

Quick Start Guide Customer Evaluation Kit for SL2001 & 2002

Introduction

This quick start guide provides step-by-step instructions to help users get started with SL2001/2 IC evaluation kits. For more details, please check the Application Notes (EVK and GUI) or if you have any further questions or need help, please contact Silanna Semiconductor Applications Team Lead, Bryan Cabico (bcabico@silanna.com).

What's Included in the Box

1. SL2001/2 Evaluation Board
2. I2C Dongle
3. USB Cable
4. USB-C Adapter
5. U.FL connector cable to connect to the function generator for external clock, includes 50Ω termination



Fig. 1 What's included in the EVB box

Required Equipment Not Included in the Box

Fig.2 shows the photo of the benchtop lab setup where the following equipment are included.

1. Oscilloscope
2. Power Supplies (2 independent channels)
3. Multimeters for voltage and current measurements
4. Function generator for external clock
5. A Windows/ Mac PC for running the GUI software

In addition to the above required equipment, if you have received an EVB with lasers, you will need the following

equipment for additional measurements, e.g. peak light output power.

1. Laser Safety Glasses
2. Integrating Sphere for average Light power measurement
3. Light Filter for light pulse amplitude control
4. High Speed Photo Receiver for light pulse FWHM measurement
5. Optical power meter
6. Thermal Camera for temperature measurement
7. Thermal Detector for average power measurement

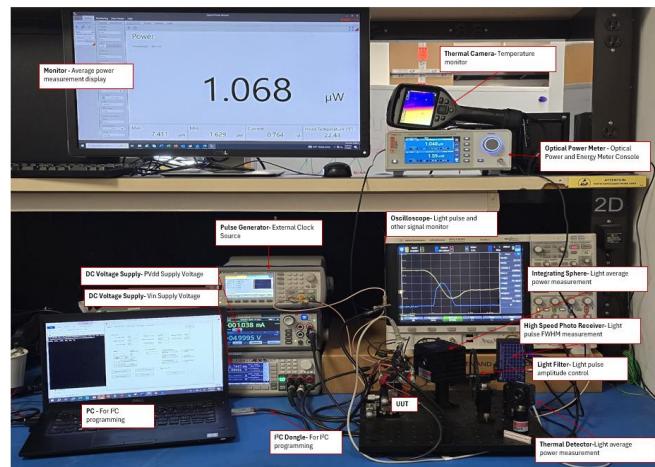


Fig.2 Test setup with lab equipment

What's Available Online (www.silannasemi.com)

1. GUI Software – The graphical user interface software with various features and functionalities for testing the EVK
2. Test Report – Presents various test conditions and experimental data from the evaluation board.
3. Datasheet – SL2002 datasheet provides the features and functionalities of the device with details such as pinout, operating conditions, register maps etc.
4. SL2002 Application Notes (GUI and EVB) – For more detailed information about the GUI (software) and the Evaluation board (hardware).
5. Application Note for Laser Emulation using Resistor
6. Application Note for peak power calculation

Board Connections and Powering Up

In order to make the proper connections to the board and power it up, please follow the step-by-step instructions provided below.

1. First step is to power up the board by applying VIN and PVDD input voltages. The same 5V power supply can be used with separate pairs of wires for PVDD and VIN or separate power supplies can also be used.

VIN should be powered up with 5V for initial power-up since the pre-programmed SL2002 settings are set for Vin=5V. Please refer to the test report for information about the expected current levels. The range of VIN is 3V-24V; however, operation above 8V without modifications to the GUI settings may overstress components and cause damage.

The voltage of PVDD is also set to 5V which powers the internal Gate Drivers of SL2002 IC to drive the external GaN FETs (FLUXOUT and FIREOUT).

2. Next step is to install the Graphical User Interface (GUI) by following through the set of instructions shown in the next section titled "GUI Software Installation". As you go through the steps in that section, you will set up the GUI for communicating with SL2002 IC through the I2C dongle. As a part of those steps, you will also be required to plug in the dongle to your computer.
3. Once the GUI is installed and the dongle is plugged into the computer, the next step is to connect the dongle to the board. Four colored wires (green, yellow, orange and black) namely SDA (green and yellow wires shorted together), SCL (orange wire) and Ground (black wire) of the dongle need to be connected to the corresponding pins on the board for programming SL2002. SL2002 is programmed through the I2C dongle and GUI. GUI allows configuring the SL2002 IC for performing under various operating conditions based on the customer's needs.
4. Once the IC is programmed through the GUI and I2C dongle, an external clock signal can be applied via the CLOCKINPUT U. FL connector on the board (see Fig.3).
5. A photo of a different EVB connections for I2C programming and powering up is shown in Fig. 4.
6. Please note, Fig.3 and Fig.4 are examples of a SL2002 EVB. Depending on the power level and load (laser vs resistor), the board you have received may look different than the one shown here.

