ModusToolbox™ Software and Tools

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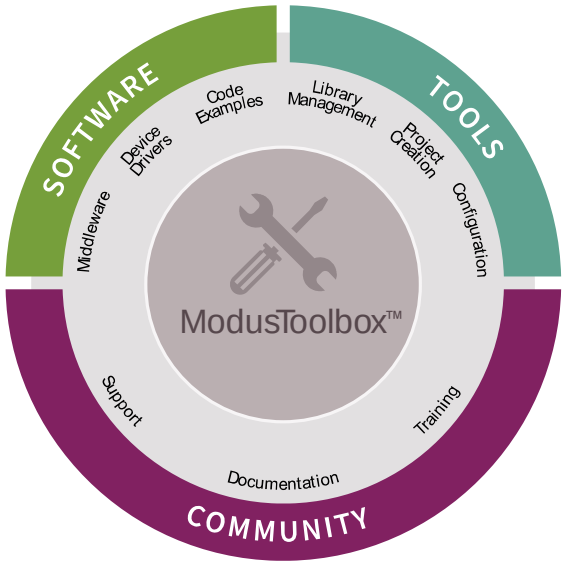
PSoC Roadshow Workshop - 2022

ModusToolbox™ Software – Overview



- ModusToolbox™ software is a modern, extensible development environment supporting a wide range of Infineon microcontroller devices.
- Provided as collection of development tools, libraries, and embedded runtime assets architected to provide a flexible and comprehensive development experience.

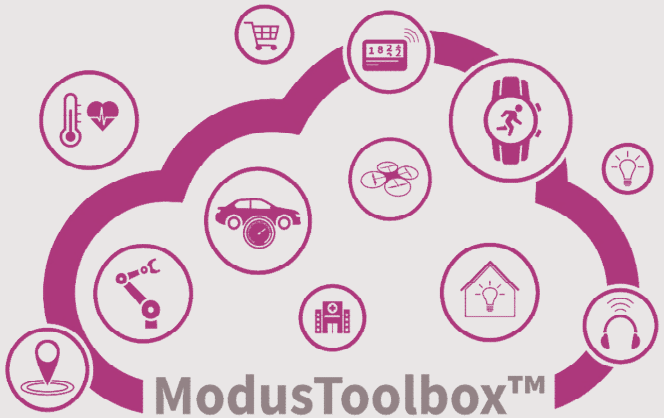
Development Tools

The ModusToolbox™ tools package includes desktop programs that enable the creation of new embedded applications, managing software components, configuring device peripherals and middleware, and embedded development tools for compiling, programming, and debugging.

Run-Time Software

The ModusToolbox™ software includes an extensive collection of GitHub-hosted repositories comprised of code examples, board support packages, middleware, and application support.

ModusToolbox™ Software – Comprehensive selection of tools



Supported IDEs

- Eclipse IDE w/ GCC (included with ModusToolbox™ installation)
- Microsoft Visual Studio Code
- IAR Embedded Workbench
- Arm Microcontroller Developers Kit – µVision

Configurators and Tools

- Project Creator
- Library Manager
- Device Configurator
- BSP Assistant
- Secure Policy Configurator
- CAPSENSE™ Configurator and Tuner
- Device level configurators for QSPI, SmartIO, SegLCD
- Middleware level configurators for Machine Learning, USB, USB-PD, Bluetooth®, LIN
- … and more

ModusToolbox™ Software – Providing development flexibility

Development Workflow

ModusToolbox™ provides a unique work environment that is extremely adaptable to the way you work. Supporting options for several different IDEs, command-line tools with GUI options, and a make-based build system.

Middleware Management

Leveraging the ModusToolbox™ Library Manager, middleware libraries from Infineon and supporting partners can be imported directly into your project structure and seamlessly incorporated into the build environment.

Functional API Levels

ModusToolbox™ includes well documented peripheral drivers and functional APIs supporting different device interface levels. These includes a HAL for maximizing portability, and a Peripheral Driver Library for maximizing code efficiency and device capabilities.

