

# **Target Support Package™ FM5 Release Notes**

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*Target Support Package™ FM5 Release Notes*

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## Summary by Version

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

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
<b>Latest Version V2.2.3 (R2009a)</b>	Yes Details	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF  Current product documentation
V2.2.2 (R2008b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.2.1 (R2008a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.2 (R2007b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.1 (R2007a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.0.5 (R2006b)	No	Yes Summary	Bug Reports Includes fixes	No
V2.0.4 (R2006a)	Yes Details	Yes Summary	Bug Reports at Web site	No
V2.0.3 (R14SP3)	No	Yes Summary	Bug Reports at Web site	No

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
V2.0.2 (R14SP2)	Yes Details	Yes Summary	Fixed bugs	No
V2.0.1 (R14SP1)	Yes Details	Yes Summary	Fixed bugs	No
V2.0 (R14)	Yes Details	Yes Summary	Known Problems	No
V1.1 (R13SP2)	Yes Details	Yes Summary	No bug fixes	V1.1 product documentation

## 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 2.2.3 (R2009a) Target Support Package FM5 Product

This table summarizes what's new in Version 2.2.3 (R2009a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	Printable Release Notes: PDF  Current product documentation

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

### CAN Support by the Vehicle Network Toolbox

The new Vehicle Network Toolbox provides host-side CAN blocks. These are replacements for previous blocks, which are now marked obsolete. Although you can continue to use these obsolete blocks, there are advantages in using the new blocks. They include the following:

- A reduced block set that uses the same packing and unpacking blocks to handle any type of message (raw data, raw signals, or CANdb signals).
- Support for the new Vector-Informatik XL driver and device line.
- Better compatibility with CANdb files (as these files are now read using the Vector-Informatik library).

### Compatibility Considerations

The Vehicle Network Toolbox is required for host-side CAN blocks. The following blocks are available from the Vehicle Network Toolbox :

- CAN Configuration



- CAN Receive
- CAN Transmit

CAN Pack and CAN Unpack blocks are available with Target Support Package™ FM5.

The Vehicle Network Toolbox is not required if you are using target-side CAN blocs.

The following blocks are now obsolete:

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

For more information on how you can identify obsolete blocks and transition to the new blocks, see CAN Blocks Transition.

## **New Boot Code**

You must install the latest version of the boot code. See “Download Boot Code to Flash Memory” in the Target Support Package FM5 documentation.

## **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC5xx processor, then interrupts are not handled correctly, causing real-time, stand-alone applications to fail at run time.

## Version 2.2.2 (R2008b) Target Support Package FM5 Product

This table summarizes what's new in Version 2.2.2 (R2008b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	Printable Release Notes: PDF  Current product documentation

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

### **New Boot Code**

You must install the latest version of the boot code. See “Download Boot Code to Flash Memory” in the Target Support Package FM5 documentation.

### **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC5xx processor, then interrupts are not handled correctly, causing real-time, stand-alone applications to fail at run time.

## Version 2.2.1 (R2008a) Target Support Package FM5 Product

This table summarizes what's new in Version 2.2.1 (R2008a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	No

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

### “What’s This?” Context-Sensitive Help Available for Simulink Configuration Parameters Dialog

R2008a introduces “What’s This?” context-sensitive help for parameters that appear in the Simulink Configuration Parameters dialog. This feature provides quick access to a detailed description of the parameters, saving you the time it would take to find the information in the Help browser.

To use the “What’s This?” help, do the following:

- 1** Place your cursor over the label of a parameter.
- 2** Right-click. A **What’s This?** context menu appears.

For example, the following figure shows the **What’s This?** context menu appearing after a right-click on the **Start time** parameter in the **Solver** pane.



- 3 Click **What's This?** A context-sensitive help window appears showing a description of the parameter.

## **New Boot Code**

You must install the latest version of the boot code. See “Download Boot Code to Flash Memory” in the Target Support Package FM5 documentation.

## **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC5xx processor, then interrupts are not handled correctly, causing real-time, stand-alone applications to fail at run time.

