

Android™ Release Notes

1 Release Description

The i.MX Android™ M6.0.1_1.0.0 release is a GA release for the Android 6.0 Marshmallow (M) platform on i.MX 6Quad, i.MX 6QuadPlus, i.MX 6Dual, i.MX 6SoloLite, and i.MX 6SoloX applications processors.

i.MX Android M6.0.1_1.0.0 release includes all necessary code, documents, and tools to assist users in building and running the Android 6.0 platform on the i.MX 6Quad, i.MX 6QuadPlus, i.MX 6DualLite, i.MX 6Solo, i.MX 6SoloLite, and i.MX 6SoloX hardware boards from scratch. Pre-built images are also included for a quick trial on the following platforms:

- i.MX 6Quad, i.MX 6QuadPlus, and i.MX 6DualLite SABRE-SD board and platform
- i.MX 6Quad, i.MX 6QuadPlus, and i.MX 6DualLite SABRE-AI board and platform
- i.MX 6SoloLite EVK platform
- i.MX 6SoloX SABRE-SD board and platforms
- i.MX 6SoloX SABRE-AI board and platforms

This release includes all 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.

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2 Supported Hardware SoC/Boards

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

- i.MX 6Quad SABRE-SD board and platform
Full test on a full image
- i.MX 6DualLite SABRE-SD platform
Full test on a full image
- i.MX 6Quad SABRE-AI board and platform
Full test on a full image
- i.MX 6QuadPlus SABRE-AI board and platform
Full test on a full image
- i.MX 6QuadPlus SDB platform
Full test on a full image
- i.MX 6DualLite SABRE-AI board and platform
Full test on a full image
- i.MX 6SoloLite EVK platform
Full test on a full image
- i.MX 6SoloX SABRE-SD board
Full test on a full image
- i.MX 6SoloX SABRE-AI board and platform
Full test on a full image

3 Release Package Contents

The M6.0.1_1.0.0 release package includes the following software and documents:

Table 1. Release package contents

Android source code patch	<ul style="list-style-type: none"> • android_M6.0.1_1.0.0_core_source.tar.gz: i.MX-specific patches (apply to Google Android repo) to enable the Android platform on i.MX-based boards. For example, Hardware Abstraction Layer implementation, hardware codec acceleration, etc.
Documents	<p>The following documents are included in android_M6.0.1_1.0.0_docs.tar.gz</p> <ul style="list-style-type: none"> • <i>Android™ Quick Start Guide (AQSUG)</i>: A document that explains how to run the Android platform on an i.MX board using prebuilt images. • <i>Android™ User's Guide (AUG)</i>: A detailed document for this release package. • <i>Android™ Frequently Asked Questions (AFAQ)</i>: A document that contains the answers to the Frequently Asked Questions (FAQs). • <i>Android™ Release Notes (ARN)</i>: A document that introduces key updates and known issues in this release.

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Table 1. Release package contents (continued)

	<ul style="list-style-type: none"> • <i>i.MX Android™ Extended Codec Release Notes</i> (IMX6ACRN) • <i>i.MX 6 Graphics User's Guide</i> (IMX6GRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.
Tools	<p>Tools in android_M6.0.1_1.0.0_tools.tar.gz</p> <ul style="list-style-type: none"> • MFGTool: Manufacturing tools for i.MX platform.
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"> • android_M6.0.1_1.0.0_core_image_6qsabresd.tar.gz: Prebuilt images with default Android features for the SABRE-SD board. • android_M6.0.1_1.0.0_core_image_6qsabreauto.tar.gz: Prebuilt images with default Android features for the SABRE-AI board. • android_M6.0.1_1.0.0_core_image_6slevk.tar.gz: Prebuilt images with default Android features for the 6SoloLite EVK platform. • android_M6.0.1_1.0.0_core_image_6sxsabresd: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-SD board. • android_M6.0.1_1.0.0_core_image_6sxsabreauto: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-AI board. • android_M6.0.1_1.0.0_full_image_6qsabresd.tar.gz: Prebuilt images with Extended Multimedia features for the SABRE-SD board. For more information about the Extended Multimedia Feature Package, see Section 6. • android_M6.0.1_1.0.0_full_image_6qsabreauto.tar.gz: Prebuilt images with Extended Multimedia features for the SABRE-AI board. For more information about the Extended Multimedia Feature Package, see Section 6. • android_M6.0.1_1.0.0_full_image_6slevk.tar.gz: Prebuilt images with extended features for the i.MX 6SoloLite EVK board. The extended features include more multimedia format support. • android_M6.0.1_1.0.0_full_image_6sxsabresd.tar.gz: Prebuilt images with extended features for the i.MX 6SoloX SABRE-SD board. The extended features include more multimedia format support. • android_M6.0.1_1.0.0_full_image_6sxsabreauto.tar.gz: Prebuilt images with extended features for the i.MX 6SoloX SABRE-AI board. The extended features include more multimedia format support. <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 understand which image should be used.</p>

4 Features

This section contains features in this package.