Application Portability

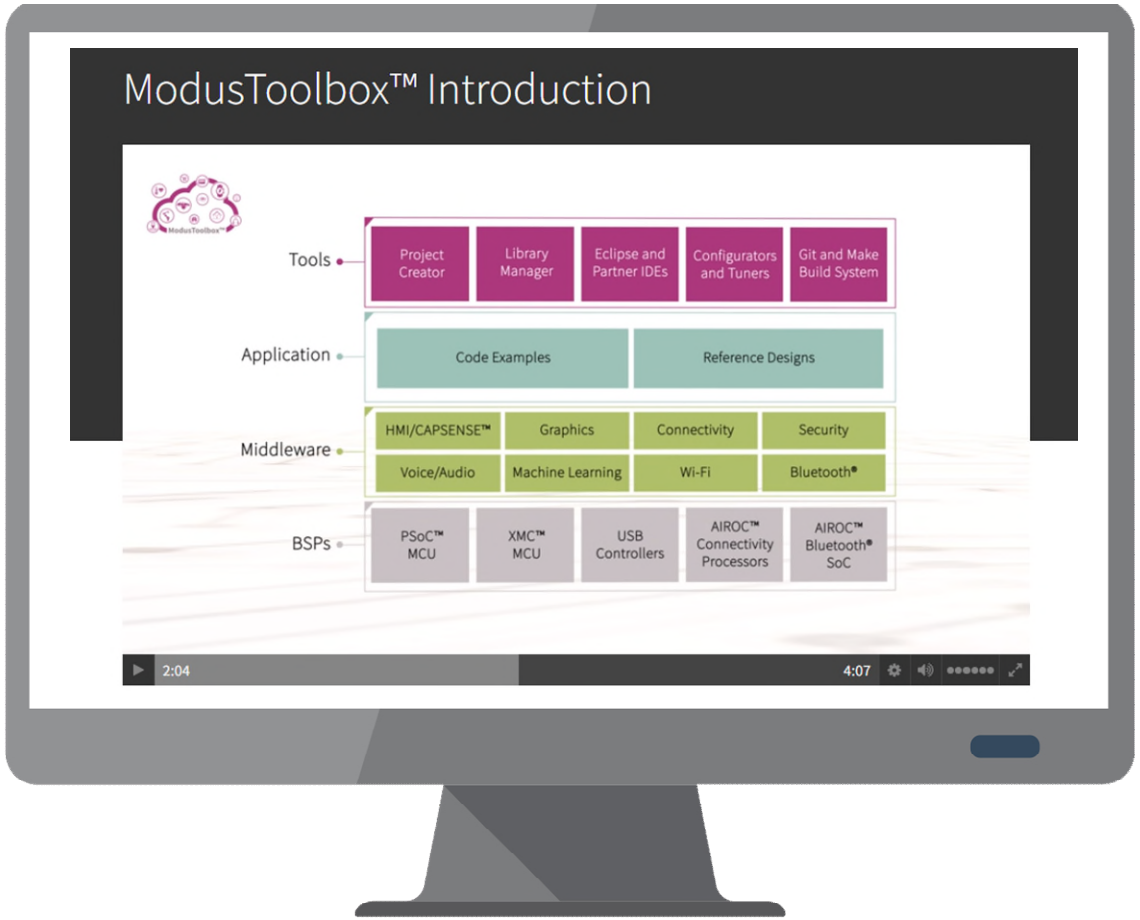
Application portability with ModusToolbox™ is facilitated through the use of the HAL APIs that work across supported MCUs, Configurators that allow you to adapt your configuration visually, and customizable Board Support Packages.

Develop the way you want to develop, with the workflow you get to define.

ModusToolbox™ Software Videos / Training

ModusToolbox™ Software Training

- ModusToolbox™ Software Training Level 1 - Getting Started
  - Introduction to tools within the ModusToolbox™ ecosystem
- ModusToolbox™ Software Training Level 2 – PSoC™ MCUs
  - PSoC™ 6 and PSoC™ 4 MCUs examples demonstrate the use of peripherals such as GPIOs, PWMs, ADCs, UARTs, etc. CAPSENSE™ and DMA
- ModusToolbox™ Software Training Level 3 - Bluetooth®
  - Exercises related to creating and debugging Bluetooth® application
- ModusToolbox™ Software Training Level 3 - Wi-Fi®
  - How to use Wi-Fi® within a ModusToolbox™ application



ModusToolbox™ Software Technical Videos

- Overview
  - Introduction / Infographic Video
- Getting Started
  - Installation / Documentation / Creating an application / Exploring an application / Command-Line Interface
- How-To
  - Start with a new application / Blinky LED / PWM / GPIO Interrupt

- **Key Topics**
  - Low-level Peripheral Driver Library APIs
    - GPIO / SBC (UART) / Timer / TRNG / Low Power / Interrupts
  - CAPSENSE Middleware
  - Device Configurator

- **Target Application**
  - Simple game, using TRNG to randomly turn on an LED that must be cleared using a capacitive touch pad before the time expires.

