Granite River Labs

Quick Start Guide

For Using GRL-V-UP API Test Software with GRL USB Power Delivery & Data Loopback Volume Tester

This material is provided as a reference to use the GRL-V-UP API Test Software for programming the Granite River Labs (GRL) USB Power Delivery & Data Loopback Volume Tester (GRL-V-UP) using API commands.

For customer support, contact support@graniteriverlabs.com.

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1 Scope of this Quick Start Guide

This Quick Start Guide helps you to familiarize with the GRL-V-UP API Test software to control the GRL USB Power Delivery & Data Loopback Volume Tester (GRL-V-UP) through API programming.

The GRL-V-UP tester supports concurrent USB Power Delivery 3.0 negotiation, 1000W max power loading and USB 2.0 & USB 3.1 data loopback testing. The GRL-V-UP tester in modular form can add up to 10 test cards in a single 3U rack unit chassis. Each test card supports loading of a single 100W USB Type-C port or dual 60W USB Type-C ports.

For more information on GRL-V-UP, please refer to https://graniteriverlabs.com/grl-v-up/.

For purchase orders, licensing questions and concerns, please contact Granite River Labs support at support@graniteriverlabs.com.

2 Connection Setup of GRL-V-UP

Figure 2.1 shows an example hardware setup for testing a USB Type-C/Power Delivery host, hub module, dock, monitor or charger using the GRL-V-UP API Test software running on a control computer and connected via USB to the GRL-V-UP tester that is attached to the USB device to be tested through the tester USB Type-C test port.

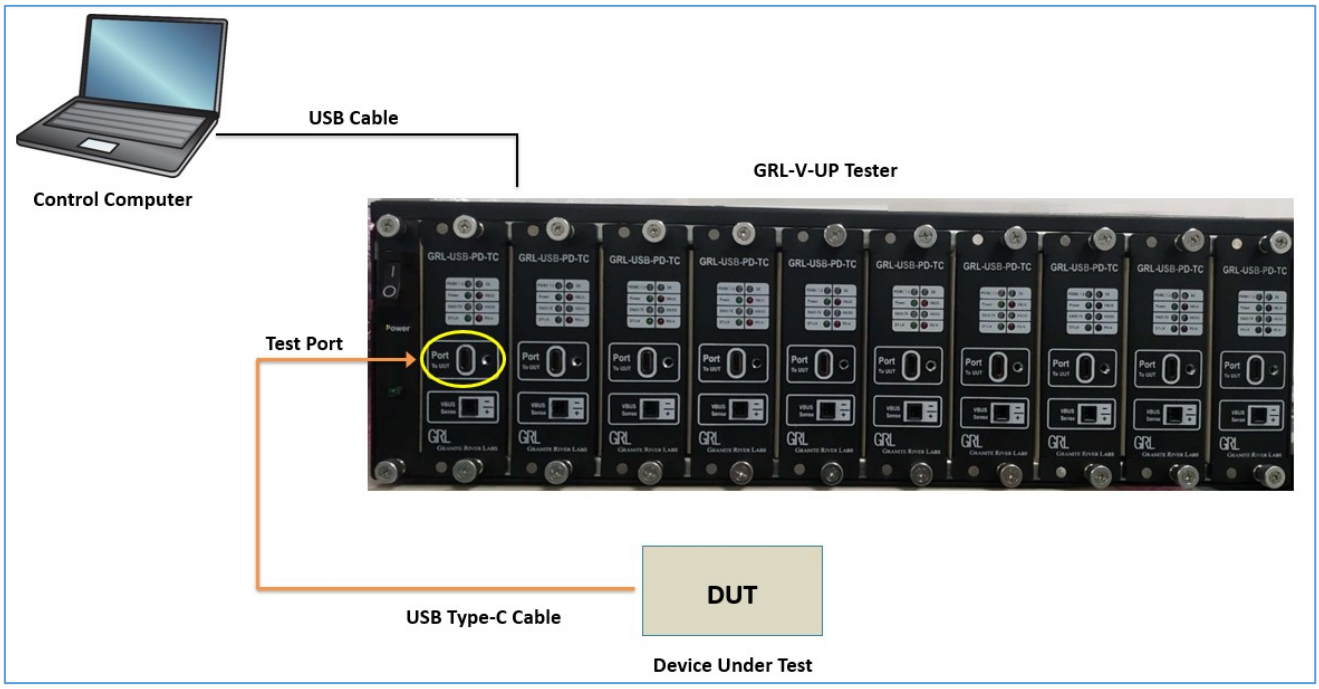

FIGURE 2.1: HARDWARE CONNECTION SETUP FOR GRL-V-UP API TEST SOFTWARE AND DEVICE UNDER TEST

The GRL-V-UP API Test software loaded on a Windows 10 computer (note this will be referred to as the control computer here onwards) allows the user to control the operation of the GRL-V-UP tester using API commands. Below is a procedure for connecting the hardware and verifying proper hardware connections.

