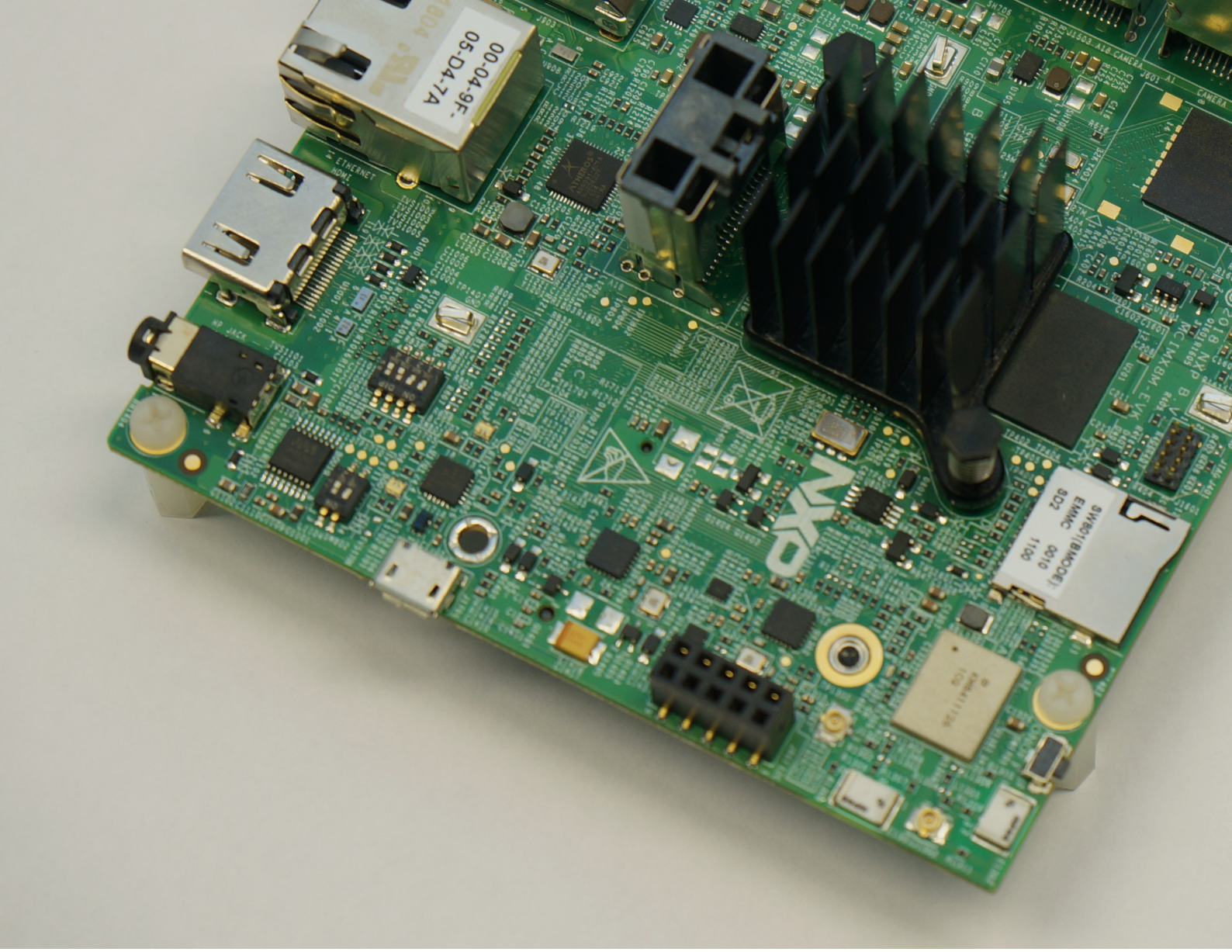

i.MX Windows 10 IoT Release Notes

for NXP i.MX Platform

Document Number: IMXWNR
Rev. W1.1.0, 6/2022

Microsoft NXP

Contents

1 Overview

This document contains important information about the package contents, supported features, known issues and limitations in this release. This release is an engineering release for Windows 10 IoT and supports SoC in the i.MX 8 families.

