Android™ Release Notes

Contents

1   Release Description

The i.MX Android™ M6.0.1_2.1.0 release is a general availability (GA) release for the Android 6.0 Marshmallow (M) platform on i.MX 6Quad, i.MX 6QuadPlus, i.MX 6Dual, i.MX 6SoloLite, i.MX 6SoloX, and i.MX 7Dual applications processors.

i.MX Android M6.0.1_2.1.0 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, i.MX 6SoloX, and i.MX 7Dual hardware boards. 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
- i.MX 7Dual SABRE-SD 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 6Quad SABRE-SD board and platform
- i.MX 6DualLite SABRE-SD platform
- i.MX 6Quad SABRE-AI board and platform
- i.MX 6QuadPlus SABRE-AI board and platform
- i.MX 6QuadPlus SDB platform
- i.MX 6DualLite SABRE-AI board and platform
- i.MX 6SoloLite EVK platform
- i.MX 6SoloX SABRE-SD board
- i.MX 6SoloX SABRE-AI board and platform
- i.MX 7Dual SABRE-SD board and platform

3   Release Package Contents

The M6.0.1_2.1.0 release package includes the following software and documents:

Table 1.   Release package contents

Android source code patch	• android_M6.0.1_2.1.0_source.tar.gz: i.MX-specific patches (apply to Google Android repository) to enable the Android platform on i.MX-based boards. For example, Hardware Abstraction Layer implementation and hardware codec acceleration.
Documents	The following documents are included in android_M6.0.1_2.1.0_docs.tar.gz • *Android™ Quick Start Guide* (AQSUG): A document that explains how to run the Android platform on an i.MX board using prebuilt images. • *Android™ User's Guide* (AUG): A detailed document for this release package. • *Android™ Frequently Asked Questions* (AFAQ): A document that contains the answers to the Frequently Asked Questions (FAQs). • *Android™ Release Notes* (ARN): A document that introduces key updates and known issues in this release. • *i.MX Android™ Extended Codec Release Notes* (IMX6ACRN) • *i.MX Android Extended Wi-Fi Display Sink Release Notes* (AEWDSRN): A document that describes the Wi-Fi Display Sink. • *i.MX Android Extended Wi-Fi Display Sink API Introduction* (WFDSINKAPI): A document that describes the APIs of the Wi-Fi Display Sink. • *i.MX 6 Graphics User's Guide* (IMX6GRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines.
Tools	Tools in android_M6.0.1_2.1.0_tools.tar.gz • MFGTool: Manufacturing tools for i.MX platform. • VivanteVTK-v5.0.11.p8.1.6.7.1.tgz: GPU tools for Vivante GPU 5.0.11p8 driver. For for information about these tools, see *i.MX 6 Graphics User's Guide* (IMX6GRAPHICUG).

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Table 1.   Release package contents (continued)

Prebuilt images	You can test the Android platform with a prebuilt image on i.MX reference board before building any code: • android_M6.0.1_2.1.0_image_6dqpsabresd.tar.gz: Prebuilt images with default Android features for the SABRE-SD board. • android_M6.0.1_2.1.0_image_6dqpsabreauto.tar.gz: Prebuilt images with default Android features for the SABRE-AI board. • android_M6.0.1_2.1.0_image_6slevk.tar.gz: Prebuilt images with default Android features for the 6SoloLite EVK platform. • android_M6.0.1_2.1.0_image_6sxsabresd: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-SD board. • android_M6.0.1_2.1.0_image_6sxsabreauto: Prebuilt images with default Android features for the i.MX 6SoloX SABRE-AI board. • android_M6.0.1_2.1.0_image_7dsabresd: Prebuilt images with default Android features for the i.MX 7Dual board. All prebuilt images are in a separate package. See the *Android™ Quick Start Guide* (AQSUG) and *Android™ User's Guide* (AUG) to choose the appropriate image.

