

Granite River Labs

Quick Start Guide

For GRL-V-DPWR Functionality API Software Using GRL USB Power Delivery Dual Role Power & Data Loopback Tester (GRL-V-DPWR)

	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	IP Address :	
Port Selection	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	192.168.0.24	
Live Update Graph Plot	Connect	Connect	Connect	Connect	Connect	Connect	Connect	Connect	Connect	Connect	
Stop updating	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	GRL-USB-PD-TC	
	192.100.0.24	192.100.0.24	192.106.0.24	192.108.0.24	192.108.0.24	192.106.0.24	192.100.0.24	192.108.0.24	192.100.0.24	192.100.0.24	
da Salaction	Poyac 1.2 O DE	Poyec 12 O DE	Po/BC 12 0 DE	Poyec 1.2 0 04	Poyac 1.2 DE	Poyec 1.2 DE	Po/ec 12 OE	Poyec 1.2 0 DL Power 0 VBUS	Poyse 12 0 DE	Poytec 1.2 0 DE	
Sink ©	EN/D-TX 🕘 🔘 HS/SS	EN/D-TX 🔘 🔘 HS/SS	EN/D-TX I HS/SS	EN/D-TX @ @ HS/SS	EN/D-TX () () HS/SS	EN/D-TX @ @ H5/SS	EN/D-TX 🔘 🔘 HS/SS	EN/D-TX @ @ HS/SS	EN/D-TX @ @ HS/SS	EN/D-TX 🕘 🔘 HS/SS	
Source	DT-LK 🔘 🔴 PD-N	DT-LK 🔘 🍎 PD-N	DT-LK 🔘 🔴 PD-N	DT-LK 🔘 😑 PD-N	DT-LK 🔘 😑 PD-N	DT-LK 🔘 🔴 PD-N	DT-LK PD-N	DT-LK 🛞 🔴 PD-N	DT-LK 🔘 🔴 PD-N	DT-LK 🔘 🔴 PD-N	All Ports
DRP	Sec Re-Advet Wes / No	Sec Re-Advet Wes / No	Sec Re-Advet Vet / No	Sec Ro-Advert () Yes / No	Sec Re-Advet Wes / No	Sec Re-Advet () Yes / No	Sec Re-Advet () Yes / No	Sec Re-Advert @ Yes / No	Sec Ro Advet () Yes / No	See Re-Advet Wes / No	
et Mode	VBUS : 0.0040 A	VBUS : 0.0030 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0040 A	VBUS : 0.0030 A	
	VCONN : 0.0010 V	VCONN : 0.0010 V	VCONN : 0.0010 V	VCONN : 0.0010 V	VCONN : 0.0010 V	VCONN : 0.0010 V	VCONN : 0.0010 V				
Select PDO : urrent / Volt : 0 Jpp Current : 0	VONE ·	Request		VBUS E-Load Off	Vco	NN E-Load Off			123317617.	192 168.0.24 : Connecting 192 168.0.24 : Connecting SRL-USB-PD-TC Internet Internet SRL-USB-PD-TC Internet Internet Internet Internet Internet Internet Internet Internet Internet Internet Internet Internet Internet Internet Inte	USE-PO Dual Role & Data Loopback T DFMP-2022002 92.169.4 V-DPWR
							-			VBUS Serite	

This material is provided as a reference to get started with the Granite River Labs (GRL) GRL-V-DPWR Functionality API Software for controlling the GRL USB Power Delivery Dual Role Power & Data Loopback Tester (GRL-V-DPWR).

For customer support, contact support@graniteriverlabs.com.



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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 likelyto cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

"THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATING 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.





This symbol indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.



Exclamatory mark for 100 W consumption.

Warning: The maximum rating for each Tester card in GRL-V-DPWR is 100 W (20 V, 5 A) through the USB Type-C Port. Please do not load/source beyond the limit.

Safety Precautions:

- Care must be taken while lifting and carrying the GRL-V-DPWR tester.
- There are no serviceable parts inside the GRL-V-DPWR tester. Unauthorized access to internal parts can lead to safety hazard and void warranty.
- Check power cord for any damage periodically.
- Check power rating before connecting the GRL-V-DPWR tester to AC mains.
- Ensure proper earthing of the GRL-V-DPWR tester.