7. Fig.3 Various input ports on the board



Fig.4 Example of the board connections for I2C programming and powering up (photo from a different EVB)

GUI Software Installation

This section provides step by step instructions on how to install the GUI software on a Windows PC. For Mac users, copy the entire folder "Mac_App_Folder" from the website (www.silannasemi.com) to your desired location and run the file StingrayApp ("Mac_app_folder\dist\StingrayApp") by double clicking it (no installation is required).

1. Download the StingrayGUI.exe file from online (Link: www.silannasemi.com)
2. Double click on the StingrayGUI.exe
3. Choose your preferred destination location and click next when you see the following screen.

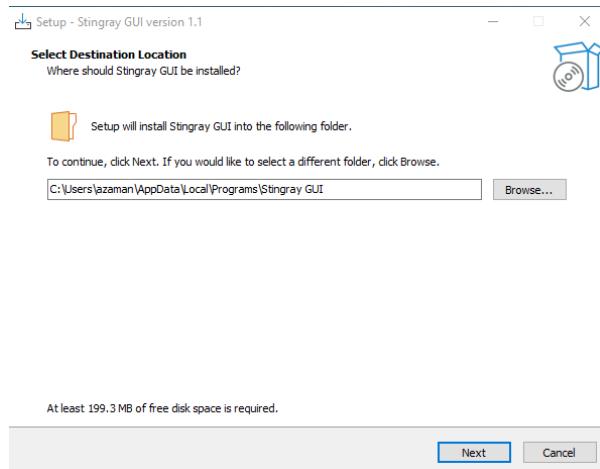


