Target Support Package™ TC2 Release Notes

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Target Support Package™ TC2 Release Notes

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Contents

Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V3.2 (R2009a)	Yes Details	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation
V3.1 (R2008b)	Yes Details	No	Bug Reports Includes fixes	No
V3.0 (R2008a)	Yes Details	No	Bug Reports Includes fixes	No
V2.3 (R2007b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.2 (R2007a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.1 (R2006b)	Yes Details	No	Bug Reports Includes fixes	No
V2.0 (R2006a)	Yes Details	No	Bug Reports at Web site	No
V1.3 (R14SP3)	Yes Details	No	Bug Reports at Web site	No
V1.2.1 (R14SP2)	Yes Details	No	Bug Reports at Web site	No
V1.2 (R14SP1+)	Yes Details	No	Fixed bugs	No

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
V1.1.1 (R14SP1)	No	No	Fixed bugs	No
V1.1 (R14)	Yes Details	No	Fixed bugs	No
V1.0 (R13SP1+)	Yes See the V1.0 (R13SP1+) product documentation			No

Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features
- Changes
- Potential impact on your existing files and practices

Review the release notes for other MathWorks™ products required for this product (for example, MATLAB® or Simulink®) for enhancements, bugs, and compatibility considerations that also might impact you.

If you are upgrading from a software version other than the most recent one, review the release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

What's in the Release Notes

New Features and Changes

- New functionality
- Changes to existing functionality

Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product is released appear under Bug Reports at The MathWorks™ Web site. Bug fixes can sometimes result in incompatibilities, so you should also review the fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

The MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time and as more information becomes available. This includes provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

Version 3.2 (R2009a) Target Support Package TC2 Software

This table summarizes what's new in Version 3.2 (R2009a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes — Details labeled as **Obsolescence Warnings**, below. See also Summary.	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this new version are:

- "Direct Memory Access (DMA) Support for C28x3x" on page 4
- "DMA Option Added to the C28x3x ADC Block" on page 5
- "New DC/DC Buck Converter Demo" on page 5
- "External Mode Added to the Motor Control Workflow Demo" on page 5
- "Obsolescence Warning: Target Preference Blocks from R2006b and Earlier" on page 5
- "Obsolescence Warning: C2000 System Target Files" on page 6
- "Obsolescence Warning: Read From Memory and Write To Memory" on page 6
- "Obsolescence Warning: Host-Side CAN Blocks" on page 6

Direct Memory Access (DMA) Support for C28x3x

The "F28335 eZdsp" and the "F28335 eZdsp Stand alone code using Flash Memory" Target Preferences blocks include parameters for enabling and configuring up to six DMA channels. The DMA module moves data directly from the ADC to memory, bypassing the CPU and improving overall system performance.

DMA Option Added to the C28x3x ADC Block

The C280x/28x3x ADC block includes a new parameter, **Use DMA (with C28x3x)**, that automatically configures the DMA module to transfer data from the ADC module to memory on C28x3x processors.

New DC/DC Buck Converter Demo

The DC-DC Buck Converter demo shows you how to develop DC-DC power conversion applications for Texas Instruments™ C2000™ DSPs using Target Support Package™ TC2 software. The incremental model refinements in this demo are a workflow for designing and implementing DC-to-DC Buck Converter applications on embedded platforms. This demo highlights advanced processor-specific capabilities of Target Support Package TC2.

External Mode Added to the Motor Control Workflow Demo

The Motor Control demo contains new information on how to use the External Mode feature, which allows you to monitor model signals and tune model parameters in real-time directly from a Simulink model.

Obsolescence Warning: Target Preference Blocks from R2006b and Earlier

A future version of the Target Support Package TC2 software will remove support for Target Preferences blocks in models that were last saved in R2006b and earlier.

Models created or last saved using R2007a through R2009a do not require update because those models contain updated target preferences blocks.

Models created or last saved using R2006b or earlier, require update. See the following Compatibility Considerations for instructions.

Compatibility Considerations

If you open a model that was last saved in R2006b or earlier, the Target Support Package TC2 software will generate a warning instructing you to

save the model using R2007a through R2009a. Doing so automatically updates the target preference blocks.

Obsolescence Warning: C2000 System Target Files

A future version of the Target Support Package TC2 software will remove ti_C2000.tlc and ti_C2000_ert.tlc system target files.

If your models were created or last saved using R2007a through R2009a, you do not need to update your block. Those versions automatically configured the system target file parameter to use a forward-compatible system target file (ccslink_ert.tlc or ccslink_grt.tlc).

Models created or last saved using R2006b or earlier, require update. See the following Compatibility Considerations for instructions.

Compatibility Considerations

If you have models that were last saved in R2006b or earlier, open and save your models using R2007a through R2009a. Doing so automatically updates the system target parameter to use a forward-compatible system target file (ccslink_ert.tlc or ccslink_grt.tlc).