1. Connect a Power Supply to the GRL-V-UP Tester Power Interface using the power cord accessory included with the tester.

2. Connect the GRL-V-UP Tester to the control computer using a physical USB Type-A to Type-B cable.

Notes:

- *For hardware setup procedure of the GRL-V-UP Tester, refer to the GRL-V-UP user documentation in* http://graniteriverlabs.com/download-center/.
- *For detailed list of API commands and custom test cases creation, refer to the GRL-V-UP API Help documentation in* http://graniteriverlabs.com/download-center/.

2.1 Turn On Tester and Connect Control Computer

1. Turn on the GRL-V-UP tester using the Power button on the front of the tester.

FIGURE 2.2: POWER ON GRL-V-UP

2. Make sure the GRL-V-UP tester is powered on and completely booted up, and then connect a USB Type-A to Type-B cable from the GRL-V-UP tester's USB (To PC) connector to one of the control computer's USB ports.
3. To make sure the USB connection is set up properly, on the control computer open the Device Manager window from the Control Panel.
4. In Device Manager, from the top menu select "View" –> "Devices by connection". The GRL-V-UP tester should appear in the list if connected properly to the control computer.

3 Getting Started with GRL-V-UP API Test Software

This section describes how to get started with the GRL-V-UP API Test software. If you are installing for the first time, please make sure to follow all the steps in this section to verify your setup prior to testing a DUT (device under test). The procedure is as follows:

1. Install the latest version of GRL-V-UP API Test software on the control computer (laptop or desktop) connected to the GRL-V-UP Tester. (Note: All the necessary drivers, API libraries and helper functions will also be installed along with the software. The software can also be downloaded and installed from http://graniteriverlabs.com/download-center/.)
2. Make sure the GRL-V-UP Tester has been updated to the latest firmware version. Refer to Section 4.1.4 for details.

If this procedure is followed and any issues arise, please contact support@graniteriverlabs.com.

3.1 Install GRL-V-UP API Test Software

1. Download the GRL-V-UP API Test software from: http://graniteriverlabs.com/download-center/.

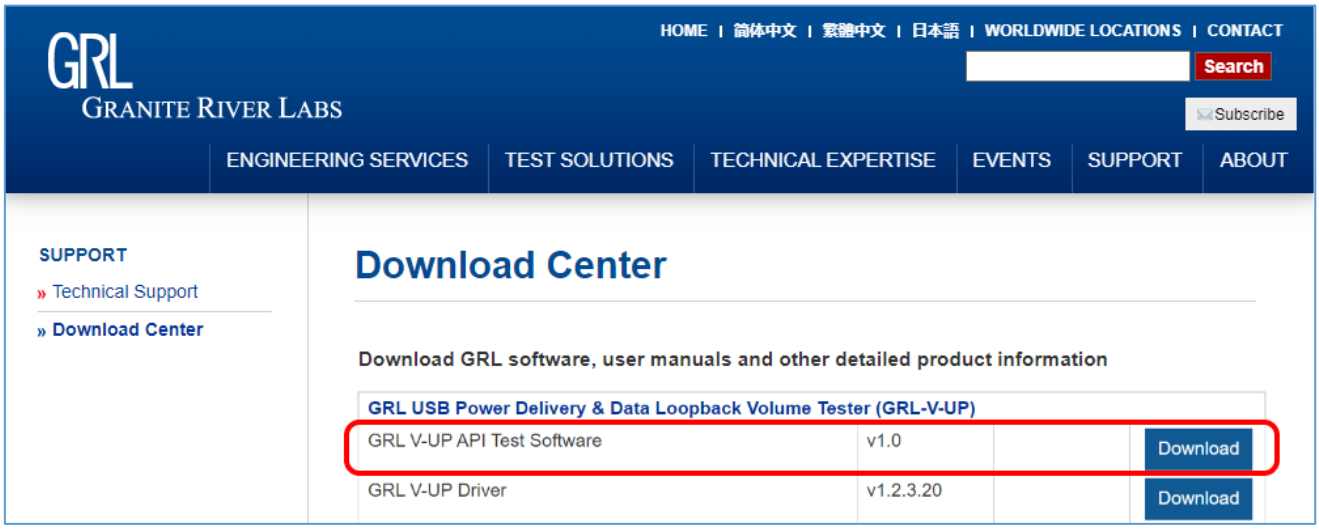

FIGURE 3.1: GRL SUPPORT DOWNLOAD CENTER PAGE

2. On the Windows 10 control computer to be used for running the GRL-V-UP API Test software, create a folder and download the software installer compressed archive (ZIP file). On the Download Center page, select the "Download" button associated with the latest GRL-V-UP API Test software version. Enter the required information and select the "Download" button:

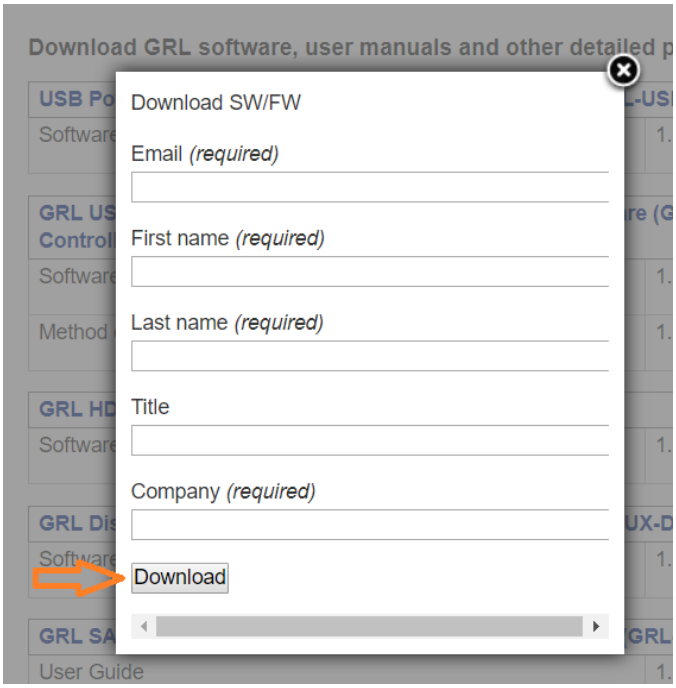

FIGURE 3.2: DOWNLOAD INFORMATION

3. Save the ZIP archive in a convenient folder and extract the GRL-V-UP API Test software installer by right-clicking the downloaded archive and selecting “Extract All”.
4. Run the installer by double clicking the extracted executable.
5. Make sure to click “Yes” when the system prompt asks if you want to allow the installer to make changes to your system. Then follow the on-screen instructions to run installation for the GRL-V-UP API Test software.

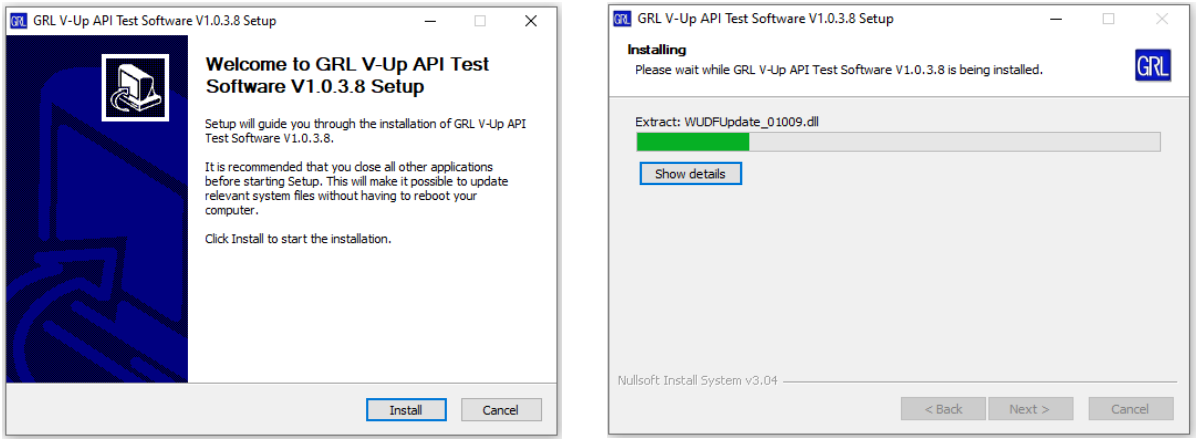

FIGURE 3.3: GRL-V-UP API TEST SOFTWARE INSTALLATION IN PROGRESS

6. While installation is running, a Command prompt window for GRL-V-UP USB drivers installation will pop up as shown in Figure 3.4. Type “YES” and press the “Enter” key to install the USB drivers. Once the drivers have been installed, the user will be asked to press any key as shown in Figure 3.5. This will complete the driver installation and will go on to begin installation for GRL-V-UP Arduino drivers.

