User's Guide
SLVUBM8C–October 2018–Revised November 2019

DRV89xx-Q1 EVM GUI user's guide

This document is provided with the DRV89xx-Q1EVM customer evaluation module (EVM) as a supplement to the DRV89xx-Q1EVM user's guide. This GUI user's guide details how to use the DRV89xx-Q1EVM GUI Application.

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1 Hardware and Software Setup

The hardware (HW) and software (SW) tools that follow are required for the evaluation of DRV89xx-Q1EVM:

- DRV89xx-Q1EVM
- A micro-USB cable
- Brushed motor or other inductive load
- Voltage supply 4.5 V to 32 V
- Jumper wires (for connections)
- DRV89xx-Q1 EVM GUI

For additional details on hardware connections refer to the *DRV89xx-Q1EVM User's Guide*.

This document describes the usage of the DRV89xx-Q1 EVM GUI.

2 GUI Application

Figure 1 shows the README page. The README page will be displayed only for the first time while opening DRV89xx-Q1EVM GUI. Once the EVM is connected, please close the popup to proceed.

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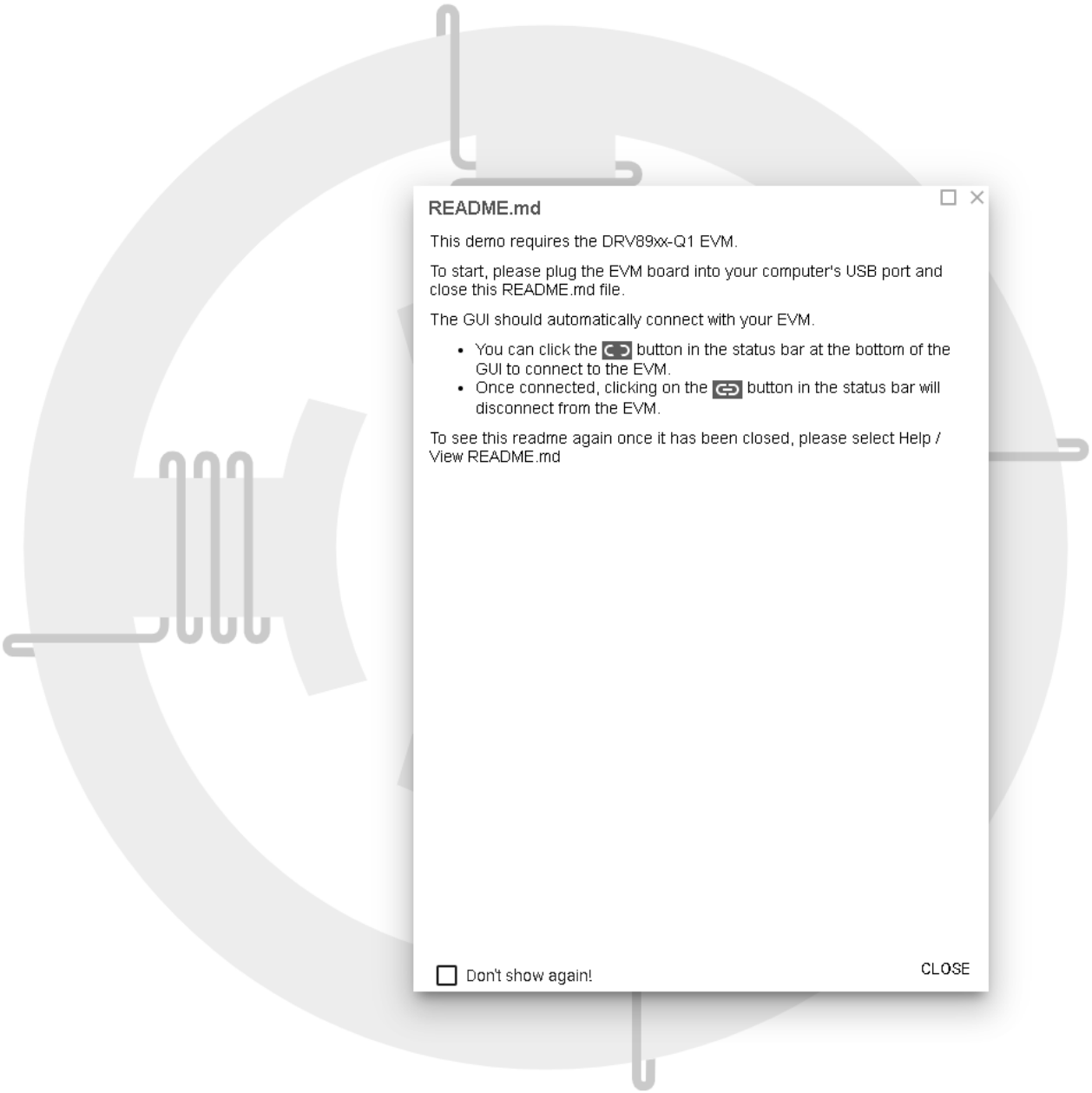

Figure 1. DRV89xx-Q1EVM GUI (Readme Page)

Figure 2 shows DRV89xx-Q1EVM GUI provides a device list according to device ID detection result. For example: if the EVM board motor drive device is DRV8912-Q1, the GUI can detect 12 Half-Bridge device DRV8912-Q1 on board and allow us to select a device which has less than or equal to 12 half bridges.

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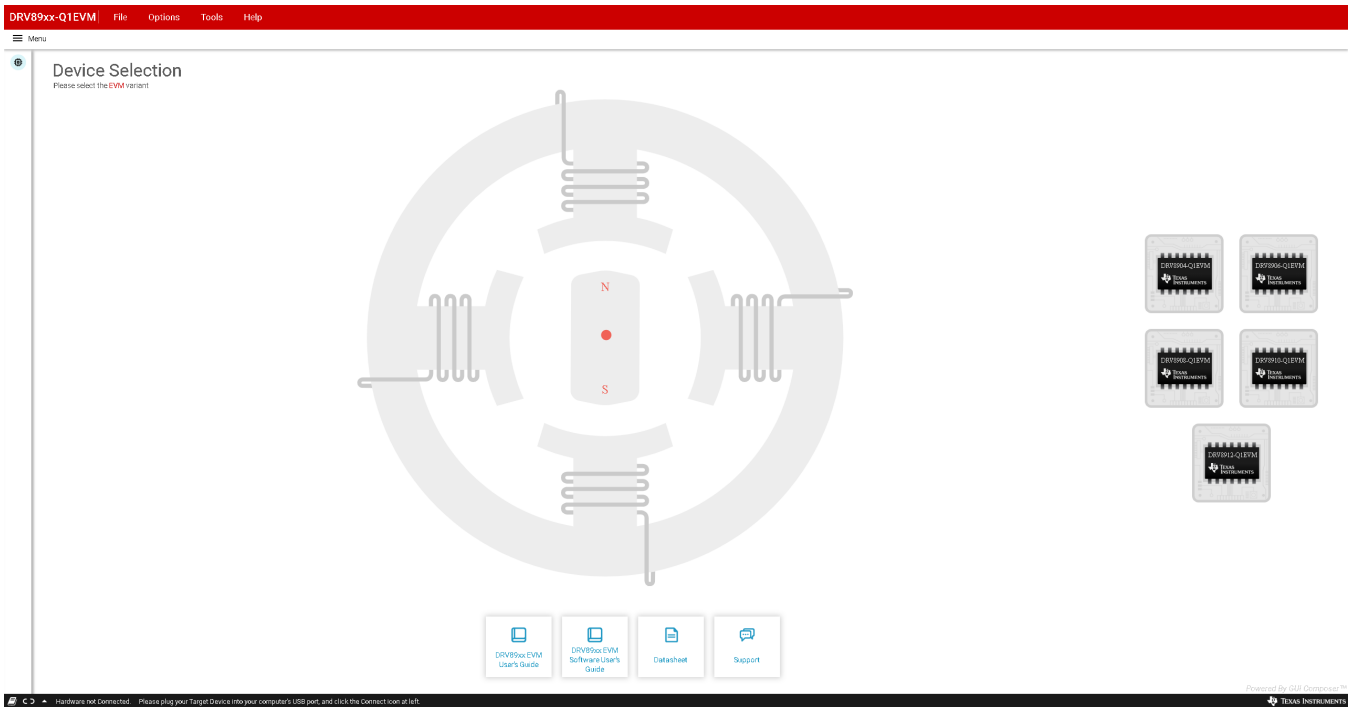

Figure 2. DRV89xx-Q1EVM GUI (Device Selection Page)

If a single EVM is connected to the PC, it will be auto connected to the application. If multiple EVMs are connected, please go to the Serial Port page by clicking the top dropdown menu "Options" to manually select an available COM port. The Serial Port page displays the list of COM ports available and have connect/disconnect button for the matching devices of the app as shown in Figure 3.

