

Android™ Release Notes

Contents

1 Release Description

i.MX Android™ KK4.4.3_2.0.0-ga is a general availability (GA) release for Android 4.4.3 KitKat (KK) on Freescale's i.MX 6Quad, i.MX 6Dual, i.MX 6DualLite, i.MX 6Solo, i.MX 6SoloLite, and i.MX 6SoloX applications processors.

i.MX Android KK4.4.3_2.0.0-ga release includes all necessary codes, documents and tools to assist users in building and running Android 4.4.3 on the i.MX 6Quad, i.MX 6DualLite, i.MX 6Solo, i.MX 6SoloLite, and i.MX 6SoloX hardware boards from scratch. The pre-built images are also included for a quick trial on Freescale i.MX 6Quad and i.MX 6DualLite SABRE-SD board and platform, i.MX 6Quad and i.MX 6DualLite SABRE-AI board and platform, i.MX 6SoloLite EVK platform, i.MX 6SoloX SABRE-SD board and platforms, and i.MX 6SoloX SABRE-AI board and platforms. This release includes all Freescale porting and enhancements based on 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

- i.MX 6Quad SABRE-SD board and platform

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Release Package Contents

- Full validation test
- i.MX 6DualLite SABRE-SD platform
 - Basic Acceptance Test (BAT) validation test
- i.MX 6Quad SABRE-AI board and platform
 - BAT validation test
- i.MX 6DualLite SABRE-AI board and platform
 - Function validation test
- i.MX 6SoloLite EVK platform
 - BAT validation test
- i.MX 6SoloX SABRE-SD board
 - Full validation test
- i.MX 6SoloX SABRE-AI board and platform
 - Full validation test

3 Release Package Contents

The KK4.4.3_2.0.0-ga release package includes the following software and documents:

| | |
|---------------------------|---|
| Android source code patch | <ul style="list-style-type: none">• android_KK4.4.3_2.0.0-ga_core_source.tar.gz: Freescale i.MX specific patches (apply to Google Android repo) to enable Android on i.MX based boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration, etc. |
| Documents | <p>The following documents are included in android_KK4.4.3_2.0.0-ga_docs.tar.gz</p> <ul style="list-style-type: none">• Android Quick Start Guide: A manual that explains how to run Android on an i.MX board using prebuilt images.• Android User's Guide: A detailed manual for this release package.• Android Frequently Asked Questions: A document that contains Frequently Asked Questions (FAQs).• Android Release Notes: A document that introduces key updates and known issues in this release.• i.MX_6_Graphics_User's_Guide: A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines. |
| Tools | <p>Tools in android_KK4.4.3_2.0.0-ga_tools.tar.gz</p> <ul style="list-style-type: none">• MFGTool: Manufacturing tools for i.MX platform.• tool/tetherxp.inf: USB tethering windows .inf driver configuration file. |
| Prebuilt images | <p>You can test Android with a prebuilt image on i.MX reference board before building any code:</p> <ul style="list-style-type: none">• android_KK4.4.3_2.0.0-ga_core_image_6qsabresd.tar.gz: Prebuilt images with default Android features for the SABRE-SD board.• android_KK4.4.3_2.0.0-ga_core_image_6qsabreauto.tar.gz: Prebuilt images with default Android features for the SABRE-AI board.• android_KK4.4.3_2.0.0-ga_core_image_6slevk.tar.gz: Prebuilt images with default Android features for the 6SoloLite EVK platform. |

- android_KK4.4.3_2.0.0-ga_core_image_6sxsabresd: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-SD board.
- android_KK4.4.3_2.0.0-ga_core_image_6sxsabreauto: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-AI board.
- android_KK4.4.3_2.0.0-ga_full_image_6qsabresd.tar.gz: Prebuilt images with Freescale Extended Multimedia features for the SABRE-SD board. For more information about the Freescale Extended Multimedia Feature Package, please refer to Section 6.
- android_KK4.4.3_2.0.0-ga_full_image_6qsabreauto.tar.gz: Prebuilt images with Freescale Extended Multimedia features for the SABRE-AI board. For more information about the Freescale Extended Multimedia Feature Package, please refer to Section 6.
- android_KK4.4.3_2.0.0-ga_full_image_6slevk.tar.gz: Prebuilt images with Freescale extended features for the i.MX6SoloLite EVK board. The extended features include more multimedia format support.
- android_KK4.4.3_2.0.0-ga_full_image_6sxsabresd.tar.gz: Prebuilt images with Freescale extended features for the i.MX6SoloX SABRE-SD board. The extended features include more multimedia format support.
- android_KK4.4.3_2.0.0-ga_full_image_6sxsabreauto.tar.gz: Prebuilt images with Freescale extended features for the i.MX 6SoloX SABRE-AI board. The extended features include more multimedia format support.

