

## **DRV8848EVM Hardware and GUI User Guide**

This document is provided with the DRV8848 customer evaluation module (EVM) as a supplement to the [DRV8848 Dual H-Bridge Motor Driver data sheet](#). This document describes the hardware implementation of the EVM.

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# 1 DRV8848 EVM Overview

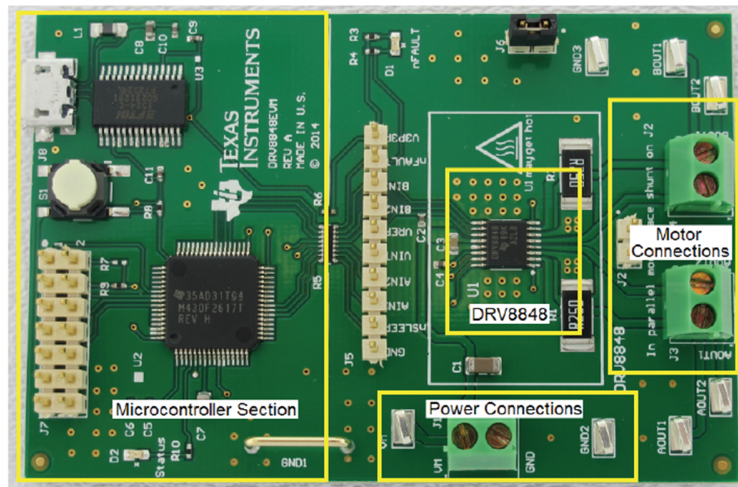


Figure 1. DRV8848 EVM

The DRV8848 customer EVM is a platform revolving around the DRV8848, a low voltage dual H-bridge driver and highly-configurable power stage. This device has been optimized to control one or two brushed DC motors, or a stepper motor. The DRV8848 can also be configured to drive a single brushed DC motor using both output stages in parallel mode to increase the drive current.

The EVM houses an MSP430 microcontroller and an USB interface chip. The USB chip allows for serial communications from a PC where a Microsoft® Windows® application is used to schedule serial commands. These commands can be used to control each of the device’s signals, and drive the motors at the desired rate.

The microcontroller firmware outputs the control signals and PWM signals to move the motor. The firmware also monitors the nFAULT signal to alert the GUI that a FAULT has occurred. This document details the operation of the EVM, as well as the hardware reconfigurability of the evaluation module.

## 1.1 Connectors

The DRV8848EVM offers access to the VM (motor voltage) power rail via a terminal block (J1). A set of test clips in parallel with the terminal block allows for the monitoring of the input power rail. The VM must be applied according to the recommended parameters in the [DRV8848 Dual H-Bridge Motor Driver data sheet](#).

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**NOTE:** VDD for the microcontroller is derived from the micro USB connector.

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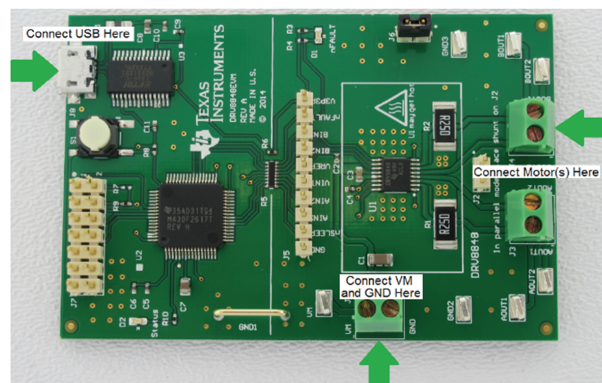


Figure 2. Connections

## 1.2 Configuration Jumpers

A 0.100-inch pitch header connector (J5) is used to provide access to every device signal in the external event control of the DRV8848 if desired. To disconnect the internal MSP430™ microcontroller, remove resistor pack R5 and resistor R6. [Table 1](#) lists the connections available on the J5 header. Each header pin is labeled on the evaluation module and matches the pin of the DRV8848.

**Table 1. J5 Header Connections**

Header Label	Description
GND	Ground
nSLEEP	Sleep mode input
AIN1	AIN1 input
AIN2	AIN2 input
VINT	Internal supply voltage of the DRV8848
VREF	Scale voltage to set IFS
BIN2	BIN2 input
BIN1	BIN1 input
nFAULT	Fault indication from DRV8848
V3P3R	3.3-V supply from FTDI FT232RL

## 1.3 Jumpers

There are two jumpers on the DRV8848EVM module. J2 is used to connect the two sense resistors in parallel. This allows the use of one brushed motor at higher current. J6 is used to hold the shunt when not in use.

## 1.4 Motor Output

Two motor connectors are provided. Connectors J3 and J4 are available as shown in [Figure 2](#).

## 2 GUI Software Installation

The following section explains the location and the procedure for installing the software properly.

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**NOTE:** Make sure that no USB connections are made to the EVM until the installation is complete. The installer also installs the GUI Composer V2 Runtime along with the GUI installation.