TABLE OF CONTENTS

TA	BLI	E OF CONTENTS	5
1	SC	COPE OF THIS QUICK START GUIDE	7
2	AC	CCESSORIES REQUIRED FOR GRL-V-DPWR HARDWARE SETUP	7
3	СС	ONNECTION SETUP OF GRL-V-DPWR	8
	3.1	SET UP REAR CONNECTIONS OF GRL-V-DPWR	9
	3.2	Power ON GRL-V-DPWR Tester Hardware	
	3.3	VERIFY GRL-V-DPWR TESTER HARDWARE ETHERNET CONNECTION	
	3.4	Ping Check	
4	GF	FTTING STARTED WITH GRI -V-DPWR API TEST SOFTWARE	14
•	- 4 1		- • 14
5	ST	TART UP AND NAVIGATE GRL-V-DPWR API TEST SOFTWARE	18
	5.1	CONNECT & START UP GRL-V-DPWR API TEST SOFTWARE	
	5.2	ΑΡΙΤΑΒ	20
	5.2 5.2	2.1 (1) GRL-V-DPWR Connection Pane	
	5.2	2.2 (2) GRL-V-DPWR Port Selection & Live Data Update Pane	
	5.2	2.3 (3) GRL-V-DPWR Mode Selection	
	5.2	2.4 (4) GRL-V-DPWR Programming Pane	
	5.2	2.5 (5) GRL-V-DPWR API Activity Log Pane/Output Window	
	5.2	2.6 (6) Save / Clear GRL-V-DPWR Configuration	
	5.2	2.7 Update GRL-V-DPWR Firmware	
	5.3	GRAPH ТАВ	
	5.4	LOOPBACK ТАВ	
	5.4	4.1 Perform Loopback Testing	
	5.5	Негь Тав	
6	SP	PECIFICATIONS	40
	6.1	Physical Specifications	40
	6.2	ELECTRICAL SPECIFICATIONS	40
	6.3	OPERATING SPECIFICATIONS	40
	6.4	STORAGE SPECIFICATIONS	40
	6.5	TRANSPORTATION SPECIFICATIONS	
GR	L-V-D	DPWR Functionality API Software Quick Start Guide	Rev4.5
© (Grani	ite River Labs 2024 Version 4.5, June 2024. Updated 06.05.2024	Page.5



7 MAINTENANCE AND REPAIR

7.1 Ge	ENERAL MAINTENANCE AND CARE	
7.1.1	Inspection and Cleaning	
7.1.2	Mechanical Maintenance	
7.1.3	Electrical Maintenance	
7.1.4	Calibration Maintenance and Intervals	
7.1.5	Tools	

42



1 Scope of this Quick Start Guide

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

For more information on GRL-V-DPWR, please refer to <u>https://www.graniteriverlabs.com/en-us/test-solutions/functional-interop-production/grl-v-dpwr</u>.

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

2 Accessories Required for GRL-V-DPWR Hardware Setup



24 V DC Power Supply







Ethernet Hub (if required)



USB Hub (if required)



3 Connection Setup of GRL-V-DPWR

Figure 1 below shows an example hardware setup for testing a USB Type-C/Power Delivery based DUT using the GRL-V-DPWR software running on a control computer and connected via Ethernet to the GRL-V-DPWR tester hardware that is attached to the USB device to be tested through the tester's USB Type-C test port.







3.1 Set Up Rear Connections of GRL-V-DPWR

Figure 2 shows the rear input connection ports of the GRL-V-DPWR tester hardware to connect to the Power cable, Ethernet LAN cable and USB cables as described below.



- Figure 2. Rear Hardware Connection Ports for GRL-V-DPWR Tester
 - a. Connect the LAN cable to the Ethernet port between the Control PC and GRL-V-DPWR tester hardware (use an Ethernet hub if required).
 - b. Connect the power adapter to a 230 V AC input and the adapter output to the 24 V DC Power IN interface of the GRL-V-DPWR tester hardware.
 - c. Connect a USB Type-A to Type-B cable from the Control PC to the USB port to update the Connectivity Manager firmware.
 - d. Connect a USB Type-A to mini-B cable from the Control PC to the E-Load FW Update port to update the E-load firmware (use a USB hub if required).

