

MCUXpresso SDK Release Notes for i.MX 8M Nano



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Chapter 1

Overview

The MCUXpresso Software Development Kit (SDK) is a collection of software enablement for Microcontrollers that includes peripheral drivers, high-level stacks including other middleware packages, multicore support and integrated RTOS support for FreeRTOS™ OS. In addition to the base enablement, the MCUXpresso SDK is augmented with demo applications and driver example projects, and API documentation to help the customers quickly leverage the support of the MCUXpresso SDK.

For more details about MCUXpresso SDK, see the MCUXpresso SDK homepage [MCUXpresso-SDK: Software Development Kit](#).

NOTE

See the attached Change Logs section at the end of this document to reference the device-specific driver logs, middleware logs, and RTOS log.

Chapter 2

MCUXpresso SDK

As part of the MCUXpresso software and tools, MCUXpresso SDK is the evolution of Kinetis SDK v2.x.x, includes support for both LPC and i.MX System-on-Chips (SoC). The same drivers, APIs, and middleware are still available with support for Kinetis, LPC, and i.MX silicon. The MCUXpresso SDK adds support for the MCUXpresso IDE, an Eclipse-based toolchain that works with all MCUXpresso SDKs. Easily import your SDK into the new toolchain to have access to all of the available components, examples, and demos for your target silicon. In addition to the MCUXpresso IDE, support for the MCUXpresso Config Tools allows for easy cloning of existing SDK examples and demos, allowing users to easily leverage the existing software examples provided by the SDK for their own projects.

NOTE

In order to maintain compatibility with legacy Freescale code, the filenames and source code in MCUXpresso SDK containing the legacy Freescale prefix 'FSL' has been left as is. The 'FSL' prefix has been redefined as the NXP Foundation Software Library.

Chapter 3

Development tools

The MCUXpresso SDK was compiled and tested with these development tools:

- IAR Embedded Workbench for Arm version 8.32.3
- Makefiles support with GCC revision v8-2018-q4-major from Arm Embedded

Chapter 4

Supported development systems

This release supports boards and devices listed in this table. Boards and devices in boldface were tested in this release:

Table 1. Supported MCU devices and development boards

Development boards	MCU devices
8MNANOD4-EVK	MIMX8MN6DVTJZ , MIMX8MN6CVTIZ, MIMX8MN5DVTJZ, MIMX8MN5CVTIZ, MIMX8MN4DVTJZ, MIMX8MN4CVTIZ, MIMX8MN3DVTJZ, MIMX8MN3CVTIZ, MIMX8MN2DVTJZ, MIMX8MN2CVTIZ, MIMX8MN1DVTJZ, MIMX8MN1CVTIZ

Chapter 5

Release contents

This table provides an overview of the MCUXpresso SDK release package contents and locations.

Table 2. Release contents

Deliverable	Location
Boards	<install_dir>/boards
Demo applications	<install_dir>/boards/<board_name>/demo_apps
Driver examples	<install_dir>/boards/<board_name>/driver_examples
RTOS examples	<install_dir>/boards/<board_name>/rtos_examples
Multicore examples	<install_dir>/boards/<board_name>/multicore_examples
Documentation	<install_dir>/docs
Middleware	<install_dir>/middleware
Multicore stack	<install_dir>/middleware/multicore
Driver, SoC header files, extension header files and feature header files, utilities	<install_dir>/devices/<device_name>
CMSIS Arm Cortex [®] -M header files, DSP library source	<install_dir>/CMSIS
Peripheral Drivers	<install_dir>/devices/<device_name>/drivers
Utilities such as debug console	<install_dir>/devices/<device_name>/utilities
RTOS Kernel Code	<install_dir>/rtos
Tools	<install_dir>/tools

Chapter 6

MCUXpresso SDK release package

The MCUXpresso SDK release package contents are aligned with the silicon subfamily it supports. This includes the boards, CMSIS, devices, documentation, middleware, and RTOS support.