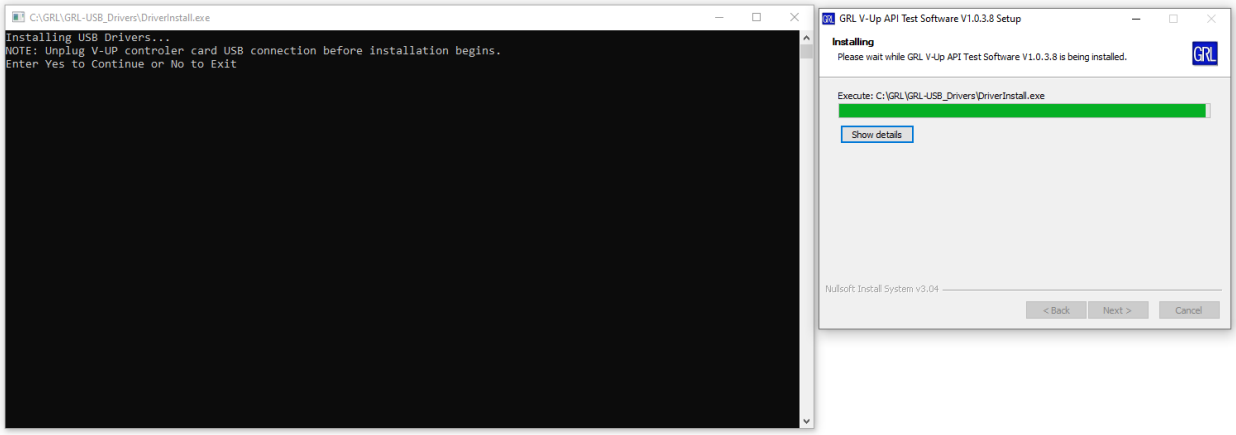

FIGURE 3.4: GRL-V-UP USB DRIVERS INSTALLATION IN PROGRESS #1

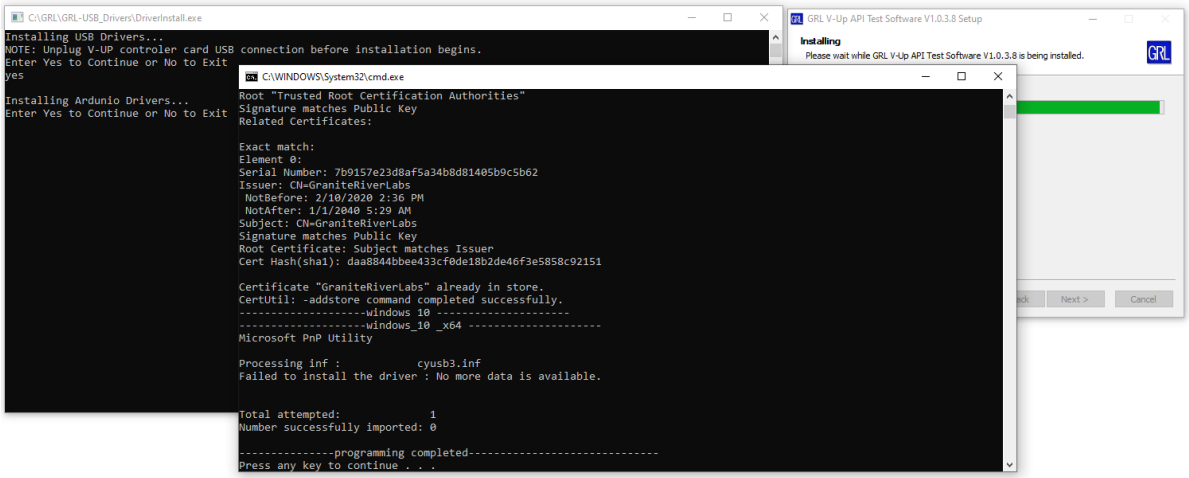

FIGURE 3.5: GRL-V-UP USB DRIVERS INSTALLATION IN PROGRESS #2

7. When prompted for GRL-V-UP Arduino drivers installation as shown in Figure 3.6, type "YES" and press the "Enter" key to install the drivers.

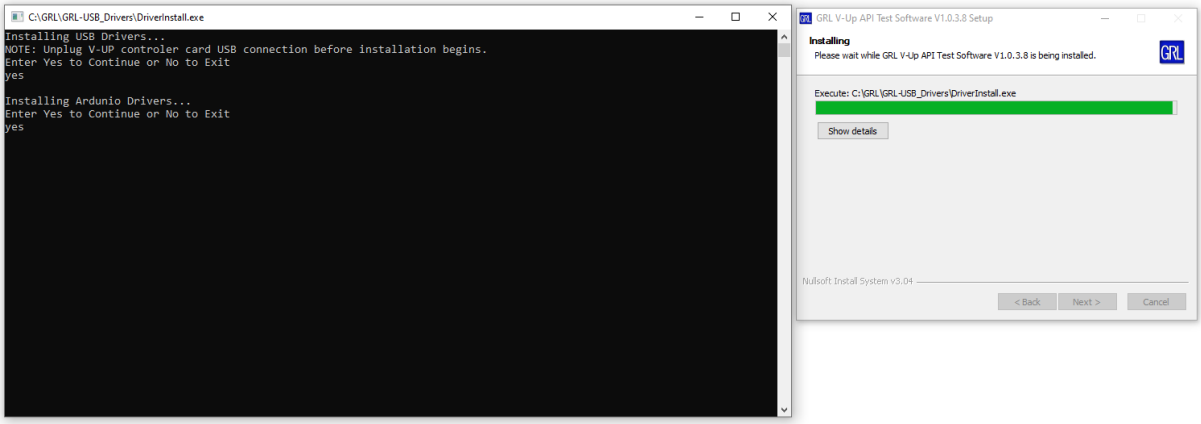

FIGURE 3.6: GRL-V-UP ARDUINO DRIVERS INSTALLATION IN PROGRESS

8. Once the drivers installation is completed, click on the "Finish" buttons to complete the GRL-V-UP API Test software installation as shown in Figure 3.7.

