

User's Manual

RAGU V1.0

The RAGU is Evaluation Tool controls the stepping motor driver IC to demonstrate and evaluate its functions:

1. Speed control (by variable clock frequency)
2. Spin direction control (Clockwise or counter-clockwise)
3. Power Save
4. Excitation modes
5. Current decay control
6. Output current control
7. Junction temperature measurement (by TEST pin diode)
8. Efficiency measurement (I_{cc} vs I_{out})

This system is composed of Software and Hardware parts. The Software runs in a PC with a USB port, and communicates with the hardware. The Hardware is composed of 2 major parts, RAGU main board (RAGU-main1-EVK-001) and RAGU option board (RAGU-op1-EVK-001). RAGU main board generates the signals to control the DUT (Device under test). RAGU option board allows oscilloscope feature and monitors output voltages and currents.

I. Introduction

What is RAGU V1.0?

It is a user friendly evaluation tool that enables to demonstrate and evaluate the function of stepping motor driver IC's.

What Can We Do with this Tool?

This tool enables the user to evaluate or demonstrate certain functions of motor driver IC's without the use of bulky instruments (e.g. oscilloscope, power supply).

With its Software and Hardware, the user can rotate stepping motors, adjust current limit, control current decay, change excitation mode, and monitor waveform of output voltages and currents.

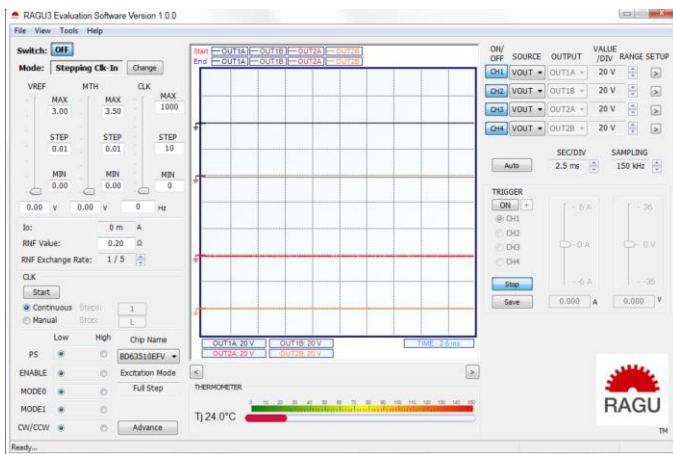


Figure 1. RAGU tool screen

II. Software Requirements

Materials and specifications needed to operate the application.

Hardware Requirements

- RAGU main board (RAGU-main1-EVK-001)
- RAGU option board (RAGU-op1-EVK-001)
- USB Cable Mini B
- Wall adapter
- RAGU board with DUT

Computer Requirements

- Windows 10 32bit
- User account with administrative privileges
- Minimum screen resolution of 1024 x 768

Software Requirements

- Cypress Drivers*1
- FPGA's Raw Binary File*1
- ※1...Installer package includes these items.

III. Software Installation

This section explains how the installer package is used to install the application into your computer.

Software Installation

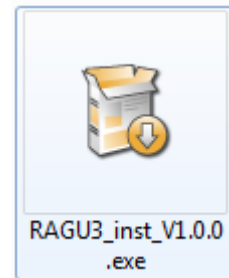


Figure 2. Icon of Installation

Step
1

Locate and run the installer.



Figure 3. Setup Screen 1

Step 2 The setup wizard will appear. Click **Next** to continue.

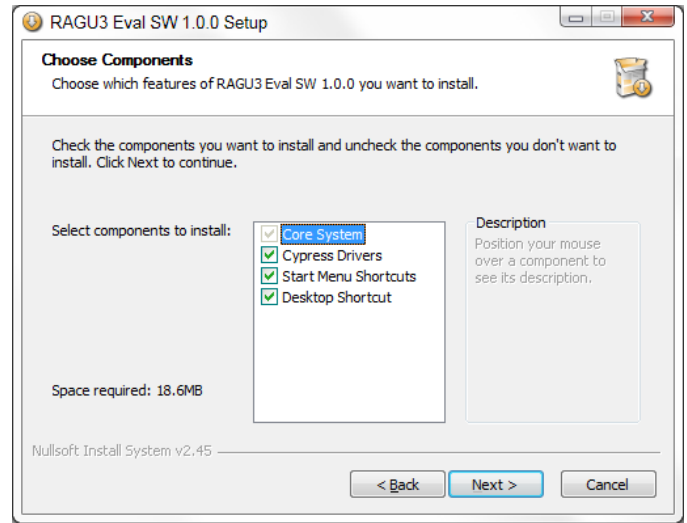


Figure 5. Setup Screen 3

Step 4 Choose your preferred options and click **Next**.

