

ARN

Android Release Notes

Rev. android-14.0.0_1.0.0 — 6 February 2024

Release notes

Document information

| Information | Content |
|-------------|--|
| Keywords | Android, i.MX, android-14.0.0_1.0.0 |
| Abstract | i.MX android-14.0.0_1.0.0 is a release for Android 13 on the i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, and i.MX 8QuadXPlus applications processors of NXP. |



1 Release Description

i.MX android-14.0.0_1.0.0 is a release for Android 14 on the i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8ULP, i.MX 8QuadMax, and i.MX 8QuadXPlus applications processors of NXP.

i.MX android-14.0.0_1.0.0 release includes all necessary code, documents, and tools to assist users in building and running Android 14 on the i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad WEVK/EVK, i.MX 8ULP EVK i.MX 8QuadMax MEK, and i.MX 8QuadXPlus MEK board. The corresponding release quality for each board is listed in the following table.

Table 1. Release description

| Platform name | Release quality |
|------------------------|-----------------|
| i.MX 8M Mini EVK | GA (RFP) |
| i.MX 8M Nano EVK | GA (RFP) |
| i.MX 8M Plus EVK | GA (RFP) |
| i.MX 8M Quad WEVK/EVK | GA (RFP) |
| i.MX 8ULP (A2 9x9) EVK | GA (RFP) |
| i.MX 8ULP (A2) EVK | GA (RFP) |
| i.MX 8QuadMax | GA (RFP) |
| i.MX 8QuadXPlus | GA (RFP) |

The prebuilt images are also included for a quick trial on NXP i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad WEVK/EVK, i.MX 8ULP EVK, i.MX 8QuadMax MEK, and i.MX 8QuadXPlus MEK Board and Platforms.

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 for 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 8M Mini EVK
Supported daughter boards:
 - With DDR4 RAM, ROHM BD71847 PMIC chip
 - With LPDDR4 RAM, NXP PCA9450 PMIC chip, and NXP 88W8987 Wi-Fi/Bluetooth module.Supported mother board:
 - Rev. C mother board
- i.MX 8M Nano EVK
Supported daughter boards:
 - With DDR4 RAM, ROHM BD71847 PMIC chip
 - With LPDDR4 RAM, NXP PCA9450 PMIC chip and NXP 88W8987 Wi-Fi/Bluetooth moduleSupported mother board:
 - Rev. C mother board
- i.MX 8M Plus (Silicon Revision A1) EVK Board (Board REV A) and Platform
- i.MX 8M Quad WEVK/EVK Rev. A Board and Platform
- i.MX 8ULP (A2) EVK Board and Platform, i.MX 8ULP (A2) EVK 9x9 Board and Platform.

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

3 Release Package Contents

The android-14.0.0_1.0.0 release package includes the following software and documents.

Table 2. Release package contents

| | |
|--|--|
| i.MX Android proprietary source code package | <ul style="list-style-type: none">• <code>imx-android-14.0.0_1.0.0.tar.gz</code>: i.MX Android proprietary source code package to enable Android on i.MX boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration. |
| Documents | <p>The following documents are included in <code>android-14.0.0_1.0.0_docs.zip</code>:</p> <ul style="list-style-type: none">• <i>Android Quick Start Guide</i> (AQSG): A document that explains how to run the Android platform on an i.MX board using prebuilt images.• <i>Android User's Guide</i> (AUG): A document describing procedures for configuring and building this release package.• <i>Android Release Notes</i> (ARN): A document that introduces key updates and known issues in this release.• <i>i.MX Android Extended Codec Release Notes</i> (IMXACRN): A document that provides the extended codec information.• <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.• <i>i.MX TensorFlow Lite on Android User's Guide</i> (IMXTFLUG): A document that describes the TensorFlow Lite on Android platform.• <i>i.MX Graphics User's Guide</i> (IMXGRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines. |
| Prebuilt images | <p>You can test the Android platform with a prebuilt image on i.MX reference board before building any code:</p> <ul style="list-style-type: none">• <code>android-14.0.0_1.0.0_image_8mmevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Mini EVK board.• <code>android-14.0.0_1.0.0_image_8mnevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Nano EVK board.• <code>android-14.0.0_1.0.0_image_8mpevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Plus EVK board.• <code>android-14.0.0_1.0.0_image_8mqevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8M Quad WEVK/EVK board.• <code>android-14.0.0_1.0.0_image_8ulpevk.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8ULP EVK board and i.MX 8ULP EVK 9x9 board.• <code>android-14.0.0_1.0.0_image_8qmek.tar.gz</code>: Prebuilt images with NXP extended features for the i.MX 8QuadMax MEK board and i.MX 8QuadXPlus MEK board. <p>All prebuilt images are in a separate package. See the <i>Android Quick Start Guide</i> (AQSG) and <i>Android User's Guide</i> (AUG) to choose the appropriate image.</p> |

