

DRV8800-01 Evaluation Module

User's Guide



Literature Number: SLVU335A
February 2010–Revised July 2019

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This document is provided as a supplement to the [DRV8800/01](#) datasheet, and DRV8800/01 Design In Guide. It details the hardware implementation of the CPG002 (DRV8800-01EVM) Customer Evaluation Module (EVM).

1 1. Introduction to EVM

The CPG002 Customer EVM is a board containing all of the necessary components to evaluate the many features found on the DRV8800 and DRV8801 devices. The EVM makes the evaluation process easier by housing a microcontroller and an USB to Serial interface chip that allows for the user to control the different [DRV8800](#) and [DRV8801](#) signals by means of a graphical user interface (GUI).

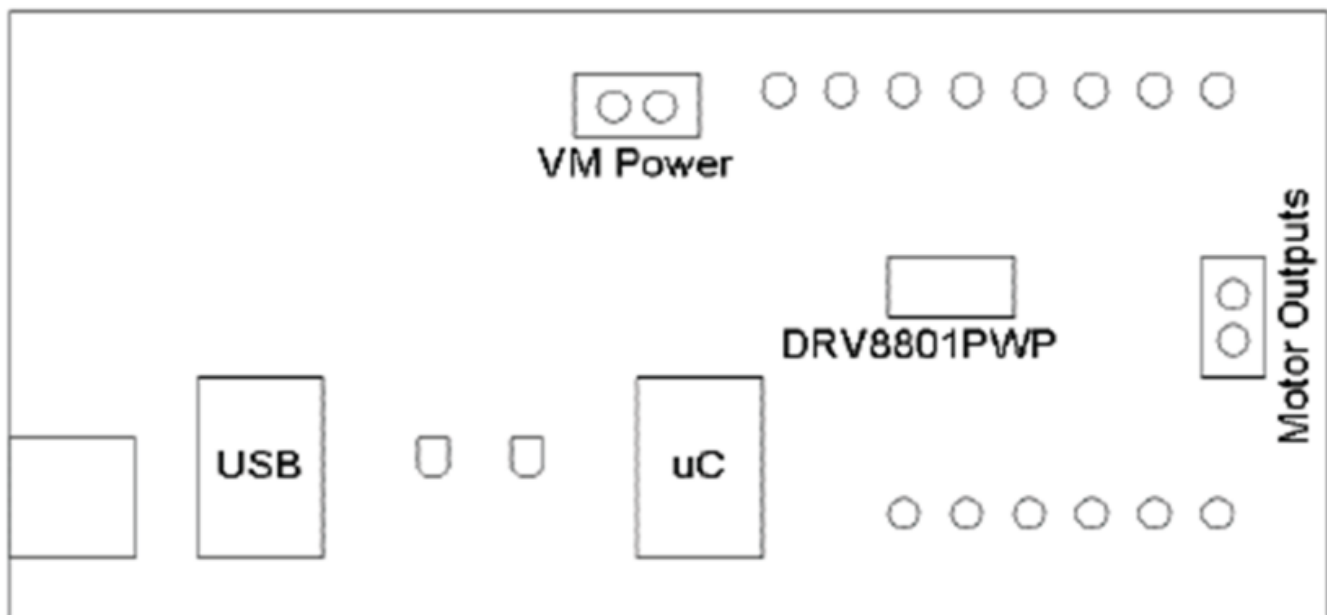


Figure 1. Block Diagram

1.1 Power Connectors

The CPG002 Customer EVM offers terminal blocks for the application of VM power and for motor power outputs. VM power rail must be externally supplied. VDD for logic is internally supplied as it is derived from the USB connection.

The user must apply VM according to datasheet recommended parameters. An USB Connection to a computer is needed for proper control of the device.

1.2 LEDs

Three LEDs offer status information about power rails and microcontroller operating status.

1.3 Jumpers

This EVM has no jumpers that need to be configured by the user.

1.4 Motor Outputs

There are two ways for connecting the motor load into the CPG002 Evaluation Module: A terminal block and a two pin header. Each connection style offers identical connectivity to the H-Bridge output terminals.

1.5 System Requirements

- Supported OS – Windows 7 (32 Bit, 64 Bit). The window text size should be Smaller-100% (Default)
- Recommended RAM memory - 4 GB or higher
- Recommended CPU Operating Speed – 3.3 GHz or higher

2 GUI Software Installation

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

2.1 GUI Software Installation

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

NOTE: Ensure that no USB connections are made to the EVM until the installation is completed. The installer will also install LabVIEW RTE 2014 and FTDI Driver, along with the GUI.

