

MCUXpresso software development kit

The MCUXpresso software development kit (SDK) is a pre-integrated collection of open-source drivers and middleware from NXP, complemented by other enabling software from partners for general-purpose, i.MX Crossover and wireless Arm® Cortex®-M based MCUs.

Overview

NXP created the MCUXpresso SDK as a software framework and reference for application development for NXP's general-purpose, crossover and wireless enabled Arm Cortex-M based MCUs. Custom SDK packages are available as custom archives or west manifests based on user selections of MCU, evaluation board, and/or optional software components. Every MCUXpresso SDK includes production-grade software with pre-integrated real-time operating systems (RTOSes), peripheral drivers, enabling software technologies (stacks and middleware), reference software and more.

NXP designed the production-ready MCUXpresso SDK with high-quality processes and robustly validated the product across multiple toolchains.

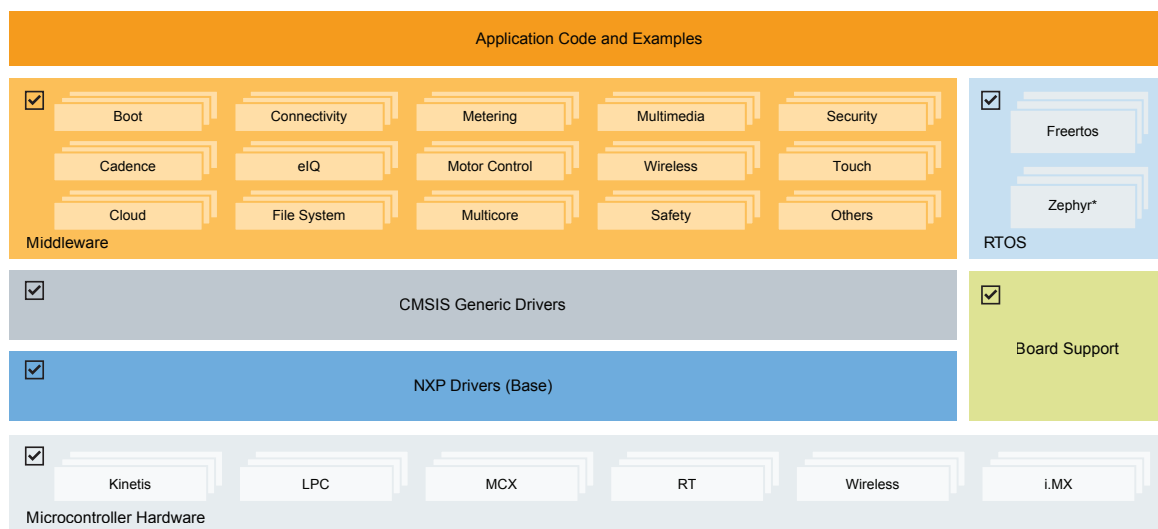
The MCUXpresso SDK is part of the cohesive suite of MCUXpresso software and tools and is inherently compatible with MCUXpresso IDE, MCUXpresso for VS Code, IAR Embedded Workbench and Keil MDK. Additionally, the SDK is supported by the MCUXpresso Config Tools suite and the MCUXpresso SEC Tool.

Features

Architecture

- Pre-integrated, production-grade software including peripheral drivers, connectivity stacks, middleware and RTOS
- Arm CMSIS-CORE startup and device header files
- CMSIS-DSP standard libraries
- Open-source peripheral drivers that provide stateless, high-performance, easy-to-use APIs
- Optional DMA support for communication peripherals
- Adding partner middleware and software is supported by using the west manifest or Open-CMSIS-Packs

MCUXpresso SDK high-level block diagram



* Zephyr RTOS leverages base SDK components via NXP Zephyr HAL

Quality

- Production-grade software
- Checked with Coverity static analysis tools

Integrated RTOS kernel options

- FreeRTOS™
- Zephyr*** uses same core/base SDK content
- RTOS-native driver wrappers

Supported Toolchains

- MCUXpresso IDE
- MCUXpresso for Visual Studio Code
- IAR Embedded Workbench®
- Arm Keil® Microcontroller Development Kit
- GNU Arm Embedded Toolchain compiler with Cmake
- West (Zephyr's meta-tool) with added Kconfig support

Software examples

- Demonstrate the usage of peripheral drivers, RTOS wrapper drivers, middleware and RTOSes
- Sample applications and usage examples for all drivers, stacks and middleware make getting started simpler

***Zephyr OS is available on several NXP General Purpose MCUs, but is delivered by the Zephyr Project. Please see nxp.com/zephyr for details.