4 Features

This section contains features in this package.

Table 3. Features

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|--|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|--|
| Google Android 14 release | Y | Y | Y | Y | Y | Y | Y | Based on android-14.0.0_r17 release |
| Linux 6.1.55 kernel (merge with AOSP kernel) | Y | Y | Y | Y | Y | Y | Y | Based on Linux OS BSP LF6.1.55-2.2.0 release. |
| Generic Kernel Image (6.1.43) | Y | Y | Y | Y | Y | Y | Y | Based on AOSP android14-6.1-2023-11_r1 |
| U-Boot | Y | Y | Y | Y | Y | Y | Y | v2023.04. |
| Trusty OS | Y | Y | Y | Y | Y | Y | Y | - |
| Graphic-HW | Y | Y | Y | Y | Y | Y | Y | VeriSilicon GC7000NanoUltra GPU with the 6.4.11.p2 driver for i.MX 8M Mini EVK. VeriSilicon GC7000UL GPU with 6.4.11.p2 driver for i.MX 8M Nano EVK and i.MX 8M Plus EVK. VeriSilicon GC7000L GPU with 6.4.11.p2 driver for i.MX 8M Quad EVK. VeriSilicon GCNANOULTRA31 GPU with 6.4.11.p2 driver for i.MX 8ULP EVK. VeriSilicon GC7000XSVX GPU with 6.4.11.p2 driver FOR i.MX 8Quad Max. VeriSilicon GC7000L GPU with 6.4.11.p2 driver for i.MX 8 QuadXPlus. |
| Graphic-HW 3D acceleration | Y | Y | Y | Y | Y | Y | Y | OpenGL ES1.1/2.0 through GC7000NanoUltra for i.MX 8M Mini EVK. OpenGL ES1.1/2.0/3.1 through GC7000UL for i.MX 8M Nano EVK and i.MX 8M Plus EVK. OpenGL ES1.1/2.0/3.1 through GC7000L for i.MX 8M Quad EVK. OpenGL ES1.1/2.0/3.1 through GCNANOULTRA31 for i.MX 8ULP EVK. OpenGL ES 1.1/2.0/3.1/3.2 through GC7000XSVX for i.MX 8Quad Max MEK. |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|---|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|---|
| | | | | | | | | OpenGL ES 1.1/2.0/3.1 through GC7000L. |
| Android Neural Network API acceleration | N | Y | Y | Y | Y | Y | Y | Android Neural Network API 1.3 accelerated through GC7000 UL for i.MX 8M Nano EVK. Android Neural Network API 1.3 accelerated through GC7000L for i.MX 8M Quad EVK. Android Neural Network API 1.3 accelerated through NPU for i.MX 8M Plus EVK. Android Neural Network API 1.3 accelerated through GCNANOULTRA31 for i.MX 8ULP EVK Android Neural Network API 1.3 accelerated through GC7000L for i.MX 8Quad XPlus. Android Neural Network API 1.3 accelerated through GC7000XSVX for i.MX 8Quad Max. |
| Graphic-HW accelerated UI surface composition | Y | Y | Y | Y | Y | Y | Y | OpenGL ES2.0 through GC7000NanoUltra for i.MX 8M Mini EVK. OpenGL ES3.1 through GC7000UL for i.MX 8M Nano EVK and i.MX 8M Plus EVK. OpenGL ES3.1 through GC7000L for i.MX 8M Quad EVK. OpenGL ES3.1 through GCNANOULTRA31 for i.MX 8ULP EVK. OpenGL ES 3.2 through GC7000XSVX for i.MX 8Quad Max MEK. OpenGL ES 3.1 through GC7000L for i.MX 8Quad XPlus MEK. |
| SCFW | N | N | N | N | N | Y | Y | Version 1.15.0 |
| SECO firmware | N | N | N | N | N | Y | Y | Version 3.8.5. |
| Boot source | SD/ eMMC | SD/ eMMC | SD/ eMMC | SD/ eMMC | eMMC | SD/ eMMC | SD/ eMMC | - |
| Splash Screen | Y | Y | Y | Y | Y | Y | Y | - |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8Quad XPlus MEK | Remarks |
