Getting Started with TI Microcontrollers
Getting Started with FreeRTOS

EMBEDDED ADVANTAGE
WORKSHOP DATA SHEET

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This datasheet provides the following information:

- Which revisions of software, tools, and hardware are supported for these workshops?
- Links to TI target boards recommended for purchase.
- Detailed workshop agenda with questions this workshop answers.

Software Tools & Revisions

Workshop solutions are tested against the following versions.

- Major changes to TI's Code Composer Studio (CCS) Integrated Development Environment (IDE) in late 2024, broke compatibility with some architectures. Therefore, not all TI MCUs are supported by CCS v20 (and later).
- Additionally, some older versions of the TI SDKs (software development kits) do not build correctly with the latest CCS IDE tools.
- The workshop solution files follow these recommendations. To address this, we provide two different solution ZIP files, one for CCSv12 and another for CCSv20.
- FreeRTOS is included in all the SDKs except MSP432E401Y.
- **C2000ware v26.00 problems: While our MCU labs build with v26.00, the FreeRTOS labs will not. Therefore, at this point in time, we suggest FreeRTOS users stick with C2000ware v5.50.
- ***MSPM0 SDK version 2.10 broke compatibility with CCSv12 by requiring a new version of the System Config tool. Therefore, we recommend all users switch to the new version of CCS. We don't plan to test future SDK revisions against CCSv12.

MCU Software Development Kits		Code Composer Studio (CCS)	
		Version 12. 8.1	Version 20.5.0
Download via TI-REX inside CCS, TI-REX online, or via links below		CCSTUDIOv12.8.1	CCSTUDIO
C2000	(C2000WARE)	5.04.00.00	5.05.00.00 **
MSPM0+	(MSPM0-SDK)	~~2.09.00.01~~ ***	2.10.00.04
MSP432E401Y FreeRTOS	(SIMPLELINK-MSP432E4-SDK) (202411.00)	3.40.01.02	Not Supported
CC1352	(SIMPLELINK-LOWPOWER-F2-SDK)	7.41.00.17	8.32.00.07
CC2340	(SIMPLELINK-LOWPOWER-F3-SDK)	8.20.0.119	9.14.02.16
CC3220	(SIMPLELINK-CC32XX-SDK)	7.10.00.13	Not Supported

Target Processors and Boards

Shown below is the full list of current and future supported targets for this workshop. Note that the processors listed in bold are the processors on the target hardware. This list also includes links for you to purchase the proper target boards.

Family	Supported Targets	Target Board & Link to TI Store
C2000	TMS320F28379D	C2000 Delfino MCU F28379D LaunchPad Development Kit (LAUNCHXL-F28379D)
MSPM0+	MSPM0C11xx MSPM0O13xx MSPM0G3xx	MSPM0G3507 LaunchPad™ development kit for Arm Cortex-M0+ MCU ($16.99) https://www.ti.com/tool/LP-MSPM0G3507
MSP432E4xx	**MSP432E401Y** MSP432E411Y	MSP-EXP432E401Y LaunchPad™ ($39.99) https://www.ti.com/store/ti/en/p/product/?p=MSP-EXP432E401Y
CC13xx	CC1311 CC1312R CC1352P **CC1352R**	LAUNCHXL-CC1352R1 L LaunchPad™ ($39.99) https://www.ti.com/store/ti/en/p/product/?p=LAUNCHXL-CC1352R1
CC26xx	CC2642R CC2652R CC2652RB	Both CC13x and CC26x supported by CC1352 LaunchPad
CC2340	**CC2340R5**	CC2340R5 LaunchPad™ (LP-EM-CC2340R5) for $25.00 (USD) Plus one of these debug probes: • XDS110 LaunchPad™ development kit debugger (LP-XDS110) • XDS110ET LaunchPad™ debugger with EnergyTrace™ (LP-XDS110ET)
CC32xx	CC3220MOD CC3220R **CC3220S** CC3220SF CC3235S CC3235SF	CC3220SF-LAUNCHXL LaunchPad™ ($49.99) https://www.ti.com/store/ti/en/p/product/?p=CC3220SF-LAUNCHXL

Description		Microcontroller	FreeRTOS
Workshop Introduction		●	●
Tool & Software Installation		CCS & SDK	FreeRTOS
Exploring SDK		●	●
Lab	Import SDK Example	●	●
Lab	Toggling Printf() (replaced by toggling LED in next lab)	●	●
GPIO Driver		●	●
Lab	Blink LED	●	●
Lab	Extend Driver	●	●
GPIO Inputs & Interrupts		●	●
Lab	Read GPIO Pin	●	●
Lab	GPIO Pin Interrupt	●	●
Example	Multi-Button Interrupts (MSPM0)	●	●
Timer Basics with Interrupts		●	●
Lab	Simple Periodic Timer Interrupt	●	●
Example	Connecting Timer Directly to Pin (MSPM0, C2000)	●	●
Example	Using GPTimer (CC1352)	●	●
Example	Creating PWM Output (MSPM0)	●	●
Serial Communication		●	●
Example	UART (Planned)	●	●
Example	SPI (Planned)	●	●
Example	I2C (Planned)	●	●
RTOS Introduction			●
Creating RTOS Projects			●
Lab	Creating “Starter” Project		●
Lab	RTOS Instrumentation – ROV & Logs (Note that TI does not support ROV/Logs for all MCU families.)		●
Lab	Idle Thread		●
Using Tasks			●
Lab	Adding a Task		●
Lab	Multi-tasking		●
“Software” Timers			●
Lab	Using FreeRTOS Software Timers		●
RTOS Signaling			●
Lab	Task Notifications		●
Lab	Semaphores		●
Lab	Events		●
Inter-Thread Communication			●
Lab	Using Queues		●
Lab	Using streamBuff (Planned)		●
Lab	Using messageBuff (Planned)		●
Lab	Using Mutex (Planned)		●
Using Hardware Interrupts			●
Lab	Using FreeRTOS with TI’s HWI library (Planned)		●
Lab	Using FreeRTOS with Bare-Metal Interrupts (Planned)		●
Pricing		$97	$197