

# Android™ Release Notes

## 1 Release Description

The i.MX Android™ automotive-10.0.0\_2.2.0 release is an Android Automotive GA (RFP) release on NXP's i.MX 8QuadXPlus/8QuadMax MEK board and platform, which is based on Android 10. It supports the device type In-vehicle infotainment defined in <https://source.android.com/devices/automotive/>.

i.MX Android automotive-10.0.0\_2.2.0 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.

## 2 Supported Hardware SoC/Boards

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

- i.MX 8QuadMax (Silicon Revision B0) MEK Board and Platform
- i.MX 8QuadXPlus (Silicon Revision B0, C0) MEK Board and Platform

## 3 Release Package Contents

The automotive-10.0.0\_2.2.0 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"> <li>• imx-automotive-10.0.0_2.2.0.tar.gz: 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.</li> </ul>
Documents	<p>The following documents are included in android_automotive-10.0.0_2.2.0_docs.zip:</p> <ul style="list-style-type: none"> <li>• <i>Android™ Quick Start Guide (AQSUG)</i>: A document that explains how to run Android Automotive on an i.MX board using prebuilt images.</li> <li>• <i>Android™ User's Guide (AUG)</i>: A document describing procedures for configuring and building this release package.</li> <li>• <i>Android™ Release Notes (ARN)</i>: A document that introduces key updates and known issues in this release.</li> </ul>

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Table 1. Release package contents (continued)

	<ul style="list-style-type: none"> <li>• <i>i.MX Android™ Extended Codec Release Notes</i> (IMXACRN): A document that provides the extended codec information.</li> <li>• <i>i.MX Android™ Security User's Guide</i> (ASUG): A document that describes how to do customization work on security features supported by i.MX Android software.</li> <li>• <i>i.MX Graphics User's Guide</i> (IMXGRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.</li> </ul>
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"> <li>• <i>automotive-10.0.0_2.2.0_image_8qmek.tar.gz</i>: Prebuilt images with NXP extended features with the EVS function enabled in the Cortex-M4 CPU core for the i.MX 8QuadMax/8QuadXPlus MEK board. The extended features include more multimedia format support.</li> <li>• <i>automotive-10.0.0_2.2.0_image_8qmek2.tar.gz</i>: Prebuilt images with NXP extended features without EVS function enabled in the Cortex-M4 CPU core for the i.MX 8QuadMax/8QuadXPlus MEK board.</li> </ul> <p>All prebuilt images are in a separate package. See the <i>Android™ Quick Start Guide</i> (AQSUG) and <i>Android™ User's Guide</i> (AUG) to choose the appropriate image.</p>

## 4 Features

Table 2. Features

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
Google Android 10 release	Y	Based on android-10.0.0_r32 release.
Linux 5.4.24 kernel (merged with the AOSP kernel)	Y	Based on Linux® OS BSP L5.4.24 GA release.
U-Boot	Y	v2019.04
Trusty OS	Y	-
Graphics-HW	Y	VeriSilicon GC7000L GPU for i.MX 8QuadXPlus, GC7000XSVX GPU for i.MX 8QuadMax with 6.4.0.p2 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.
SCFW	Y	Version 1.5.0
SECO firmware	Y	Version 2.5.7
Boot source	eMMC	-

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Table 2. Features (continued)

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
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	BCM 1FD BCM4359. Profiles: A2DP Sink, AVRCP, BLE Host, HFP, PBAPClient, MAPMCE, PAN, HID Device.
Connectivity - Wi-Fi	Y	BCM 1FD BCM4359. Features: STA mode, AP mode, Wi-Fi Direct.
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	-
Vulkan	Y	-
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.

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Table 2. Features (continued)

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
Media rearview camera	Y	MAX9286 camera.
Car Audio Policy	Y	Alarm, notification, and system sounds are played from the audio jack on the CPU board. Other sounds such as music are played from the extended audio board.

## 5 Multimedia Codecs

For multimedia codecs and features, see the *i.MX Android™ Extended Codec Release Notes* (IMXACRN).

## 6 Change Log

Compared to the automotive-10.0.0\_1.1.0 release, this release has the following major changes:

- Upgraded the Android code base from android-10.0.0\_r14 to android-10.0.0\_r32.
- Upgraded the kernel from v4.19.42 to v5.4.24.
- Integrated OAA.

## 7 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.
For i.MX 8QuadXPlus silicon revision B0 chip, 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"> <li>• Download flash.bin in the eMMC Boot Partition + 0KB offset + eMMC fastboot enabled in fuse.</li> <li>• Download flash.bin in the eMMC User Partition + 32KB offset (eMMC fastboot can be either enabled or disabled in fuse).</li> </ul> <p>For more information, see <a href="https://community.nxp.com/docs/DOC-342877">https://community.nxp.com/docs/DOC-342877</a>.</p>

## 8 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
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
android-10.0.0_2.2.0-AUTO	06/2020	i.MX 8QuadXPlus/8QuadMax MEK GA release

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