|--|-----------------------------|-----------------------------|---|---|----------------|--|-----------------------------------|---|
| UI (input) | Y | Y | Y | Y | Y | Y | Y | USB Mouse and Multi-touch on the MIPI panel display. |
| UI (display) | MIPI-DSI-to-HDMI/MIPI panel | MIPI-DSI-to-HDMI/MIPI panel | HDMI/MIPI-to-HDMI/MIPI panel/ LVDS-to-HDMI/ LVDS panel/ dual channel LVDS to HDMI The physical HDMI supports HDMI-CEC | HDMI/MIPI-DSI-to-HDMI/MIPI panel The physical HDMI supports HDMI-CEC | HDMI/MIPI/EPDC | HDMI/MIPI-to-HDMI/MIPI-panel/ LVDS-to-HDMI Display The physical HDMI supports HDMI-CEC | LVDS-to-HDMI/MIPI-to-HDMI Display | i.MX 8M Mini EVK max resolution: <ul style="list-style-type: none"> • MIPI-to-HDMI: 1920x1080 • MIPI Panel: 1080x1920 i.MX 8M Nano EVK max resolution: <ul style="list-style-type: none"> • MIPI-to-HDMI: 1920x1080 • MIPI Panel: 1080x1920 i.MX 8M Plus EVK max resolution: <ul style="list-style-type: none"> • Physical HDMI: 3840x2160 • MIPI-to-HDMI: 1920x1080 • LVDS-to-HDMI: 1280x720 • LVDS panel: 1920x1200 • MIPI panel: 1080x1920 • Dual-channel LVDS to HDMI: 1920x1080 i.MX 8M Quad EVK max resolution: <ul style="list-style-type: none"> • Physical HDMI: 3840x2160 • MIPI-to-HDMI: 1280x720 • MIPI panel: 1080x1920 i.MX 8ULP EVK max resolution: <ul style="list-style-type: none"> • HDMI: 720x480 • MIPI: 720x1280 • EPDC: 1024x758 i.MX 8Quad Max MEK max resolution: <ul style="list-style-type: none"> • physical HDMI: 3840x2160 • LVDS-to-HDMI/MIPI-to-HDMI: 1920x1080 • MIPI panel: 1080x1920 i.MX 8QuadXPlus MEK max resolution: <ul style="list-style-type: none"> • LVDS-to-HDMI/MIPI-to-HDMI: 1920x1080 |
| UI (dual displays, UI mirror displayed on second device) | N | N | Y | Y | N | Y | Y | i.MX 8M Quad EVK and i.MX 8M Plus EVK support MIPI-DSI-to-HDMI and HDMI dual displays. i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK support dual LVDS-to-HDMI displays. |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|--|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|--|
| UI (brightness control) | Y | Y | Y | Y | Y | Y | N | With MIPI panel display for all boards. With LVDS panel display for i.MX 8M Plus EVK. |
| UI-Low Power Display(LPD) | N | N | N | | Y | N | N | Share display with RTD core. |
| Storage - External Media | Y | Y | Y | Y | Y | Y | Y | i.MX 8M Mini EVK and i.MX 8M Nano EVK support U-disk on the USB 2.0 port. i.MX 8M Plus EVK and i.MX 8M Quad EVK support U-disk on the USB Type-A host port. i.MX 8ULP EVK supports U-disk on the USB 0 port and USB 1 port. i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK support U-disk on the USB 2.0 port. |
| Connectivity - Ethernet | N | N | N | N | N | N | N | - |
| Connectivity - Bluetooth wireless technology | Y | Y | Y | Y | Y | Y | Y | Hardware: <ul style="list-style-type: none">• NXP 88W8987 for i.MX 8M Mini EVK LPDDR4 board and i.MX 8M Nano EVK LPDDR4 board• NXP 88W8997 for i.MX 8M Plus EVK.• PCIE9098 (Murata LBEE5 ZZ1XL) for i.MX 8M Quad EVK Rev. A board, i.MX 8Quad Max MEK and i.MX 8 QuadXPlus MEK.• NXP IW416 (v2) for i.MX 8ULP EVK board. Profiles: <ul style="list-style-type: none">• A2DP Source• AVRCP• BLE Host• HSP• HID Host• HID Device• PAN• OPP |