1.1 References

For more information about Windows 10 IoT Enterprise, see Microsoft online documentation.

- http://windowsondevices.com

The quick start guides contain basic information on the board and setting it up. They are available on NXP website.

- i.MX 8M Quad Evaluation Kit Quick Start Guide
- i.MX 8M Mini Evaluation Kit Quick Start Guide
- i.MX 8M Nano Evaluation Kit Quick Start Guide
- i.MX 8M Plus Evaluation Kit Quick Start Guide

Documentation is available online at nxp.com

- i.MX 8 information is at http://www.nxp.com/imx8

2 BSP change history

This chapter lists changes in releases, including new features and defect fixes.

2.1 1/2022 : W0.9.0

Private preview release for i.MX8M platform.

- **Supported boards:** The existing BSP with support for MCIMX8M-EVK NXP board.

2.2 3/2022 : W0.9.1

Public preview release for i.MX8M platform.

- Fixes:
  - **eMMC driver:** eMMC tuning parameters add to the Dsdt-Sdhc.asl.
  - **BSP deployment:** Removed invalid characters from make-winpe-enterprise.cmd.

2.3 4/2022 : W1.0.0

Public release for i.MX8M and i.MX8M Mini platforms.

- **Supported boards:** MCIMX8M-EVK evaluation kit
  8MMINILPD4-EVK evaluation kit
- New features:
  - **VPU driver:** Supported codecs HEVC, VP9, H.264, VP8. MPEG-2 and MPEG-4 codecs supported on i.MX8M only.
- Fixes:
  - **UART driver:** The UART driver failure during uninstallation in the Device manager has been fixed.
  - **I2C driver:** The issue in iMXI2cRead function (when ReadBufferSize == 1) in UEFI has been fixed.

  - buildme 64.sh: : The script has been updated. Updates in UEFI source code were included in firmware.bin only if firmware was built with -c parameter (clean build).
  - PCIe: : PCIE ATU (Address Translation Unit) setup for PCIE BAR memory mapped registers in UEFI drivers has been fixed. After this fix, the system works as expected in UEFI and relevant Storage drivers appears in Windows.

2.4 6/2022 : W1.1.0

Public release for i.MX8M Nano and i.MX8M Plus platforms.

- **Supported boards:** MCIMX8M-EVK evaluation kit
  8MMINILPD4-EVK evaluation kit
  8MNANOD4-EVK evaluation kit
  8MPLUSLPD4-EVK evaluation kit
- New features:
  - **Camera driver:** OV5640 camera in J1502 connector has been supported on i.MX8M EVK board.
  - **FlexCAN driver:** FlexCAN device has been supported on i.MX8M Plus EVK by the imxcan.sys driver.
  - **I2C driver:** I2C expander (PCA6416) has been supported in iMX8BoardInit module and options “SelectCAN1InsteadOfI2C5” and “SelectCAN2InsteadOfPDMStream3” allows to configure corresponding selectors on the Base Board.
  - **GPU driver:** GPU driver has been updated to v1.1.
  - **Debug drivers:** WinDbg over Ethernet has been supported. WinDbg over ethernet requires the kd_8003_1fc9.dll library which is not distributed as a part of the BSP. Please contact Microsoft to get this library.
  - **ENET driver:** HW checksum offload has been supported in the NDIS miniport driver.
- Fixes:
  - **Audio driver:** A failure during uninstallation in the Device manager has been fixed.
  - **Display driver:** IMX-LVDS-HDMI and IMX-MIPI-HDMI converters: If a native HDMI display resolution exceeds the upper limit, the fixed maximum available resolution is set instead. 1920x1080 60Hz in case of IMX-MIPI-HDMI and 1280x720 60 Hz in case of IMX-LVDS-HDMI.

- **SD driver:** Configuration “fixed device” has been changed to “removable device” which allows to safely remove the SD card by the “Eject” option.