2.1.1 Installation Procedure

The following procedure helps you install the DRV8800-01EVM GUI

1. Double click on the **Setup_DRV8800-01EVM.exe** as shown in [Figure 2](#).

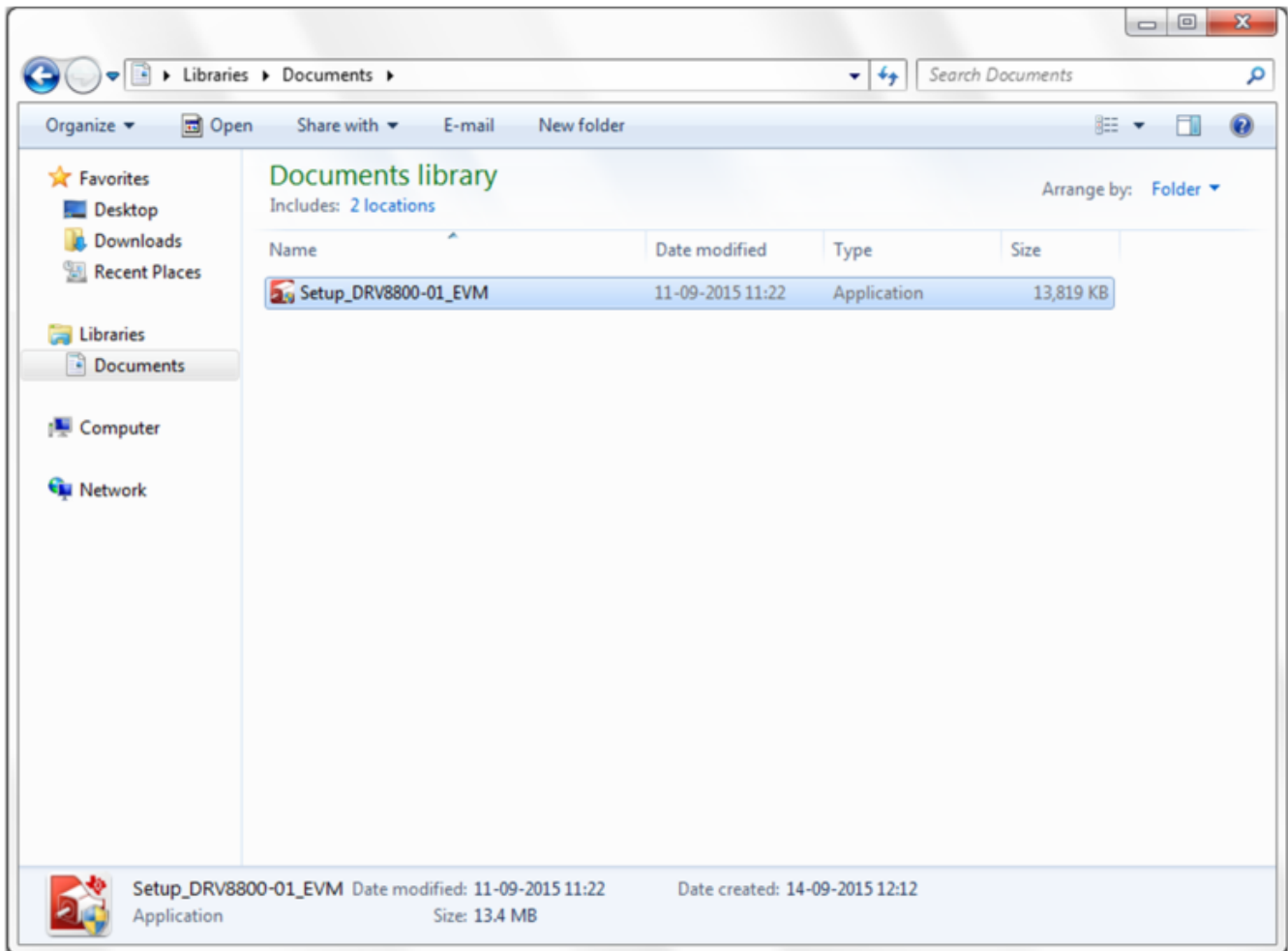


Figure 2. Setup_DRV8800-01EVM.exe

2. The screen shown below in [Figure 3](#) appears, indicating installer initialization. Click the **Next** button.

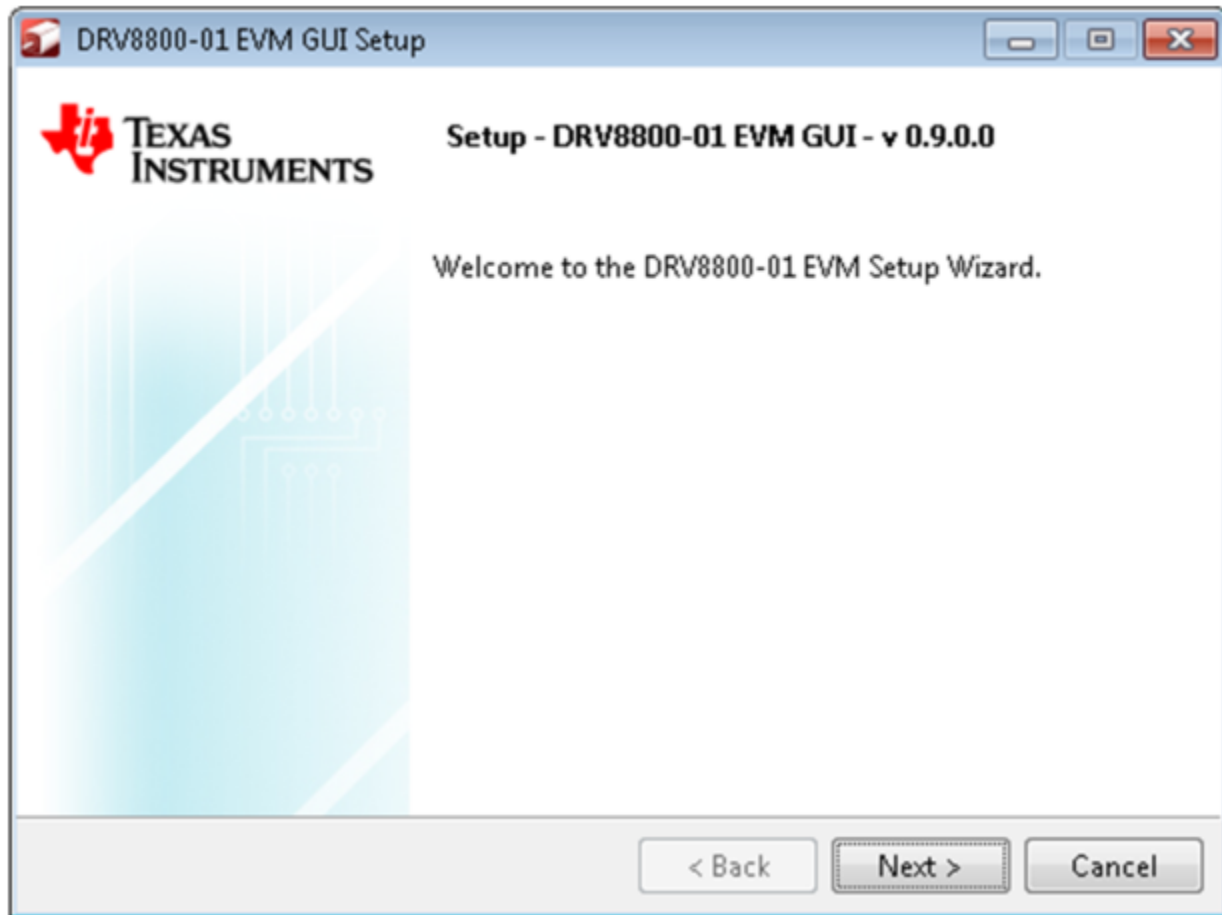


Figure 3. Installation Initialization

3. In the newly open installation pop-up window, click **Next**. The license agreement will be displayed. Please, read through it carefully and enable the "I Accept the Agreement" radio button and press **Next**.

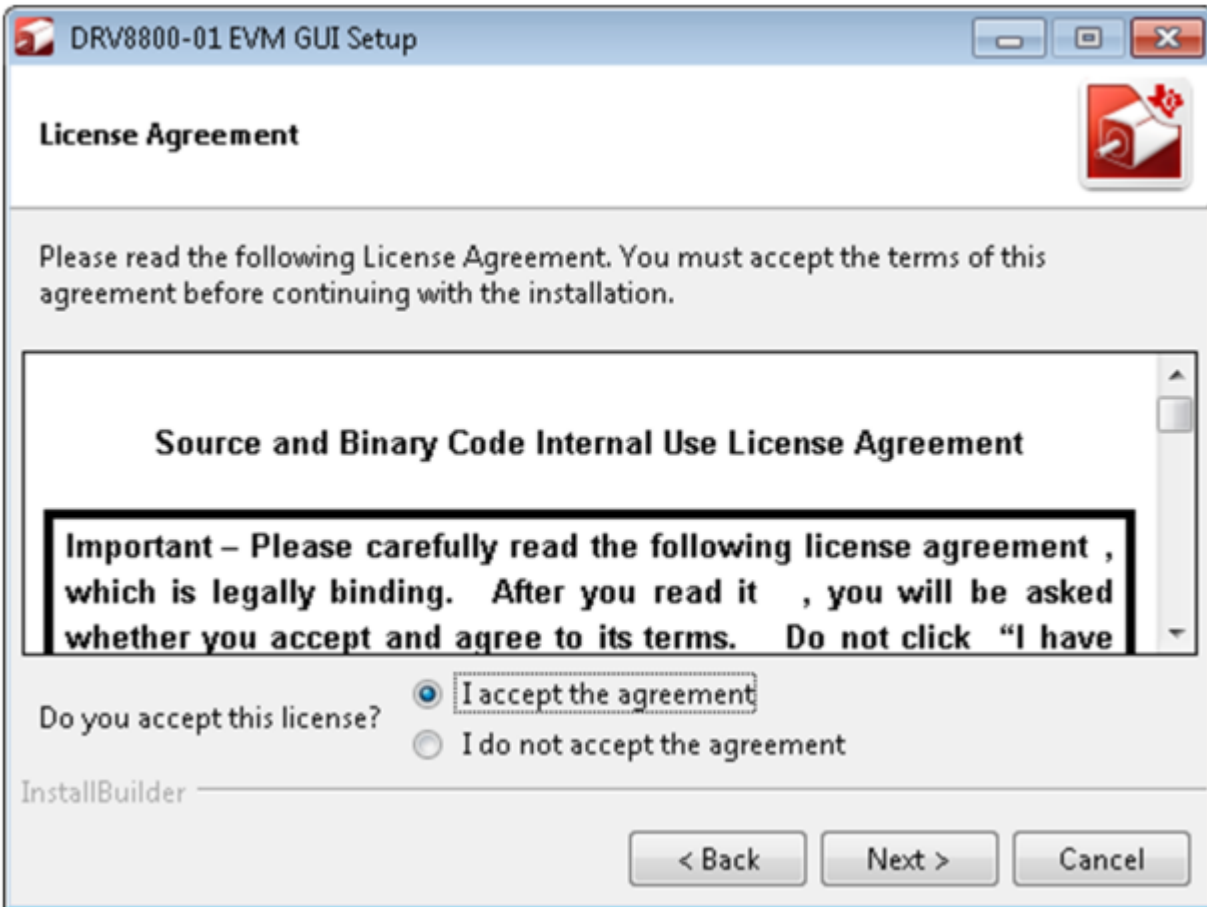


Figure 4. License Agreement

4. A screen as shown below in [Figure 5](#) appears, displaying the license agreement of National Instruments. Please read through the agreement carefully and enable the “I Accept the License Agreement” radio button and press the **Next** button.

