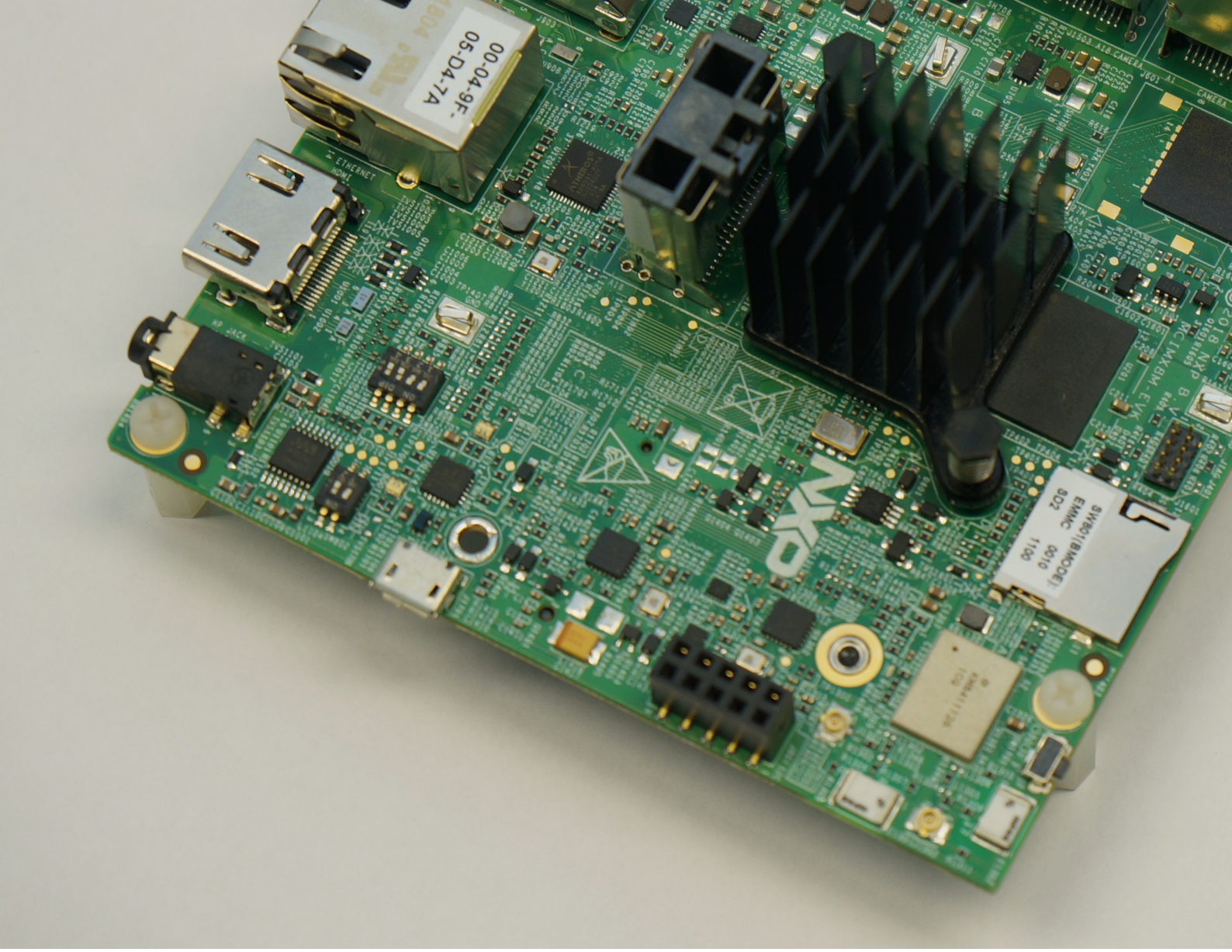

i.MX Windows 10 IoT Release Notes

for NXP i.MX Platform

Document Number: IMXWNR
Rev. W1.1.0, 4/2020

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 6, iMX 7, and i.MX 8 families.

