DSC RTCESL 4.5.1 Release Notes

1 Overview

These release notes are for the DSP56800EX Real-Time Control Embedded Software Libraries release 4.5.1.

The purpose of this release is to recompile the whole library without the SLLD (64-bit data types support) attribute and the Bit Accurate Models (BAM) of RTCESL functions are added.

Contents

2   What is new

All libraries are rebuilt without the SLLD attribute to avoid compilation warnings when RTCESL is a part of projects with the SLLD option. The inline functions can be compiled without the SLLD option if the SUPPORT_64BIT_DATA_TYPE define is not defined.

The most important functions newly contain their Bit Accurate Models (BAM) for Matlab Simulink environment. Using the BAMs, you can simulate most motor-control applications. After a sucessful simulation, the Simulink schema can be transferred to the generated code using the Matlab Coder toolbox and the application can be executed from a target board. The DSC RTCESL 4.5.1 installer with the BAMs can be downloaded from the DOWNLOAD section at www.nxp.com/rtcesl.

To create your simulation schema, open the BAM (.mdl file from the installation folder; for example c:\nxp\RTCESL\DSC_bam; MATLAB 2020a or higher version is required). Connect the block inputs, outputs, and assigned block parameters (if any) and run the simulation.

If you want to transfer your Simulink schemas to the target board, download the model-based design toolbox at: www.nxp.com/mbdt.

3   Description

This release of RTCESL supports the following platforms:

- DSP56800EX

It contains the following libraries:

- MLIB
- GFLIB
- GDFLIB
- GMCLIB
- AMCLIB
- PCLIB

It is compiled on:

- CodeWarrior 11.1 (build 181224)

Optimization used:

- The maximum speed optimization is used for all libraries.

Memory models used:
- SDM - Small Data Model and Large Program Model. To achieve such configuration, uncheck all Large Data Memory Model and Huge Program Model items and check the Large Program Model item in the CodeWarrior Properties window.

- LDM - Large Data and Large Program Model. To achieve such configuration, uncheck all Small Data Memory Model and Huge Program Model Items and check the Large Data Model and Large Program Model items in the CodeWarrior Properties window.

The selected algorithms support the 16-bit and 32-bit fixed-point types only.