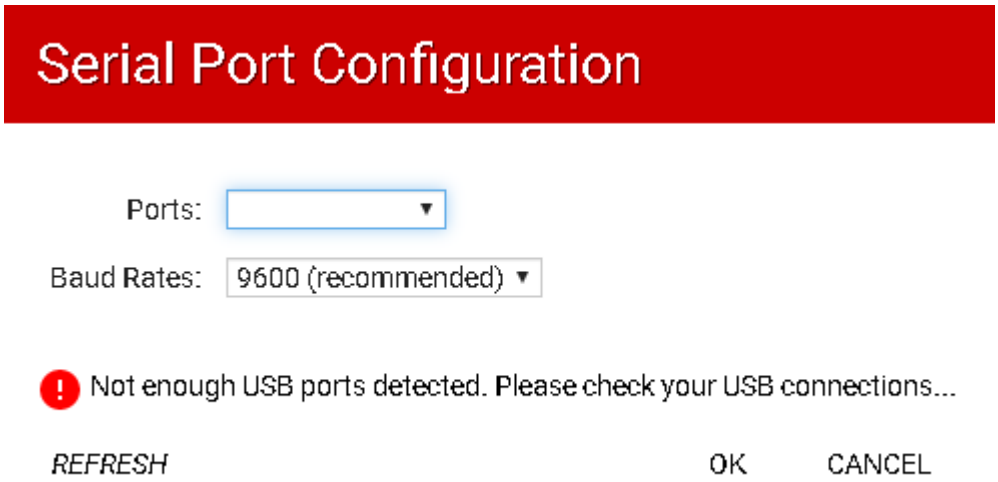

Figure 3. DRV89xx-Q1 EVM GUI (Serial Port Page Showing the Required Friendly Name)

NOTE: To correctly connect to the GUI, first power up the EVM, then connecting the USB to the computer.

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2.1 Using DRV89xx-Q1EVM GUI

The DRV89xx-Q1EVM GUI along with DRV8912-Q1EVM facilitates control of brushed DC motors and other loads, along with manipulation of control settings. It provides functionality for adjusting the speed and direction of the motor, adjusting the other parameters such as voltage and current regulation limits and monitoring the device status. Use the steps that follow to get started with the GUI:

Step 1. Attach Brushed DC motors, or other loads on OUTx.

Step 2. Plug in the micro-USB cable between the PC and EVM board.

Step 3. Enable the motor power supply. For additional details on hardware connections refer to the *DRV89xx-Q1EVM User's Guide*.

Step 4. Make sure the EVM connection; Click on DRV89xx-Q1EVM GUI shortcut either on the desktop or from the start menu to run the GUI application.

Step 5. Figure 4. shows the GUI interface after selecting device.

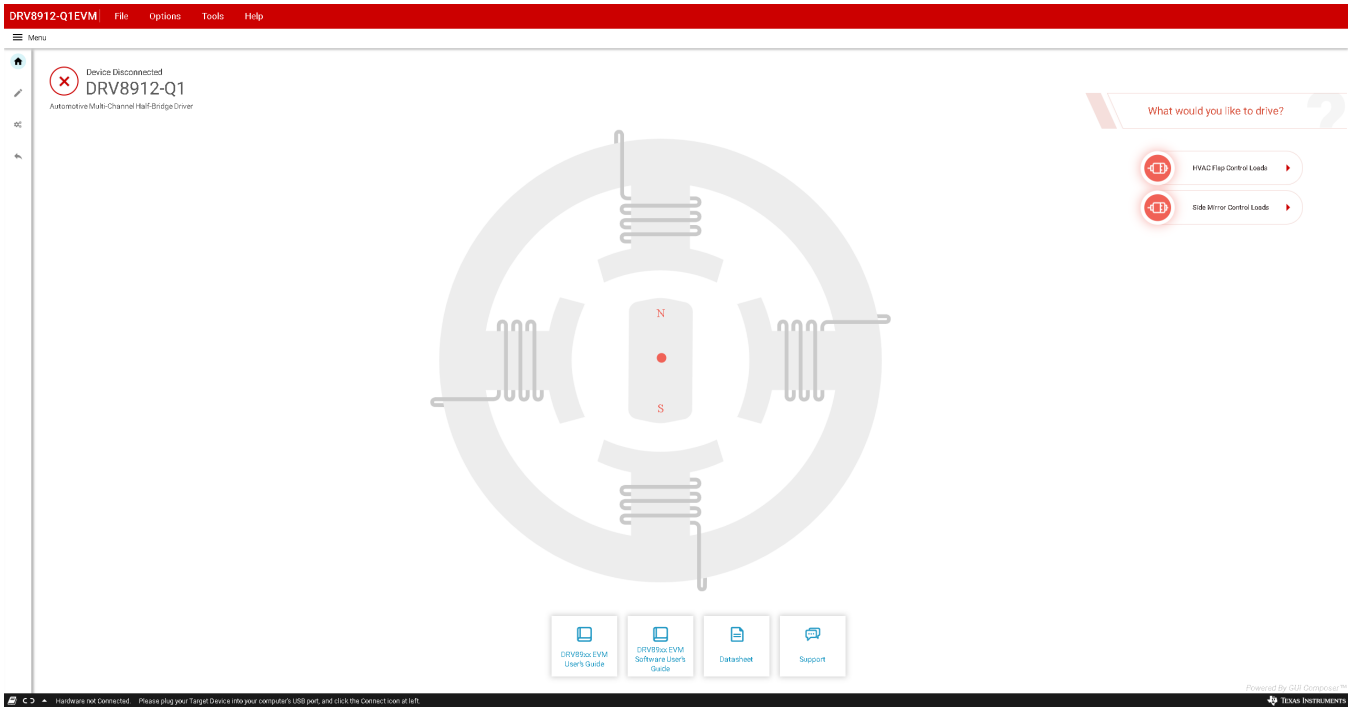

Figure 4. DRV89xx-Q1 EVM GUI (Interface after selecting DRV8912-Q1 device)

Step 6. Use the side-bar menu to navigate to the following pages or sub-pages at any time. The pages that follow are in context to the launched device:

