

MCUXSDKIMX8ULPRN

MCUXpresso SDK Release Notes for EVK-MIMX8ULP and EVK9-MIMX8ULP

Rev. 1 — 20 June 2022

Release notes

Document Information

Information	Content
Keywords	EVK-MIMX8ULP, EVK9-MIMX8ULP, 8ULP, MIMX8ULP
Abstract	This document describes the MCUXpresso SDK release notes for EVKMIMX8ULP and EVK9-MIMX8ULP.



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. In addition to the base enablement, the MCUXpresso SDK is augmented with demo applications, driver example projects, and API documentation to help the customers quickly leverage the support of the MCUXpresso SDK. For details on MCUXpresso SDK, see [MCUXpresso-SDK: Software Development Kit for MCUXpresso](#).

2 MCUXpresso SDK

As part of the MCUXpresso software and tools, MCUXpresso SDK is the evolution of Kinetis SDK v2.10.0, includes support for LPC, DSC, and i.MX System-on-Chip (SoC). The same drivers, APIs, and middleware are still available with support for Kinetis, LPC, DSC, 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 access 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 easy cloning of existing SDK examples and demos, allowing users to leverage the existing software examples provided by the SDK for their own projects.

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

3 Development tools

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

- GCC Arm Embedded, version is 10-2021.10.
- IAR Embedded Workbench for Arm, version is 9.32.1.

4 Supported development systems

This release supports boards and devices listed in table below. The boards and devices in bold were tested in this release.

Table 1. Supported boards and devices

Development boards	MCU devices
EVK-MIMX8ULP	MIMX8UD7DVP10SA
EVK9-MIMX8ULP	MIMX8UD5DVK10SA

5 MCUXpresso SDK release package

The MCUXpresso DSC SDK release package content is aligned with the silicon subfamily it supports. This includes the boards, devices, documentation, and middleware.

5.1 Device support

The device folder contains the whole software enablement available for the specific System-on-Chip (SoC) subfamily. This folder includes clock-specific implementation, device register header files, device register feature header files, and the system configuration source files. Included with the standard SoC support are

folders containing peripheral drivers, toolchain support, and a standard debug console. The device-specific header files provide a direct access to the microcontroller peripheral registers. The device header file provides an overall SoC memory mapped register definition. The folder also includes the feature header file for each peripheral on the microcontroller. The toolchain folder contains the startup code and linker files for each supported toolchain. The startup code efficiently transfers the code execution to the main() function.

5.1.1 Board support

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

5.1.2 Demo application 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.

5.2 CMSIS DSP Lib

5.2.1 CMSIS DSP Library

The MCUXpresso SDK is shipped with the standard CMSIS development pack, including the prebuilt libraries.

5.3 Operating system

5.3.1 FreeRTOS

The MCUXpresso SDK is integrated with FreeRTOS OS.

5.4 Middleware

5.4.1 Multicore

Multicore Software Development Kit

6 Release contents

[Table 2](#) provides an overview of the MCUXpresso SDK release package contents and locations.

Table 2. MCUXpresso SDK release package contents and locations

Deliverable	Location
Boards	INSTALL_DIR/boards
Demo Applications	INSTALL_DIR/boards/<board_name>/demo_apps
Driver Examples	INSTALL_DIR/boards/<board_name>/driver_examples
Driver, SoC header files, extension header files and feature header files, utilities	INSTALL_DIR/devices/<device_name>
CMSIS drivers	INSTALL_DIR/devices/<device_name>/cmsis_drivers
Peripheral drivers	INSTALL_DIR/devices/<device_name>/drivers
Toolchain linker files and startup code	INSTALL_DIR/devices/<device_name>/<toolchain_name>

Table 2. MCUXpresso SDK release package contents and locations...continued

Deliverable	Location
Utilities such as debug console	INSTALL_DIR/devices/<device_name>/utilities
CMSIS Arm Cortex-M header files, DSP library source	INSTALL_DIR/CMSIS
Components and board device drivers	INSTALL_DIR/components
Documents	INSTALL_DIR/docs
RTOS	INSTALL_DIR/rtos
Release Notes, Getting Started Document and other documents	INSTALL_DIR/docs
Tools such as shared cmake files	INSTALL_DIR/tools

7 MISRA compliance

All MCUXpresso SDK drivers comply to MISRA 2012 rules with exceptions in [Table 3](#).

Table 3. MISRA exception rules

Exception rules	Description
Directive 4.4	Sections of code should not be commented out.
Directive 4.5	Identifiers in the same namespace 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 5.1	External identifiers shall be distinct.
Rule 5.4	Macro identifiers shall be distinct.
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.

Table 3. MISRA exception rules...continued

Exception rules	Description
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.
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 21.1	#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.
Rule 21.12	The exception handling features of <fenv.h> should not be used.

8 Known issues

This section lists the known issues, limitations, and/or workarounds.

8.1 Maximum file path length in Windows 7 operating system

The 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:\<folder>.

8.2 Fusion DSP may load wrong data from shared SRAM on Silicon A0.1 with specific command sequence

There is issue in the shared SRAM controller prefetch logic for silicon A0.1.

A back-2-back access to the same memory location without any “nop” cycle in between corrupts the prefetch buffer under the following conditions.

First cycle access is a read to address N, immediately followed by the second cycle-partial write (1 byte or halfword (16-bits)) to address N.

