key attestation support and commands to provide attestation keys and certificate chains.
- Added dual-bootloader feature.
- Added HVAC over vehicle HAL.
- Added Cluster Display over second display.
- Shortened Android Automotive boot time to 10.27s for i.MX 8QuadMax MEK with images in android_o8.1.0_2.1.0-auto-ga_image_8qmek.tar.gz.
- Shortened Android Automotive boot time to 11.04s for i.MX 8QuadMax MEK with images in android_o8.1.0_2.1.0-auto-ga_image_8qmek2.tar.gz.
- Shortened Android Automotive boot time to 13.99s for i.MX 8QuadXPlus MEK with images in android_o8.1.0_2.1.0-auto-ga_image_8qmek.tar.gz.
- Shortened Android Automotive boot time to 15.3s for i.MX 8QuadXPlus MEK with images in android_o8.1.0_2.1.0-auto-ga_image_8qmek2.tar.gz.

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.
The display is sometimes black on both i.MX 8QuadMax MEK and i.MX 8QuadXPlus MEK boards.	<p>The display is sometime black with the following log on both the i.MX 8QuadMax and i.MX 8QuadXPlus MEK board.</p> <pre>imx-dpu-crtc imx-dpu-crtc.4: flush - wait for content shld done timeout.</pre> <p>It will be fixed in next release.</p>
For i.MX 8QuadXPlus, it fails to boot from some types of eMMC.	<p>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.</p> <p>There are two possible solutions:</p> <ul style="list-style-type: none"> 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). <p>For more information, see https://community.nxp.com/docs/DOC-342285.</p>
Video cannot be played any more after certain HTML5 H.264 or VP8 video playback on i.MX 8QuadMax MEK and i.MX 8QuadXPlus MEK boards.	It will be fixed in next release.

9 Revision History

Table 4. 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
O8.1.0_2.0.0-AUTO-beta	01/2019	i.MX 8QuadXPlus/8QuadMax Beta release
O8.1.0_2.1.0-AUTO-ga	04/2019	i.MX 8QuadXPlus/8QuadMax GA release

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