BOOSTXL8323RS Hardware Quick Start Guide

Version 1.0.1 *Motor Solutions*

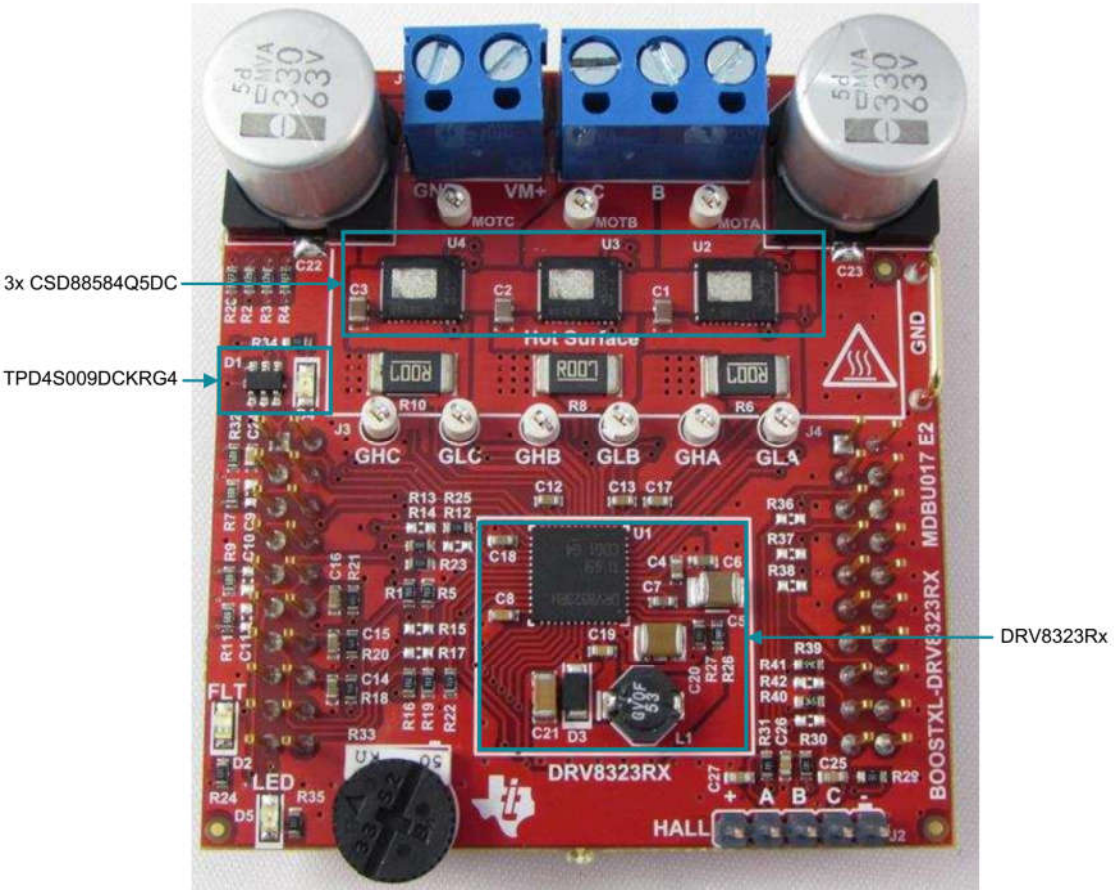


Fig 1: BOOSTXL-DRV8323Rx EVM Hardware Connections Overview

This document acts as a guide book for your evaluation of an InstaSPIN-FOC enabled Piccolo LaunchPad paired with BOOSTXL-DRV8323RS, a three phase smart gate driver evaluation module.