Enabling software technologies

Audio and voice

- Voice intelligent technology for local voice commands with VoiceSeeker audio front-end
- Maestro and Cadence Xtensa Audiostreamer frameworks
- Essential audio processing library

Connectivity

- EmSA CANopen and CANopen FD stacks**
- USB Host, Device, and OTG
- Bluetooth®, Wi-Fi®, 802.15.4 driver support
- NFC/NTAG®
- lwIP
- OpenThread™, EdgeFast Bluetooth stack support
- GenAVB/TSN AV Bridging/Time Sensitive Networking stack

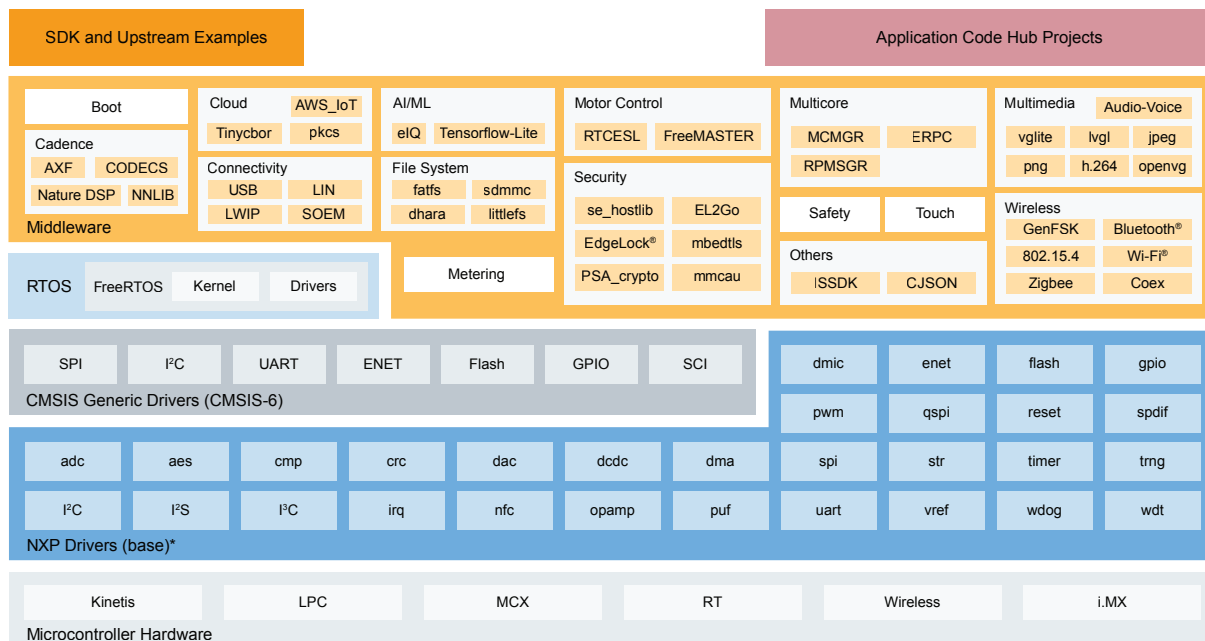
Cloud/IoT

- Amazon Web Services IoT SDK
- Memfault remote diagnostic device monitoring**

eIQ® Machine Learning Software

- TensorFlow Lite for microcontrollers
- Glow and DeepViewRT
- Arm CMSIS-NN kernels
- Cadence® Tensilica® Hi-Fi 4 NN library
- Vision processing pipeline library

MCUXpresso SDK detailed block diagram



*Not a complete representative list

Graphics and HMI

- SEGGER emWin
- Embedded Wizard by TARA systems**
- Storyboard by Crank software**
- LVGL
- TSI touch Library

Motor control

- PMSM, ACIM, BLDC libraries
- FreeMASTER embedded component

Security

- Arm Mbed™ TLS
- WolfSSL Embedded SSL/TLS**
- Trusted Firmware-M examples
- Secure element host drivers
- MCU bootloader

Storage

- FatFS, littleFS
- SD/MMC stacks
- DMA Manager

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Other

- EEMV L1 that complies with EMV v4.3_Book_1 specification
- IEC 60730 Class B Functional Safety Library
- IoT sensing SDK (ISSDK)**
- USB Type C power delivery stack

* Software shown may not be available for all NXP MCUs.

** Partner Software is supported by using the west manifest or Open-CMSIS-Packs. Separate license may be required from NXP partner for use in end products.

Delivery options

The MCUXpresso SDK is conveniently packaged and delivered in various methods to meet the preference of the developer. The MCUXpresso IDEs have simplified how users add the SDK into their user workspace from the following options.

SDK builder

mcuxpresso.nxp.com

A custom MCUXpresso SDK is conveniently packaged and delivered as a downloadable archive file based on user selections of MCU, evaluation board and optional software components. Pre-built packages based on platform or device can be imported directly from the MCUXpresso IDE.

Github

github.com/nxp-mcuxpresso/mcuxsdk-manifests

The mcuxsdk project provides one repository to conveniently access an entire SDK release. The user

has access to fundamental enablement for multiple devices and boards. Git utilities can be used to track/compare/integrate future updates to the SDK.

Use of a west manifest with GitHub SDK allows users to customize their SDK contents based on selections of MCU and software components.

GitHub SDK provides access to preview of patches and feature development prior to production release along with visibility to the development commit history of SDK.

Open-CMSIS-Packs

keil.arm.com/vendors/nxp

Packs are made available to support IDEs that include a pack manager (MDK, CMSIS Solution). The packs contain SDK software organized by device, board and middleware. User can search supported IDEs for packs that fit the requirements of their project. Packs include dependency information to assist the IDE to properly import the software into a project.

Get started

Learn more:

nxp.com/mcuxpresso/sdk

MCUXpresso SDK online documentation:

mcuxpresso.nxp.com/mcuxsdk/latest/html/index.html

Join the MCUXpresso SW and tools community:

community.nxp.com/community/mcuxpresso/mcuxpresso-sdk

Professional support and services:

nxp.com/services

nxp.com/mcuxpresso/SDK

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