- Introduction (Home)
- Registers
- Motor Control

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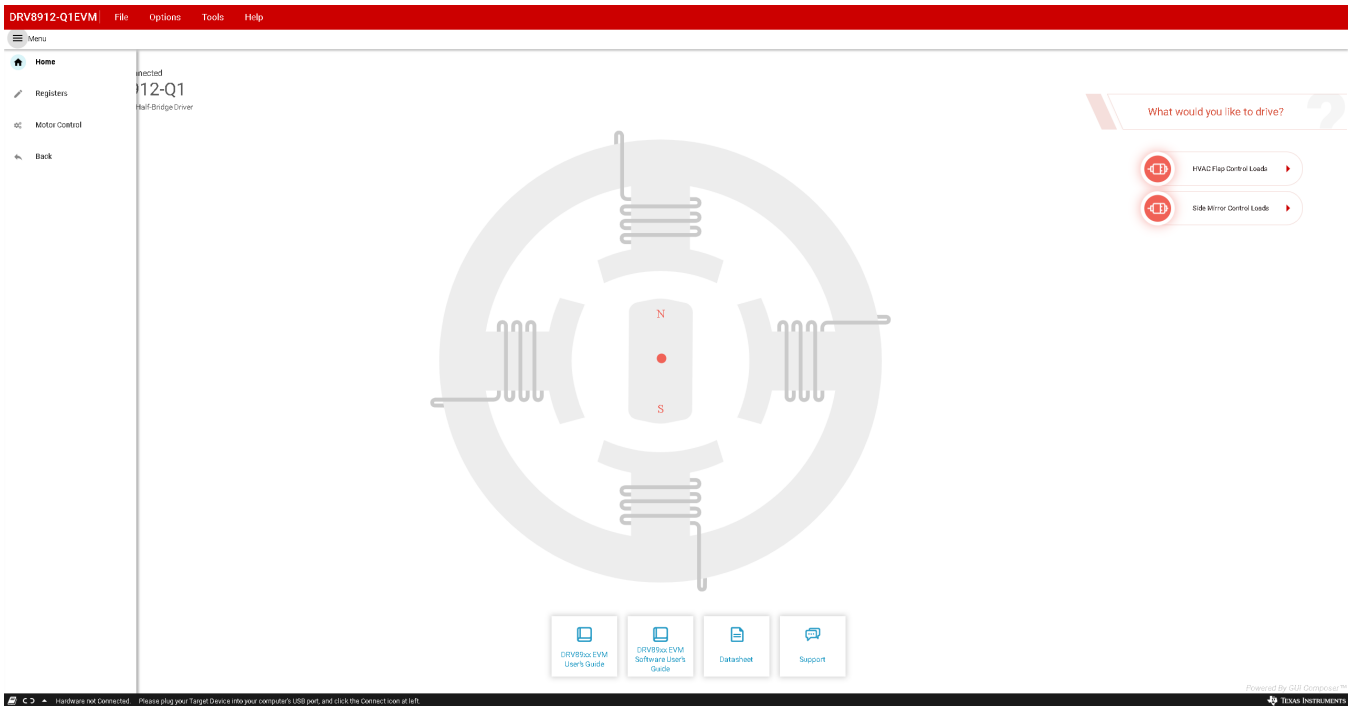

Figure 5. DRV89xx-Q1EVM GUI (Menu)

Step 7. Introduction (Home) page

The Introduction (Home) page provides access to main application "HVAC Flap DC motors and LEDs" page or customized application "Side Mirror Control" page.

Step 8. Registers page

This page shows all the registers and their fields present on the DRV89xx-Q1 device. The page allows reading and writing any register, field, or bit. Click on the question mark icon on any register or field to get in-place data sheet help.

NOTE: The register maps are different between the DRV8912-Q1, DRV8910-Q1 register maps and the DRV8908-Q1, DRV8906-Q1, DRV8904-Q1 register maps. Refer to the datasheet for more information.

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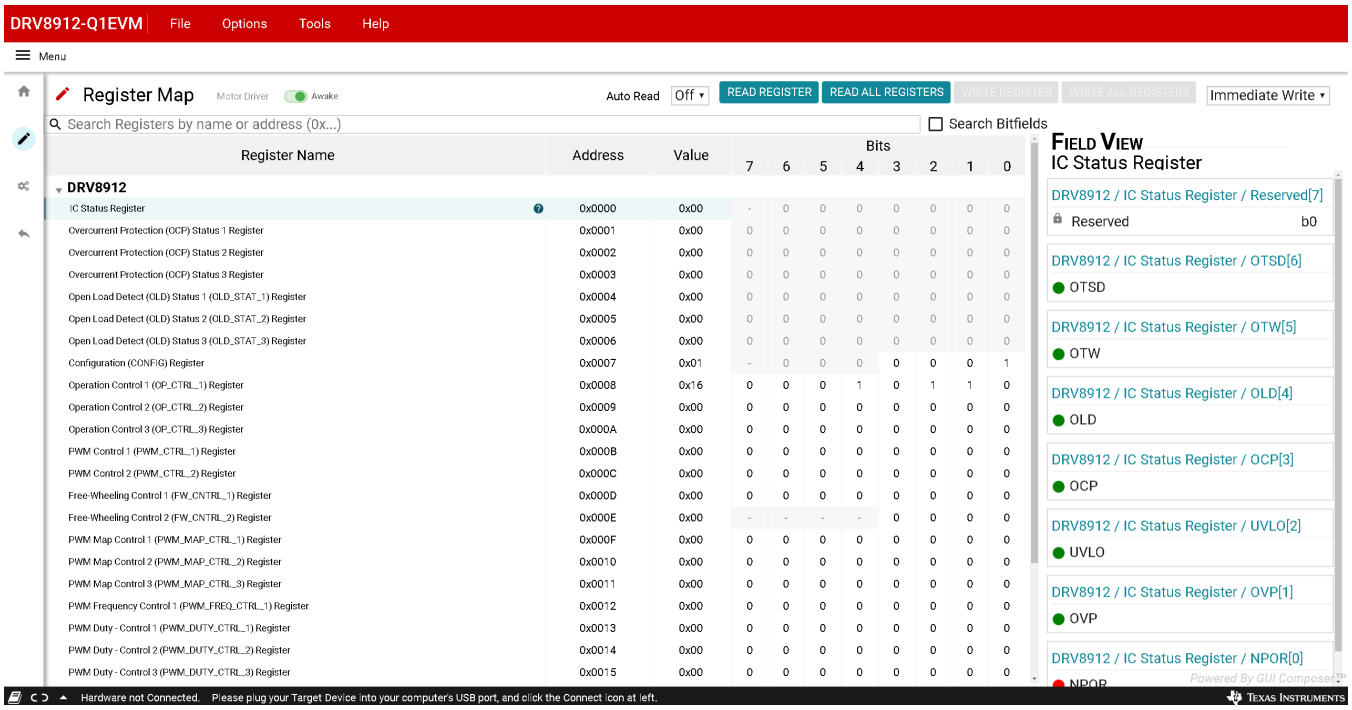

Figure 6. DRV89xx EVM GUI (Registers Page)

Step 9. HVAC Flap Control Loads pages

After select "HVAC Flap Control Loads" in main page. The following three pages show the load connection setting to match the EVM hardware setting.

a. Selecting the No. of motors and LEDs are connected to the EVM and click "Proceed".

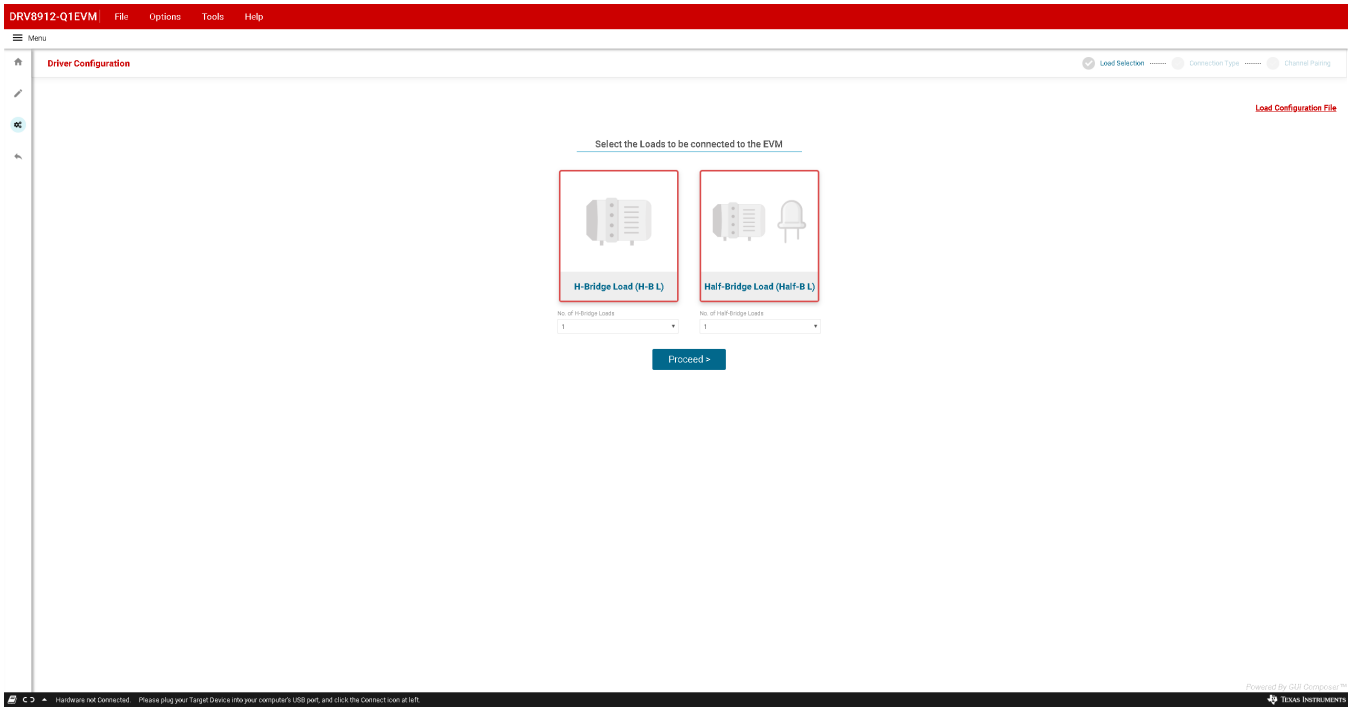

Figure 7. DRV89xx-Q1 EVM GUI - Select Motors and LEDs

b. For each motors and LEDs, please select its connection type (Independent/Parallel). For

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motors, select its brake mode as High Side or Low Side. For LEDs, select using high FET or low FET as a switch. And then click "Proceed".

