

DRV10983 and DRV10975 Evaluation Module

This document provides complete details of DRV10983 and DRV10975 customer evaluation module (EVM) including its hardware implementation, jumper configuration, and operating procedure to run 3-phase BLDC motors. The guide pertains to four EVM configurations: two main configurations are DRV10983 and DRV10975, and depending upon operating mode each of two devices, EVMs are further sub-divided as Standby mode and Sleep mode. This EVM user's guide is intended to be used with the DRV10983 and DRV10975 Tuning Guide ([SLOU395](#)) to optimally tune a user motor.

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1 DRV10983 and DRV10975 EVM Kit Contents

The DRV10983 and DRV10975 evaluation kit contains following:

1. DRV10983 and DRV10975 EVM board
2. USB2ANY communication board for I2C GUI interaction
3. USB cable
4. 10-pin ribbon cable to connect USB2ANY and DRV10983 and DRV10975 EVM
5. DRV10983 and DRV10975 EVM GUI
6. A Runtian 3-phase BLDC motor, model number ZWL12_22_2.5A, or Telco model DT4260-24-055-04H

The DRV10983 and DRV10975 EVM boards and GUI are designed to work together to evaluate the device features.

2 Introduction

The DRV10983 and DRV10975 EVM is a complete solution for evaluating the DRV10983 24-V and DRV10975 12-V, Three-Phase Sensorless BLDC motor drivers. Device evaluation and configuration for specific applications is possible with the provided DRV10983 and DRV10975 EVM GUI. This document describes the kit details and explains the functions and locations of test points, jumpers, and connectors present on the kit. This document is also a quick start guide for using the GUI to tune a motor for application. There are four identifications marks on EVM ⁽¹⁾ to help the user easily identify the right configuration. For example, [Figure 1](#) shows the EVM using the DRV10983 standby device. For detailed information about operating modes of the DRV10983 and DRV10975 devices, refer to their data sheets ([SLVSCP6](#)) and ([SLVSCP2](#)), respectively.

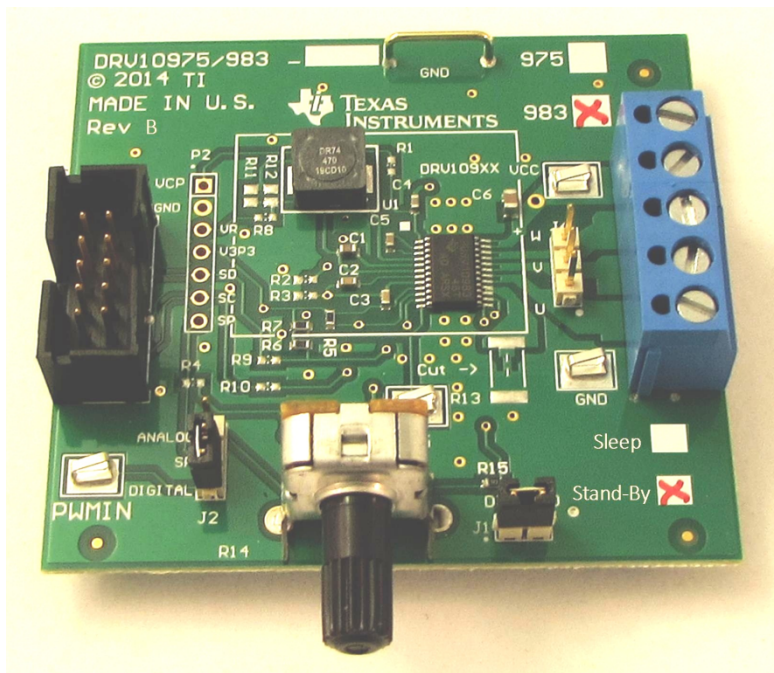


Figure 1. DRV10983 EVM with Standby Device

⁽¹⁾ There are two revisions of the DRV10983 and DRV10975 EVM. The REV-A board uses only two identification marks to distinguish between DRV10983 and DRV10975. The latest REV-B board uses two additional identifications marks to distinguish between Standby and Sleep mode parts.

3 DRV10983 and DRV10975 EVM Board

3.1 Power and Motor Connectors P1

The DRV10983 and DRV10975 EVM shares terminal P1 for power supply and motor phase output. To operate the EVM, a single power supply rail between 8 to 28 V for DRV10983 EVM and 6.5 to 18 V for DRV10975 EVM (depending on the motor requirements) is necessary. For DRV10975 EVM, nominal voltage is 12 V, and for DRV10983, nominal voltage is 24 V. The pin assignment of terminal P1 is as follows:

Pin	Description
1	VCC
2	W
3	V
4	U
5	GND

3.2 Test Point Connector P2

Connector P2 can be used to measure signals from the DRV10983 and DRV10975. P2 is not populated. The pin assignment is as follows:

Pin	Description
1	VCP, charge pump output
2	GND
3	VR, VREG output
4	V3P3
5	SD from J3 (connects to SDA of device)
6	SC from J3 (connects to SCL of device)
7	SP, SPEED input from PWMIN or R14


3.3 Control Input Connectors J3

The connector J3 is used for the I2C interconnection with the GUI. The pin assignment is as follows:

Pin	Description
6	GND
9	SD (connects to SDA of device)
10	SC (connects to SCL of device)

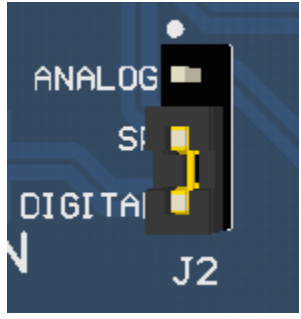
3.4 Jumper J1 (Direction)

In order to control the spin direction of the motor, the DRV10983 and DRV10975 EVM is equipped with a direction jumper. Depending if 3V3 or GND is supplied to the DRV10983 and DRV10975 direction input, the motor spins either in forward or reverse direction.

	J1 Connection	Description
	unconnected	DIR is set to 3.3V
connected	DIR is set to GND (shown)	

3.5 Jumper J2 (Speed Input)

The motor speed input source is configured with J2. If J2, pins 2-3 is populated, supply a PWM to the PWMIN test pin to control the motor speed. If J2, pins 1-2 is populated, the motor speed is controlled with the analog potentiometer R14 equipped on the EVM.

	J2 Connection	Description
	1 – 2	Analog Pot R14
2 – 3	PWMIN digital input (shown)	

NOTE: The motor operation may be unpredictable if the DRV10983 and DRV10975 internal register setting does not match the J2 selection.

3.6 FG Test Pin

The FG test pin outputs the motor speed, depending on the internal DRV10983 and DRV10975 divider setting and the number of motor poles.

4 DRV10983 and DRV10975 GUI

4.1 Overview

The DRV10983 and DRV10975 EVM is provided with a GUI to configure the device and tune the application. Refer to [Appendix A](#) to download and install GUI application. The GUI is structured into three tabs (Basic Settings, Advanced Settings, and Display) allowing configuration of the register settings and tuning of the device parameters for the target application. For details about the settings, refer to the DRV10983 datasheet ([SLVSCP6](#)) and DRV10975 datasheet ([SLVSCP2](#)).

In following sections, DRV10983 GUI images are shown to explain the various features of GUI. The same applies for DRV10975 devices unless otherwise specified.

4.2 Basic Settings

The Basic Settings tab is the landing screen after launching the GUI on the computer. The tab sets the motor parameters, startup parameters, initial speed detection prior to startup, and current limits. This tab can also load and save motor parameters and program the EEPROM with optimized settings.

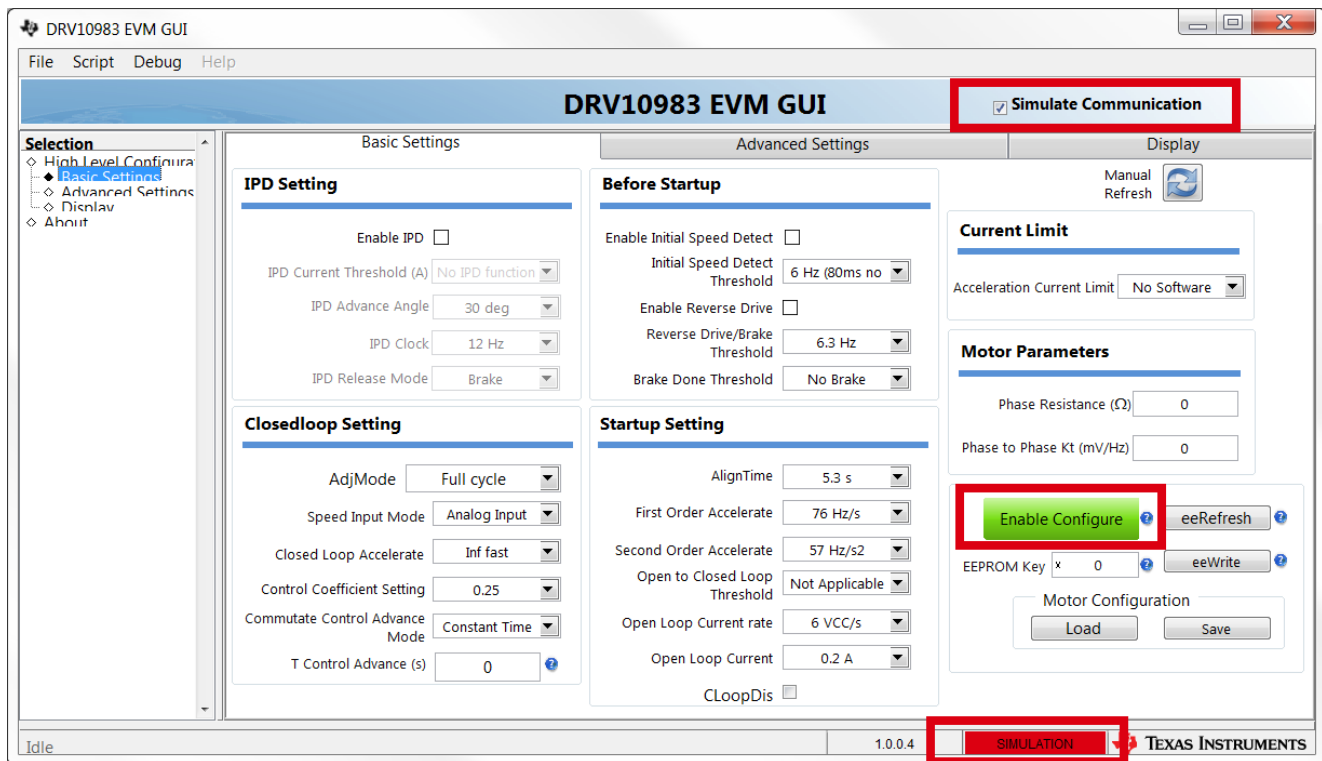


Figure 2. DRV10983 GUI Basic Settings

4.2.1 Communication

The GUI is designed to work with and without the hardware connected, allowing evaluation of the available settings. Select *Simulate Communication* on the top right to work offline. When the EVM is connected to the GUI, this box should be unchecked and the bar at the bottom shows *Connected*. If the GUI cannot connect to the hardware, check that the hardware is powered and the I2C communication is correctly established.

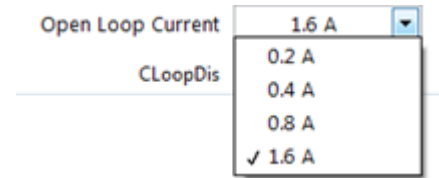
4.2.2 Register Access – Enable Configure

To access the register settings, left click the Enable Configure button. Refer to [Figure 2](#). Once selected, the button changes to green and the settings can change.

4.2.3 Changing Register Settings

The GUI supports three different input types to set the register values:

1. Dropdown list to select a predefined setting. An example is shown to the right.
2. Checkbox to set single bit values. An example with the selection enabled is shown to the right.
3. Text boxes (user input data might be changed by the device due to data type conversions). 1.5 was entered, 1.54 is the nearest value and was selected.



A screenshot of a GUI dropdown menu. The label 'Open Loop Current' is on the left. The dropdown box is open, showing a list of values: 0.2 A, 0.4 A, 0.8 A, and 1.6 A. The 1.6 A option is selected, indicated by a checkmark and a small downward arrow on the right side of the dropdown box. The label 'CLoopDis' is visible below the dropdown box.

IPD Setting

Enable IPD

Motor Parameters

Phase Resistance (Ω)

4.2.4 Work with EEPROM

The settings are saved and loaded using the Save and Load buttons on the Basic tab. When saved, the file is written as a .csv file that can be loaded at a later time.

To program the DRV10983 and DRV10975 devices and change the default EEPROM settings, follow the instructions of the DRV10983 datasheet ([SLVSCP6](#)) and DRV10975 datasheet ([SLVSCP2](#)).

4.2.4.1 Advanced Settings

The Advance settings tab controls functions such as lock detection, anti-voltage surge function, dead time, PWM frequency, and the Buck Regulator output voltage.

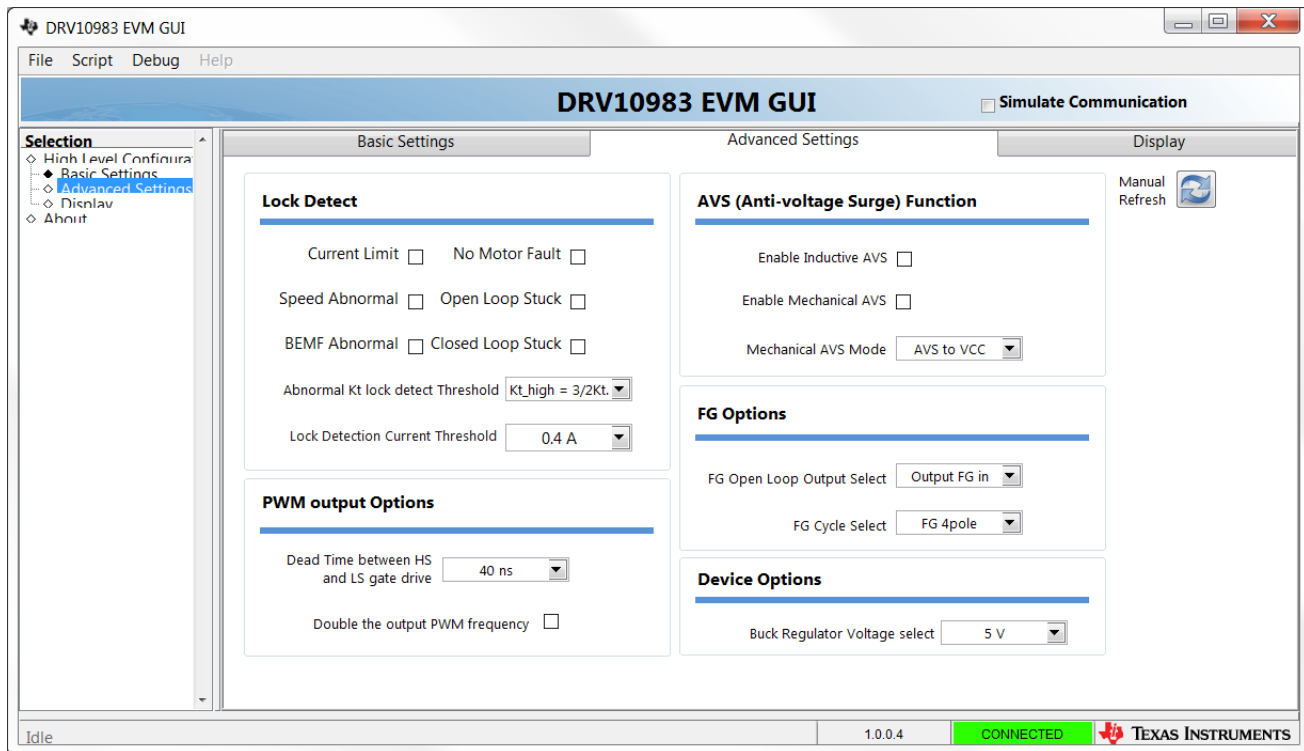


Figure 3. DRV10983 GUI Advanced Settings

4.2.4.2 Display

The Display tab monitors the device status and motor parameters.

The left side shows all motor parameters. The parameters can be refreshed manually, or automatically every second.

NOTE: Auto refresh may slow communication with the device.

The right side shows the device status. An active fault condition lights the red indication.

Control the motor speed from the GUI with the speed control in the bottom right. To control the motor speed using the GUI, check the OverRide bit and set the motor speed from 0 to 511 decimal.