6.1 Device support

The device folder contains all available software enablement for the specific System-on-Chip (SoC) subfamily. This folder includes clock-specific implementation, device register header file, device register feature header file, CMSIS derived device SVD, and the system configuration source files. Included with the standard SoC support are folders containing peripheral drivers, toolchain support, and a simple debug console.

The device-specific header files provide a direct access to the MCU peripheral registers. The device header file provides an overall SoC memory mapped register definition. In addition to the overall device memory mapped header file, the MCUXpresso SDK also includes the feature header file for each peripheral instantiated on the SoC.

The toolchain folder contains the startup code and linker files for each supported toolchain. The startup code is a CMSIScompliant startup that efficiently transfers the code execution to the main() function.

6.1.1 Board support

The boards folder provides the board-specific demo applications, driver examples, RTOS, and middleware examples.

6.1.2 Demo applications and other examples

The demo applications demonstrate the usage of the peripheral drivers to achieve a system level solution. Each demo application contains a readme file that describes the operation of the demo and required setup steps.

The driver examples demonstrate the capabilities of the peripheral drivers. Each example implements a common use case to help demonstrate the driver functionality.

6.2 Middleware

6.2.1 RTOS

The MCUXpresso SDK is integrated with FreeRTOS OS.

Chapter 7

MISRA compliance

All MCUXpresso SDK drivers comply to MISRA 2012 rules with the following exceptions.

Table 3. MISRA exceptions

Exception Rules	Description
Rule 5.1	External identifiers shall be distinct.
Rule 5.4	Macro identifiers shall be distinct.
Rule 21.1	#define and #undef shall not be used on a reserved identifier or reserved macro name.
Rule 21.2	A reserved identifier or macro name shall not be declared.
Directive 4.4	Sections of code should not be "commented out".
Directive 4.5	Identifiers in the same name space with overlapping visibility should be typographically unambiguous.
Directive 4.6	Typedefs that indicate size and signedness should be used in place of the basic numerical types.
Directive 4.8	If a pointer to a structure or union is never dereferenced within a translation unit, then the implementation of the object should be hidden.
Directive 4.9	A function should be used in preference to a function-like macro where they are interchangeable.
Directive 4.13	Functions which are designed to provide operations on a resource should be called in an appropriate sequence.
Rule 1.2	Language extensions should not be used.
Rule 2.3	A project should not contain unused type declarations.
Rule 2.4	A project should not contain unused tag declarations.
Rule 2.5	A project should not contain unused macro declarations.
Rule 2.6	A function should not contain unused label declarations.
Rule 2.7	There should be no unused parameters in functions.
Rule 4.2	Trigraphs should not be used.
Rule 5.9	Identifiers that define objects or functions with internal linkage should be unique.
Rule 8.7	Functions and objects should not be defined with external linkage if they are referenced in only one translation unit.
Rule 8.9	An object should be defined at block scope if its identifier only appears in a single function.
Rule 8.11	When an array with external linkage is declared, its size should be explicitly specified.

Table continues on the next page...

Table 3. MISRA exceptions (continued)

Rule 8.13	A pointer should point to a const-qualified type whenever possible.
Rule 10.5	The value of an expression should not be cast to an inappropriate essential type.
Rule 11.4	A conversion should not be performed between a pointer to object and an integer type.
Rule 11.5	A conversion should not be performed from pointer to void into pointer to object.
Rule 12.1	The precedence of operators within expressions should be made explicit.
Rule 12.3	The comma operator should not be used.
Rule 12.4	Evaluation of constant expressions should not lead to unsigned integer wrap-around.
Rule 13.3	A full expression containing an increment (++) or decrement (--) operator should have no other potential side effects other than that caused by the increment or decrement operator.
Rule 15.4	There should be no more than one break or go to statement used to terminate any iteration statement.
Rule 17.5	The function argument corresponding to a parameter declared to have an array type shall have an appropriate number of elements.
Rule 17.8	A function parameter should not be modified.
Rule 19.2	The union keyword should not be used.
Rule 20.1	#include directives should only be preceded by preprocessor directives or comments.
Rule 20.10	The #and ## preprocessor operators should not be used.
Rule 21.12	The exception handling features of <fenv.h> should not be used. .