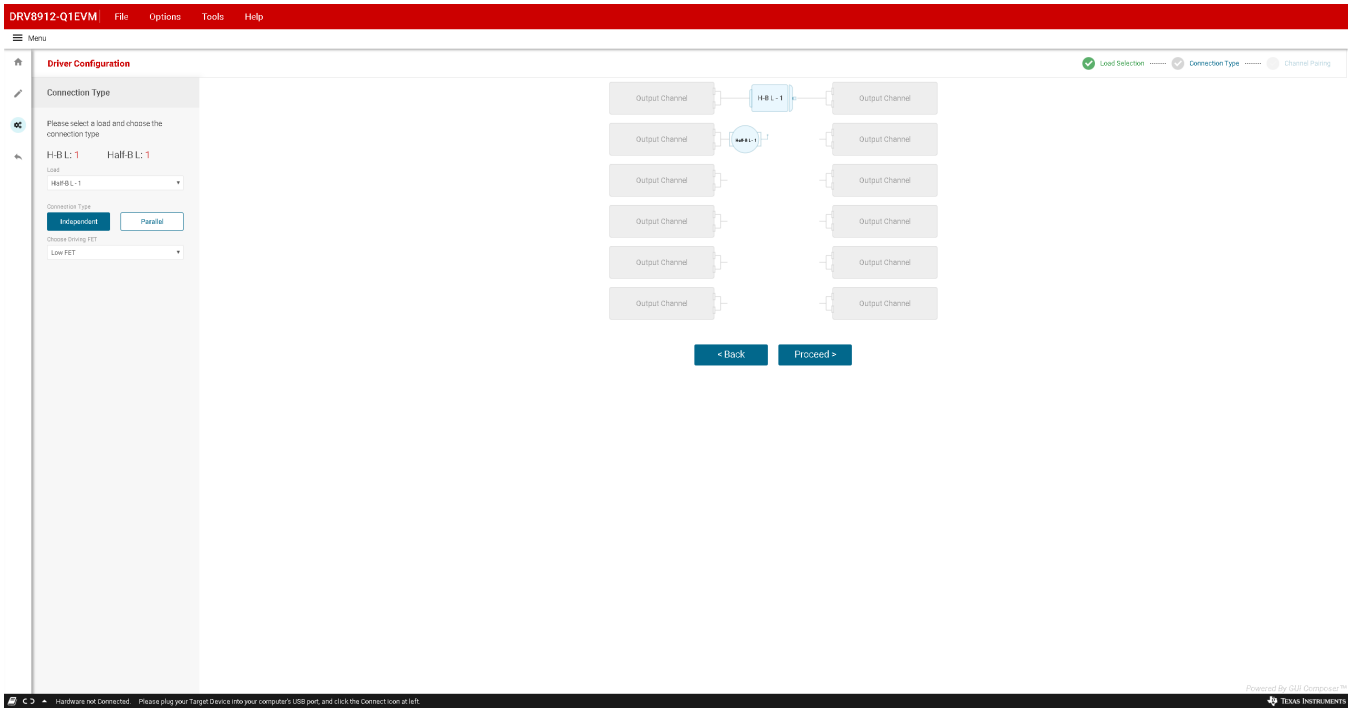

Figure 8. DRV89xx-Q1 EVM GUI - Select Motors and LEDs Connection Types

c. Drag the "OUT-x" half bridges to the "Drop OUT channel here" box and let them match the EVM connection.

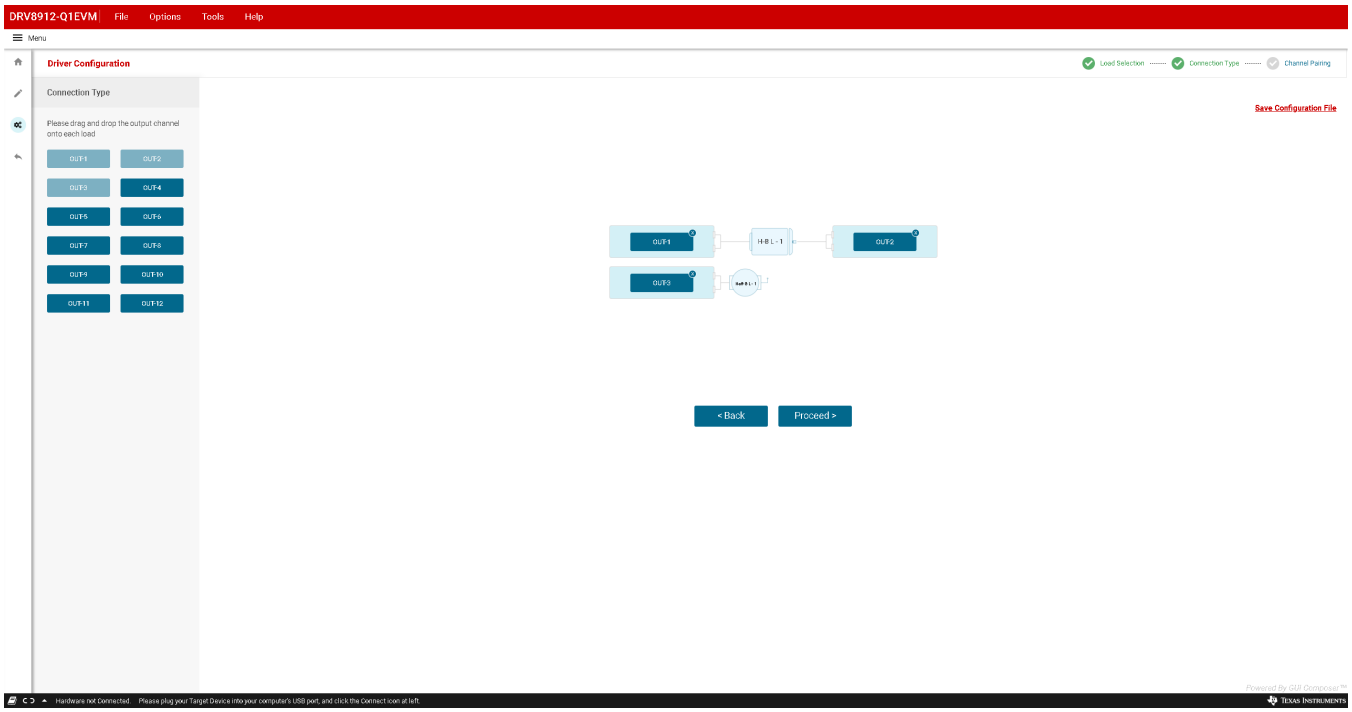

Figure 9. DRV89xx-Q1 EVM GUI -HVAC Flap Control Loads Connection Configuration Pages

d. After completing the connection configuration, we can save the configuration to a .json file. This allows the user to skip configuration steps in future. To load this configuration

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file, please click "Load Configuration" button available on the top right corner of "Load Selection" page.

e. Click "Proceed" button to go to motor and led control panel.