## Version 2.2 (R2007b) Target for Freescale MPC5xx Product

This table summarizes what's new in Version 2.2 (R2007b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	No

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

### **New CodeWarrior Toolset Support**

Freescale™ CodeWarrior® Development Studio, MPC5xx Edition, v8.7, is now supported.

### **New Boot Code**

You must install the latest version of the boot code.

### **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC5xx processor, then interrupts are not handled correctly, causing real-time, stand-alone applications to fail at run time.

### **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*.

## Renamed Target Floating-Point Math Environment Parameter

In this release, the Configuration Parameter setting **Target floating-point math environment** has been renamed to **Target function library**. This parameter is on the Real-Time Workshop® Interface pane. There is no change in behavior.

## Compatibility Considerations

Models which were previously created with the **Target floating-point math environment** Configuration Parameter setting C99 (ISO) are automatically converted when opened, to use the new Target for Freescale MPC5xx (ISO) **Target function library** setting. The new setting references the same compiler-specific ISO function tables as the old C99 (ISO) setting.

When you create new models with the `mpc555rt.tlc`, `mpc555rt_grt.tlc` or `mpc555exp.tlc` **System target file**, the Target for Freescale MPC5xx (ISO) is automatically selected for the **Target function library** setting. If your model contains floating-point mathematical function blocks (e.g., trigonometric functions, log functions), then you should use this setting for target-optimized function libraries. See “Optimized Target Function Library” in the Target for Freescale™ MPC5xx User’s Guide documentation.

## Version 2.1 (R2007a) Target for Freescale MPC5xx Product

This table summarizes what's new in Version 2.1 (R2007a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	No

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

### External Mode

External mode is now supported via CAN. You can use either external mode or a third party calibration tool to interact with the real-time application running on the target processor. The CAN Calibration Protocol block provides a means of monitoring signals and altering the parameter values in the application code running on the target. See the demo `mpc555rt_ccp.md1`.

See “Using External Mode” for details.

### Real-Time Workshop GRT Target Support

Real-Time Workshop GRT target is supported for build and download, so Real-Time Workshop® Embedded Coder™ is optional.

However Real-Time Workshop Embedded Coder ERT target is required for PIL and AE.

The CAN Calibration Protocol Data Acquisition (DAQ) List mode of operation is only supported with Real-Time Workshop Embedded Coder. The CCP Polling mode of operation can be used both with or without Real-Time Workshop Embedded Coder.

## **Implicit Modification of PIL Input / Output Signal Storage Classes**

In previous releases of Target for MPC555, PIL input/output signals with non-Auto storage classes (eg. ExportedGlobal) had their storage class implicitly modified to Auto during code generation for PIL.

### **Compatibility Considerations**

Now, such storage classes are not modified during code generation. Instead, an error message is thrown - the error message (below) includes steps for resolution of the error. This behavior has changed because Real-Time Workshop no longer supports overriding of storage classes in the way described above.

The error message is as follows:

Real-Time Workshop Fatal: PIL Inport 1 has non-"auto" storage class "ExportedGlobal". Only signals with "auto" storage classes are supported at the PIL subsystem boundary.

To avoid this error, storage classes must be explicitly set to "auto" in the model before beginning a PIL build. Please update the model accordingly.

If non-"auto" storage classes are required for real-time deployment then modification of the model between real-time and PIL builds can be avoided by taking the following approach:

- a) For real-time deployment, provide a Simulink.Signal object that resolves to the signal requiring non-"auto" storage class in the model. Set the storage class as desired on the Simulink.Signal object.
- b) For PIL, remove the Simulink.Signal object or re-define its storage class to be "auto".

## **Host Side Profiling Via CAN Uses Vector "Application Channel"**

You can now specify the CAN Application Channel to use with the execution profiling command, and run the Vector Informatik configuration utility to



configure the bit rate of the channel. In previous versions, CAN channels other than CANCardX 1 and CAN AC2 PCI 1 were inaccessible. The syntax to use this new argument is:

```
profile_mpc555('can','CANChannel','MATLAB 1')
```

The default is 'MATLAB 1' if no Application Channel is specified.