1.1 References

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

- http://windowsondevices.com

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

- SABRE Platform Quick Start Guide (IMX6QSDPQSG)
- SABRE Board Quick Start Guide (IMX6QSDBQSG)
- i.MX 6UltraLite EVK Quick Start Guide (IMX6ULTRALITEQSG)
- i.MX 6ULL EVK Quick Start Guide (IMX6ULLQSG)
- i.MX 6SoloX Quick Start Guide (IMX6SOLOXQSG)
- i.MX 7Dual SABRE-SD Quick Start Guide (SABRESDBIMX7DUALQSG)
- i.MX 8M Quad Evaluation Kit Quick Start Guide (IMX8MQUADEVKQSG)
- i.MX 8M Mini Evaluation Kit Quick Start Guide (8MMINIEVKQSG)
- i.MX 8M Nano EVK Quick Start Guide(IMX-8M-Nano-QSG)

Documentation is available online at nxp.com

- i.MX 6 information is at http://nxp.com/iMX6series
- i.MX SABRE information is at http://www.nxp.com/imxSABRE
- i.MX 6UltraLite information is at http://www.nxp.com/imx6ul
- i.MX 6ULL information is at http://www.nxp.com/imx6ull
- i.MX 6SoloX information is at http://www.nxp.com/imx6sx
- i.MX 7Dual information is at http://www.nxp.com/imx7d
- 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 4/2020 : W1.1.0

Production release for i.MX6, i.MX7 and i.MX8M platform.

- New:
  - **Supported boards:** The existing BSP ported to additional i.MX8MN NXP board.
  - **USB driver:** Added UcmTcpciCx Port Controller Client Driver for iMX8MQ-EVK. i.MX8MQ-EVK has support for runtime change of the USB Type-C plug orientation.
  - **Default application:** The Arm64DefaultApp, prebuilt Windows 10 IoT Core Default App for ARM64 devices and the Out-of-Box Experience (OOBE) runs upon startup on supported i.MX8 devices.
- Fixes:
  - **PWM driver:** Fixed PWM timing calculation for current input clock source.
  - **BootLoader:** imx-mkimage compilation error fixed by adding MKIMAGE_COMMIT to sources.
  - **Generated BSP:** Deployment of files into BSP directory by GenerateBSP fixed by adding files necessary for imxdod (all i.MX8), Arm64CrtRuntime (all i.MX8), BSP.svupdateOS.wm.xml (Sabre_iMX7D_1GB), NXPEVK_iMX8M_Mini_2GB.
  - **WinPe:** Added make-WinPE scripts for i.MX 6Qx subfamily.
  - **i.MX6ULL boot issue:** Initialization of CAAM module has been removed from optee_os_arm for i.MX6ULL MCU (i.MX6ULL doesn't have CAAM module).
  - **imxnetmini driver:** Multicast address hash table register GAUR setting fixed. All boards can obtain IPv6 address.
- Improvements:
  - **TA:** Updated MSRSec containing OP-TEE Trusted Applications.
  - **BootLoader:** Updated imx-mkimage submodule to revision d7f9440d.
  - **WinPe:** Script now handles paths containing spaces.
  - **PWM driver:** Added initialization of the PWM clocks in UEFI across all supported boards.

  - **Release distribution:** Unnecessary log files have been removed from release.
  - **Clock subsystem:** Changes done to clock signal routing.
    * Set higher CPU clock frequency to MCIMX6UL-EVK board. Cortex-A7 core is running on 528/696MHz according the chip version: Vx05/Vx07 MCUs (chip version detected from FUSEs).
    * Set higher CPU clock frequency to MCIMX6ULL-EVK board. Cortex-A7 core is running on 528/792/900MHz according to the chip version: Vx05/08/09 MCUs (chip version detected from FUSEs).
    * Bypassed CCM in CPU clock path on MCIMX8M-EVK board. CPU core clock is routed directly from ARM PLL. CCM clock is still limited to 1GHz max.

2.2 10/2019 : W1.0.0

Initial engineering release for i.MX6, i.MX7 and i.MX8M platform.