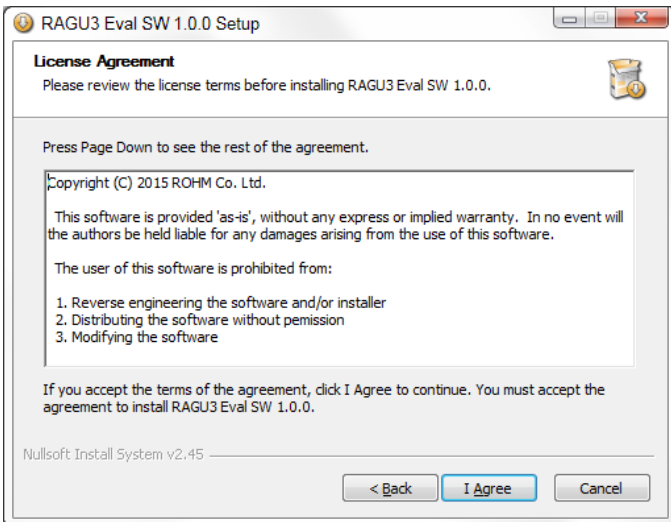


Figure 4. Setup Screen 2

Step 3 To confirm the installer's Terms of Agreement, click **I Agree**.

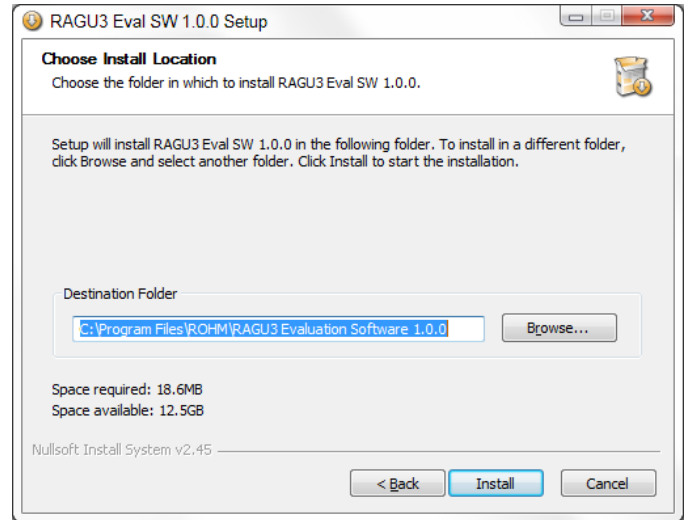


Figure 6. Setup Screen 4

Click **Browse** to change the installation directory otherwise the default directory will be used. Click **Install** to proceed. *It is **highly recommended** that the application be installed in a directory or computer that has administrative rights.*

Step 5

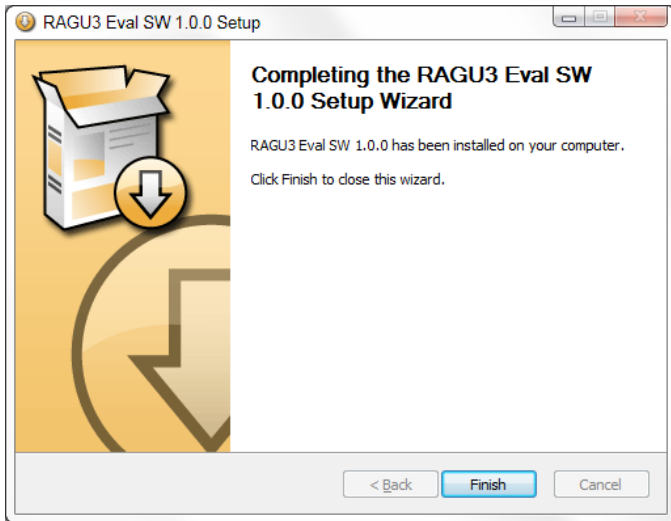


Figure 7. Setup Screen 5

Step 6 Click **Finish** to close the wizard.



Figure 8. RAGU shortcut

Notice that there are shortcuts of the application in the desktop and start menu. (Note: You have the option to select where to add/or not to add shortcuts.)

Step 7

IV. System Setup

General Setup

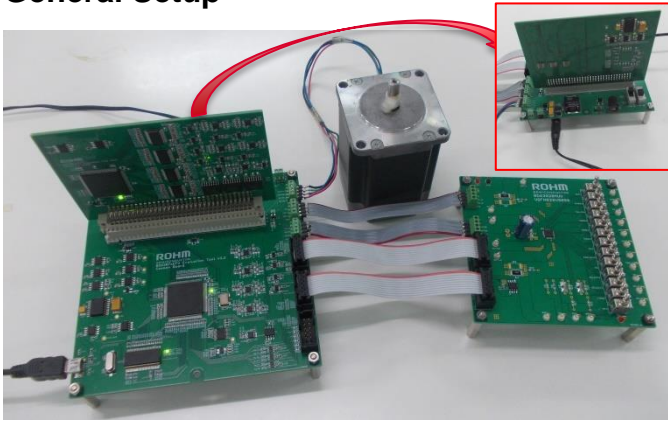
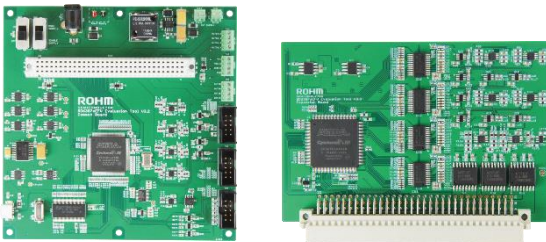


Figure 9. General Setup



Stepping Motor AC adaptor RAGU DUT board
Connecting cable



RAGU main board RAGU option board

Figure 10. Hardware parts

Component Descriptions

Motor	Stepping
Connectors	USB 2.0 (that is connected to PC) AC adaptor Ribbon wire with connectors
RAGU DUT board	CLK-IN type
RAGU main board	RAGU-main1-EVK-001
RAGU option board	RAGU-op1-EVK-001

Table 1. Hardware parts

V. Function

This section discusses the different function available for the RAGU software.

