Target Support Package™ TC6 Release Notes

Contents

Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V3.4 (R2008a)	Yes Details	No	Bug Reports	Printable Release Notes: PDF Current product documentation
V3.3 (R2007b)	Yes Details	Yes Summary	Bug Reports	No
V3.2 (R2007a)	Yes Details	Yes Summary	Bug Reports	No
V3.1 (R2006b)	Yes Details	Yes Summary	Bug Reports	No
V3.0 (R2006a)	Yes Details	Yes Summary	Bug Reports	No
V2.4 (R14SP3)	Yes Details	No	Bug Reports	No
V2.3 (R14SP2)	Yes Details	No	Bug Reports	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 3.4 (R2008a) Target Support Package™ TC6 Software

This table summarizes what's new in Version 3.4 (R2008a):

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

New features and changes introduced in this version are

- "New C6000™ Video Format Conversion Blocks" on page 3
- "New DM6437 EVM Video Blocks" on page 4
- "New DM6437 EVM CAN Blocks" on page 4
- "Enhanced Demos: Custom Device Driver Integration via Legacy Code Tool" on page 4
- "New Demo: Video Stabilization" on page 5
- "New Demo: CAN Loopback Testing for DM6437 EVM" on page 5
- "New Demo: Video Stabilization for DM6437 EVM" on page 5
- "New Documentation for Installing Third-Party Target Support Packages" on page 5

New C6000™ Video Format Conversion Blocks

This release provides two new C6000™ video blocks:

- C6000 Interleave — Create YCbCr 4:2:2 interleaved data from planar format YCbCr 4:2:2 data.

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- C6000 Deinterleave — Separate interleaved YCbCr 4:2:2 data into its Y, Cb, and Cr components.

New DM6437 EVM Video Blocks

This release provides four new DM6437 EVM video blocks that support on-chip processing:

- DM6437 EVM Video Capture — Configure the on-chip Video Processing Front End (VPFE) to capture NTSC/PAL video.

- DM6437 EVM Video Display — Configure the on-chip Video Processing Back End (VPBE) to display NTSC/PAL video.

- DM6437 EVM OSD — Configure the on-chip Video Processing Back End (VPBE) to display graphics using On-Screen Display (OSD) module.

- DM6437 EVM Draw Rectangles — Configure the on-chip Video Processing Back End (VPBE) to draw rectangles using OSD module.

New DM6437 EVM CAN Blocks

This release provides three new DM6437 EVM CAN blocks:

- DM6437 EVM CAN Setup — Configure CAN bus parameters on the DM6437 EVM.

- DM6437 EVM CAN Transmit — Configure a CAN mailbox to transmit messages to the CAN bus on the DM6437 EVM.

- DM6437 EVM CAN Receive — Configure a CAN mailbox to receive messages from the CAN bus on the DM6437 EVM.

Enhanced Demos: Custom Device Driver Integration via Legacy Code Tool

These demos show you how to develop a custom device driver on your Texas Instruments™ C6000 processor using the Legacy Code Tool (LCT). Two versions of the demo are available:

- c6455dsk_codec_lct.mdl for the Spectrum Digital™ C6455 DSK

- dm6437evm_codec_lct.mdl for the Spectrum Digital DM6437EVM

New Demo: Video Stabilization

The Video Stabilization demo illustrates a workflow for developing video applications for Texas Instruments C6000 processors using Simulink® and Target Support Package™ TC6 software.

New Demo: CAN Loopback Testing for DM6437 EVM

The dm6437evm_can_loopback.mdl demo shows you how to use the CAN Receive and CAN Transmit blocks on the Spectrum Digital DM6437EVM.

New Demo: Video Stabilization for DM6437 EVM

The dm6437evmstabilize.mdl demo shows you how to develop a video stabilization application on the Spectrum Digital DM6437 using the sum of absolute differences (SAD) method.

New Documentation for Installing Third-Party Target Support Packages

The user guide contains a new topic, ""Installing Third-Party Target Support Packages"" to help you set up your development environment prior to using the product.