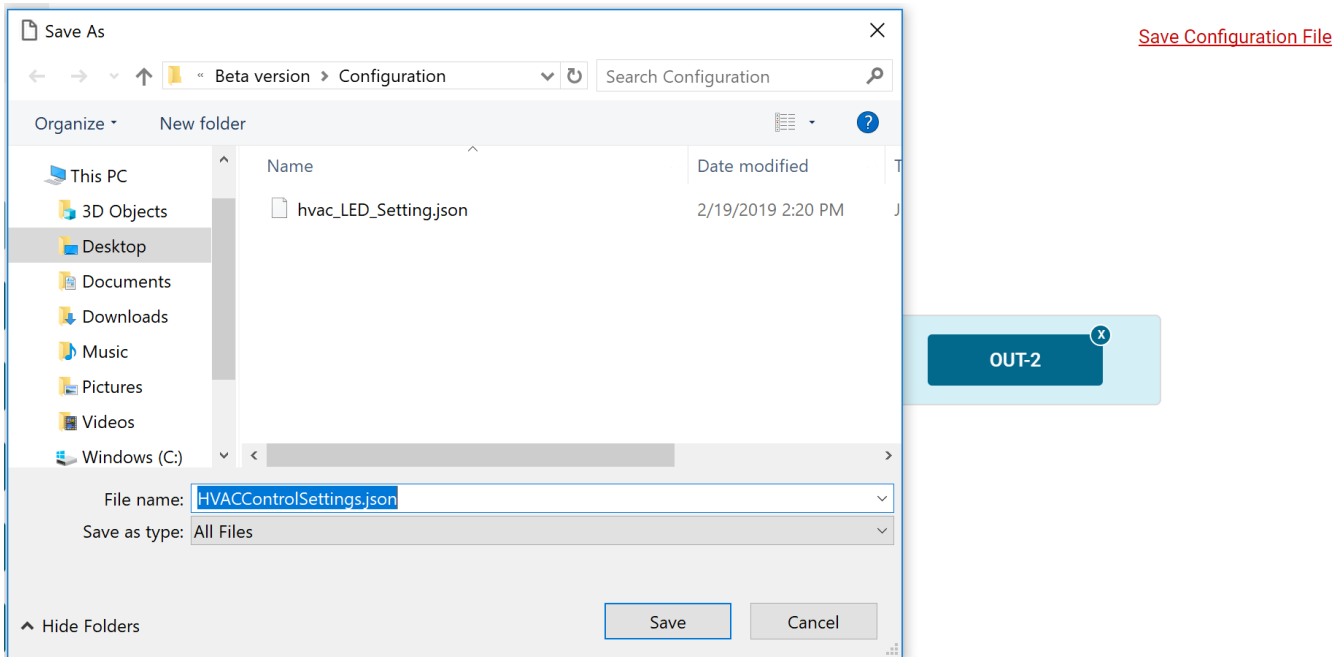

Figure 10. DRV89xx-Q1 EVM GUI - Save HVAC Flap Control Loads Configuration Pages

Step 10. Motors and LEDs control panel page

In "HVAC Flap Control Loads" page, it allows:

a. Setting nSLEEP pin high or low by clicking Motor drive "Enable" or "Disable" button at top right corner

NOTE: When the driver is disabled, the register read-write (R/W) operations are not allowed.

b. To Set Fault and Pin configuration by clicking "Configure" at top right region or clear fault by clicking "Clear" near Fault status.

c. To set OUTx slew rate; continue mode or PWM mode (free wheeling; PWM frequency; Duty cycle and channel selection).

NOTE: All OUTx's PWM channel setting has to be completed before enable PWM output (before running from Coast or HIZ mode to other mode).

d. Motor Coast; Forward; Reverse and brake mode control

NOTE: If any of the MOSFET is in operating condition (switched-ON) and the current flowing in the particular MOSFET is lower than the open-load current threshold (IOLD) for at least open-load deglitch time (tOLD), then an open-load condition is detected.

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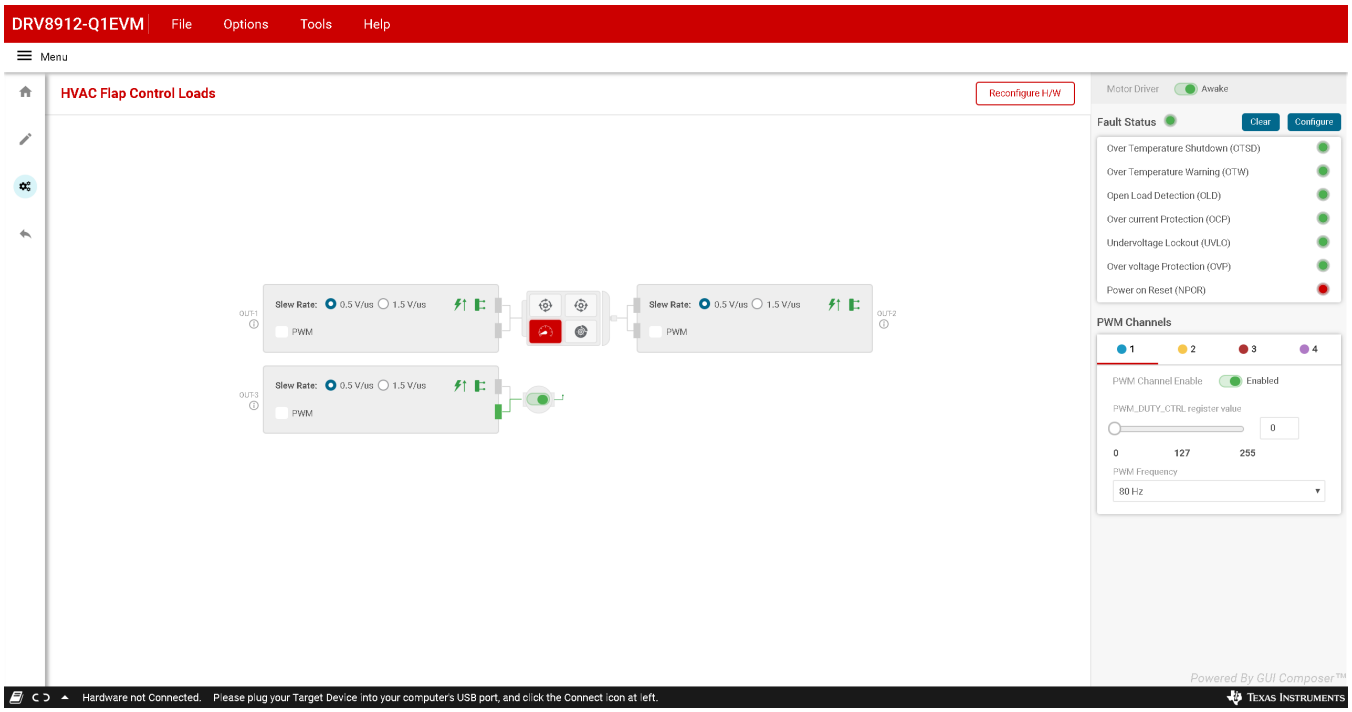