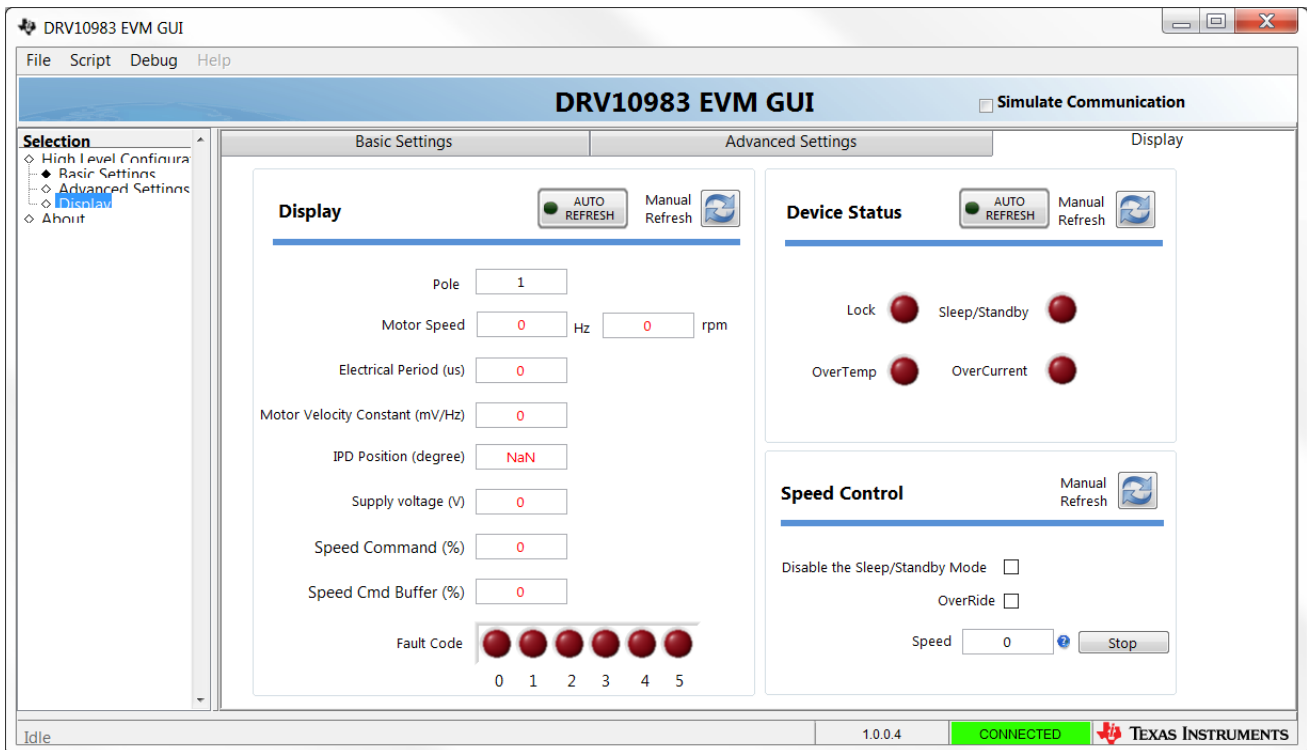


Figure 4. DRV10983 GUI Display Settings

5 Out-of-the-Box Quick Start Guide

The DRV10983 and DRV10975 evaluation kit comes with Runtian or Telco 3-phase BLDC motor as part of hardware package. Use this motor as a first step to get familiar with operating procedure of EVM before attempting to run the user specific motor. This section assumes that user has already downloaded the DRV10983 and DRV10975 application GUI as mentioned in [Appendix A](#).

Perform the following procedure to confirm proper operation of the EVM kit:

1. Do not connect the motor phases and ensure that jumper J2 is set to analog.
2. For DRV10983 and DRV10975 Standby mode devices, set the speed input to 0 by rotating the potentiometer R14 fully counterclockwise. For DRV10983 and DRV10975 Sleep mode devices, set the speed input to maximum by rotating the potentiometer R14 fully clockwise.
3. Only with DRV10983 and DRV10975 EVMs with Standby mode devices, connect the motor phases of the user motor to connector P1. Phase sequence is not important as it only determines the direction of rotation.

CAUTION

Do not connect the motor phases for EVMs with sleep mode devices.

4. Connect the USB2Any board to your computer using the supplied USB cable. Then connect the 10-pin ribbon cable header to J4 on the USB2Any board and J3 on the DRV10983 and DRV10975 EVMs.
5. Connect a power supply to VCC (pin1) and GND (pin 5) of connector P1. Power on EVM with VCC: For the DRV10975 EVM apply 12 V, and for the DRV10983 EVM apply 24 V.

CAUTION

With VCC, never exceed 18 V on DRV10975 EVMs and 28 V on the DRV10983 EVMs during motor operation.

6. Launch the DRV10983-75.exe application on the computer. Select the appropriate device configuration as shown in [Figure 5](#) and press OK.

The following GUI images will appear for DRV10983 EVMs only, but the same images and operating steps are applicable for DRV10975 EVMs.

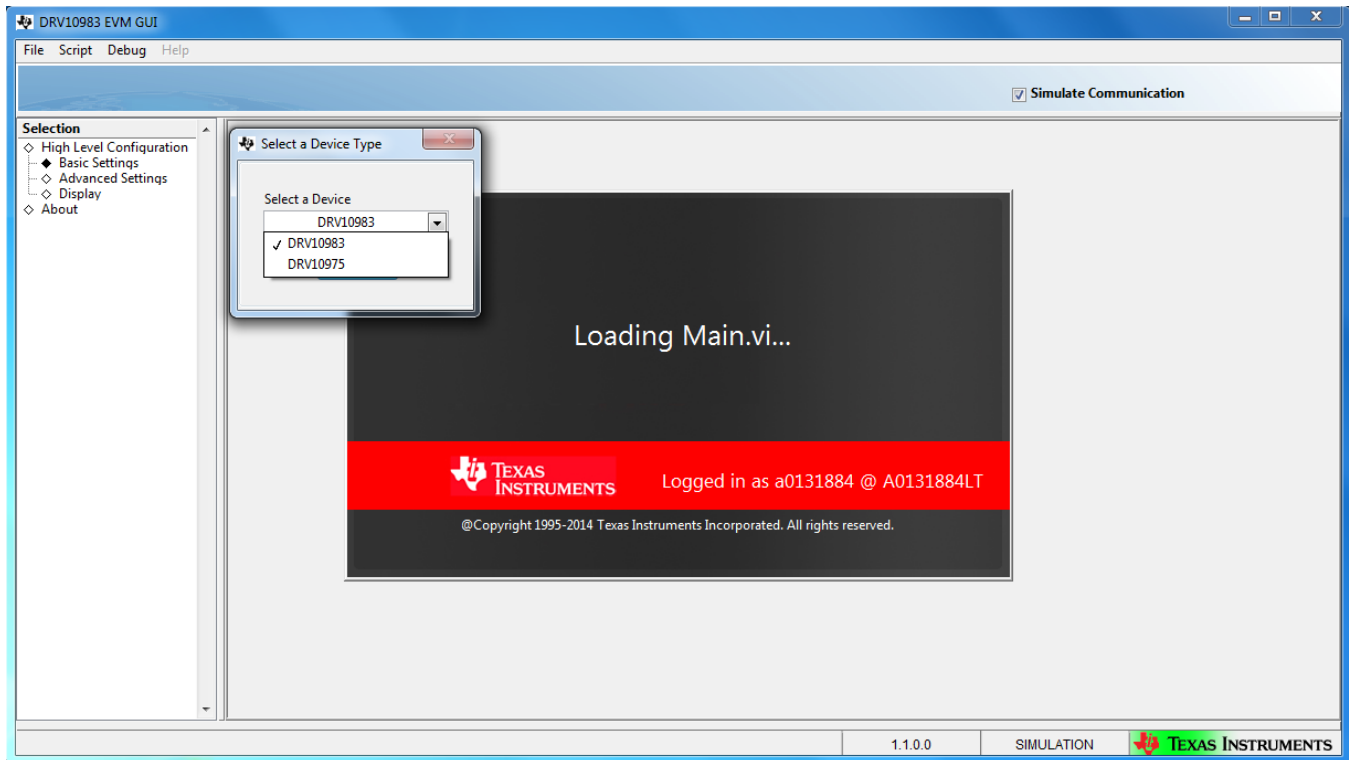


Figure 5. Initial GUI Screen

- If Simulate Communication was enabled previously, the following GUI screen image would appear as shown in Figure 6. Uncheck the Simulate Communication box to go to next step. Otherwise, the GUI screen image shown in Step 8 will appear directly, after Step 6.

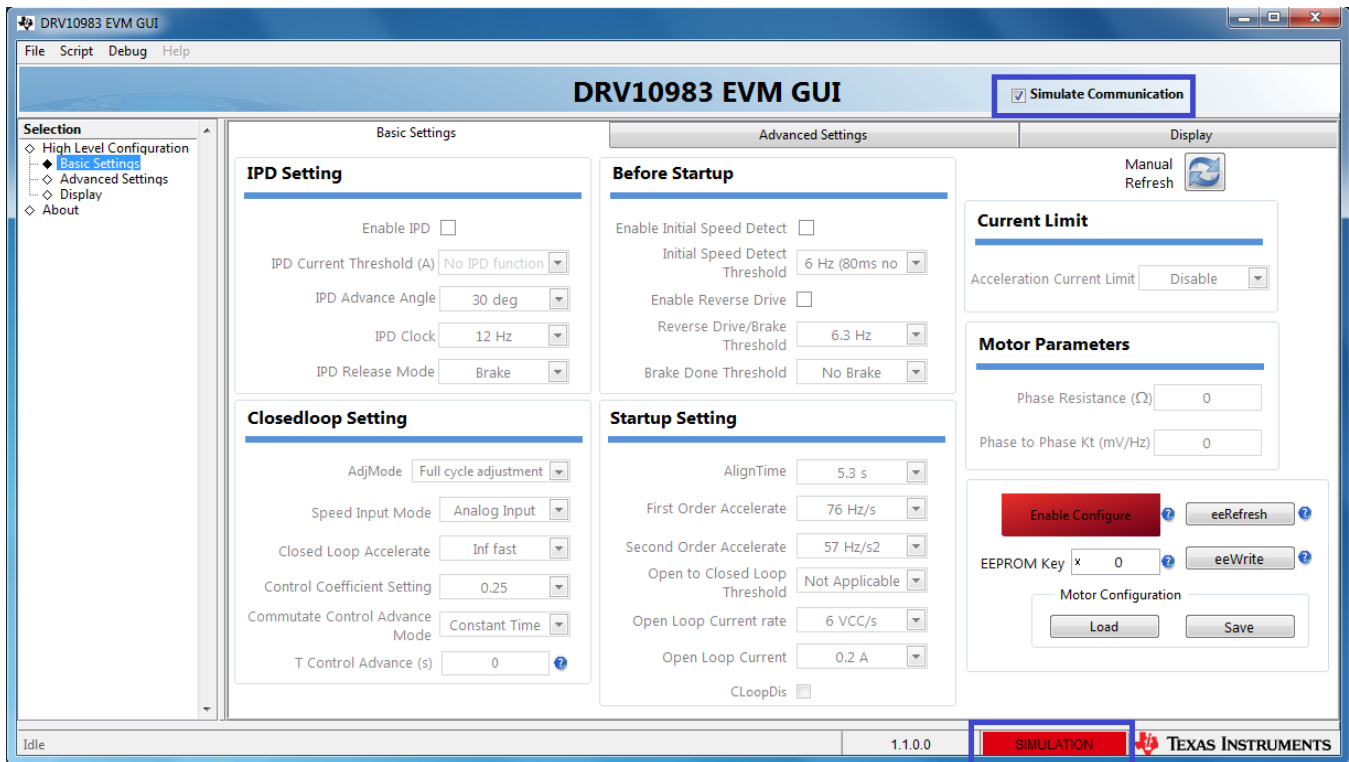


Figure 6. GUI in Simulation Mode

- CONNECTED should turn green, indicating that the GUI is communicating with the device. Select Enable Configure to turn the button to green as well (see Figure 7).

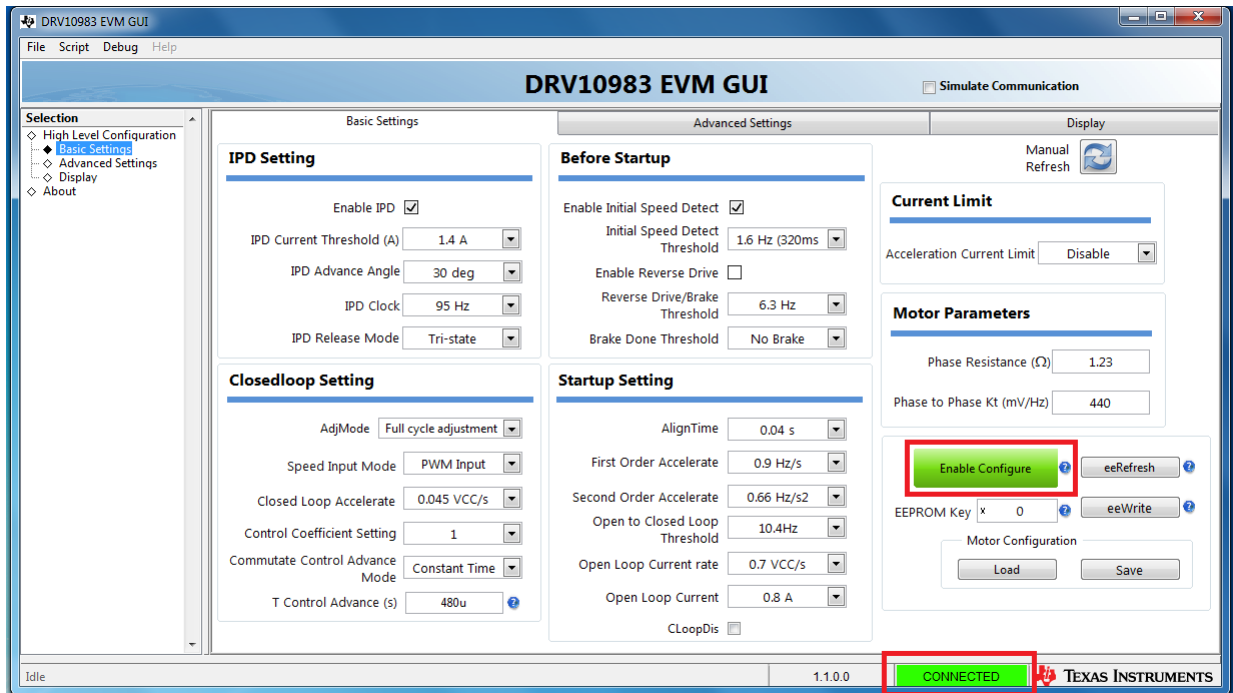


Figure 7. Enable Configure

9. In the Display tab, disable Sleep mode as shown in Figure 8

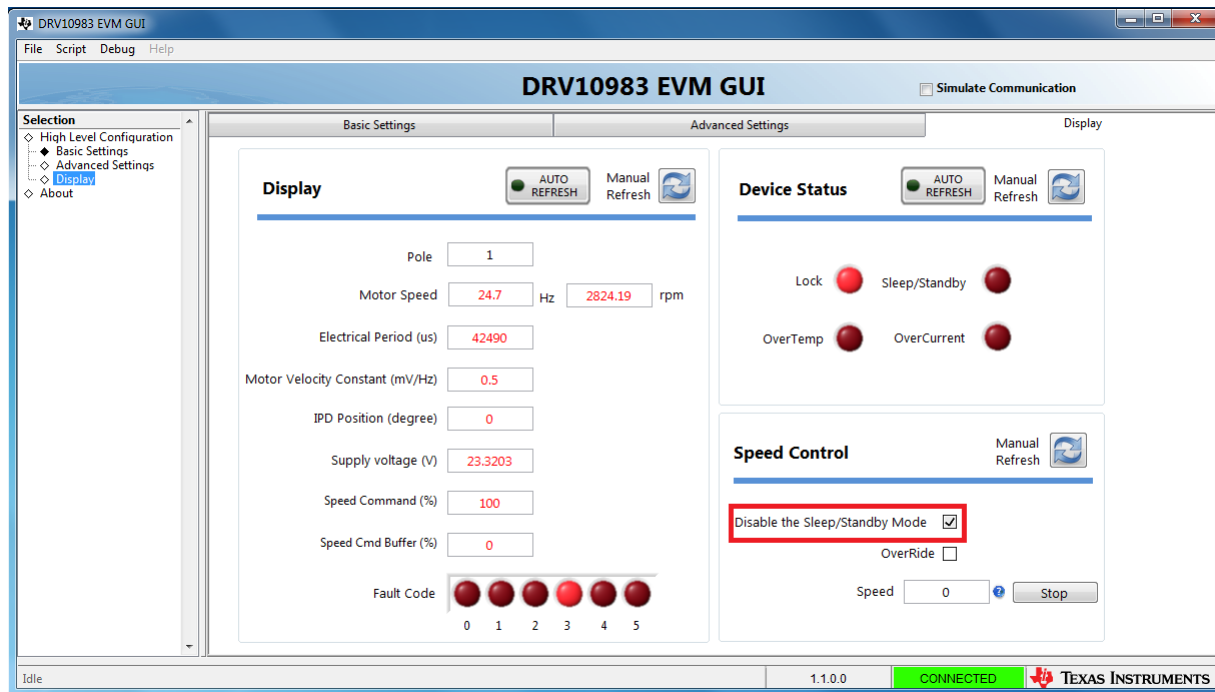


Figure 8. Disable Sleep Mode

For DRV10983 and DRV10975 EVMs with Sleep mode devices, Potentiometer R14 can be brought back to zero by rotating counterclockwise because Sleep mode is disabled and it will not cause issue with the GUI. Now motor can be connected at P1 to Sleep mode EVMs.

CAUTION

Do not short motor phases to VCC at connector P1, specifically P1-2 (Wphase) to P1-1(VCC) because EVM is in power-on condition.

