Tools and Software

Motor Control Development Toolbox

Target Applications

- Aerospace and defense
- Automotive control design
- Embedded system development
- Industrial automation
- Machinery real-time systems

Overview

The motor control development toolbox is a comprehensive collection of tools that plug in to the MATLAB™/Simulink™ model-based design environment to support rapid application development targeting Freescale MCUs. The toolbox includes support for motor control application development and is designed to enable control engineers and embedded developers to meet the demands of shorter project life cycles. The motor control development toolbox includes an integrated Simulink embedded target supporting Freescale MCUs for direct rapid prototyping and processor-in-the-loop (PIL) development workflows. The toolbox contains peripheral device interface blocks and drivers, target-optimized math and motor control algorithm blocks for efficient execution on the target MCU and bit-accurate simulation results in the Simulink simulation environment.

Development Tools

The motor control development toolbox generates all code required to start up the MCU and run from either flash or RAM memory configurations supporting builds with CodeWarrior, Green Hills Multi and WindRiver Diab compilers. Integrated into the toolbox are utilities to profile execution on the target MCU in rapid prototyping or PIL modes of operation. The toolbox has built-in support for direct code download to the target MCU through the RAppID boot loader utility, leveraging the Qorivva MCU-based built-in boot assist module. Freescale FreeMASTER real-time debug monitor and data visualization tool interfaces are also built in to provide an interface to monitor signals in real time on the embedded target as well as to support data logging, signal capture and parameter tuning. FreeMASTER provides visibility into the target MCU for algorithm calibration and tuning that is often required in advanced control systems and those required by motor control development.

freescale™

MathWorks Product Requirements

- MATLAB (32-bit)
- Simulink
- MATLAB coder
- Simulink coder
- Embedded coder

Product Part Numbers

Standard Suite: Motor Control Development Toolbox

- Perpetual node locked
  - Part number: CWP-MCTB-564xL-N
  - Part Number: CWP-MCTB-567xK-N
  - Part Number: CWP-MCTB-PXS20-N
  - Part Number: CWP-MCTB-PXS30-N

Contact your local Freescale representative for more information.

MCU Support

	Device Driver Blocks Provided											
MCUs	**CAN**	**SPI**	**Flex PWM**	**CTU**	**ADC**	**Sin Wave**	**Digital In**	**Digital Out**	**eTimer***	**eSCI****	**PIT**	**BAM**
MPC564xL	x	x	x	x	x	x	x	x	x	x	x	x
MPC567xK	x	x	x	x	x		x	x	x	x	x	x
PXS20xx	x	x	x	x	x	x	x	x	x	x	x	x
PXS30xx	x	x	x	x	x		x	x	x	x	x	x

* Input capture and output compare functionality supported

**Utilized to support boot assist module (BAM) based boot loader and FreeMASTER tool support

Automotive Math and Motor Control Libraries

GFLIB	
Trigonometric Functions	• GFLIB_Sin • GFLIB_Cos • GFLIB_Tan • GFLIB_Asin • GFLIB_Acos • GFLIB_Atan • GFLIB_AtanXY
Limitation Functions	• GFLIB_Limit • GFLIB_LowerLimit • GFLIB_UpperLimit • GFLIB_VectorLimit
PI Controller Functions	• GFLIB_ControllerPIr • GFLIB_ControllerPIrAW • GFLIB_ControllerPIp • GFLIB_ControllerPIpAW
Linear Interpolation	• GFLIB_Lut1D
Hysteresis Function	• GFLIB_Hyst
Signal Integration Function	• GFLIB_IntegratorTR
Sign Function	• GFLIB_Sign
Signal Ramp Function	• GFLIB_Ramp
GMCLIB	
Clark Transformation	• GMCLIB_Clark • GMCLIB_ClarkInv
Park Transformation	• GMCLIB_Park • GMCLIB_ParkInv
Duty Cycle Calculation	• GMCLIB_SvmStd
Elimination of DC Ripples	• GMCLIB_ElimDcBusRip
Decoupling of PMSM Motors	• GMCLIB_DecouplingPMSM
GDFLIB	
Finite Impulse Filter	• GDFLIB_FilterFIR
Moving Average Filter	• GDFLIB_FilterMA
First Order Infinite Impulse Filter	• GDFLIB_FilterIIR1init • GDFLIB_FilterIIR1
Second Order Infinite Impulse Filter	• GDFLIB_FilterIIR2init • GDFLIB_FilterIIR2

For current information, visit freescale.com/mctoolbox

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