Version 3.3 (R2007b) Target for TI C6000™

This table summarizes what's new in Version 3.2 (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	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are

- "Link and Target Products Regrouped in New Start, Help, and Demos Category" on page 6
- "Support for S-video" on page 7
- "Improved Usability of TCP/IP blocks" on page 7
- "Added Support for the DM643x Platform" on page 7
- "Updated CCS and BIOS Support" on page 7
- "Compatibility Considerations" on page 7

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 S-video

The DM642EVM Video Capture and Display blocks have been upgraded to support S-video.

Improved Usability of TCP/IP blocks

There are now no restrictions on the size of data to be sent or received. Also, the blocks are now able to send and receive any built-in Simulink data type, and the restriction that the output port width should be smaller than the input buffer size has been lifted.

Added Support for the DM643x Platform

Support has been added for the Texas Instruments™ DaVinci SOC platform.

Updated CCS and BIOS Support

Support for CCS 3.3 and BIOS 5.2+ combination.

Compatibility Considerations

- Support for the C6711 DSK has been removed. Most of the documentation pertaining to the C6713 DSK has supplanted references to the C6711 DSK.

- Support for big-endian byte ordering has been removed.

Version 3.2 (R2007a) Target for TI C6000™

This table summarizes what's new in Version 3.2 (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	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are

- "External Mode for Modifying Block Parameters in Real Time and Logging Block Output" on page 8

- "Block Processing Subsystem Block Processes Portions of Images to Improve Throughput" on page 9

- "New C6455 SRIO Blocks for C6455 Targets" on page 9

- "Enhanced DM642 EVM Video Block Supports PAL Format" on page 9

- "Product Name Change" on page 9

- "Moved Code Generation to Link for Code Composer Studio™" on page 10

External Mode for Modifying Block Parameters in Real Time and Logging Block Output

You can use external mode with C6000™ targets to change block parameters in a model during simulations, and log the block outputs. External mode works with the following hardware:

- C6416 DSK

- C6455/TCI6482 DSK/EVM

- C6711 DSK

- C6713 DSK

- DM642 EVM

The Professional Audio Development Kit (PADK) does not support external mode. For details about external mode, refer to *Using the External Mode User Interface* in the Real-Time Workshop® documentation in the online Help system.

Block Processing Subsystem Block Processes Portions of Images to Improve Throughput

To help you process images, and other arrays, the new Block Processing block enables you to work on subarrays of the data. Using smaller portions of the data array and reassembling the array after processing can improve your processing performance. To further improve throughput, the Block Processing block uses direct memory access (DMA) to perform required memory operations. Find the block in the C6000 Core Support Library (`c6000dspcorelib`).

New C6455 SRIO Blocks for C6455 Targets

New C6455 SRIO blocks (C6455 SRIO Config, C6455 SRIO Receive, C6455 SRIO Transmit) add Serial RapidI/O interconnect to your models so the generated code implements Texas Instruments™ SRIO on the C6455 EVM. You find the new blocks in the library `c6455evmlib` in the C6000 block library `c6000lib`.

Enhanced DM642 EVM Video Block Supports PAL Format

In addition to NTSC and SVGA video, the DM642 EVM Video block now support PAL video format capture and display. In the block dialog boxes, you see PAL options on the **Mode** list.

Product Name Change

Embedded Target for the Texas Instruments TMS320C6000™ DSP Platform is now Target for TI C6000™™.

Moved Code Generation to Link for Code Composer Studio™

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 by making the interfaces the same across all targets, such as adding chips, libraries, or source files.

Compatibility Considerations

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

- The system target files `ti_c6000_ert.tlc` and `ti_c6000_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 library, some block parameters are different. Old block parameters still exist. In some cases they have been relocated. You need to open the Target Preferences block in your model and reset the parameters.

- The configuration parameters for models have changed. You need to open the Configuration Parameters dialog box for your model and set the **Real-Time Workshop** and **Link for CCS** options.

- The option that enables DSP/BIOS for supported processors is now part of the Target Preferences block. It used to be in the

  Configuration Parameters dialog box for your model. Selecting `DSP/BIOS` from the **Operating system** list on the **Board Info** pane in the Target Preferences block dialog box replaces the **Incorporate DSP/BIOS** checkbox in Configuration Parameters. The results are the same.

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 3.2, Target for TI C6000 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 3.2, 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 C6000 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:

- Updates the target preferences (TP) block in your model to the new TP block format and populates the new block options with the parameters from the existing target preferences block and from the model Configuration Parameters. This includes options such as memory mapping, section definitions, custom code specifications, and other options in the TP block.