- Switch back to the Basic Settings tab. Load the parameters for the supplied motor. Select Load, and a new window appears. Depending on which motor the kit came with, select the associated file. See [Figure 9](#) and [Figure 10](#) for the different motors and their accompanying file names. Both files are located in the downloaded GUI software folder. Browse to the folder and select the correct file name for the motor. Click Okay to configure the registers for the motor provided.



Figure 9. Runtian EVM Motor

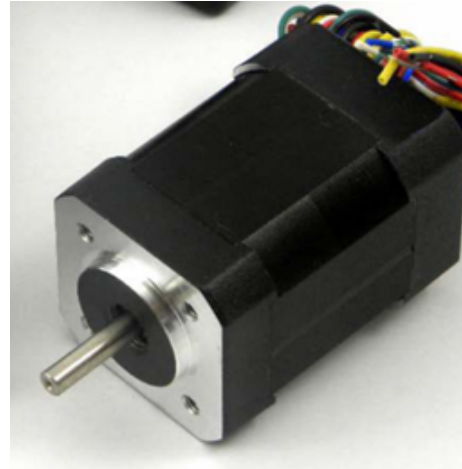


Figure 10. TelcoMotion EVM Motor

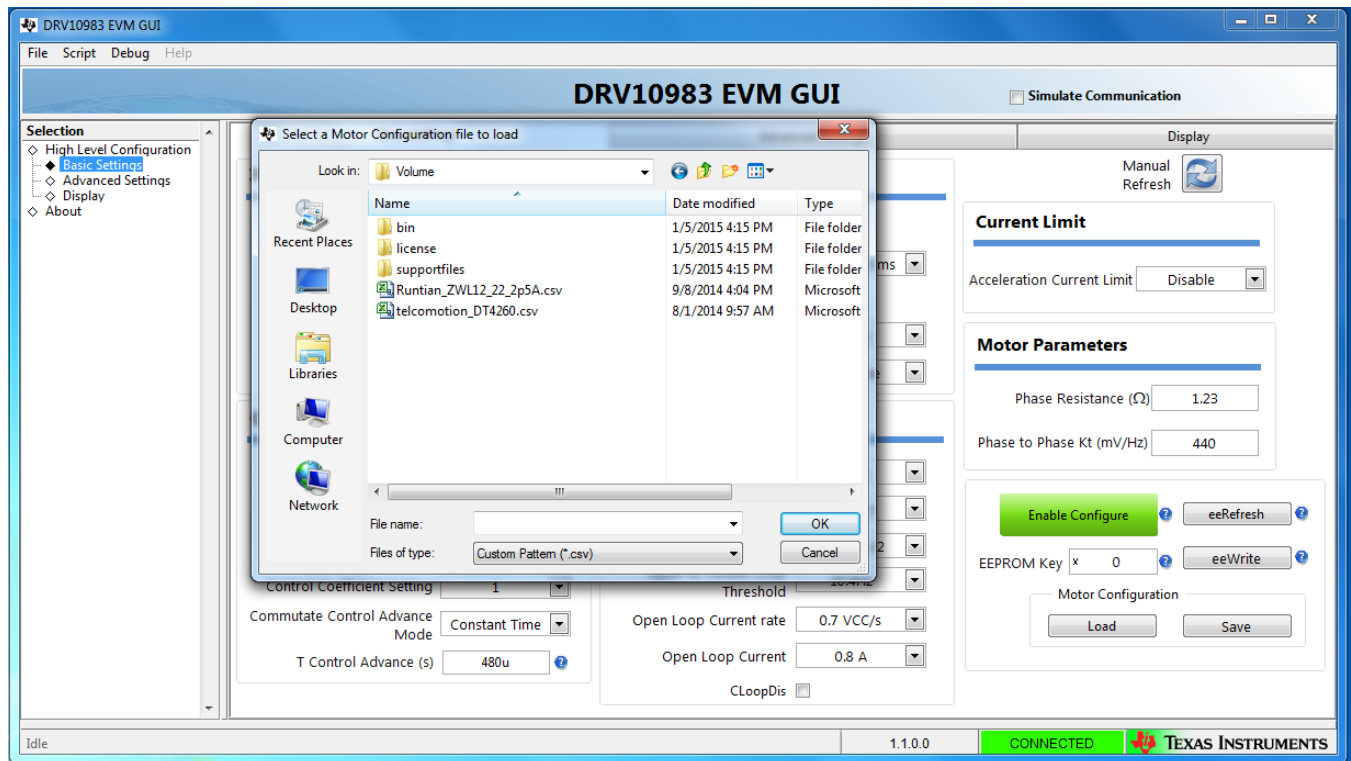


Figure 11. Load Motor Parameters

- Turn the pot R14 clockwise. The motor speed increases as the pot is turned clockwise, and decreases as the pot is turned counter clockwise.
- Change the motor direction by connecting or removing jumper J1.

13. Override the analog speed control by switching to the Display tab and select the OverRude box.

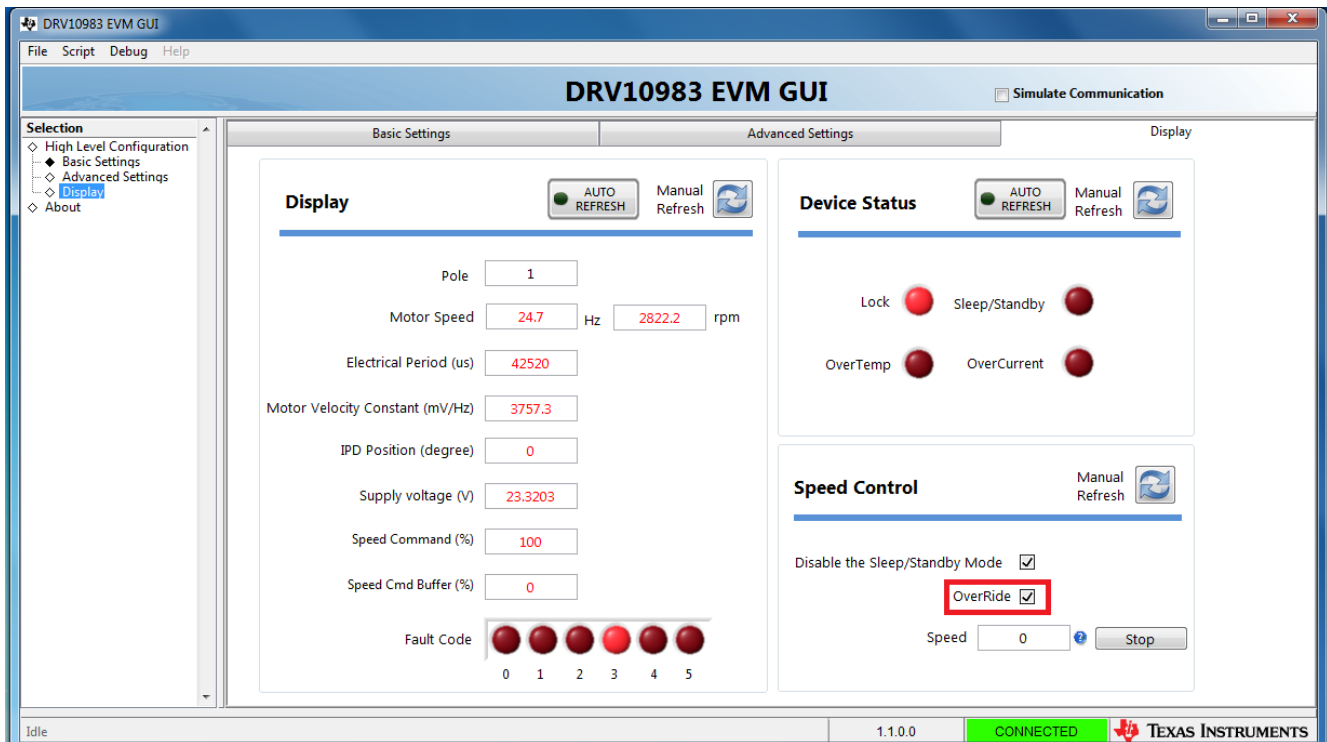


Figure 12. OverRide Selected

14. Enter values from 0 (stopped) to 511 (full speed) in the Speed text box to control the speed.

15. When complete, set the speed to 0 and uncheck the OverRide checkbox.

6 Power-on Sequence and Connection With User Specific Motor

Once the supplied motor is evaluated, a user motor can be evaluated. The DRV10983 and DRV10975 EVMs are shipped with default EEPROM settings for all registers, which may or may not be suitable to operate the target motor. To connect the user motor to the EVM, follow the steps mentioned in [Section 5](#) to avoid any damage to EVM.

In order to successfully tune user motor, refer to the DRV10983 and DRV10975 Tuning Guide ([SLOU395](#)).

7 Schematic and Bill of Materials

This section contains the DRV10983 and DRV10975 schematic and bill of materials (BOM).

7.1 Schematic

Figure 13 shows the DRV10983 and DRV10975 schematic.

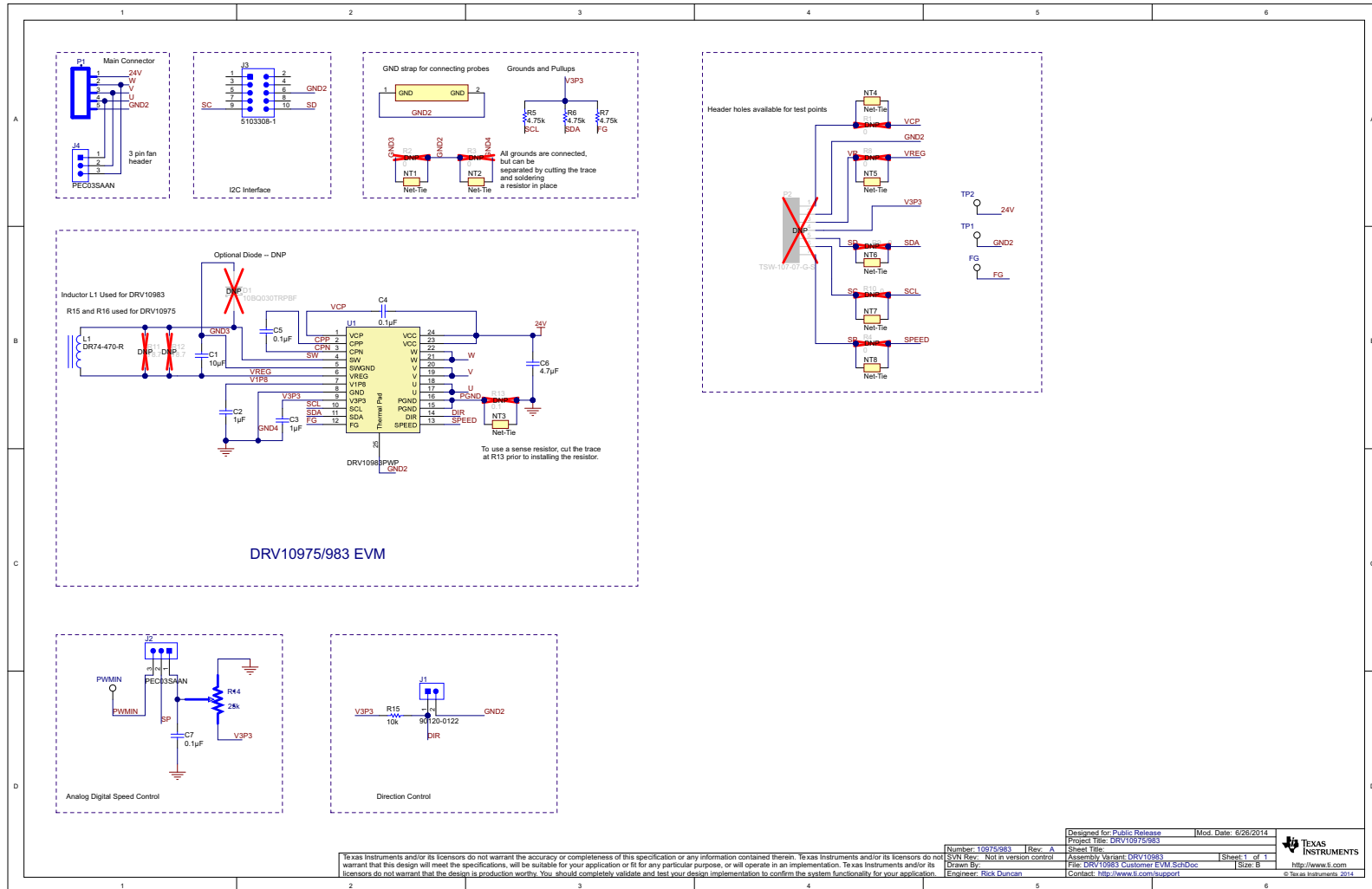


Figure 13. DRV10983 and DRV10975 Schematic

7.2 Bill of Materials (BOM)

Table 1 lists the DRV10983 and DRV10975 EVM bill of materials.

Table 1. DRV10983 and DRV10975 Bill of Materials

Designator	Description	Manufacturer	PartNumber	Quantity
IPCB	Printed Circuit Board	Any	10975/983	1
C1	CAP, CERM, 10 uF, 10 V, +/-20%, X5R, 0603	TDK	C1608X5R1A106M	1
C2, C3	CAP, CERM, 1 uF, 25 V, +/-10%, X5R, 0603	TDK	C1608X5R1E105K080AC	2
C4, C5, C7	CAP, CERM, 0.1 uF, 50 V, +/-10%, X7R, 0603	AVX	06035C104KAT2A	3
C6	CAP, CERM, 4.7 uF, 50 V, +/-10%, X5R, 0805	TDK	C2012X5R1H475K125AB	1
FG, PWMIN, TP1, TP2	Test Point, Compact, SMT	Keystone	5016	4
GND2	Shorting Plug, 1MM uninsulated	Harwin Inc	D3082-05	1
H9, H10, H11, H12	Bumpon, Hemisphere, 0.44 X 0.20, Clear	3M	SJ-5303 (CLEAR)	4
J1	Header, 100mil, 2x1, Tin plated, TH	Molex	90120-0122	1
J2, J4	Header, 100mil, 3x1, Tin plated, TH	Sullins Connector Solutions	PEC03SAAN	2
J3	Header (shrouded), 100mil, 5x2, Gold, TH	TE Connectivity	5103308-1	1
L1	Inductor, Shielded Drum Core, Ferrite, 47 uH, 1.15 A, 0.216 ohm, SMD	Coiltronics	DR74-470-R	1
P1	Terminal Block, 5-pin, 15-A, 5.1mm	OST	D120/5DS	1
R5, R6, R7	RES, 4.75k ohm, 1%, 0.1 W, 0603	Vishay-Dale	CRCW06034K75FKEA	3
R14	Potentiometer, Carbon, 1/8W, Horiz. Adjust	CTS	296XD253B1N	1
R15	RES, 10k ohm, 5%, 0.1W, 0603	Vishay-Dale	CRCW060310K0JNEA	1
SH-J1, SH-J2	Shunt, 100mil, Gold plated, Black	3M	969102-0000-DA	2
U1	IC, Motor Driver 3 Phase	Texas Instruments	DRV10983 and DRV10975 ⁽¹⁾	1
Motor	Runtian 3-phase BLDC motor	Runtian	ZWL12_22_2.5A	1

⁽¹⁾ U1 part number can be any of the following depending on the EVM:

1. For Standby mode EVM: DRV10975PWP or DRV10983PWP
2. For Sleep mode EVM: DRV10975Z or DRV10983Z

GUI Installation and Overview

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

NOTE: Ensure that no USB connections are made to the EVM until the installation is completed.

A.1 System Requirements

- Supported OS – Microsoft® Windows® XP, Windows 7 (32 bit,64 bit)
- Recommended RAM memory - 4GB or higher
- Recommended CPU operating speed – 3.3 GHz or higher

A.2 Installation Procedure

The following procedure describes how to install the DRV10983/75 GUI. The installer also installs Python 2.7, USB2ANY SDK along with the GUI installation.