Basic Drive

This is the basic function is included by default on the software. It allows the user to use the basic drive features located on the left side of the control software.

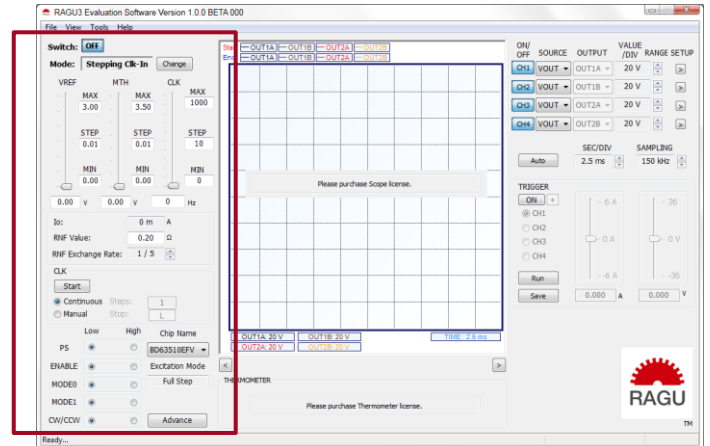


Figure 11. RAGU at startup

Dynamic Mode

This license allows the user to access the Dynamic Mode window.

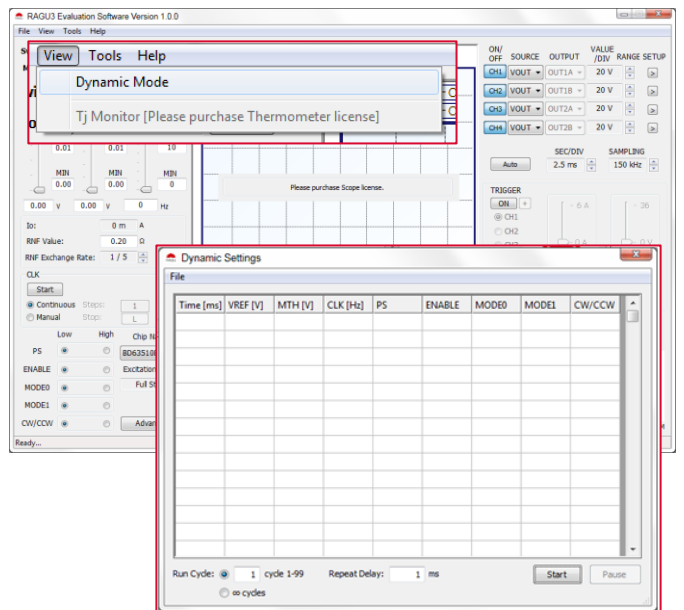


Figure 12. Dynamic Mode

Oscilloscope

This license allows the user to use the built-in oscilloscope which features 4 input channels and triggering feature. Also the oscilloscope's calibration feature may be used.

*Note: In order use this feature, RAGU-op1-EVK-001 is necessary.

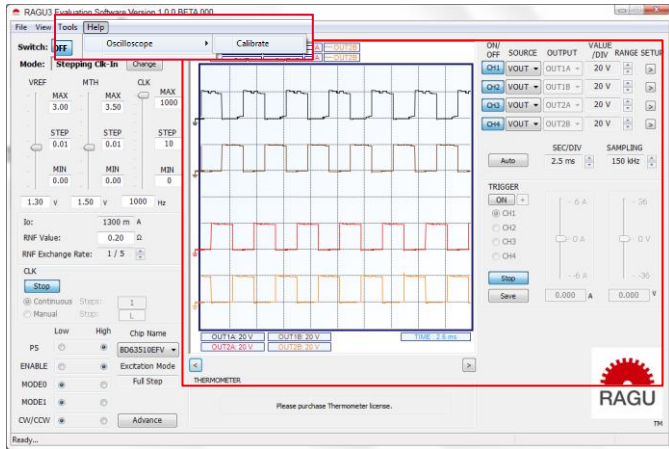


Figure 13. Oscilloscope at startup

Thermometer

This license allows the user to monitor the DUT's temperature via the thermometer control and also allow access to the Tj Monitor window.

*Note: In order use this feature, RAGU-op1-EVK-001 is necessary.