Obsolescence Warning: Read From Memory and Write To Memory

A future release will remove the From Memory and To Memory blocks from the Target Support Package TC2 product.

Compatibility Considerations

If your model contains the From Memory and To Memory blocks, you can prepare for this change by replacing them with the Memory Copy block from the Embedded IDE Link™ CC software (a system requirement for the Target Support Package TC2 software).

Obsolescence Warning: Host-Side CAN Blocks

A future release of the Target Support Package TC2 product may remove the following host-side CAN blocks:

- CAN Message Filter (Obsolete)
- CAN Message Packing (Obsolete)
- CAN Message Unpacking (Obsolete)
- CAN Message Packing (CANdb) (Obsolete)
- CAN Message Unpacking (CANdb) (Obsolete)
- Vector CAN Configuration (Obsolete)
- Vector CAN Receive (Obsolete)
- Vector CAN Transmit (Obsolete)

You can use two new host-side CAN blocks, CAN_Pack and CAN_Unpack, available starting with your R2009a Target Support Package TC2 license, to pack or unpack CAN messages. For more information, refer to the CAN Blocks Transition Page.

Compatibility Considerations

If you have models that use obsolete host-side CAN blocks in the Target Support Package TC2 block library, you will see an obsolescence warning message. Update your models to use the CAN Communication blocks available with the Vehicle Network Toolbox block library.

Update your models to use the new CAN_Pack and CAN_Unpack blocks available from the Target Support Package TC2 block library.

For information on using the new CAN blocks refer to the CAN Blocks Transition Page.

Version 3.1 (R2008b) Target Support Package TC2 Software

This table summarizes what's new in Version 3.1 (R2008b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this new version are:

- "Bug Notice" on page 8

- "Support for F2823x Processors Added to C28x Libraries" on page 9

- "Integrated Support for Programming Flash Memory" on page 9

- "C280x ePWM Block Now Uses SFO_V5 Library " on page 9

- "New Demo: Permanent Magnet Synchronous Motor Field-Oriented Control" on page 9

Bug Notice

Version 3.1 (R2008b) Target Support Package TC2 software contains the following bugs in the C2000 Target Preferences Library (c2000tgtpreflib):

- The icon for the **C28335 eZdsp Stand alone code using Flash Memory** block has a bad link. You will not be able to use the block in a model.

- The **C28335 eZdsp Target Preferences** block from the same library lacks definitions for the external memory sections ZONE7P and ZONE7D. Therefore, these sections are absent from the block's Memory bank list. You will not be able to use those external memory sections for your generated code.

To resolve these issues, visit
http://www.mathworks.com/support/bugreports/details.html?rp=485854 and
apply the patch available in the Workaround section.

Support for F2823x Processors Added to C28x Libraries

The libraries for C28x in Target Support Package TC2 now support the
F28232, F28234, and F28235 processors.

Integrated Support for Programming Flash Memory

Users can now configure Target Support Package TC2 software to
automatically program the flash memory after building and generating code.
You can also configure the software to erase, program, and verify individual
flash sectors.

C280x ePWM Block Now Uses SFO_V5 Library

The C280x ePWM block now uses the Scale Factor Optimizing Software
Version 5 (SFO_V5) library. TI recommends this library to "dynamically
determine the number of MEP steps per SYSCLKOUT period while the
HRPWM is in operation."

New Demo: Permanent Magnet Synchronous Motor Field-Oriented Control

The Permanent Magnet Synchronous Motor Field-Oriented Control demo
shows how to use C28x peripherals and DMC library blocks to control the
speed of a three-phase Permanent Magnet Synchronous Motor in a closed-loop
fashion using Field-Oriented Control.

You can get versions of this demo for the following Spectrum Digital boards:

- F2812 eZdsp

- F2808 eZdsp

- F28335 eZdsp

- F2806-based boards

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Version 3.0 (R2008a) Target Support Package TC2 Software

This table summarizes what's new in Version 3.0 (R2008a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this new version are:

- "New Target Preferences Blocks for F28335 eZdsp" on page 10
- "New I2C, Watchdog, and GPIO Blocks" on page 11
- "Blocks with Expanded Support for C2833x" on page 11
- "New Demo: Using the I2C Bus to Access a Connected EEPROM" on page 12
- "Expanded Control of On-Chip Peripherals Using Qualification Type and Sampling Period" on page 12
- "Expanded Control of Enhanced Pulse Width Modulation (ePWM) Using Interrupts" on page 13

New Target Preferences Blocks for F28335 eZdsp

Two new target preferences blocks provide support for F28335 eZdsp boards:

- F28335 eZdsp
- F28335 eZdsp Stand alone code using Flash Memory

New I2C, Watchdog, and GPIO Blocks

Five new blocks provide support for inter-integrated circuit (I2C), watchdog timer, and general-purpose I/O (GPIO) for the processors indicated by the block name:

- C280x/C2833x I2C Receive — Configure the I2C module to receive data from the I2C bus.