### **Compatibility Considerations**

It is no longer possible to specify the CAN bit rate as an argument to `profile_mpc555`. The old syntax for specifying the bit rate, e.g.,

```
profile_mpc555('can','bitrate',1000000)
```

or

```
profile_mpc555('can','modelName','mymodel')  
% Calculates required bit-rate by inspecting mymodel
```

now returns an error. The error describes the new approach for setting the CAN bit rate.

### **New Boot Code**

You must install the latest version of the boot code.

### **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC5xx processor, then interrupts are not handled correctly, causing real-time standalone applications to fail at run time.

## Version 2.0.5 (R2006b) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0.5 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports Includes fixes	No

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

### New Boot Code

You must install the latest version of the boot code.

### Compatibility Considerations

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts are not handled correctly, causing real-time standalone applications to fail at run time.

### Driver Block Pass-Through No Longer Supported

The pass-through mechanism was deprecated in Version 2.0 (R14) and has now been removed. The replacement for the pass through mechanism is shown in the demo `mpc555_fuelsys_project`. This demo illustrates current best practices in deploying a single algorithm for multiple execution applications including simulation, PIL testing, and production deployment. This new approach reduces code overhead and can be easily applied to any target.

## Compatibility Considerations

If you try to use a legacy model containing driver blocks that are configured to use pass-through, you receive a warning similar to the following:

```
Driver block pass-through is no longer supported. The model has one or more I/O driver blocks that are configured to use pass-through, however, this feature is no longer supported.
```

```
See the demo model mpc555_fuelsys_project for a recommended new approach to replace the old pass-through feature.
```

To prevent this warning message from appearing again, run the command `mpc555_blk_compatibility('fix', 'modelName')`.

## Version 2.0.4 (R2006a) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0.4 (R2006a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports at Web site	No

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

### TPU Emulation Mode

TPU emulation mode allows you to download functions to DPTRAM that are not part of the standard ROM mask of TPU functions. A new demo with two simple blocks are provided to illustrate the process.

### New Boot Code

You must install the latest version of the boot code.

### Compatibility Considerations

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.

## Version 2.0.3 (R14SP3) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0.3 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Bug Reports at Web site	No

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

### New Boot Code

You must install the latest version of the boot code.

### Compatibility Considerations

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.

If you try to use the Download Control Panel to download an application to a target running an out-of-date boot code, you will see a boot code mismatch error message. This message instructs you to use the boot code installation **Start** menu option to install new boot code. Alternatively a download via BDM will appear to succeed but the application will fail at run-time.

Use the **Start** menu boot code installer and follow the instructions in the dialog.

To upgrade from Version 1.0.1 (Release 13) or earlier boot code you are instructed to use the alternative install method via CAN. The following

instructions describe the steps required if you have Release 13 or Release 12.1 boot code currently running on the target, and you do not have a BDM.

### **Upgrading from Release 13 or Release 12.1**

If you have a BDM available you can download the new boot code over CAN or serial. Use the **Start** menu boot code installer.

If you have CAN but no BDM you cannot use the **Start** menu option to use the Download Control Panel. Instead you can use the upgrade model, `can_bootcode_upgrade`.

- 1** Enter `can_bootcode_upgrade` at the MATLAB command line.
- 2** Double-click the Download Protection block to unlock the model. It turns green.
- 3** Click Run in the toolbar.

There is no longer any need to change parameters in the model to avoid a block error. This was necessary for Release 14.

The model should run successfully to download new bootcode.

## Version 2.0.2 (R14SP2) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0.2 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Fixed bugs	No

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

### Support for Latest Toolchains

Version 2.0.2 of the Embedded Target for Motorola MPC555 supports these toolchain versions:

- Wind River Systems, Wind River Compiler, version 5.2.1 (formerly known as Diab), and Wind River Systems SingleStep™ debugger of the following versions:
  - Version 7.7.3 (debug via Wind River visionPROBE) (for MPC5xx)
  - Version 7.6.2 (debug via Macraigor Systems Wiggler, Raven / Blackbird, On-board BDM) (for MPC555 only)
- Metrowerks CodeWarrior for Embedded PowerPC version 8.1 - EPPC\_5XX

The full feature set (PIL, RT, and AE targets) is supported for both toolchains.

