# 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 its 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. Users can download this SDK based on their selections of MCU, evaluation board and optional software components. Every MCUXpresso SDK download 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. NXP also developed all peripheral drivers in compliance with MISRA-C guidelines and analyzed them with Coverity® static analysis tools.

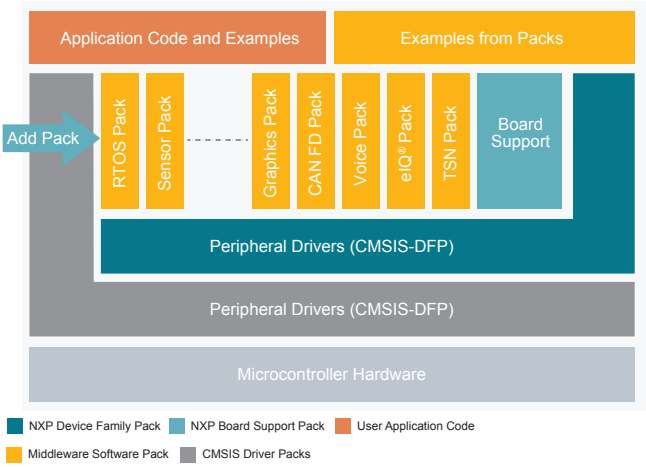
The MCUXpresso SDK is part of the cohesive suite of MCUXpresso Software and Tools and is inherently compatible with MCUXpresso IDE, MCUXpresso for VS Code, IAR Embedded Workbench and Keil MDK. MCUXpresso MCUXpresso Config Tools suite and the MCUXpresso SEC Tool.

## 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
  - Support for Partner middleware and software via Open-CMSIS-Packs
- Quality
  - Production-grade software
  - All drivers and startup code are MISRA-C:2012 compliant
  - Checked with Coverity static analysis tools
- Integrated RTOS kernel options***
  - FreeRTOS™
  - Azure RTOS ThreadX
  - 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
- 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 https://nxp.com/zephyr for details.

## MCUXpresso SDK Block Diagram




## Enabling Software Technologies

- Audio and Voice
  - Voice Intelligent Technology (VIT) 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
  - Azure RTOS USBX
  - Bluetooth, Wi-Fi, 802.15.4 driver support
  - NFC/NTAG®
  - lwIP and Azure RTOS NetX Duo
  - OpenThread™, EdgeFast Bluetooth stack support
  - GenAVB/TSN AV Bridging/Time Sensitive Networking stack
- Cloud / IoT
  - Amazon Web Services IoT SDK
  - Microsoft® Azure® IoT
- eIQ® Machine Learning Software
  - TensorFlow Lite for Microcontrollers
  - Glow and DeepViewRT
  - Arm CMSIS-NN kernels
  - Cadence® Tensilica® HiFi 4 NN library
  - Vision processing pipeline library
- 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
  - Azure RTOS TLS 1.2/1.3
  - WolfSSL Embedded SSL/TLS**
  - Trusted Firmware-M examples
  - Secure element host drivers
  - MCU bootloader
- Storage
  - FatFS, littleFS and Azure RTOS FileX and LevelX
  - SD/MMC stacks
  - DMA Manager
- 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 provided in Open-CMSIS-Packs. Separate license may be required from NXP partner for use in end products.

## Get Started:

Learn more:
www.nxp.com/mcuxpresso/sdk

Join the MCUXpresso SW and Tools community:
https://community.nxp.com/community/mcuxpresso/mcuxpresso-sdk

Professional Support and Services:
www.nxp.com/services

### 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/mcux-sdk

The mcux-sdk 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.

### Open-CMSIS-Packs

keil.arm.com/vendors/nxp

Packs are made available in IDEs via a pack manager. The packs contain SDK software organized by device, board and middleware. User can search in IDE 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.

**www.nxp.com/mcuxpresso/SDK**



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