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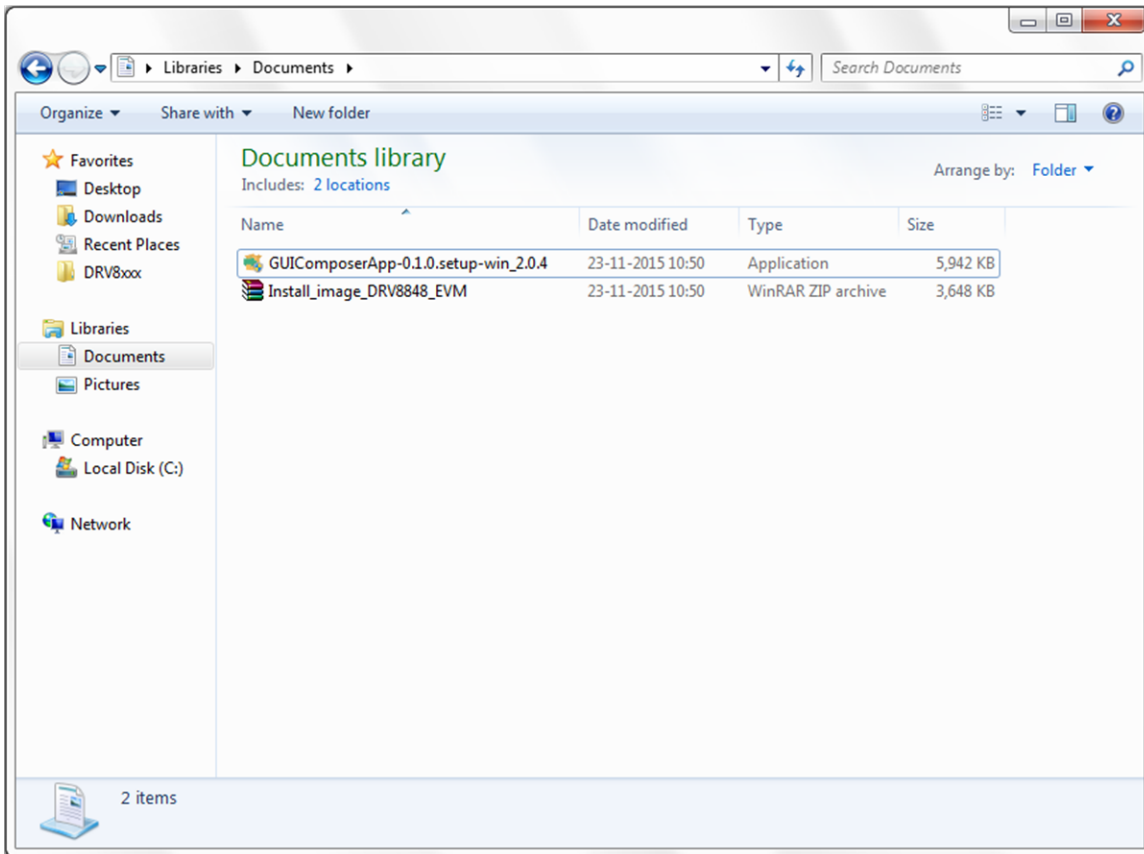
### 2.1 System Requirements

- Supported OS – Windows 7 (32 Bit, 64 Bit)
- Recommended RAM memory - 4 GB or higher
- Recommended CPU Operating Speed – 3.3 GHz or higher

### 2.2 Installation Procedure

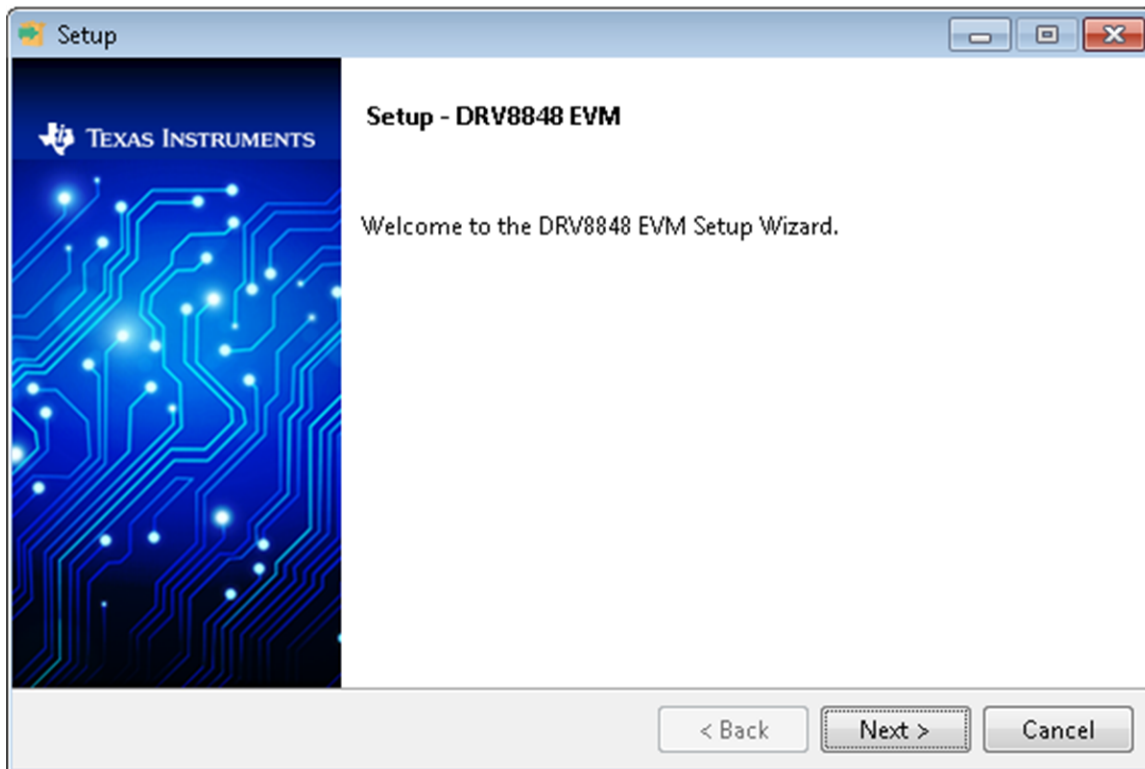
The following procedure will help you install the DRV8848 GUI.