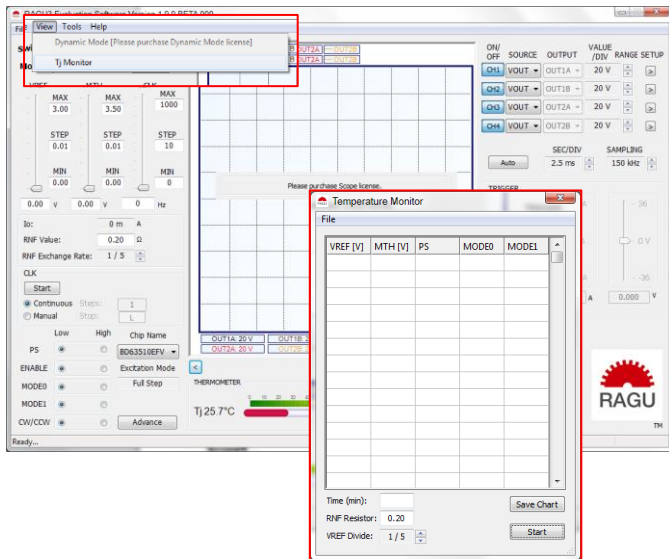


Figure 14. DUT temperature measurement tools

VI. Parts of the Control Software

Main GUI

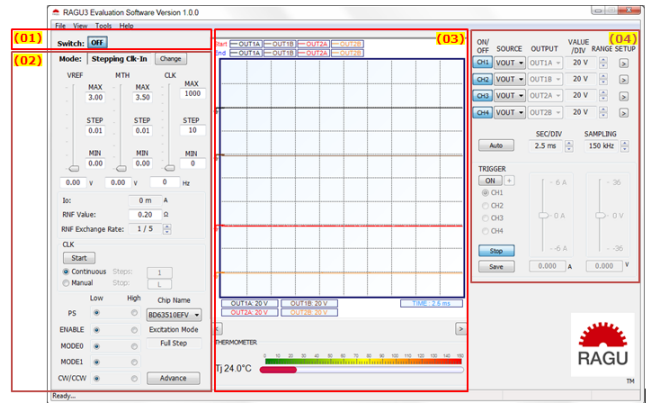


Figure 15. Main GUI

(01)ON Switch	Switch that enables access to RAGU
(02)DUT Control Settings	Input control signal of DUT (Motor Driver IC)
(03)Graph/Plot Area	Graphs measured values
(04)Oscilloscope Settings	Oscilloscope like settings

Table 2. Main GUI Common Controls

DUT Control Settings

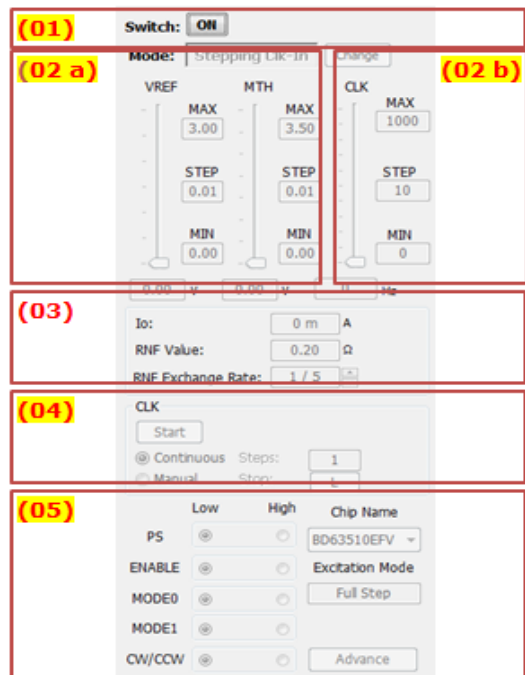


Figure 16. DUT Control Settings

(01) Operating Mode	-Switch that enables access to RAGU
(02) Levels	
(a) Voltage Level	-Value can be changed by either the slider or text box. -To move from one text box to another, use the enter key. -The sliders can be configured using the MAX, STEP and MIN text boxes.
(b) Frequency Level	-Value can be changed by either the slider or text box. -The CLK slider can be configured using the MAX, STEP and MIN text boxes.
(03) Computation	-Displays the calculated I _o
(04) Clock Output	-Use the Start button to enable or disable the clock output. - Continuous Mode: Clock outputs until the Stop button is clicked. - Manual Mode: Clock generates specified number of clock cycles.
(05) Pin Voltage Levels	-Use the choices to select the voltage levels of the corresponding pins.

Table 3. Main GUI Common Controls

(01)Graph/Plot Area	
(a) Time-Delta Measurement	-Use the right double click to ON/OFF, use right single click to move the blue cursor. Time is measured between the red (left click) and blue (right click) cursors.
(b) Time-Value Display	-Use the left double click to ON/OFF, use left single click to move the cursor
(c) Horizontal Scroll	-Use the Left and Right Arrow Buttons to scroll through the waveform
(02)Channel Settings	
(a) On/Off	-Show/hide the specified channel
(b) Source	-Select measurement source (Output Voltage/Current/ICC)
(c) Output	-Channel Select (A/B)
(d) Value/Div	-Display the current or voltage value/Div of each channel
(e) Range	-Change the VALUE/Div Settings
(f) Setup	-Open the Channel Settings window
(g) Sec/Div	-Control the TIME/Div setting of the display (in seconds)
(h) Sampling Rate	-Control the sampling frequency of the Waveform Scope
(03)Sampling Rate	
(a) Trigger	-ON/OFF triggering
(b) Channel	-Select Channel
(c) Current	-Vary current input level
(d) Voltage	-Vary input voltage level
(e) Run/Stop	-Enable/Disable triggering -Continuously read the 4 channels and plot them in chart. Only the current available data in the RAM (8k samples) will be displayed at any time.
(f) Save	-Export graph as image (jpeg.)
Note: Only one slider is active at any time. The active slider will depend on the input type (Voltage/Current) of the currently selected channel.	