1. Double click on setup.exe from the Volume folder as shown in [Figure 14](#).

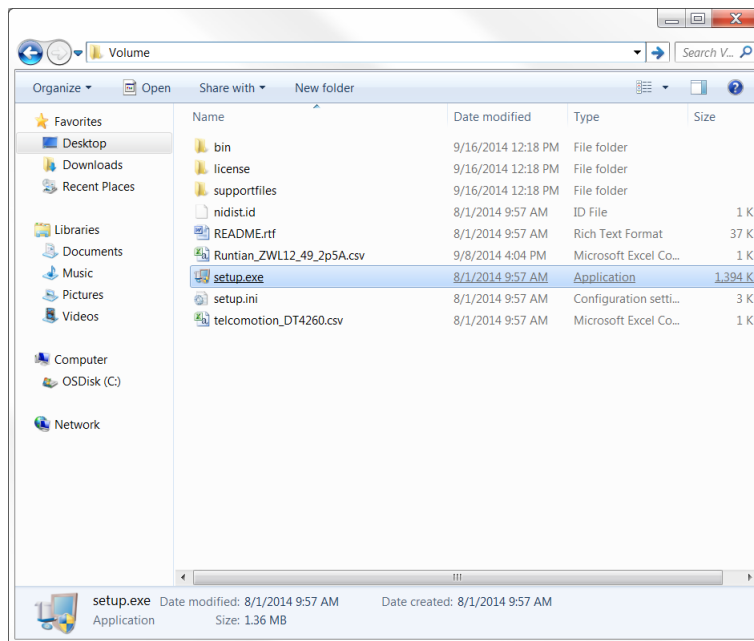


Figure 14. Setup.exe from the Volume Folder

2. A screen shown in [Figure 15](#) appears. Press the *Next >>* button.

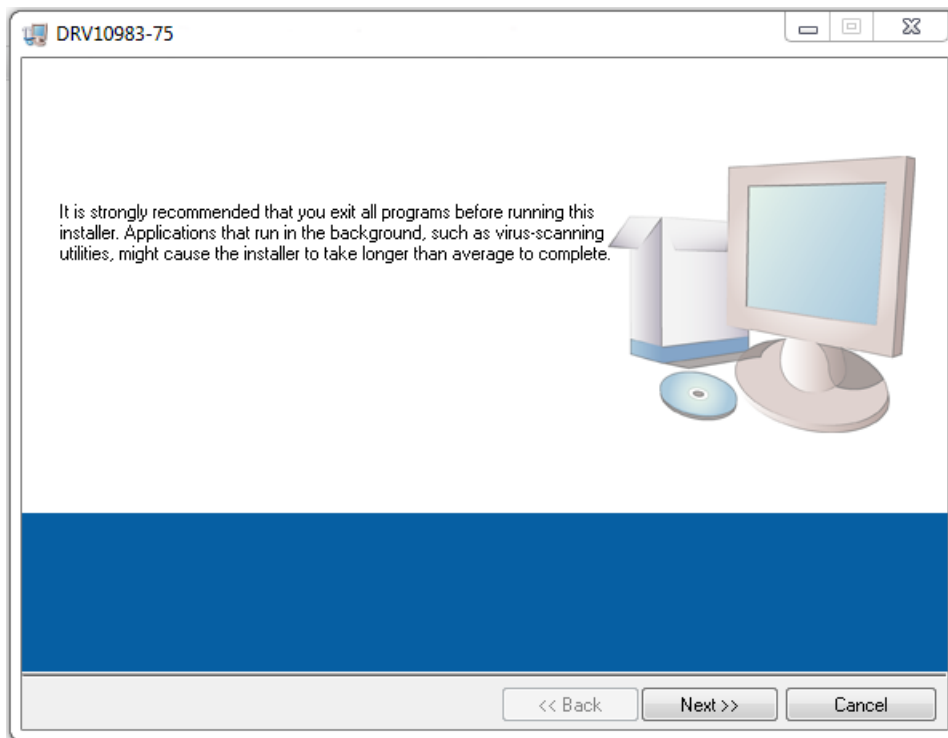


Figure 15. GUI Installation Initialization

3. Set the destination directories for the GUI installation and press the *Next >>* button as shown in [Figure 16](#). It is recommended to keep the default values as provided in the installer.

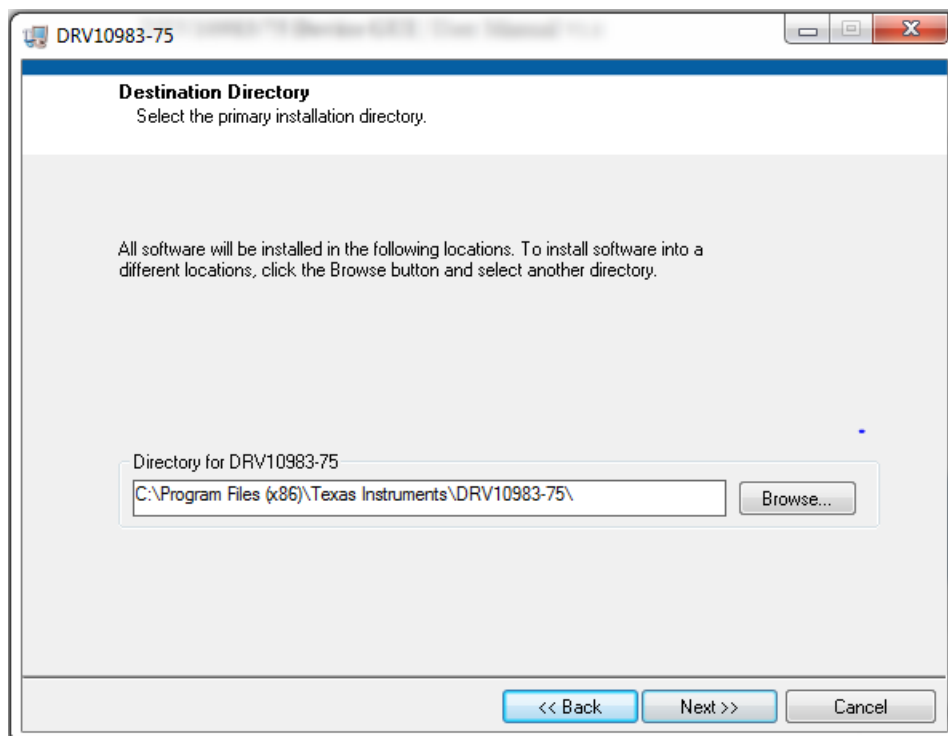


Figure 16. GUI Destination Directory

4. The *License Agreement* screen appears as shown in [Figure 17](#). Read through the agreement carefully and enable the “I Accept the License Agreement” radio button, then press the *Next»* button.

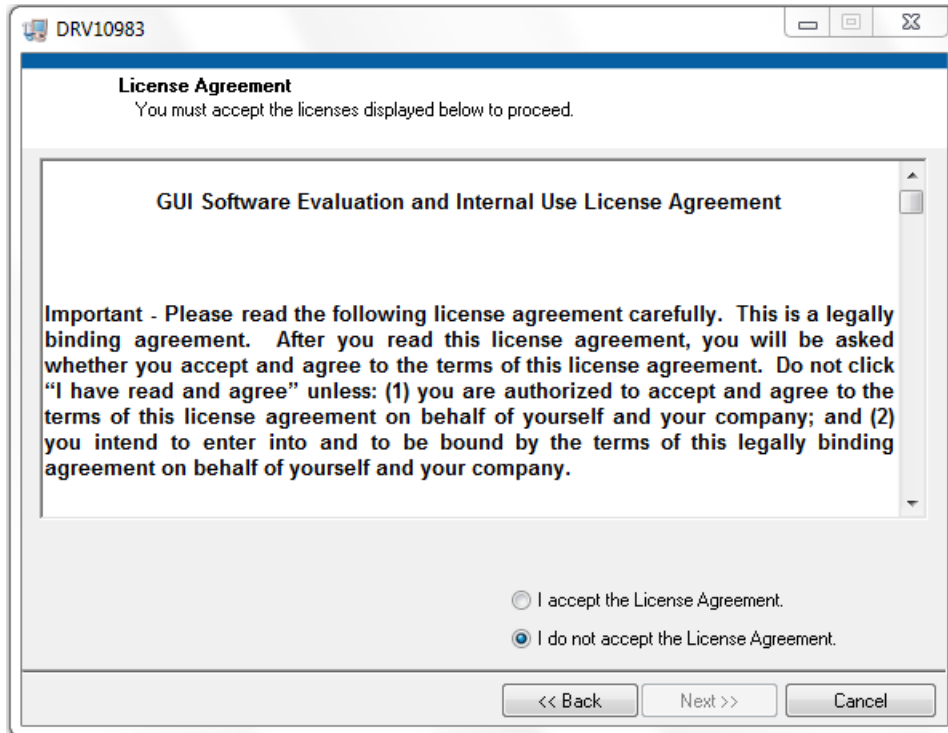


Figure 17. GUI License Agreement

5. The screen shown in [Figure 18](#) appears. Click *Next >>* to begin installation.

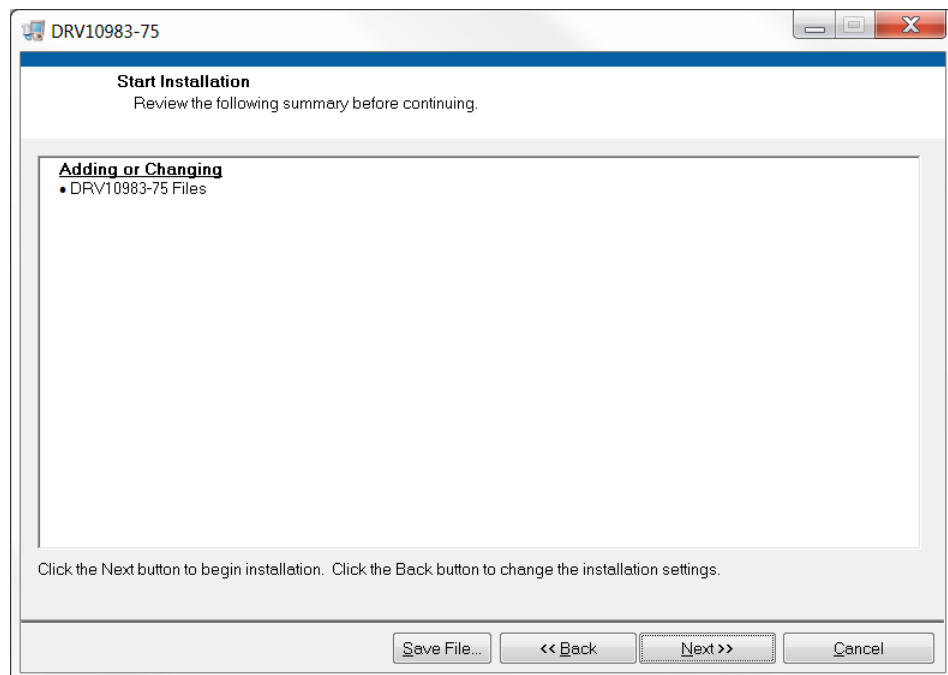


Figure 18. GUI Start Installation

6. The installer begins self-extraction and proceeds with the installation as shown in [Figure 19](#).

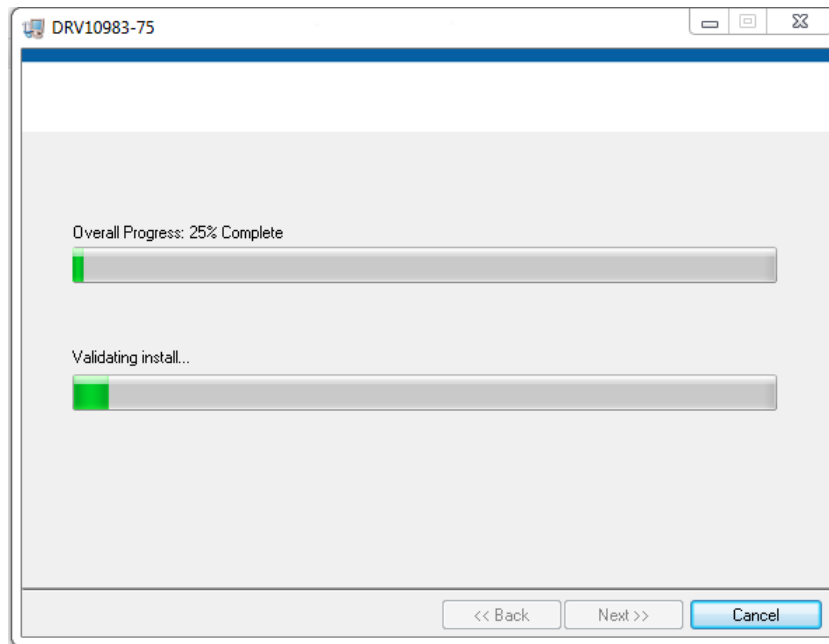


Figure 19. GUI Installation in Progress

7. The *Installation Complete* screen ([Figure 20](#)) appears, providing the link for LabVIEW Runtime Engine. This denotes the completion of DRV10983/75 GUI Installation.

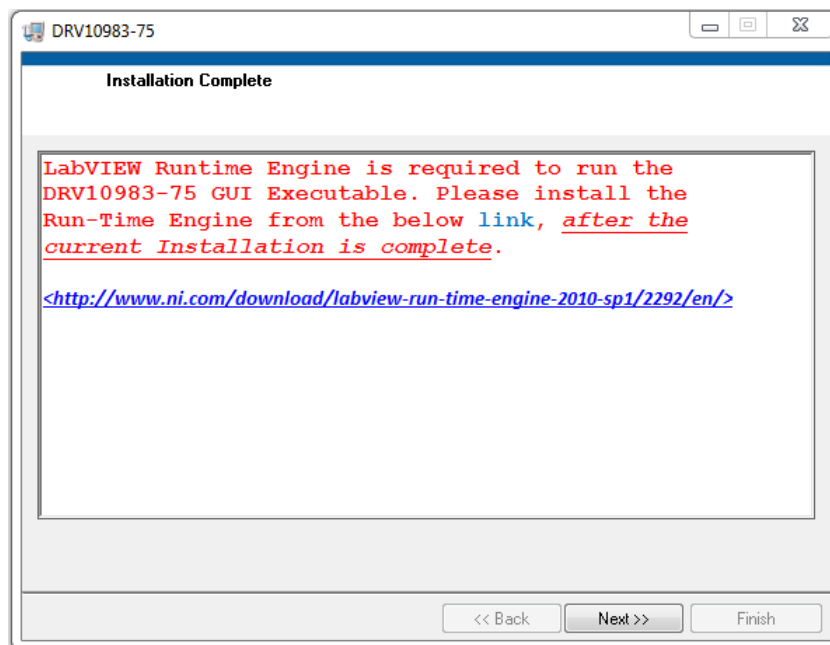


Figure 20. GUI Installation Complete

- After the installation of the GUI, Python installation initiates. Once python is installed, a screen as shown in [Figure 21](#) appears. Click the **OK** button to proceed with USB2ANY installation.

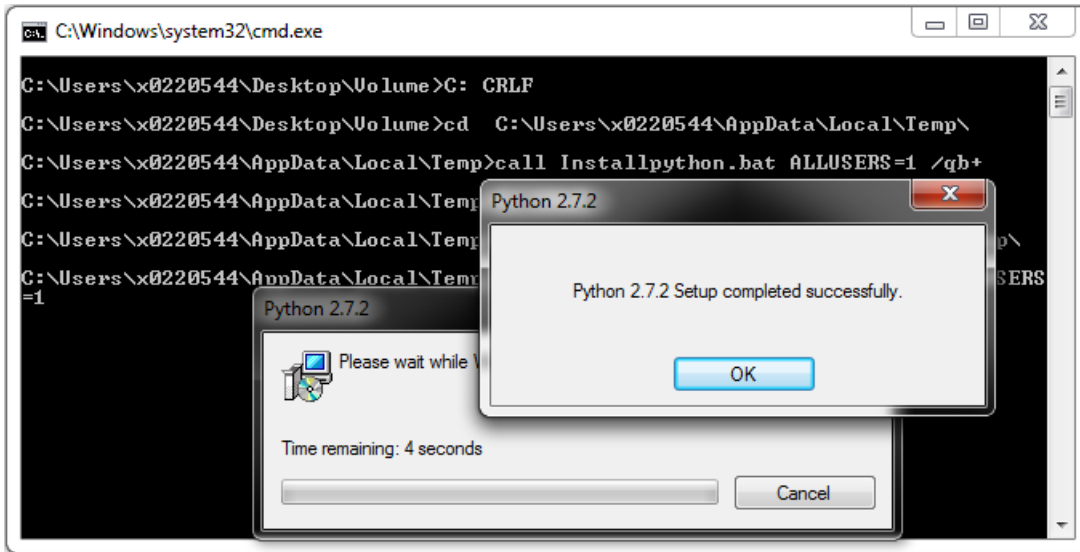


Figure 21. Python Installation Complete

- A screen as shown in [Figure 22](#) appears, click the **Next >** button to proceed.

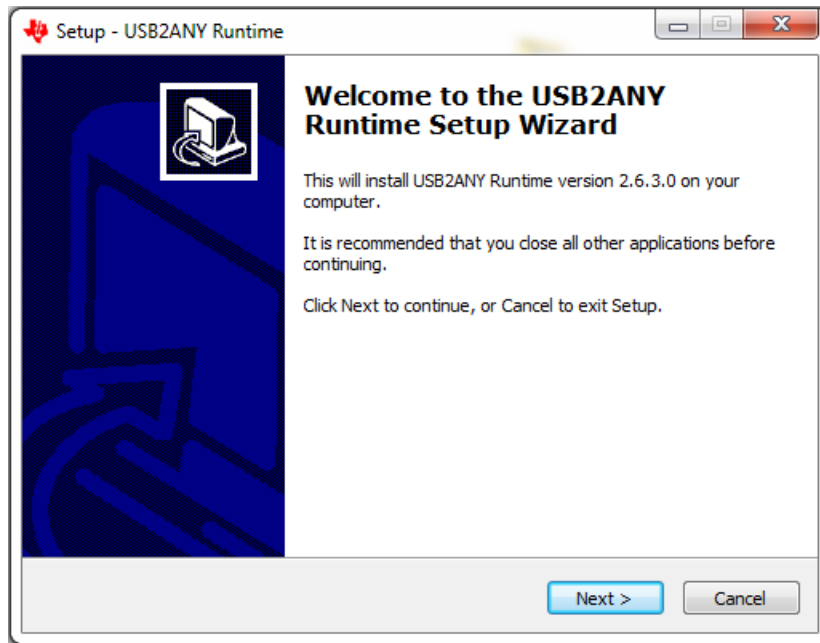


Figure 22. USB2ANY Installation Initialization

10. The *License Agreement* appears, as shown in [Figure 23](#). Read through the agreement carefully and enable the *I Accept the License Agreement* radio button, then press the *Next >* button.