- Changes the system target file from ti_c6000_ert.tlc or ti_c6000_grt.tlc to ccslink_ert.tlc or ccslink_grt.tlc as appropriate.

- Populates the new **Link for CCS** options in Configuration Parameters with the parameters from the **C6000 Compiler** and **C6000 Linker** options (now obsolete) in your model.

- Enables DSP/BIOS if your model used it. The update process transfers the DSP/BIOS option setting from the Configuration Parameters to the **Operating system** option in the TP block.

Updating Models for DM642 EVM. If your model uses the DM642 EVM, the update feature prompts you to identify the version of your board. Select your board version from the list and click **OK**. The update process applies the board version information to the TP block in your model by adding the required custom code declarations for your board version.

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To change the version of the DM642 EVM your model runs on later, follow these steps to change the board version for your model.

1 Open the backup copy of your model.

2 When prompted for the DM642 EVM version, select the version to use from the list.

3 Click **OK**. The model update process creates a new model for the version you selected.

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 3.1 (R2006b) Embedded Target for TI TMS320C6000 DSP

This table summarizes what's new in V3.1 (R2006b):

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	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are

- "Code Composer Studio 3.2 Compatibility" on page 14

- "Blocks for UDP Made General Use" on page 14

- "TCP/IP Blocks for Targets Added" on page 14

- "Host Communication Library Added to C6000lib" on page 14

- "New C6000 Memory Blocks" on page 15

- "Blocks Relocated from DM642 Library" on page 16

- "New Memory Mapping Capability from Real-Time Workshop Embedded Coder" on page 16

- "Demo Added" on page 17

- "Additional C6000 Processors in Custom C6000 Target Preferences Block" on page 17

- "Added Target Preferences blocks for C6455 DSK and PADK6727 Targets" on page 18

Code Composer Studio 3.2 Compatibility

Embedded Target for TI TMS320C6000 DSP now works with Code Composer Studio 3.2 for the C6455 DSK and C6727 PADK targets which require CCS 3.2. Note that you must install the following software:

- Code Composer Studio V3.2

- Spectrum Digital Drivers package `setupCCSPlatinum_v30104C.exe` (includes both C2000 and C6000 drivers). This file is available from Spectrum Digital.

- (For DM642 users only) Driver development kit (DDK) that comes on the Texas Instruments software CD included with the DM642 EVM

Compatibility Consideration

Embedded Target for TI TMS320C6000 DSP only works with CCS versions 3.1 and 3.2. The product does not support any earlier CCS versions.

Blocks for UDP Made General Use

The UDP Send and Receive blocks now apply to all C6000 targets. As noted (here)

TCP/IP Blocks for Targets Added

The C6000 DSP Communication Library includes two new TCP/IP blocks for configuring TCP/IP communications to and from your C6000 target. Note that these blocks only apply on the target.

Host Communication Library Added to C6000lib

The Host Communication library contains five new UDP message-related blocks.

- Byte Pack

- Byte Reversal

- Byte Unpack

- UDP Receive

- UDP Send

These blocks enable you to send and receive UDP messages to and from the target. The byte manipulating blocks configure messages to be used by UDP, and the UDP blocks provide the connection between the transport and communications layers on the target.

New C6000 Memory Blocks

Two new blocks in C6000 DSP Core Support library provide control for memory allocation and copying on the target.

- Memory allocate — Allocate memory section on C6000 target
- Memory copy — Copy to and from memory section on C6000 target

These new blocks replace the functions provided by the From Memory and To Memory blocks. As a result, the older blocks are obsolete and may be removed in the future.

In new models, use the new Memory Allocate and Memory Copy. In older models, we recommend that you replace the To Memory and From Memory blocks with the new blocks.

Compatibility Consideration

The To Memory and From Memory blocks are being deprecated and were removed from the C6000 Core Support Library (`c6000dspcorelib`) library. They remain in the block reference library `memblks`. Existing models that use these blocks continue to work until the blocks are removed from the `memblks` library in a future release.

R13SP2 models that use To Memory and From Memory blocks work because of the Simulink block-forwarding mechanism between the C6000 Core Support (`c6000dspcorelib`) and `memblks` libraries. You can avoid invoking the block-forwarding mechanism each time you use the models by resaving your R13SP2 models after you open them with this release of the product .