All prebuilt images are in a separate package. See *Android™ Quick Start Guide* and *Android™ User's Guide* to understand which image should be used.

4 Features

This section contains features in this package.

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 6DualLite SABRE-AI | i.MX 6SoloLite EVK | i.MX 6SoloX SABRE- SD | i.MX 6SoloX SABRE- AI | Remarks |
|-----------------------------|--------------------------------------|--------------------------------------|--------------------------|--------------------------------|--------------------------------|--|
| Linux 3.10.53 kernel | Y | Y | Y | Y | Y | Based on Linux® OS BSP L3.10.53 GA release |
| Google Kitkat 4.4.3 release | Y | Y | Y | Y | Y | Based on android-4.4.3_r1 release |
| Boot source | eMMC, External SD | SD, NAND | External SD | External SD | External SD, NAND | Default NAND chip supported is Micron MT29F8G08ABACAWP |
| Splash Screen for LVDS | Y | Y | Y | Y | Y | - |
| UI (input) | Multi-touch on LVDS panel | Multi-touch on LVDS panel | N | Multi-touch on LVDS panel | Multi-touch on LVDS panel | - |
| UI (display) | LVDS panel, HDMI display | LVDS panel, HDMI display | LCD panel | LVDS panel | LVDS panel | - |

Table continues on the next page...

Features

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 6DualLite SABRE-AI | i.MX 6SoloLite EVK | i.MX 6SoloX SABRE- SD | i.MX 6SoloX SABRE- AI | Remarks |
|---|--------------------------------------|--------------------------------------|--------------------------|--------------------------------|--------------------------------|---|
| UI (dual display, LVDS +HDMI, UI mirror displayed on second device) | Y | Y | N | N | N | - |
| UI (brightness control) | Y | Y | Y | Y | Y | - |
| Storage - External Media | Y | Y | Y | Y | Y | SD, External SD, and UDisk |
| Connectivity - Ethernet | Y | Y | Y | Y | Y | - |
| Connectivity - BT | Y | N | N | Y | N | Hardware: <ul style="list-style-type: none"> Silex AR6233X SDIO card Profiles: <ul style="list-style-type: none"> A2DP HID OPP PBAP AVRCP PAN FTP |
| Connectivity - Wi-Fi | Y | Y | Y | Y | Y | Hardware: <ul style="list-style-type: none"> Atheros AR6103 SDIO card Silex AR6233X SDIO card Realtek 8723AS SDIO card Features: <ul style="list-style-type: none"> AP mode Wake on Wireless |
| Connectivity - 3G | Y | N/A | N/A | N/A | N/A | Hardware: <ul style="list-style-type: none"> HUAWEI EM770W modem Infineon Amazon 1 modem ZTE FM210 modem |
| Connectivity - GPS | Y | N/A | N/A | N/A | N/A | Locosys AH-1613 |
| Connectivity - USB Tethering | Y | Y | Y | Y | Y | Supports Wi-Fi or Ethernet as upstream |
| Power - Battery status report | Y | N/A | N/A | N/A | N/A | Known limitations about the accuracy in some use cases |
| Power - CPU Freq | Y | Y | Y | Y | Y | - |

Table continues on the next page...

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 6DualLite SABRE-AI | i.MX 6SoloLite EVK | i.MX 6SoloX SABRE- SD | i.MX 6SoloX SABRE- AI | Remarks |
|------------------------------|--------------------------------------|--------------------------------------|--------------------------|--------------------------------|--------------------------------|--|
| Power - Bus Freq | Y | Y | Y | Y | Y | - |
| Media - Music Play | Y | Y | Y | Y | Y | SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI |
| Media - Sound Record | Y | Y | Y | Y | Y | SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI |
| Media - Video Play | Y | Y | Y | Y | Y | - |
| Media - Camera | Y | Y | Y | Y | Y | Camera panorama is not supported on the i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD boards. |
| Media - TVIN | N/A | Y | N/A | N/A | Y | PAL/NTSC |
| Media - Dual Camera | Y | Y | Y | Y | Y | Hardware for SABRE-SD: <ul style="list-style-type: none"> • Front camera: OV5642/OV5640 CSI camera • Rear camera: OV5640 MIPI camera Hardware for SABRE-AI: <ul style="list-style-type: none"> • Front camera: UVC camera • Rear camera: TV IN Hardware for i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD: <ul style="list-style-type: none"> • Front camera: UVC camera • Rear camera: OV5640 |
| Media - Camcorder | Y | Y | Y | Y | Y | No recorder function for Rear Camera on SABRE-AI. |
| Media - USB Camera | Y | Y | Y | Y | Y | Logitech: <ul style="list-style-type: none"> • C250 • E3500 Camera panorama is not supported on the i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD board. |
| Media - USB Mic | Y | Y | Y | Y | Y | - |
| Media - Movie Studio | Y | Y | N/A | N/A | N/A | - |
| Media - HDMI audio output | Y | Y | N/A | N/A | N/A | - |
| Graphic - HW 3D acceleration | Y | Y | N/A | Y | Y | OpenGL-ES 1.1/2.0/3.0 through GC2000, GC880 3D core, or GC400T |

Table continues on the next page...