Table 4. Main GUI Common Controls

Graph/Plot Area and Oscilloscope Settings

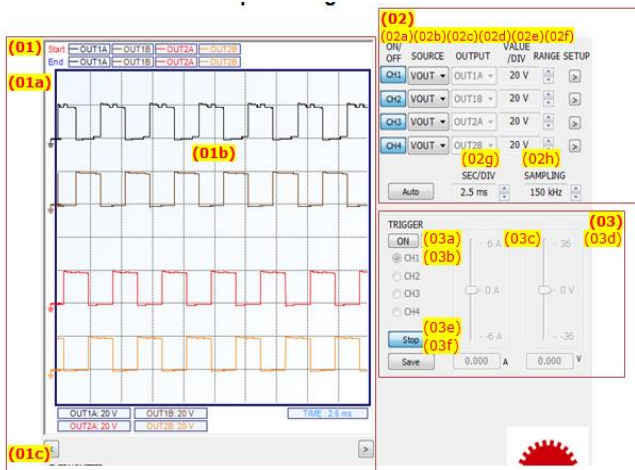


Figure 17. Oscilloscope Settings

Dynamic Window

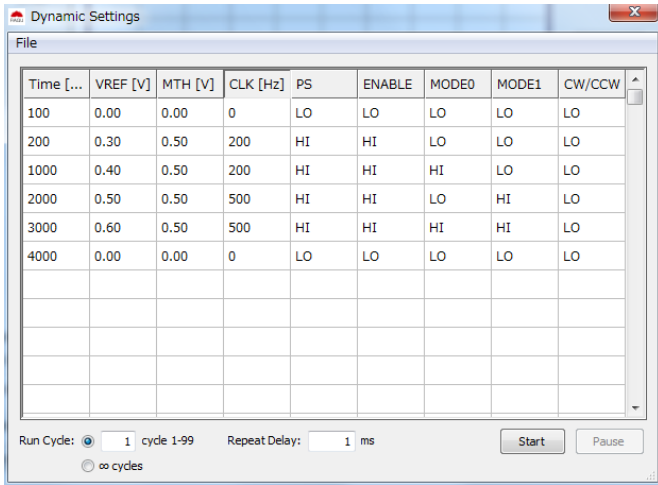


Figure 18. DUT Control Settings 1

Accessed via: View -> **Dynamic Window Menu Item**

- The Dynamic Settings window allows the user to preprogram a sequence of configurations to the device.
- The Run Cycle determines the repeat count for the whole sequence.
- The repeat delay defines the time between each cycle.
- Press **Start** to begin the dynamic sequence.

Accessed via: View -> **Tj Monitor Menu Item**

- The Temperature Monitor window allows the user to preprogram a sequence of configurations to the device in order to monitor the temperature at each setting.
- At the end of the sequence, the logged temperature data is plotted into a Microsoft Excel Spreadsheet.
- Press **Start** to begin temperature monitoring.
- Press **Save Chart** to plot the existing temperature log in a spreadsheet.

Calibrate

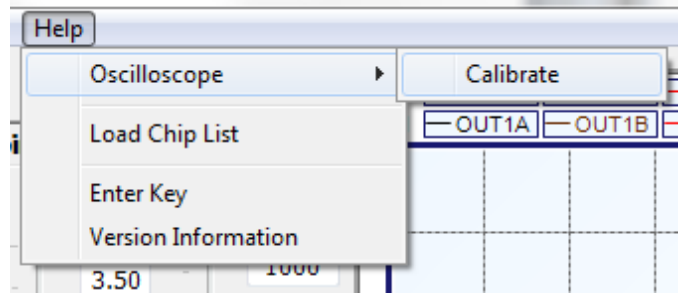


Figure 20. Calibration Settings

The calibrate function is found under the Help Menu.

- Note: Ensure that all oscilloscope functions are turned off before calibrating the device. Calibrating the device while using the oscilloscope may result to an incorrect calibration.

Temperature Monitor

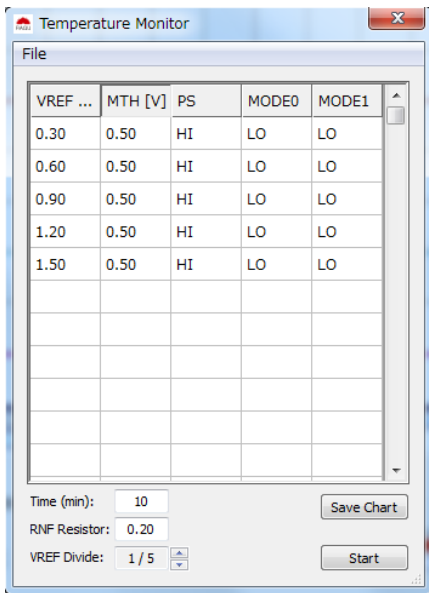


Figure 19. DUT Control Settings 2

VII. Using the Application and Its Tools

How to Use Dynamic Mode

How to Use the Scope



Figure 21. Oscilloscope at startup

Step 1 Set desired drive settings.