- C280x/C2833x I2C Transmit — Configure the I2C module to transmit data on the I2C bus.

- C28x Watchdog — Configure the Watchdog module on the C280x, C281x, and C2833x Digital Software Controllers.

- C280x/C2833x GPIO Digital Input — Configure GPIO inputs for the specified pins with qualification type settings.

- C280x/C2833x GPIO Digital Output — Configure GPIO outputs for the specified pins.

Blocks with Expanded Support for C2833x

Fifteen blocks provide expanded support for the C2833x processor:

- C280x/C2833x ADC — Configure ADC to output a constant stream of data collected from the ADC pins on the C280x/C2833x.

- CAN Calibration Protocol — Implement CAN Calibration Protocol (CCP) on the target processor.

- C280x/C2833x eCAN Receive — Configure an eCAN mailbox to receive messages from the eCAN bus pins on the C280x/C2833x processor.

- C280x/C2833x eCAN Transmit — Configure an eCAN mailbox to transmit messages to the CAN bus pins on the C280x/C2833x processor.

- C280x/C2833x eCAP — Configure the settings of the C280x/C2833x processor for eCAP.

- C280x/C2833x ePWM — Configure the Event Manager of the C280x/C2833x to generate ePWM waveforms.

- C280x/C2833x eQEP — Provide an enhanced quadrature encoder pulse (eQEP) module for use in high performance motion and position control systems.

- C280x/C2833x Hardware Interrupt — Create an interrupt service routine which executes the downstream subsystem.

- C280x/C2833x SCI Receive — Configure Serial Communication Interface (SCI) of the C280x/C2833x processor to receive data from the SCIRXD pin.

- C280x/C2833x SCI Transmit — Configure Serial Communication Interface (SCI) of the C280x/C2833x processor to transmit data from the SCITXD pin.

- C280x/C2833x Software Interrupt Trigger — Trigger a hardware interrupt in software.

- C280x/C2833x SPI Receive — Receive uint16 data from SPISOMOx and SPISIMIx pin when running in slave and master mode, respectively.

- C280x/C2833x SPI Transmit — Transmit uint16 data from SPISOMIx and SPISIMOx pin when running in slave and master mode, respectively.

- Idle Task — Create a free-running task that executes the downstream subsystem.

- Read From Memory — Read from sequential locations of the target memory starting at a specified address.

- Write To Memory — Write to sequential locations of the target memory starting at a specified address.

New Demo: Using the I2C Bus to Access a Connected EEPROM

The demo, Using the I2C Bus to Access a Connected EEPROM, shows you how to access an EEPROM connected to the chip using the I2C bus. Versions of the demo are available for the Spectrum Digital™ F2808 eZdsp and F28335 eZdsp boards.

Expanded Control of On-Chip Peripherals Using Qualification Type and Sampling Period

The target preference blocks now provide parameters for you to set the GPIO Input qualification type and sampling period.

Expanded Control of Enhanced Pulse Width Modulation (ePWM) Using Interrupts

The C280x/C2833x ePWM block provides Event Trigger parameters that you can use to enable an ePWM interrupt, select the event to generate the interrupt, and set the interrupt counter match event condition.

Version 2.3 (R2007b) Target for TI C2000

This table summarizes what's new in Version 2.3 (R2007b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes — Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this new version are:

- "Link and Target Products Regrouped in New Start, Help, and Demos Category" on page 14
- "Support for High Resolution PWM" on page 15
- "Support for CCP/ASAP2" on page 15
- "Interrupt Handling for 280x eQEP" on page 15
- "Compatibility Considerations" on page 15

Link and Target Products Regrouped in New Start, Help, and Demos Category

A new product category, Links and Targets, now contains all MathWorks software products that link, target, or cosimulate code.

Compatibility Considerations

This change impacts you in the following ways:

- Finding and viewing these products through the MATLAB Desktop **Start** button and in the Help browser **Contents** and **Demos** panes.
- Using the demo command to access the product demos.

For more about this new product category, see "Demos and Help Browser Contents Now Include New Category for Links and Targets", in the *MATLAB Release Notes*.

Support for High Resolution PWM

High Resolution PWM support has been added to the ePWM block.

Support for CCP/ASAP2

Support has been added for the CCP/ASAP2 protocols, including the ability to use external mode with these protocols.

Interrupt Handling for 280x eQEP

Support for interrupt handling for the 280x eQEP has been added, along with a panel within the block parameters dialog where interrupts corresponding to specific events are enabled or disabled.

Compatibility Considerations

- Support for the C24x family has been removed.

- The C280x ePWM block has been updated in such a way that it may not be compatible with models created in R2007a. In particular, when opening R2007a models containing the ePWM block in R2007b, several warning messages may be generated, and the settings for the C280x ePWM blocks may not be honored. This pertains specifically to settings that are made through the input port.