Blocks Relocated from DM642 Library

We moved the following blocks out of the DM642 Library and into the C6000 DSP Communication Library to indicate they are no longer specific to the DM642 EVM. The blocks still work the same way.

- DM642 EVM IP Config — Renamed C6000 IP Config

- DM642 EVM UDP Receive — Renamed C6000 UDP Receive

- DM642 EVM UDP Send — Renamed C6000 UDP Send

New Memory Mapping Capability from Real-Time Workshop Embedded Coder

When you select a target based on the embedded real-time target (such as the ti_c6000_ert.tlc), there is a new configuration option in the **Select** tree—Memory Sections.

The Memory Sections pane provides an interface for inserting comments and pragmas into the generated code for

- Data defined in custom storage classes

- Internal data not defined in custom storage classes

- Model-level functions

- Atomic subsystem functions with or without separate data

In general, inserting pragmas in your generated code is difficult. This new interface option provides a direct technique that lets you add the pragmas when you generate code from your model.

Pragmas inserted into generated code can surround

- A contiguous block of data or function definitions

- Each data or function definition separately

When pragmas surround each definition separately, the text of each pragma can name the definition to which it applies.

Using the new memory section capability can help you optimize how your code runs on your target, improving performance. These new memory section features work in combination with the memory mapping features in the target preferences blocks for each processor.

For more information about the new `Memory Sections` pane in Configuration Parameters, refer to "Introduction to Memory Sections" in your Real-Time Workshop Embedded Coder documentation.

Demo Added

New demo "Using the PCI Bus to Exchange Data with xPC."

Note that

"Using the PCI Bus to Exchange Data with xPC" requires xPC to run.

This demo is particularly valuable because it demonstrates how to use some of the new blocks.

Two more demos

- Custom Device Driver via Legacy Code Integration
- User-Controlled Memory Mapping

show you how to use memory allocation and copy blocks to control memory use on the target and to develop your own device drivers.

Additional C6000 Processors in Custom C6000 Target Preferences Block

The Custom C6000 Target Preferences block now supports additional processors in the C6000 DSP family. Adding the block to your model and selecting the appropriate processor from the list lets you target your model to more DSPs. To use the new processors, install CCS 3.2.

Added Target Preferences blocks for C6455 DSK and PADK6727 Targets

New target preferences blocks enable you to configure models to generate code for two new targets:

- C6455 DSP Starter Kit

- Professional Audio Development Kit for the 6727 processor

Compatibility Consideration

To support the new PADK and C6455 processors, all of the target preferences blocks gained a new set of options for board custom code. As a result of the change, if you used earlier versions of the target preferences blocks in models, you should open the block in the model and resave it. This process will update the block and prevent compatibility problems. Users of the DM642 are likely to be most affected by this change to all of the preferences blocks.

Version 3.0 (R2006a) Embedded Target for TI TMS320C6000 DSP

This table summarizes what's new in V3.0 (R2006a):

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	No

New features and changes introduced in this version are

- "Code Composer Studio 3.1 Compatibility" on page 19
- "Asynchronous Scheduler" on page 20
- "Most Demos Updated to Use Asynchronous Scheduler" on page 23
- "DSP/BIOS Library Added to C6000lib" on page 23
- "Communications Blocks in New Host Communication Library added to C6000lib" on page 23
- "New C6000 DSP Core Support Blocks Added" on page 24
- "New Blocks in DM642 Library" on page 24
- "New Memory Mapping Capability from Real-Time Workshop Embedded Coder" on page 25
- "'Host to Target' and 'Audio and Video Loopback' Demos Added" on page 26

Code Composer Studio 3.1 Compatibility

Embedded Target for TI TMS320C6000 DSP now works with Code Composer Studio 3.1. Note that you must install the following software:

- Code Composer Studio V3.1

- Spectrum Digital Drivers package `setupCCSPlatinum_v30104C.exe` (includes both C2000 and C6000 drivers). This file is available from Spectrum Digital.

- (For DM642 users only) Driver development kit (DDK) that comes on the Texas Instruments software CD included with the DM642 EVM

- (For DM642 EVM users only) Network development kit (NDK) that comes on the Texas Instruments software CD included with the DM642 EVM

Compatibility Consideration

Embedded Target for TI TMS320C6000 DSP only works with CCS version 3.1. The product does not support earlier CCS versions.