Fig.5 Select destination for GUI installation

4. Click Next when you see the following screen.

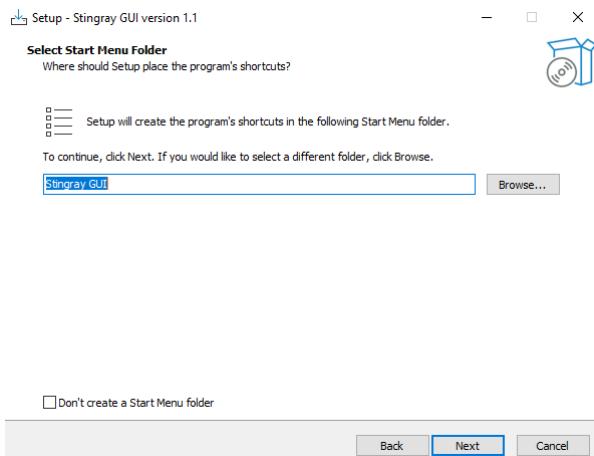


Fig.6 Selecting start menu folder

5. Click Next when you see the following screen.

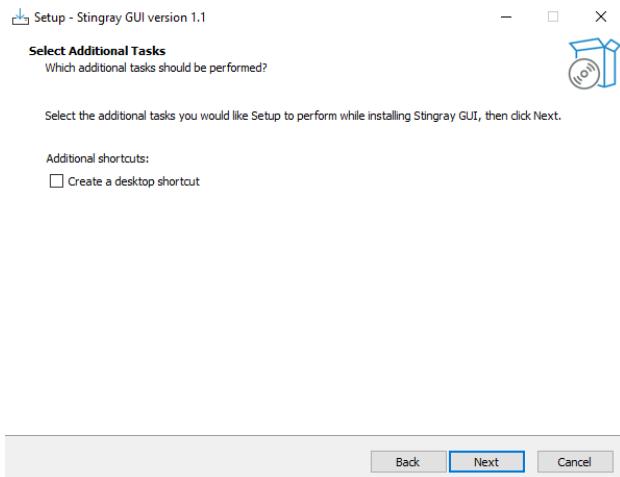


Fig.7 Selecting additional tasks

6. Click Install when you see the following screen.

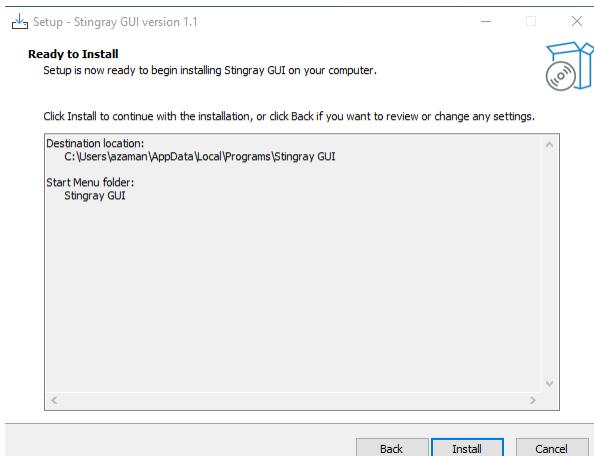


Fig.8 Software ready to install

7. The installation will begin and the green progress bar will reach 100%.

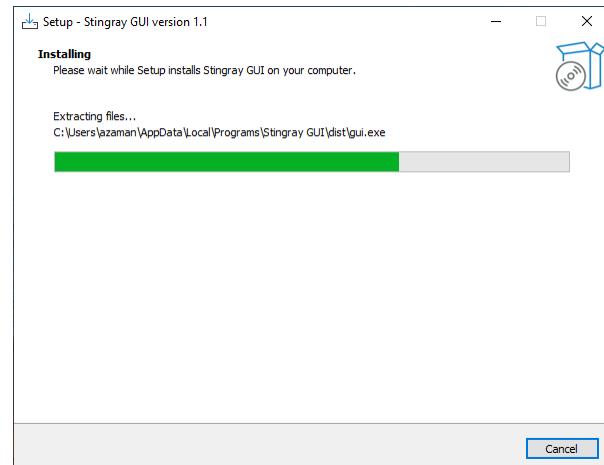


Fig.9 Software installation begins

8. Before completing the installation, a new setup wizard (shown below) will open for LibUSB-Win32. Click Next.

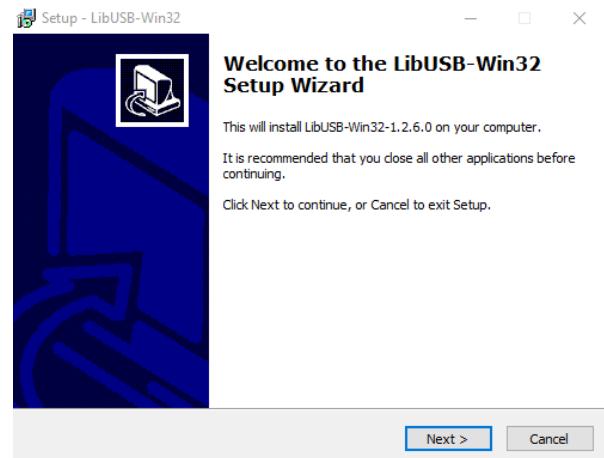


Fig.10 LibUSB-Win32 setup wizard

9. Please accept the agreement and click next.