This is the list of algorithms contained in this release:

```
AMCLIB_ACIMCtrlMTPAInit_F16
AMCLIB_ACIMCtrlMTPA_F16
AMCLIB_ACIMRotFluxObsrvInit_F16
AMCLIB_ACIMRotFluxObsrv_F16
AMCLIB_ACIMSpeedMRASInit_F16
AMCLIB_ACIMSpeedMRAS_F16
AMCLIB_AngleTrackObsrvInit_F16
AMCLIB_AngleTrackObsrv_F16
AMCLIB_CtrlFluxWkngInit_F16
AMCLIB_CtrlFluxWkng_F16
AMCLIB_PMSMBemfObsrvABInit_F16
AMCLIB_PMSMBemfObsrvAB_F16
AMCLIB_PMSMBemfObsrvDQInit_F16
AMCLIB_PMSMBemfObsrvDQ_F16
AMCLIB_TrackObsrvInit_F16
AMCLIB_TrackObsrv_F16

GDFLIB_FilterExpInit_F16
GDFLIB_FilterExp_F16
GDFLIB_FilterIIR1Init_F16
GDFLIB_FilterIIR1_F16
GDFLIB_FilterIIR2Init_F16
GDFLIB_FilterIIR2_F16
GDFLIB_FilterIIR3Init_F16
GDFLIB_FilterIIR3_F16
GDFLIB_FilterIIR4Init_F16
GDFLIB_FilterIIR4_F16
GDFLIB_FilterMAInit_F16
GDFLIB_FilterMA_F16

GFLIB_Acos_F16
GFLIB_Asin_F16
GFLIB_AtanYX_F16
GFLIB_Atan_F16
GFLIB_Cos_F16
GFLIB_CtrlBetaIPDpAWInit_F16
GFLIB_CtrlBetaIPDpAW_F16
GFLIB_CtrlBetaIPpAWInit_F16
GFLIB_CtrlBetaIPpAW_F16
GFLIB_CtrlPIDpAWInit_F16
GFLIB_CtrlPIDpAW_F16
GFLIB_CtrlPIpAWInit_F16
GFLIB_CtrlPIpAW_F16
GFLIB_DFlexRampCalcIncr_F16
GFLIB_DFlexRampInit_F16
```

```
GFLIB_DRampInit_F32
GFLIB_DRamp_F16
GFLIB_DRamp_F32
GFLIB_FlexRampCalcIncr_F16
GFLIB_FlexRampInit_F16
GFLIB_FlexRamp_F16
GFLIB_FlexSRampCalcIncr_F16
GFLIB_FlexSRampInit_F16
GFLIB_FlexSRamp_F16
GFLIB_Hyst_F16
GFLIB_IntegratorInit_F16
GFLIB_Integrator_F16
GFLIB_Limit_F16
GFLIB_Limit_F32
GFLIB_LowerLimit_F16
GFLIB_LowerLimit_F32
GFLIB_Lut1D_F16
GFLIB_Lut1D_F32
GFLIB_LutPer1D_F16
GFLIB_LutPer1D_F32
GFLIB_RampInit_F16
GFLIB_RampInit_F32
GFLIB_Ramp_F16
GFLIB_Ramp_F32
GFLIB_Sin_F16
GFLIB_Sqrt_F16
GMCLIB_Clark_F16
GMCLIB_DecouplingPMSM_F16
GMCLIB_ElimDcBusRipFOC_F16
GMCLIB_ElimDcBusRip_F16sas
GMCLIB_ParkInv_F16
GMCLIB_Park_F16
GMCLIB_SvmDpwm_F16
GMCLIB_SvmExDpwm_F16
GMCLIB_SvmIct_F16
GMCLIB_SvmStd_F16
GMCLIB_SvmU0n_F16
GMCLIB_SvmU7n_F16

MLIB_AbsSat_F16
MLIB_AbsSat_F32
MLIB_Abs_F16
MLIB_Abs_F32
MLIB_Add4Sat_F16
MLIB_Add4Sat_F32
```

```
MLIB_Add4_F16                      MLIB_MacSat_F16
MLIB_Add4_F32                      MLIB_MacSat_F32
MLIB_AddSat_F16                    MLIB_MacSat_F32lss
MLIB_AddSat_F32                    MLIB_Mac_A32ass
MLIB_Add_A32as                     MLIB_Mac_F16
MLIB_Add_A32ss                     MLIB_Mac_F32
MLIB_Add_F16                       MLIB_Mac_F32lss
MLIB_Add_F32                       MLIB_MnacRndSat_F16
MLIB_Clb_U16l                      MLIB_MnacRndSat_F32
MLIB_Clb_U16s                      MLIB_MnacRndSat_F32lls
MLIB_Conv_F16l                     MLIB_MnacRnd_A32ass
MLIB_Conv_F32s                     MLIB_MnacRnd_F16
MLIB_Div1QSat_A32as                MLIB_MnacRnd_F32
MLIB_Div1QSat_F16                  MLIB_MnacRnd_F32lls
MLIB_Div1QSat_F16ll                MLIB_MnacSat_F16
MLIB_Div1QSat_F16ls                MLIB_MnacSat_F32
MLIB_Div1QSat_F32                  MLIB_MnacSat_F32lss
MLIB_Div1QSat_F32ls                MLIB_Mnac_A32ass
MLIB_Div1Q_A32as                   MLIB_Mnac_F16
MLIB_Div1Q_A32ll                   MLIB_Mnac_F32
MLIB_Div1Q_A32ls                   MLIB_Mnac_F32lss
MLIB_Div1Q_A32ss                   MLIB_Msu4RndSat_F16
MLIB_Div1Q_F16                     MLIB_Msu4RndSat_F32
MLIB_Div1Q_F16ll                   MLIB_Msu4Rnd_F16
MLIB_Div1Q_F16ls                   MLIB_Msu4Rnd_F32
MLIB_Div1Q_F32                     MLIB_Msu4Sat_F32ssss
MLIB_Div1Q_F32ls                   MLIB_Msu4_F32ssss
MLIB_DivSat_A32as                  MLIB_MsuRndSat_F16
MLIB_DivSat_F16                    MLIB_MsuRndSat_F32
MLIB_DivSat_F16ll                  MLIB_MsuRndSat_F32lls