- New:
  - **Supported boards:** The existing BSP from Microsoft ported to additional i.MX6, i.MX7 and i.MX8M NXP boards.
  - **Audio driver:** WM8960 audio codec driver supported.
  - **VPU driver:** Video processing unit enabled for i.MX8M_4GB and i.MX8M_Mini_2GB boards.
- Improvements:
  - **Ethernet driver:** Ethernet PHY configuration data moved from the driver code (mp_enet_phy.c) to the ENET ACPI table (_DSD in Dsdt-Network.asl).

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
MCIMX6QP-SDB	700-28857 REV A1	SCH-28857 REV A2	Sabre_iMX6QP_1GB
MCIMX6Q-SDB	700-27516 REV B	SCH-27516 REV C4	Sabre_iMX6Q_1GB
MCIMX6Q-SDP	700-27392 REV C	SCH-27392 REV C4	Sabre_iMX6Q_1GB
MCIMX6DL-SDP	700-27417 REV C	SCH-27417 REV C4	Sabre_iMX6DL_1GB
MCIMX6SX-SDB	700-27962 REV A2	SCH-27962 REV C	Sabre_iMX6SX_1GB
MCIMX7SABRE	700-28590 REV D	SCH-28590 REV D1	Sabre_iMX7D_1GB
MCIMX6UL-EVK	700-28617 REV B	SCH-28617 REV B (CPU board)	EVK_iMX6UL_512MB
	700-28616 REV A1	SCH-28616 REV C2 (Base board)	
MCIMX6ULL-EVK	700-29364 REV A	SCH-29364 REV A1 (CPU board)	EVK_iMX6ULL_512MB
	700-28616 REV A1	SCH-28616 REV C3 (Base board)	
MCIMX8M-EVK	700-29615 REV A3	SCH-29615 REV B4	NXPEVK_iMX8M_4GB
MCIMX8MMINILPD4-EVK	700-31407 REV A	SCH-31407 REV C1 (Base board)	NXPEVK_iMX8M_Mini_2GB
	700-31399 REV A	SCH-31399 REV C1 (CPU board)	
MCIMX8MNAMOD4-EVK	700-31407 REV A3	SCH-31407 REV C3 (Base board)	EVK_iMX8MN_2GB
	700-45699 REV X3	SCH-45699 REV A1 (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. • i.MX 6QuadPlus/Quad/DualLite SABRE-SD and i.MX 6SoloX SABRE-SD support LDDR3 400 MHz @ 32 bit. • i.MX 6UltraLite EVK supports DDR3 400 MHz @ 16 bit. • i.MX 6ULL supports DDR3 400 MHz @ 16 bit.
OP-TEE	All i.MX 6 All i.MX 7 All i.MX 8M	• OP-TEE OS is required on the boot partition with the TEE file for OP-TEE enablement.
Machine-specific layer		
Arm® Core	All i.MX	• i.MX 6 SABRE-SD, 6SLL, 6 SoloX-SD support the Arm Cortex-A9 processor. • i.MX 7Dual SABRE-SD support the Arm Cortex-A7 processor. • i.MX 6UltraLite EVK, 6ULL EVK, support the Arm Cortex-A7 processor. • i.MX 8M Quad and i.MX 8M Mini/Nano supports four Cortex-A53 cores.

Feature	Supported board	Comment
Memory	All i.MX	• On i.MX 6 and i.MX 7 SoC, the user/kernel space is split. • i.MX 6QuadPlus/Quad/DualLite SABRE-SD support DDR3 528 MHz @ 64 bit. • i.MX 6SoloX SABRE-SD support LDDR3 400 MHz @ 32 bit. • i.MX 7Dual SABRE-SD supports DDR3 533 MHz @ 32 bit. • i.MX 8M Quad supports one 32-bit LPDDR4 channel @ 1600 MHz and 50 MHz. • i.MX 8M Mini supports one 32-bit LPDDR4 channel @ 1500 MHz and 50 MHz. • i.MX 8M Nano supports one 16-bit LPDDR4 channel @ 1200 MHz and 50 MHz.
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. • GPT Timer used for i.MX 6 and i.MX 7. • On i.MX 8M Quad, 8M Mini/Nano system counter timer instead of GPT. • On i.MX 8, Arm Arch timer used instead of GPT
GPIO/EDIO	All i.MX	• GPIO is initialized in earlier phase according to hardware design.
IOMUX	All i.MX	• Provides the interfaces for I/O configuration. IOMUX-V3 version is used on i.MX 6and i.MX 7, i.MX 8M Quad, and i.MX 8M Mini/Nano boards.
DMA engine		