Chapter 8

Known issues

8.1 Maximum file path length in Windows 7[®] operating system

Windows 7 operating system imposes a 260 character maximum length for file paths. When installing the MCUXpresso SDK, place it in a directory close to the root to prevent file paths from exceeding the maximum character length specified by the Windows operating system. The recommended location is the C:\nxp folder.

MCUXpresso SDK Release Notes for i.MX 8M Nano

[Change Logs](#)

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1 Driver Change Log

CLOCK

The current CLOCK driver version is 2.0.0

- 2.0.0
 - Initial version.

ECSPI

The current eCSPI driver version is 2.0.1.

- 2.0.1
 - Memset local variable SDMA transfer configuration structure to make sure unused members in structure are cleared.
- 2.0.0
 - Initial version.

GPT

The current GPT driver version is 2.0.0.

- 2.0.0
 - Initial version.

GPIO

The current GPIO driver version is 2.0.3.

- 2.0.3 -Bug Fixes
 - MISRA C-2012 issue fixed.
 - * Fixed rules, containing: rule-10.3, rule-14.4, and rule-15.5.
- 2.0.2
 - Bug Fixes
 - * Fixed the bug of enabling wrong GPIO clock gate in initial API. Since some GPIO instances may not have a clock gate enabled, it checks the clock gate number and makes sure the clock gate is valid.
- 2.0.1
 - Improvements
 - * API interface changes:
 - Refined naming of the API while keeping all original APIs, marking them as deprecated. Original APIs will be removed in next release. The main change is to update

the API with prefix of `_PinXXX()` and `_PortXXX()`.

- 2.0.0
 - Initial version.

I2C

The current I2C driver version is 2.0.5.

- 2.0.5
 - Bug Fixes
 - * Fixed Coverity issue of unchecked return value in `I2C_RTOS_Transfer`.
- 2.0.4
 - Bug Fixes
 - * Fixed the issue that I2C Master transfer APIs(blocking/non-blocking) did not support the situation that master transfer with subaddress and transfer data size being zero, which means no data followed by the subaddress.
- 2.0.3
 - Improvements
 - * Improved code readability, added new static API `I2C_WaitForStatusReady` for the status flag wait, and changed to call `I2C_WaitForStatusReady` instead of polling flags with reading register.
- 2.0.2
 - Improvements
 - * Added `I2C_WATI_TIMEOUT` macro to allow users to specify the timeout times for waiting flags in functional API and blocking transfer API.
- 2.0.1
 - Bug Fixes
 - * Added a proper handle for transfer config flag `kI2C_TransferNoStartFlag` to support transmit with `kI2C_TransferNoStartFlag` flag. Only supports write only or write+read with no start flag; does not support read only with no start flag.
- 2.0.0
 - Initial version.

TMU

The current TMU driver version is 2.0.1.

- 2.0.1
 - Bug Fixes
 - * Fixed missing right pair definition for extern C.
- 2.0.0
 - Initial version.
 - This module was first developed on i.MX 8MM.

PDM

The current PDM driver version is 2.1.1.

- 2.1.1
 - Improvement:
 - * Used new SDMA API SDMA_SetDoneConfig instead of SDMA_EnableSwDone for PDM SDMA driver.
- 2.1.0
 - Improvement:
 - * Added software buffer queue for transactional API.
- 2.0.1
 - Improvement:
 - * Improved HWVAD feature.
- 2.0.0
 - Initial version.

PWM

The current PWM driver version is 2.0.0.

- 2.0.0
 - Initial version.

UART

The current UART driver version is 2.0.1.

- 2.0.1
 - Bug Fixes
 - * Memset local variable SDMA transfer configuration structure to make sure unused members in structure are cleared.
- 2.0.0
 - Initial version.

MU

The Current MU driver version is 2.0.4.