3 BSP Supported Features

The following table displays the features supported in this BSP release. If no board is explicitly mentioned, the feature is shared across All boards listed in Supported Hardware in the Release contents section; otherwise, the feature is only supported on the boards listed.

Table 3.1: Supported boards

Board name	Board revision	Schema revision	BSP name
MCIMX8M-EVK	700-29615 REV A3	SCH-29615 REV B4	NXPEVK_iMX8M_4GB
8MMINILPD4-EVK	700-31407 REV X5	SCH-3140 REV C	NXPEVK_iMX8M_Mini_2GB
8MNANOD4-EVK	700-31407 REV A3 (base board)	SCH 31407 REV C3 (base board)	EVK_iMX8MN_2GB
	700-45699 REV X3 (cpu board)	SCH-45699 REV A1 (cpu board)	
8MPLUSLPD4-EVK	700-46370 REV X1 (base board)	SCH-46370 REV A1 (base board)	EVK_iMX8MP_6GB
	700-46368 REV X2 (cpu board)	SCH-46368 REV A (cpu board)	

Table 3.2: Supported features

Feature	Supported board	Comment
Boot Image		
U-Boot	All i.MX	• Clock, Anatop regulator, ENET, UART, MMC/SD, eMMC4.3/4.4/4.5. • SPI-NOR, Parallel NOR, SATA, NAND, FlexSPI-NOR, USB MassStorage.

Feature	Supported board	Comment
OP-TEE	All i.MX	• OP-TEE OS is required on the boot partition with the TEE file for OP-TEE enablement.
Machine-specific layer		
Interrupt	All i.MX	• GIC
Clock	All i.MX	• Controls the system frequency and clock tree distribution.
Timer	All i.MX	• System timer tick and broadcast timer support.
GPIO	All i.MX	• GPIO is initialized in earlier phase according to hardware design.
IOMUX	All i.MX	• Provides the interfaces for I/O configuration.
DMA engine		
SDMA	i.MX8M	• SDMA HAL.
Character device drivers		

Feature	Supported board	Comment
UART	All i.MX	• i.MX8 supports Cortex-A53 processor through UART0 and Cortex-M4 processor through UART2.
Networking drivers		
ENET	All i.MX	• i.MX8 supports Atheros AR8031 PHY with 10/100/1000 bps mode
PCIe	All i.MX	• i.MX8 supports M.2 interface.
Sound drivers		
WM8524 codec	i.MX8M/Mini/Nano	• Supports playback
WM8960 codec	i.MX8M Plus	• Supports playback.
USB drivers		
USB Host	All i.MX	• Supports USB-A and USB-C connectors.
Video		
HDMI/Display Port	i.MX8M	• i.MX8M supports HDMI through DCSS.

Feature	Supported board	Comment
GPU	i.MX8M	• HW acceleration for 3D rendering through D3D11 API, thus accelerates D2D, XAML, UWP, WinUI, Windows desktop UI and D3D11 apps.
OV5640 camera	i.MX8M	• AVStream driver implemented for CSI1 (connector J1502) at 720p.
VPU	i.MX8M/Mini	• Supported codecs HEVC, VP9, H.264, VP8. MPEG-2 and MPEG-4 codecs supported on i.MX8M and i.MX8 Mini only.
General drivers		
uSDHC	All i.MX	• Supports SD, SDXC, eMMC.
I2C	All i.MX	• Supports I2C master mode.
SPI	All i.MX	• Supports SPI master mode.
FlexCAN	i.MX8M	• FlexCAN low level driver.

