

# Android™ Release Notes

## 1 Release Description

The i.MX Android™ P9.0.0\_1.0.2-AUTO-alpha release is an Android Automotive Alpha (EAR) release on NXP's i.MX 8QuadXPlus/8QuadMax MEK board and platform, which is based on Pie 9.0. It supports the device type In-vehicle infotainment defined in <https://source.android.com/devices/automotive/>.

i.MX Android P9.0.0\_1.0.2-AUTO-alpha 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 P9.0.0\_1.0.2-AUTO-alpha 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-p9.0.0_1.0.2-auto-alpha.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_p9.0.0_1.0.2-auto-alpha_docs.tar.gz:</p> <ul style="list-style-type: none"> <li>• <i>Android™ Quick Start Guide</i> (AQSUG): A document that explains how to run Android Automotive on an i.MX board using prebuilt images.</li> <li>• <i>Android™ User's Guide</i> (AUG): A document describing procedures for configuring and building this release package.</li> <li>• <i>Android™ Release Notes</i> (ARN): A document that introduces key updates and known issues in this release.</li> <li>• <i>i.MX Android™ Extended Codec Release Notes</i> (IMXACRN): A document that provides the extended codec information.</li> <li>• <i>Android™ Frequently Asked Questions</i> (FAQ): A document that contains the answers to the Frequently Asked Questions (FAQs).</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>
Tools	<p>Tools in android_p9.0.0_1.0.2-auto-alpha_tools.tar.gz</p> <ul style="list-style-type: none"> <li>• VivanteVTK-6.2.4.p2.1.7.6.tgz: GPU tools for VeriSilicon GPU 6.2.4.p2 driver. For more information about these tools, see <i>i.MX Graphics User's Guide</i> (IMXGRAPHICUG).</li> <li>• rpmb_key_alpha.bin: Initial version of RPMB key. For how to use this key to initialize the secure storage, see Chapter 8.4.2 in the <i>Android™ User's Guide</i> (AUG).</li> <li>• fastboot_imx_flashall.sh: A script for Linux system. It invokes the fastboot tool to automatically flash Android images.</li> <li>• fastboot_imx_flashall.bat: A batch file for Windows system. It invokes the fastboot tool to automatically flash Android images.</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>• android_p9.0.0_1.0.2-auto-alpha_image_8qmek.tar.gz: Prebuilt images with NXP extended features for the i.MX 8QuadXPlus/8QuadMax MEK board. The extended features include more multimedia format support.</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

This section contains features in this package.

**Table 2. Features**

Feature	i.MX 8QuadXPlus/ 8QuadMax MEK	Remarks
Google Pie 9.0 release	Y	Based on android-9.0.0_r8 release.
Linux 4.14.62 kernel (merged with the AOSP kernel)	Y	Based on Linux® OS BSP 4.14.62 Beta release.
U-Boot	Y	v2018.03
Graphics-HW	Y	VeriSilicon GC7000L GPU for i.MX 8QuadXPlus, GC7000XSVX GPU for i.MX 8QuadMax with 6.2.4.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.
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 QCA6174A. Profiles: A2DP Sink, HFP.
Connectivity - Wi-Fi	Y	Qualcomm QCA6174A. 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	-
Screen Recording	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 Pie 9.0 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\_1.1.0\_AUTO-beta release, this release has the following major changes:

- Upgrade the Android code base from android-8.1.0\_r1 to android-9.0.0\_r8.
- Upgraded the kernel from 4.9.69 to 4.14.62.
- Upgraded U-Boot from v2017.03 to v2018.03.
- Added rearview camera support.
- Added Trusty OS (TEE) backed security services, such as secure storage and keymaster support.
- Shortened the Android Automotive boot time to 14.45 seconds for i.MX 8QuadMax MEK and 18.85 seconds for i.MX 8QuadXPlus MEK.

## 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.
Bluetooth HFP sound from the Audio Out ports has a lot of noise.	There is much noise in the phone call audio. It is a third-party (Murata) firmware issue.
The rearview camera information is not shown on the display.	Cortex-M4 takes control of the camera and display before Android OS booting is complete and gives control back to the Cortex-A core when Android booting is complete. If the rearview camera is running during the camera and display control switch, this issue may occur.
The display area for the rearview camera is not correct.	Run the rearview camera before Android OS booting is complete, and then run the rearview camera again after Android boot is complete. When this issue occurs, the image is shown on the right top of the display.  This is a camera driver issue.

## 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
P9.0.0_1.0.2-AUTO-alpha	11/2018	i.MX 8QuadXPlus/8QuadMax Automotive Alpha release

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