- 2.0.4
 - Improvements:
 - * Improved for the platforms which don't support reset assert interrupt and get the other core power mode.
- 2.0.3 -Bug fix
 - MISRA C-2012 issue fixed.

- * Fix rules, containing: rule-10.3, rule-14.4, rule-15.5.
- 2.0.2
 - Added support for MIMX8MQx.
- 2.0.1
 - Added support for MCIMX7Ux_M4.
- 2.0.0
 - Initial version.

RDC

The current RDC driver version is 2.0.1.

- 2.0.1
 - Bug Fixes:
 - * Added __DSB after new configuration is set to ensure the new configuration takes effect.
- 2.0.0
 - Initial version.

RDC_SEMA42

The current RDC_SEMA42 driver version is 2.0.1.

- 2.0.1
 - Improvements:
 - * Added support for the platforms that don't have dedicated RDC_SEMA42 clock gate.
- 2.0.0
 - Initial version.

SAI

The current SAI driver version is 2.2.2.

-2.2.2 Bug fix:

- Fix the issue of MISRA 2004 rule 9.3.

2.2.1

- Improvements:
 - Added mclk post divider support in function SAI_SetMasterClockDivider.
 - Removed useless configuration code in SAI_RxSetSerialDataConfig.
- Bug fix:
 - Fixed the SAI SDMA driver build issue caused by the wrong structure member name used in the function SAI_TransferRxSetConfigSDMA/SAI_TransferTxSetConfigSDMA.
 - Fixed BAD BIT SHIFT OPERATION issue caused by the FSL_FEATURE_SAI_CHANNEL_COUNTn.

- Apply ERR05144: not set FCONT = 1 when TMR > 0, otherwise the TX may not work.

2.2.0

- Improvements:
 - Add new APIs for parameters collection and user interfaces simplify: SAI_Init SAI_SetMasterClockConfig SAI_TxSetBitClockRate SAI_TxSetSerialDataConfig SAI_TxSetFrameSyncConfig SAI_TxSetFifoConfig SAI_TxSetBitclockConfig SAI_TxSetConfig SAI_TxSetTransferConfig SAI_RxSetBitClockRate SAI_RxSetSerialDataConfig SAI_RxSetFrameSyncConfig SAI_RxSetFifoConfig SAI_RxSetBitclockConfig SAI_RXSetConfig SAI_RxSetTransferConfig SAI_GetClassicI2SConfig SAI_GetLeftJustifiedConfig SAI_GetRightJustifiedConfig SAI_GetTDMConfig

2.1.9

- Improvements:
 - Improved SAI driver comment for clock polarity.
 - Added enumeration for SAI for sample inputs on different edge.
 - Changed FSL_FEATURE_SAI_CHANNEL_COUNT to FSL_FEATURE_SAI_CHANNEL_COUNTn(base) for the difference between the different SAI instance.
 - Added new API: SAI_TxSetBitClockDirection SAI_RxSetBitClockDirection SAI_RxSetFrameSyncDirection SAI_TxSetFrameSyncDirection

2.1.8

- Improvements:
 - Added feature macro test for the sync mode2 and mode 3.
 - Added feature macro test for masterClockHz in sai_transfer_format_t.

2.1.7

- Improvements:
 - Added feature macro test for the mclkSource member in sai_config_t.
 - Changed "FSL_FEATURE_SAI5_SAI6_SHARE_IRQ" to "FSL_FEATURE_SAI_SAI5_SAI6_SHARE_IRQ".
 - Add #ifndef #endif check for SAI_XFER_QUEUE_SIZE to allow redefinition.
- Bug fix:
 - Fixed build error caused by feature macro test for mclkSource.

-2.1.6

- Improvement:
 - Added feature macro test for mclkSourceClockHz check.
 - Added bit clock source name for general devices.
- Bug fix:
 - Fixed incorrect channel numbers setting while call RX/TX set format together.

-2.1.5

- Bug fix:
 - Corrected SAI3 driver IRQ handler name.

