# Android™ Release Notes

# 1  Release Description

The i.MX Android™ N7.1.2_2.0.0 release is a general availability (GA) release for the Android 7.1 Nougat (N) platform on the i.MX 6Quad, i.MX 6QuadPlus, i.MX 6Dual, i.MX 6SoloLite, i.MX 6SoloX, and i.MX 7Dual applications processors.

i.MX Android N7.1.2_2.0.0 release includes all necessary code, documents, and tools to assist users in building and running the Android 7.1 platform on the i.MX 6Quad, i.MX 6QuadPlus, i.MX 6Dual, i.MX 6DualLite, i.MX 6Solo, i.MX 6SoloLite, i.MX 6SoloX, and i.MX 7Dual hardware board from the scratch. Pre-built images are also included for a quick trial on the following platforms:
- i.MX 6Quad, i.MX 6QualPlus, and i.MX 6DualLite SABRE-SD Board and Platform
- i.MX 6Quad, i.MX 6QuadPlus, and i.MX 6DualLite SABRE-AI Board and Platforms
- i.MX 6SoloLite EVK Board and Platforms
- i.MX 6SoloX SABRE-SD Board and Platforms
- i.MX 6SoloX SABRE-AI Board and Platform
- i.MX 7Dual SABRE-SD 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 of some proprietary modules/libraries from third parties.

## Contents

# 2 Supported Hardware SoC/Boards

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

- i.MX 6QuadPlus SABRE-SD Board and Platform
- i.MX 6QuadPlus SABRE-AI Board and Platform
- i.MX 6Quad SABRE-SD Board and Platform
- i.MX 6Quad SABRE-AI Board and Platform
- i.MX 6DualLite SABRE-SD Board and Platform
- i.MX 6DualLite SABRE-AI Board and Platform
- i.MX 6SoloX SABRE-SD Board and Platform
- i.MX 6SoloX SABRE-AI Board and Platform
- i.MX 6SoloLite EVK Board and Platform
- i.MX 7Dual SABRE-SD Board and Platform

# 3 Release Package Contents

The N7.1.2_2.0.0 release package includes the following software and documents.

**Table 1. Release package contents**

| | |
|---|---|
| Android source code patches | • android_N7.1.2_2.0.0_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_N7.1.2_2.0.0_docs.tar.gz<br><br>• *Android™ Quick Start Guide* (AQSUG): A document that explains how to run the Android platform on an i.MX board using prebuilt images.<br>• *Android™ User's Guide* (AUG): A document describing procedures for configuring and building this release package.<br>• *Android™ Release Notes* (ARN): A document that introduces key updates and known issues in this release.<br>• *i.MX Android™ Extended Codec Release Notes* (IMX6ACRN): A document that provides the extended codec information.<br>• *Android™ Frequently Asked Questions* (AFAQ): A document that contains the answers to the Frequently Asked Questions (FAQs).<br>• *i.MX Android Extended Wi-Fi Display Sink Release Notes* (AEWDSRN): A document that describes the Wi-Fi Display Sink.<br>• *i.MX Android™ Wi-Fi Display Sink API User's Guide)* (WFDSINKAPIUG: A document that describes the APIs of the Wi-Fi Display Sink.<br>• *i.MX Android™ Camera Issues on the SDP Platform* (ACOI): A document that describes the camera issues on the SDP platform.<br>• *Android™ HDCP2.x User's Guide* (AHDCP2XUG): A document that explains the steps to enable the HDCP2.X function based on the Android™ Extended Wi-Fi Display Sink Release package.<br>• *i.MX Graphics User's Guide* (IMXGRAPHICUG): A document that describes GPU 2D API, Tools, Memory, and Application programming guidelines. |
| Tools | Tools in android_N7.1.2_2.0.0_tools.tar.gz<br><br>• MFGTool: Manufacturing tools for i.MX platform.<br>• VivanteVTK-v6.2.2.1.7.0.tgz: GPU tools for VeriSilicon GPU 6.2.2.p1 driver. For more information about these tools, see *i.MX Graphics User's Guide* (IMXGRAPHICUG). |

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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_N7.1.2_2.0.0_image_6dqpsabresd.tar.gz: Prebuilt images with NXP extended features for the SABRE-SD board. The extended features include more multimedia format support and Wi-Fi display Sink.<br>• android_N7.1.2_2.0.0_image_6dqpsabreauto.tar.gz: Prebuilt images with NXP extended features for the SABRE-AI board. The extended features include more multimedia format support and Wi-Fi display Sink.<br>• android_N7.1.2_2.0.0_image_6slevk.tar.gz: Prebuilt images with NXP extended features for the i.MX 6SoloLite EVK board. The extended features include more multimedia format support.<br>• android_N7.1.2_2.0.0_image_6sxsabresd.tar.gz: Prebuilt images with NXP extended features for the i.MX 6SoloX SABRE-SD board. The extended features include more multimedia format support.<br>• android_N7.1.2_2.0.0_image_6sxsabreauto.tar.gz: Prebuilt images with NXP extended features for the i.MX 6SoloX SABRE-AI board. The extended features include more multimedia format support.<br>• android_N7.1.2_2.0.0_image_7dsabresd.tar.gz: Prebuilt images with NXP extended features for the i.MX 7Dual SABRE-SD board. The extended features include more multimedia format support.<br><br>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. HDIMI display is not supported.