Version 2.2 (R2007a) Target for TI C2000

This table summarizes what's new in Version 2.2 (R2007a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes — Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this new version are:

- "General Purpose I/O (GPIO) Blocks to Configure GPIO Registers for C280X Processors" on page 16

- "Software Triggered Interrupt Blocks for Interrupt-Driven Scheduling in Models" on page 17

- "C280x Enhanced CAP (eCAP) Block for C280x Processor Targets" on page 17

- "Product Name Change" on page 17

- "Code Generation Capability Moved to Link for Code Composer Studio Development Tools" on page 17

General Purpose I/O (GPIO) Blocks to Configure GPIO Registers for C280X Processors

Four general-purpose I/O (GPIO) blocks have been added to configure GPIO registers for C280x processors:

- C280x/C28x3x GPIO Digital Input: Configure general purpose input pins

- C280x/C28x3x GPIO Digital Output: Configure general purpose output pins

- C281x GPIO Digital Input: Configure general purpose input pins

- C281x GPIO Digital Output: Configure general purpose output pins

These new blocks are similar to the existing blocks for C24x processors.

Software Triggered Interrupt Blocks for Interrupt-Driven Scheduling in Models

Both the C280x and C281x block libraries have SW Triggered Interrupt blocks (C280x Software Interrupt Trigger and C281x Software Interrupt Trigger) for developing processes that use asynchronous scheduling.

C280x Enhanced CAP (eCAP) Block for C280x Processor Targets

The C280x/C28x3x eCAP block enables your project to configure enhanced capture channels or the auxiliary pulse width modulator (PWM) capability in the capture and PWM modules.

Product Name Change

Embedded Target for the Texas Instruments TMS320C2000™ DSP Platform is now Target for TI C2000™.

Code Generation Capability Moved to Link for Code Composer Studio Development Tools

Moving the code generation features to the Project Generator component of Link for Code Composer Studio™ provides a number of benefits:

- Unifies code generation across all of the target products.

- Improves the product maintainability

- Accelerates adding new features across the target products

- Enables greater consistency of use, such as adding chips, or libraries, or source files, by making the interfaces the same across all target products.

Compatibility Considerations

Relocating code generation from this product causes the following issues to occur:

- The system target files `ti_c2000_ert.tlc` and `ti_c2000_grt.tlc` have been removed. In the configuration parameters for your model, replace the existing system target file with the Link for CCS system targets file `ccslink_ert.tlc` or `ccslink_grt.tlc`.

- Target Preferences blocks have changed. While the blocks are in the same libraries, the block parameters are different. You need to open the Target Preferences block in your model and reset the parameters.

- In earlier releases, Target Preferences blocks contained target-specific simulation parameters. Those parameters are now part of Link for CCS and are new or changed. You need to open the Configuration Parameters dialog box for your model and set the **Real-Time Workshop** and **Link for CCS** options to update your model to the new organization.

Updating Older Simulink Models. As noted in the Compatibility Considerations, moving the code generation function out of this product causes a number of issues with existing models. To help you migrate your current models to Version 2.2, Target for TI C2000 provides an automatic model update feature that operates the first time you open an existing model.

When you open an existing model after you install Version 2.2, you see a message that your model is not compatible with the new release and that asks you whether to update your model to the new configuration.

If you click **No**, the update process does not proceed and your model remains unchanged. The next time you open the model, the prompt appears again.

If you click **OK**, Target for TI C2000 makes a backup copy of your model (named *model*`.bak`) and then attempts to convert your model to the new configuration by making the following changes:

- Uses the target preferences in your model to configure the Target Preferences block in the new model, populating the new block options with the parameters from the existing target preferences and from the model configuration parameters. This includes build options, code generation options, and peripheral settings.

- Changes the system target file from `ti_c2000_ert.tlc` or `ti_c2000_grt.tlc` to `ccslink_ert.tlc` or `ccslink_grt.tlc`, as appropriate.

- Populates the new **Link for CCS** options in the Configuration Parameters dialog box with the parameters from the **Real-Time Workshop** options in your model.

- Populates the new **Peripherals** pane on the new Target Preferences block with many of the peripherals parameters from the original model.

Model updating cannot migrate all of the peripheral information you have defined in the original Target Preferences block in your model. For the processors shown in the following table, model update may not migrate all the options for the listed peripherals. You have to verify and set the peripheral options manually in the Target Preferences block:

Processor or Family	Peripheral
C2407	SCI
	SPI
C280x	SCIB
C281x	ADC
	SCI A
	SCI B
	SPI

When the model update does not migrate the options, it sets the new options to the default values.

As the model update process continues, it prints messages in the MATLAB command window about the changes it makes and about any changes you need to make manually.

