

# MCUXSDKMCIMX93EVKRN

## MCUXpresso SDK Release Notes for MCIMX93-EVK

Rev. 2.14.0 — 30 June 2023

Release notes

### Document Information

Information	Content
Keywords	MCUXpresso SDK, Release Notes, MCIMX93-EVK
Abstract	This document describes the MCUXpresso SDK release notes for MCIMX93-EVK.



## 1 Overview

The MCUXpresso SDK is a comprehensive software enablement package designed to simplify and accelerate application development with Arm Cortex-M-based devices from NXP, including its general purpose, crossover and Bluetooth-enabled MCUs. MCUXpresso SW and Tools for DSC further extends the SDK support to current 32-bit Digital Signal Controllers. The MCUXpresso SDK includes production-grade software with integrated RTOS (optional), integrated enabling software technologies (stacks and middleware), reference software, and more.

In addition to working seamlessly with the MCUXpresso IDE, the MCUXpresso SDK also supports and provides example projects for IAR, KEIL, and GCC with Cmake. 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.

Underscoring our commitment to high quality, the MCUXpresso SDK is MISRA compliant and checked with Coverity static analysis tools. 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, 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 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 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 has 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 10.3.1
- IAR Embedded Workbench for Arm, version is 9.30.1

## 4 Supported development system

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
MCIMX93-EVK RevB	<b>MIMX9352</b>

## 5 MCUXpresso SDK release package

The MCUXpresso 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 Middleware

#### 5.2.1 eIQ

The package contains several example applications using the eIQ TensorFlow Lite for Microcontrollers library.

#### 5.2.2 Ethos-u-core-software

Arm Ethos-U65 microNPU is integrated into i.MX93 applications processors, enabling developers to create more capable, cost-effective, and energy-efficient ML applications. It improves the inference performance of neural networks and is supported with an open-source driver and compiler. The Neural Processing Unit (NPU) targets quantized Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN).

#### 5.2.3 lwIP

lwIP is a small independent implementation of the TCP/IP protocol suite.

#### 5.2.4 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
Board Project Template for MCUXpresso IDE NPW	INSTALL_DIR/boards/<board_name>/project_template
Driver, SoC header files, extension header files and feature header files, utilities	INSTALL_DIR/devices/<device_name>
Peripheral drivers	INSTALL_DIR/devices/<device_name>/drivers
Toolchain linker files and startup code	INSTALL_DIR/devices/<device_name>/<toolchain_name>
Utilities such as debug console	INSTALL_DIR/devices/<device_name>/utilities
Device Project Template for MCUXpresso IDE NPW	INSTALL_DIR/devices/<device_name>/project_template
CMSIS Arm Cortex-M header files, DSP library source	INSTALL_DIR/CMSIS
Components and board device drivers	INSTALL_DIR/components
RTOS	INSTALL_DIR/rtos
Release Notes, Getting Started Document and other documents	INSTALL_DIR/docs
Tools such as shared cmake files	INSTALL_DIR/tools
Middleware	INSTALL_DIR/middleware

## 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 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.

Table 3. MISRA exception rules...continued

Exception rules	Description
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.
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 SEGGER J-Link debugger usage problem

When an M core software is already running, it is possible to get HardFault or data verification issue during loading image into TCM by debugger.

The following steps are recommended to use the J-Link debugger.

1. Configure switch SW1301 to M core boot; low-power boot. Ensure that there is no image on the boot source.
2. Power the board and start the debugger for use.
3. To restart the debugger, stop the debugger, power off the board, and repeat step #2.

### 8.3 eDMA examples accessing AIPS peripheral bridge memory must run through U-Boot loading method

Non-secure access to Arm IP Bus (AIPS) must be configured in Trusted Resource Domain Control (TRDC) for enhanced direct memory access (eDMA) controller. Due to the limitation that Sentinel ROM can release TRDC only once, such examples must run through U-Boot loading method after Trusted Firmware-A (TF-A) configuring TRDC.

To make low-power boot mode work for only M core in such example, you need to implement the request of the TRDC release and configure TRDC. However, it will break the single boot mode with TF-A/Linux BSP.

The following eDMA examples need access to AIPS.

- cmsis\_lpi2c\_edma\_b2b\_transfer\_master
- cmsis\_lpi2c\_edma\_b2b\_transfer\_slave
- cmsis\_lpuart\_edma\_transfer
- flexcan\_loopback\_edma\_transfer
- lpi2c\_edma\_b2b\_transfer\_master
- lpi2c\_edma\_b2b\_transfer\_slave
- lpuart\_edma\_transfer
- pdm\_edma\_transfer
- sai\_edma\_transfer

### 8.4 Low-power wakeword demo may fail to work

There is a possibility that the low-power wakeword demo may fail to work. The issue may occur during Linux booting. If the error is encountered, the following wm8962 probe error messages appear.

```
[ 10.510909] i2c-rpmsg virtio0.rpmsg-i2c-channel.-1.3: rpmsg_xfer failed: timeout
```

[ 10.518347] wm8962 0-001a: Failed to read ID register

[ 10.525284] wm8962: probe of 0-001a failed with error -110

This issue will be fixed in the next release.

## 9 Change Log

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Change log of software components included in the package, see the MCUXpresso SDK ChangeLog\_MIMX9352.pdf.

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