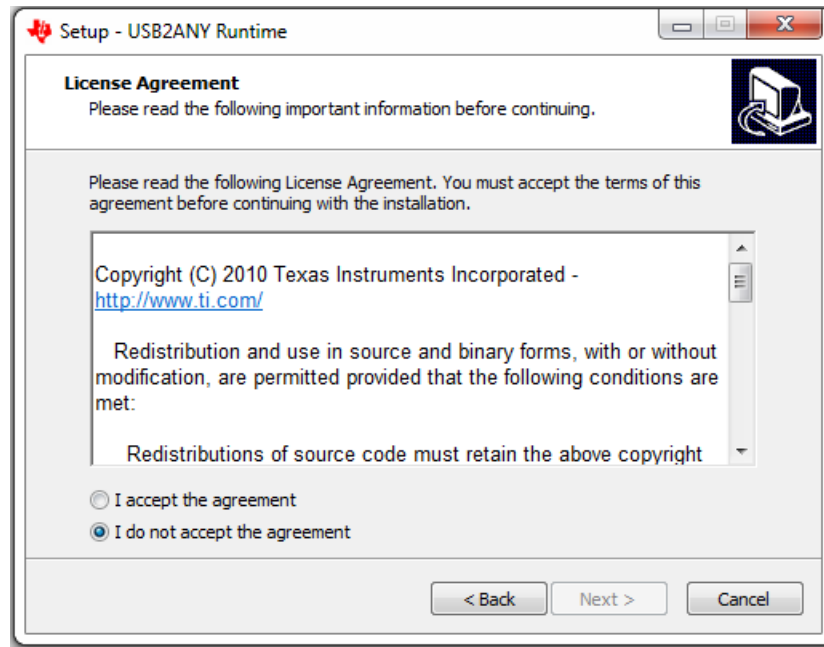


Figure 23. USB2ANY License Agreement

11. Set the destination directories for the USB2ANY installation and press the *Next >* button as shown in [Figure 24](#).

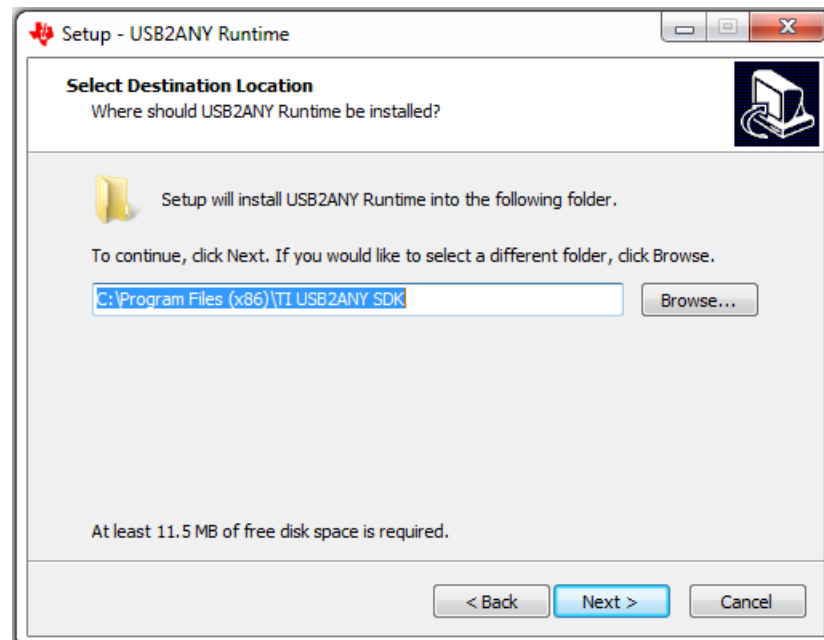


Figure 24. USB2ANY Destination Directory

12. The screen shown in [Figure 25](#) appears. Click the *Install* button to begin the USB2ANY installation.

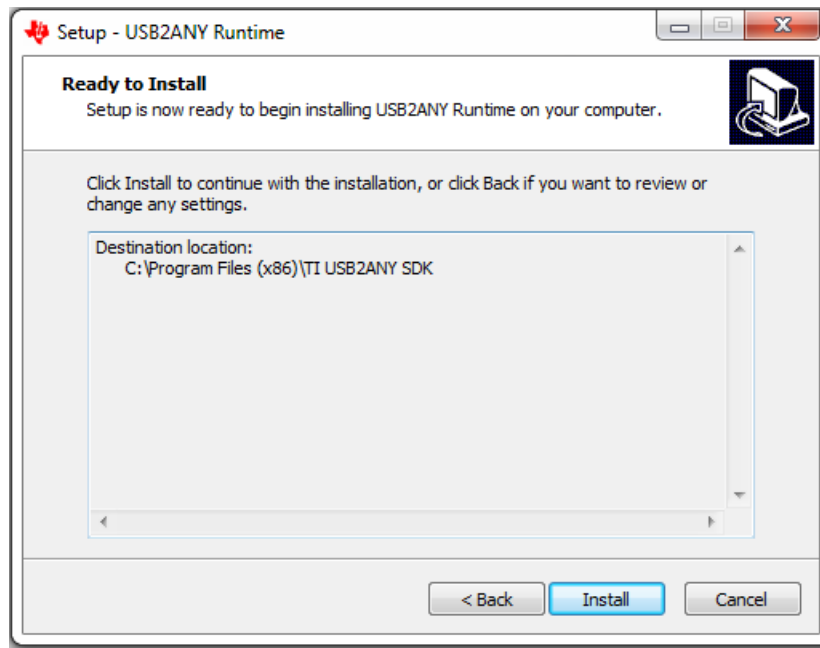


Figure 25. USB2ANY Start Installation

13. The installer begins self-extraction and proceeds with the installation as shown in [Figure 26](#).

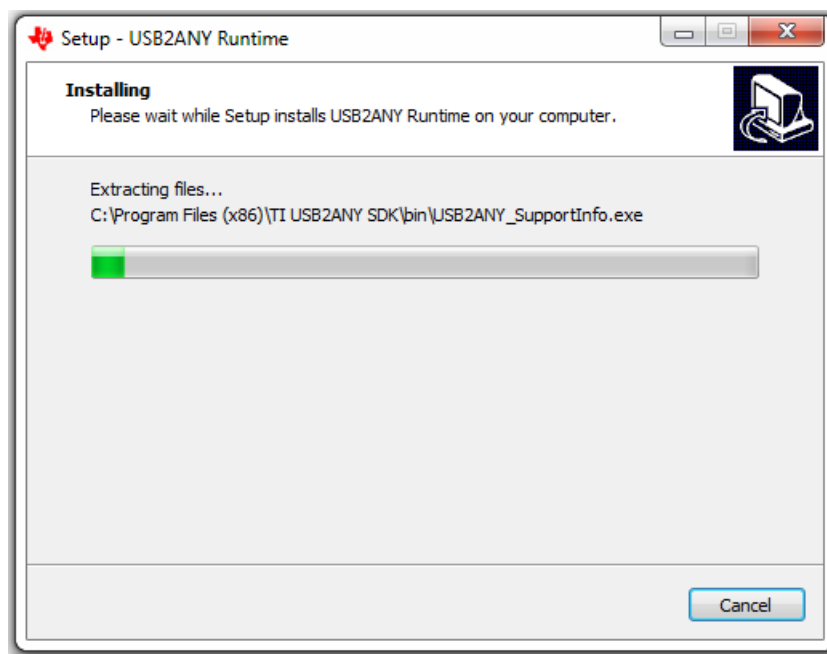


Figure 26. USB2ANY Installation Progress

14. The *USB2ANY Installation Complete* window (Figure 27) appears, indicating the completion of the USB2ANY installation. Click the *Finish* button.

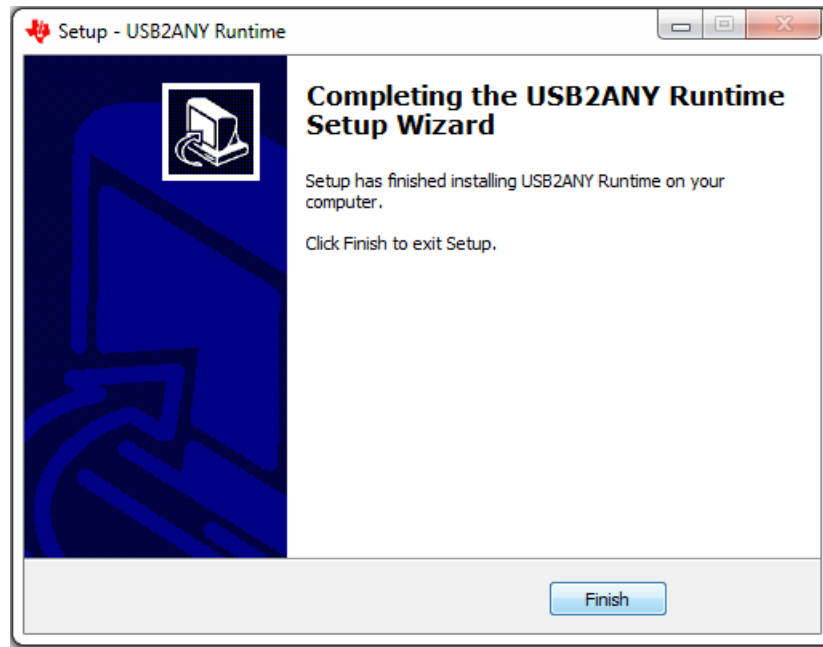


Figure 27. USB2ANY Installation Complete

NOTE: The DRV10983/75 GUI requires the LabVIEW Run-Time Engine 2010 to be installed before the GUI is executed.

The DRV10983 and DRV10975 GUI Installer does not include the LabVIEW Run-time-engine. Download the National Instruments LabVIEW Run-Time Engine 2010 from <http://www.ni.com/download/labview-run-time-engine-2010-sp1/2292/en/>.

The DRV10983 and DRV10975 GUI executable was built in the LabVIEW 2010 (32-Bit) version and expects the LabVIEW Run-Time Engine (32-Bit) version.

A.3 LabVIEW Run-Time-Engine Installation Procedure

The following procedure describes how to install the LabVIEW 2010 Run-Time-Engine.

1. Download the LabVIEW 2010 RTE from the link provided earlier.
2. Double click on the downloaded LVRTE2010std.exe file. The screen shown in [Figure 28](#) appears. Press the *Next >* button.

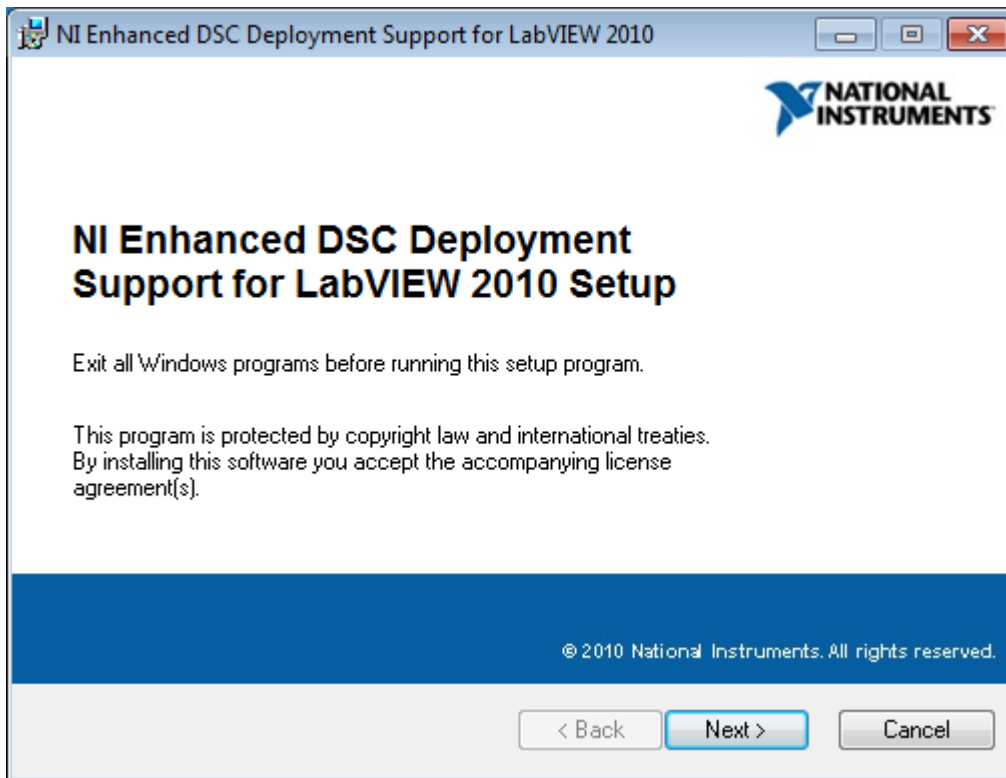


Figure 28. LabVIEW RTE Installation Initialization

3. A window as shown in [Figure 29](#) appears. Select the desired features in Run-Time Engine, then click the *Next >* button to continue. TI recommends keeping the default values as provided in the installer.

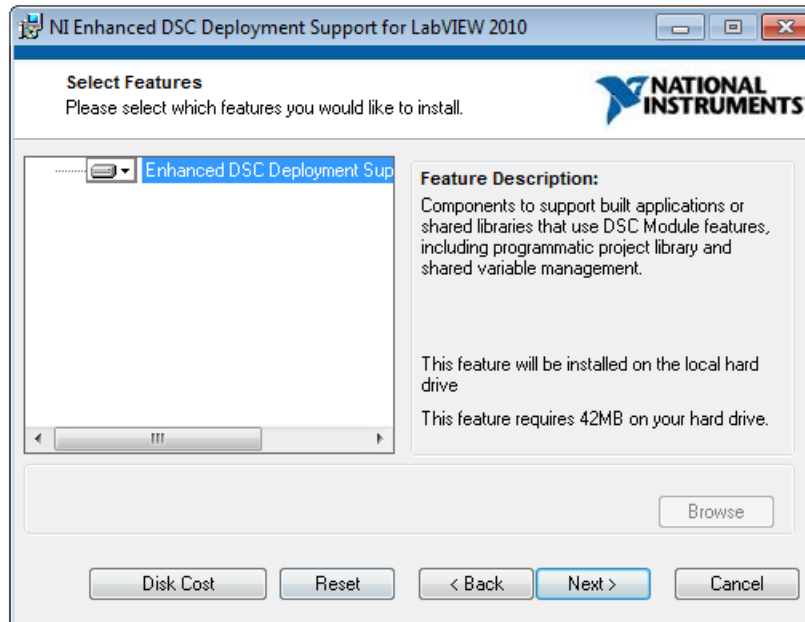


Figure 29. LabVIEW RTE Select Features

4. The License Agreement appears as shown in [Figure 30](#). Read through the agreement carefully and enable the “I Accept the License Agreement” radio button, then press the *Next >* button.