Version 2.1 (R2006b)Target for TI C2000

This table summarizes what's new in Version 2.1 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	No

New features and changes introduced in this version are

- "Host-Side SCI Transmit and Receive Blocks Provide Real-Time Communication with Target" on page 20

- "c280x SCI Transmit and Receive Blocks Provide Real-Time Communication with Host" on page 21

- "c280x SPI Transmit and Receive Blocks Provide Serial Peripheral Communication with Host" on page 22

- "Custom Data Configuration for Serial Communications Interface on c281x SCI Transmit and Receive Blocks" on page 22

- "Optional Blocking Mode and Output Status Ports Added to c281x SPI Transmit and Receive Blocks" on page 22

- "SCI and SPI Module Configuration Available for Target Preferences Blocks" on page 23

- "TMS320C2802 and TMS320C2809 Chip Support Added to c280x DSP Chip Library" on page 23

- "New Demos and Demo Versions" on page 23

Host-Side SCI Transmit and Receive Blocks Provide Real-Time Communication with Target

The new host-side SCI blocks communicate with the running target processor, thereby providing blocking mode for real-time synchronization. The new host-side SCI Library, `c2000scilib`, includes the following blocks:

- SCI Setup

  Configure COM ports: Specify raw data or protocol mode, baud rate, character length bits, stop bits, parity mode, and time-out. Protocol mode provides the ability to block processes by requiring the transmitting side to transmit $SND and the receiving side to respond $RDY before any data is actually sent. While this handshake is being performed and data is being transmitted, all other processes are suspended.

- SCI Receive

  Configure data: Specify additional package headers and terminators, data type and package length, what value to output on time-out, and sample time.

- SCI Transmit

  Configure transmission: Specify COM port and additional package headers and terminators.

c280x SCI Transmit and Receive Blocks Provide Real-Time Communication with Host

c280x SCI Transmit and Receive blocks communicate with the host via the serial communications interface. You can specify the following:

- Module (select A or B)

- c280x SCI Receive block parameters:

  - Data type and package length

  - Value to output on time-out

  - Sample time

  - Add status output port

  - Enable receive FIFO interrupt

- c280x SCI Transmit block parameters:

  - Additional package headers and/or terminators

  -

  - Enable transmit FIFO interrupt

c280x SPI Transmit and Receive Blocks Provide Serial Peripheral Communication with Host

c280x SPI Transmit and Receive blocks communicate with the host via the serial peripheral interface. You can specify the following:

- Module (select A, B, C, or D)

- c280x SPI Receive block parameters:
    - Data length
    - Add status output port
    - Enable blocking mode
    - Post interrupt when data is received
    - Sample time

- c280x SCI Transmit block parameters:
    - Add status output port
    - Enable blocking mode
    - Post interrupt when data is transmitted

Custom Data Configuration for Serial Communications Interface on c281x SCI Transmit and Receive Blocks

c281x SCI Transmit and SCI Receive blocks now provide custom data configurations for transmit and receive. Specify module, data type, package length, value to output on time-out, sample time, status output port, and receive FIFO interrupt on the c281x SCI Receive block. Also specify additional package headers and terminators and enable transmit FIFO interrupt on the c281x SCI Transmit block.

Optional Blocking Mode and Output Status Ports Added to c281x SPI Transmit and Receive Blocks

c281x SPI Transmit and SPI Receive now provide optional blocking mode and output transmit and receive error status ports.

SCI and SPI Module Configuration Available for Target Preferences Blocks

SCI and SPI module configuration for specifying serial communication interface and serial peripheral interface parameters is now available for F2808, F2812, and Custom 281x blocks.

TMS320C2802 and TMS320C2809 Chip Support Added to c280x DSP Chip Library

The TMS320C2802 and TMS320C2809 chips have been added to the list of supported c280x DSP chips.

New Demos and Demo Versions

Several new demos, as well as new versions of existing demos, are included in this release:

• HIL Verification of IIR Filter Using SCI

  Hardware-in-the loop (HIL) demo using SCI for Spectrum Digital F2812 and F2808 eZdsp(tm).

  This demo is new. The following version is available:

      Spectrum Digital F2812 eZdsp: `c2000scitest.mdl`
      Spectrum Digital F2808 eZdsp: `c2000scitest.mdl`

• Permanent Magnet Synchronous Motor Field-Oriented Control

  PMSM FOC demo using asynchronous scheduler with flash memory download for Spectrum Digital F2812, Spectrum Digital F2808 eZdsp(tm), and F2806 custom board.

  This version is an enhancement of an existing demo. The following versions are available:

      Spectrum Digital F2806 eZdsp: `c2806pmsmfoc.mdl`
      Spectrum Digital F2806 eZdsp with flash-based memory map: `c2806pmsmfocflash.mdl`
      Spectrum Digital F2808: `c2808pmsmfoc.mdl`
      Spectrum Digital F2808 with flash-based memory map: `c2808pmsmfocflash.mdl`

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Spectrum Digital F2812 eZdsp: `c2812pmsmfoc.mdl`
Spectrum Digital F2812 eZdsp with flash-based memory map:
`c2812pmsmfocflash.mdl`

- Simulation of FOC Using PMSM Model

  Simulation demo of FOC using PMSM model for Spectrum Digital F2812
  and F2808 eZdsp(tm) .