**Table 2.  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 | i.MX 7Dual SABRE-SD | Remarks |
|---|---|---|---|---|---|---|---|
| Linux 4.9.17 kernel | Y | Y | Y | Y | Y | Y | Based on Linux® OS BSP L4.9.11 GA release |
| Google Nougat 7.1 release | Y | Y | Y | Y | Y | Y | Based on android-7.1.2_r9 |
| Boot source | eMMC, External SD | External 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, | - |

*Table continues on the next page...*

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## Table 2.  Features (continued)

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 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 |
|---|---|---|---|---|---|---|---|
| | | | | | | HDMI display, E-Ink Display | |
| 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 on i.MX 6<br><br>Only support U-disk for i.MX 6SoloLite, i.MX 6SoloX SABRE-SD, and i.MX 7Dual SABRE-SD |
| Connectivity - Ethernet | Y | Y | Y | Y | Y | Y | - |
| Connectivity - Bluetooth® wireless technology | Y | N | N | Y | N | Y | Hardware:<br><br>• Broadcom BCM4339<br><br>Profiles:<br><br>• A2DP Source<br>• A2DP Sink<br>• HID<br>• OPP<br>• PBAP<br>• AVRCP<br>• PAN<br>• FTP<br>• BLE Host |
| Connectivity - Wi-Fi | Y | N | Y | Y | N | Y | Hardware:<br><br>• Broadcom BCM4339<br><br>Features:<br><br>• AP mode |
| Connectivity - USB Tethering | Y | Y | Y | Y | Y | Y | Supports Wi-Fi or Ethernet as upstream |
| 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,<br><br>ESAI CS42888 for SABRE-AI |

*Table continues on the next page...*

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## Table 2.   Features (continued)

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 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 | N | Y | N | Hardware for SABRE-SD:<br><br>• Front camera: OV5642/ OV5640 CSI camera<br>• Rear camera: OV5640 MIPI camera<br><br>Hardware for SABRE-AI:<br><br>• Front camera: UVC camera<br>• Rear camera: TV IN<br><br>Hardware for i.MX 6SoloLite EVK and i.MX 6SoloX SABRE-SD:<br><br>• Front camera: UVC camera<br>• 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:<br><br>• C920<br>• C525<br>• C270<br><br>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 | 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+, |

*Table continues on the next page...*

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## Table 2.  Features (continued)

| Feature | i.MX 6Quad/ 6DualLite SABRE-SD | i.MX 6Quad/ 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: <ul><li>Realtek 8821AS SDIO card</li></ul> |
| 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 | N/A | - |
| 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 Android 7.1 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, Opus, AC3, DD+
- Streaming playback
    - More formats supported in HTTP
    - 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<br><br>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 | RV 8/9/10 | RA Cook |
| .rm | | | AAC |
| .ra | | | |

## 6.4 Dolby digital audio

NXP provides 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 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 N7.1.1_1.0.0 release, this release has the following major changes:

- Upgraded the Android code base from android-7.1.1_r13 to android-7.1.2_r9.
- Upgraded U-Boot from v2015.04 to v2017.03.
- Upgraded the kernel from v4.1.15 to v4.9.17.
- Upgraded the GPU driver from 6.2.0.p2 to 6.2.2.p1.
- Upgraded the Wi-Fi BCMDHD release version to 1.141.100.6.
- Refine the Gralloc and HWC HAL.
- Enable the GPT partition to replace the MBR partition.

# 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 5.  Known issues and limitations

| Issue description | Remarks |
|---|---|
| Huawei® EM770W 3G modem with the China Mobile SIM card consumes too much power, which flashes the LVDS screen. | - |
| The battery level inforimation is incorrect when charged in the i.MX 6DualQuad/ i.MX 6DualLite SABRE-SD board. | To resolve this issue, add a fuel gauge in hardware. |
| UI is Landscape while camera preview is portrait on the SABRE-SDP board. | It is a SABRE-SDP board issue. For details, see the *i.MX Android Camera issue on SDP board* (ACOI). |
| 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 power management is not supported. For the instructions to enable PCIe Wi-Fi, see How to Enable PCIe WiFi into i.MX6 Android Release? |
| The L/R channel is swapped in the SABRE-AI board. | It is a hardware issue. Connect the red line to white port, white line to red port. |
| The 3G modem cannot work if Bluetooth is enabled in bootargs of bootloader. | The IO pin KEY_COL4 is either used by UART5 as UART RTS pin or by 3G modem as DISABLE pin. |
| The Google USB driver must be installed multiple times for the MTP, PTP, MTP&ADB, PTP&ADB, and ADB function settings. | Some Windows XP environment may display MTP and PTP windows even with only PTP enabled in the device. |
| There is silence in the first few seconds for HDMI output when connecting the board to some kinds of TV-sets. | This issue is related with TV-sets. Some TV-sets have no issue. Some TV-sets have issue. |
| There is an external storage in setting on the i.MX 6 DualQuad SABRE-SD board. | The stem will take the boot SD storage as the external adopt storage. EMMC and SD card use the same fstab.freescale. Users can delete the external storage in fstab.freescale when choosing the SD card as boot storage. |

# 9  Revision History

## Table 6.  Revision history

| Revision number | Date | Substantive changes |
|---|---|---|
| N7.1.2_2.0.0 | 10/2017 | Initial release |

**Android™ Release Notes, Rev. N7.1.2_2.0.0, 10/2017**

Document Number:  ARN
Rev. N7.1.2_2.0.0
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