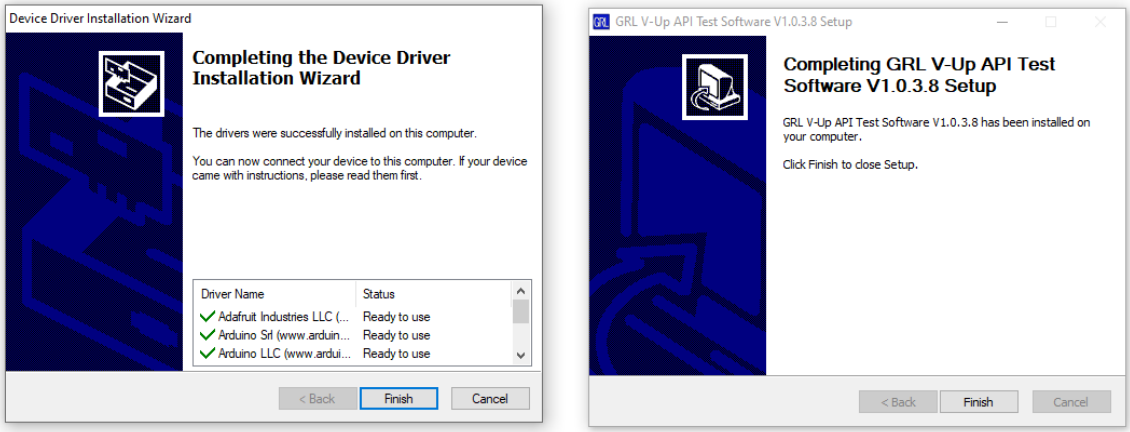

FIGURE 3.7: GRL-V-UP API TEST SOFTWARE INSTALLATION COMPLETED

4 Start Up and Navigate GRL-V-UP API Test Software

Once installed, launch the GRL-V-UP API Test software. There are four main tabs on the left side of the software screen as follows:

- API
- Graph
- Loopback
- Help

Each of these tabs will display its respective functional screen when selected.

4.1 API Tab

Select this tab to access all API components for controlling the GRL-V-UP tester.

