

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 was compiled and tested with these development tools:

- IAR Embedded Workbench for Arm, Rev. 9.10.2, with IAR patch *ewarm910-lpc553x.zip*
- MCUXpresso IDE, Rev. 11.4.0_6224
- Keil MDK, version is 5.34
- GCC ARM Embedded, version is 10-2020-q4-major

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4 Supported development systems

This release supports boards and devices listed in [Table 1](#). The boards and devices in bold were tested in this release.

Table 1. Supported MCU devices and development boards

| Development boards | MCU devices |
|--------------------|---|
| LPCXpresso55S36 | LPC55S36JBD100, LPC5536JBD100, LPC5536JBD64, LPC5536JHI48, LPC5534JBD100, LPC5534JBD64, LPC5534JHI48, LPC55S36JHI48 |

5 Release contents

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

Table 2. Release contents

| Deliverable | Location |
|--|---|
| Boards | <install_dir>/boards |
| CMSIS Arm Cortex®-M header files, DSP library source | <install_dir>/CMSIS |
| CMSIS drivers | <install_dir>/devices/<device_name>/cmsis_drivers |
| Cortex Microcontroller Software Interface Standard (CMSIS) driver examples | <install_dir>/boards/<board_name>/cmsis_driver_examples |
| Demo applications | <install_dir>/boards/<board_name>/demo_apps |
| Documentation | <install_dir>/docs |
| 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> |
| emWin examples | <install_dir>/boards/<board_name>/emwin_examples |
| FatFS examples | <install_dir>/boards/<board_name>/fatfs_examples |
| mbed TLS | <install_dir>/middleware/mbedtls |
| mbed TLS examples | <install_dir>/boards/<board_name>/mbedtls_examples |
| Peripheral Drivers | <install_dir>/devices/<device_name>/drivers |
| Qualcomm WiFi | <install_dir>/middleware/wifi_qci |
| Qualcomm WiFi stack examples | <install_dir>/boards/<board_name>/wifi_qca_examples |
| RTOS examples | <install_dir>/boards/<board_name>/rtos_examples |
| RTOS Kernel Code | <install_dir>/rtos |
| SDMMC card driver | <install_dir>/middleware/sdmmc |
| Tools | <install_dir>/tools |
| USB demo applications | <install_dir>/boards/<board_name>/usb_examples |
| USB stack | <install_dir>/middleware/usb |
| Utilities such as debug console | <install_dir>/devices/<device_name>/utilities |

6 MCUXpresso SDK release package

The MCUXpresso SDK release package content is 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 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, 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 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 is a CMSIS compliant startup code 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 USB stack

See *MCUXpresso SDK USB Stack User's Guide* (document MCUXSDKUSBSUG) for more information.

6.2.1.1 Peripheral devices tested with USB Host stack

[Table 3](#) provides a list of USB devices tested with the USB Host stack.

Table 3. Peripheral devices

| Device type | Device |
|-------------|--------------|
| USB HUB | BELKINF5U233 |
| | BELKIN |
| | F5U304 |
| | BELKIN |
| | F5U307 |
| | BELKIN |
| | F4U040 |
| | UNITEKY-2151 |

Table continues on the next page...

Table 3. Peripheral devices (continued)

| Device type | Device |
|-------------------------|---|
| | Z-TEK ZK032A HYUNDAI HY-HB608 |
| USB flash drive | ADATA C008 32 GB ADATA S102 8 G ADATA S102 16 G VerbatimSTORE N GO USB Device 8 G Kingston DataTraveler DT101 G2 SanDisk Cruzer Blade 8 GB Unisplendour 1 G Imation 2 GB V-mux 2 GB Sanmina-SCI 128 M Corporate Express 1 G TOSHIBA THUHYBS-008G 8 G Transcend JF700 8 G Netac U903 16 G SSK SFD205 8 GB Rex 4 GB SAMSUNG USB3.0 16GB |
| USB card reader/adaptor | SSK TF adapter Kawau Multi Card Reader Kawau TF adapter Kawau SDHC card |
| USB Mouse | DELL MS111-P DELL M066U0A DELL MUAVDEL8 TARGUS AMU76AP DELL MD56U0 DELL MS111-T RAPOO M110 |
| USB Keyboard | DELLSK8135 DELLSK8115 |

6.2.2 File system

The FatFs file system is integrated with the MCUXpresso SDK and can be used to access either the SD card or the USB memory stick when the SD card driver or the USB Mass Storage Device class implementation is used.

6.2.3 RTOS

The MCUXpresso SDK is integrated with FreeRTOS OS.

6.2.4 CMSIS

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

6.2.5 emWin

The MCUXpresso SDK is pre-integrated with the SEGGER emWin GUIBuilder.

7 MISRA compliance

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

Table 4. MISRA exceptions

| Exception rules | Description |
|-----------------|---|
| Directive 4.2 | This rule is Advisory and currently disabled in the analysis configuration. |
| 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 5.1 | External identifiers shall be distinct. |
| Rule 5.4 | Macro identifiers shall be distinct. |

Table continues on the next page...

Table 4. MISRA exceptions (continued)

| Exception rules | Description |
|-----------------|--|
| 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 | <code>#include</code> directives should only be preceded by preprocessor directives or comments. |
| Rule 20.10 | The <code>#</code> and <code>##</code> preprocessor operators should not be used. |
| Rule 21.1 | <code>#define</code> and <code>#undef</code> 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 <code><fenv.h></code> should not be used. |

8 Known issues

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:\nxp` folder.

8.2 New project wizard compile failure

The following components request the user to manually select other components that they depend upon in order to compile. These components depend on several other components and the New Project Wizard (NPW) is not able to decide which one the user requires.

NOTE

xxx means core variants, such as, cm0plus, cm33, cm4, cm33_nodsp.

Components: issdk_mag3110, issdk_host, systick, gpio_kinetis, gpio_lpc, issdk_mpl3115, sensor_fusion_agm01, sensor_fusion_agm01_lpc, issdk_mma845x, issdk_mma8491q, issdk_mma865x, issdk_mma9553, and CMSIS_RTOS2.

Also for low-level adapter components, currently the different types of the same adapter cannot be selected at the same time.

For example, if there are two types of timer adapters, `gpt_adapter` and `pit_adapter`, only one can be selected as timer adapter in one project at a time. Duplicate implementation of the function results in an error.

NOTE

Most of middleware components have complex dependencies and are not fully supported in new project wizard. Adding a middleware component may result in compile failure.

8.3 MCUXpresso Config Tools v6.0.0 clone issue

- The lib file path cannot be converted when MDK examples are cloned.
- Not support to clone the TrustZone examples.

9 Revision history

| Rev. | Date | Description |
|------|----------------|--|
| 0 | March 2021 | Initial release, for niobe4analog (LPCXpresso55S36) EAR0.3 release |
| 1 | 31 August 2021 | For niobe4analog (LPCXpresso55S36) EAR1.0 release <ul style="list-style-type: none"> • Updated Development tools • Updated Table 1 • Removed MCUXpresso IDE support issue from the Known issues. • Updated New project wizard compile failure. |

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