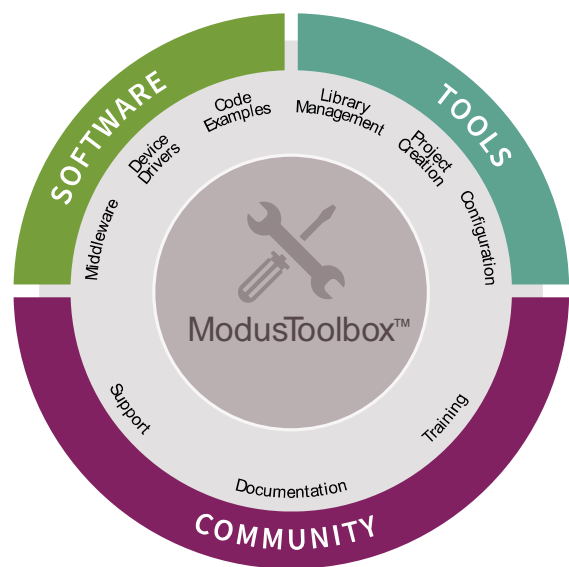


# ModusToolbox™ Software and Tools

Clark Jarvis (Software and Tools Product Marketer)  
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.

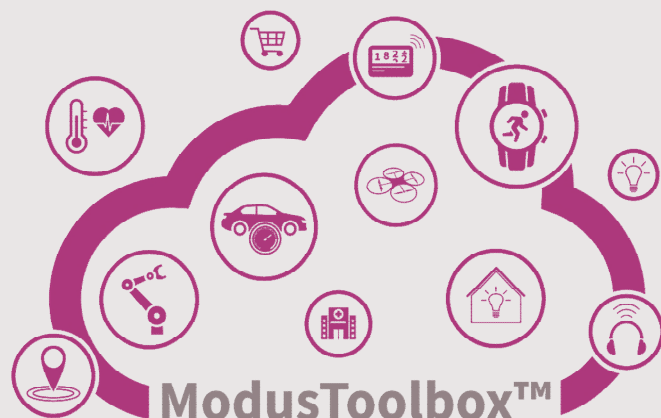
## Development Tools

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.**

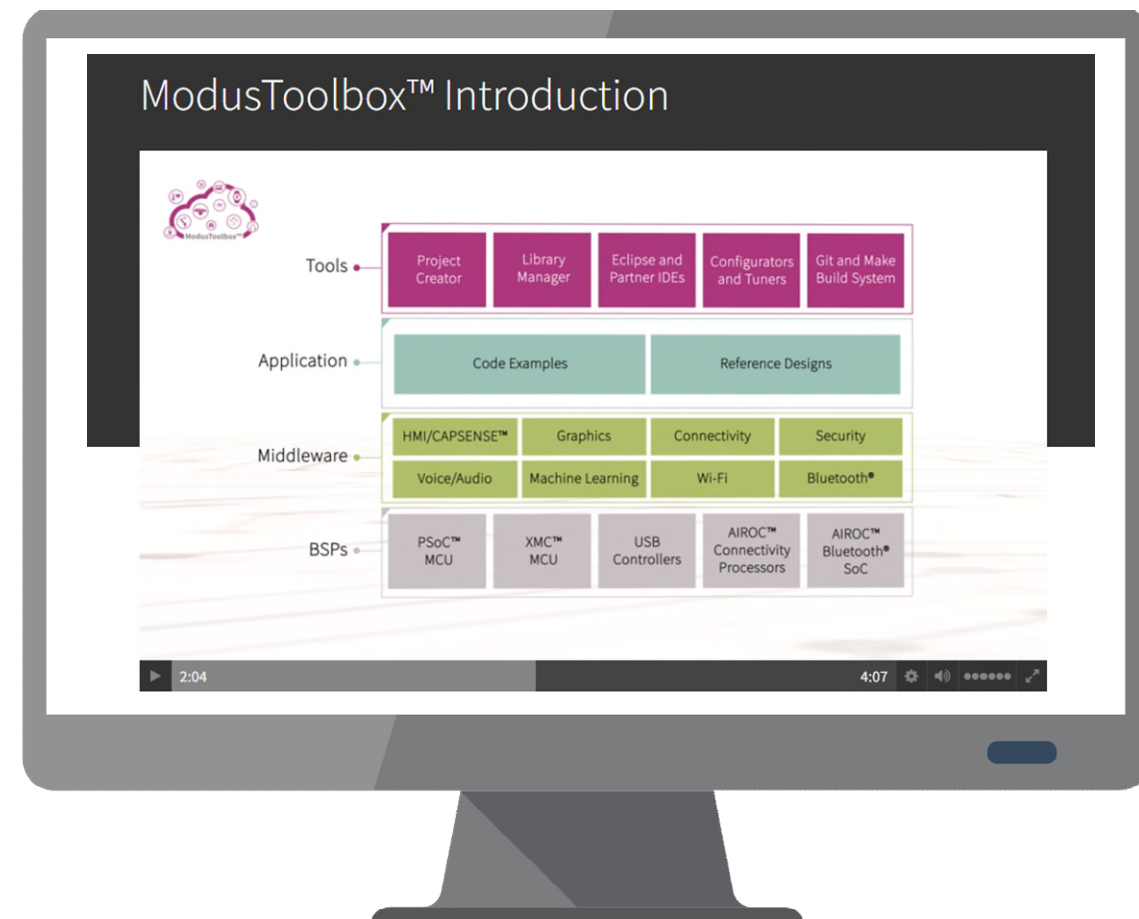
# ModusToolbox™ Software Videos / Training