Step 2 Ensure that scope is running.

Step 3 The captured waveforms will be displayed.

User may use the other scope features such as: Channel settings, Trigger & Cursor Measurement
 See **Parts of the Control Software > Graph/Plot Area and Oscilloscope Settings.**

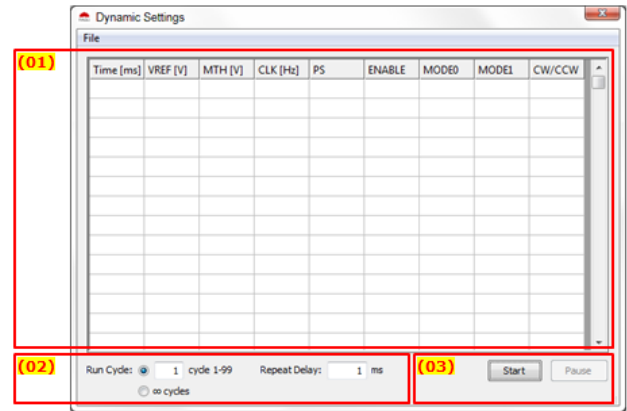


Figure 22. Dynamic mode setting screen

Input desired values in grid:

Time	Time when row of settings will be implemented
VREF	Value in x.xx format
MTH	Value in x.xx format
CLK	Value in hertz [Hz]
PS	Value is either 1/0(H/L)
ENABLE	Value is either 1/0(H/L)
MODE0	Value is either 1/0(H/L)
MODE1	Value is either 1/0(H/L)
CW/CCW	Value is either 1/0(H/L)

User may select multiple cells to copy/delete/paste for easy use.
 User may also copy cells from MS Excel and paste here.

Step 1

Step 2 Set the cycle settings.

Step 3 Click **Start** when ready. **Stop** to cancel.

User may also choose to **load** and **save** settings via the **File** menu.

VIII. Driver Installation

Drivers are used to detect a device, by checking its firmware

CyUSB Driver Installation Guide for Windows 10 32bit

1. Search for "Device Manager" or "devmgmt.msc". Open the application.
2. Attach the USB device.

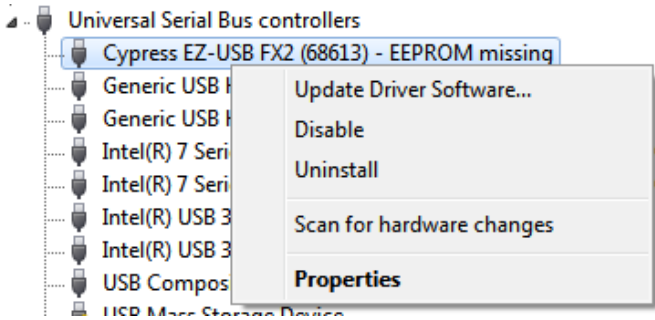


Figure 23. Driver installation screen 1

Under **Universal Serial Bus controllers**, select the USB device. Right click the device then press **Update Driver Software...**