Table 2. Features

Feature	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLi te EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	Remarks
Linux 3.14.52 kernel	Y	Y	Y	Y	Y	Based on Linux® OS BSP L3.14.52 GA release

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Table 2. Features (continued)

Feature	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLi te EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	Remarks
Google Marshmallow 6.0 release	Y	Y	Y	Y	Y	Based on android-6.0.1_r3 release
Boot source	eMMC, External SD	SD, NAND	External SD	External SD	External SD, NAND	Default NAND chip supported is Micron MT29F64G08AFAAA
Splash Screen for LVDS	Y	Y	Y	Y	Y	-
UI (input)	Multitouch on LVDS panel	Multitouch on LVDS panel	N	Multitouch on LVDS panel	Multitouch on LVDS panel	-
UI (display)	LVDS panel, HDMI display	LVDS panel, HDMI display	LCD panel	LVDS panel	LVDS panel	-
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 - Bluetooth® wireless technology	Y	N	N	Y	N	Hardware: <ul style="list-style-type: none"> • Broadcom BCM4339 Profiles: <ul style="list-style-type: none"> • A2DP Source • A2DP Sink • HID • OPP • PBAP • AVRCP • PAN • FTP • BLE Host
Connectivity - Wi- Fi	Y	Y	Y	Y	Y	Hardware: <ul style="list-style-type: none"> • Broadcom BCM4339 Features: <ul style="list-style-type: none"> • AP mode
Connectivity - 3G	Y	N/A	N/A	N/A	N/A	Hardware: <ul style="list-style-type: none"> • HUAWEI EM770W modem

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Table 2. Features (continued)

Feature	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLi te EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	Remarks
Connectivity - GPS	N	N/A	N/A	N/A	N/A	-
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	-
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

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Table 2. Features (continued)

Feature	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLi te EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	Remarks
						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 - 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 OpenGL-ES 1.1/2.0/3.0 through GC3000+, OpenGL-ES 1.1/2.0 through GC2000, GC880, GC400T, GC400T
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	MAG3110 for i.MX 6, FXAS8700 for i.MX 7Dual
Sensor - Accelerometer	Y	Y	N	Y	N/A	MMA8451Q for i.MX 6, FXOS8700 for i.MX 7Dual
Sensor - Gyroscope	N/A	N/A	N/A	N/A	N/A	FXAS2100
Sensor - Light	Y	Y	N/A	Y	N/A	Intersil ISL29023
Sensor - Pressure	N/A	N/A	N/A	N/A	N/A	MPL3115
Sensor - Temperature	N/A	N/A	N/A	N/A	N/A	MPL3115
NTFS-3G File System	Y	Y	Y	Y	Y	For external Storage
NAND	N/A	Y	N	N	Y	Tested NAND chip: Micron MT29F64G08AFAAA
Wi-Fi Display Source	Y	Y	N/A	N/A	N/A	Hardware: <ul style="list-style-type: none"> Realtek 8821AS SDIO card
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

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Table 2. Features (continued)

Feature	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-SD	i.MX 6Quad/ 6QuadPlus/ 6DualLite SABRE-AI	i.MX 6SoloLi te EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	Remarks
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

For multimedia codecs and features, see Section 5 in the [Google Android Marshmallow 6.0 Compatibility Definition Document \(CDD\)](#).

6 Extended Feature Packages

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

6.1 Extended multimedia feature package

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

- Local playback
 - Enhanced Codecs, Demultiplexer, and File Format support
 - MOV, AVI, ASF, FLV, MPEG-PS, MPEG-TS, RealMedia, and APE
 - 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.

Table 3. Microsoft codec support

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 RealMedia support

Licensed package feature support is described in the following table.

Table 4. RealMedia support

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

6.4 Dolby digital audio

We offer 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

The Android platform is extended with a Wi-Fi Display Sink feature. The Wi-Fi hardware module used for this feature is the Broadcom BCM4339 SDIO Card (Murata TypeZP Ver2.0 SDIO module), but the design of this feature allows porting to any Wi-Fi hardware module. Using the 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 Log

Compared to the L5.1.1_2.1.0-ga release, this release has the following major changes:

- Upgraded the Android Code base from the android-5.1.1_r1 release to the android-6.0.1_r3 release.
- Updated Broadcom BCM4339 Wi-Fi and BT firmware to improve the P2P connection stability.
- Supported arm-linux-androideabi-4.9 compiler to compile U-Boot and kernel code.

- Upgraded the GPU driver from 5.0.11p7 to 5.0.11p8.
- Passed new added deqp.egl and deqp.gles2 CTS on all platforms.

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.

Table 5. Known issues and limitations

Issue description	Remarks
Battery level info is incorrect when charged in i.MX 6DualQuad/6DualLite SABRE-SD board and platform.	To resolve this issue, add a fuel gauge in hardware.
UI is in Landscape mode while camera preview is in Portrait mode 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 How to Enable PCIe Wi-Fi into i.MX 6 Android Release? about the instructions to enable PCIe Wi-Fi.
L/R channel is swapped in SABRE-AI board.	It is a hardware issue. Connect the 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 the UART5 as UART RTS pin or by the 3G modem as a DISABLE pin.
Google USB driver for Windows® OS 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.
There is silence in the first a few seconds for HDMI output when connecting the SABRE-AI or SABRE-SD board to a TV set.	This issue is related to the TV set. Some TV sets have no issues while some TV sets have issues.
The system may be down if running monkey for overnight on the SABRE-AI board.	This issue is still under investigation.
Video is frozen and audio continues playing if switching from full-screen playback to normal webpage window in Youtube.	This issue is still under investigation.
Wi-Fi Display Source on the i.MX SABRE-SD board sends the invitation to Wi-Fi Display Sink every time after rebooting or power cycle though the connection is established previously.	This issue is still under investigation.
CTS android.media.cts.EncodeVirtualDisplayWithCompositionTest#testVirtualDisplayRecycle s may fail on the i.MX 6QuadPlus SABRE-SD board.	This issue is still under investigation.
CTS android.hardware.camera2.cts.StillCaptureTest#testStillPreviewCombination and android.hardware.camera2.cts.CameraDeviceTest#testInvalidCapture may fail on the i.MX 6Quad SABRE-SD board.	It is an OV5640 sensor hardware issue.

9 Revision History

Table 6. Revision history

Revision number	Date	Substantive changes
M6.0.1_1.0.0	04/2016	Initial release

How to Reach Us:

Home Page:

nxp.com

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nxp.com/support

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