Figure 11. DRV89xx-Q1 EVM GUI - HVAC Flap Control Loads Page

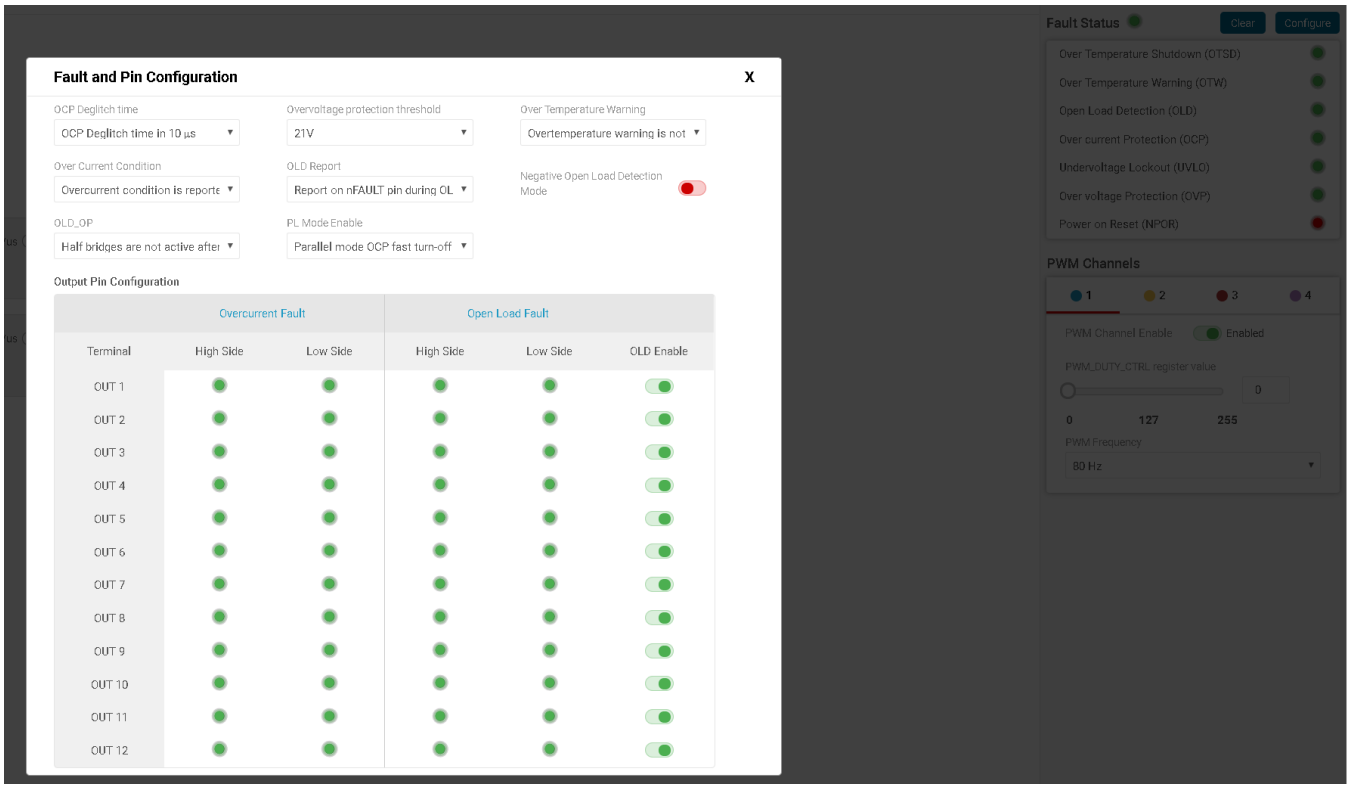

Figure 12. DRV89xx-Q1 EVM GUI - Fault and Pin Configuration Page

Click on the info icon "i" near each OUT-x channels to view the FET Structures & Faults of all OUT-x channels with respect to each load. Figure 13 shows “FET Structures & Faults” popup.

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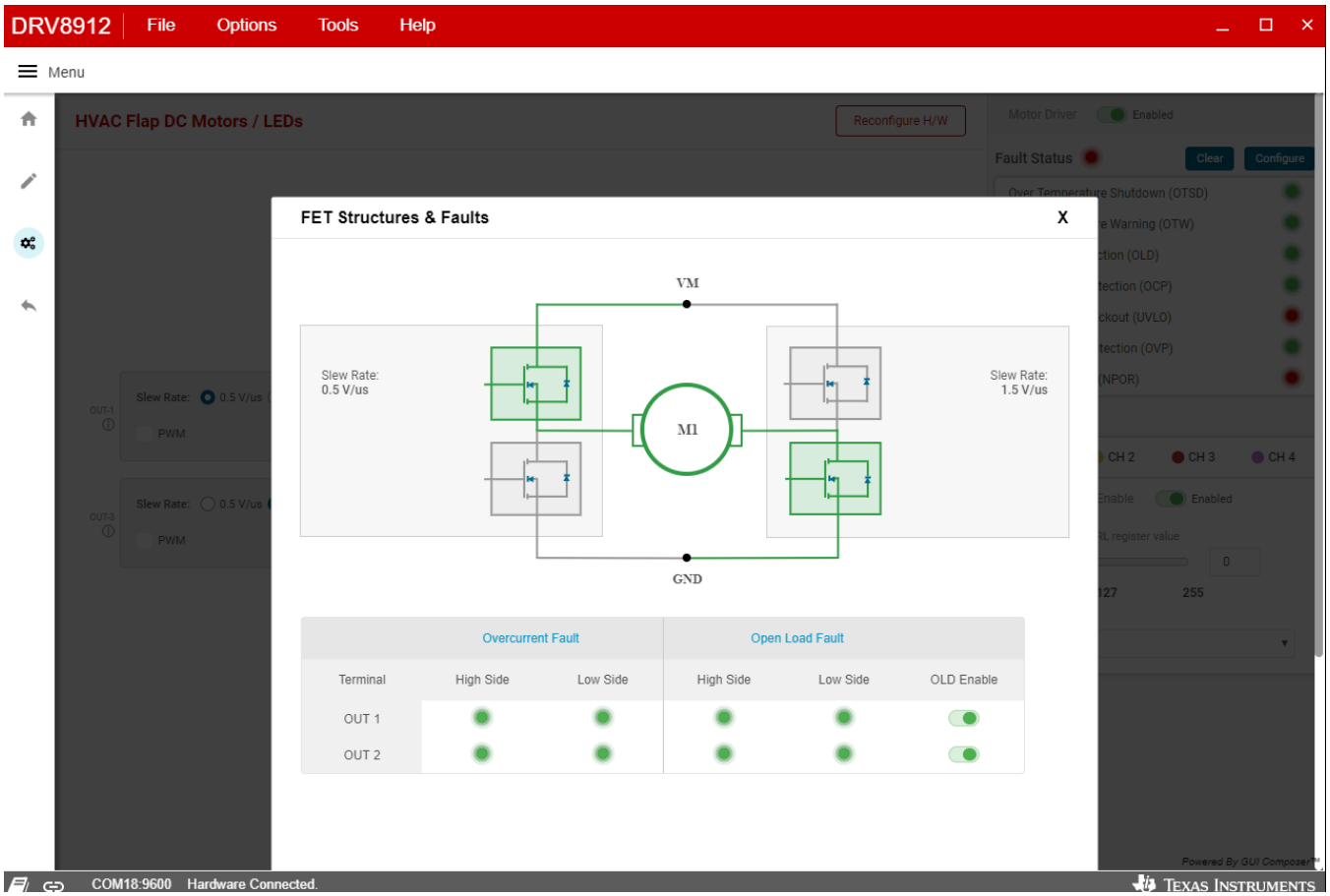

Figure 13. DRV89xx-Q1 EVM GUI - FET Structures and Faults Page

Step 11. Side Mirror Control

Side Mirror Control gives an application example for side mirror applications.

After select "Side Mirror Control" in main page, the following page shows the load connection setting page to match the EVM hardware setting. The settings sequence is common for both "HVAC Flap Control Loads" application and "Side Mirror Control" application.