| Connectivity - Wi-Fi | Y | Y | Y | Y | Y | Y | Y | Hardware: <ul style="list-style-type: none">• NXP 88W8987 for i.MX 8M Mini EVK LPDDR4 board |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|------------------------------|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|---|
| | | | | | | | | and i.MX 8M Nano EVK LPDDR4 board. • NXP 88W8997 for i.MX 8M Plus EVK board. • PCIE9098 (Murata LBEE5 ZZ1XL) for i.MX 8MQuad EVK Rev. A board, i.MX 8Quad Max MEK and i.MX 8 QuadXPlus MEK board. • NXP IW416 (v2) for i.MX 8ULP EVK board. Features: • STA mode • AP mode • Wi-Fi Direct • AP/STA Concurrency • MAC randomization |
| Connectivity - USB Tethering | Y | Y | Y | Y | Y | Y | Y | Supports Wi-Fi and Ethernet as upstream. |
| Power - CPU Freq | Y | Y | Y | Y | N | Y | Y | - |
| Power - Bus Freq | Y | Y | Y | Y | N | Y | Y | - |
| ISP | N | N | Y | N | N | N | N | VeriSilicon ISP8000NANO_V1802 with 4.2.2p24 driver/ server for i.MX 8M Plus EVK. |
| Media - Music Play | Y | Y | Y | Y | Y | Y | Y | SSI+WM8524 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, and i.MX 8M Quad EVK. SSI+wm8960 for i.MX 8M Plus EVK. SSI+WM8960 for i.MX 8ULP EVK. WM8960+CS42888+HDMI for i.MX 8Quad Max MEK. WM8960+CS42888 for i.MX 8 QuadXPlus MEK. |
| Media - Sound Record | Y | Y | Y | Y | Y | Y | Y | PDM for i.MX 8M Mini EVK, i.MX 8M Nano EVK. AK5558 for i.MX 8M Quad EVK. SSI+wm8960+PDM for i.MX 8M Plus EVK. SSI+WM8960 for i.MX 8ULP EVK. |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|-------------------------|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|---|
| | | | | | | | | ESAI+CS42888 for i.MX 8Quad Max MEK and i.MX 8 QuadXPlus MEK. |
| Media-Compress Playback | N | N | Y | N | N | Y | Y | Compress MP3 playback via SOF (Sound Open Firmware) |
| Media - Video Play | Y | Y | Y | Y | Y | Y | Y | For i.MX 8M Mini, i.MX 8M plus, i.MX 8M Quad, i.MX 8Quad Max, and i.MX 8 QuadXPlus which have VPU integrated, see the <i>i.MX Android Extended Codec Release Notes</i> (IMXACRN) to find the information about the supported format, resolution, frame rate, and bit rate. For i.MX 8M Nano and i.MX 8ULP, which do not have VPU integrated, the video playback is supported by Google software decoder. |
| Media-HDR Video Play | N | N | N | Y | N | N | N | - |
| Media - Camera | Y | Y | Y | Y | Y | Y | Y | OV5640 CSI MIPI camera for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Quad EVK i.MX 8ULP EVK, i.MX 8Quad Max MEK, and i.MX 8 QuadXPlus MEK. For i.MX 8M Plus EVK: <ul style="list-style-type: none"> • Two Basler cameras (max resolution 1920x1080) • Basler + OV5640 (Basler max resolution 3840x2160 depends on the boot parameter) • Single Basler (max resolution 3840x2160 depends on the boot parameter) • Single OV5640 • Two OS08A20 (max resolution 1920x1080) • Single OS08A20 (max OS08A20 resolution can reach 3840x2160, depending on the boot parameter) |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8Quad XPlus MEK | Remarks |