Step 1. Double click on the GUIComposerApp-0.1.0.setup-win\_2.0.4 as shown in [Figure 3](#).



**Figure 3. GUIComposerApp-0.1.0.setup-win\_2.0.4**

A screen shown in [Figure 4](#) will appear indicating installer initialization. Click Next button.



**Figure 4. Installation Initialization**

Step 2. The License Agreements will appear.

- A Screen as shown in [Figure 5](#) will appear, displaying the license agreement of DRV8848 EVM GUI. Please read through the agreement carefully and enable the “I Accept the License Agreement” radio button and press the Next button.

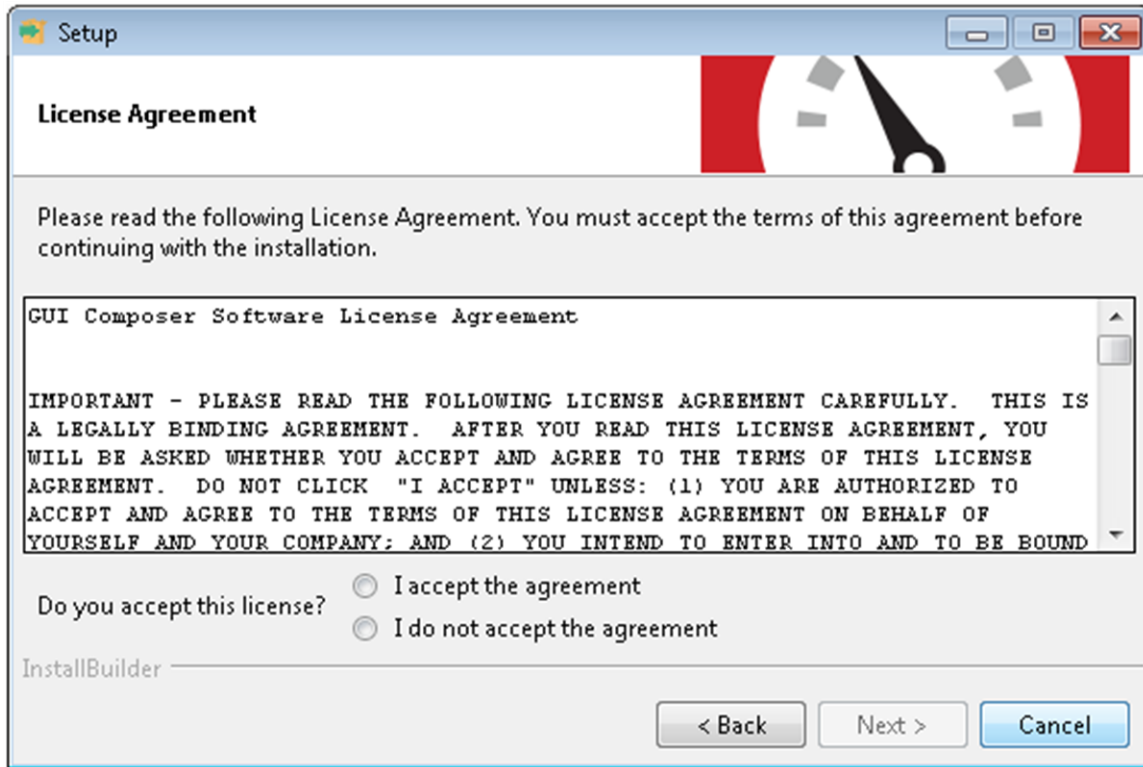


Figure 5. License Agreement

Step 3. Set the default directory for the GUI installation and press the Next button.