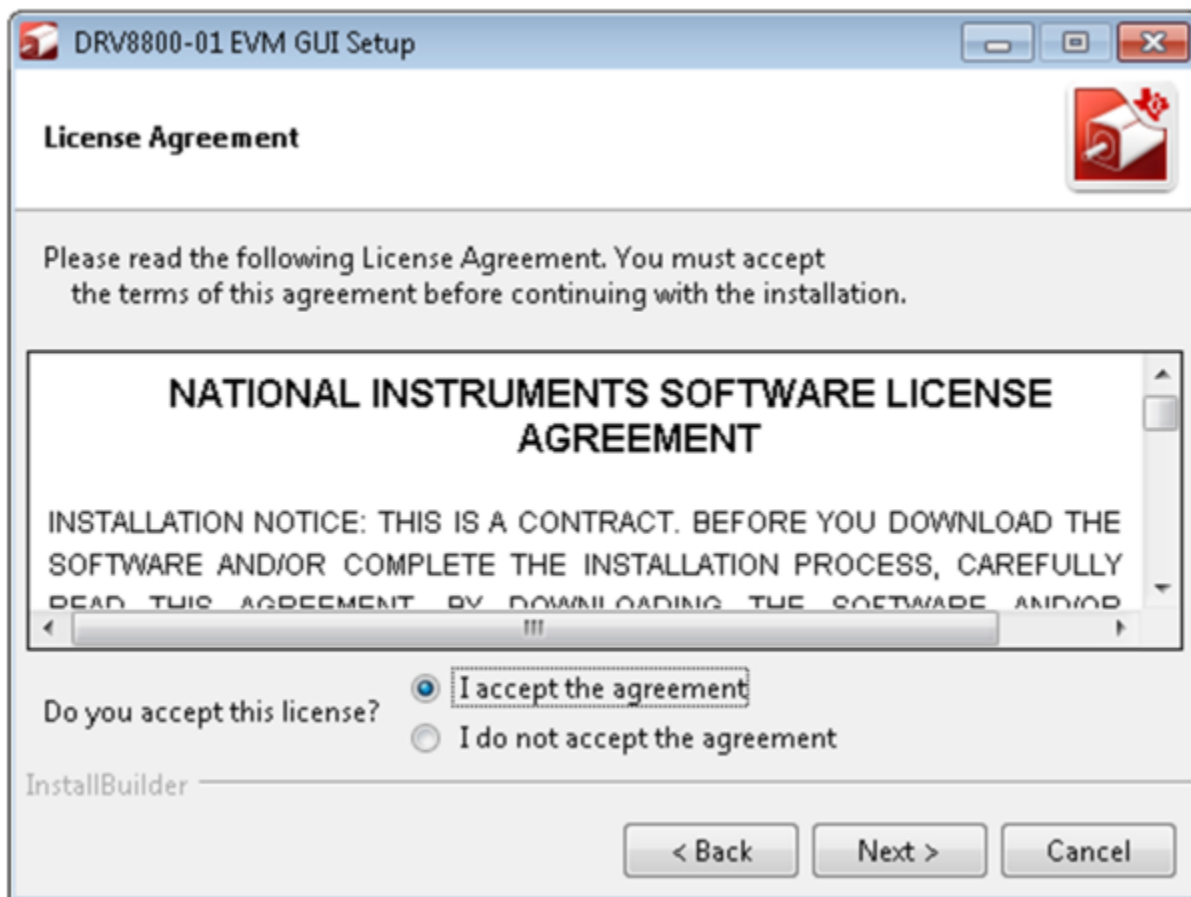


Figure 5. NI License Agreement

5. Set the default directory for the GUI Installation and click **Next**.

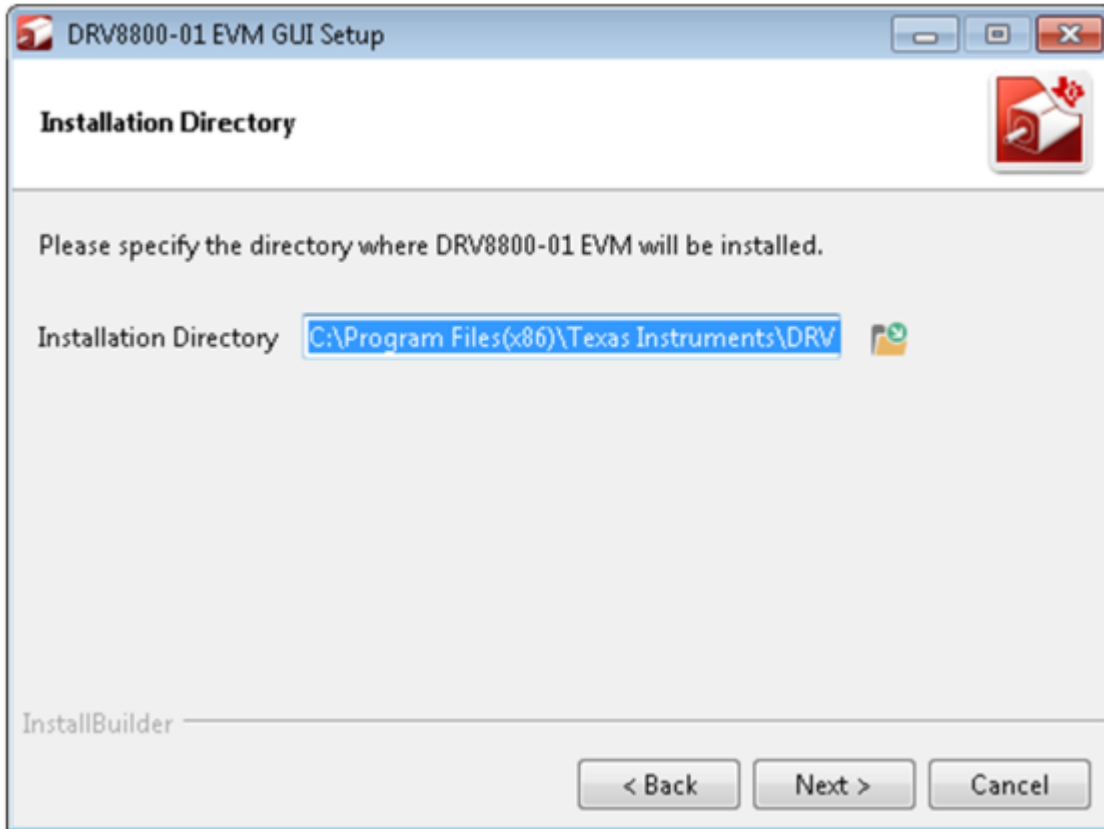


Figure 6. Installation Directory Screen

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

6. A screen as shown in [Figure 7](#) appears. This screen is to select the components to install. Select the Components to Install and Click **Next** to continue installation. The LabVIEW RTE component checks out if the LabVIEW RTE 2014 is already installed on the PC.

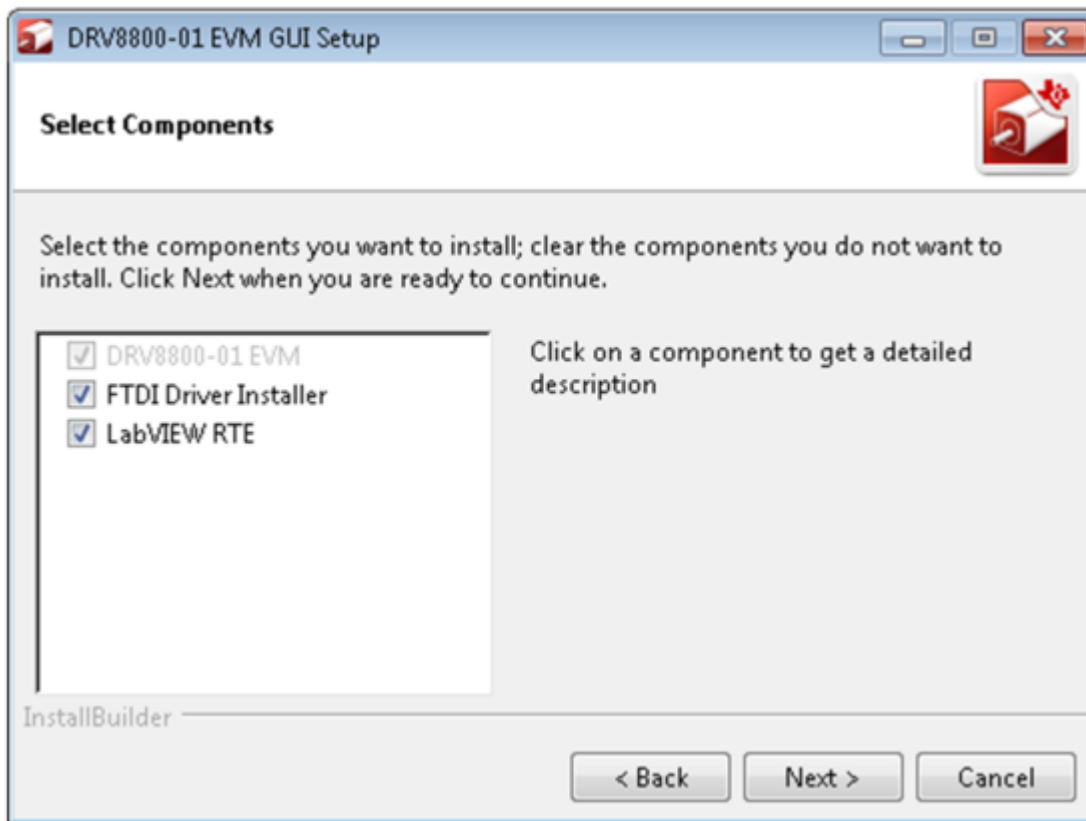


Figure 7. Component Selection

7. If LabVIEW RTE is selected as a component to install, a screen appears as shown in [Figure 8](#). Configure the proxy settings as required. This screen is to download the LabVIEW RTE 2014 from ni.com, Click **Next** to continue the installation.