The partial write is not updated to prefetch buffer. Subsequent reading from the Shared SRAM address N returns incorrect data.

8.3 Real-Time Domain cannot normally resume from the power-down mode due to EdgeLock secure enclave (S400) failure

There is an issue in EdgeLock secure enclave (S400) during state restoring phase for silicon A0.1. When Real Time Domain (RTD) is about to enter the power-down mode, S400 is promoted to save the current state to the memory. However, once RTD wakes up, S400 encounters an error when trying to restore the state.

This error can cause S400 decide to reset RTD, which means RTD cannot normally resume from the power-down mode.

8.4 Cortex-M33 cannot exit from upower IRQ handler

The Cortex-M33 cannot exit from upower IRQ handler because the upower interrupt occurs before setting the global variable `mu_tx_pend` in `upwr_tx(upower_api.c)`.

To fix the issue, apply the patch below.

```
diff --git a/MIMX8UD7/drivers/upower/upower_api.c b/MIMX8UD7/drivers/upower/upower_api.c
index 464581ad7d..d95e1adaa7 100644
--- a/MIMX8UD7/drivers/upower/upower_api.c
+++ b/MIMX8UD7/drivers/upower/upower_api.c
@@ -3115,10 +3115,10 @@ int upwr_tx(const uint32_t*      msg,

    mu_tx_callb = callback;

-    upwr_copy2tr(mu, msg, size);
+    mu_tx_pend = 1UL;
+    mu->TCR.R = 1UL << (size - 1UL);

-    mu_tx_pend = 1UL;
+    upwr_copy2tr(mu, msg, size); /* Will generate upower tx interrupt after
   TR is full when with interrupt mode */

    return 0;
}
```

8.5 Flexcan_ping_pong_buffer_transfer case loses first 8 bytes data for armgcc flash_debug

To prevent flexcan_ping_pong_buffer_transfer case from losing the first 8 bytes data for armgcc flash_debug, apply the fix below.

```
a/flexcan/example/ping_pong_buffer_transfer/flexcan_ping_pong_buffer_transfer.c
+++ b/flexcan/example/ping_pong_buffer_transfer/
flexcan_ping_pong_buffer_transfer.c
@@ -539,10 +539,11 @@ int main(void)
    else
    {
        /* Wait until Rx queue 1 full. */
-       while (rxQueueNum != 1U)
+       while (rxQueueNum == 0U)
        {
        };
-       rxQueueNum = 0;
+       if (rxQueueNum == 1)
+       rxQueueNum = 0;
        LOG_INFO("Read Rx MB from Queue 1.\r\n");
        for (i = 0; i < RX_QUEUE_BUFFER_SIZE; i++)
        {
```

8.6 LPSPI b2b examples transfer fail on iar/armgcc flash target

Due to the latency of instruction retrieval (XiP), LPSPI-related flash target examples may fail. The failure happens because the data is not retrieved in time from FIFO on the receiving end.

To prevent the failure, place the fsl_lpspi.c file in TCM to boost the instruction fetch performance.

Apply the patch as below,

```
diff --git a/MIMX8UD7/gcc/MIMX8UD7xxxxx_cm33_flash.ld b/MIMX8UD7/gcc/
MIMX8UD7xxxxx_cm33_flash.ld
index 02b76a8ea3..709e1c73d5 100644
--- a/MIMX8UD7/gcc/MIMX8UD7xxxxx_cm33_flash.ld
+++ b/MIMX8UD7/gcc/MIMX8UD7xxxxx_cm33_flash.ld
@@ -85,18 +85,22 @@ SECTIONS
    *(EXCLUDE_FILE(
        /* Exclude flash and frequently executed functions from XiP */
        */fsl_flexspi.c.obj
+       */fsl_lpspi.c.obj
    ) .text) /* .text sections (code) */
    *(EXCLUDE_FILE(
        /* Exclude flash and frequently executed functions from XiP */
        */fsl_flexspi.c.obj
+       */fsl_lpspi.c.obj
    ) .text*) /* .text* sections (code) */
    *(EXCLUDE_FILE(
        /* Exclude flash and frequently executed functions from XiP */
        */fsl_flexspi.c.obj
+       */fsl_lpspi.c.obj
    ) .rodata) /* .rodata sections (constants, strings, etc.) */
    *(EXCLUDE_FILE(
        /* Exclude flash and frequently executed functions from XiP */
        */fsl_flexspi.c.obj
+       */fsl_lpspi.c.obj
```

```
    ) .rodata*)                /* .rodata* sections (constants, strings, etc.) */
    *(.glue_7)                 /* glue arm to thumb code */
    *(.glue_7t)                /* glue thumb to arm code */
@@ -201,6 +205,7 @@ SECTIONS
    *(CodeQuickAccess)
    /* Explicit placement of flash and frequently executed functions in RAM */
    /*fsl_flexspi.c.obj(.text .text* .rodata .rodata*)
+   /*fsl_lpspi.c.obj(.text .text* .rodata .rodata*)
    *(DataQuickAccess)
    . = ALIGN(16);
    __quickaccess_end__ = .;
```

9 Change log

Change log of software components included in the package, see MCUXpresso SDK ChangeLog_MIMX8ULP.pdf.

10 Revision history

[Table 4](#) below summarizes the revisions to this document.

Table 4. Revision history

Revision number	Date	Substantive changes
1	20 June 2023	Initial public release

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