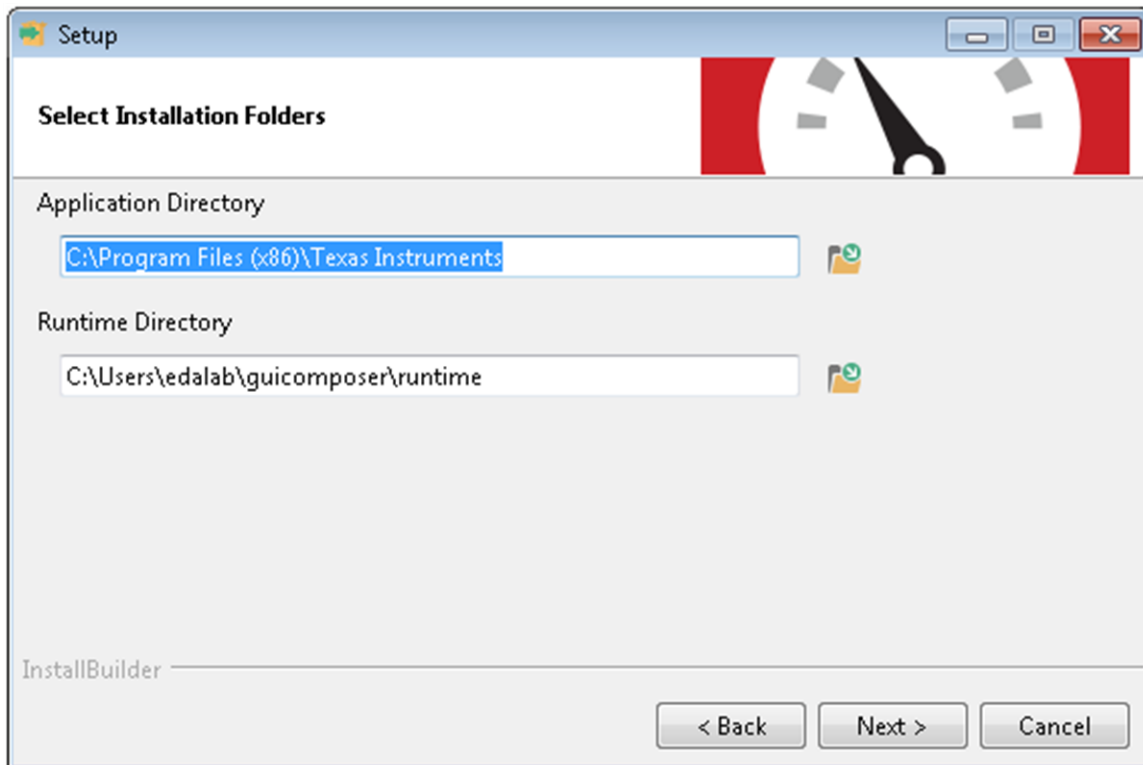
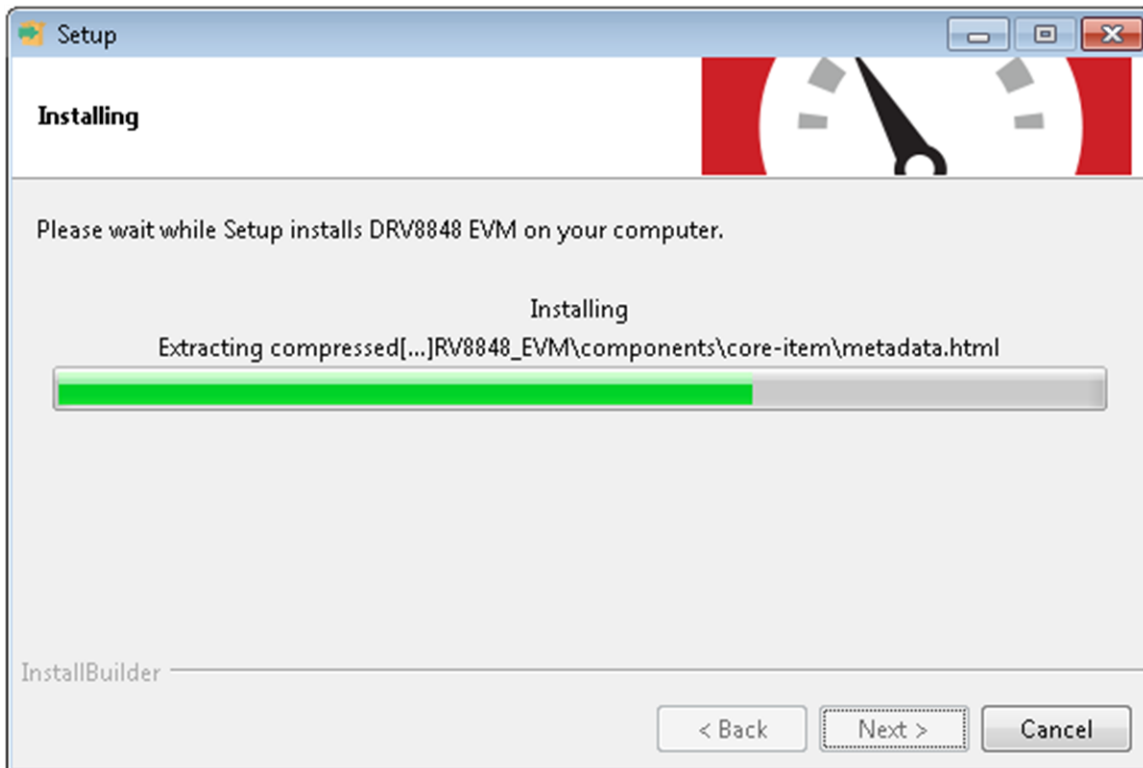