## 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](#)



# PSoC™ 4 Hands-on Workshop

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## › Key Topics

- Low-level Peripheral Driver Library APIs
  - GPIO / SCB (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

# PSoC™ 6 Hands-on Workshop

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## › Key Topics

- Middleware
  - FreeRTOS, Connectivity (Wi-Fi, lwIP, HTTP Server)
  - Middleware integration via Makefile
- HAL APIs / Inter-Processor 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



## 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

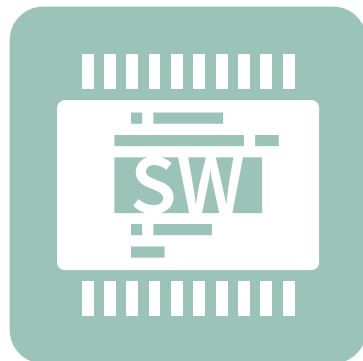
### Software releases

- › 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



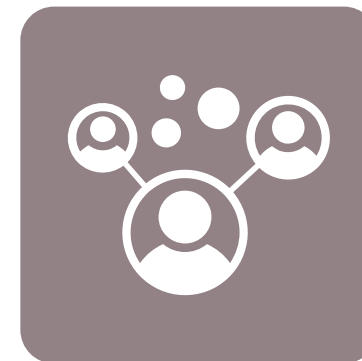
[ModusToolbox™  
Software and Tools  
Product Page](#)



[ModusToolbox™  
Software GitHub  
Repository](#)



[ModusToolbox™  
Software Training  
Repository](#)



[ModusToolbox™  
Community Forum](#)