  This demo is new. The following versions are available:

  Spectrum Digital F2808: `c2808pmsmsim.mdl`
  Spectrum Digital F2812 eZdsp: `c2812pmsmsim.mdl`

Version 2.0 (R2006a) Target for TI C2000

This table summarizes what's new in Version 2.0 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are

- "Asynchronous Interrupt Scheduling Support for C280x and C281x" on page 25
- "Expanded Support for C2000 Targets" on page 26
- "C28x Blocks and Library Renamed" on page 26
- "Flash Memory Programming Support" on page 27
- "New C280x Chip Support Library" on page 27
- "New Demos and Demo Versions" on page 28
- "New Memory Management Features in Real-Time Workshop Embedded Coder" on page 28

Asynchronous Interrupt Scheduling Support for C280x and C281x

Asynchronous interrupt scheduling is now supported for C280x and C281x-based boards. The following new blocks are the result of the implementation of this feature:

- C280x Hardware Interrupt
- C281x Hardware Interrupt
- C281x Timer
- Idle Task

Additionally, many existing C281x blocks and new C280x blocks include a check box that lets you trigger an asynchronous interrupt when a specific processing event occurs.

Expanded Support for C2000 Targets

New Target Preferences blocks in the C2000 Target Preferences library provide support for an expanded range of boards. The new Target Preferences blocks include:

- F2808 eZdsp, which lets you target the F2808 eZdsp™ DSP board from Spectrum Digital.
- Custom C280x Board, which lets you target custom boards based on several members of the C280x chip family.
- Custom C281x Board, which lets you target custom boards based on several members of the C281x chip family.

C28x Blocks and Library Renamed

With the introduction of support for C280x-based boards, the designations "C2800" and "C28x", which in the past had been used to refer primarily to the F2812 eZdsp DSP board, became ambiguous.

To avoid confusion that might result from this ambiguity, the block library `c2800dspchiplib` has been superseded by a new (and expanded) block library named `c281xdspchiplib`. Also, all references to blocks in this library have been changed from "C28x..." to "C281x...".

The `c281xdspchiplib` library features an improved layout with blocks organized into the following categories:

- Utilities
- Scheduling
- Control
- Communications

> **Note** The introduction of the `c281xdspchiplib` block library should have no effect on backward compatibility. The old `c2800dspchiplib` block library is no longer included in the product, but when you open an existing model, the Simulink block forwarding mechanism will automatically remap your C28x blocks to the new block library.

Flash Memory Programming Support

The Target Preferences blocks for F2812 eZdsp and F2808 eZdsp boards now let you choose to burn generated code into on-board flash memory.

New C280x Chip Support Library

The new C280x Chip Support Library, `c280xdspchiplib`, includes the following blocks presented in functional categories as follows:

Utilities

- From Memory
- To Memory

Scheduling

- C280x Hardware Interrupt
- Idle Task

Control

- C280x ADC
- C280x ePWM
- C280x eQEP

Communications

- C280x eCAN Receive
- C280x eCAN Transmit

New Demos and Demo Versions

Several new demos, as well as new versions of existing demos, are included in this release:

- Permanent Magnet Synchronous Motor Field-Oriented Control

  This is a new demo. The following version is available:

  > Spectrum Digital F2812 eZdsp: `c2812pmsmfoc.mdl`

- Asynchronous Scheduling

  This is a new demo. The following versions are available:

  > Spectrum Digital F2812 eZdsp: `c2812asyncscheduling.mdl`
  > Spectrum Digital F2808 eZdsp: `c2808asyncscheduling.mdl`

- PWM Duty Cycle Control via Period Change

  The following new version of this existing demo is available:

  > Spectrum Digital F2808 eZdsp: `c2808pwmtest.mdl`

- ADC Control of PWM Duty Cycle

  The following new version of this existing demo is available:

  > Spectrum Digital F2808 eZdsp: `c2808adcpwmtest.mdl`

- ADC-PWM Synchronization via ADC Interrupt

  This is a new demo. The following versions are available:

  > Spectrum Digital F2812 eZdsp: `c2812adcpwmasynctest.mdl`
  > Spectrum Digital F2808 eZdsp: `c2808adcpwmasynctest.mdl`

New Memory Management Features in Real-Time Workshop Embedded Coder

The Embedded Real-Time (ERT) target for the Target for TI C2000 (`ti_C2000_ert.tlc`) offers new memory management features that give you a

way manage the performance of your code while working with limited memory resources. This option requires Real-Time Workshop Embedded Coder.

For more information on this, see the chapter on Memory Sections in the *Real-Time Workshop Embedded Coder User's Guide*.