Asynchronous Scheduler

Now you can use an asynchronous (real-time) scheduler for your target application. Earlier versions of the Embedded Target for TI TMS320C6000 DSP used a synchronous CPU timer interrupt-driven scheduler. With the new scheduler you can define interrupts and tasks to occur when you want them to by using new blocks in the following libraries:
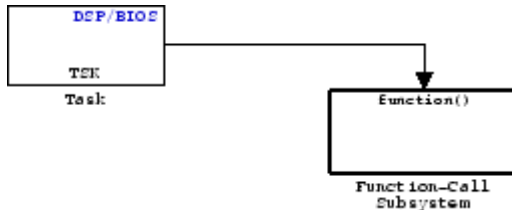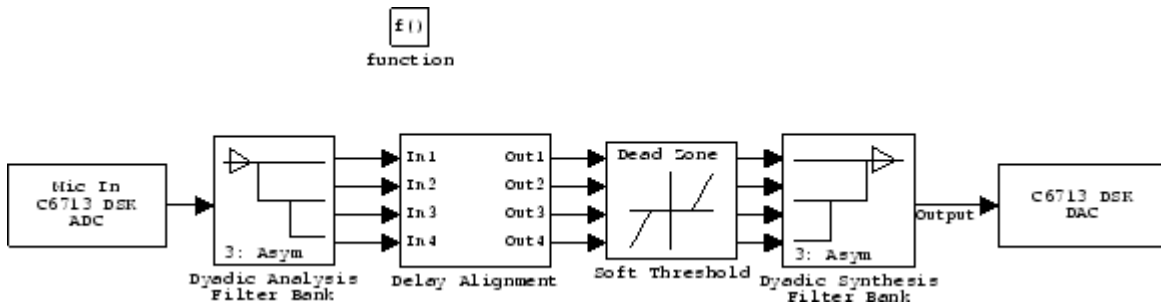
- C6000 DSP Core Support
- DSP/BIOS Library

With the new scheduler, you can schedule multiple tasks asynchronous execution using blocks in the C6000 DSP Core Support and DSP/BIOS Library block libraries. The following figures show a model updated to use the asynchronous scheduler.

Before
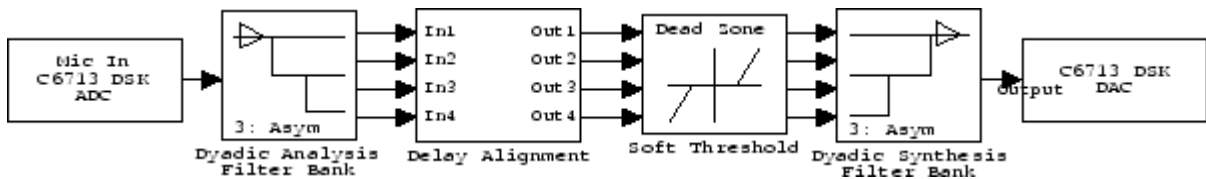
After

**Model Inside the Function Call Subsystem Block**

Compatibility Consideration.. The V3.0 changes in the real-time scheduler can break some existing multirate models that contain codec blocks such as the ADC and DAC. The models affected contain at least one sample rate that is faster than the codec block rate. You do not run into this problem if all rates in the model are lower than the codec rate.

The new scheduler provides improved control for your processing and improved performance. You should recast all of your models to use the new asynchronous scheduler. To update your models, embed the entire processing algorithm or system in a function-call subsystem driven by a DSP/BIOS Task or Idle Task block from the DSP/BIOS Library.

An example of such a model contains a combination of an ADC block and a DAC block, with a processing algorithm between them that executes at the higher rate. If you run code generated for such a model in multitasking or auto solver mode, you might hear occasional audio glitches or your program

may overrun. The exact symptom of the problem depends on the run-time overrun action setting in the `TIC6000 Code Generation` options.