Step 1

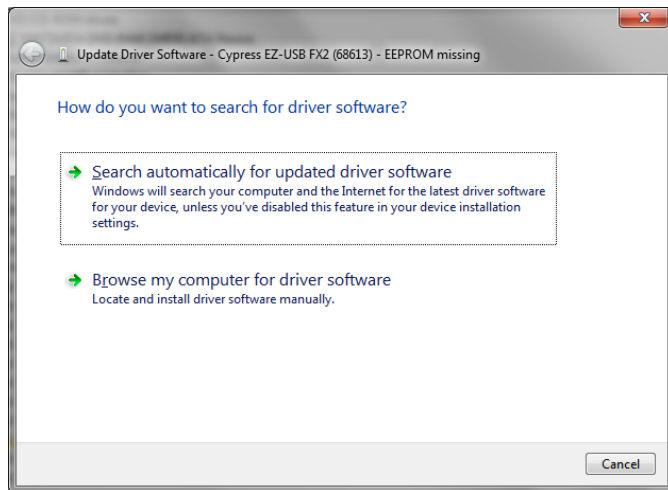


Figure 24. Driver installation screen 2

Select **Browse my computer for driver software.**

Step 2

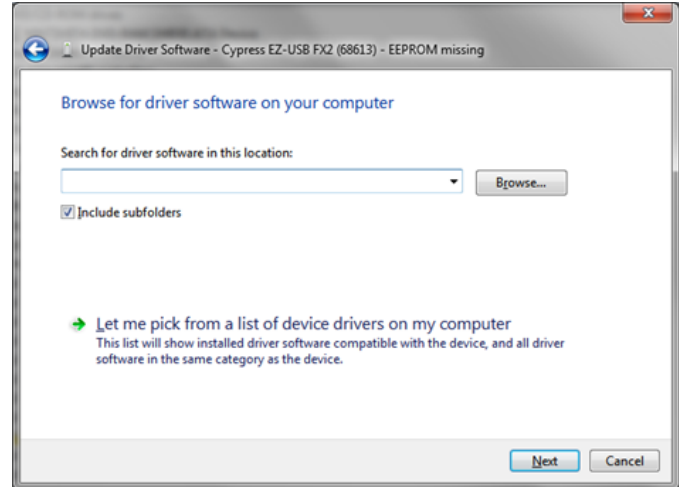


Figure 25. Driver installation screen 3

Click **Browse...** and locate the directory where RAGU V1.0 is installed. Click **Next.**

Step 3

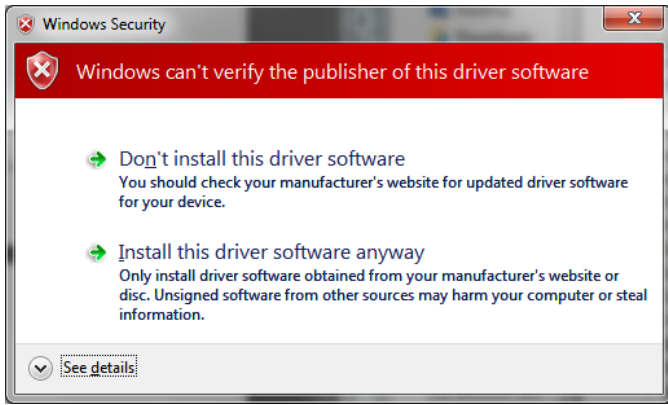


Figure 26. Driver installation screen 4

Step 4 Select **Install this driver software anyway.**

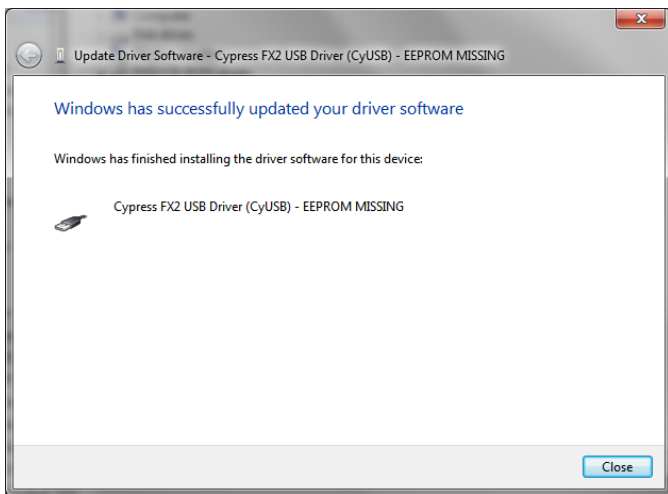


Figure 27. Driver installation screen 5

The window will display that the driver has been successfully updated.

Step 5

IX. Software Uninstallation

Please note that the uninstaller is only capable of removing files from the specified installed directory, and not the files that have been transferred to another directory (as for reasons of the user).

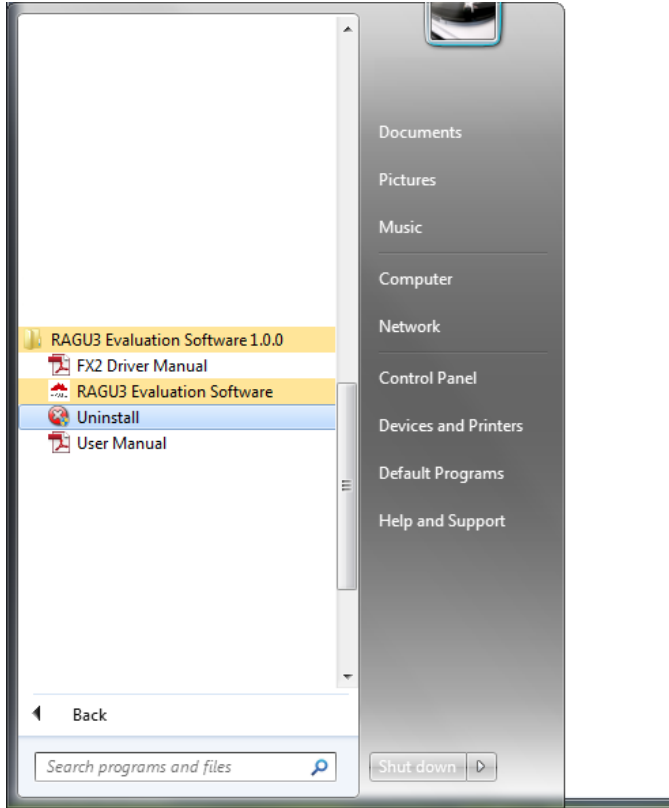


Figure 28. Uninstall screen 1

Step 1 Locate and run the **Uninstall.exe** from the **start menu**.