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 6SoloLite EVK	i.MX 6SoloX SABRE-SD	i.MX 6SoloX SABRE-AI	i.MX 7Dual SABRE-SD	Remarks
Linux 4.1.15 kernel	Y	Y	Y	Y	Y	Y	Based on Linux® OS BSP L5.1.15_1.2.0-ga release
Google Marshmallow 6.0 release	Y	Y	Y	Y	Y	Y	Based on android-6.0.1_r22 release
Boot source	eMMC, External SD	SD, NAND	External SD	External SD	External SD, NAND	External SD	Default NAND chip supported is Micron MT29F64G08AFAAA
Splash Screen for LVDS	Y	Y	Y	Y	Y	Y	-
UI (input)	Multitouch on LVDS panel	Multitouch on LVDS panel	N	Multitouch on LVDS panel	Multitouch on LVDS panel	Single-touch on LCD panel	-
UI (display)	LVDS panel, HDMI display	LVDS panel, HDMI display	LCD panel	LVDS panel	LVDS panel	LCD panel, HDMI display, E-Ink Display	-

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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 6SoloL ite EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABR E-SD	Remarks
UI (dual display, LVDS+HDMI, UI mirror displayed on second device)	Y	Y	N	N	N	N	-
UI (brightness control)	Y	Y	Y	Y	Y	Y	-
Storage - External Media	Y	Y	Y	Y	Y	Y	SD, External SD, and UDisk
Connectivity - Ethernet	Y	Y	Y	Y	Y	Y	-
Connectivity - Bluetooth® wireless technology	Y	N	N	Y	N	Y	Hardware: • Broadcom BCM4339 Profiles: • A2DP Source • A2DP Sink • HID • OPP • PBAP • AVRCP • PAN • FTP • BLE Host
Connectivity - Wi-Fi	Y	Y	Y	Y	Y	Y	Hardware: • Broadcom BCM4339 Features: • AP mode
Connectivity - 3G	Y	N/A	N/A	N/A	N/A	N/A	Hardware: • HUAWEI EM770W modem
Connectivity - GPS	N	N/A	N/A	N/A	N/A	N/A	-
Connectivity - USB Tethering	Y	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	N/A	Known limitations about the accuracy in some use cases
Power - CPU Freq	Y	Y	Y	Y	Y	Y	-
Power - Bus Freq	Y	Y	Y	Y	Y	Y	-
Media - Music Play	Y	Y	Y	Y	Y	Y	SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI

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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 6SoloL ite EVK	i.MX 6SoloX SABRE- SD	i.MX 6SoloX SABRE- AI	i.MX 7Dual SABR E-SD	Remarks
Media - Sound Record	Y	Y	Y	Y	Y	Y	SSI WM8962 for SABRE-SD, ESAI CS42888 for SABRE-AI
Media - Video Play	Y	Y	Y	Y	Y	Y	-
Media - Camera	Y	Y	Y	Y	Y	N	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	N/A	PAL/NTSC
Media - Dual Camera	Y	Y	Y	Y	Y	N	Hardware for SABRE-SD: • Front camera: OV5642/ OV5640 CSI camera • Rear camera: OV5640 MIPI camera Hardware for SABRE-AI: • Front camera: UVC camera • Rear camera: TV IN Hardware for i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD: • Front camera: UVC camera • Rear camera: OV5640
Media - Camcorder	Y	Y	Y	Y	Y	N	No recorder function for Rear Camera on SABRE-AI.
Media - USB Camera	Y	Y	Y	Y	Y	Y	Logitech: • 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	Y	-
Media - HDMI audio output	Y	Y	N/A	N/A	N/A	Y	-
Graphic - HW 3D acceleration	Y	Y	N/A	Y	Y	N/A	OpenGL-ES 1.1/2.0/3.0 through GC2000, GC880 3D core, or OpenGL-ES 1.1/2.0/3.0 through GC3000+,