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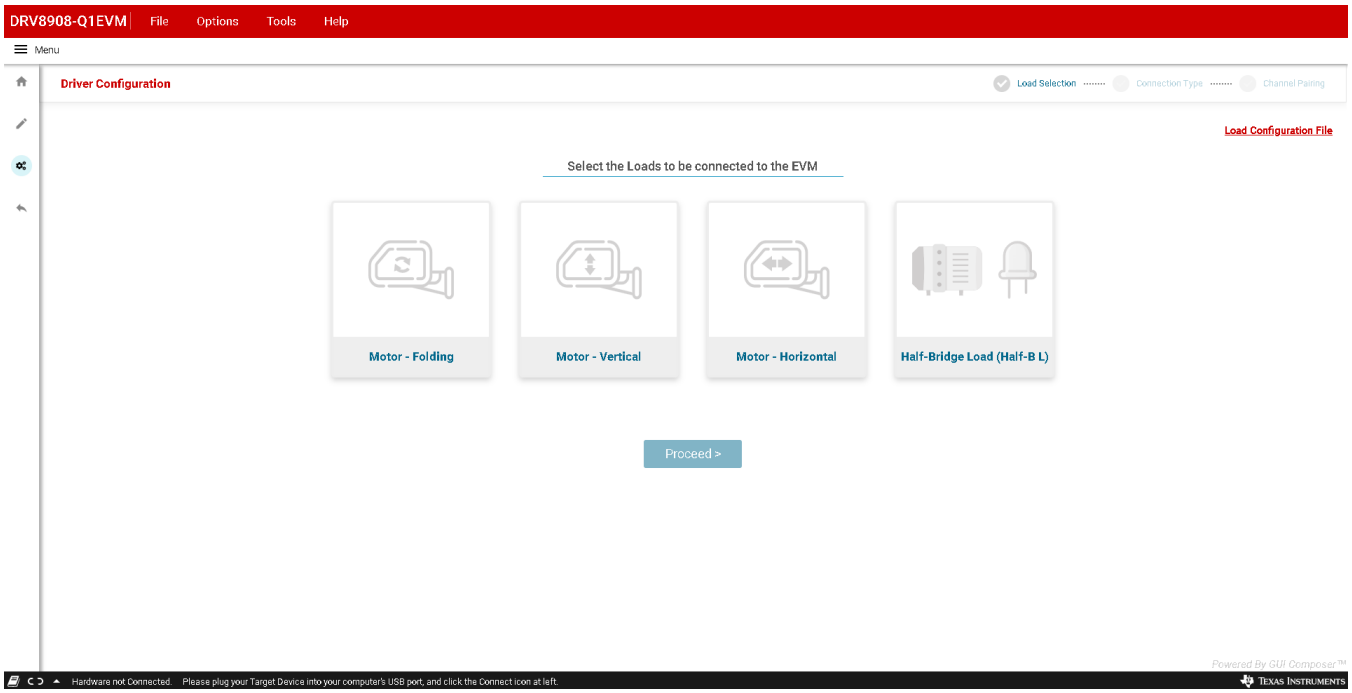

Figure 14. DRV89xx-Q1EVM Side Mirror Control Application Starting Page

In "Side Mirror Application" page, it allows:

a. To set nSLEEP pin high or low by clicking Motor drive "Enable" or "Disable" button at top right corner.

b. To set Fault and Pin configuration by clicking "Configure" at top right region or clear fault by clicking "Clear" near Fault status.

c. To set OUTx slew rate, continue mode or PWM mode setting (free-wheeling, PWM frequency, Duty cycle and channel selection).

d. Motor Operations:

- Fold Motor: FOLD (spins motor in forward direction), UNFOLD (spins motor in reverse direction)
- HD Motor: LEFT (spins motor in forward direction), RIGHT (spins motor in reverse direction)
- VD Motor: TOP (spins motor in forward direction), BOTTOM (spins motor in reverse direction).

NOTE: All the motor operations will be performed approximately 1000 ms and return to Coast / Brake state based on the toggle value for each motor.

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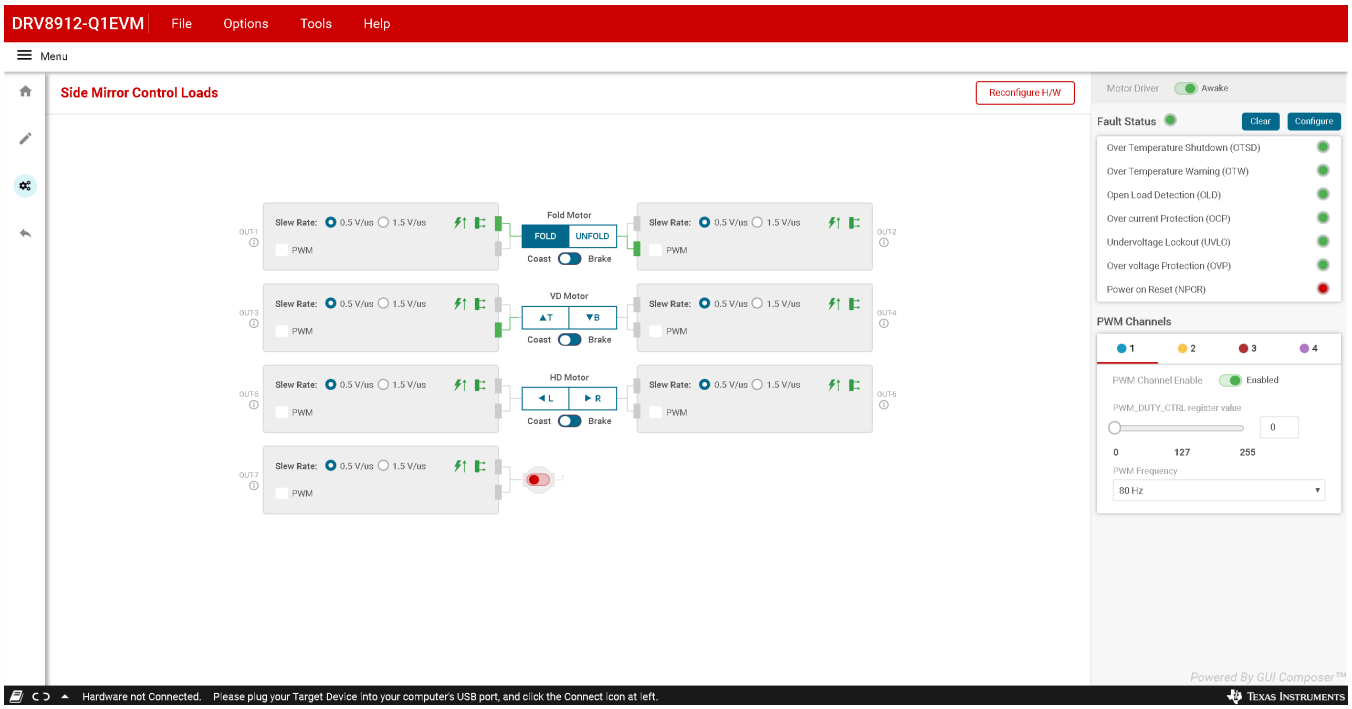

Figure 15. DRV89xx-Q1EVM Side Mirror Control Loads Page

Step 12. The following toolbar options are available on the top of the GUI as shown in Figure 14:

- File—"Load Registers/Save Registers/Save Registers As..." allows the user to load / save the register settings. This feature can also be used when no actual EVM is connected to the computer.
- File—"Program Device" loads the firmware on to MSP430G2553 on the EVM. For this to work, the MSP430 Flash Emulation Tool needs to be connected between the PC and EVM J1.

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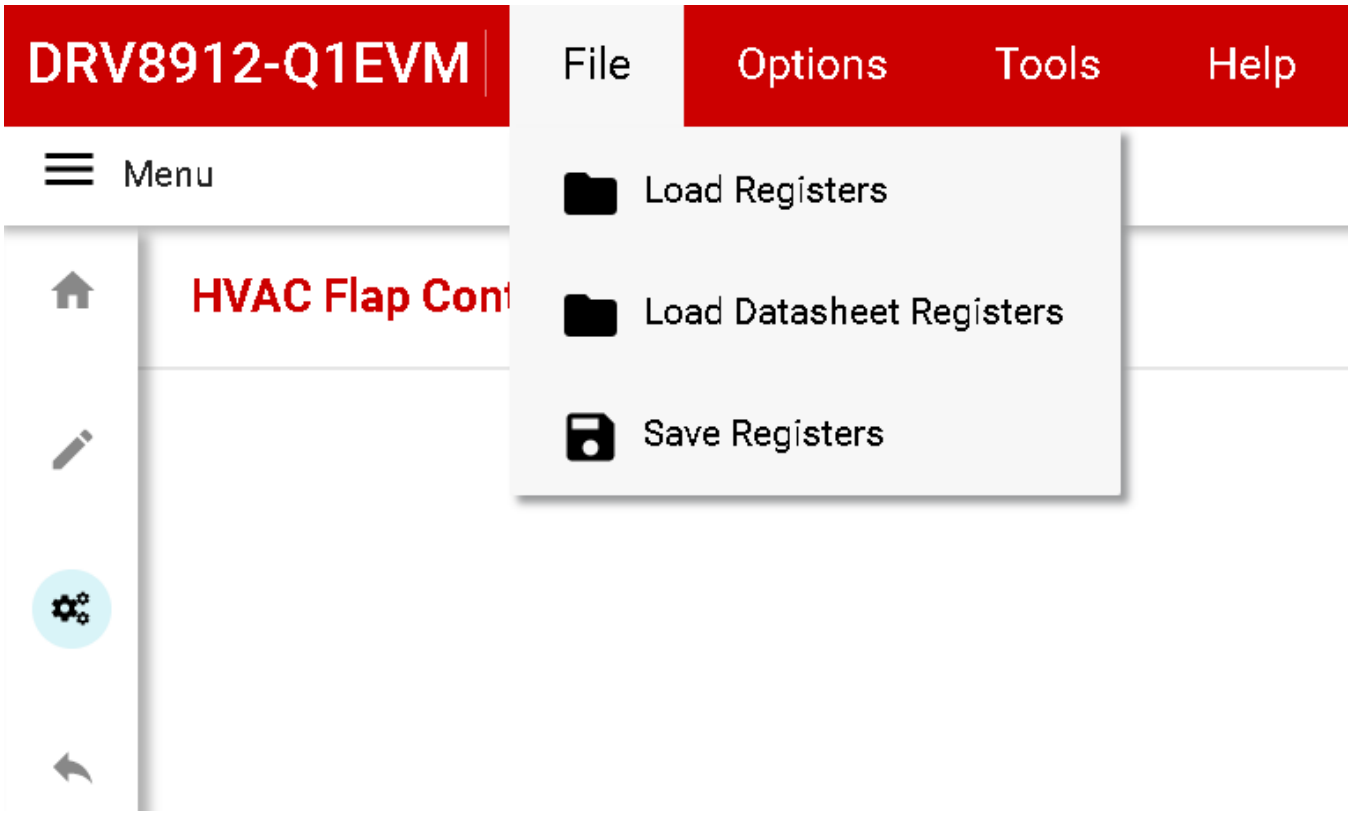