Supports:

- Piccolo InstaSPIN enabled controllers
  - LAUNCHXL-F28069M LaunchPad for InstaSPIN-FOC
    - Includes on-card XDS100v2 JTAG (isolated)
  - LAUNCHXL-F28027F LaunchPad for InstaSPIN-FOC
    - Includes on-card XDS100v2 JTAG (isolated)
- 3-phase Inverters

- Low Voltage / Medium Current: boostxldrv8323Rx_revA
  - PN: BOOSTXL-DRV8323RS

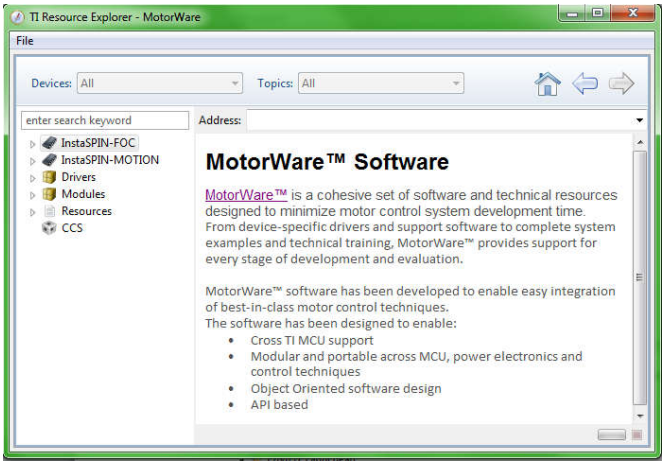
Notes: For more detail about DRV8323RS device and BOOSTXL-DRV8323RS, refer to the datasheet and user's guide as http://www.ti.com/product/DRV8323R and http://www.ti.com/tool/boostxl-drv8323rs

Version: 1.0.1

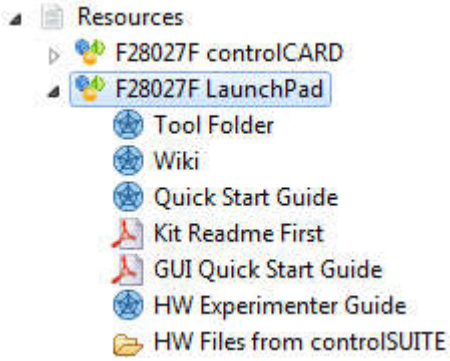
Revision History:

1.0.1	**October 23, 2017**	**First release for BOOSTXL8323RS EVM board**

1. Always make sure you are using the latest version of MotorWare
    a. www.ti.com/tool/motorware
    b. LaunchPad and BoosterPack support starts with version 1_01_00_10
    c. MotorWare contains all of the modules, drivers, example Code Composer Studio based InstaSPIN projects, and associated documentation
    d. It can be easily browsed by running MotorWare.exe from the installation directory



2. Set-up Hardware according to documentation



For typical use the following settings should be used

LAUNCHXL-F28027F

i. Remove Jumpers 1, 2, 3 to isolate USB and power from BOOSTXL-DRV8301
ii. S1 set to OFF-ON-ON to allow JTAG
iii. S4 set to OFF
iv. Provide DC bus through the BoosterPack

LAUNCHXL-F28069M

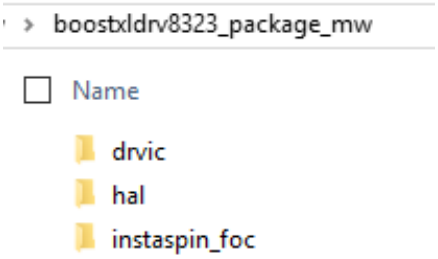
i. Remove Jumpers 1 and 2 to isolate USB and power from BOOSTXL-DRV8301
ii. S1 set to ON-ON-ON
iii. JP3, JP6, JP7 ON-ON-ON
iv. JP4, JP5

a. ON-ON: if just using bottom BoosterPack headers J5-J8
b. OPEN-OPEN: if using top BoosterPack headers J1-J4 or using both BoosterPack headers J1-J4 & J5-J8;