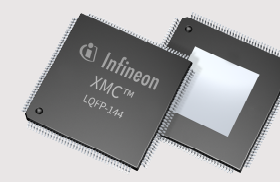
PSoC™ 6

[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

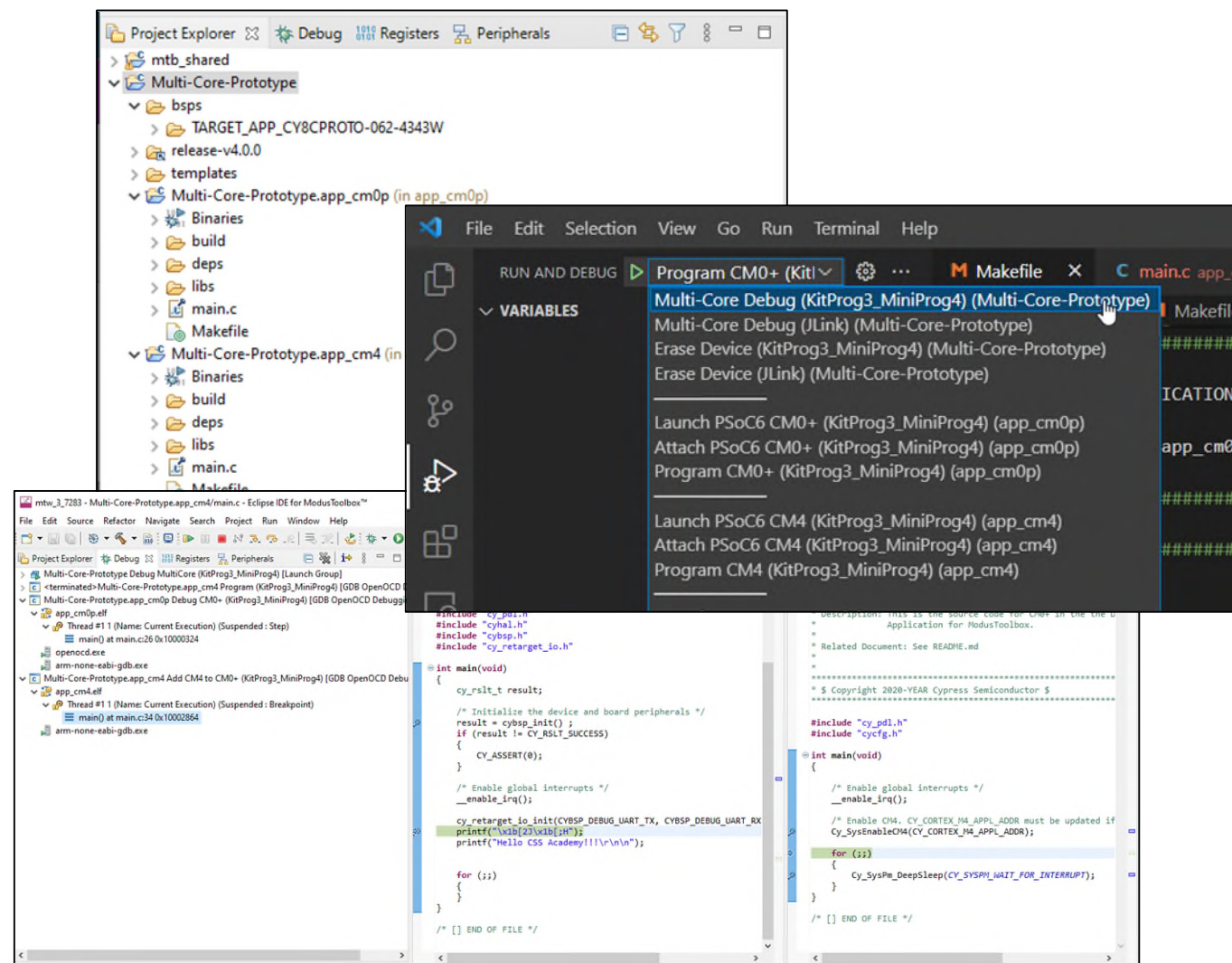
- Individual core projects in subfolders
- BSP shared are project parent level
- Make build commands function at application and project levels

## › 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
<b>32-bit PSoC™ 4 Arm® Cortex®-M0/M0+</b>	
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*
<b>32-bit PSoC™ 5 LP Arm® Cortex®-M3</b>	
PSoC™ 5LP	PSoC™ Creaor
<b>32-bit PSoC™ 6 Arm® Cortex®-M4 / M0+</b>	
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.