### Switch Target Configuration Block

This new block runs a convenience function that configures your model and Target Preferences to one of a set of pre-defined hardware configurations. The

function can also be used as a template for setting up your own customized configurations.

## New Boot Code

You must install the latest version of the boot code.

## Compatibility Considerations

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.

If you try to use the Download Control Panel to download an application to a target running an out-of-date boot code, you will see a boot code mismatch error message. This message instructs you to use the boot code installation **Start** menu option to install new boot code. Alternatively a download via BDM will appear to succeed but the application will fail at run-time.

Use the **Start** menu boot code installer and follow the instructions in the dialog.

To upgrade from Version 1.0.1 (Release 13) or earlier boot code you are instructed to use the alternative install method via CAN. The following instructions describe the steps required if you have Release 13 or Release 12.1 boot code currently running on the target, and you do not have a BDM.

## Upgrading from Release 13 or Release 12.1

If you have a BDM available you can download the new boot code over CAN or serial. Use the **Start** menu boot code installer.

If you have CAN but no BDM you cannot use the **Start** menu option to use the Download Control Panel. Instead you can use the upgrade model, `can_bootcode_upgrade`.

- 1 Enter `can_bootcode_upgrade` at the MATLAB command line.
- 2 Double-click the Download Protection block to unlock the model. It turns green.



**3** Click Run in the toolbar.

There is no longer any need to change parameters in the model to avoid a block error. This was necessary for Release 14.

The model should run successfully to download new bootcode.

## Version 2.0.1 (R14SP1) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0.1 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Fixed bugs	No

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

### Real-Time Target Support for Model Reference

Model reference is now supported by the Real-Time (RT) target. Processor in the Loop (PIL) co-simulation and Algorithm Export (AE) do not yet support the use of model reference.

### Download Control Panel Support for Vector Application Channels

The Download Control Panel is now integrated with the Vector CAN Driver Configuration Tool, and uses the Application Channel mechanism used by the Vector CAN Blocks. This means the Download Control Panel now provides support for all CAN devices supported by the Vector CAN Driver Library. Please see the documentation for details of how to use the Download Control Panel with Vector Application Channels. Note that we support the CAN Driver Library, and not the XL Driver Library; however, certain XL boards are supported for CAN (only) by the CAN Driver Library - see Vector Informatik for further details.

## **QADCE Support for more MPC56x Processors**

There is now support for Enhanced Queued Analog-To-Digital Converter Module-64 (QADCE) for the processors MPC561, MPC562, MPC563, and MPC564, in addition to the existing support for MPC565 and MPC566. There is continued QADC support for the MPC555.

## **Technical Solution Support For External (Off-Chip) Flash Memory**

A Solution note giving details on the configuration steps required to target External Flash memory has been published on The MathWorks web site. See this URL:

<http://www.mathworks.com/support/solutions/data/1-08EW4.html?solution=1-08EW4>

## **New Boot Code**

You must install the latest version of the boot code.

## **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.

## Version 2.0 (R14) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 2.0 (R14):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	Known Problems	No

New features and changes introduced in this version are

- “Serial Download” on page 24
- “Support for MPC5xx” on page 25
- “CAN Driver Enhancements” on page 26
- “Task Execution Profiling” on page 26
- “Temporary Task Overruns Now Permitted by the Scheduler” on page 26
- “Program Prepare Downloads at Application Specific Bit Rates” on page 27
- “Support for Latest Toolchains” on page 27
- “Improved Resource Checking” on page 27
- “Replacement for the Pass Through Mechanism” on page 27
- “Stateflow No Longer Required” on page 28
- “CANdb DBC File Support” on page 28

### Serial Download

You can now download applications to a suitably prepared MPC5xx board via a serial cable, even if you have no BDM or CAN connection to the target.