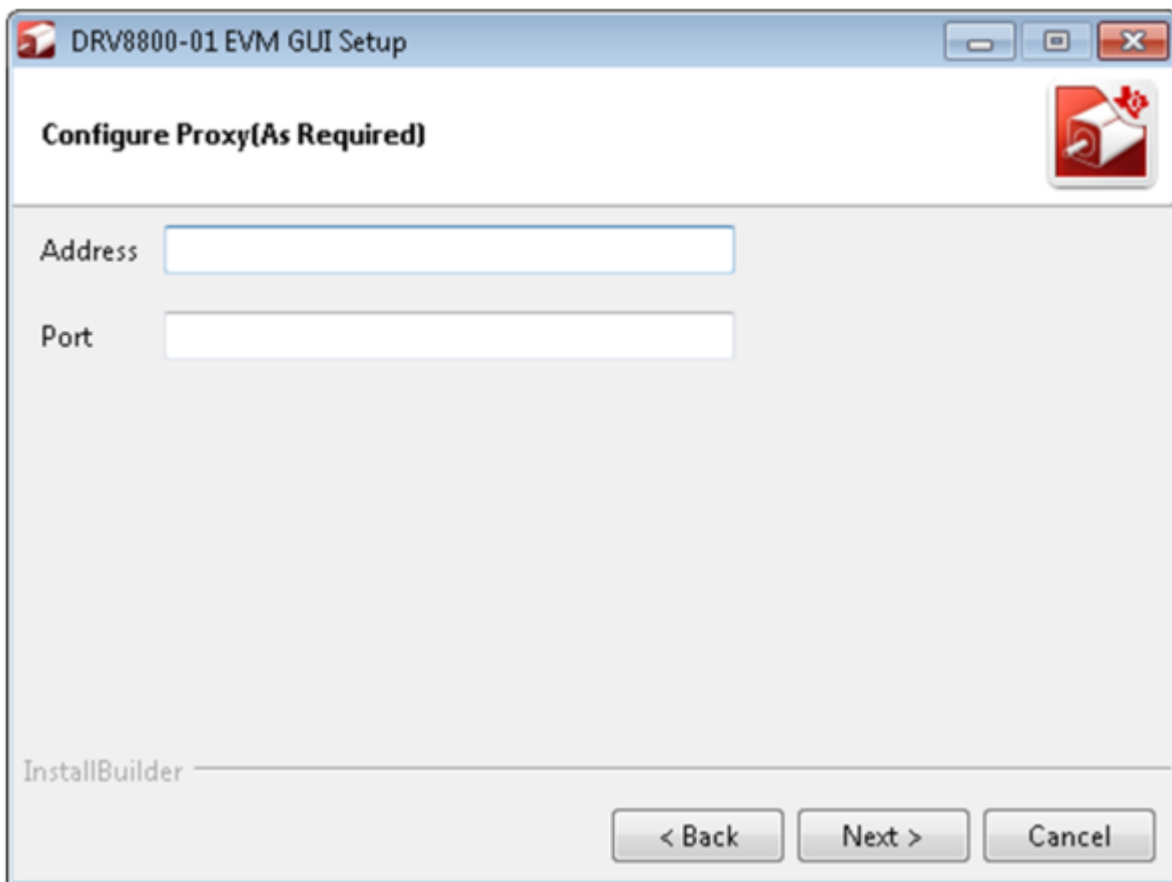


Figure 8. Configure Proxy

8. A screen as shown in [Figure 9](#) appears. Click **Next** to begin the installation.

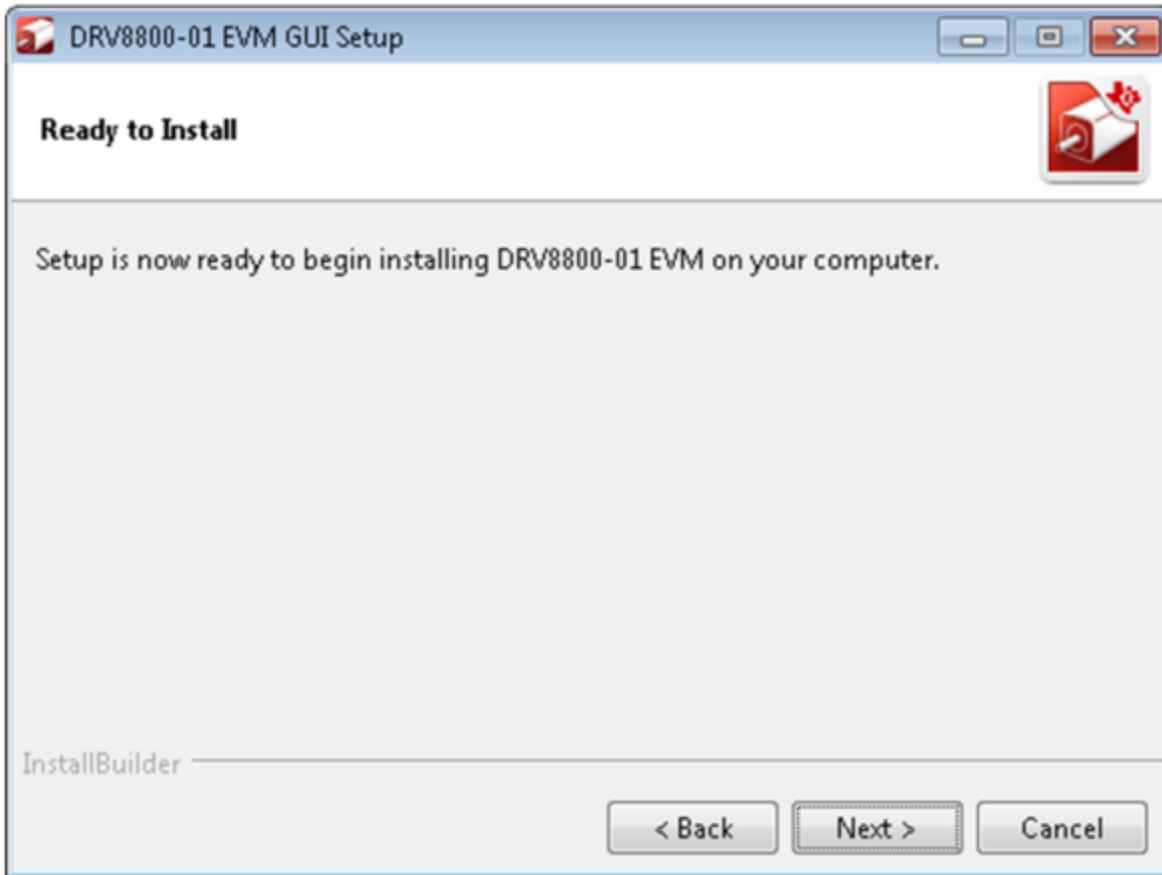


Figure 9. Ready to Install

9. If the LabVIEW RTE 2014 is selected as a component to install, LabVIEW RTE downloads and performs a silent mode installation.

