

C2000™ Microcontroller Blockset Release Notes



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# R2023a

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**Version: 1.0**

**New Features**

## Introducing C2000 Microcontroller Blockset

Starting in R2023a, the C2000™ Microcontroller Blockset product replaces the Embedded Coder® Support Package for Texas Instruments® C2000 Processors and SoC Blockset™ Support Package for Texas Instruments C2000 Processors. You use C2000 Microcontroller Blockset to design, simulate, and implement single and multi-core applications with co-processors for Texas Instruments C2000 microcontrollers.

C2000 Microcontroller Blockset lets you design, simulate and implement single and multicore applications for Texas Instruments Microcontrollers. It provides blocks and libraries for peripherals such as ADC, digital IO, ePWM, SPI, I2C and more. It includes blocks to partition algorithms for multicore execution with inter-processor data communication and co-processor (Control Law Accelerator) workflow.

C2000 Microcontroller Blockset lets you perform simulations that account for ADC-PWM synchronization and latency. You can also connect your Simulink® model directly to Texas Instruments C2000 microcontrollers for live IO data exchange. A wide range of C2000 microcontrollers are supported including single-core, multicore, fixed point and floating-point processing units.

C2000 Microcontroller Blockset lets you generate code and perform real-time signal monitoring, parameter tuning, and processor-in-loop (PIL) testing with execution profiling (with Embedded Coder). The code is optimized for C2000 microcontrollers using IQ Math and related optimization routines. You can build and deploy Motor Control Algorithms to run on C2000 microcontrollers (with Motor Control Blockset™ and Embedded Coder).

## Product restructuring overview

In R2023a, C2000 Microcontroller Blockset provides the following support that previously was provided by Embedded Coder Support Package for Texas Instruments C2000 Processors, SoC Blockset, and SoC Blockset Support Package for Texas Instruments C2000 Processors.

- Enables you to run Simulink models on TI C2000 MCUs and automatically generate C code for your algorithms and device driver blocks that can run directly on the target hardware.
- Use key features of the SoC Blockset support package including ISR-based software architecture modeling, I/O device behavioral simulation, real-time on-device profiling, and embedded C code generation with device drivers.

In the new product, in general, software interfaces and development workflows are unchanged from previous releases. Product restructuring introduced these differences:

- Product requirements and dependencies:
  - C2000 Microcontroller Blockset requires only MATLAB® and Simulink for simulation and connected IO capabilities.
  - Embedded Coder is required to generate C/C++ code, create executables, and deploy the code on the hardware.
  - SoC Blockset is no longer required as the SoC Blockset Support Package for Texas Instruments C2000 Processors functionality is included in C2000 Microcontroller Blockset.
  - No support package is required.
- C2000 Microcontroller Blockset block libraries:

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- C2000 Microcontroller Blockset libraries replace block libraries from Embedded Coder Support Package for Texas Instruments C2000 Processors and SoC Blockset Support Package for Texas Instruments C2000 Processors .
  - Existing block names are unchanged and new blocks are added. Existing models created with Embedded Coder Support Package for Texas Instruments C2000 Processors and loaded in R2023a with C2000 Microcontroller Blockset will automatically link to the correct new blocks in C2000 Microcontroller Blockset.

## **Communicate with Texas Instruments C2000 Boards in Normal mode simulation using Connected IO**

The C2000 Microcontroller Blockset now supports Connected IO during Normal mode simulation for these peripherals.

- GPIO Digital Output
- GPIO Digital Input
- ADC
- ePWM

When you simulate a Simulink model in Normal mode with Connected IO, the model communicates with the IO peripherals on the hardware, enabling you to verify the model design before deploying it on the hardware. Connected IO enables you to verify the model design before deploying it on the hardware. For more information, see “Communicate with Hardware Using Connected IO”.

## **Linux Host Platform support for Texas Instruments C2000 Processors**

C2000 Microcontroller Blockset now provides support for Linux host platform. With the Linux support, you can perform code generation, Connected IO, Monitor & Tune (External mode), and PIL simulation.

## **Support for Hardware Interrupt and CLA Math blocks**

- Use the Hardware Interrupt block to create an interrupt service routine (ISR) automatically in the generated code of your model to react to the events selected. The ISR executes the downstream function-call subsystem associated with event ports of the block.

The **Hardware Mapping** app unifies the process of setting hardware peripheral properties and assigning tasks to event or interrupt sources into one location during the application deployment.

- Use the CLA Math block to implement CLA Math functions such as trigonometric, logarithmic, exponential, and power functions from CLA Math library.