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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 6SoloL ite EVK	i.MX 6SoloX SABRE-SD	i.MX 6SoloX SABRE-AI	i.MX 7Dual SABR E-SD	Remarks
							OpenGL-ES 1.1/2.0 through GC2000, GC880, GC400T, GC400T
Graphic - HW accelerated UI surface composition	Y	Y	Y	Y	Y	N/A	-
Misc - ADB over USB	Y	Y	Y	Y	Y	Y	-
Misc - Fastboot utility	Y	Y	Y	Y	Y	Y	-
Misc - SW update and factory reset	Y	Y	Y	Y	Y	Y	-
Sensor - Magnetometer	Y	Y	N	Y	N/A	Y	MAG3110 for i.MX 6, FXAS8700 for i.MX 7Dual
Sensor - Accelerometer	Y	Y	N	Y	N/A	Y	MMA8451Q for i.MX 6, FXOS8700 for i.MX 7Dual
Sensor - Gyroscope	N/A	N/A	N/A	N/A	N/A	Y	FXAS2100
Sensor - Light	Y	Y	N/A	Y	N/A	N	Intersil ISL29023
Sensor - Pressure	N/A	N/A	N/A	N/A	N/A	N	MPL3115
Sensor - Temperature	N/A	N/A	N/A	N/A	N/A	N	MPL3115
NTFS-3G File System	Y	Y	Y	Y	Y	Y	For external storage
NAND	N/A	Y	N	N	Y	N/A	Tested NAND chip: Micron MT29F64G08AFAAA
Wi-Fi Display Source	Y	Y	N/A	N/A	N/A	N/A	Hardware: • Realtek 8821AS SDIO card
Data Partition Encryption	Y	Y	Y	Y	Y	Y	Not supported for NAND boot in Sabre-AI
USB Accessory	Y	Y	Y	Y	Y	Y	Google AOA v2.0
Screen Recording	Y	Y	N/A	N/A	N/A	N/A	-
Ethernet APK	Y	Y	Y	Y	Y	Y	-
webGL	Y	Y	N/A	Y	Y	Y	-
UIBC in Wi-Fi Display Source	Y	Y	N/A	N/A	N/A	N/A	-

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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

The release extends the default AOSP Android version with the following features. For more information about the features below, contact "L2manager-android@freescale.com".

6.1 Extended multimedia feature package

An enhanced multimedia experience is available 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, and RealMedia
        - WMA, ADTS, APE, Real Audio, AC3, DD+
        - WMV, VC1, Real Video, MJPEG
- Streaming playback
    - HTTP
    - RTSP
    - RTP
    - UDP

For more information, see *i.MX Android Extended Codec Release Notes* (IMX6ACRN).

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

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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 .ra	RM	RV 8/9/10	RA Cook AAC

6.4   Dolby digital audio

Two Dolby Digital Audio solutions which can be integrated into the Extended Multimedia Package are available.

- 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 a custom Sink Application. This feature has been verified using several of the most popular Android phones and tablets.

7   Change Log

Compared to the M6.0.1_1.0.0 release, this release has the following major changes:

- Upgraded the U-Boot and Linux Kernel Code base from the L4.1.15_1.0.0 release to the L4.1.15_1.2.0 release.
- Added support for the i.MX 7Dual SABRE-SD board.

8   Known Issues and Limitations

Read 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 information is incorrect when charged in i.MX 6DualQuad/6DualLite SABRE-SD board and platform.	To resolve this issue, add a fuel gauge in hardware.

Table continues on the next page...

Table 5. Known issues and limitations (continued)

Issue description	Remarks
UI is in Landscape mode while camera preview is in Portrait mode on the SABRE-SD platform.	SABRE-SD platform issue. See "*i.MX Android Camera Issues on the SDP Board*" (ACOI) for more details.
PCIe does not support Hot Plug and Power Management.	PCIe Intel Wi-Fi source code is 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? to enable PCIe Wi-Fi.
L/R channel is swapped in the SABRE-AI board.	This is a hardware issue. Connect the red line to the white port and a white line to the red port.
3G modem does not work if the BT in bootargs of the bootloader is enabled.	The I/O pin KEY_COL4 is either used by the UART5 as a UART RTS pin or used 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.
HDMI output is silent for a few seconds 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.
A Cactus player stops when chosen to play at Gallery if the Cactus permission is not enabled.	This issue is still under investigation.
The recorded video playback is not smooth when taking pictures during 1080 p/720 p recording.	This issue is still under investigation.

9 Revision History

Table 6. Revision history

Revision number	Date	Substantive changes
M6.0.1_2.1.0	07/2016	Initial release

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