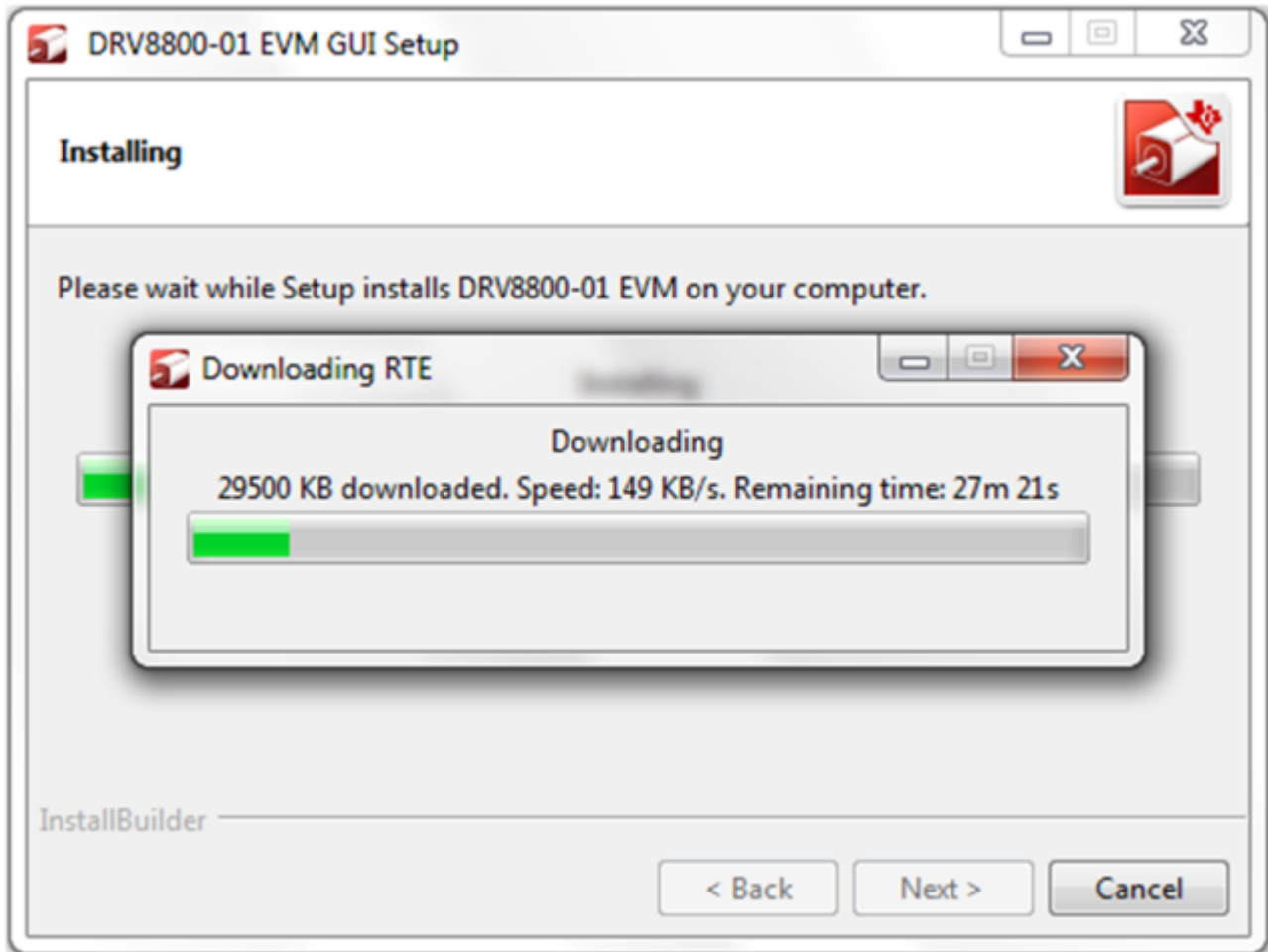


Figure 10. Downloading RTE

10. Once the Download completes, LabVIEW begins with the self-extraction as shown in [Figure 11](#).

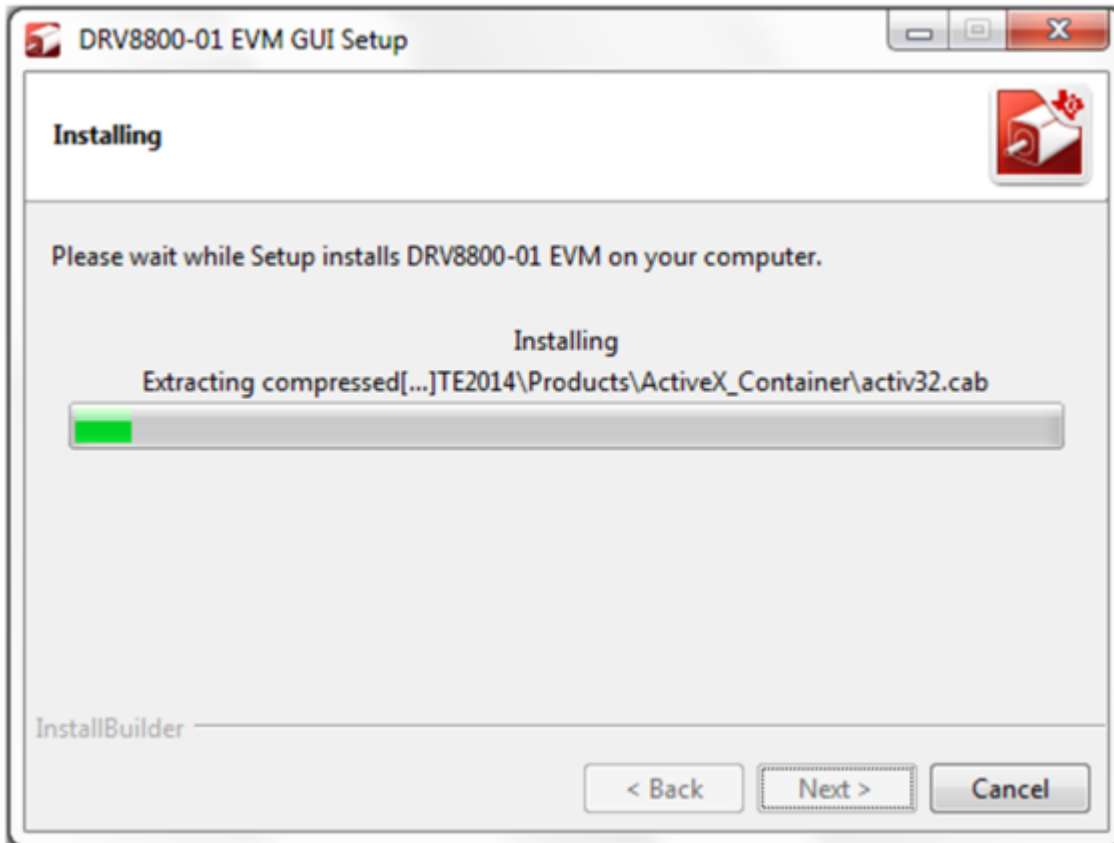


Figure 11. LabVIEW RTE Self Extraction

11. A screen appears as shown in [Figure 12](#). It initializes the LabVIEW RTE Installation.

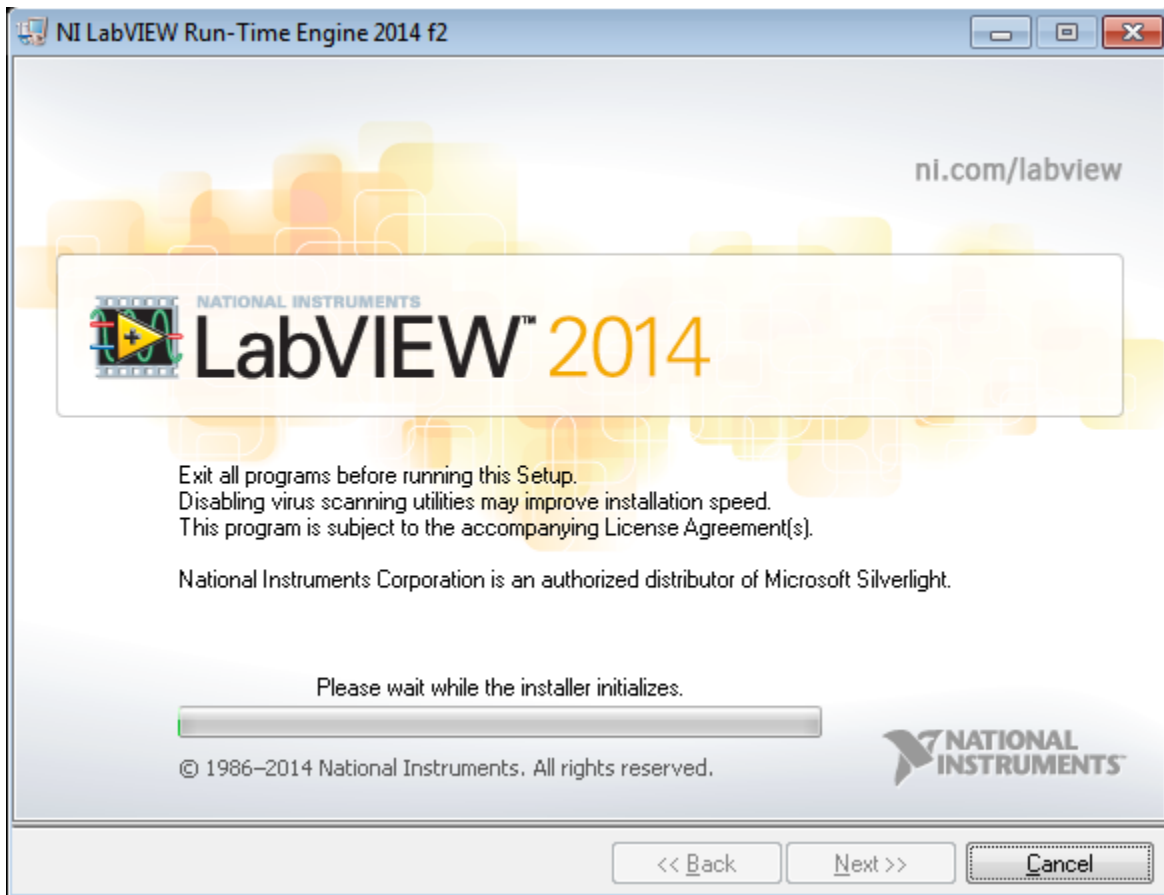


Figure 12. LabVIEW RTE Installation Initialization

12. A display as shown below appears which indicates the progress of LabVIEW RTE installation.

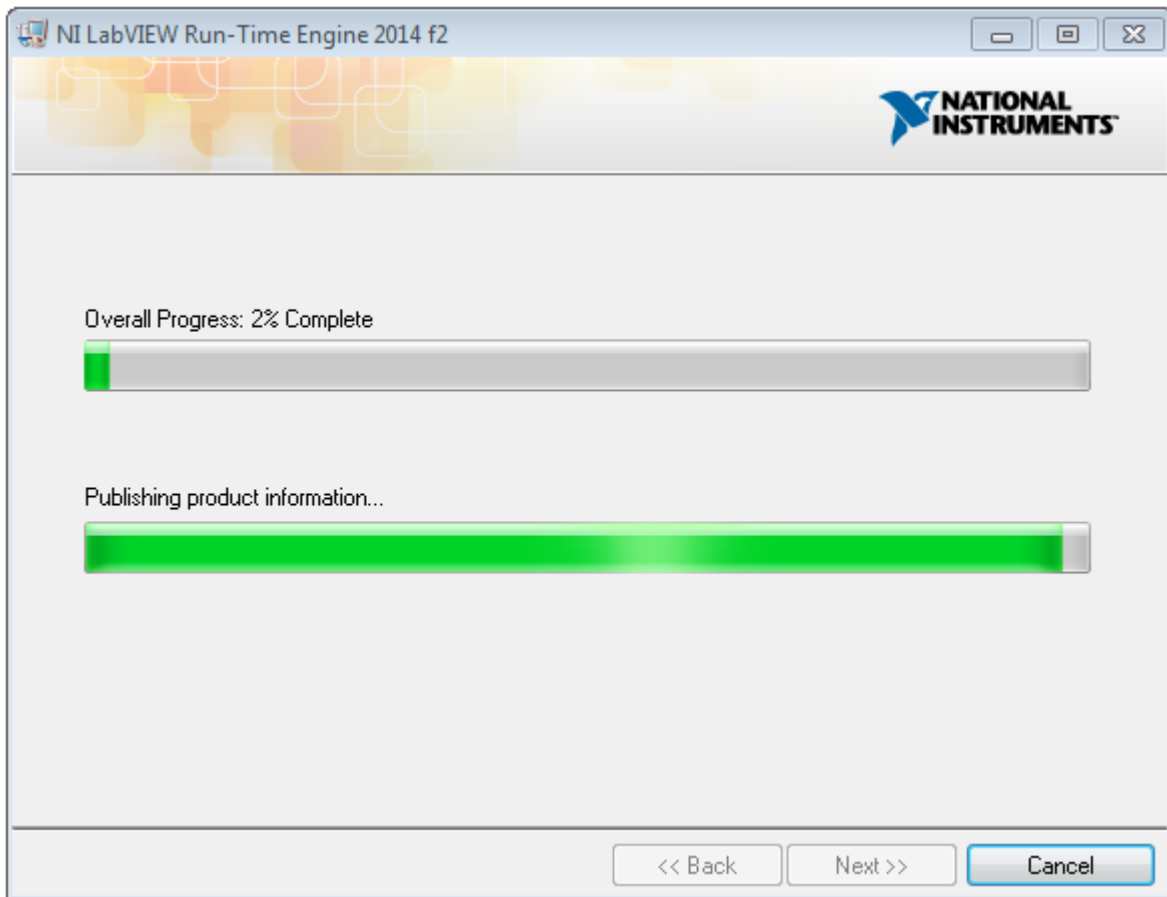


Figure 13. Installation of LabVIEW RTE in Progress

13. Once the LabVIEW RTE 2014 is installed, DRV 8313 EVM GUI component installs.
14. After DRV8800-01EVM Installation, FTDI Installation begins. A screen as shown in [Figure 14](#) appears, click **Extract** to proceed.