Features

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 6DualLite SABRE-AI | i.MX 6SoloLite EVK | i.MX 6SoloX SABRE- SD | i.MX 6SoloX SABRE- AI | Remarks |
|---|--------------------------------------|--------------------------------------|--------------------------|--------------------------------|--------------------------------|---|
| Graphic - HW accelerated UI surface composition | Y | Y | Y | Y | Y | - |
| Misc - ADB over USB | Y | Y | Y | Y | Y | - |
| Misc - Fastboot utility | Y | Y | Y | Y | Y | - |
| Misc - SW update and factory reset | Y | Y | Y | Y | Y | - |
| Sensor - Magnetometer | Y | Y | N | Y | N/A | Freescale MAG3110 |
| Sensor - Accelerometer | Y | Y | N | Y | N/A | Freescale MMA8451Q |
| Sensor - Light | Y | Y | Y | Y | N/A | Intersil ISL29023 |
| NTFS-3G File System | Y | Y | Y | Y | Y | For external Storage |
| NAND | N/A | Y | N | N | Y | Tested NAND chip: - Micron 29F8G08ABACA |
| Wi-Fi Display Source | Y | Y | N/A | N/A | N/A | Hardware: <ul style="list-style-type: none"> • Realtek 8723AS SDIO card • Atheros AR6103 SDIO card • Silex AR6233X SDIO card Only available on android_kk4.4.3_2.0.0-ga_wfdsink_source.tar.gz |
| Data Partition Encryption | Y | Y | Y | Y | Y | Not supported for NAND boot in Sabre-AI |
| USB Accessory | Y | Y | Y | Y | Y | Google AOA v2.0 |
| Infrared transmitter | Y | N | N | N/A | N/A | - |
| Screen Recording | Y | Y | N/A | N/A | N/A | - |
| Ethernet APK | Y | Y | Y | Y | Y | - |
| webGL | Y | Y | N/A | Y | Y | - |
| UIBC in Wi-Fi Display Source | Y | Y | N/A | N/A | N/A | - |

5 Multimedia Codecs

Please refer to the Google Android 4.4 Compatibility Definition Document (CDD), Section 5 for multimedia codecs and features.

6 Freescale Extended Feature Packages

Available for the release are several packages to extend the base Android Multimedia features. For more information and details about any of the below packages, please send inquiry to "L2manager-android@freescale.com".

6.1 Extended multimedia feature package

Freescale offers an enhanced multimedia experience for Android. This package delivers an error resilient, feature rich multimedia solution by extending the existing multimedia features of Android and introduces additional features. Extended and additional features include:

- Local playback
 - Freescale Enhanced Codecs, Demultiplexer, and File Format support
 - MOV, AVI, ASF, FLV, MPEG-PS, MPEG-TS, REAL MEDIA
 - Trick Mode Playback
 - Multiple Audio Track Selection
 - Audio pass through to AV receiver
- Recording
- Streaming playback
 - HTTP
 - RTSP
 - RTP
 - UDP
- Subtitle support

6.2 Microsoft codec support

Licensed package feature support is described in the following table.

| File extension | Demuxers | Video decoders | Audio decoders |
|----------------|----------|--------------------------|------------------------|
| .wma | ASF | | WMA STD, PRO, Lossless |
| .wmv/.asf | ASF | VC-1 SP/MP/AP WMV 7/8 | WMA STD, PRO, Lossless |
| .mkv/.mka | MKV | VC-1 SP/MP/AP | WMA STD, PRO, Lossless |

6.3 Real media support

Licensed package feature support is described in the following table.

| File extension | Demuxers | Video decoders | Audio decoders |
|----------------|----------|----------------|----------------|
| .rmvb | RM | RV 8/9/10 | RA Cook |
| .rm | | | AAC |
| .ra | | | |

6.4 Dolby digital audio

Freescale offers two Dolby Digital Audio solutions which can be integrated into the Extended Multimedia Package.