- **Bonus Content**
  - SmartIO w/ Breathing LED in Sleep low-power mode

- **Key Topics**
  - Middleware
    - FreeRTOS, Connectivity (Wi-Fi, lwIP, HTTP Server)
    - Middleware integration via Makefile
  - HAL APIs / Interprocessor Communication
  - Library Manager

- **Target Application**
  - Connectivity application featuring a soft Access Point with HTTP server, leveraging dual core (world's most complicated blinky)

- **Bonus Content**
  - Server-side Event (updating live web status)

Reference Slides

ModusToolbox™ Software and Tool release process

Infineon Developer Center

GitHub

ModusToolbox™ Tools Installation release

- Major or Minor release on 6-months cadence
- Point releases done as required
- Released as installable tools package on Infineon Developer Center

ModusToolbox™ Packs

- Out of cadence releases covering specific tool releases or early access packages
- Published as installable technology pack in Infineon Developer Center

Software releases

- Drivers, Libraries, Middleware releases on 3-months cadence
- May be broken into difference tracks: General, Machine Learning, Security
- Published to Infineon GitHub repositories

ModusToolbox™ Software – Key reference links for MCU

ModusToolbox™ Software and Tools Product Page

ModusToolbox™ Software GitHub Repository

ModusToolbox™ Software Training Repository

ModusToolbox™ Community Forum

PSoC™ 6

PSoC™ 6 Peripheral Driver Library

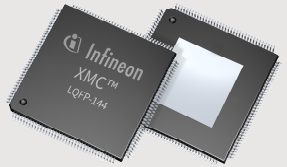
Hardware Abstraction Layer (HAL)