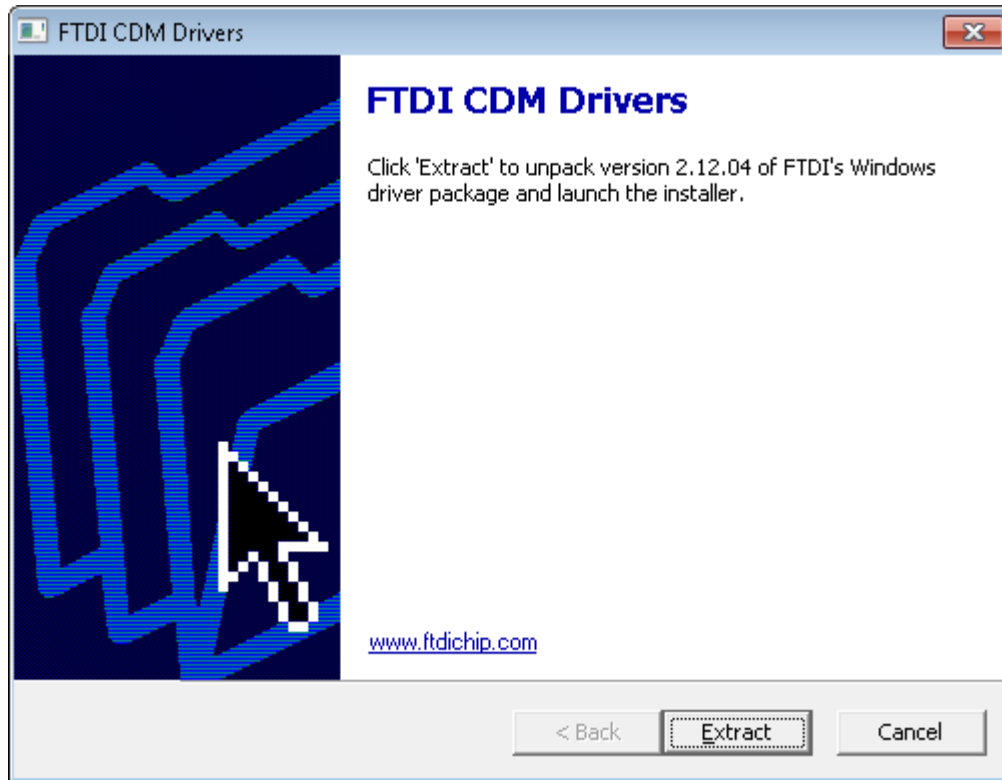


Figure 14. FTDI Installation Initialization

15. A screen as shown in [Figure 15](#) appears, click **Next** to proceed.

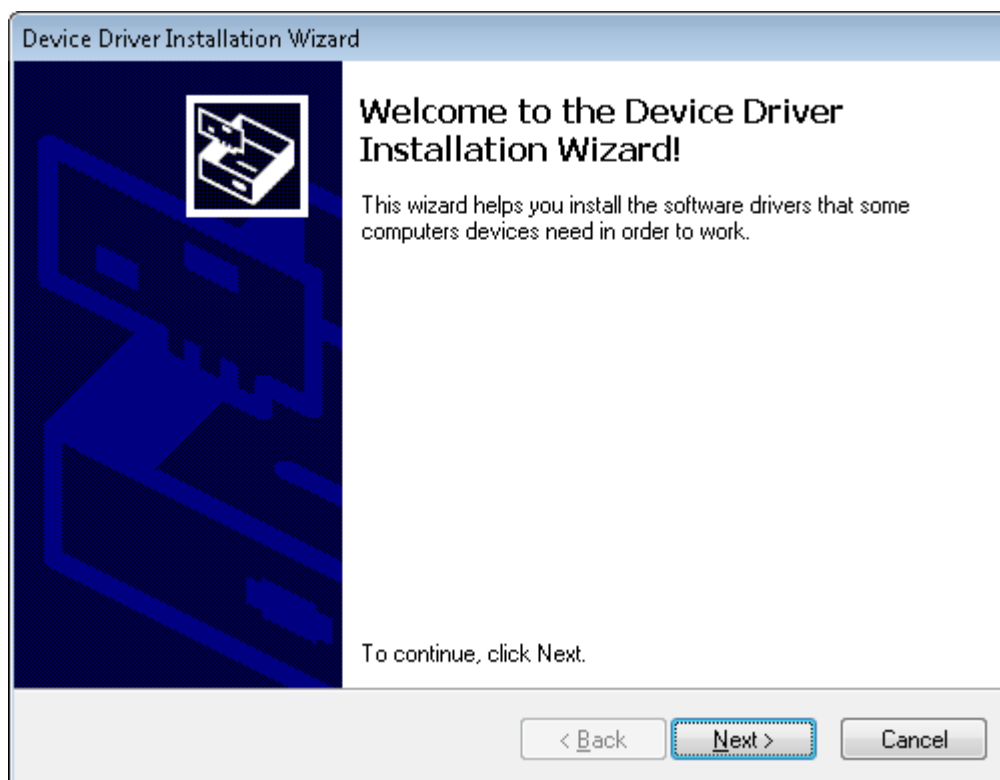


Figure 15. Driver Installation Wizard

16. The License Agreement appears on screen as shown below.
17. Read through the License Agreement carefully and enable the "I Accept this Agreement" radio button and Click on **Next**.