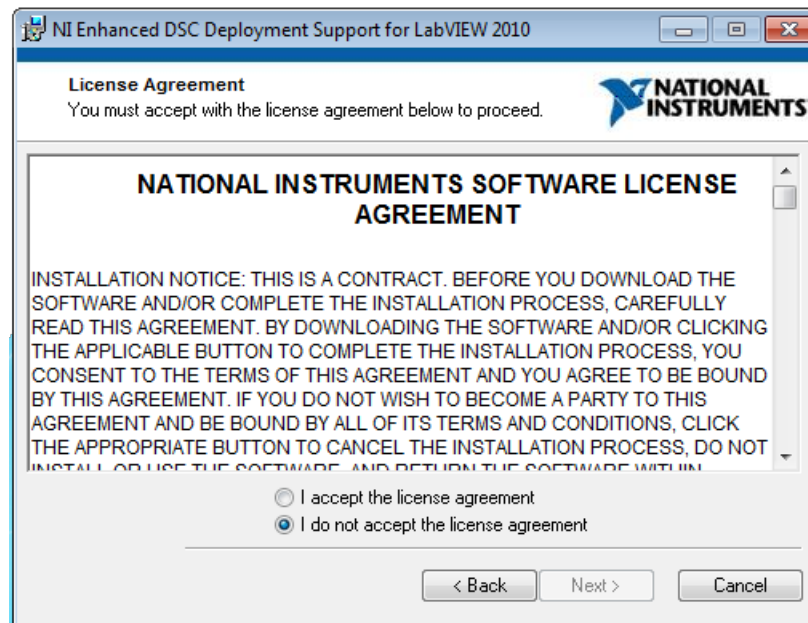


Figure 30. LabVIEW RTE License Agreement

5. The *LabVIEW RTE Start Installation* window (Figure 31) appears, click the *Next >* button to begin installation.

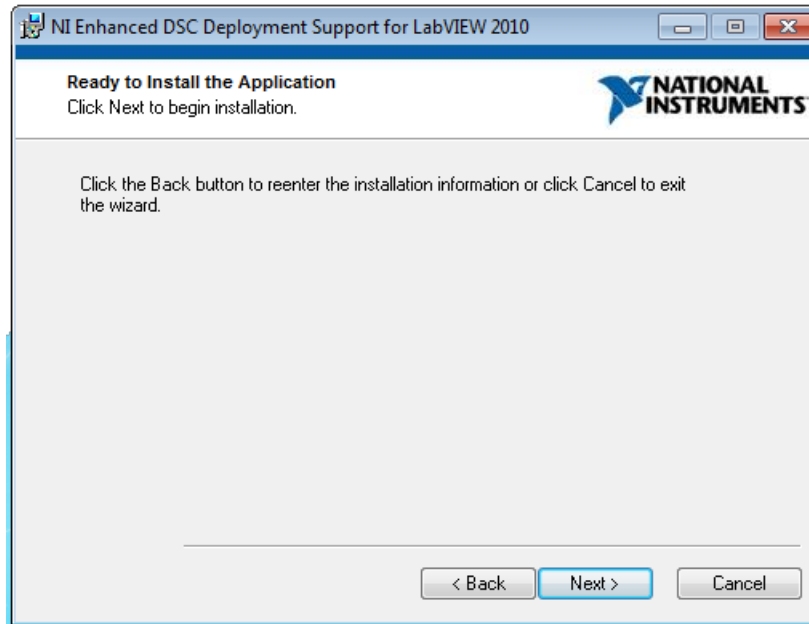


Figure 31. LabVIEW RTE Start Installation

6. The installer begins self-extraction and proceeds with the installation as shown in Figure 32.

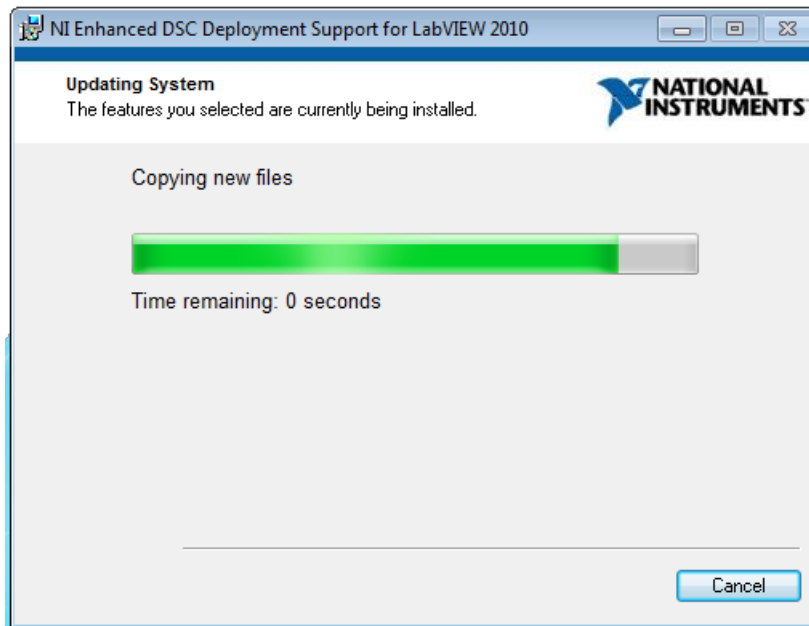


Figure 32. LabVIEW RTE Installation in Progress

7. The *LabVIEW RTE Installation Complete* window (Figure 33) appears, indicating the completion of the LabVIEW 2010 RTE installation. Click the *Finish* button.

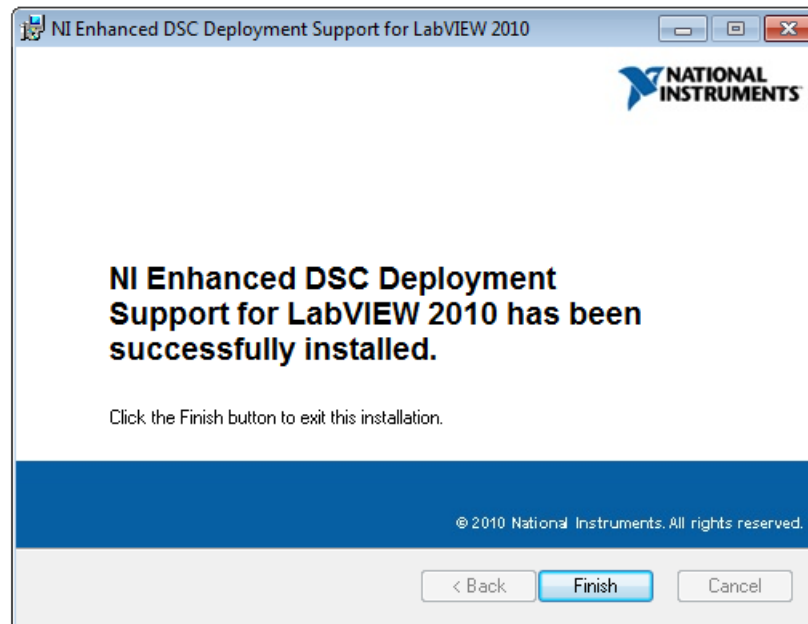


Figure 33. LabVIEW RTE Installation Complete

A.4 GUI Overview

The DRV10983 and DRV10975 GUI was developed to communicate with the part to configure different registers within the device, and to understand the response based on the configurations. The following sections describe some of the specific features of the GUI, but does not explain the configurations of the controls and indicators.

In following sections, DRV10983 GUI images are shown to explain the various features of GUI. The same images apply for DRV10975 devices unless otherwise specified.

A.4.1 Components of the GUI

The device GUI contains four pages:

- Basic Settings
- Advanced Settings
- Display
- About

A.4.1.1 Basic Settings

Figure 34 illustrates the *Basic Settings Page* of the GUI.

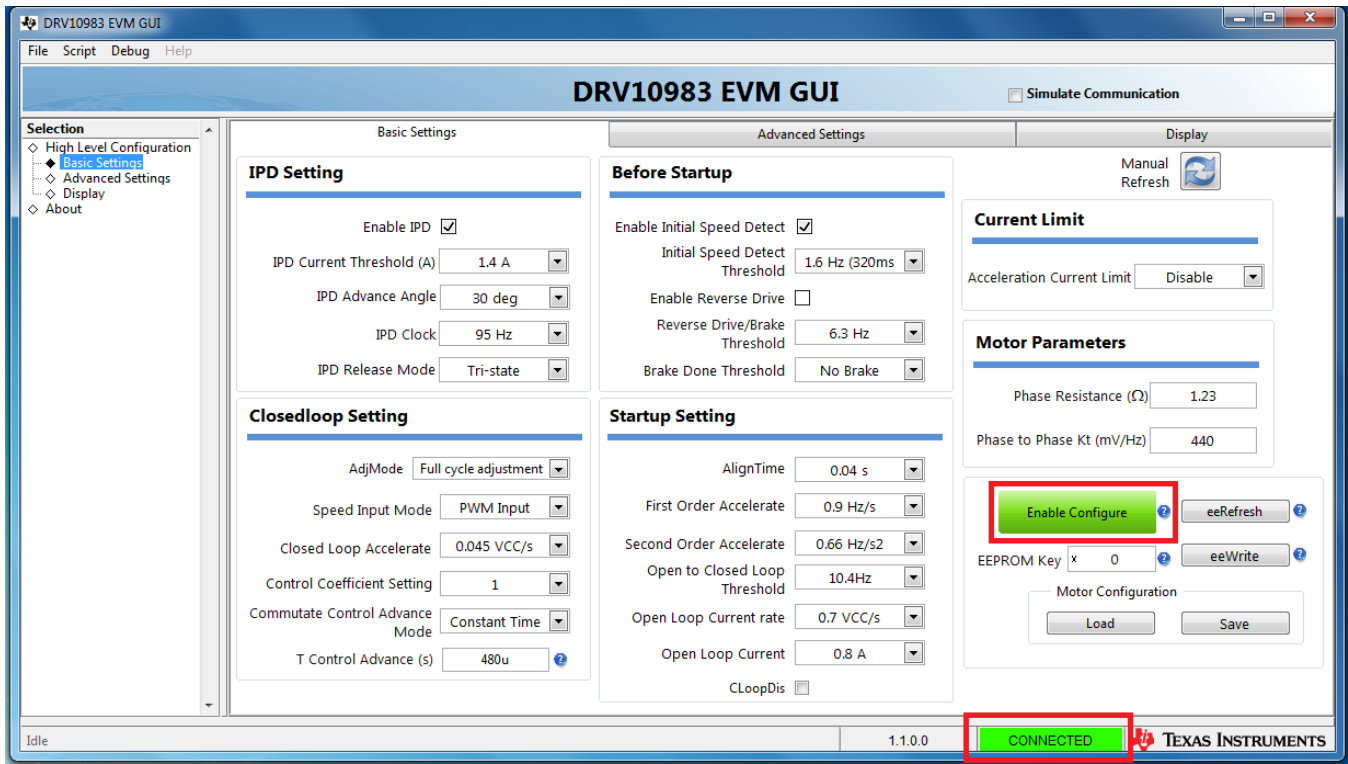


Figure 34. Basic Settings Page

A.4.1.1.1 Enable Configure

The controls in the Basic Settings page and Advanced Settings page are only enabled if Enable Configure is selected. Enable Configure specifies the data use between the registers and EEPROM. Click on the control to select the data use. If Enable configure is enabled (the control turns green in color), the register data is used, or else (the control turns red) the EEPROM data is used.

A.4.1.1.2 Enable IPD

This control enables and disables the controls related to IPD settings. If the control is disabled, a value 0 is written to the IPD current threshold. If the control is enabled, a value 1 is written to IPD current threshold field.

A.4.1.1.3 eeWrite

eeWrite programs to the EEPROM. When this control is clicked, a prompt message asks for confirmation of the voltage level (Figure 35). The eeWrite field is written only if the EEPROM Key is set to B6, and the the power supply voltage level is confirmed.

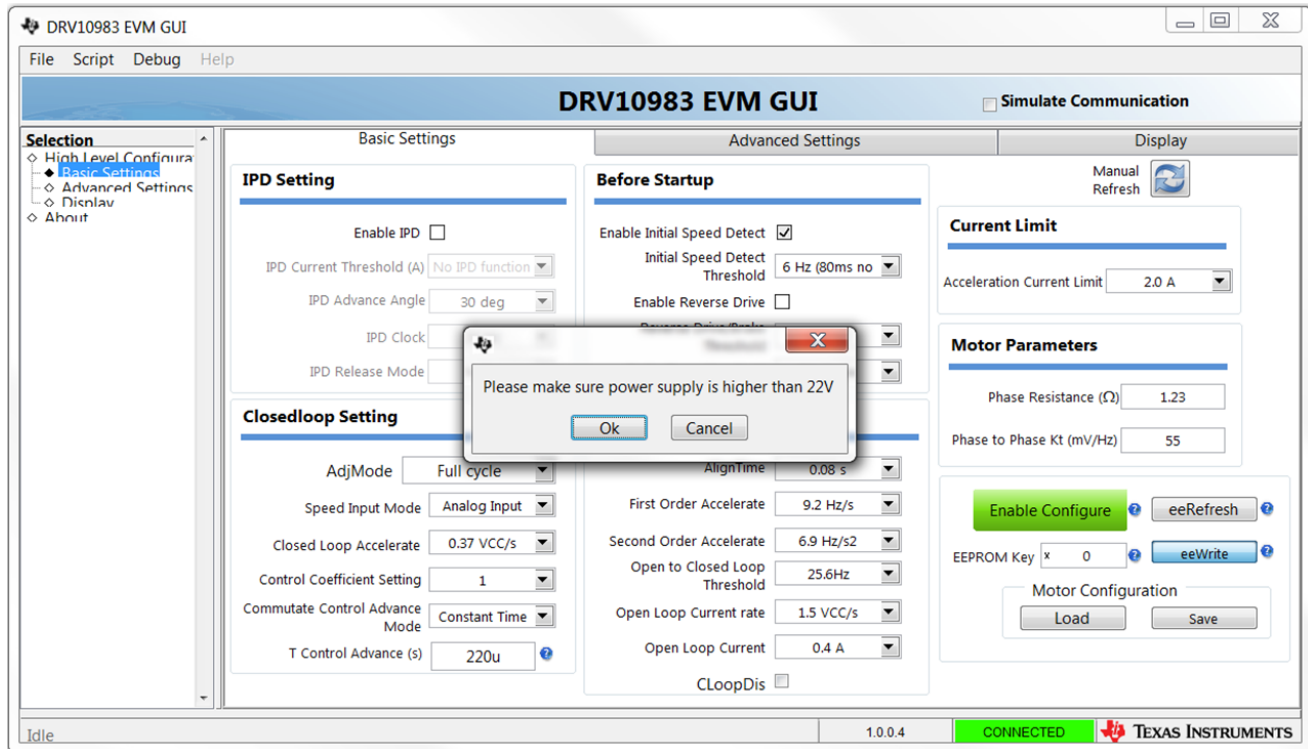


Figure 35. Confirmation on Voltage Level

A.4.1.1.4 eeRefresh

The eeRefresh Button refreshes the controls in the Basic Settings page, which reads the latest value of the corresponding fields from the registers and updates the controls.

A.4.1.1.5 Manual Refresh

The Manual Refresh Button refreshes the controls of the Motor Parameters, which reads the latest value of the corresponding fields from the registers and updates the controls. The function of this button is same in every section.

A.4.1.1.6 Save Motor Configuration

This button saves the current motor configuration into a file that is later loaded into the GUI using the Load option. The button saves the Last Read values for the registers. Perform a Manual Refresh operation before saving the configurations into a file.

A.4.1.1.7 Load Motor Configuration

This button loads the configuration file saved earlier, to bring the device to a known state.

A.4.1.1.8 Help Icon

Move the mouse over the help icon to display a brief description for the control, as shown in Figure 36.

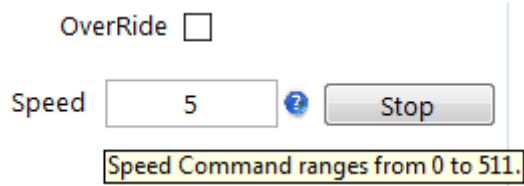


Figure 36. Help Icon

A.4.1.2 Advanced Settings

The Advanced Settings page contains controls to handle the frequency overflow, Buck regulator voltage, Hardware Current Limit, FG motor pole option, and so forth.

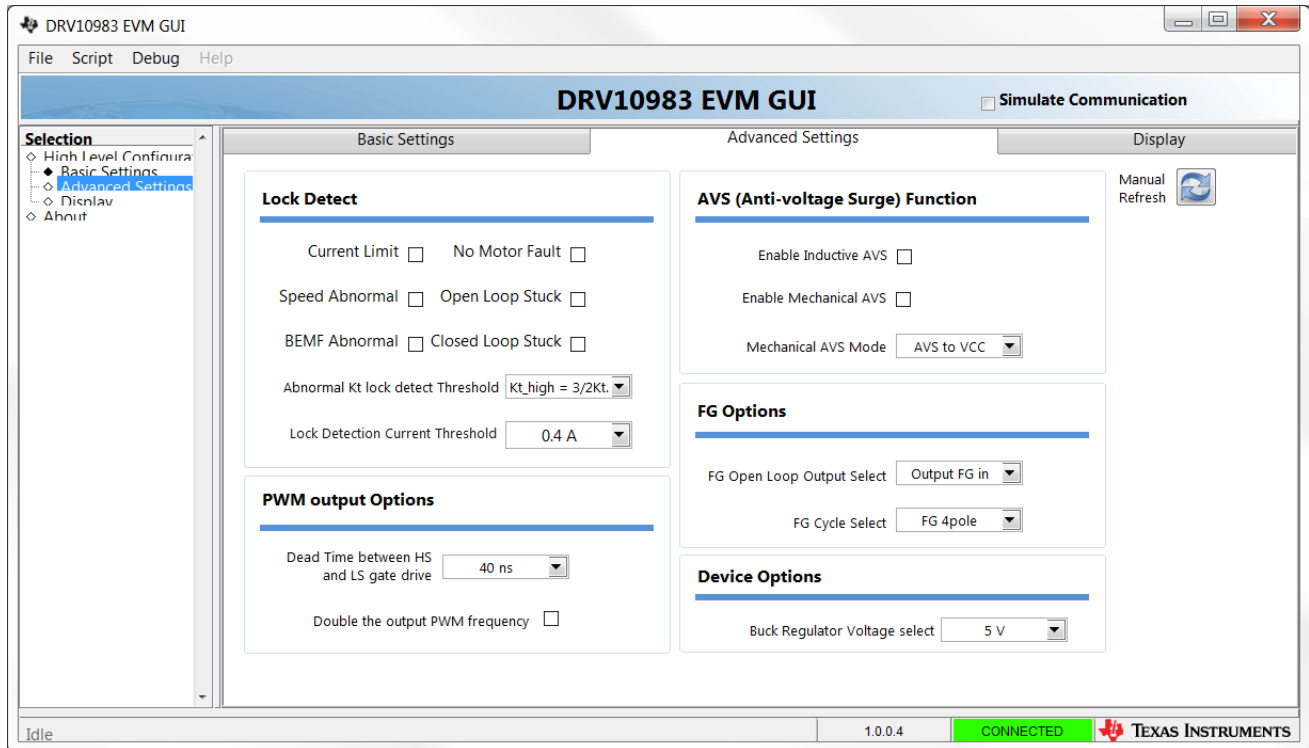


Figure 37. Advanced Settings

A.4.1.3 Display

The Display page (Figure 38) contains controls to handle the motor speed, indicates the status of the device, and displays the value of motor attributes such as motor speed, current, and IPD position.