Refer to Figure 3 below for connection setup of the above cables:



Figure 3. Rear Hardware Connection Setup for GRL-V-DPWR Tester



3.2 Power ON GRL-V-DPWR Tester Hardware

Power ON the GRL-V-DPWR tester hardware using the Power switch on the front of the tester and check for the following LED indications:

- Power LED continuously ON
- DT-LK Turns ON initially and OFF after booting.
- PD-N Blinks twice while booting and goes OFF.

Check the LCD display of the GRL-V-DPWR tester hardware which should show the 'VDPWR-<serial number>' and IP address of the tester.



Figure 4. GRL-V-DPWR Power ON

3.3 Verify GRL-V-DPWR Tester Hardware Ethernet Connection

The Ethernet port on the control computer needs to be configured correctly for the GRL-V-DPWR tester hardware to recognize the control computer and vice versa.

To make sure the network connection is set up correctly, open the Network Connections panel from the Control Panel as shown in the following examples.





Figure 5. Network Connections Before Connecting GRL-V-DPWR

Open the Ethernet panel for the Ethernet port that will connect to the GRL-V-DPWR tester hardware, select "Internet Protocol Version 4 (TCP/IPv4)" and click on the "Properties" button below and to the right.

Ethernet 5 Properties								
Networking Sharing								
Connect using:								
🛃 ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter								
Configure This connection uses the following items:								
✓ ✓								
Install Uninstall Properties								
Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks. OK Cancel								

Figure 6. Ethernet Properties

Set up the TCP/IPv4 properties as shown in the example below.



eneral	
You can get IP settings as this capability. Otherwise, for the appropriate IP set	signed automatically if your network supports you need to ask your network administrator tings.
Obtain an IP address	automatically
• Use the following IP	address:
IP address:	192.168.0.2
Subnet mask:	255.255.255.0
Default gateway:	
Obtain DNS server a	ddress automatically
Use the following DN	S server addresses:
Preferred DNS server:	
Alternative DNS server:	
	on exit

Figure 7. Ethernet Properties with TCP/IPV4 Selected

Select a static IP address ("Use the following IP address:") which should be 192.168.0.*n* where *n* is any number between 2 and 255. The subnet mask should be 255.255.255.0 and the rest of the items should remain unchanged.

Click on the "OK" button on the Internet Protocol Properties and close the Ethernet Properties. Make sure the GRL-V-DPWR tester hardware is powered on and completely booted up and then connect the Ethernet cable from the GRL-V-DPWR tester hardware to the computer's Ethernet port that was just set up. The network connections window should now look as shown in the following example:



Figure 8. Network Connections After Setup and Connection of GRL-V-DPWR

The GRL-V-DPWR tester hardware is now set up and ready for use.





3.4 Ping Check

1. Open the command prompt window and check for the Ping. (The IP address of the GRL-V-DPWR tester hardware will be available in the tester's front display).



- Figure 9. Ping Check in Command Prompt Window
 - 2. Connect the GRL-V-DPWR tester hardware to the Control PC and navigate the API Test software using the IP address.



4 Getting Started with GRL-V-DPWR API Test Software

This section describes how to get started with the GRL-V-DPWR 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. Download and install the latest version of GRL-V-DPWR API Test software on the control computer (laptop or desktop) connected to the GRL-V-DPWR tester hardware. (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-DPWR tester hardware has been updated to the latest firmware version. Refer to Section 5.2.7 for details.

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

4.1 Install GRL-V-DPWR API Test Software

- 1. Download the GRL-V-DPWR API Test software from: <u>http://graniteriverlabs.com/download-center/</u>.
- On the Windows 10 control computer to be used for running the GRL-V-DPWR 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-DPWR API Test software version.
- 3. Save the ZIP archive in a convenient folder and extract the GRL-V-DPWR 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-DPWR API Test software.





Figure 10. GRL-V-DPWR API Test Software Installation in Progress

6. While installation is running, a Command prompt window for GRL-V-DPWR USB driver installation will pop up as shown in Figure 11 below. 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 12. This will complete the driver installation and will proceed to begin installation for GRL-V-DPWR Arduino drivers.