## Support for MPC5xx

There is now support for more processor variants:

- MPC555
- MPC561 (no Flash features)
- MPC562 (no Flash features)
- MPC563
- MPC564
- MPC565
- MPC566

You can easily switch processors using the Target Preferences settings, and Model Resource Configuration settings.

There is new support for some additional capabilities of some processor variants, as follows.

Additional capabilities of MPC565 & 566:

- 3rd TouCAN module
- 3rd TPU module
- MIOS14 support providing 4 more PWM channels
- QADC Enhanced support - different module with different features to MPC555 version

Additional capabilities of MPC561, 562, 563 and 564:

- 3rd TouCAN module
- MIOS14 support providing 4 more PWM channels

QADC is not currently supported, but support is planned in the future.

## **CAN Driver Enhancements**

A number of enhancements have been incorporated into the TouCAN Transmit and TouCAN Receive blocks. These enhancements include the ability to select different modes of operation depending on the requirements for each message. The benefits include higher utilization of the available CAN bandwidth and reduced loading on the MPC555 microcontroller.

The default mode for transmission of CAN messages now uses 3 hardware buffers in conjunction with an interrupt driven priority queue; this mode of operation guarantees that messages will be transmitted in order of priority, with no inter-message delay.

A dedicated buffer transmission mode allows messages to be transmitted with no interrupt servicing overhead.

A FIFO buffer transmission mode, with very fast interrupt servicing is well suited for data acquisition purposes.

For receipt of CAN messages, an additional mode has been added that uses a FIFO buffer. This mode of operation is suitable if a number of messages with different CAN identifiers should be received via a single hardware buffer. This allows more efficient use of the limited number of hardware buffers on the MPC555 TouCAN module.

## **Task Execution Profiling**

This is a new feature that allows execution profiling data to be recorded, uploaded and displayed in the form of a MATLAB graphic and as an HTML report. Execution profiling data can be collected over serial or CAN. See the demo model `mpc555rt_multitasking`.

## **Temporary Task Overruns Now Permitted by the Scheduler**

It is now possible for task overruns in the base rate or one of the sub- rates to occur without causing a failure. The benefit is that if it occasionally takes longer than the normally allowed time to complete a task, this is now possible without having to increase the sample time. The overrun

behavior is configurable and is illustrated by the new demo model `mpc555rt_multitasking`.

## **Program Prepare Downloads at Application Specific Bit Rates**

Program prepare downloads now work with an application running CAN at any of the bit rates supported by the Embedded Target Download tool. Also, the application may be running at a non-default (20MHz) frequency - in this case, you will see a warning if the chosen bit rate is not suitable for program prepare downloading. This will occur if the boot code, running at 20MHz, cannot achieve the CAN bit rate used by the application.

## **Support for Latest Toolchains**

The Embedded Target for Motorola MPC555 now supports these cross-development tools:

- Wind River Systems Diab cross-compiler (version 5.1.2), and Wind River Systems SingleStep debugger of the following versions:
  - Version 7.7.3 (debug via Wind River Vision Probe) (for MPC5xx)
  - Version 7.6.2 (debug via Macraigor Systems Wiggler, Raven / Blackbird, On-board BDM) (for MPC555 only)
- Metrowerks CodeWarrior for Embedded PowerPC (version 8.0 - EPPC\_5XX)

## **Improved Resource Checking**

There are enhancements to resource configuration to help you avoid device driver conflicts — for example, if you choose the same PWM channel for two different blocks you will be warned.

## **Replacement for the Pass Through Mechanism**

There is a new demo which illustrates current best practices in deploying a single algorithm for multiple execution applications including simulation, PIL testing, and production deployment. See the demo model `mpc555_fue1sys_project` for the new approach.

Previously, a pass through mechanism was used. This new approach reduces code overhead and can be easily applied to any target. In general, it is not advised to use the old pass through. In a future release the pass through feature will be completely removed. The old pass through mechanism still works but will generate a warning because it is being deprecated.