Figure 6. Installation Directory

**NOTE:** It is highly recommended to keep the default values as provided in the installer.

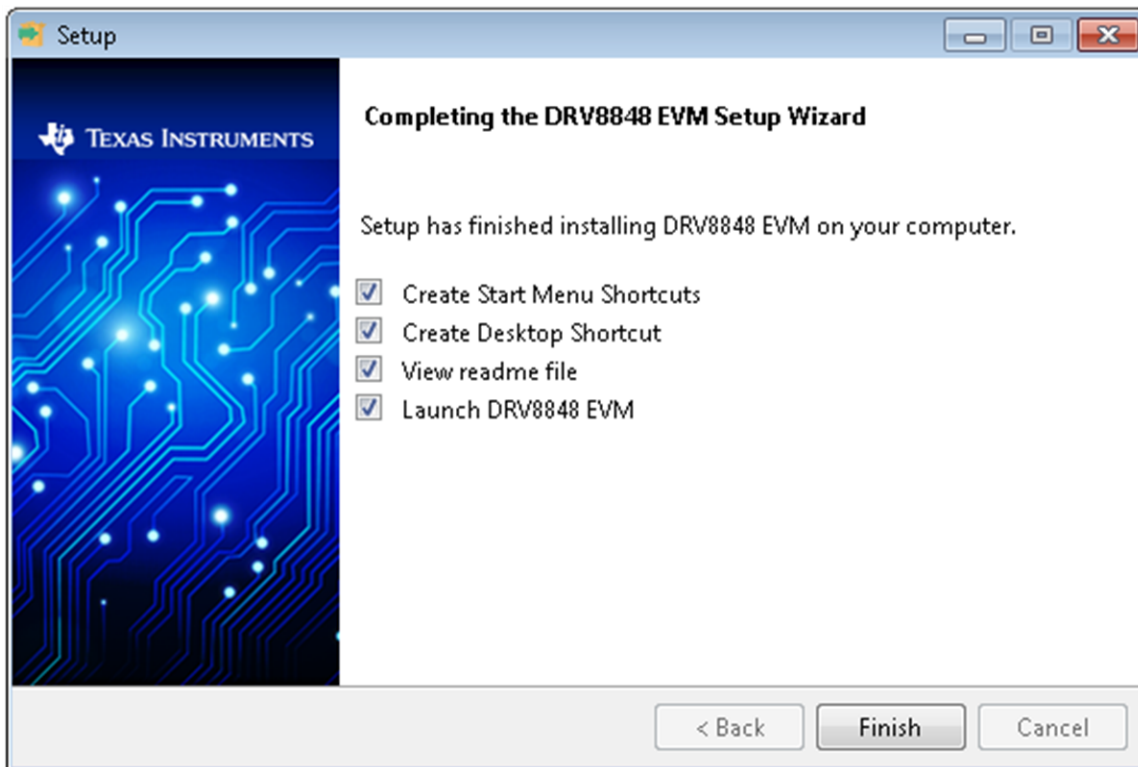
- Step 4. At this point, a few options may appear. If the GUI Composer Runtime v.2.0.6 has not been previously installed, select *Install from File* radio button and download the runtime from the following link, [GC Runtime v2.0.6](#). Click the Search button to the right of the text box next to *Install from File* and select the downloaded runtime v.2.0.6 file. Click *Next* to continue.
- Step 5. The installer will begin self-extraction of GUI Composer component and proceed with the installation.
- Step 6. After the self-extraction of GUI Composer component, the installer will proceed with the installation as shown in [Figure 7](#).



**Figure 7. Installation in Progress**

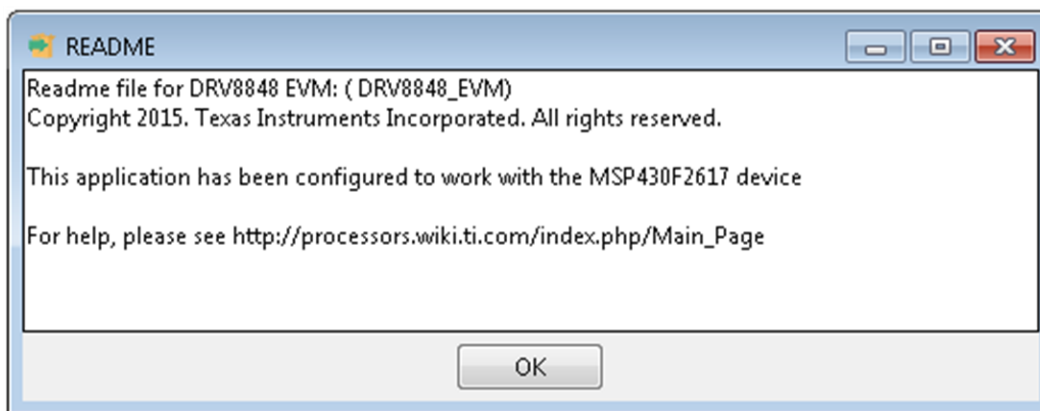
- Step 7. When the installation is complete, the final page will be displayed.