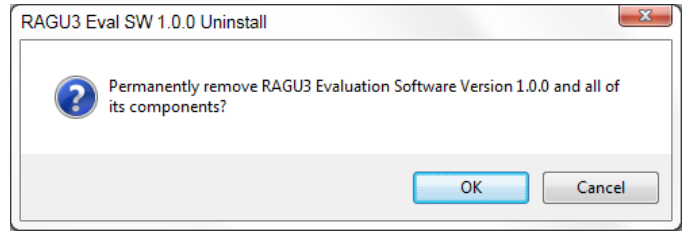


Figure 29. Uninstall screen 2

Step 2 Click **OK** to proceed.

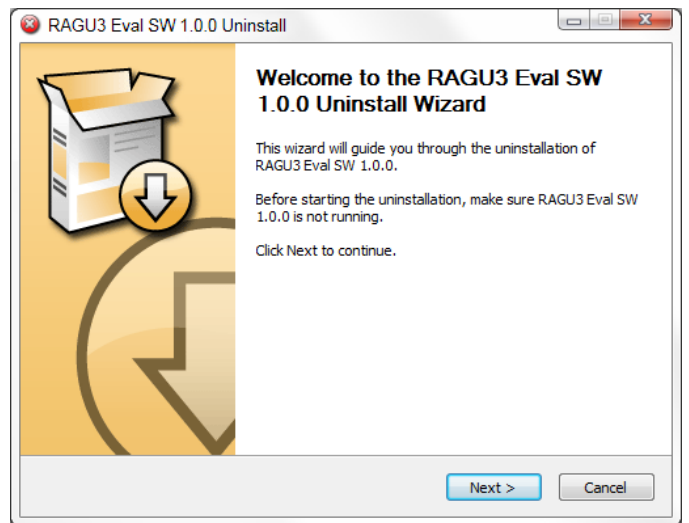


Figure 30. Uninstall screen 3

Step 3 Click **Next** to proceed.

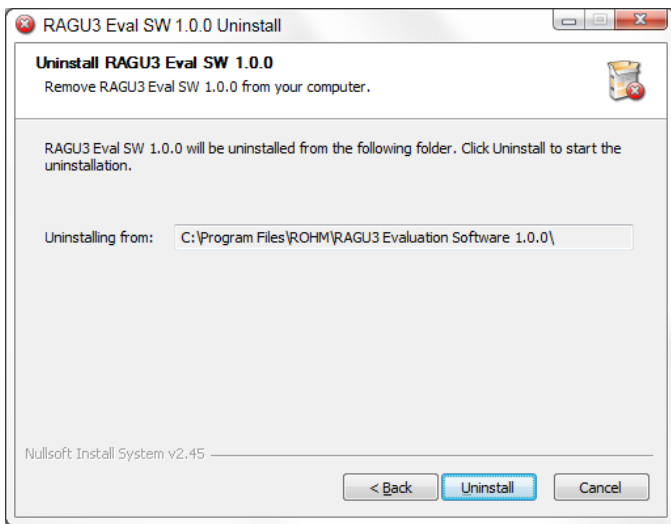


Figure 31. Uninstall screen 4

Step 4 Click **Uninstall**.

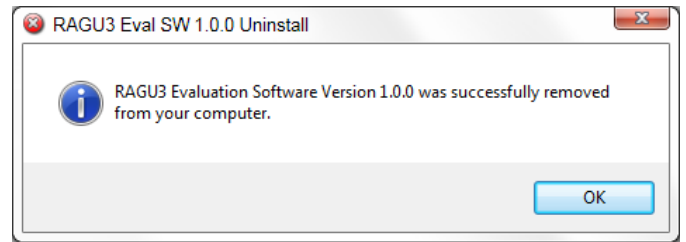


Figure 33. Uninstall screen 6

The software has been successfully removed.
Click **OK**.

Step 6

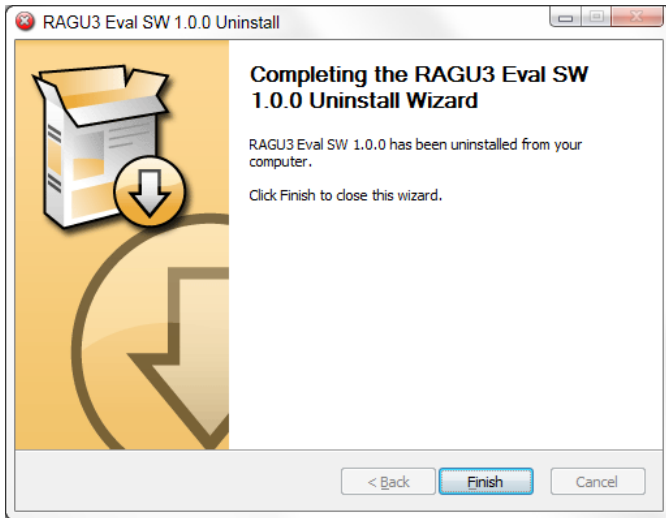


Figure 32. Uninstall screen 5

Step 5 Click **Finish** to close the wizard.

Revision History

Date	Revision	Changes
20.Nov.2018	001	New Release

Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
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