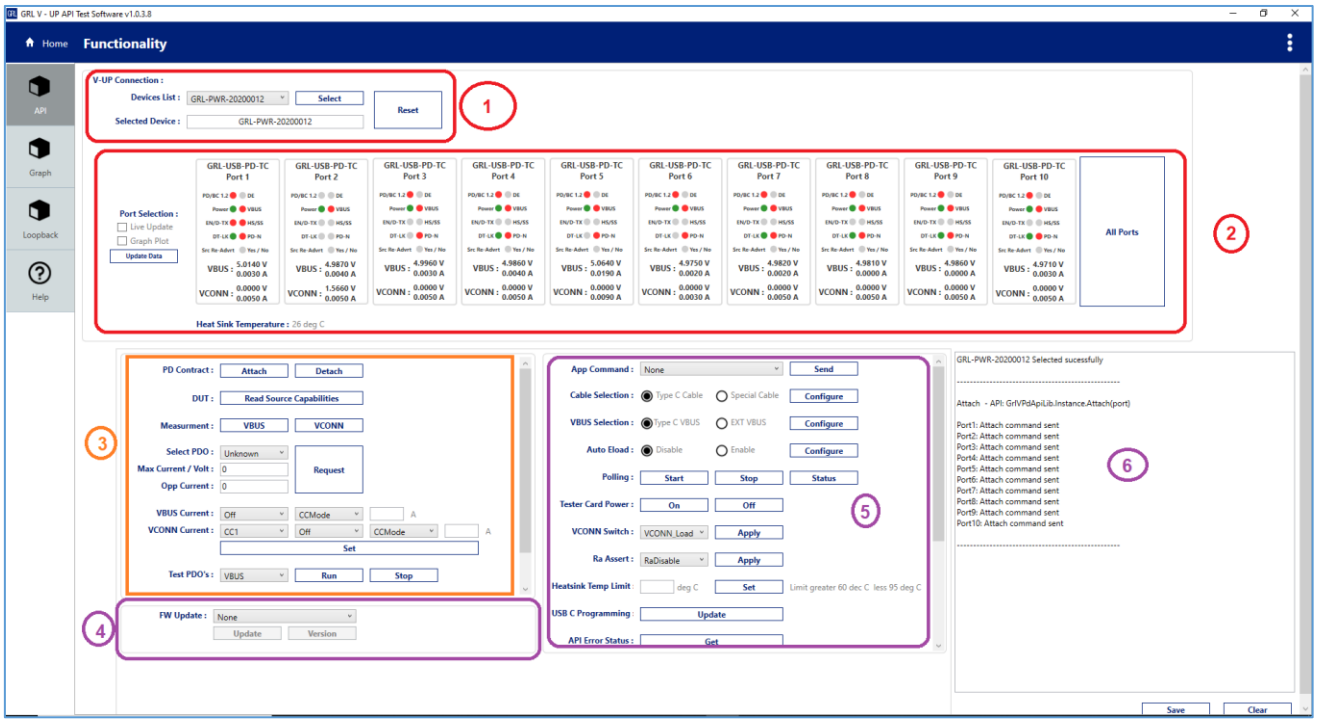

FIGURE 4.1: GRL-V-UP API TEST SOFTWARE API TAB SCREEN

Below describes each pane (as numbered in Figure 4.1 above) on the API tab screen:

4.1.1 (1) GRL-V-UP Connection Pane

In this pane the user can select to control a GRL-V-UP tester unit connected to the control computer from the **Devices List** drop-down menu. Click on the **Select** button and the selected tester unit will be displayed in the **Selected Device** field. The user can also perform a reset for the selected tester unit by clicking on the **Reset** button.

4.1.2 (2) GRL-V-UP Port Selection & Live Data Update Pane

In this pane the user can select active tester card port(s) on the GRL-V-UP tester or all ports (by clicking on the **All Ports** button) to perform live data update and plot graphs.

- Select the **Live Update** checkbox and click on the **Update Data** button to perform live updates of all LED components on the tester cards, VBUS voltage & current, VCONN voltage & current, Source Re-Advertise and Heat Sink Temperature data of the tester for the selected port(s).
- Select the **Graph Plot** checkbox and click on the **Update Data** button to plot live graph traces for the selected port(s).

4.1.3 (3) GRL-V-UP USB Power Delivery Programming Pane

In this pane the user can perform USB Power Delivery (PD) related operations such as Attach / Detach the DUT during PD contract negotiation, read the Source Capabilities of the DUT, request PDO's, set Load current and test PDO's.

4.1.4 (4) GRL-V-UP Firmware Update Pane

In this pane the user can select from the **FW Update** drop-down menu to perform firmware updates for the controller card, tester card, USB Power Delivery controller and E-Load on the GRL-V-UP tester. Click on the **Update** button to start updating the firmware for the selected component.

The user can also click on the **Version** button to verify the current firmware version on the GRL-V-UP tester. Alternatively, the user can access through the Help tab screen as shown in Figure 4.2 below.