**Figure 8. Setup Completion**

Step 8. A Readme window as shown in [Figure 9](#) will appear displaying the link for LV 2014 RTE.



**Figure 9. Readme Window**

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**NOTE:** The DRV8848 EVM GUI requires the GUI Composer Runtime V2 to be installed before the GUI is executed.

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### 3 DRV8848 EVM GUI

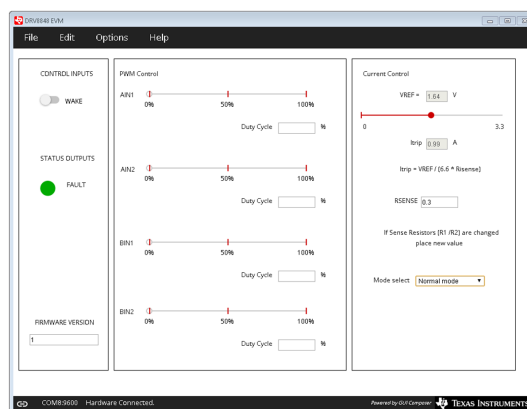


Figure 10. DRV8848 EVM GUI

#### 3.1 Operate the EVM

Operate the EVM with the following:

1. Install the drivers and GUI.
2. Connect the wires of the one or two brushed motors to terminals AOUT1, AOUT2, BOUT1, and BOUT2. Alternately, plug in a stepper motor to terminals AOUT1, AOUT2, BOUT1, and BOUT2.
3. Connect the VM power supply but do not apply power at this step.
4. Connect the USB cable between the PC and the EVM. Once the USB is connected to the EVM, the status LED will begin to blink.
5. Open the GUI by selecting the launcher.exe file. It may take up to 30 seconds to establish a connection.
6. Apply 12 V to the VM and GND connections.
7. Configure the current setting using the VREF slider. If the sense resistors have been changed, enter the new value of RISENSE.

- The current is calculated using the VREF slider, and the Sense resistor value using [Equation 1](#).

$$I_{FS} = \frac{VREF}{6.6 \times RISENSE} \quad (1)$$

The 12-bit DAC channel 0 is connected to the DRV8848 analog input VREF. Changing the DAC digital value from 0 to 4092 in steps of 4 changes the analog voltage at the VREF pin from 0V to VINT V. See [Equation 2](#).

$$VREF = \frac{VINT}{4095} \times (VREF\_slider \times 4) \quad (2)$$

8. Wake the device for operation.
  - After setting the desired chopping current for the DRV8848, enable the DRV8848 by pressing the WAKE button. When the WAKE button is pressed, the circle to the left of the button toggles from red to green.
  - If the WAKE button is pressed during motor operation, the motor is immediately stopped, and the motor control signals from the microcontroller are reset.
9. The DRV8848 EVM is now awake and can be commanded to turn the motor. The motor is turned by sliding the AINx or BINx sliders.
  - For slow decay mode, decreasing xIN1 while holding xIN2 at 100% causes the brushed motor to run in one direction. Decreasing xIN2 while holding xIN1 at 100% causes the brushed motor to move in the opposite direction.
  - For fast decay mode, increasing xIN1 while holding xIN2 at 0% will cause the brushed motor to move in one direction. Increasing xIN2 while holding xIN1 at 0% will cause the brushed motor to

move in the opposite direction.

- As an extra precaution, the motor can be stopped by selecting the WAKE button. Once selected, the motor is stopped. To re-enable the motor, re-select the WAKE button.

### 3.2 Normal Mode Operation

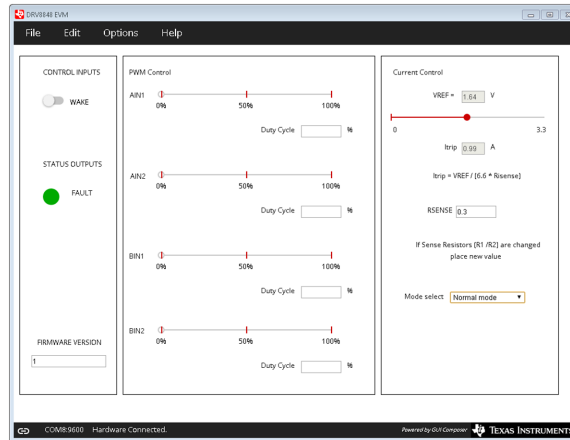


Figure 11. Normal Mode Operation

By default, Normal mode operation is selected. This configuration allows connection of one or two brushed motors for evaluation. If transitioning from either Parallel mode or Stepper mode, the following actions occur:

- The AINx sliders will re-appear.
- The chopping current is recalculated.