Version 1.3 (R14SP3)Target for TI C2000

This table summarizes what's new in Version 1.3 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are

- "Free-Running Scheduler" on page 30

- "Support for the C2407 Internal Memory Map" on page 31

- "New SCI Blocks" on page 31

- "New SPI Blocks" on page 31

- "New Ramp Control Block" on page 31

- "New Ramp Generator Block" on page 31

- "ADC Enhancements" on page 31

- "CAN Enhancements" on page 31

- "PWM Enhancements" on page 32

- "Simulation Stop Time" on page 32

Free-Running Scheduler

A new scheduler that does not use any interrupts has been added as an option to the L2407 and F2812 Target Preferences blocks under **CodeGeneration > Scheduler > Algorithm**. Tasks using this scheduler run in priority-based order and execution depends on how fast the task can run.

Support for the C2407 Internal Memory Map

The Internal Memory Map option on the C2407 Target Preferences is now supported. Note that only very small programs will fit into the internal memory of the C2407.

New SCI Blocks

The C24x and C28x libraries now include blocks for receiving and transmitting data via the serial communications interface. Note that, as of Version 2.0, the C28x library has been renamed to C281x.

New SPI Blocks

The C24x and C28x libraries now include blocks for receiving and transmitting data via the serial peripheral interface. Note that, as of Version 2.0, the C28x library has been renamed to C281x.

New Ramp Control Block

A new Ramp Control block for creating a ramp up or ramp down function has been added to the Digital Motor Control library.

New Ramp Generator Block

A new Ramp Generator block for generating ramp output has been added to the Digital Motor Control library.

ADC Enhancements

Support for the following has been added to the ADC blocks:

- Simultaneous sampling mode for c281x-based boards
- Oversampling mode for c281x- and c240x-based boards

CAN Enhancements

Support for nonblocking transmit mode has been added to the CAN blocks.

PWM Enhancements

Support for the following has been added to the PWM blocks:

- Ability to change PWM waveform control logic in real time

- Ability to change deadband period value in real time

- Ability to select units (CPU clock cycles, seconds, or percentages) for PWM period and duty cycle

Simulation Stop Time

In generated code, the Simulink simulation stop time is no longer supported. A simulation stop via a Stop block, however, is honored in the generated code.

Version 1.2.1 (R14SP2)Target for TI C2000

This table summarizes what's new in Version 1.2.1 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are described here:

CAP Blocks

Two blocks for capturing transitions on the capture unit pins have been added — C24x CAP and C28x CAP.

Version 1.2 (R14SP1+) Target for TI C2000

This table summarizes what's new in Version 1.2 (R14SP1+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Fixed bugs	No

New features and changes introduced in this version are

- "RTDX" on page 34
- "VectorCAN" on page 34
- "DC Motor Speed Control Demo" on page 34
- "Fixed Bugs" on page 35

RTDX

Two blocks for real-time data exchange (RTDX) support in generated code have been added — From RTDX and To RTDX. RTDX enables data exchange between the host, which hosts TI Code Composer Studio and the target, which hosts your DSP program.

VectorCAN

Blocks for VectorCAN and CAN message packing and unpacking have been added. VectorCAN blocks configure, read, and transmit CAN channels for use with Vector-Informatik drivers. CAN message packing blocks pack signals into CAN messages.

DC Motor Speed Control Demo

The new 2812 eZdsp DC Motor Speed Control demo requires the Signal Processing Blockset.

Fixed Bugs

The Target for TI 0C2000 includes several bug fixes made since Version 1.1.1. This section describes a particularly important Version 1.2 bug fix.

To Memory Block and Contiguous Data

The To Memory block now verifies that data at its input port is contiguous.

Version 1.1.1 (R14SP1) Target for TI C2000

This table summarizes what's new in Version 1.1.1 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Fixed bugs	No

New features and changes introduced in this version are described here:

Fixed Bugs

The Target for TI C2000 includes several bug fixes made since Version 1.1. This section describes the particularly important Version 1.1.1 bug fixes.

CCS Warnings About Custom Data Types

During code compilation for the C2400, Code Composer Studio now processes custom data types defined in the tmwtypes.h file correctly, without issuing warnings.

Custom Code Options in Real-Time Workshop Configuration Parameters Now Supported

The Custom Code options in the Real-Time Workshop® Configuration Parameters are now supported. This allows you to add additional files and paths to the build process. It also supports inserting custom C code into specific sections of your code.

Deadband Theoretical Results Updated in TI Documentation

The deadband values (settable via the PWM Blocks) were not explained sufficiently in the Texas Instruments documentation. This information has been updated on page 2-4 of Texas Instruments document SPRU065B, TMS320F28x Event Manager (EV) Peripheral Reference Guide. This document can be downloaded from the Texas Instruments Web site http://www.ti.com/.

First Time Opening Target Preference Block Shows Correct Inspector GUI

When you double-click the Target Preference block for the first time in a given model, the Inspector page now appears correctly.

Simulation Stop Times Match in Simulation and Generated Code

When the simulation stop time is less than infinity, the effective stop time in simulation now matches the effective stop time in the generated code.

Upgrading from an Earlier Release

This section describes an upgrade issue involved in moving from the Target for TI C2000 1.1 to Version 1.1.1.