- Dolby Digital (AC-3) with support for Audio Pass-through
- Dolby Digital Plus

6.5 Wi-Fi Display Sink feature package

Freescale extends Android by offering a Wi-Fi Display Sink feature. The Wi-Fi hardware module used for this feature is the Atheros AR6203 and Realtek 8723AS SDIO Card, but the design of this feature allows porting to any Wi-Fi hardware module. Using the Freescale Wi-Fi Display Sink API and the demonstration application, users can easily develop their own Sink Application. This feature has been verified using several of the most popular Android phones and tablets.

7 Change List

Compared to the KK4.4.3_2.0.0-beta release, this release has the following major changes:

- Upgraded the Linux OS kernel from L3.10.31 Beta release to L3.10.53 GA release.
- Upgraded the GPU version to 5.0.11p4 from 5.0.11p1.
- Enabled the Android native fence feature.
- Added i.MX 6SoloX SABRE-AI board and platform support.
- Added USB headset support.
- Passed the Android CTS 4.4_r3.
- Fixed the issue that ADB does not work in recovery mode.
- Fixed the issue that MTP/PTP cannot be identified by PC after hotplugged.
- Fixed the issue that the Bluetooth does not worked on the i.MX 6SoloX SABRE-SD board.
- Fixed the issue that the system may hang when the CPU frequency changes with GPU power auto gating for i.MX 6Quad/DualLite.

8 Known Issues and Limitations

Read through all hardware related reference material and ensure the necessary hardware modifications have been made before using the software.

| Issue description | Remarks |
|---|--|
| Huawei EM770W 3G modem with China Mobile SIM card consumes too much power, which will flash the LVDS screen. | - |
| Battery level info is incorrect when charged in MX6DQ/ MX6DL SABRE-SD board and platform. 100% | To resolve this issue, add a fuel gauge in hardware. |
| UI is Landscape while camera preview is portrait on the SABRE-SD platform. | SABRE-SD platform issue. See " <i>i.MX Android Camera Issue on the SDP Board</i> " for more details. |
| PCIe does not support Hot Plug and Power Management. | PCIe Intel Wi-Fi source code has been integrated into this release. However, PCIe is not enabled by default because the power management is not supported. See community.freescale.com/docs/DOC-94045 about the instructions to enable PCIe Wi-Fi. |
| L/R channel is swapped in SABRE-AI board. | It is hardware issue. Please connect red line to white port, white line to red port. |
| 3G modem cannot work if the BT in bootargs of the bootloader is enabled. | The I/O pin KEY_COL4 is either used by UART5 as UART RTS pin or by 3G modem as DISABLE pin. |
| Google USB driver must be installed multiple times for the MTP, PTP, MTP&ADB, PTP&ADB, and ADB function settings. | Some Windows® XP OS environments may display MTP and PTP Windows OS even though PTP only is enabled in the device. |
| When Accessibility -> Magnification is enabled, several blue lines appear if sliding from bottom when playing a video. | Known issue, it is related with DPI, and should be Android SystemUI or Gallery3D layout issue. There will be no such issue if set DPI to 128 in <code>init.freescale.rc</code> , but we set DPI to 160 by default for some reasons in the release. |
| There will be silence in the first few seconds for HDMI output when connecting the board to a TV set. | This issue is related with the TV set. Some TV sets have no issues while some TV sets have issues. |
| BT cannot work coexisting with Wi-Fi by using the AR6233X combo module from Silex. | <p>This issue may be caused by:</p> <ul style="list-style-type: none"> • The firmware needs to enable corresponding configurations to support the concurrent feature. • A wireless tool, <code>btfilter</code>, is needed to handle operating parameters to the Atheros WLAN driver when the co-located bluetooth radio enters or exits specific operating states. This mechanism provides most information to the WLAN device to optimize the WLAN performance and bluetooth protection policies or mechanisms. This tool is intended for system designs where the WLAN and BT radios utilize hardware coexistence signaling between the devices. We only have the old version for this tool that is based on <code>bluez</code> and old Wi-Fi driver. You need to contact the Wi-Fi vendor to supply the new version tool to support it. |
| The system is down, if the i.MX 6SoloLite EVK is kept rebooting when adjusting the CPU frequency. | Still under debugging. |
| A certain CTS case may fail randomly during the whole CTS test for i.MX 6DualLite SABRE-SD board and i.MX 6DualLite SABRE-AI board. | Still under debugging. |
| Backlight cannot be adjusted when backlight setting progress bar moves from the middle position to the highest position. | Will be fixed in next release. |
| On the i.MX 6SoloX SABRE-AI board, one white line at the top of the TVIN preview shows whether the input source is PAL. | Still under debugging. |

Table continues on the next page...

Known Issues and Limitations

| Issue description | Remarks |
|--|------------------------|
| On the i.MX 6SoloX SABRE-AI board, the TVIN source cannot adjust to fit the preview of Camera when powering on the DVD player. | Still under debugging. |

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