Figure 11. GRL-V-DPWR USB Drivers Installation in Progress #1



🖾 C:\WINDOWS\System32\cmd.exe		×
Related Certificates:		
Exact match: Element 0: Serial Number: 7b9157e23d8af5a34b8d81405b9c5b62 Issuer: CN=GraniteRiverLabs NotBefore: 10-02-2020 02:36 PM NotAfter: 01-01-2040 05:29 AM Subject: CN=GraniteRiverLabs Signature matches Public Key Root Certificate: Subject matches Issuer Cert Hash(sha1): daa8844bbee433cf0de18b2de46f3e5858c92151		
Certificate "GraniteRiverLabs" already in store. CertUtil: -addstore command completed successfully. 		
Processing inf : cyusb3.inf Successfully installed the driver. Driver package added successfully. Published name : oem28.inf		
Total attempted: 1 Number successfully imported: 1 programming completed Press any key to continue		

Figure 12. GRL-V-DPWR USB Drivers Installation in Progress #2

7. When prompted for GRL-V-DPWR Arduino driver installation as shown in Figure 13 below, type "YES" and press the "Enter" key to install the drivers.



Figure 13. GRL-V-DPWR Arduino Drivers Installation in Progress

8. Once the driver installation has completed, click on the "Finish" buttons to complete the GRL-V-DPWR API Test software installation as shown in Figure 14.





Figure 14. GRL-V-DPWR API Test Software Installation Completed



5 Start Up and Navigate GRL-V-DPWR API Test Software

Once installed, launch the GRL-V-DPWR API Test software as described below.

5.1 Connect & Start Up GRL-V-DPWR API Test Software

Follow the steps below to connect and start using the GRL-V-DPWR API test software:

1. Open the GRL-V-DPWR API test software and connect the GRL-V-DPWR tester hardware to the control computer using an Ethernet cable. Figure 15 below shows no connection has yet to be established with the tester hardware.

IP Address : 192.168.0.1 Connect	IP Address : 192.168.0.30 Connect	IP Address : 192.168.0.25 Connect	IP Address : 192.168.0.16 Connect	IP Address : 192.168.0.4 Connect	IP Address : 192.168.0.4 Connect	IP Address : 192.168.0.4 Connect	IP Address : 192.168.0.4 Connect	IP Address : 192.168.0.4 Connect	IP Address : 192.168.0.4 Connect	
GRL-USB-PD-TC Not Connected Point 1.2 De Point 0405 END-TX H45/35 DT-LK Point Sec Re-Adort Visc / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected Poyle 1.2 © D4 Power © VBUS EN/D-TX © HSUSS D1-UK © PO N Scc Re Adurt © YBC/ No VBUS : VCONN :	GRL-USB-PD-TC Not Connected PO/Sc12 DE PO/Sc12 DE EN/OTX HISS DT-KK PON Scc Re-Advrt Visc / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected P0/8c12 © DE Power © VIUS EN/D-TX © H5/2S DT-LK © PD-N Sec Re-Mert © Yes / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected PO/BCI2 © DE PO/BCI2 © DE EN/D-TZ © DE USDS DI LK © PO N Sec Re-Advet © Yes / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected P0%12 © DE P0%12 © DE EN/0-TX © H5/25 DT-LK © P0 N Src Re-Adurt © Yes / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected P0%12 © DE Power © VUUS EN/D-TX © H5/25 DT-UK © PD-N Src Re-Adurt © Yes / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected P0/8c12 © DE P0/8c12 © DE Power © VUUS EN/0-TX © H5/25 D1:UK © PO-N Src Re-Advrt © Yer / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected Polse12 © DE Polse12 © DE Polse VUIDS EN/D-TX © H5/255 DT-LK © PD-N Ser Re-Adert © Yes / No VBUS : VCONN :	GRL-USB-PD-TC Not Connected PO/Sc12 © DE Power © VUUS EN/D-TX © H5/25 DT-UX © PD-N Src Re-Advrt © Yer / No VBUS : VCONN :	All Ports
Temp : 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp: 0 deg C	Temp : 0 deg C	

- Figure 15. GRL-V-DPWR API Test Software Showing No Connection Establishment with Tester
 - Enter the IP Address of the GRL-V-DPWR tester hardware and click on the Connect button. The IP address will be displayed below the Connect button of the respective port when connected successfully. All LED components on the tester cards, VBUS voltage & current, VCONN voltage & current, Source Re-Advertise and Heat Sink Temperature data of the tester hardware for the connected port(s) will also be displayed.