### 3.3 Parallel Mode Operation

A feature of the DRV8848 is the ability to operate a single motor in parallel mode, effectively doubling the current capability. When using Parallel mode, the motor must be connected across both AOUT1/BOUT1 and AOUT2/BOUT2. This requires a small jumper wire to connect the two outputs at connectors J3 and J4.

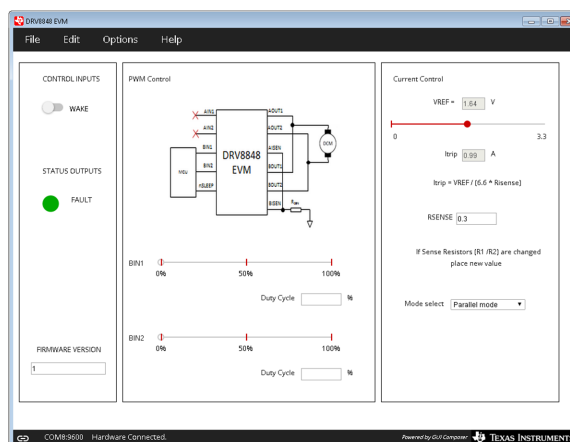


Figure 12. Parallel Mode Operation

To use this feature, set the Mode select pulldown to Parallel mode. When the parallel mode is activated, the following actions occur:

- The AINx sliders will disappear.
- The chopping current will be recalculated.

3. A message describing how to connect the motor appears. The message also instructs the user to place the shunt on J2.

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**NOTE:** The shunt on J2 is only used for parallel mode, it should be placed on J6 for all other operations.

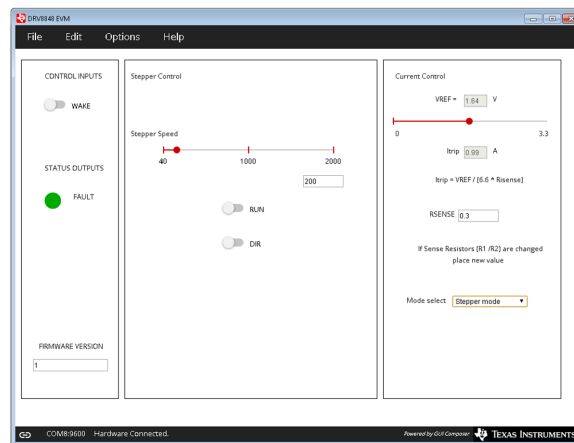
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The parallel mode can now be controlled using the BINx sliders. The operation is the same as normal mode.

- a. For slow decay mode, decreasing BIN1 while holding BIN2 at 100% causes the brushed motor to run in one direction. Decreasing BIN2 while holding BIN1 at 100% causes the brushed motor to run in the opposite direction.
- b. For fast decay mode, increasing BIN1 while holding BIN2 at 0% causes the brushed motor to run in one direction. Increasing BIN2 while holding BIN1 at 0% causes the brushed motor to move in the opposite direction.

### 3.4 Stepper Mode Operation

The DRV8848 EVM provides the ability to operate a stepper motor in full step mode. The firmware provides the necessary timing pulses on the INAx/INBx input signals to drive the stepper at the desired speed and direction.



**Figure 13. Stepper Mode Operation**

To use the stepper feature, set the Mode select pulldown to Stepper mode.

Set the desired stepper step and direction, and then select RUN. The stepper speed and direction can be changed as the motor is running but may cause the motor to stall.

### 3.5 Menu Options

#### 3.5.1 File

The File menu contains the options as shown in [Figure 14](#). This section describes each of the options.

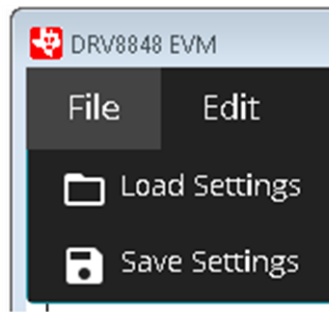


Figure 14. File Menu

### 3.5.1.1 Load Settings

If this option is clicked, it loads the configuration file which was saved earlier to bring the device to a known state.

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**NOTE:** Load Config will overwrite the existing data in registers with the value specified in the .json file loaded.

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### 3.5.1.2 Save Settings

If this option is clicked, the current register configuration will be saved into a file which can be later loaded into the GUI using the Load option.

### 3.5.2 Edit

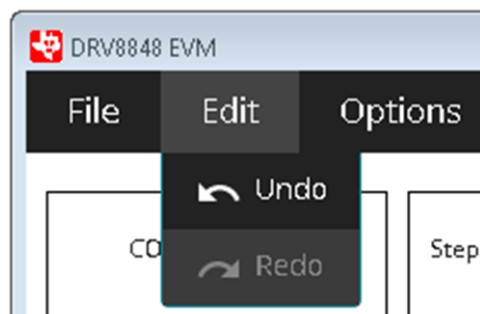


Figure 15. Edit Menu

This is used to Undo and Redo the changes done in the GUI.

### 3.5.3 Options

The Options menu is to configure the Serial Port and connect to the serial port.

