Motor Control Development Toolbox

Release Notes

An Embedded Target for the MPC564xL Family of Processors

By **freescale**

Version 1.3.0

Target Based Automatic Code Generation Tools
For MATLAB™/Simulink™/Stateflow™ Models working with Simulink Coder ™ and Embedded Coder®

Motor Control Development Toolbox Release Notes is for use with the Motor Control Development Toolbox, an embedded target and block set library for MATLAB/Simulink/Stateflow supporting model based design and code generation.

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1 MCU Parts Supported

This toolbox supports the MPC5643L MCU in both LSM and DPM modes of operation. The tool support operation with an 8MHz, 16MHz and 40 MHz external XTAL.

2 MATLAB Releases Supported

This tool supports the following MATLAB releases R2013A, R2013B, R2014A, R2014B, R2015A and R2015B.

3 Compiler Support

The following compilers are supported and have been tested with the following releases.

Compiler Supported	Release Version
Green Hills MULTI for PowerPC	V5.1.7
WindRiver DIAB	V5.9
CodeWarrior Development Studio for Freescale MPC5xxx	V2.8
CW for MCU	V10.6

4 Supported Peripherals/Devices of MCU

-Peripheral Blocks:
    ADC – Analog to Digital Converter
    FlexPWM – PWM Generation
    CTU – Cross Trigger Unit
    PIT – Periodic Interrupt Timer
    Digital I/O – general Purpose Digital Input and output
    eTimer – Ehanced Timer Module
    DSPI – Deserial Serial Peripheral Interface
    FlexCAN – CAN Communications Module
    SWG – Sine Wave Generation Module
    Memory Read/Write

- All Motor Control library functions
- CodeWarrior, WindRiver and GreenHills build targets are supported for RAM and Flash
- Freemaster interface via SCI and CAN
- Profiler
- Processor-In-Loop verification support
- Example modules for supported blocks
- The possibility to add the user's files into a project supported using the user defined script, please refer to reference manual for details
- Model Referencing support
- CCP interface

5 Math and Motor Control Function Support

All functions in the Automotive Math and Motor Control Functions Library are supported as blocks for simulation, SIL, PIL and embedded target code generation.

6 FreeMASTER Support

The Motor Control Development Toolbox has built-in code generation support for FreeMASTER through Serial and CAN interface support. The CAN interface works with Vector CAN hardware, and IXAAT CAN interface cards. All features of FreeMASTER are supported with exception of flash programming capability.

7 On-Target Profiling Support

The Motor Control Development Toolbox provides blocks to be used for On-Target function profiling that returns results in units of clock cycles of execution per execution iteration.

8 Processor-In-the-Loop Support (PIL)

The Motor Control Development Toolbox provides PIL support for purposes of ASIL software development processes, "Model PIL Block" (Model Reference) and "PIL Block" modes of operation are supported "Top Model PIL" mode is not supported. PIL contains full support for Math and Motor Control Blocks, and limited support for peripheral blocks. No support for interrupts exist in supported PIL modes of execution, therefore no blocks with interrupts are supported in PIL mode.

9 Example Models

Example models for different peripheral and motor control blocks are located in the Examples directory rappid564xl/examples. These are working examples of different configurations and use cases of peripheral blocks.

10 Bug Fixes

The following bug fixes have been applied in this release:
a) Incorrect code generation when some Toolbox blocks are placed to the library.
b) Shared utility files are not compiled and linked into application for PIL Reference Model.
c) CTU ISR enable-disable block error.
d) Incorrect generated code for some MC library functions with vector-parameter passed.

11 Known Limitations

The following limitations exist in the tool.
a) Do not support embedded target code generation when using Model Reference.
b) Do not support SIL Simulation using "Top Model SIL".
c) Do not support PIL Simulation using "Top Model PIL".

12 Additional Information

12.1 Setting the Path for Motor Control Development Toolbox

In the toolbox the path needs to be setup in the MATLAB environment, this is done by navigating to the MCToolbox/rappid564xl installation directory and running the "rappid_path" m-script.

12.2 Setting up the Target Compilers

The target compiler for MCD Toolbox to use will need to be defined. Ensure a system environment variable called <COMPILER_STRING>_TOOL is defined to a value similar to what is shown below:

GHS_TOOL = C:/ghs/multi517
DIAB_TOOL = C:/WindRiver/diab
MW_TOOL = C:/"Program Files"/Freescale/"CW for MPC55xx and MPC56xx 2.8"
CW_TOOL = C:/Freescale/"CW MCU v10.6"

Note 1: Please use "/" when defining compiler path as shown above and please use " " around any directories that have spaces in the names eg: C:/"Program Files"/compilerpath
Note 2: Once Environmental variables are setup you will need to restart MATLAB in order for them to take effect.
Note 3: If both MW_TOOL and CW_TOOL variables are set then CodeWarrior compiler defined by MW_TOOL is used.

12.3 Internal Bootloader

Internal Bootloader is a standalone application which requires the Microsoft .NET Framework version 4.0 installed on PC, please download the package from http://www.microsoft.com/download and install if you are going to use PIL and internal Bootloader.
The board should be configured to work with BAM to use Internal Bootloader. Please check board documentation.

13 Release History

Version 1.0.0 Release occurred October 19, 2011 and supported R2009A, 2009B, 2010A, 2010B, 2011A, and 2011B on Windows XP and Windows 7 32-Bit MATLAB releases.
Version 1.1.0 Release occurred April 26th, 2012 and supported R2009A, 2009B, 2010A, 2010B, 2011A, 2011B, and 2012A on Windows XP and Windows 7 32-Bit MATLAB releases.
Version 1.1.1 Release occurred September 21st, 2012 and supported R2009A, 2009B, 2010A, 2010B, 2011A, 2011B, and 2012A on Windows XP and Windows 7 32-Bit MATLAB releases.

Version 1.2.0 Release occurred June 28th, 2013 and supported R2011A, 2011B, 2012A, 2012B, and 2013A on Windows XP and Windows 7 32-Bit MATLAB releases.

14 Support Information

To order Freescale products or literature, consult your local sales representative.

For technical support please use the following email address:
support@freescale.com