- Added I2S4/5/6 IRQ handler.
- Added base in handler structure to support different instances share one IRQ number.
- New features:
 - Updated SAI driver for MCR bit MICS.
 - Added 192 KHZ/384 KHZ in the sample rate enumeration.
 - Added multi FIFO interrupt/SDMA transfer support for TX/RX.
 - Added API to read/write multi FIFO data in a blocking method.
 - Added bclk bypass support when bclk is same with mclk.

2.1.4

- New feature:
 - Added API to enable/disable auto FIFO error recovery in platforms that support this feature.
 - Added API to set data packing feature in platform which support this feature.

2.1.3

- New feature:
 - Added feature to make I2S frame sync length configurable according to bitWidth.

2.1.2

- Bug fix:
 - Added 24-bit support for SAI eDMA transfer. All data shall be 32 bits for send/receive, as eDMA cannot directly handle 3 Byte transfer.

2.1.1

- Optimization:
 - Reduced code size while not using transactional API.

2.1.0

- API name change:
 - SAI_GetSendRemainingBytes -> SAI_GetSentCount.
 - SAI_GetReceiveRemainingBytes -> SAI_GetReceivedCount.
 - All transactional API name add "Transfer" prefix.
 - All transactional API use base and handle as input parameter.
 - Unify the parameter names.
- Bug fix:
 - Fixed WLC bug while reading TCSR/RCSR registers.
 - Fixed MOE enable flow issue, move MOE enable after MICS settings in SAI_TxInit/SAI_Rx-Init.

2.0.0

- Initial version.

SDMA

The current SDMA driver version is 2.3.0.

- 2.3.0
 - Improvements
 - * Added peripheral-to-peripheral support in SDMA driver.
 - Bug Fixes
 - * Fixed Coverity issue: left shift may overflow issue.
 - * Fixed MISRA2004 issue: the operand of underlying type 'unsigned char' or 'unsigned short' caused the result cast to the underlying type.
- 2.2.1
 - Bug fix:
 - * Fix MISRA 2004 issue in sdma driver.
- 2.2.0
 - Improvements:
 - * Add fsl_sdma_script.h to define the SDMA script address and firmware.
 - * Update the format of generic register R7 to align with newest firmware.
- 2.1.1
 - Improvements:
 - * Added SDMA_SetDoneConfig to support hardware/software done configuration.
 - * Marked SDMC_EnableSwDone as deprecated.
 - Bug fix:
 - * Fixed logical dead code issue in function SDMA_SetDoneConfig.
- 2.1.0
 - Improvements:
 - * Added SDMA_SetMultiFifoConfig API to support multi FIFO feature.
 - * Added SDMA_EnableSwDone API to support software done feature.
 - * Added SDMA_LoadScript API to support load script to SDMA program memory.
 - * Added SDMA_DumpScript API to support dump script from SDMA program memory.
 - * Added SDMA3 IRQ handler.
- 2.0.0
 - Initial version.

SEMA4

The current SEMA4 driver version is 2.0.0.

- 2.0.0
 - Initial version.

WDOG

The current WDOG driver version is 2.1.0.

- 2.1.0
 - New Features
 - * Added new API "WDOG_TriggerSystemSoftwareReset()" to allow users to reset the sys-

- tem by software.
- * Added new API "WDOG_TriggerSoftwareSignal()" to allow users to trigger a WDOG_B signal by software.
- * Removed the parameter "softwareAssertion" and "softwareResetSignal" out of the wdog_config_t structure.
- * Added new parameter "enableTimeOutAssert" to the wdog_config_t structure. With this parameter enabled, when the WDOG timeout occurs, a WDOG_B signal will be asserted. This signal can be routed to external pin of the chip. Note that WDOG_B signal remains asserted until a power-on reset (POR) occurs.
- 2.0.1
 - New Features
 - * Added control macro to enable/disable the CLOCK code in current driver.
- 2.0.0
 - Initial version.

ASRC

The current ASRC driver version is 2.0.1.