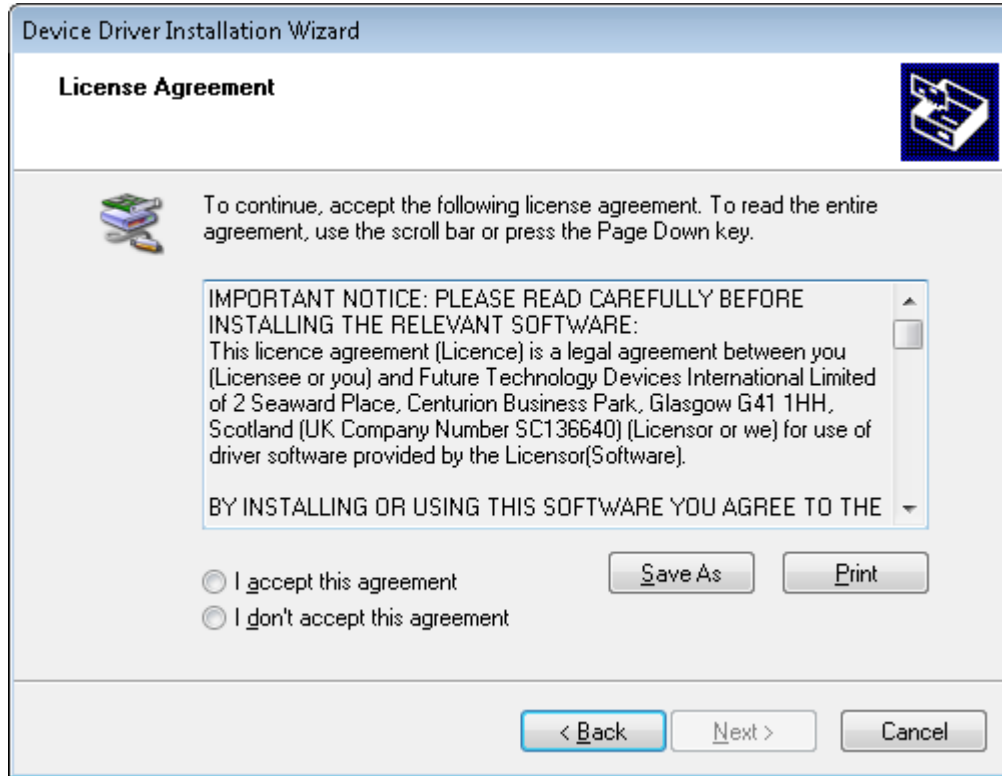


Figure 16. License Agreement for FTDI Driver

18. Click **Finish** to complete the Driver Installation.

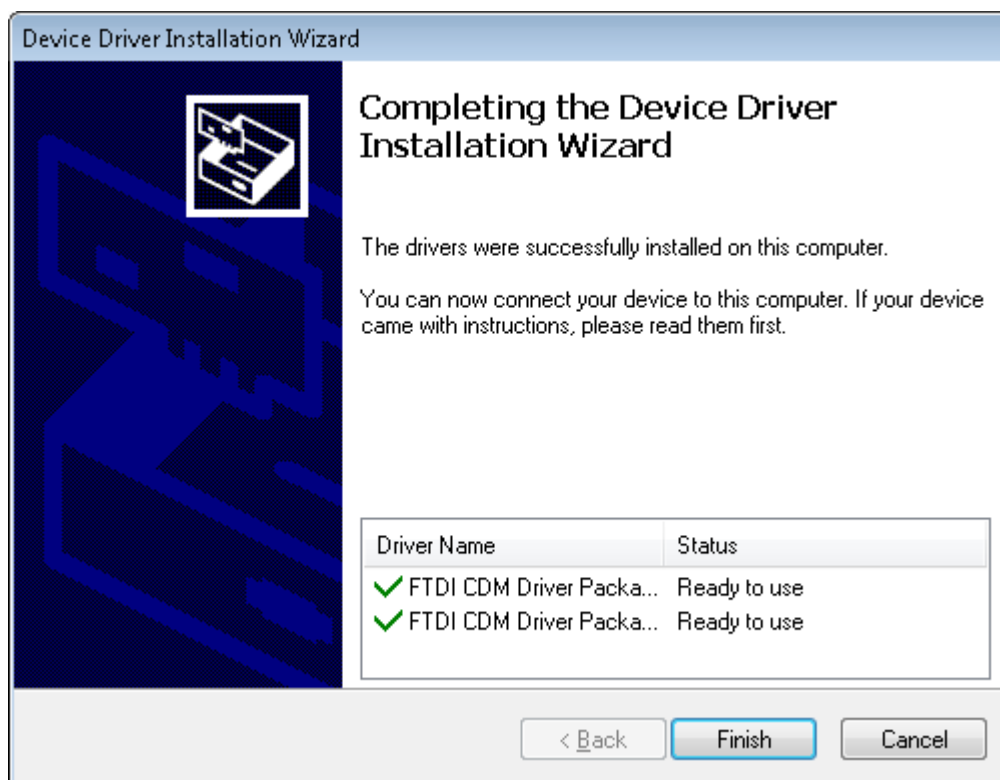


Figure 17. Driver Installation Completion

19. The [Figure 18](#) screen appears denoting the completion of DRV8800-01EVM GUI Installation. Click **Finish**.

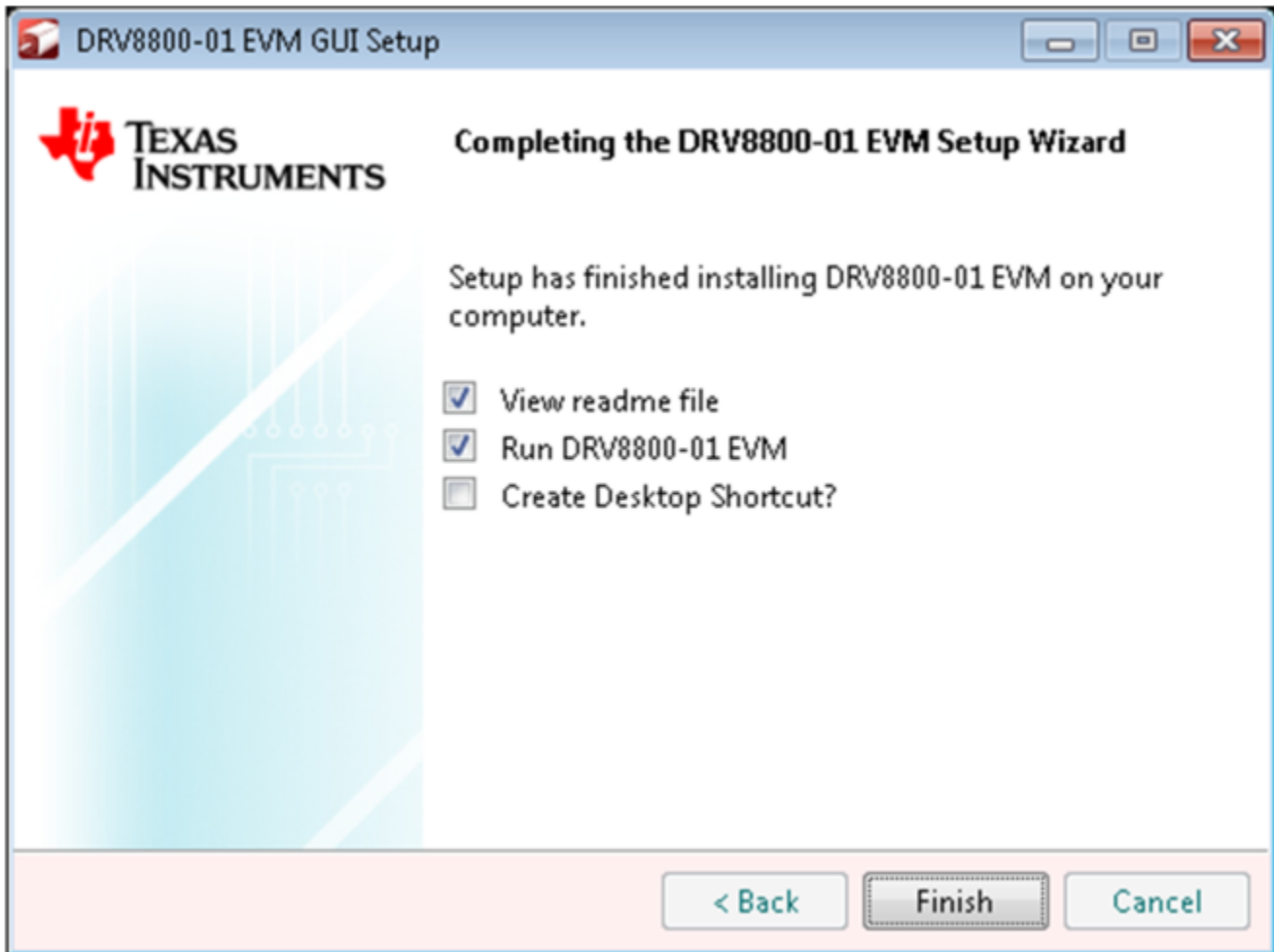


Figure 18. Installation Complete

20. A Readme window as shown below appears displaying the link for LV 2014 RTE.

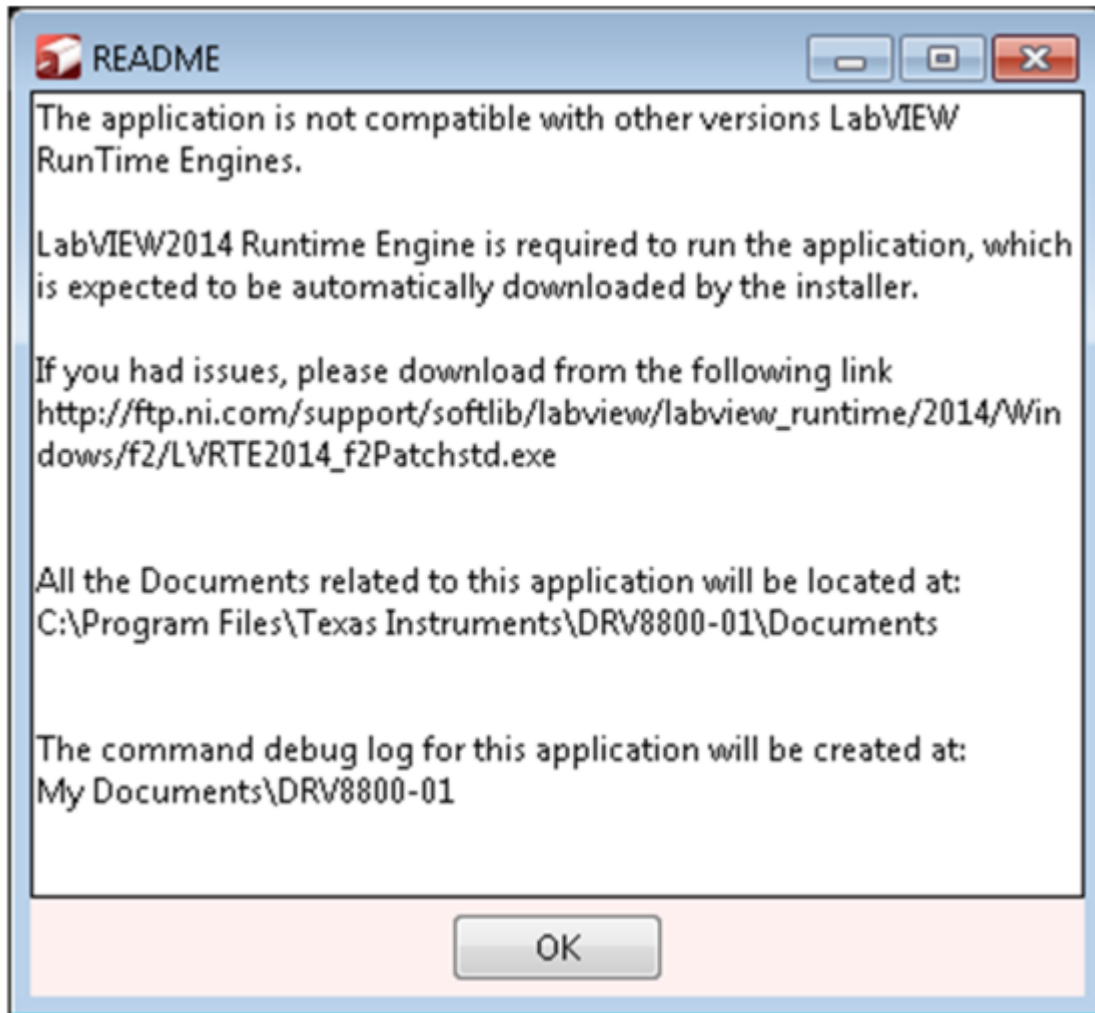


Figure 19. Readme Window

WARNING

The DRV8800-01EVM GUI requires the LabVIEW Run-Time Engine 2014 to be installed before the GUI executes. Please note the application is not compatible with other versions of LabVIEW Runtime Engine.

You can download National Instruments LabVIEW Run-Time Engine 2014 from the below link:
[LabVIEW Run-Time Engine 2014](http://ftp.ni.com/support/softlib/labview/labview_runtime/2014/Windows/f2/LVRTE2014_f2Patchstd.exe)

NOTE: DRV8800-01EVM GGUI executable has been built in LabVIEW 2014 (32-bit) version, and it expects the LabVIEW Run-Time Engine version to be LabVIEW Run-Time Engine (32-bit version).

3 DRV8800-01 EVM GUI Overview

The DRV8800-01EVM Windows application is the software counterpart for the CPG002 EVM. It is in charge of connecting to the EVM via an USB connection which in turn selects the proper logic state for the DRV8800-01EVM control signals.

The Graphical User Interface (GUI) has been designed to allow for all of the DRV8800-01EVM device’s functionality to be tested without having to intervene with the hardware. Figure 20 shows the DRV8800-01 EVM High-Level Page. It contains menu items to configure and enable/disable the serial port and frames with GPIO control for the DRV8800-01EVM Control Signals as well as the ability to PWM the ENABLE and the PHASE inputs.



Figure 20. GUI Overview

3.1 Pages in the GUI

The GUI has one Page (High-Level Page). It contains frames with GPIO control for the DRV8800-01 control signals, motor control Frame, and PWM Frame.

3.1.1 High-Level Page

3.1.1.1 DRV8800-01 GPIO Control Signals

Once the application is communicating with the interface board, the control signals can be actuated by checking or unchecking check boxes on the Signals frame. Green in the Pin control translates to the High level on the respective control signal and Red in the Pin control translates to the Low level on the respective control signal.

Pin Information/Control

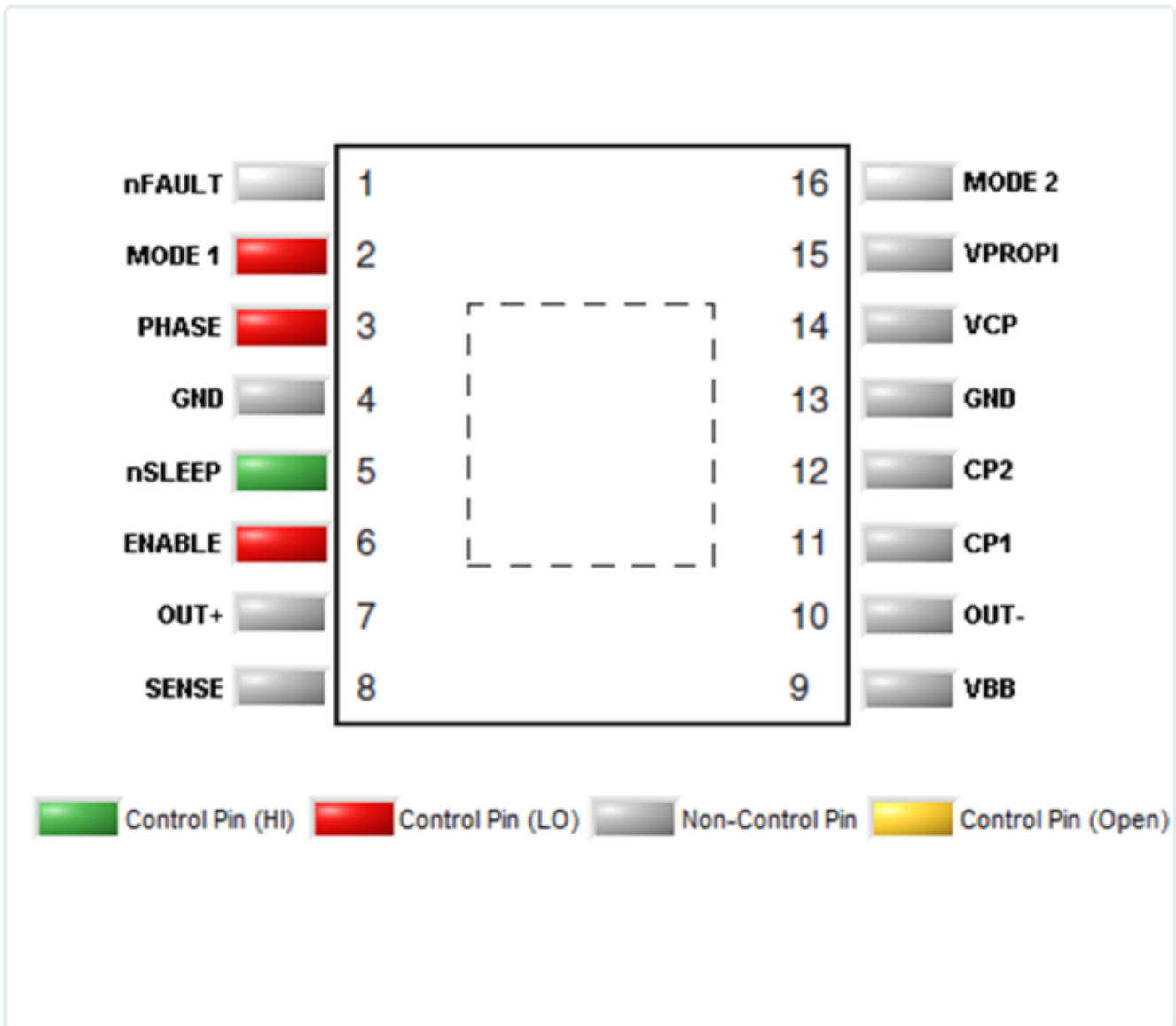


Figure 21. Pin Information/Control Widget

Clicking on the ENABLE and PHASE Boolean set the PWM duty cycle to 0x00 (when Low) or 0xFF (when High). Moving the slider bar configures the PWM duty cycle to a value in between.