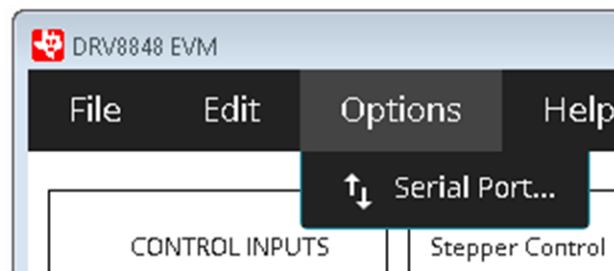


Figure 16. Options Menu

### 3.5.4 Help

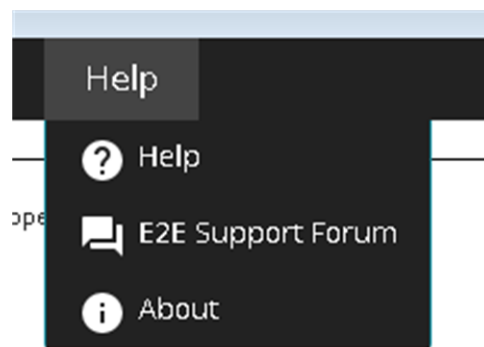


Figure 17. Help Menu

#### 3.5.4.1 Help

The Help connects to the E2E forum.

#### 3.5.4.2 E2E Support Forum

The Help connects to the E2E forum.

#### 3.5.4.3 About

This gives the information about the GUI.

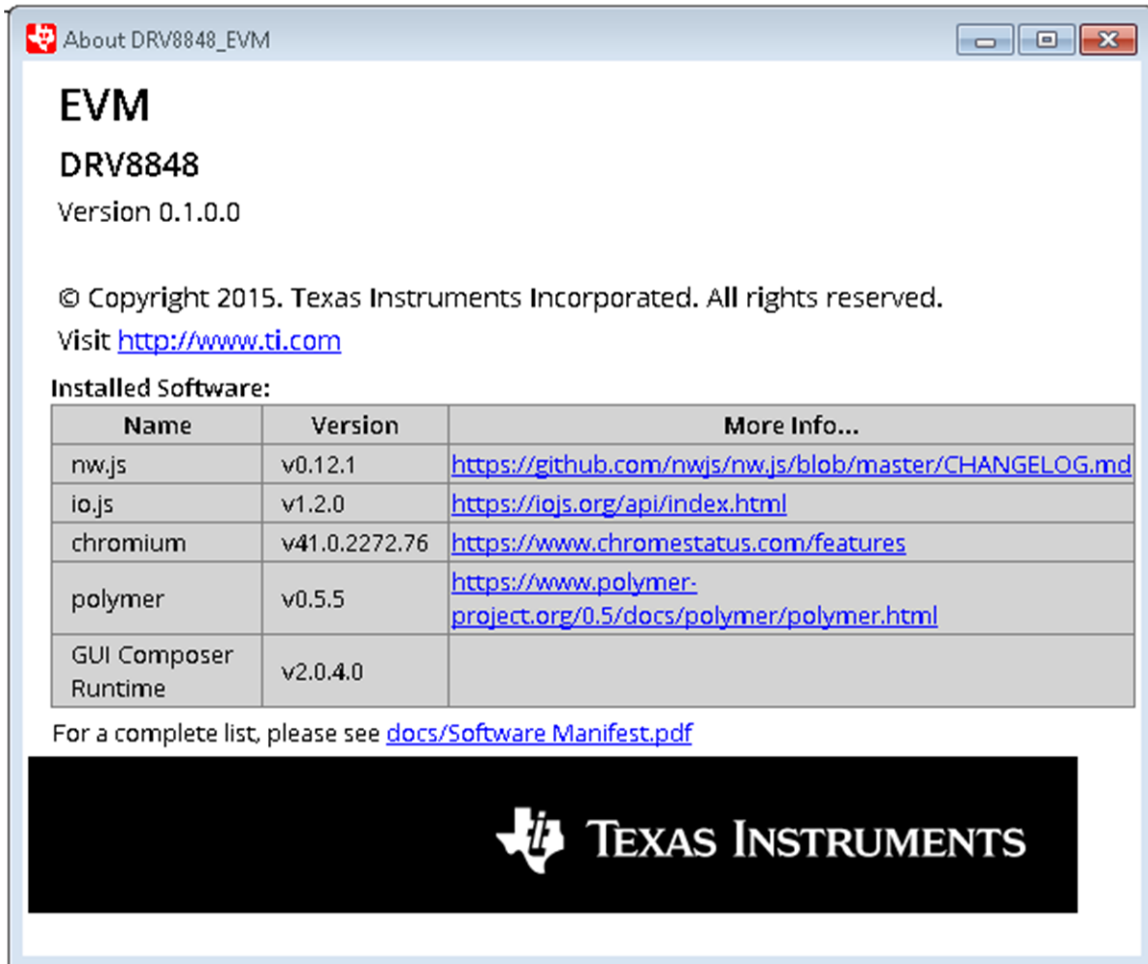


Figure 18. About Page

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