Figure 16. DRV89xx-Q1 EVM GUI - (File Toolbar Menu)

- Tools—The "log pane" option in this menu is to open a log pane at the bottom of the GUI which shows different logs: information, warning, error, debug.

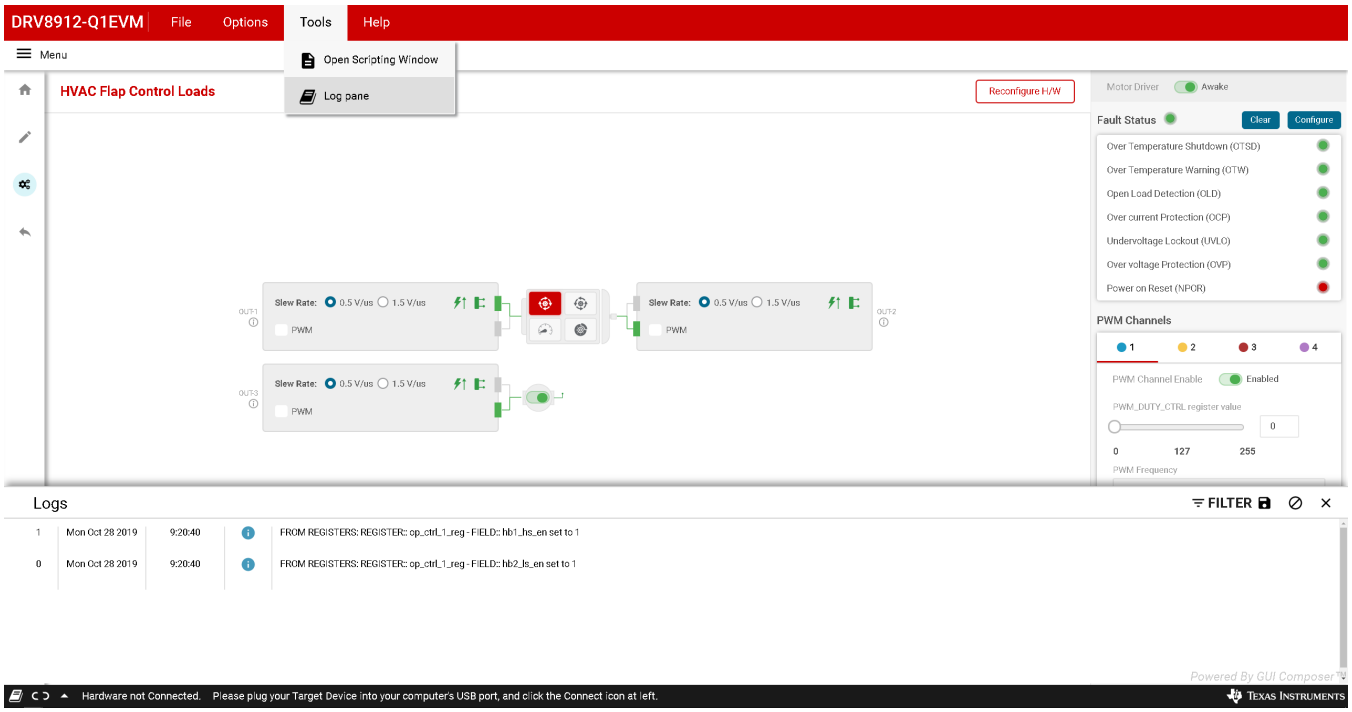

Figure 17. DRV89xx-Q1 EVM GUI (Tools Toolbar Menu)

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- Help—This menu shows the information such as version of this GUI application under the *About* option.

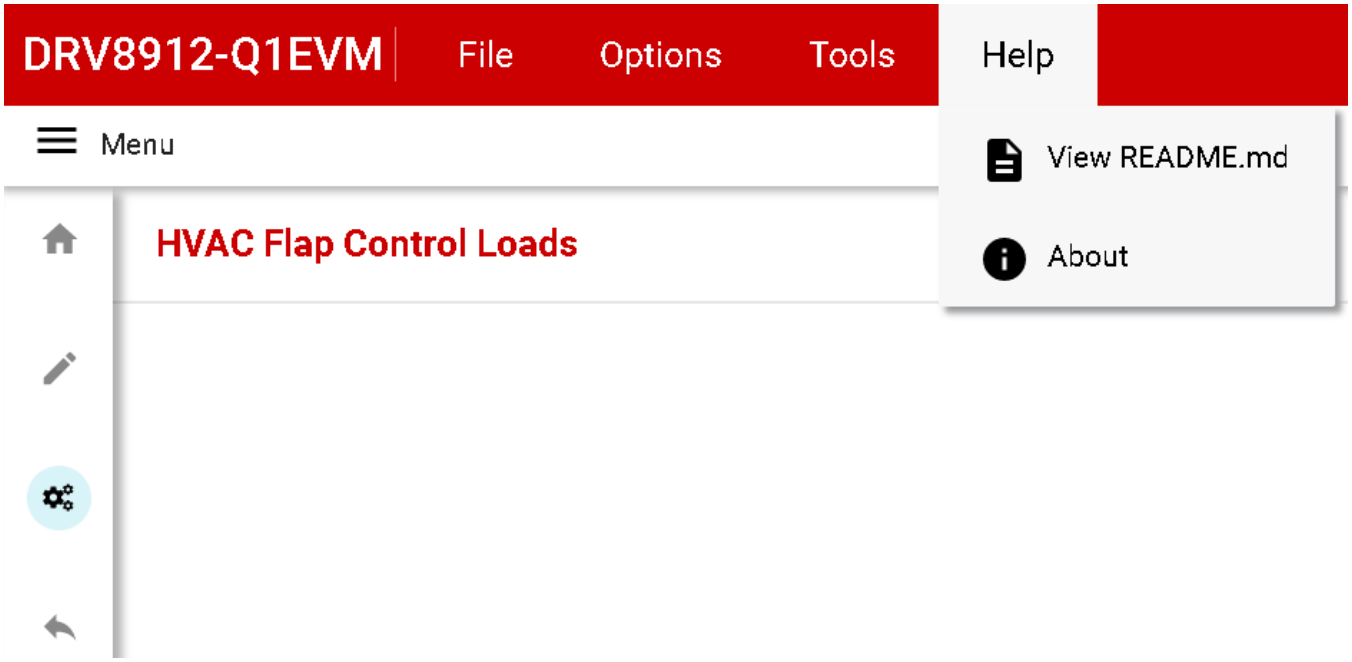

Figure 18. DRV89xx-Q1 EVM GUI (Help Toolbar Menu)

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