|---------------------------|------------------|------------------|------------------|------------------|---------------|--------------------|----------------------|--|
| Media HDMI RX | N | N | N | N | N | Y | N | - |
| Media - TVIN | N | N | N | N | N | N | N | - |
| Media - Dual Camera | Y | Y | Y | Y | Y | Y | Y | - |
| Media - Camcorder | Y | Y | Y | Y | Y | Y | Y | - |
| Media - USB Camera | Y | Y | Y | Y | Y | Y | Y | USB camera supports C920, C930, and C270 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Quad EVK, i.MX 8M Plus EVK, i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK USB camera supports C270 for i.MX 8ULP EVK, Can only work with the Camera2 Basic application. |
| Media - USB Mic | Y | Y | Y | Y | Y | Y | Y | - |
| Media - HDMI audio output | N | N | Y | Y | Y | Y | N | - |
| Media-DSD Playback | Y | N | N | Y | N | N | N | DSD playback on Audio Expansion Board. |
| Media-PlayReady DRM | N | N | N | N | N | N | N | - |
| Media-WideVine DRM | Y | N | Y | Y | N | Y | N | Supports WideVine DRM Level 3 for i.MX 8M Mini EVK with GMS package. Widevine CDM version 18.0 and OPK version 18.4. Supports WideVine DRM Level 1 and Level 3 for i.MX 8M Plus EVK, i.MX 8M Quad EVK and i.MX 8Quad Max MEK. Widevine CDM version 18.0 and OPK version 18.4. |
| Media-MCU Playback | Y | N | Y | N | Y | N | N | Audio playback based on: <ul style="list-style-type: none"> FreeRTOS on the Cortex-M4 core for i.MX 8M Mini EVK. FreeRTOS on the Cortex-M7 core for i.MX 8M Nano EVK. FreeRTOS on Cortex-M33 core for i.MX 8ULP EVK. |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|---------------------------|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|---|
| Media-Hi-Res audio output | Y | N | N | Y | N | Y | Y | High-resolution audio output from Audio. Expansion Board for i.MX 8M Mini EVK and i.MX 8M Quad EVK: <ul style="list-style-type: none">• 2-channel: 384000, 768000 sampling rate• 4-channel: 48000, 96000, 192000, 384000, 768000 sampling rate• 6-channel: 48000, 96000, 192000, 384000 sampling rate• 8-channel: 48000, 96000, 192000, 384000, 768000 sampling rate For i.MX 8Quad Max MEK and i.MX 8QuadXPlus MEK: <ul style="list-style-type: none">• 4/6/8-channel: 48000, 96000, 192000 sampling rate |
| Misc - ADB over USB | Y | Y | Y | Y | Y | Y | Y | - |
| Misc - Fastboot utility | Y | Y | Y | Y | Y | Y | Y | - |
| Misc - Factory reset | Y | Y | Y | Y | Y | Y | Y | - |
| Misc-Recovery mode | Y | Y | Y | Y | Y | Y | Y | Supports installing updates and wiping data. |
| Powerkey-Suspend & Resume | Y | Y | Y | Y | Y | Y | Y | - |
| Battery-Charger mode | Y | Y | Y | Y | Y | Y | Y | - |
| Sensor - Magnetometer | N | N | N | N | N | Y | Y | FXOS8700 |
| Sensor - Accelerometer | N | N | N | N | N | Y | Y | FXOS8700 |
| Sensor - Gyroscope | N | N | N | N | N | Y | Y | FXAS2100 |
| Sensor - Light | N | N | N | N | N | Y | Y | ISL29023 |
| Sensor - Pressure | N | N | N | N | N | Y | Y | MPL3115 |
| Sensor - Temperature | N | N | N | N | N | Y | Y | MPL3115 |