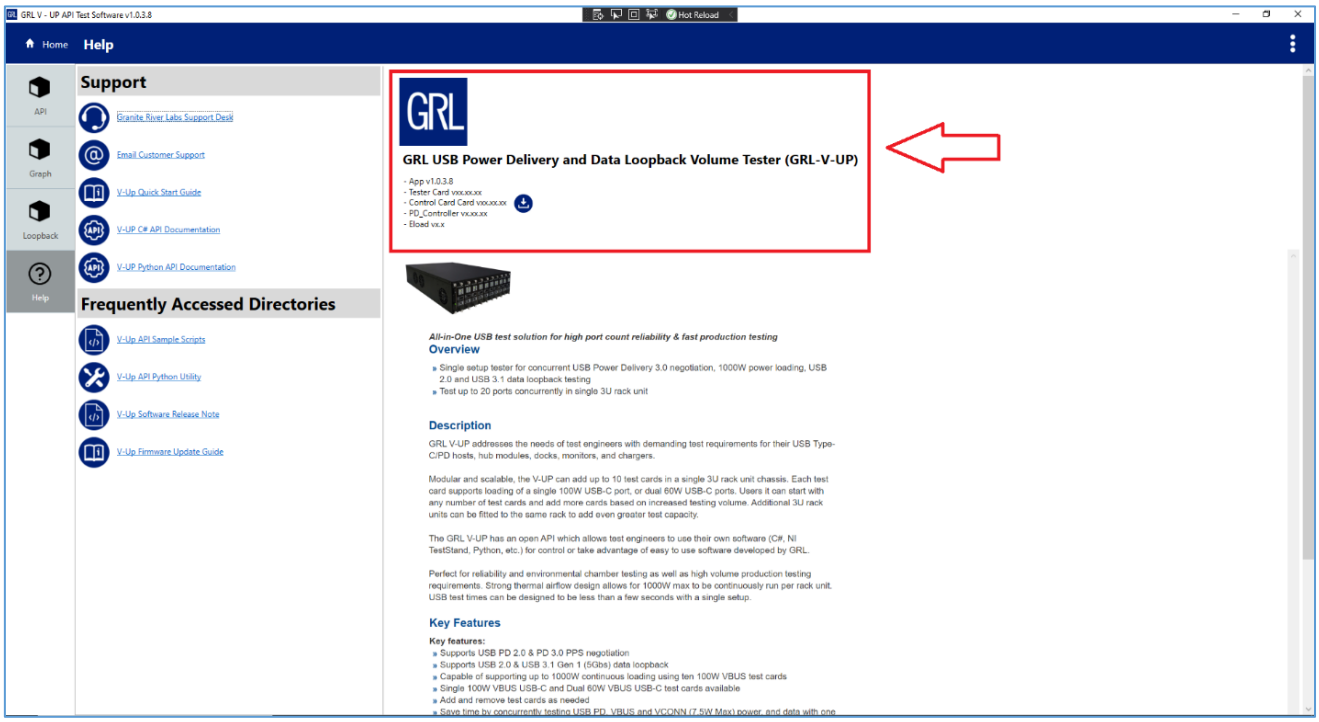

FIGURE 4.2: CHECK FIRMWARE VERSION ON GRL-V-UP API TEST SOFTWARE HELP TAB SCREEN

4.1.5 (5) GRL-V-UP Miscellaneous API Configuration Pane

In this pane the user can configure and apply various API controls / functionalities such as controller fan switch, tester card power, USB cable selection, VCONN switch and so on.

4.1.6 (6) GRL-V-UP API Activity Log Pane

This pane will display a log of all user activity carried out through the API Tab screen.

4.2 Graph Tab

Select this tab to view a graphical representation of the VBUS voltage & current for all active ports on the GRL-V-UP tester. The user can also select to view traces for specific ports using the checkboxes at the top right of each graph plot.

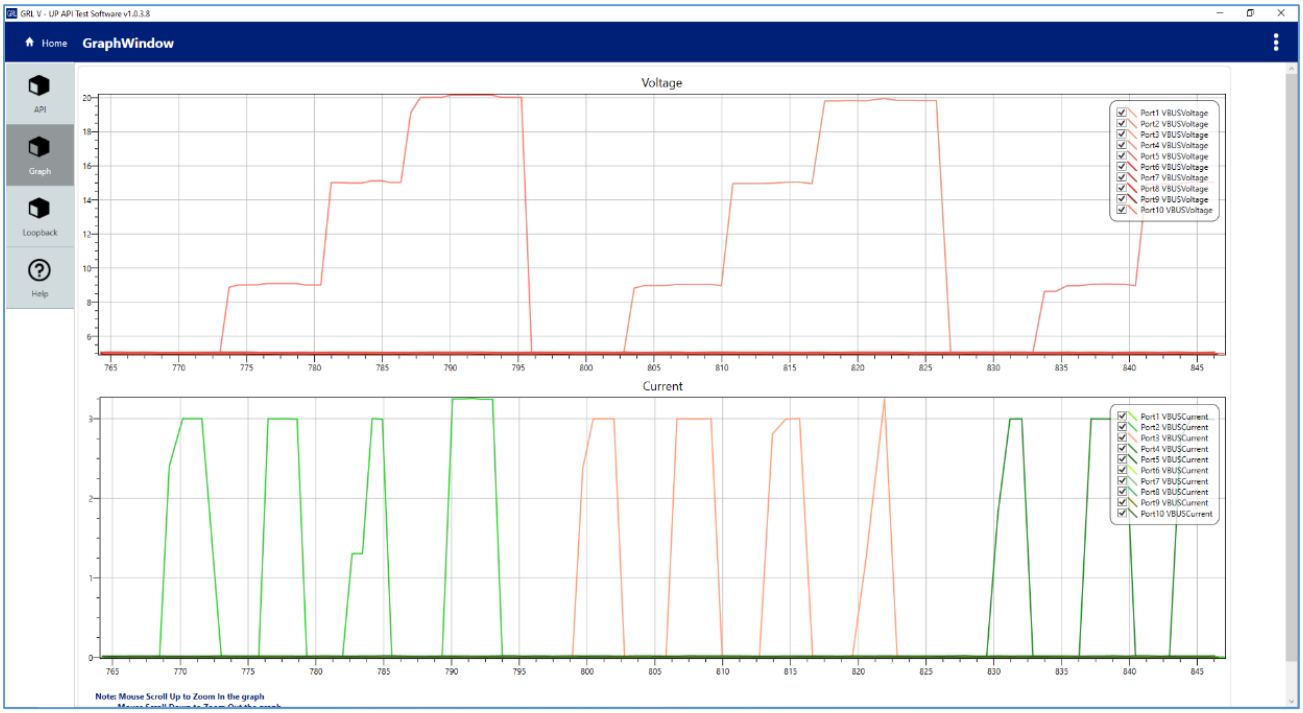

FIGURE 4.3: GRL-V-UP API TEST SOFTWARE GRAPH TAB SCREEN

4.3 Loopback Tab

Select this tab to perform data loopback testing. The user can select from the **Devices List** drop-down menu the DUT's with loopback capability that are connected to the tester cards on the GRL-V-UP tester. Click on the **Select** button and the selected loopback device will be displayed in the **Selected Device** field.