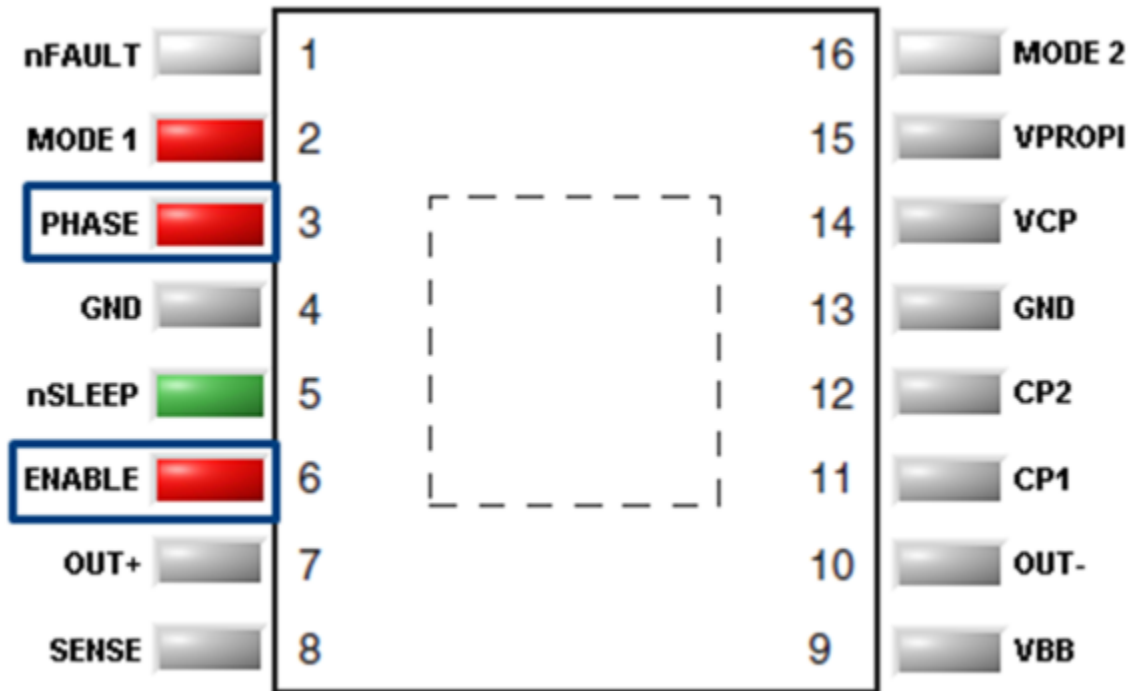


Figure 22. PHASE and ENABLE Pin Widgets

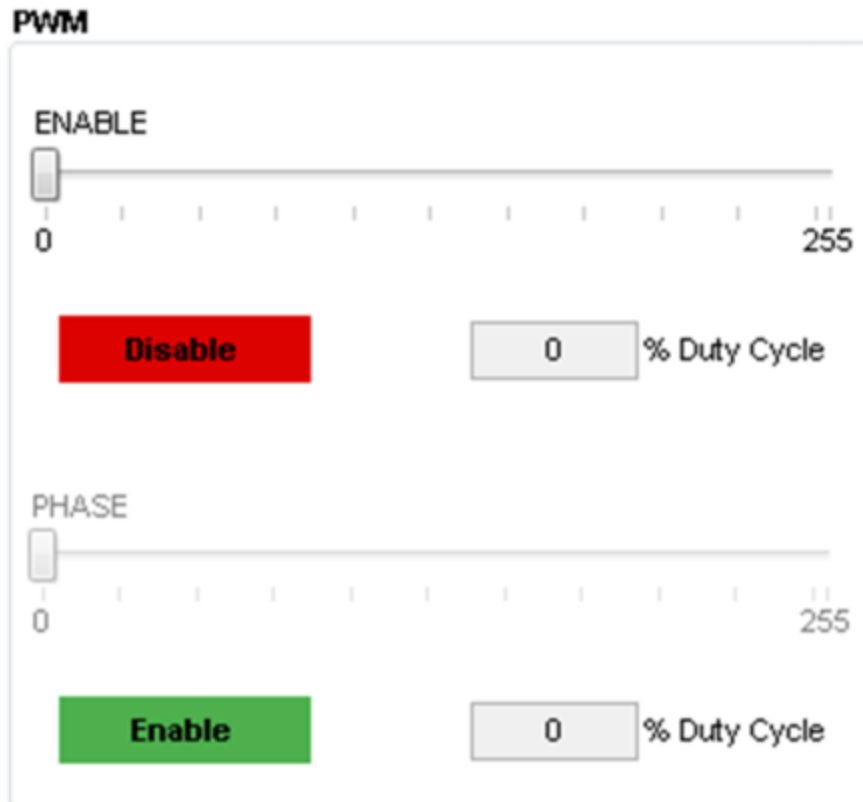


Figure 23. PHASE and ENABLE Sliders

3.2 Menu Options

3.2.1 File

The File menu contains the options as shown in [Figure 24](#). Each of the options is explained below. This is to Exit the application

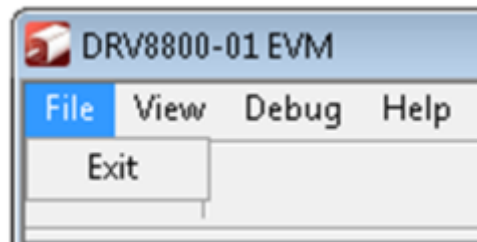


Figure 24. File Menu

3.2.2 View

Under view, there is an option “Schematic” which takes the user to a menu of different device Schematics that are available for viewing.

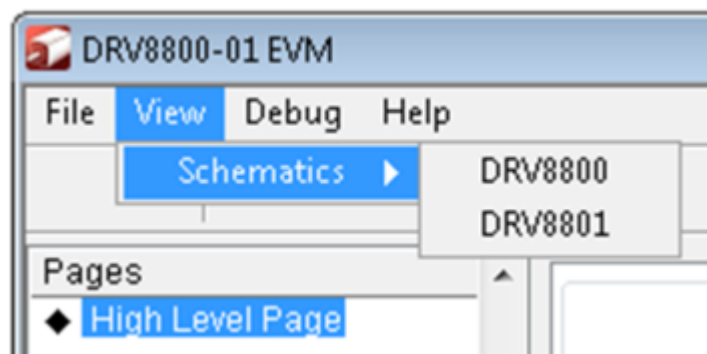


Figure 25. View Menu

3.2.3 Debug

The Debug option can be used for the following operations

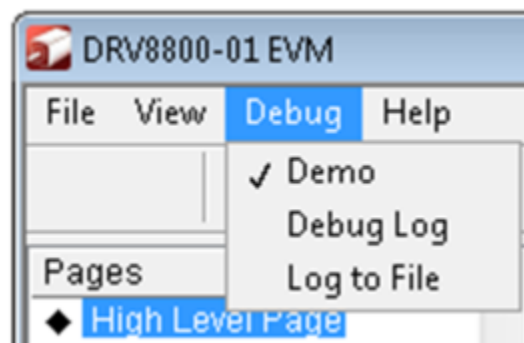


Figure 26. Debug Menu

3.2.3.1 Demo

By selecting the Demo in the submenu, the GUI will run in simulation mode, and by unselecting it, the GUI will run in connected mode.

3.2.3.2 Debug Log

The Debug log option will enable to log all the activities of the user. If that is not selected, only the high-level operations will be logged.

3.2.3.3 Log to File

The log to file submenu is used to log the GUI activities to a log file that is specified.

3.2.4 Help

Clicking the About in the Help Menu.

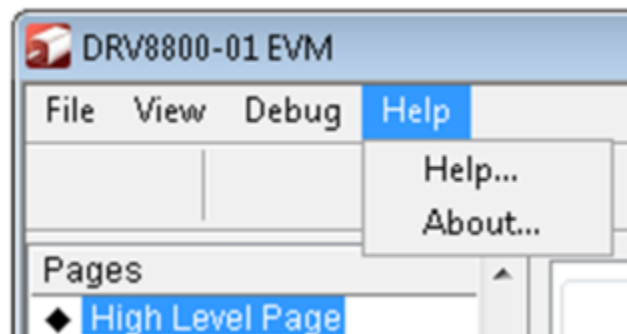


Figure 27. Help Menu

3.2.4.1 About

The About Page provides the details like the Name of the GUI, GUI version, Supported OS and Copyright Information.



Figure 28. About Page

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
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 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。
http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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3. 技術基準適合証明を取得後ご使用いただく。

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3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page 電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。
http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page

3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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- 4 *EVM Use Restrictions and Warnings:*
 - 4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.
 - 4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
 - 4.3 *Safety-Related Warnings and Restrictions:*
 - 4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.
 - 4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.
 - 4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.
 5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.
 6. *Disclaimers:*
 - 6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.
 - 6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.
 7. *USER'S INDEMNITY OBLIGATIONS AND REPRESENTATIONS.* USER WILL DEFEND, INDEMNIFY AND HOLD TI, ITS LICENSORS AND THEIR REPRESENTATIVES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, EXPENSES, COSTS AND LIABILITIES (COLLECTIVELY, "CLAIMS") ARISING OUT OF OR IN CONNECTION WITH ANY HANDLING OR USE OF THE EVM THAT IS NOT IN ACCORDANCE WITH THESE TERMS. THIS OBLIGATION SHALL APPLY WHETHER CLAIMS ARISE UNDER STATUTE, REGULATION, OR THE LAW OF TORT, CONTRACT OR ANY OTHER LEGAL THEORY, AND EVEN IF THE EVM FAILS TO PERFORM AS DESCRIBED OR EXPECTED.

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9. *Return Policy.* Except as otherwise provided, TI does not offer any refunds, returns, or exchanges. Furthermore, no return of EVM(s) will be accepted if the package has been opened and no return of the EVM(s) will be accepted if they are damaged or otherwise not in a resalable condition. If User feels it has been incorrectly charged for the EVM(s) it ordered or that delivery violates the applicable order, User should contact TI. All refunds will be made in full within thirty (30) working days from the return of the components(s), excluding any postage or packaging costs.

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