MLIB_DivSat_F16ls                  MLIB_MsuRnd_A32ass
MLIB_DivSat_F32                    MLIB_MsuRnd_F16
MLIB_DivSat_F32ls                  MLIB_MsuRnd_F32
MLIB_Div_A32as                     MLIB_MsuRnd_F32lls
MLIB_Div_A32ll                     MLIB_MsuSat_F16
MLIB_Div_A32ls                     MLIB_MsuSat_F32
MLIB_Div_A32ss                     MLIB_MsuSat_F32lss
MLIB_Div_F16                       MLIB_Msu_A32ass
MLIB_Div_F16ll                     MLIB_Msu_F16
MLIB_Div_F16ls                     MLIB_Msu_F32
MLIB_Div_F32                       MLIB_Msu_F32lss
MLIB_Div_F32ls                     MLIB_MulNegRndSat_A32
MLIB_Log2_U16                      MLIB_MulNegRndSat_F16as
MLIB_Mac4RndSat_F16                MLIB_MulNegRnd_A32
MLIB_Mac4RndSat_F32                MLIB_MulNegRnd_F16
MLIB_Mac4Rnd_F16                   MLIB_MulNegRnd_F16as
MLIB_Mac4Rnd_F32                   MLIB_MulNegRnd_F32
MLIB_Mac4Sat_F32ssss               MLIB_MulNegRnd_F32ls
MLIB_Mac4_F32ssss                  MLIB_MulNegSat_A32
MLIB_MacRndSat_F16                 MLIB_MulNegSat_F16as
MLIB_MacRndSat_F32                 MLIB_MulNeg_A32
MLIB_MacRndSat_F32lls              MLIB_MulNeg_F16
MLIB_MacRnd_A32ass                 MLIB_MulNeg_F16as
MLIB_MacRnd_F16                    MLIB_MulNeg_F32
MLIB_MacRnd_F32                    MLIB_MulNeg_F32ss
MLIB_MacRnd_F32lls                 MLIB_MulRndSat_A32
```

```
MLIB_MulRndSat_F16                          MLIB_ShLBiSat_F32
MLIB_MulRndSat_F16as                        MLIB_ShLBi_F16
MLIB_MulRndSat_F32                          MLIB_ShLBi_F32
MLIB_MulRndSat_F32ls                        MLIB_ShLSat_F16
MLIB_MulRnd_A32                             MLIB_ShLSat_F32
MLIB_MulRnd_F16                             MLIB_ShL_F16
MLIB_MulRnd_F16as                           MLIB_ShL_F32
MLIB_MulRnd_F32                             MLIB_ShRBiSat_F16
MLIB_MulRnd_F32ls                           MLIB_ShRBiSat_F32
MLIB_MulSat_A32                             MLIB_ShRBi_F16
MLIB_MulSat_F16                             MLIB_ShRBi_F32
MLIB_MulSat_F16as                           MLIB_ShR_F16
MLIB_MulSat_F32                             MLIB_ShR_F32
MLIB_MulSat_F32ss                           MLIB_Sign_F16
MLIB_Mul_A32                                MLIB_Sign_F32
MLIB_Mul_F16                                MLIB_Sub4Sat_F16
MLIB_Mul_F16as                              MLIB_Sub4Sat_F32
MLIB_Mul_F32                                MLIB_Sub4_F16
MLIB_Mul_F32ss                              MLIB_Sub4_F32
MLIB_NegSat_F16                             MLIB_SubSat_F16
MLIB_NegSat_F32                             MLIB_SubSat_F32
MLIB_Neg_F16                                MLIB_Sub_A32as
MLIB_Neg_F32                                MLIB_Sub_A32ss
MLIB_Rcp1Q1_A32s                            MLIB_Sub_F16
MLIB_Rcp1Q_A32s                             MLIB_Sub_F32
MLIB_Rcp1_A32s
MLIB_Rcp_A32s                               PCLIB_Ctrl2P2ZInit_F16
MLIB_RndSat_F16l                            PCLIB_Ctrl2P2Z_F16
MLIB_Rnd_F16l                               PCLIB_Ctrl3P3ZInit_F16
MLIB_Sat_F16a                               PCLIB_Ctrl3P3Z_F16
MLIB_Sh1LSat_F16                            PCLIB_CtrlPIDInit_F16
MLIB_Sh1LSat_F32                            PCLIB_CtrlPID_F16
MLIB_Sh1L_F16                               PCLIB_CtrlPIInit_F16
MLIB_Sh1L_F32                               PCLIB_CtrlPI_F16
MLIB_Sh1R_F16                               PCLIB_CtrlPIandLPInit_F16
MLIB_Sh1R_F32                               PCLIB_CtrlPIandLP_F16
MLIB_ShLBiSat_F16
```