The following model demonstrates one possible model configuration that can demonstrate the audio problems.
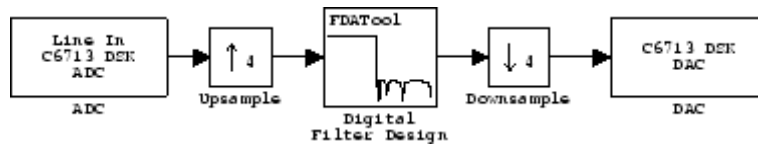
This multirate model uses two interrupts to control real-time execution of the generated code:

- A DMA interrupt to drive the execution of the code for ADC and DAC blocks

- A timer interrupt to drive the execution of the code for the FIR filter at an increased sample rate

In earlier product versions, the generated scheduler constantly synchronized the DMA and timer interrupts to ensure they remained in sync with one another, despite the possible clock drift with interrupts that are clocked by independent clock sources.

With the new real-time scheduler, the product does not synchronize the ADC and timer interrupts.

One interrupt may get out of sync with the other, with the time difference between them (drift) fluctuating with changes in the independent interrupt clocks. When the drift reaches a critical threshold, processing may skip an instance of a lower-priority task.

At that point, the interrupts are back in sync and the process continues. Losing synchronization between the interrupts can corrupt the audio signal or lead to an interrupt overrun.

To avoid the audio problems in an existing model that you cannot update to the new scheduler, set the run-time overrun action for the model to either `None` or `Notify_and_continue` to prevent the program from overrunning.

Most Demos Updated to Use Asynchronous Scheduler

To demonstrate using the asynchronous schedule capability, most of the existing demos now use the tasking blocks and interrupts to drive the demos. The processing parts of the demos now reside in function-call subsystem blocks that respond to task blocks of one form or another. Reviewing these demos can help you become familiar with the new blocks and scheduler.

DSP/BIOS Library Added to C6000lib

To enable you to use the new asynchronous scheduler, you must be able to create tasks the respond to interrupts. When you add DSP/BIOS to your configuration for your model, the following new blocks provide the means to add the tasks to your model.

- HWI — Create interrupt service routine on C6000 hardware target

- Task — Create task that runs as separate DSP/BIOS thread

- Triggered Task — Create asynchronously triggered task

Communications Blocks in New Host Communication Library added to C6000lib

The Host Communication library contains five new UDP message-related blocks:

- Byte Pack — Convert input signals into `uint8` vector

- Byte Reversal — Reverse order of bytes in input word

- Byte Unpack — Unpack UDP `uint8` input vector into Simulink data type values

- UDP Receive — Receive `uint8` vector as UDP message

- UDP Send — Send UDP message to host

These blocks enable you to send and receive UDP messages on the target. The Byte related blocks configure messages to be used by UDP, and the UDP blocks provide the connection between the transport and communications layers on the target.

New C6000 DSP Core Support Blocks Added

New blocks in this library enable you to use the new asynchronous scheduler in bare-board code generation mode that does not incorporate the DSP/BIOS features.

- Hardware Interrupt — Generate interrupt service routine. Same as the DSP/BIOS interrupt block
- CPU timer — Generate interrupt service routine
- Idle Task — Create free-running background task

New Blocks in DM642 Library

The new blocks let you configure the audio codec on the DM642 EVM, use the general-purpose I/O pins on the EVM, set up the IP protocol parameters, and use UDP messaging on the target. One block lets you configure the EVM to collect custom video by defining the raw video format.

- DM642 EVM Audio ADC — Configure audio codec and peripherals on the DM642 Evaluation Module
- DM642 EVM Audio DAC — Configure the audio codec to convert digital audio input to analog audio output
- DM642 EVM FPGA GPIO Read — Configure DM642 EVM User GPIO registers to read from selected pins
- DM642 EVM FPGA GPIO Write — Configure DM642 EVM User GPIO registers
- DM642 EVM IP Config — Configure Internet Protocol (IP) parameters for DM642 EVM
- DM642 EVM UDP Receive — Configure Ethernet driver to receive UDP message as uint8 vector
- DM642 EVM UDP Send — Configure Ethernet driver to send UDP message
- DM642 EVM Video Port — Configure video port to receive video data stream from video input port

New Memory Mapping Capability from Real-Time Workshop Embedded Coder

When you select a target based on the embedded real-time target (such as the ti_c6000_ert.tlc), there is a new configuration option in the **Select** tree—Memory Sections.

The Memory Sections pane provides an interface for inserting comments and pragmas into the generated code for

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When pragmas surround each definition separately, the text of each pragma can name the definition to which it applies.