## **Stateflow No Longer Required**

Stateflow and Stateflow Coder are no longer required products, although they are recommended. This was a previous requirement for use of the CAN Calibration Protocol block.

## **CANdb DBC File Support**

You can now use CANdb DBC and DBF files to specify the packing and unpacking of CANdb messages.

## **Fixed Bugs**

### **Correct Number of Bytes Received by Serial Receive Block**

When using Serial Receive block in previous versions, it was possible in some cases for extra data to be received. This problem was caused by the driver code calculating an incorrect value for the number of bytes in the receive buffer.

This problem is fixed in Release 14.

## **New Boot Code**

You must install the latest version of the boot code.

## **Compatibility Considerations**

If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.



## Version 1.1 (R13SP2) Embedded Target for Motorola MPC555

This table summarizes what's new in Version 1.1 (R13SP2):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
Yes Details below	Yes — Details labeled as <b>Compatibility Considerations</b> within descriptions of new features and changes, below. See also Summary.	No bug fixes	V1.1 product documentation

New features and changes introduced in this version are

- “Full CodeWarrior Support” on page 30
- “Time Processor Unit (TPU3) Support” on page 30
- “Serial I/O Support” on page 30
- “Automatic Boot Code Loading” on page 30
- “Target Preferences Dialog” on page 30
- “New Boot Code” on page 20
- “More CAN Message IDs in Vector CAN Receive” on page 31
- “Automatic ODBC Data Source Configuration” on page 31
- “New Test Program” on page 31
- “Two New Demos” on page 31
- “Improved Compiler Support for CCP” on page 32
- “Streamlined SingleStep Configuration” on page 32
- “CANdb Limitation Lifted” on page 32
- “Upgrade Existing Boot Code via CAN or BDM” on page 32

## **Full CodeWarrior Support**

Version 1.1 adds Full CodeWarrior support for Real Time Target mode, in addition to the existing processor-in-the-loop (PIL) target support.

## **Time Processor Unit (TPU3) Support**

Six new Time Processor Unit (TPU3) blocks have been added to support the use of the MPC555 TPU submodules:

- TPU Digital In
- TPU Digital Out
- TPU Fast Quadrature Decode
- TPU New Input Capture/Input Transition Counter
- TPU Programmable Time Accumulator
- TPU Pulse Width Modulation Out

## **Serial I/O Support**

Serial transmit and receive blocks.

## **Automatic Boot Code Loading**

Version 1.1 adds automatic boot code loading, with SingleStep or CodeWarrior, accessible from the MATLAB **Start** menu.

## **Automatic CAN Download**

You can now reach the CAN Download Control Panel using the MATLAB **Start** menu, or you can open it automatically at the end of the build process.

## **Target Preferences Dialog**

Version 1.1 includes a new Target Preferences dialog, accessible from the **Start** menu.

## **Automatic ASAP2 Generation**

Version 1.1 provides automatic set up of correct settings for ASAP2 file generation. There is no longer any need to run the `mpc555dk_asap2` utility.

## **More CAN Message IDs in Vector CAN Receive**

You can now specify a vector of CAN message IDs in a Vector CAN Receive block, so you can receive messages with different IDs from the same Vector Receive Block.

## **Automatic ODBC Data Source Configuration**

Configuration of the ODBC Data Source is now automatic; previously you had to configure this manually. The ODBC Data Source is used for importing data from CANdb.

## **New Test Program**

Version 1.1 includes a new test program, accessible from the **Start** menu, which downloads and runs on your MPC555 target hardware to verify your installation.

## **Two New Demos**

Two new demos have been added to demonstrate the use of CANdb Message Packing and Unpacking blocks. You can generate code from `mpc555rt_candb.mdl` for real-time execution on an MPC555. If you have Vector-Informatik CAN hardware and drivers installed, you can use the companion model `mpc555rt_candbhost.mdl` to exchange CAN messages with the `mpc555rt_candb.mdl` model (running either in Simulink simulation or on hardware).