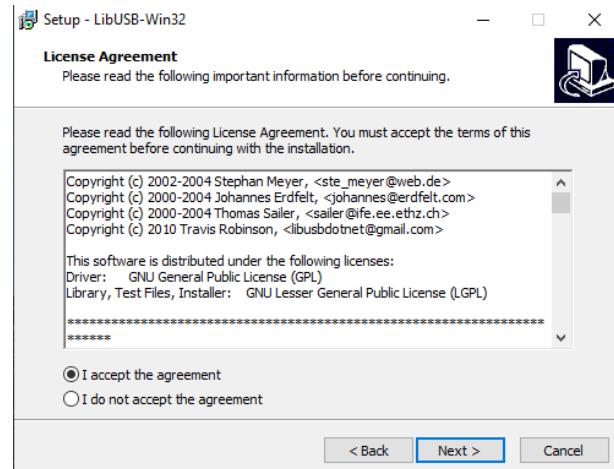


Fig.11 Accepting the license agreement

10. Click Next again once you see the following screen.

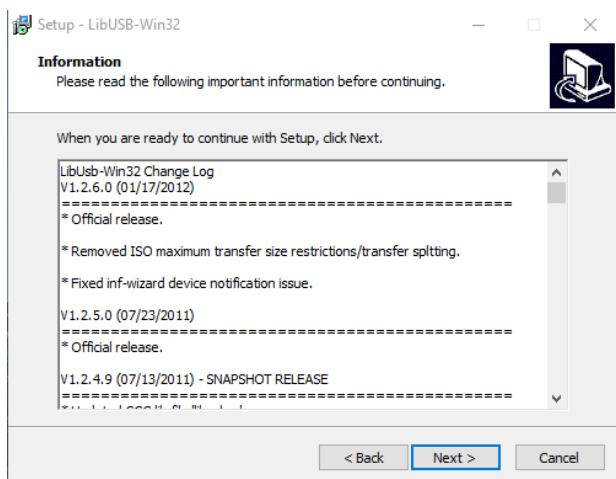


Fig.12 Review information before setup begins

11. Click Next again once you see the following screen.

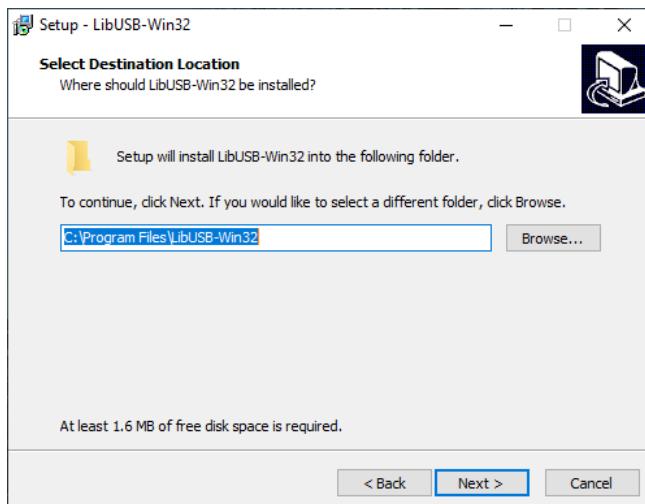


Fig.13 Selecting destination location for LibUSB-Win32

12. Click Next again once you see the following screen.

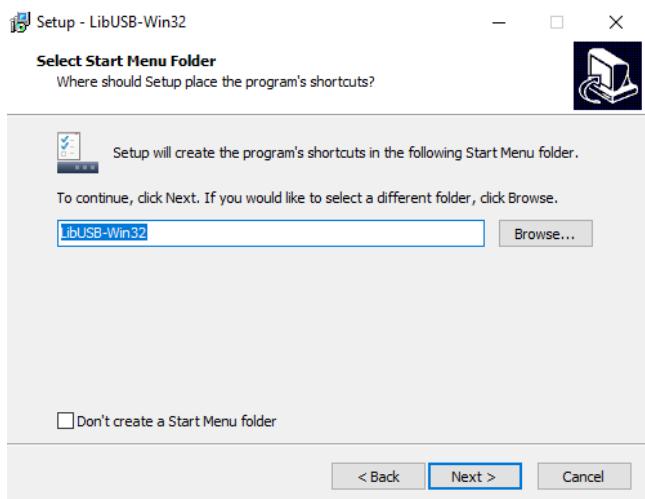


Fig.14 Selecting start menu folder for LibUSB-Win32

13. Click Install once you see the following screen.

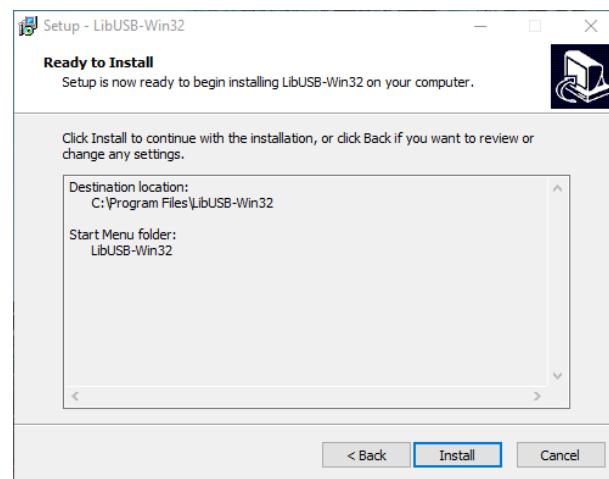


Fig.15 LibUSB-Win32 ready to install

14. Next click Finish and make sure the **Launch filter installer wizard** box is checked.