v. Provide DC bus at any attached BoosterPack

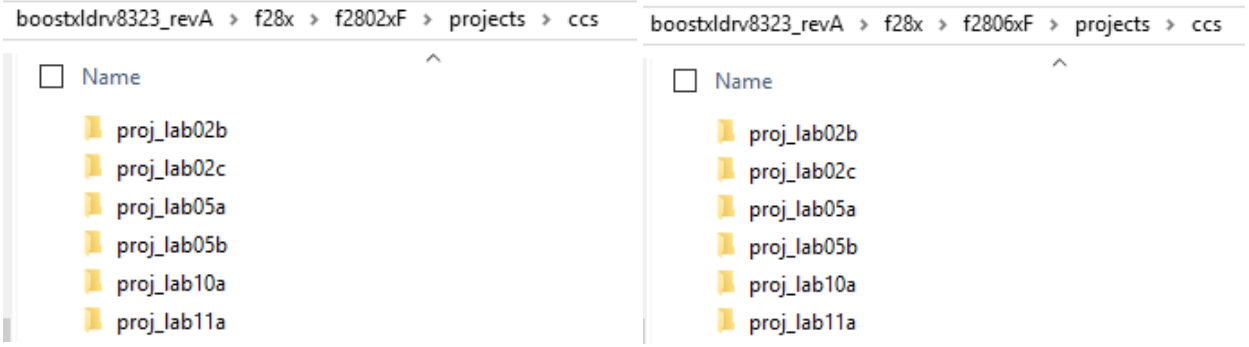
BOOSTXL-DRV8323RS

i. Solder the 3 capacitors C9, C10, C11 with 0.1uF capacitance.
ii. Connect the BoosterPack to Launchxl-F28027F or Launchxl-F28069M
iii. Download the software package for DRV8323RS. Extract the compressed files to find 3 file directories as shown in the below figure. Copy and overwrite the files to the corresponding directories in MotorWare.
   a. Copy “drvic” to “\sw\drivers\drvic,
   b. Copy “hal” to “\sw\modules\hal”,
   c. Copy “instaspin_foc” to “\sw\solutions\instaspin_foc”.



3. Read further documentation as required
   i. InstaSPIN-FOC & InstaSPIN-MOTION User’s Guide (SPRUHJ1)
   ii. Technical Reference Manuals
      a. F2802xF InstaSPIN-FOC (SPRUHP4)
      b. F2806xF InstaSPIN-FOC (SPRUHI9)

There are 6 lab projects supporting the BoostXL-DRV8323RS for both LaunchXL-F28027F and LaunchXL-F28069M. You can open these projects and run as you would any other InstaSPIN lab. The 6 supported labs are shown below:



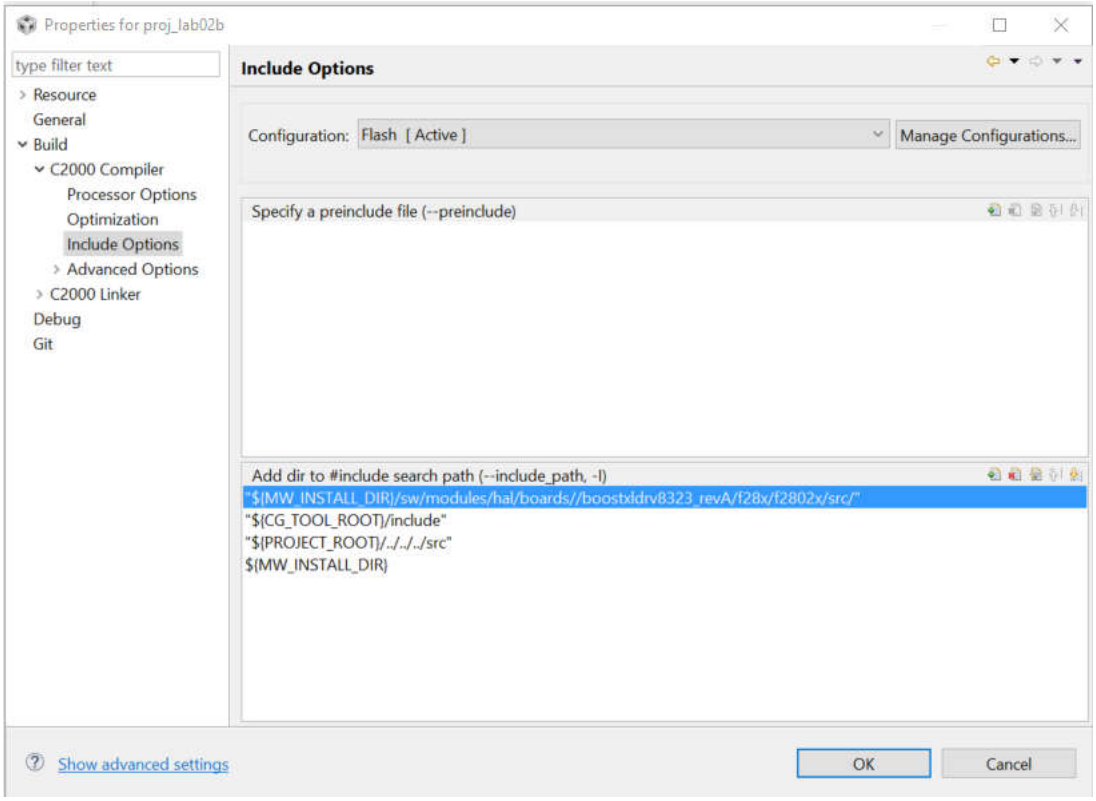
The following steps should be followed to migrate one of the 6 supported projects from an existing DRV83xx device to the DRV8323RS:

1. Copy the target project from
   “\sw\solutions\instaspin_foc\boards\boostxldrv8305_revA\f28x\f2802xF\projects\ccs” to
   “\sw\solutions\instaspin_foc\boards\boostxldrv8323_revA\f28x\f2802xF\projects\ccs”

2. Remove the drv8305.c from the now transferred project, and add drv8323.c from
   “\sw\drivers\drvic\drv8323\src\32b\f28x\f2802x” to the project.

3. Remove hal.c from the project, and add the DRV8323RS version of hal.c from
   “\sw\modules\hal\boards\boostxldrv8323_revA\f28x\f2802x\src” to the project,

4. Change the include path in “Project->Properties->Build->C2000 Compiler->Include Options” to "${MW_INSTALL_DIR}/sw/modules/hal/boards//boostxldrv8323_revA/f28x/f2802x/src/" as shown below



5. Refer to example lab projects to copy and add the below code to the project main source file proj_lab0x.c.
   a. Object definition codes

```
#ifdef DRV8323_SPI
// Watch window interface to the 8323 SPI
DRV_SPI_8323_Vars_t gDrvSpi8323Vars;
#endif
```

b. Turn on and initialize DRV8323 driver interface

```
#ifdef DRV8323_SPI
  // turn on the DRV8323 if present
  HAL_enableDrv(halHandle);

  // initialize the DRV8323 interface
  HAL_setupDrvSpi(halHandle,&gDrvSpi8323Vars);

  gDrvSpi8323Vars.Ctrl_Reg_06.CSA_GAIN = Gain_20VpV;
  gDrvSpi8323Vars.Ctrl_Reg_06.VREF_DIV = 1;
  gDrvSpi8323Vars.WriteCmd = true;

  HAL_writeDrvData(halHandle,&gDrvSpi8323Vars);

  gDrvSpi8323Vars.ReadCmd = true;
  HAL_readDrvData(halHandle,&gDrvSpi8323Vars);
#endif
```

c. Write or Read DRV8323 registers

```
#ifdef DRV8323_SPI
        HAL_writeDrvData(halHandle,&gDrvSpi8323Vars);

        HAL_readDrvData(halHandle,&gDrvSpi8323Vars);
#endif
```

If using the LaunchXL-F28069M, it is necessary to change “f2802x” to “f2806x” in the directory labels for the above steps.