Feature	Supported board	Comment
SDMA	All i.MX 6 All i.MX 7 8M Quad 8M Mini/Nano	• SDMA HAL.
Character device drivers		
UART	All i.MX	• i.MX 6 SABRE-SD support console through internal Debug UART1. • i.MX 6SoloX SABRE-SD support Cortex-A9 processor through UART1 and Cortex-M4 processor through UART2. • i.MX 7Dual SABRE-SD Cortex-A7 processor through UART1 and Cortex-M4 processor through UART2. • i.MX 6UltraLite, 6ULL EVKs Cortex-A7 processor through UART1. • i.MX 8M Mini/Nano EVK supports CA53 through UART2 and CM4 through UART4. • i.MX 8 supports Cortex-A53 processor through UART0 and Cortex-M4 processor through UART2.
Networking drivers		
ENET	All i.MX 6 7D-SABRE-SD All i.MX 8	• i.MX 6Quad/SoloX board supports AR8031 PHY, i.MX 6UltraLite EVK board supports KSZ8081 PHY, and i.MX 7Dual SABRE-SD board supports BCM54220 PHY. • i.MX 8 supports Atheros AR8031 PHY with 10/100/1000 bps mode
PCIe	6SABRE_SD 6SoloX-SD 7D-SABRE-SD All i.MX 8	• i.MX 6 and i.MX 7 listed support the mini PCIe interface.i.MX 8 supports M.2 interface.
Sound drivers		

Feature	Supported board	Comment
WM8524	8M Quad 8M Mini/Nano	• Supports playback
WM8962/SSI WM8960/SSI	6SABRE-SD 6SoloX-SD 7D-SABRE-SD 6UltraLite 6ULL	• Supports playback
SAI/WM8962	6SoloX-SD 7D-SABRE-SD 6UltraLite 6ULL 8M Quad 8M Mini/Nano	• Supports 16 bit, 24 bit, and 32 bit PCM format. • Supports sample rate 44.1 kHz for record and playback .
Input device drivers		
USB drivers		
USB Host	All i.MX	• Supports USB HOST1 and USB OTG host.
USB	All i.MX	• Supports USB OTG2.0, USB Host2.0. • USB Host mode: MSC, HID, UVC, and USB audio.
Video		
LVDS	6SABRE-SD 6SoloX-SD	• Supports HannStar LVDS panel on i.MX 6.
HDMI Display	6SABRE-SD 7D-SABRE-SD	• i.MX 6SABRE-SD, 7Dual support on-chip HDMI hardware.
HDMI/Display Port	8M Quad	• i.MX 8M Quad supports HDMI through DCSS.

Feature	Supported board	Comment
MIPI to HDMI	8M Mini/Nano	• Uses Advantec adv7535.
MIPI-DSI Display	8M Mini/Nano	• Supports 4 lanes driven by eLCDIF up to 720p60 on i.MX 8M Mini/Nano.
Parallel-LCD Display	6UltraLite 6ULL 7D-SABRE-SD	• Supports Embest LCD8000-43T LCD panel.
VPU	8M Quad and 8M Mini	• Supports playback of H264 and H265 codecs. VP9 codec is supported experimentally.
General drivers		
uSDHC	All i.MX	• Supports SD, SDXC, eMMC.
I2C	All i.MX	• Supports I2C master.
SPI	All i.MX	• Supports SPI master mode.