4 Known Issues and Limitations

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

4.0.1 Common known issues and workarounds for all supported i.MX Family SoC:

- Boot
  - **Limitation**: In case multiple SD cards marked as bootable are inserted before power on target might fail to boot.
    Workaround: It is recommended to newly format the SD card using Diskpart.
  - **Limitation**: SD/eMMC is the only supported boot media
    Workaround: No workaround.
- USB
  - **Limitation**: Only USB HOST mode is supported.
    Workaround: No workaround.
- VS2017 build
  - **Limitation**: Build of iMXPlatform.sln fails if there are spaces in project path.
    Workaround: Place the imx-windows-iot directory in way its path doesn't contain spaces.
- WSL build
  - **Limitation**: On older versions of Windows the OP-TEE Trusted OS build might fail inside WSL environment if the BSP is located in Windows file system.
    Workaround: Move sources to WSL root drive (eg. $HOME).
- HAL Drivers
  - **Limitation**: The HAL Extensions must be signed be certificates provided by Microsoft. Unfortunately required cerificates that are included in WDK 1809 have expired.
    Workaround: Download the Microsoft Kits Package from Collaborate and use the "Windows OEM HAL Extension Test Cert 2017 (TEST ONLY)" and "Windows OEM Intermediate 2017 (TEST ONLY)" found in the EWDK.iso file or contact Microsoft for help.
- Drivers

  - **Limitation**: The sdport.sys in the recommended Windows build 19044.1288.211006-0501.21h2_release could cause the blue bug check screen. This could be observed when encrypting volumes with Bitlocker or using Cfimager.

    Workaround: Patch the operating system with newer sport.sys included in bsp. When deploying bsp use `/patch_sdport` option as described in Install Windows IOT Enterprise to eMMC chapter. Please note that this driver is test signed and will cause blue screen in case of testsigning is disabled (`/test_signing` is not used). If testsigning is disabled do not use `/patch_sdport` and install KB5014023.

- SDHC
  - **Limitation**: The imxusdhc.sys in crashdump mode doesn't read HW specific settings from ACPI so that these values are hardcoded in the SdhcSlotInitialize() method.

    Workaround: Keep these values synchronized with values in Dsdt-Sdhc.asl ACPI table.

- TPM/BitLocker
  - **Limitation**: Windows does not start if BitLocker encrypted system drive (eMMC). There is failure on "Microsoft Windows Trusted Runtime Secure Service".

    Workaround: Patch firmware according to the following three steps. First apply patch: 'cd mu_platform_nxp/MU_BASECORE/ && git apply ../../patches/MU_BASECORE-TCG2_PHYSICAL_PRESENCE_FLAGS_VARIABLE.patch && cd ../../'. Second build firmware: './buildme64.sh -b 8M -t all -c -fw -t secured_uefi', change '8M' for another SoC. See Building ARM64 Firmware chapter in User's Guide for more details. Third deploy the firmware, see Deploy boot firmware chapter in User's Guide.

- signed_firmware
  - **Limitation**: Built signed_firmware.bin does not verify the FIT image signed.

    Workaround: Add CONFIG_IMX_HAB=y and CONFIG_FIT_SIGNATURE=y into uboot-imx/configs/imx8mq_evk_nt_uuu_defconfig for i.MX8MQ or imx8mm_evk_nt_uuu_defconfig for i.MX8MM and build signed_firmware.bin using command ./buildme64.sh -b 8M -t all -fw -t secured_uefi -t sign_images for i.MX8MQ, use -b 8Mm for i.MX8MM. See Enabling Secure Boot chapter in User's Guide.

- fTMP
  - **Limitation**: "Physical Presence" is not enabled in UEFI.

    Workaround: MU_BASECORE-TCG2_PHYSICAL_PRESENCE_FLAGS_VARIABLE patch must be applied.

- RPMB

  - **Limitation**: Product Key is not kept during re-installation.

    Workaround: RPMB must be cleared e.g. using the following firmware version. In buildme64.sh, update line for make optee with "CFG_RPMB_RESET_FAT=y" ("make -s -j12 PLATFORM=imx PLATFORM_FLAVOR=$optee_plat CFG_TEE_CORE_DEBUG=n CFG_RPMB_RESET_FAT=y ...") and use "-t secured_uefi" parameter for buildme64.sh.

- uSDHC
  - **Limitation**: SDCARD insertion/removal can cause bug check if the delay between insertion/removal is too short.

    Workaround: Wait a few seconds before insertion/removal.

4.0.2 Common known issues and workarounds for i.MX8M SoC:

- Power management
  - **Limitation**: Device is unable to enter sleep and then wakeup. Device that is left unattended for longer period of time might hang.