PSoC™ 6 Code Examples

PSoC™ 4

PSoC™ 4 Peripheral Driver Library

PSoC™ 4 Code Examples



XMC™

XMC™ Peripheral Library

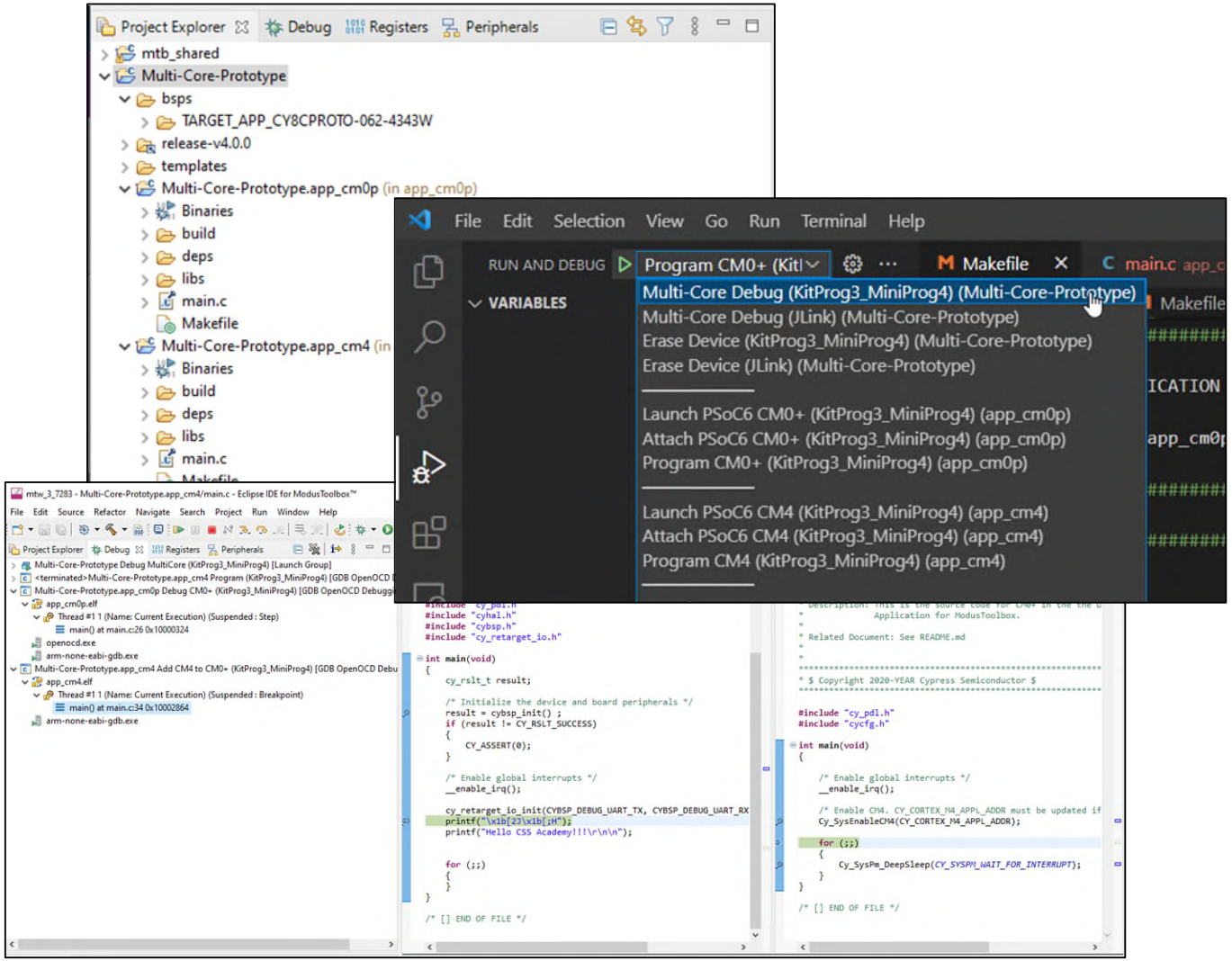
XMC™ Code Examples

Dual-core development with ModusToolbox™ 3.0

- **Multi-core application file structure**
  - Individual core projects in subfolders
  - BSP shared are project parent level
  - Make build commands function at application and project levels

- **ModusToolbox updates to support dual core**
  - Library Manager supports managing libraries included in each individual core's projects
  - Device Configurator allows generation of initialization code for both cores
  - Updated Code Examples featuring dual core use cases

- **Dual-Core Debugging / IDE Support**
  - Eclipse IDE for ModusToolbox™ and Microsoft VS Code support simultaneous debugging in single IDE instance
  - IAR EWARM and Arm µVision support dual core debugging in multiple instances, including ETM support



Alignment of ModusToolbox™ with Microcontrollers Portfolio

Microcontroller family	Recommended software development tool
32-bit PSoC™ 4 Arm® Cortex®-M0/M0+	
PSoC™ 4000	PSoC™ Creaor
PSoC™ 4000S	ModusToolbox™ Software and Tools*
PSoC™ 4100S	ModusToolbox™ Software and Tools*
PSoC™ 4100S Plus	ModusToolbox™ Software and Tools*
PSoC™ 4100S Plus 256KB	ModusToolbox™ Software and Tools
PSoC™ 4100S Max	ModusToolbox™ Software and Tools
other PSoC™ 4100	PSoC™ Creator
PSoC™ 4200	PSoC™ Creator
PSoC™ 4700S	ModusToolbox™ Software and Tools*
32-bit PSoC™ 5 LP Arm® Cortex®-M3	
PSoC™ 5LP	PSoC™ Creaor
32-bit PSoC™ 6 Arm® Cortex®-M4 / M0+	
PSoC™ 61	ModusToolbox™ Software and Tools
PSoC™ 62	ModusToolbox™ Software and Tools *
PSoC™ 63	ModusToolbox™ Software and Tools
PSoC™ 64	ModusToolbox™ Software and Tools

** Existing support is also available in PSoC™ Creator for these devices to support on-going project development*

- All new IoT Compute and Wireless MCUs (PSoC™ 4, PSoC™ 6, XMC, etc.) are planned to include support within ModusToolbox™
- PSoC™
  - PSoC™ 3 and PSoC™ 5 devices are not planned to be migrated to ModusToolbox™ at this time
- XMC™
  - Existing XMC™ devices are being migrated to ModusToolbox™, based on XMC Lib
  - New XMC™ devices will feature Peripheral Driver Library (PDL) and HAL in alignment with PSoC™ devices

Part of your life. Part of tomorrow.