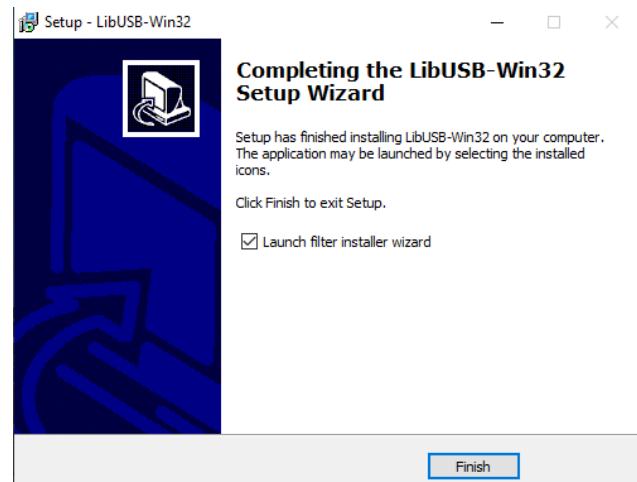


Fig.16 Selecting destination location for LibUSB-Win32

15. Next select **Install a device filter** and click Next when the following screen pops up. The purpose of this step is to filter the USB port where the Dongle is connected. This step is needed if the device is not already filtered.

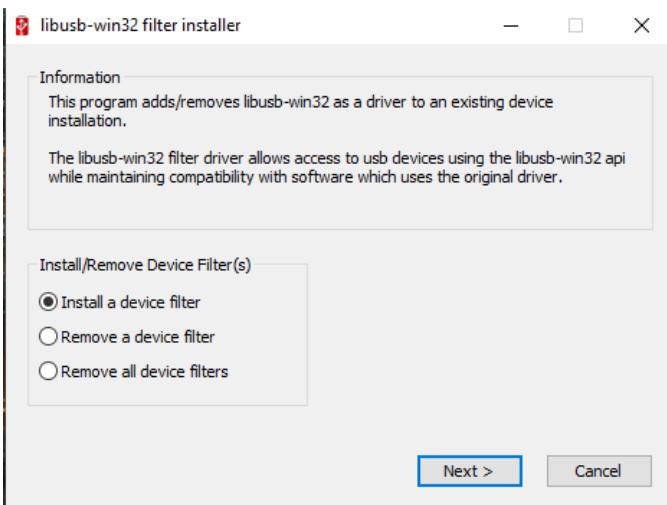


Fig.17 Installing the device filter

16. For this step the USB Dongle must be connected to the PC. As shown in the following screen look for **USB Serial Converter**. If this is not in the list, it means the device is already filtered and no further action is needed. Please click cancel and finish the software installation. If the device is in the list, click on the device and then click Install to finish the software installation.