Table 3. Features...continued

| Feature | i.MX 8M Mini EVK | i.MX 8M Nano EVK | i.MX 8M Plus EVK | i.MX 8M Quad EVK | i.MX 8ULP EVK | i.MX 8Quad Max MEK | i.MX 8 Quad XPlus MEK | Remarks |
|------------------------|------------------|------------------|------------------|------------------|---------------|--------------------|-----------------------|---|
| Sensor-Pedometer | N | N | N | N | Y | N | N | - |
| File Based Encryption | Y | Y | Y | Y | Y | Y | Y | - |
| USB Accessory | Y | Y | Y | Y | Y | Y | Y | Google AOA v2.0 |
| USB-MTP | Y | Y | Y | Y | Y | Y | Y | - |
| USB-PTP | Y | Y | Y | Y | Y | Y | Y | - |
| USB-MIDI | Y | Y | Y | Y | Y | Y | Y | - |
| Real Time Clock(RTC) | Y | Y | Y | Y | Y | Y | Y | - |
| Ethernet APK | Y | Y | Y | Y | Y | Y | Y | - |
| imx-chip-tool APK | N | Y | N | N | N | N | N | Supports Matter devices control tool <code>imx-chip-tool apk</code> . |
| webGL | Y | Y | Y | Y | Y | Y | Y | - |
| Vulkan | N | Y | Y | Y | Y | Y | Y | - |
| OTA for A/B | Y | Y | Y | Y | Y | Y | Y | Supports OTA with secure boot and encrypted boot. |
| USB Type-C PD | Y | Y | Y | Y | N | Y | Y | Supports power role switch with devices that support USB power delivery. |
| DM Verity | Y | Y | Y | Y | Y | Y | Y | - |
| TEE backed Keymint HAL | Y | Y | Y | Y | Y | Y | Y | This is based on i.MX Trusty OS TEE firmware. |
| TEE backed AVB | Y | Y | Y | Y | Y | Y | Y | This is based on i.MX Trusty OS TEE firmware and secure storage of eMMC chip. In this release, users need to initialize the RPMB part manually. |
| Neural Networks | N | Y | Y | Y | Y | Y | Y | |
| Secure boot | Y | Y | Y | Y | Y | Y | Y | Secure boot based on HABv4 for i.MX 8M Mini EVK, i.MX 8M Nano EVK, i.MX 8M Plus EVK, i.MX 8M Quad EVK. Secure boot based on AHAB for i.MX 8ULP EVK, i.MX 8Quad Max MEK and i.MX 8 QuadXPlus MEK. |
| TEE backed security | Y | Y | Y | Y | Y | Y | Y | This is based on i.MX Trusty OS TEE firmware. |

5 Multimedia Codecs

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

6 Extended Features

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. Extended codec packages are provided on [nxp.com](https://www.nxp.com) with controlled access because they require additional licensing by a third party. Contact your sales representative for access.

For detailed extended and additional features, see the *i.MX Android Extended Codec Release Notes* (IMXACRN).