    Workaround: Disable sleep.

- UART
  - **Limitation**: The RTS-CTS hardware flow control is not available.

    Workaround: No workaround.

- Display
  - **Limitation**: Display driver supports 1280 x 720 60 Hz resolution only.

    Workaround: No workaround.

- Display
  - **Limitation**: The driver only supports HDMI monitor.

    Workaround: No workaround.

- Display
  - **Limitation**: Monitor power-off is emulated by displaying a blank image.

    Workaround: No workaround.

- GPU
  - **Limitation**: The driver doesn't support D3D9, so WPF (Windows Present Foundation) will not be accelerated.

    Workaround: No workaround.

- Camera
  - **Limitation**: Only i.MX 8MQ EVK SCH-29615 rev. B4 is supported. Earlier boards use different I2C for camera.

    Workaround: For i.MX 8MQ EVK SCH-29615 rev. B3 chose I2C1 camera device instead of I2C2 in `mu_platform_nxp/NXP/MCIMX8M_EVK_4GB/AcpiTables/Dsdt-Camera_Ov5640.asl`.
- UEFI
  - **Limitation**: USB is not enabled in UEFI by default.

    Workaround: Add "BLD_*_CONFIG_USB" :“TRUE” into the “default profile” in “win10-iot-bsp/mu_platform_nxp/NXP/MCIMX8M_EVK_4GB/PlatformBuild.py”, line 34.

4.0.3 Common known issues and workarounds for i.MX8M Nano/Mini SoCs:

- Display
  - **Limitation**: MIPI-DSI display interface supported with fixed resolution 1920x1080 60Hz. IMX-MIPI-HDMI converter from MIPI-DSI to HDMI display supported.

    Workaround: No workaround.

4.0.4 Common known issues and workarounds for i.MX8M Nano/Mini/Plus SoCs:

- UEFI
  - **Limitation**: USB is not supported in UEFI.

    Workaround: Use on board serial port and console application in order to access UEFI menu.
  - **Limitation**: DisplayMonitor power-off is emulated by displaying a blank image.

    Workaround: No workaround.
- GPU
  - **Limitation**: The driver doesn’t support D3D9, so WPF (Windows Present Foundation) will not be accelerated.

    Workaround: No workaround.

4.0.5 Common known issues and workarounds for i.MX8M Mini SoC:

- Power management

  - **Limitation**: Device is unable to enter sleep and then wakeup. Device that is left unattended for longer period of time might hang.

    Workaround: Disable sleep.

- Power management
  - **Limitation**: Thermal management is not supported.

    Workaround: No workaround.

- UART
  - **Limitation**: The RTS-CTS hardware flow control is not available.

    Workaround: No workaround.

4.0.6 Common known issues and workarounds for i.MX8M Plus SoC:

- Display
  - **Limitation**: LVDS0 (4 lines) display interface supported with fixed resolution 1280x720 60Hz. IMX-LVDS-HDMI converter from LVDS to HDMI supported.

    Workaround: UEFI firmware can be re-compiled for LVDS dual (8 lines) or MIPI-DSI display interface support with fixed resolution up to 1920x1080 60 Hz.

- USB
  - **Limitation**: The USB host controller reports 64 bit DMA capability but it supports 32 bits only.

    Workaround: Use only 3GB of SDRAM

- VPU
  - **Limitation**: The VPU is not supported yet.

    Workaround: No workaround.

- Ethernet
  - **Limitation**: The ethernet QoS(ENET0, J8) device is not supported yet. The FEC(ENET1, J9) device can be used instead.

    Workaround: No workaround.

5 Revision History

Table 5.1: Revision history

Revision number	Date	Substantive changes
W0.9.0	1/2022	Private preview release for i.MX8M platform.
W0.9.1	3/2022	Public preview release for i.MX8M platform.
W1.0.0	4/2022	Public release for i.MX8M and i.MX8M Mini platforms.
W1.1.0	6/2022	Public release for i.MX8M Nano and i.MX8M Plus platforms.