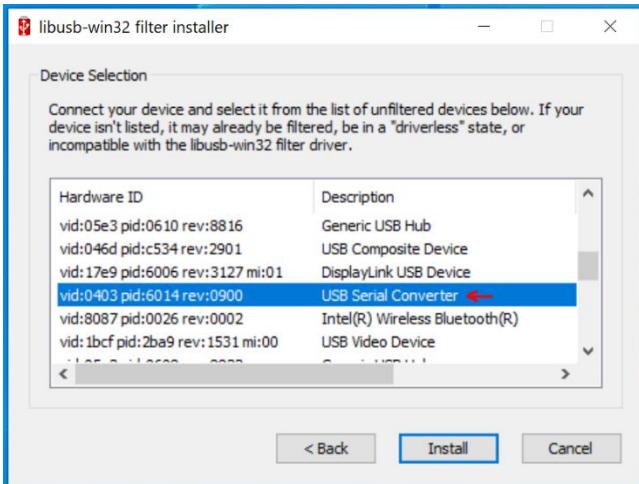


Fig.18 Device selection screen

17. Once the device filter installation is complete you will see the following screen. Click OK.

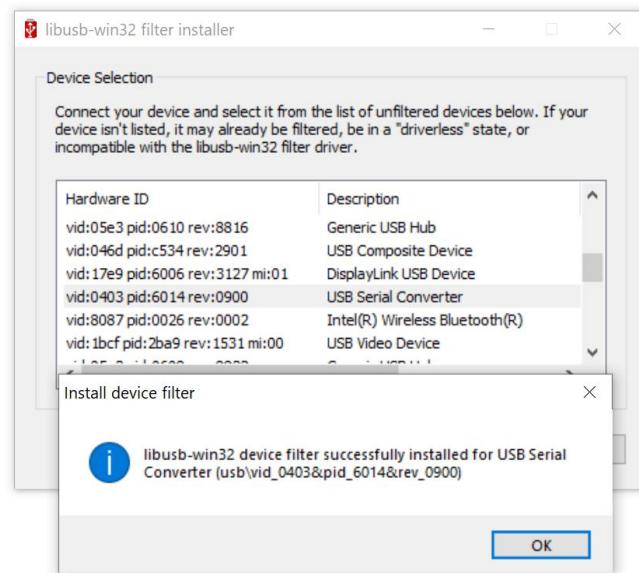


Fig.19 Device filter installation complete

18. Finish installation by clicking the Finish button.

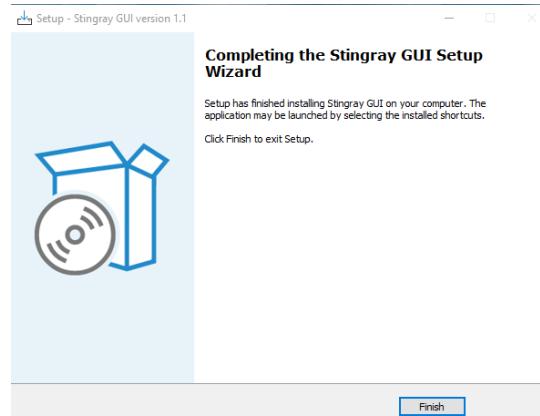


Fig.20 Device filter installation complete

After finishing the installation of the GUI, please go back to the first page of this Quick Start Guide and finish steps 3 and 4 of the “Board Connections and Powering Up” section to complete powering up the board and its connections with the I2C Dongle.

GUI Software Operation

Once the software installation is complete and the board is powered up (5V applied to PVDD and VIN) and connected via USB dongle, please follow the step-by-step instructions on how to operate the GUI.

1. Go to your local computer drive where your installation folder for Stingray GUI is located. Inside the folder there is subfolder called **dist**. Inside of it there is an executable file called **gui.exe**. Double click on it to run the GUI. You should see the following screens. If you receive any warning

related to GPIB as shown here, ignore those. The GUI software should run without any issue in that case.

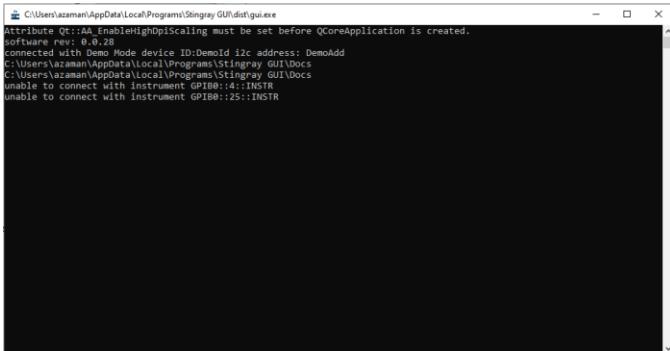


Fig.21 GUI startup window

2. However, if you receive any warning saying “unable to connect FTDI controller not initialized” as shown below, there is something wrong with the software installation and/ or the USB dongle is not properly plugged into the computer.

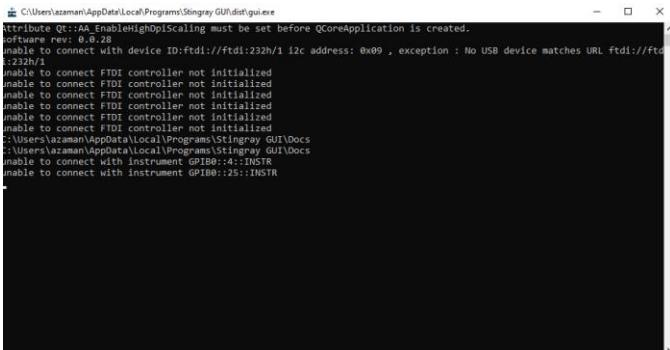


Fig.22 GUI startup window showing FTDI controller not initialized

Please first try unplugging and plugging back in the dongle or USB-C-to-A adapter (if using one) and check if the USB-C-to-A adapter driver is up to date. If that doesn't resolve the issue, please go through the following steps:

- Check if 5V power is applied correctly to Silanna EVB by probing PVDD test point on the board.
- Check if I2C SDA and SCL pins are getting correct pull up by probing the header. User should see 3.3V (before launching GUI) or 5V (After launching GUI)
- Check if USB dongle header connections are made correctly, especially the two SDA headers are shorted together (green and yellow)
- Shutdown GUI application and re-launch (this is needed when USB dongle is unplugged then plugged back into)

- Launch already installed libsub-win32 filter installer, go to Device Selection page and check if the “USB Serial Converter” is still listed. When filter is installed correctly “USB Serial Converter” should not be listed. If it is still presenting, then click on install the filter.
- Try using a different USB-A port (native port instead of using a USB-C to USB-A adapter), or if no USB-A port is available, try using a different USB-C-to-A adapter.
- You may also try uninstalling and installing the GUI app on your computer repeating the above steps related to the software installation and powering up the board.

If the problem persists, please contact Silanna Semiconductor Marketing Application Lead (Bryan Cabico, bcabico@silnna.com).

3. The following image shows the GUI screen.

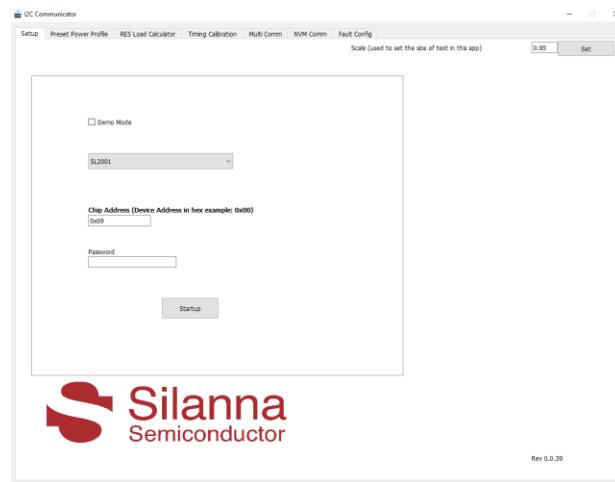


Fig.23 First GUI screen (Setup) once it's loaded

4. Uncheck the Demo Mode and update the Chip Address box to 0x09 and leave the password field blank. Then click on the **Startup** button.
5. Check your command prompt screen for gui.exe to make sure you are not receiving an error message, such as **Unable to Connect..** If you receive such an error message, please make sure the board is powered up and the dongle is still connected with the board and the PC.
6. To test the board, the user will need to program the SL2002 IC using the **Timing Calibration** Tab of the GUI (please see GUI App Note for more details). No password is needed for this on the Setup page. The user just needs to click the “Startup” button to unlock the device for programming. Then the Timing Calibration tab can be modified as recommended in the test report. The default Timing

Calibration page should look like the following. Once the user presses the bottom left button **Read from registers** the values in **Flux Time code**, **Charge Time code** and **Fire Time code** boxes should match with the values shown in the picture below.

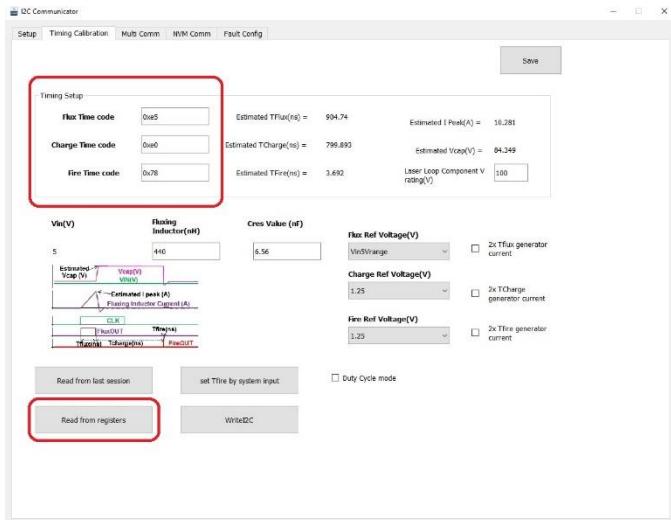


Fig.24 Second GUI screen (Timing Calibration)

7. On the Multi Comm tab of the GUI, please type in 0x10 and 0x16 in the Start and Stop boxes respectively and press **Read from I2C** button as shown in the picture below. The values in those seven registers should match the values shown in the picture below.