7 Change Logs

Compared to the android-13.0.0_2.0.0 release, android-14.0.0_1.0.0 release has the following major changes:

- Upgraded the Android code base from android-13.0.0_r69 to android-14.0.0_r17.
- Upgraded the kernel from v6.1.36 to v6.1.55.
- Upgraded the GKI kernel from android14-6.1-2023-07_r6 to android14-6.1-2023-11_r1.
- Updated the keymint to version "3", hardware keystore to version "300".
- Updated Widevine CDM to version 18.0 and updated OPK to version 18.4.
- Dropped support for i.MX 8M Plus EVK REV B4 board with WM8962 codec.
- Enabled HDMI-CEC feature on i.MX 8M Plus EVK, i.MX 8M Quad WEVK and i.MX 8QuadMax MEK.
- Supports DSD playback on i.MX 8M Mini EVK and i.MX 8M Quad WEVK/EVK with Audio Board.
- Supports encrypted boot OTA.
- The NeuralNetworks HAL switched to use AIDL interfaces based on VSI open source TIM-VX.
- The Allocator HAL switched to use AIDL interfaces.
- The Hardware Composer HAL switched to use AIDL interfaces.
- The Thermal HAL switched to use AIDL interfaces.
- The USB HAL and USB Gadget HAL switched to use AIDL interfaces.
- The onboard Camera HAL and external Camera HAL switched to use AIDL interfaces.

8 Known Issues and Limitations

The known issues about the hardware and hardware rework instructions are not included in this document. There may be hardware-related reference materials for some reference boards. Make sure to check the link [i.MX Application Processors](#) to see if it is applicable.

Table 4. 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 hangs when erasing Kingston SD card. | U-Boot hangs when sending the erase command on some Kingston SD cards. |

Table 4. Known issues and limitations...continued

| Issue description | Remarks |
|--|---|
| Manufacturing protection feature is not ready on i.MX 8ULP, so features that require the manufacturing protection public key like secure unlock and secure provisioning would be impacted. | - |
| Three cases in the CTS CtsNetTestCases module failed after swicthging to PCIE9098 (Murata LBEE5ZZ1XL). | On i.MX 8M Quad EVK, i.MX EVK 8Quad Max MEK, and i.MX 8QuadXPlus MEK. |

9 Revision History

Revision history

| Revision number | Release date | Description |
|----------------------|-----------------|--|
| android-14.0.0_1.0.0 | 6 Feburary 2024 | i.MX 8ULP EVK, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-13.0.0_2.2.0 | 24 October 2023 | i.MX 8ULP EVK, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-13.0.0_2.0.0 | 07/2023 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-13.0.0_1.2.0 | 03/2023 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-13.0.0_1.0.0 | 01/2023 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-12.1.0_1.0.0 | 10/2022 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |
| android-12.0.0_2.0.0 | 07/2022 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-12.0.0_1.0.0 | 03/2022 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-11.0.0_2.6.0 | 01/2022 | i.MX 8ULP EVK Beta release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-11.0.0_2.4.0 | 10/2021 | i.MX 8ULP EVK Alpha release, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-11.0.0_2.2.0 | 07/2021 | i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-11.0.0_2.0.0 | 04/2021 | i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus, and i.MX 8M Quad GA release. |
| android-11.0.0_1.0.0 | 12/2020 | i.MX 8M Plus EVK Beta release, and all the other i.MX 8 GA release. |
| android-10.0.0_2.3.0 | 07/2020 | i.MX 8M Plus EVK Beta1 release, and all the other i.MX 8 GA release. |
| android-10.0.0_2.0.0 | 05/2020 | i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release. |

Revision history...continued

| Revision number | Release date | Description |
|----------------------|--------------|---|
| android-10.0.0_2.1.0 | 04/2020 | i.MX 8M Plus Alpha and i.MX 8QuadXPlus Beta release. |
| android-10.0.0_1.0.0 | 03/2020 | Deleted the Android 10 image. |
| android-10.0.0_1.0.0 | 02/2020 | i.MX 8M Mini, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8Quad XPlus GA release. |
| P9.0.0_2.0.0-ga | 08/2019 | Updated the location of the SCFW porting kit. |
| P9.0.0_2.0.0-ga | 04/2019 | i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release. |
| P9.0.0_1.0.0-ga | 01/2019 | i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release. |
| P9.0.0_1.0.0-beta | 11/2018 | Initial release |

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