Click on the **Start** button to run the loopback testing and **Stop** button to terminate the process. The data transfer, speed and status will be updated continuously as the loopback test is running.

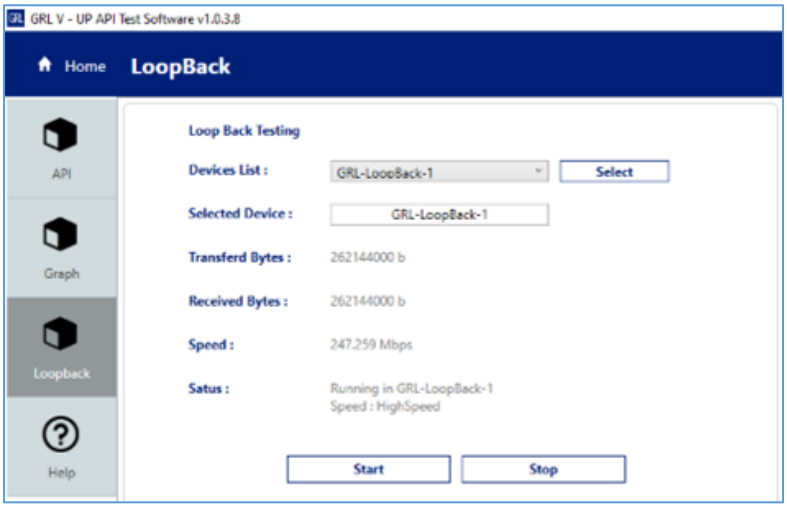

FIGURE 4.4: GRL-V-UP API TEST SOFTWARE LOOPBACK TAB SCREEN

4.4 Help Tab

Select this tab access GRL support information as well as related documentation, C# & Python API user documentation, sample scripts, software release notes, firmware update documentation and latest firmware released version.

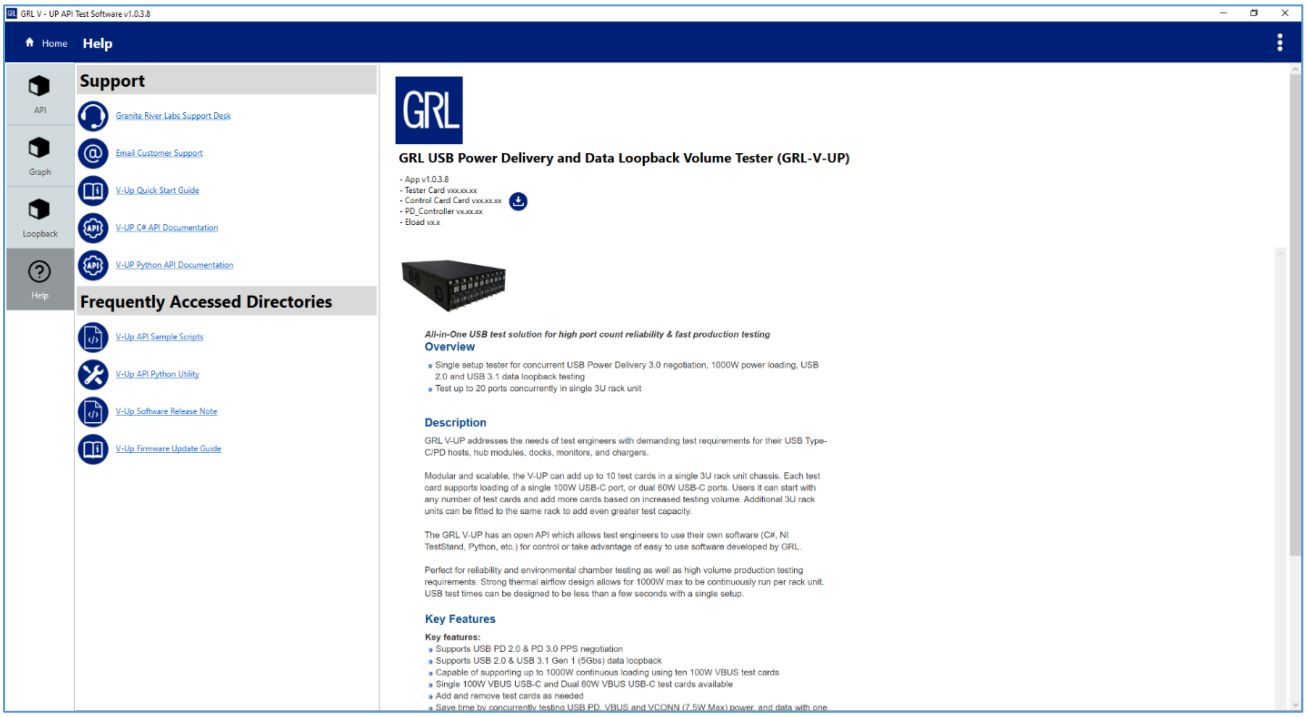

FIGURE 4.5: GRL-V-UP API TEST SOFTWARE HELP TAB SCREEN

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