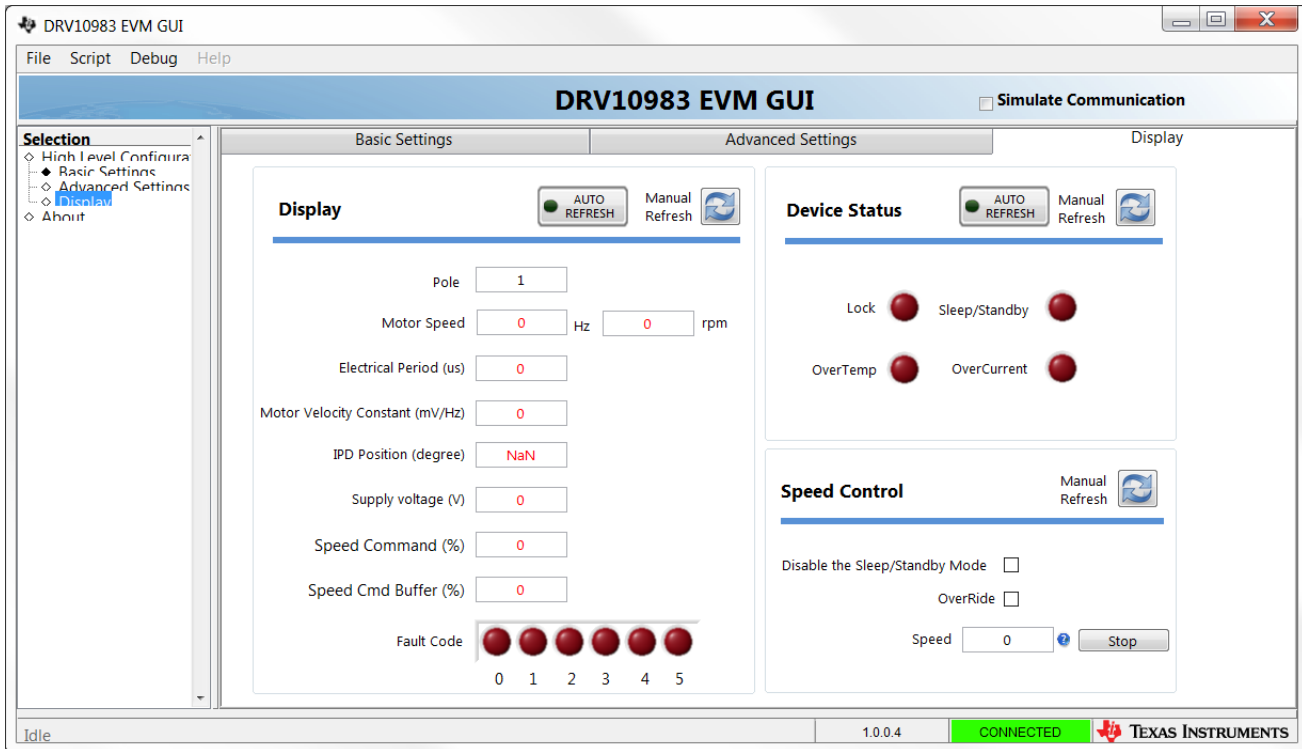


Figure 38. Display

A.4.1.3.1 Auto Refresh

The Auto Refresh Button periodically refreshes the controls of the motor parameters, which read the latest value of the corresponding fields from the registers and update the controls. The rate of auto refresh is specified in the configuration file found parallel to the application. The function of this button is same in every section.

A.4.1.3.2 Pole

This control calculates the RPM in the Display section, given by the formula:

- If motor speed (Hz) ≥ 2 , motor speed (rpm) = $(1000000/\text{electrical period(us)}) \times 120/\text{pole}$. Else, motor speed (rpm) = motor speed (Hz) $\times 120/\text{pole}$. The default value of this control is 1.

A.4.1.3.3 Stop

This control writes the speed control with a value of 0.

A.4.1.3.4 About

The About Page provides the details like the GUI version, supported OS, and the firmware version of the USB2ANY.

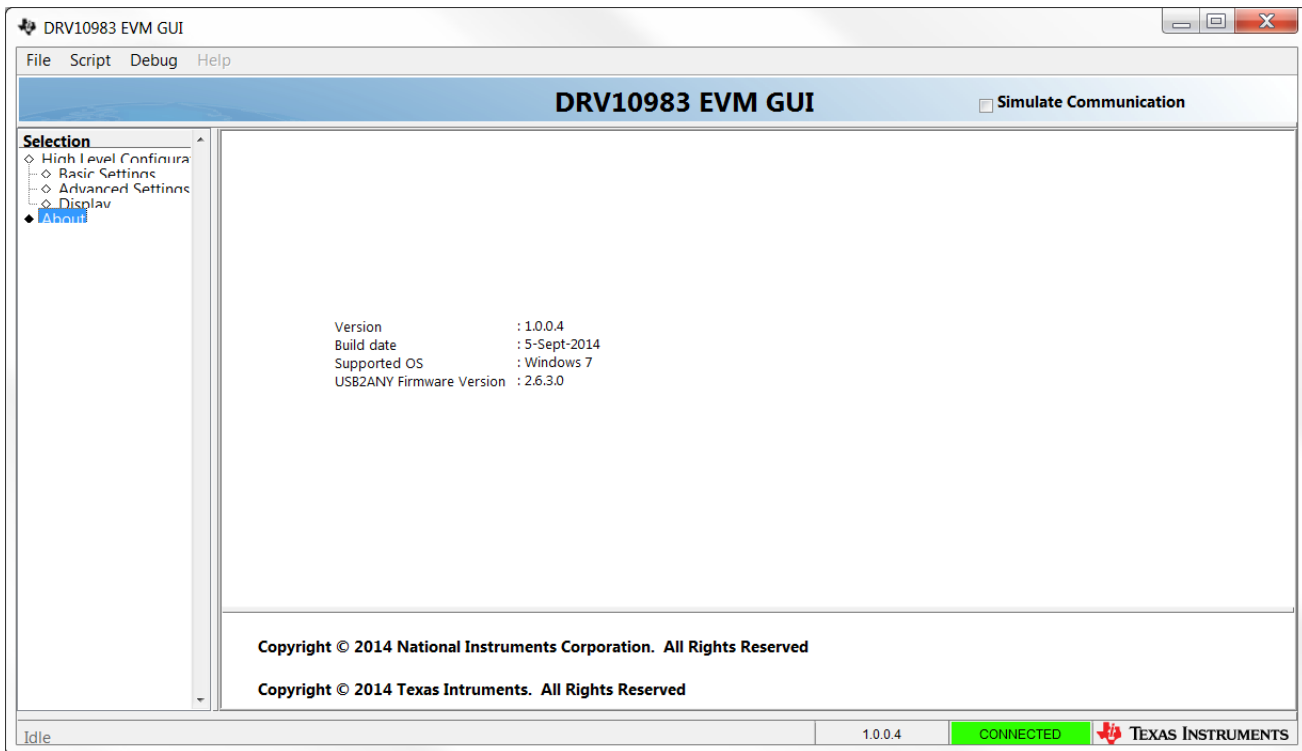


Figure 39. About Page

A.4.2 Menu Options

A.4.2.1 File

The File menu contains the Exit option as shown in Figure 40. The Exit option stops the execution of the DRV10983 and DRV10975 GUI.

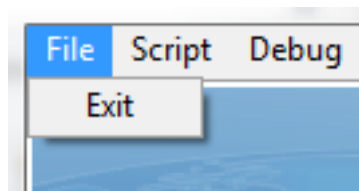


Figure 40. File Menu

A.4.2.2 Script

- Scripting automates the device operations and reduces the time consumption in repeating similar operations.
- Scripting is helpful in situations where performing a particular device function requires setting 10 to 15 registers on the device to a particular value. In these circumstances, scripts can be recorded and run whenever needed.
- In DRV10983 and DRV10975 GUI, the scripting is done using Python.

A.4.2.2.1 Recording and Running Scripts

1. Start recording by going to Scripts → Launch Window in the DRV10983 and DRV10975 GUI.

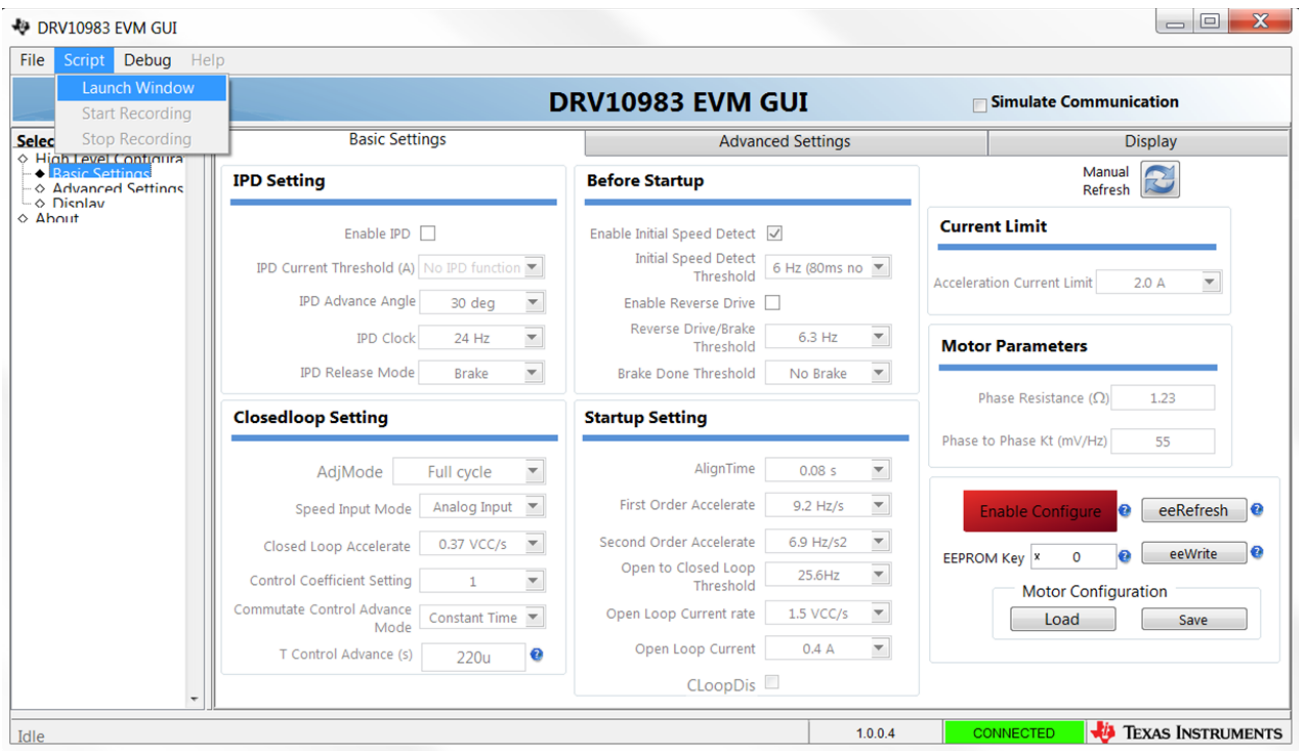


Figure 41. Script Menu

2. This opens an untitled, empty Python window in IDLE IDE.

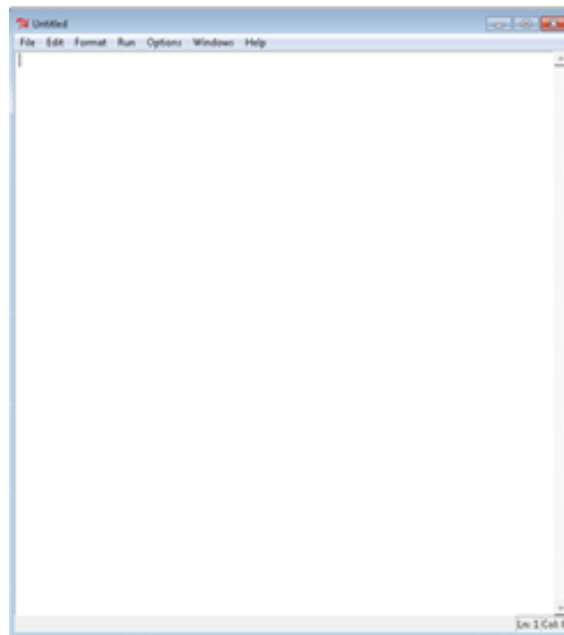


Figure 42. Launch Macro

- Once the python window launches, the Start Recording option is enabled in the same Script menu, in the GUI window. Selecting the Launch Window again opens another untitled window, and the last opened window is active.
- In the GUI window, traverse to the Scripts → Start Recording option in the menu.

All actions performed on the GUI are recorded in the Python window. The recording function is indicated by the window blinking in green, while the window is recording as shown in [Figure 43](#).

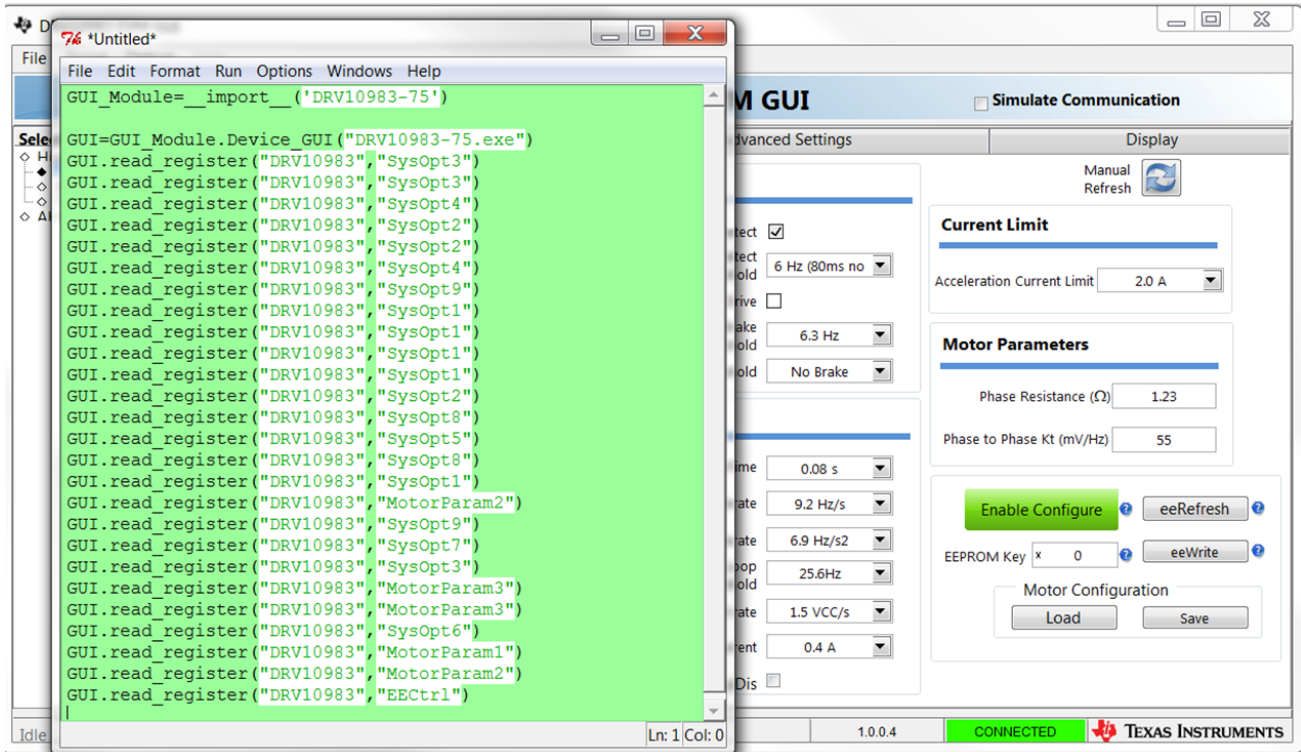


Figure 43. Start Recording

The Python window captures predefined actions only. While recording, no action such as moving the cursor or entering data has to be performed on the Python window.

- Stop Recording. To stop recording, traverse to the Scripts → Stop Recording option in the GUI window menu.

- The Launch Window remains after the recording has been stopped, as shown in Figure 44. It can be closed with or without saving.