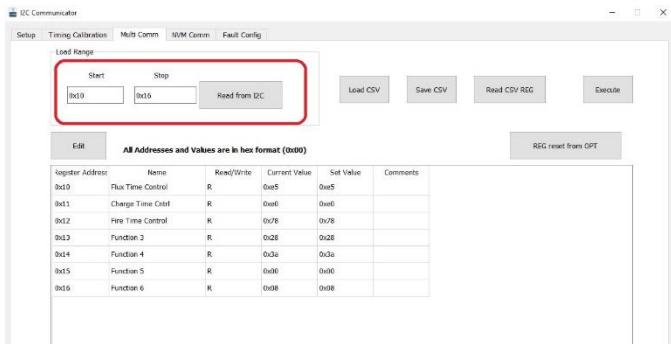


Fig.25 Third GUI screen (Multi Comm)

8. Once all the above steps are complete, the user should test the EVB to ensure its functionality. To test the EVB please apply a 10 kHz external clock (5V peak-to-peak with 2.5V offset, resulting in 0V to 5V clock signal). Please note, this board does not have any thermal management, so we recommend to keep the external clock frequency at 10KHz. The resulting input currents from 5V Vin should be around 49 mA and 5V Vdd should be around 0.85 mA.

9. Connect two single ended probes of the oscilloscope to display the capacitor voltage (Vcap) and the external clock signal. If available, a third probe can be used to capture the input voltage (VIN) waveform at the board (cable end) to ensure the infrequent periodic nature of the current pulses doesn't cause the input voltage to drop too much which can potentially cause under-voltage (UV) protection fault of SL2002 IC (when enabled). The following screenshots show how the waveforms look like in the oscilloscope, for your reference.

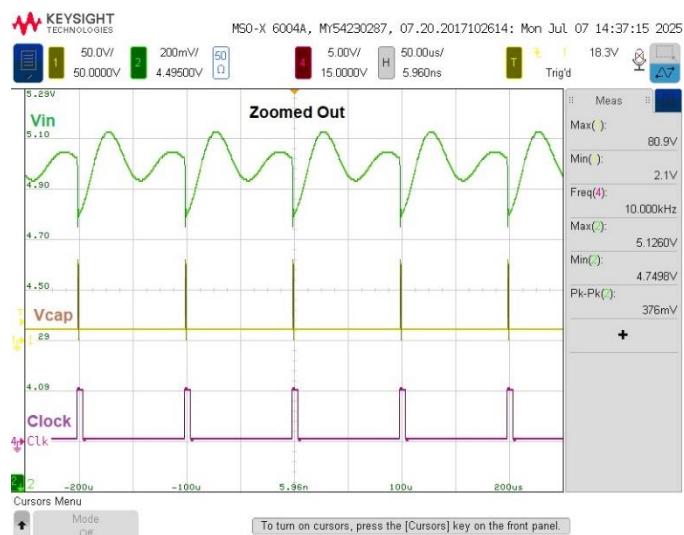


Fig.26 Zoomed out waveform of Vin, Vcap and Clock



Fig.27 Zoomed in waveform of Vin, Vcap and Clock

The above waveforms show how the input voltage, measured at the board terminals, drops ~250mV every time the external clock triggers the laser current. Ideally, we want to ensure the input voltage remains relatively flat during the operation. As a result, we recommend using a power supply

with separate force and sense outputs, allowing 4-wire connections to be used for the input voltage, VIN.

- Once the SL2002 IC is programmed, the dongle doesn't need to be attached with the board when taking the measurement **as long as the VDD supply is being applied**. Resetting Vdd will erase every change made in the IC through the GUI. The GUI will retain all of its settings, but the part will reset to its default values and will need to be reprogrammed to match the GUI. However, the SL2001 and SL2002 ICs have internal One Time Programmable (OTP) and Multiple (3) Times Programmable (MTP) memory blocks which allow programming the IC with the existing setup, so that the GUI setup is not required anymore, even after resetting the Vdd.

Safety Warning

This device is capable of driving laser diodes to generate high power optical pulses. Such pulses are capable of causing PERMANENT VISION DAMAGE AND BLINDNESS as well as additional injury or property damage. Laser diodes emit light that may be outside of the users' visual range which can cause PERMANENT VISION DAMAGE AND BLINDNESS as well as additional injury or property damage. Users are fully responsible for following proper laser safety procedures to prevent injury or damage. We recommend the use of Laser Eye Safety Goggles for all testing.

Revision History

Revision	Date	Author	Note
0.1	21 Jul 2025	AZ	Draft release.
1.0	17 Aug 2025	AZ	Document Control Release