## **Accelerator Mode**

Simulink Accelerator mode is now fully supported. Previous restrictions on models that contain CAN blocks and QADC blocks from the Embedded Target for Motorola MPC555 libraries have been removed.

## Improved Compiler Support for CCP

The CAN Calibration Protocol (CCP) block is now compatible with any MEX compiler that you may choose (use the `mex -setup` command to choose your default MEX compiler). Stateflow will use the default MEX compiler at Simulation time to process the Stateflow charts that implement the CCP block. This block has been tested with LCC and MSVC 6.0.

## Streamlined SingleStep Configuration

There is no longer any need for shortcuts to SingleStep. Setup is now considerably simpler. You can remove any existing shortcuts to SingleStep.

## CANdb Limitation Lifted

You no longer need to place your DBASE (.dbf) files in your working directory. You can use the CAN Message Packing (CANdb) block mask to browse to DBASE files in any directory.

## Upgrade Existing Boot Code via CAN or BDM

To install the new bootcode into flash memory on the target via BDM, follow the instructions under "Downloading Boot Code" in the chapter on Generating Stand-Alone Real-Time Applications in the *Embedded Target for Motorola MPC555 User's Guide*.

You can also upgrade the bootcode over CAN (removing the need for a BDM connector). It is not possible to upgrade from a previous bootcode using the regular `candownload` utility, so if you wish to download via CAN then follow these instructions:

- 1 Open the model `can_bootcode_upgrade`.
- 2 Follow the instructions contained inside the model to download the new bootcode to the MPC555 via CAN.

Note: Once you have initially downloaded the new bootcode using the upgrade model, it will be possible to use the standard `candownload` program to download application code to RAM or flash, and bootcode to flash.

### **Compatibility Considerations**

You must download the new bootcode provided with the latest release. If you do not have the latest boot code version installed on your MPC555 processor, then interrupts will not be handled correctly, causing real-time standalone applications to fail at run-time.

## Compatibility Summary for the Target Support Package FM5 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 with the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
<b>Latest Version</b> <b>V2.2.3 (R2009a)</b>	See the <b>Compatibility Considerations</b> subheading for this new feature or change: <ul style="list-style-type: none"> <li>• “CAN Support by the Vehicle Network Toolbox” on page 4</li> <li>• “New Boot Code” on page 5</li> </ul>
V2.2.2 (R2008b)	See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 6
V2.2.1 (R2008a)	See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 8
V2.2 (R2007b)	See the <b>Compatibility Considerations</b> subheading for each of these new features or changes: <ul style="list-style-type: none"> <li>• “New Boot Code” on page 9</li> <li>• “Link and Target Products Regrouped in New Start, Help, and Demos Category” on page 9</li> <li>• “Renamed Target Floating-Point Math Environment Parameter” on page 10</li> </ul>

<b>Version (Release)</b>	<b>New Features and Changes with Version Compatibility Impact</b>
V2.1 (R2007a)	<p>See the <b>Compatibility Considerations</b> subheading for each of these new features or changes:</p> <ul style="list-style-type: none"> <li>• “Implicit Modification of PIL Input / Output Signal Storage Classes” on page 12</li> <li>• “Host Side Profiling Via CAN Uses Vector "Application Channel"” on page 12</li> <li>• “New Boot Code” on page 13</li> </ul>
V2.0.5 (R2006b)	<p>See the <b>Compatibility Considerations</b> subheading for each of these new features or changes:</p> <ul style="list-style-type: none"> <li>• “New Boot Code” on page 14</li> <li>• “Driver Block Pass-Through No Longer Supported” on page 14</li> </ul>
V2.0.4 (R2006a)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 16</p>
V2.0.3 (R14SP3)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 17</p>
V2.0.2 (R14SP2)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 20</p>
V2.0.1 (R14SP1)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 23</p>
V2.0 (R14)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “New Boot Code” on page 28</p>
V1.1(R13SP2)	<p>See the <b>Compatibility Considerations</b> subheading for this new feature or change: “Upgrade Existing Boot Code via CAN or BDM” on page 32</p>