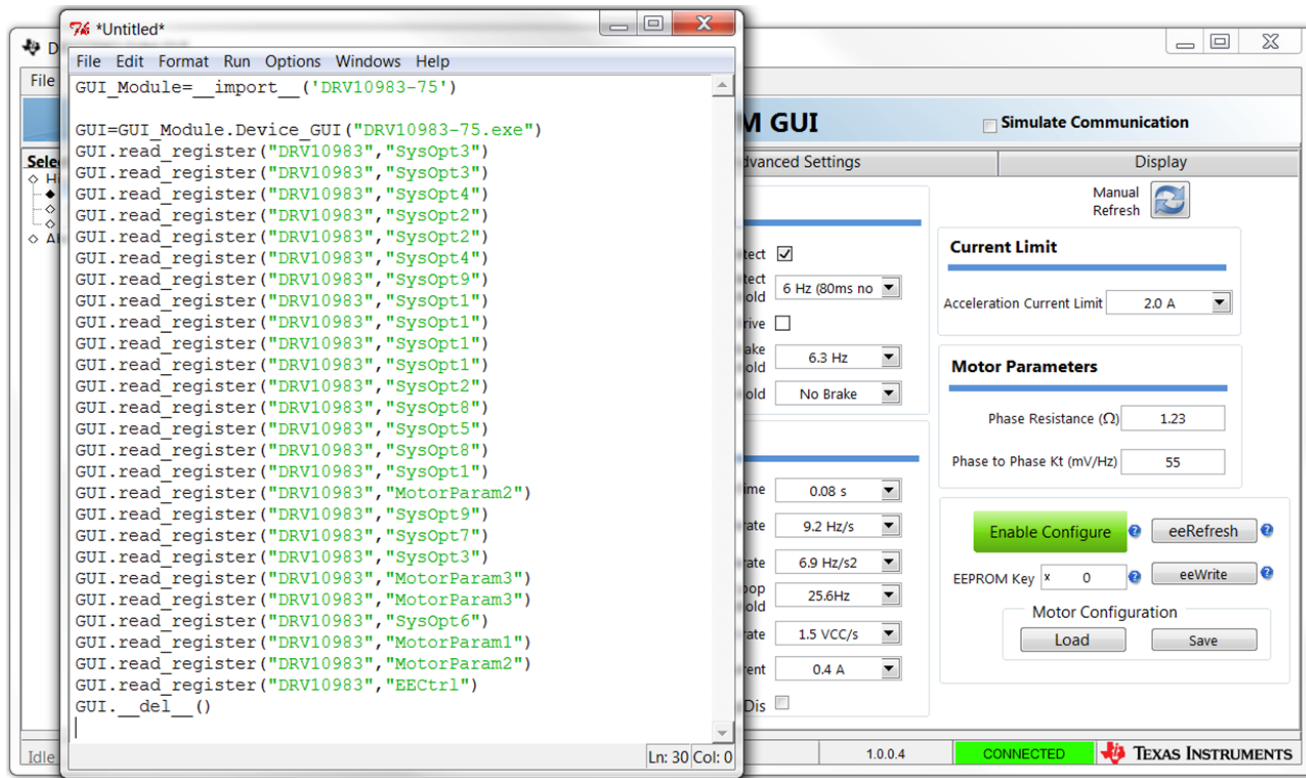


Figure 44. Stop Recording

- While saving, the window must be saved with extension .py under the script folder.

4. Run Script. To run the script, in the IDLE IDE menu bar, go to Run → Run Module as shown in Figure 45.

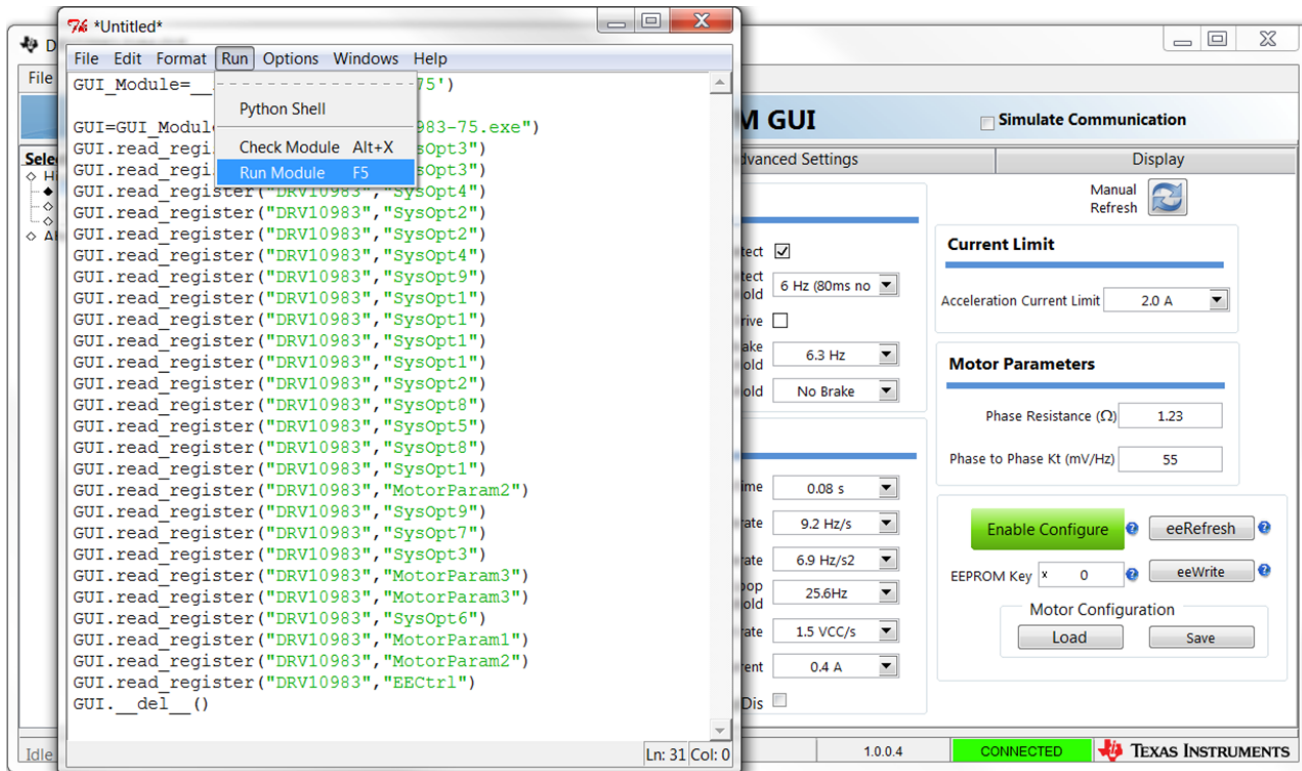


Figure 45. Run Macro

5. The script runs and displays the message “Script completed successfully” in the Python window.
6. To run an already saved script, go to File → Open in the IDLE IDE window, and choose the file from the browser.

A.4.2.2.2 Debug

The Debug option is used for the following operations:

- **Simulation** – By selecting the simulation submenu, the GUI runs in simulation mode. By unselecting it, the GUI runs in connected mode.
- **File Logging** – The log to file submenu logs the GUI activities to a specified log file.
- **Debugging** – The Debug log option logs all user activities. If not selected, only the high-level operations are logged.

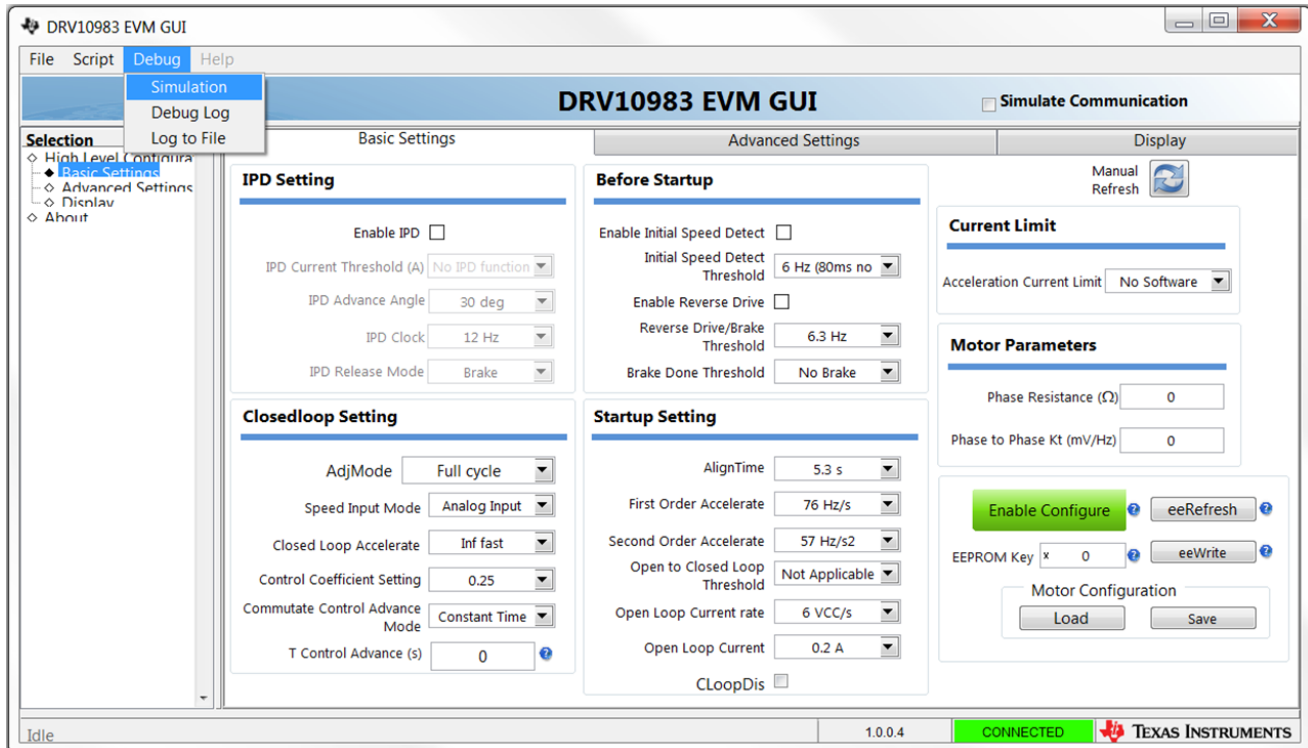


Figure 46. Debug Menu

GUI to DRV10983 and DRV10975 Register Cross Reference

The DRV10983 and DRV10975 register names and GUI names do not always match. [Table 2](#) provides a cross reference between the two. The Tab and Section location of the register values in the GUI is also provided.

Table 2. GUI to DRV10983 and DRV10975 Register Cross Reference

Registers			GUI		
Register Name	Addr	Register Map	Tab	Section	GUI Name
SpeedCtrl1	0x00	SpdCtrl[7:0]	Display	Speed control	Speed
SpeedCtrl2	0x01	OverRide	Display	Speed control	OverRide
		SpdCtrl[8]	Display	Speed control	Speed
DevCtrl	0x02	enProgKey[7:0]	Basic	Motor parameters	EEPROM KEY
EECtrl	0x03	sleepDis	Display	Speed control	Disable Sleep/Standby mode
		Slidata	Basic	Motor parameters	Enable Configure
		eeRefresh	Basic	Motor parameters	eeRefresh
		eeWrite	Basic	Motor parameters	eeWrite
Status	0x10	OverTemp	Display	Device status	OverTemp
		Slp_Stdby	Display	Device status	Sleep/Standby
		OverCurr	Display	Device status	Overcurrent
		MtrLck	Display	Device status	Lock
MotorSpeed1	0x11	MotorSpeed[15:8]	Display	Display	Motor speed (rpm)
MotorSpeed2	0x12	MotorSpeed[7:0]	Display	Display	Motor speed (rpm)
MotorPeriod1	0x13	MotorPeriod[15:8]	Display	Display	Electrical period (μs)
MotorPeriod2	0x14	MotorPeriod[7:0]	Display	Display	Electrical period (μs)
MotorKt1	0x15	MotorKt[15:8]	Display	Display	Motor velocity constant (mV/Hz)
MotorKt2	0x16	MotorKt[7:0]	Display	Display	Motor velocity constant (mV/Hz)
IPDPosition	0x19	IPDPosition[7:0]	Display	Display	IPD position (degree)
SupplyVoltage	0x1A	SupplyVoltage [7:0]	Display	Display	Supply voltage (V)
SpeedCmd	0x1B	SpeedCmd [7:0]	Display	Display	Speed command (%)
spdCmdBuffer	0x1C	spdCmdBuffer[7:0]	Display	Display	Speed cmd buffer (%)
FaultCode	0x1E	Lock5	Display	Display	Fault code 5
		Lock4	Display	Display	Fault code 4
		Fault3	Display	Display	Fault code 3
		Lock2	Display	Display	Fault code 2
		Lock1	Display	Display	Fault code 1
		Lock0	Display	Display	Fault code 0
MotorParam1	0x20	DoubleFreq	Advanced	PWM output options	Double the output PWM frequency
		Rm[6:0]	Basic	Motor parameters	Phase resistance (Ohms)
MotorParam2	0x21	AdjMode	Basic	Closedloop setting	AdjMode
		Kt[6:0]	Basic	Motor parameters	Phase to phase Kt (mV/Hz)
MotorParam3	0x22	CtrlAdvMd	Basic	Closedloop setting	Commutate control advance mode
		TCtrlAdv[6:0]	Basic	Closedloop setting	T control advance (s)
SysOpt1	0x23	ISDThr[1:0]	Basic	Before startup	Initial speed detect threshold
		IPDAdvAg[1:0]	Basic	IPD setting	IPD advance angle

Table 2. GUI to DRV10983 and DRV10975 Register Cross Reference (continued)

Registers			GUI		
Register Name	Addr	Register Map	Tab	Section	GUI Name
		ISDen	Basic	Before startup	Enable initial speed detect
		RvsDrEn	Basic	Before startup	Enable reverse drive
		RvsDrThr[1:0]	Basic	Before startup	Reverse drive/brake threshold
SysOpt2	0x24	OpenLCurr[1:0]	Basic	Startup setting	Open loop current
		OpLCurrRt[2:0]	Basic	Startup setting	Open loop current rate
		BrkDoneThr[2:0]	Basic	Before startup	Brake done threshold
SysOpt3	0x25	CtrlCoeff[1:0]	Basic	Closedloop setting	Control coefficient setting
		StAccel2[2:0]	Basic	Startup setting	Second order accelerate
		StAccel[2:0]	Basic	Startup setting	First order accelerate
SysOpt4	0x26	Op2ClsThr[4:0]	Basic	Startup setting	Open to closed loop threshold
		AlignTime[2:0]	Basic	Startup setting	Align time
SysOpt5	0x27	LockEn[3]	Advanced	Lock detect	No motor fault
		LockEn[2]	Advanced	Lock detect	BEMF abnormal
		LockEn[1]	Advanced	Lock detect	Speed abnormal
		LockEn[0]	Advanced	Lock detect	Current limit
		AVSIndEn	Advanced	AVS (Anti-voltage surge) function	Enable inductive AVS
		AVSMEn	Advanced	AVS (Anti-voltage surge) function	Enable mechanical AVS
		AVSMMd	Advanced	AVS (Anti-voltage surge) function	Mechanical AVS mode
SysOpt6	0x28	IPDRIsMd	Basic	IPD setting	IPD release mode
		SWiLimitThr[3:0]	Basic	Current limit	Acceleration Current Limit
SysOpt7	0x29	HWiLimitThr[2:0]	Advanced	Current limit	Lock Detection Current Threshold
		LockEn5	Advanced	Lock detect	Closed loop stuck
		ClslpAccel[2:0]	Basic	Closedloop setting	Closed loop accelerate
SysOpt8	0x2A	Deadtime[3:0]	Advanced	PWM output options	Dead time between HS and LS gate drive
		IPDCurrThr[3:0]	Basic	IPD setting	IPD current threshold
		LockEn4	Advanced	Lock detect	Open loop stuck
SysOpt9	0x2B	VregSel	Advanced	Device options	Buck regulator voltage select
		IPDClk[1:0]	Basic	IPD setting	IPD clock
		FGOLSet[1:0]	Advance	FG options	FG open loop output select
		FGcycle[1:0]	Advance	FG options	FG cycle select
		KtLckThr[1:0]	Advance	Lock detect	Abnormal Kt lock detect threshold
		SpdCtrlMd	Basic	Closedloop setting	Speed input mode
		CLoopDis	Basic	Startup setting	CLoopDis

Revision A History

Changes from Original (July 2014) to A Revision	Page
• Changed TelcoMotion DT4260-24-055--4H-TI to Runtian ZWL12_22_2.5A in the <i>DRV10983 EVM Kit Contents</i> list	3
• Changed #8 in the <i>Out-of-the-Box Quick Start Guide</i> section.	15
• Added EVM motor images.	15
• Changed TelcoMotion DT4260-24-055--4H-TI to Runtian ZWL12_22_2.5A in the <i>DRV10983 Bill of Materials</i> list.....	18
• Changed <i>Setup.exe</i> from <i>Volume Folder</i> image in the <i>Installation Procedure</i> section.	19
• Changed <i>GUI Start Installation</i> image in the <i>Installation Procedure</i> section.	21
• Changed GUI content in <i>SysOpt6</i> row of the <i>GUI to DRV10983 Register Cross Reference</i> table.	42

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Revision B History

Changes from A Revision (October 2014) to B Revision	Page
• Added DRV10975 throughout the guide, Changed all mentions of DRV10983 EVM to DRV109xx family	1
• Added <i>Initial GUI Screen</i> image	11
• Added <i>GUI in Simulation Mode</i> image	12
• Added <i>Disable Sleep Mode</i> image	14
• Added <i>Power-on Sequence and Connection With User Specific Motor</i> section	16
• Changed U1 PartNumber.....	18

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Revision C History

Changes from B Revision (January 2015) to C Revision	Page
• Changed all DRV109xx uses to DRV10983 and DRV10975.....	1
• Changed power supply rail voltage from "8 to 26 V" to "8 to 28 V"	4
• Changed first image under Section 4.2.3	7
• Deleted first five steps from previous revision, Added first five steps from Section 6 in previous revision	10
• Changed voltage limit for DRV10983 EVMs from 26 V to 28 V	10
• Changed Step 9	14
• Deleted Steps 6 and 7 and Figure 13 from previous revision	16
• Deleted "Trimmed" register map from "Status" row	41

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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