- 2.0.1
 - Bug Fixes
 - * Fixed the context id hard code issue in the function ASRC_TransferInCreateHandleSDMA/ASRC_TransferOutCreateHandleSDMA.
 - Improvements
 - * Added support for the data size bigger than 64K in sdma driver.
- 2.0.0
 - Initial version.

2 RTOS Change Log

FreeRTOS for MCUXpresso SDK.

The current version is Amazon-FreeRTOS 1.4.0 Original package is available at github.com/aws/amazon-freertos.

- 1.4.7_rev0
 - New features:
 - * Add optional allocation scheme heap_useNewlib.c by D. Nadler.
 - * Enable task aware debugging for cm33 platforms
 - * Move tickless implementation to application layer
 - Other changes:
 - * Fix other build warnings, errors
- 1.4.6_rev0
 - New features:
 - * Update support of CM33 port with Trustzone, MPU, FPU support
 - * Add support for AWS test for Cypress WiFi
 - * Use lwip netif api to avoid lwIP raw API calls outside of tcpip thread in aws_wifi.c
 - Other changes:
 - * Fix issues with mflash driver
 - * Fix other build warnings, errors
- 1.4.0_rev1
 - New features:
 - * Add implementation of vTaskEndScheduler for CM0 GCC port.
 - * Support for CM33, CM33F architectures based on CM3, CM4F ports
- 1.4.0_rev0
 - New features:
 - * Support for pkcs11 for several platforms, secure element host library under pkcs11/portable/nxp folder
 - * Lwip, wifi_qca support for secure_sockets in secure_sockets/portable/nxp folder
 - * Flash driver support for several platforms in third_party/mcu_vendor/nxp folder
 - * Generic support for aws_wifi under wifi/portable/nxp/common folder
 - Other changes:
 - * Fix several build warnings, errors

Updates applied to FreeRTOS kernel up to version 10.0.0 (up to Amazon - FreeRTOS merge). New kernel related changes will be described in section above as part of AWS package.

- 9.0.0_rev3
 - New features:
 - * Tickless idle mode support for Cortex-A7. Add fsl_tickless_epit.c and fsl_tickless_generic.h in portable/IAR/ARM_CA9 folder.
 - * Enabled float context saving in IAR for Cortex-A7. Added configUSE_TASK_FPU_SUPPORT macros. Modified port.c and portmacro.h in portable/IAR/ARM_CA9 folder.

- Other changes:
 - * Transformed ARM_CM core specific tickless low power support into generic form under freertos/Source/portable/low_power_tickless/.
- 9.0.0_rev2
 - New features:
 - * Enabled MCUXpresso thread aware debugging. Add freertos_tasks_c_additions.h and configINCLUDE_FREERTOS_TASK_C_ADDITIONS_H and configFRTOS_MEMORY_SCHEME macros.
- 9.0.0_rev1
 - New features:
 - * Enabled -fno-plt optimization in GCC by adding **attribute((used))** for vTaskSwitchContext.
 - * Enabled KDS Task Aware Debugger. Apply FreeRTOS patch to enable configRECORD_STACK_HIGH_ADDRESS macro. Modified files are task.c and FreeRTOS.h.
- 9.0.0_rev0
 - New features:
 - * Example freertos_sem_static.
 - * Static allocation support RTOS driver wrappers.
 - Other changes:
 - * Tickless idle rework. Support for different timers is in separated files (fsl_tickless_systick.c, fsl_tickless_lptmr.c).
 - * Removed configuration option configSYSTICK_USE_LOW_POWER_TIMER. Low power timer is now selected by linking of appropriate file fsl_tickless_lptmr.c.
 - * Removed configOVERRIDE_DEFAULT_TICK_CONFIGURATION in RVDS port. Use of **attribute((weak))** is the preferred solution. Not same as _weak!
- 8.2.3
 - New features:
 - * Tickless idle mode support.
 - * Added template application for Kinetis Expert (KEx) tool (template_application).
 - Other changes:
 - * Folder structure reduction. Keep only Kinetis related parts.

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