Using the new memory section capability can help you optimize how your code runs on your target, improving performance. These new memory section features work in combination with the memory mapping features in the target preferences blocks for each processor.

For more information about the new Memory Sections pane in Configuration Parameters, refer to the "Introduction to Memory Sections" section in the Real-Time Workshop Embedded Coder documentation.

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'Host to Target' and 'Audio and Video Loopback' Demos Added

Two demos, 'Host to Target' and 'Audio and Video Loopback,' show you how to use the new asynchronous scheduler with new blocks for defining tasks and interrupts. You find these new demos in the online Help system, under `Simulink->Embedded Target for TIC6000 DSP`.

These demos are particularly valuable because they demonstrate how to use some of the new blocks.

Additional C6000 Processors in Custom C6000 Target Preferences Block

The Custom C6000 Target Preferences block now supports additional processors in the C6000 DSP family. Adding the block to your model and selecting the appropriate processor from the list lets you target your model to more DSPs.

Version 2.4 (R14SP3) Embedded Target for TI TMS320C6000 DSP

This table summarizes what's new in V2.4 (R14SP3):

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

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

New Video ADC and DAC Block Options for DM642 EVM

Recently, Spectrum Digital released a new version of the DM642 EVM that uses different decoders. To support the new revision, we changed the existing Video ADC and DAC blocks. We added new options for configuring the blocks.

1 To the Video ADC block, we added the **Decoder type** option to let you specify whether your EVM uses the Phillips SAA7115 decoder or the newer TI TVP5146/5150 decoder. The new DM642 EVM uses the `TVP5146` decoder setting, shown here. This is also the default setting for the block configuration.

2 To both the Video ADC and Video DAC block options, we added the **Data order** option. With this, you tell the decoder or encoder whether to output video in row major or column major order.

Most video capture and display systems use row major ordering. MATLAB and Simulink use column major ordering. As a result, some Simulink blocks and MATLAB operations may not produce the output you expect unless you change the ordering for video from the default `row major` setting to `column major`.

You can find more information about these new options on the reference pages for the DM642 EVM Video ADC and DM642 Video DAC blocks in the

Embedded Target for TI C6000 DSP User's Guide documentation in the online Help system.

Model Reference Support

Embedded Target for TI C6000 DSP now supports the model referencing capability provided by Simulink. Model Reference makes working with very large models that have many blocks more convenient for code generation, maintenance, and operation. For more information about model reference, refer to the Real-Time Workshop documentation in the online Help system.

For information about using model reference with Embedded Target for TI C6000 DSP, refer to the Embedded Target for TMS320C6000 DSP Platform documentation in the online Help system.

Allows Multiple DM642 EVM Video ADC Blocks in a Model

Now you can add up to two Video ADC blocks to Simulink models. Adding two blocks lets you use two inputs to your DM642 EVM and use both video streams. Having two video inputs available lets you do such things as use Picture-in-Picture on your display.

Generated Code Does Not Honor Simulation Stop Time on GRT-based Targets

You can set a simulation stop time in the Configuration Parameters for any model. Models that you target to TI hardware using the GRT-based target do not respond to the simulation stop time in the generated code on the target.

ERT-based targets never respected the stop time setting.

We still support stop requests from the Stop block in code. This is true for both ERT- and GRT-based targets.

# Version 2.3 (R14SP2) Embedded Target for TI TMS320C6000 DSP

This table summarizes what's new in V2.3 (R14SP2):