Space Vector Generator Inputs Renamed

The input parameters to the Space Vector Generator block have been renamed from `Va` and `Vb` to `Ua` and `Ub`, respectively. This change matches the terminology used in Texas Instruments documentation.

Version 1.1 (R14) Target for TI C2000

This table summarizes what's new in Version 1.1 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Fixed bugs	No

New features and changes introduced in this version are

- "New DMC Library" on page 38
- "New C28x Blocks" on page 39
- "New C24x Blocks" on page 39
- "Enhancements to Other Blocks" on page 39
- "Fixed Bugs" on page 39

New DMC Library

A new digital motor control (DMC) library has been added to support C28x boards. This library contains these blocks:

- Clarke Transformation — transforms three-phase into two-phase quadrature quantities
- Inverse Park Transformation — transforms rotating reference frame vectors to two-phase stationary reference frame
- Park Transformation — transforms two-phase stationary system vectors to rotating system vectors
- PID Controller — creates a digital PID controller
- Space Vector Generator — calculates duty ratios to generate stator reference voltage
- Speed Measurement — calculates motor speed

New C28x Blocks

The following new blocks have been added to support C28x boards:

- C28x GPIO Digital Input — configures the General Purpose I/O pin registers for digital input

- C28x GPIO Digital Output — configures the General Purpose I/O pin registers for digital output

- C28x QEP — configures the quadrature pulse encoder circuit

New C24x Blocks

The following new blocks have been added to support C24x boards:

- C24x GPIO Digital Input — configures the General Purpose I/O pin registers for digital input

- C24x GPIO Digital Output — configures the General Purpose I/O pin registers for digital output

- C24x QEP — configures the quadrature pulse encoder circuit

Enhancements to Other Blocks

The C24x and C28x ADC blocks have been enhanced by adding a triggering mode option which synchronizes the ADC with a PWM waveform generated by the same event manager module.

Fixed Bugs

The Target for TI C2000 includes several bug fixes made since Version 1.0. This section describes the particularly important Version 1.1 bug fixes.

ADC Block Accuracy

When the C28x ADC high-speed peripheral clock rate was equal to the system clock rate, A/D conversion results were not accurate. This has been fixed by setting the ADC core clock divider to 1 to halve the high-speed peripheral clock rate.

EMIF Setting Changed to Reduce Wait States

When full memory map is used with the F2812 eZdsp, extra wait states were included for external memory banks. This did not allow for the fastest code execution speed possible with the external memory type used with the F2812 eZdsp. Unnecessary wait states have been removed to enable fastest code execution speed.

Multitasking Solver Mode Now Supported

In the previous version, only single-tasking solver mode was supported because the generated code did not allow preemption. Multitasking solver mode is now fully supported in the code generated by this version of the Target for TI C2000 DSPs.

Previously Unsupported Blocks Now Supported

The following Signal Processing Blockset blocks are now supported in this version:

- Digital Filter
- Discrete Impulse
- Dyadic Analysis Filter Bank
- Dyadic Synthesis Filter Bank
- FIR Decimation
- FIR Interpolation
- FIR Rate Conversion
- Median
- Multiphase Clock
- Multiport Selector
- Random Source
- Sort
- Two-Channel Analysis Subband Filter
- Two-Channel Synthesis Subband Filter

- Variable Fractional Delay
- Variable Integer Delay
- Wavelet Analysis
- Wavelet Synthesis

Previous versions of the above blocks are still not supported nor are these blocks:

- Integer Delay (available only in previous versions)
- Singular Value Decomposition (SVD) Solver

Compatibility Summary for the Target Support Package™ TC2 Product

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V3.2 (R2009a)	See the **Compatibility Considerations** subheading for this new feature or change: • "Obsolescence Warning: Target Preference Blocks from R2006b and Earlier" on page 5 • "Obsolescence Warning: C2000 System Target Files" on page 6 • "Obsolescence Warning: Read From Memory and Write To Memory" on page 6 • "Obsolescence Warning: Host-Side CAN Blocks" on page 6
V3.1 (R2008b)	None
Version V3.0 (R2008a)	None

Version (Release)	New Features and Changes with Version Compatibility Impact
Version V2.3 (R2007b)	See the **Compatibility Considerations** subheading for this new feature or change: • "Compatibility Considerations" on page 15 • "Link and Target Products Regrouped in New Start, Help, and Demos Category" on page 14
Version 2.2 (R2007a)	See the **Compatibility Considerations** subheading for this new feature or change: • "Code Generation Capability Moved to Link for Code Composer Studio Development Tools" on page 17
Version 2.1 (R2006b)	None
Version 2.0 (R2006a)	None
Version 1.3 (R14SP3)	None
Version 1.2.1 (R14SP2)	None
Version 1.2 (R14SP1+)	None
Version 1.1.1 (R14SP1)	None
Version 1.1 (R14)	None
Version 1.0 (R13SP1+)	None