4 Known Issues/Limitations

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

The imx-iotcore reference BSP has the following limitations:

- SD/eMMC is the only supported boot media

Table 4.1: Common known issues and workarounds for i.MX Family SoC

SoC	Module	Source	Description	Workaround
All SoC	Boot	Software	In case multiple SD cards marked as bootable are inserted before power on target might fail to boot.	It is recommended to newly format the SD card using Diskpart.
All SoC	UART	Software	Command line option dtr=off shall be used while opening UART device via MinComm.exe. Otherwise UART device cannot be opened.	No workaround
All SoC	USB	Software	Only USB HOST mode is supported.	No workaround
All SoC	MU Platform build	Software	The MuEnvironment python module imported by `PlatformBuild.py` is not fully supported. This results in `PlatformBuild.py --setup` command to fail.	Released BSP doesn't require `PlatformBuild.py --setup` to be run. If the command is required to be executed it is needed to setup a git repository in MSRSec or in its parent directory. The MSRSec repository can be obtained from Github.
All SoC	VS2017 build	Software	Build of iMXPlatform.sln fails if there are spaces in project path.	Place the imx-iotcore directory in way its path doesn't contain spaces.

SoC	Module	Source	Description	Workaround
All SoC	WSL build	Software	OP-TEE Trusted OS couldn't be built inside WSL environment if located in Windows file system.	Move sources to WSL root drive eg $HOME.
i.MX 6Q, 6QP, 6DL, 6SX	UEFI	Software	USB stack is not enabled in UEFI by default.	Download PciEmulation.c and PciEmulation.inf files from imx-edk2-platforms MSFT github and enable USB stack by set CONFIG_USB symbol to TRUE value in *.dsc file
i.MX 6DL	WinPe	Software	Kernel crash can be observed after SW restart from WinPE.	HW restart is needed to suppress this behaviour.
i.MX 6UL, 6ULL, 6SX, 6DL	PEP	Software	PEP driver is not implemented, the power management may not be fully functional.	No workaround
i.MX 6SX, 6UL, 6ULL	IMXDOD	Software	Display back-light is not turned off after switch to PowerDeviceD3 mode (parallel LCD display should be "frozen", LCD signals stop to generate)	No workaround
i.MX 7D	IMXDOD	Software	Display back-light is not turned off after switch to PowerDeviceD3 mode (parallel LCD display should be "frozen", LCD signals stop to generate)	No workaround

SoC	Module	Source	Description	Workaround
i.MX 8	eMMC Boot	Software	eMMC boot on ARM64. flash.bin is not deployed from WinPE onto eMMC device thus execution of bootloader from SD card is still needed when booting from eMMC.	No workaround
i.MX 8	FFU deployme	Software	Deploying FFU file to SD card using IotCoreDashboard application causes early restart of the device resulting in improper initialization when Device name is changed in IotCoreDashboard.	Do not change Device name in IotCoreDashboard application or use Dism.exe to burn FFU image.
i.MX 8MM, 8MN	USB	Software	USB Type-C port driver (imxUcmTcpciCxClient) is not implemented yet. Port properties are detected/configured only in UBOOT and are not enumerated when OS is running.	USB cable must be plugged before U-Boot is running.
i.MX 8MM, 8MN	Display	Software	Display driver supports 1920 x 1080 60 Hz resolution only.	No workaround
i.MX 8MQ	Display	Software	Display driver supports 1280 x 720 60 Hz resolution only.	No workaround

SoC	Module	Source	Description	Workaround
i.MX 8MQ, 8MM	VPU	Software	Because a GPU driver is not available yet, operations on GPU, such as scaling, resize and other transformation are not HW supported. These operations are computed by CPU and consumes enormous piece of computation time. Interlaced videos needs to be scaled inside the VPU driver, thus interlaced videos may be laggy and cause high CPU load.	No workaround for interlaced videos. For progressive videos, deny scaling in player.

5 Revision History

Table 5.1: Revision history

Revision number	Date	Substantive changes
W1.1.0	4/2020	Production release for i.MX6, i.MX7 and i.MX8M platform. New i.MX8MN board supported.
W1.0.0	10/2019	Initial engineering release for i.MX6, i.MX7 and i.MX8M platform.