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

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

New Target Preferences Blocks for Targeting Custom Hardware

Version 2.3 introduces new blocks for targeting both existing supported boards and custom hardware. Located in the C6000 Target Preferences library (enter c6000tgtpreflib at the MATLAB prompt) and shown in this figure, the blocks provide configuration details for both supported boards like the C6711 DSK, and your custom hardware based on processors from the C6000 family.
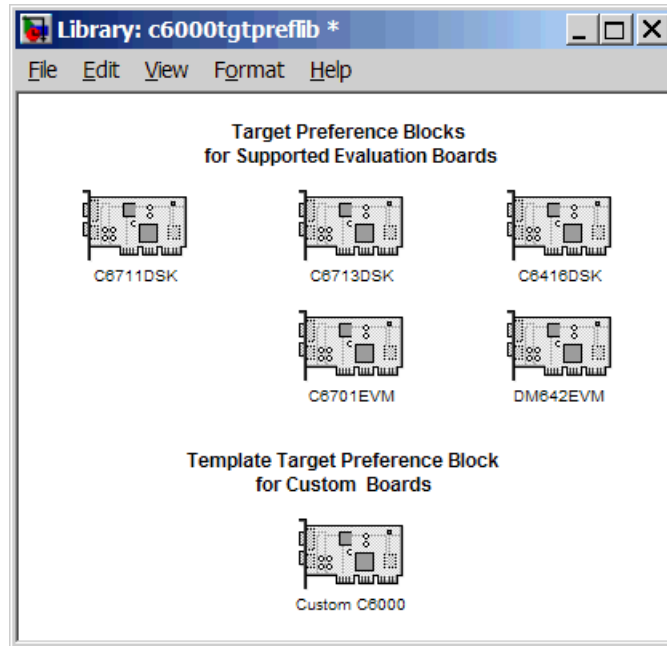
Note the two block categories:

- Blocks for supported boards:
    - C6416DSK — Set the target preferences and memory map for the C6416 DSP Starter Kit
    - C6701EVM — Set the target preferences and memory map for the C6701 Evaluation Module
    - C6711DSK — Set the target preferences and memory map for the C6711 DSP Starter Kit
    - C6713DSK — Set the target preferences and memory map for the C6713 DSP Starter Kit
    - DM642EVM — Set the target preferences and memory map for the DM642 Evaluation Module

- Block for targeting custom hardware—Custom C6000—Set the target preferences and memory map for your custom hardware based on a TI C6000 family processor

These blocks replace the C6000 Target Preferences block released in an earlier version. For details about the blocks, refer to the online Help for the Embedded Target for TI C6000 DSP. Each block has a reference page and you can find tutorial information about using the new blocks in "Targeting C6000 DSP Hardware" in the online Help system as well.

Added Interrupt Threshold Option in Configuration Parameters

To allow you to control how the compiler, linker, and assembler handle loops in your code, Embedded Target for TI C6000 DSP provides options that control interrupts in your code:

- **Interrupt threshold (-mi)** — Enables the interrupt threshold option the project and enables Interrupt threshold value (cycles) so you can set the threshold.

- **Interrupt threshold value (cycles)** — Sets the interrupt threshold for your code.

When you enable and set the threshold options, you are specifying the number of cycles that the compiler can disable interrupts. For more information, refer to the online Help system, and search for the keywords 'interrupt' and 'threshold'.

Embedded Target for TI C6000 Requires CCS 3.0

To use this 2.3 release of Embedded Target for TI C6000 DSP, you must install Code Composer Studio 3.0 from Texas Instruments.

New Target Preferences Blocks Replace Existing C6000 Target Preferences Block

If you have models that use the earlier version of the C6000 Target Preferences block, those models now have a broken link to the block. The C6000 Target Preferences block is obsolete and is not provided in this release.

To update your models, replace the existing C6000 Target Preferences block with the appropriate new block from the C6000 Target Preferences library. Select either the block that is specifically identified for your target, or use the Custom C6000 block if your hardware is not one of the explicitly supported boards.

Compatibility Summary

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 with the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V3.4 (R2008a)	None
Version V3.3 (R2007b)	See the **Compatibility Considerations** subheading for this new feature or change: • "Link and Target Products Regrouped in New Start, Help, and Demos Category" on page 6
Version V3.2 (R2007a)	See the **Compatibility Considerations** subheading for this new feature or change: • "Moved Code Generation to Link for Code Composer Studio™" on page 10
Version V3.1 (R2006b)	See the **Compatibility Considerations** subheading for this new feature or change: • "Code Composer Studio 3.2 Compatibility" on page 14 • "Added Target Preferences blocks for C6455 DSK and PADK6727 Targets" on page 18 • "New C6000 Memory Blocks" on page 15
Version V3.0 (R2006a)	See the **Compatibility Considerations** subheading for this new feature or change: • "Code Composer Studio 3.1 Compatibility" on page 19 • "Asynchronous Scheduler" on page 20

Version (Release)	New Features and Changes with Version Compatibility Impact
Version 2.4 (R14SP3)	None
Version 2.3 (R14SP2)	None