IP Address : 192.168.0.31 Connect										
GRL-USB-PD-TC										
192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	192.168.0.31	
PD/BC 1.2 🛑 🔘 DE	PD/8C 1.2 🛑 🔘 DE	PD/BC 1.2 🛑 🔘 DE	PD/BC 1.2 🛑 🔘 DE	PD/8C 1.2 🛑 🔘 DE	PD/8C 1.2 🛑 🔘 DE	PD/BC 1.2 🛑 🔘 DE	PD/8C 1.2 🛑 🔘 DE	PD/8C 1.2 🛑 🔘 DE	PD/BC 1.2 🛑 🔘 DE	
Power 🔵 🔴 VBUS	Power 🔵 🛑 VBUS	Power 🔵 🛑 VBUS	Power 🔵 🔴 VBUS	Power 🔵 🔴 VBUS	Power 🔵 😑 VBUS	Power 🔵 🛑 VBUS	Power 🔵 🛑 VBUS	Power 🔵 🔴 VBUS	Power 🔵 🛑 VBUS	
EN/D-TX 🔘 🔘 HS/SS										
DT-LK 🔘 🔴 PD-N	All Ports									
Sec Re-Advet 🔘 Yes / No	Sec Re-Advet 🔘 Yes / No	Src Re-Advrt 🕘 Yes / No	Sec Re-Advet 🔘 Yes / No	Sec Re-Advet No Yes / No	Src Re-Advrt 🔘 Yes / No	Src Re-Advrt 🔘 Yes / No	Src Re-Advrt 🔘 Yes / No	Src Re-Advrt 🔘 Yes / No	Src Re-Advrt 🔘 Yes / No	
VBUS : 4.9700 V 0.0020 A	VBUS : 4.9500 V 0.0020 A	VBUS : 4.9730 V 0.0030 A	VBUS : 4.9610 V 0.0030 A	VBUS : 4.9770 V 0.0030 A	VBUS : 4.9610 V 0.0030 A	VBUS : 4.9490 V 0.0020 A	VBUS : 4.9490 V 0.0020 A	VBUS : 4.9770 V 0.0030 A	VBUS : 4.9500 V 0.0020 A	
VCONN : 0.0000 V 0.0050 A										
Temp: 24 deg C										

- Figure 16. Check Tester Connection Establishment
 - 3. Observe the LED's in the GRL-USB-PD-TC tester card as shown in Figure 17 below.



Figure 17. Observe LED's in GRL-USB-PD-TC Tester Card

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- **Power LED** should turn **ON** for all attached GRL-USB-PD-TC tester cards.
- **DT-LK LED** should turn **ON** and then turn **OFF**.
- After the DT-LK LED turns off, check that the **PD-N (Red) LED** blinks twice and then turns OFF.
- LED specifications:

LED Type	LED Name	Functionality	Indication				
		USB Power Delivery or USB BC	Red for USB Power Delivery mode				
Dual Color	PD/BC 1.2	1.2 mode indication	Green for USB BC 1.2 mode				
	25		Red indicates data error in data loopback and firmware update				
Dual Color	DE	Data error indication	Green indicates no error in data loopback and firmware update				
Single Color	Power	Tester card power on indication	Green indicates that the tester card is powered on				
Single Color	VBUS	VBUS status indication	Red indicates that VBUS is present				
		Main link communication	Red indicates that enumeration is successful for data loopback				
Dual Color	EN/D-TX	indication	Green indicates that data transmission is in progress for data loopback				
			Red indicates High Speed for the USB Type-C 2.0 cable				
Dual Color	HS/SS	Link speed indication	Green indicates Super Speed for the USB Type-C 3.0 cable				
Single Color	DT-LK	Data loopback indication or	Green with blinking indicates that data transmission is happening during firmware update				
		LED ON/OFF indication	LED ON/OFF indicates each API command sent to the tester				
Single Color	gle Color PD-N USB Power Delivery negotiation indication		Red indicates that USB Power Delivery negotiation is successful				

Virtual indication on the GRL-V-DPWR API software user interface:

Indication Type	Indication Name	Functionality	Indication
Single Color	Src Re-Advrt	Source capabilities re-advertise indication	Green indicates when the DUT Source capabilities re-advertise from actual



There are four main tabs on the left of the GRL-V-DPWR API software screen as follows:

- API
- Graph
- Loopback
- Help

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

5.2 API Tab

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

🤣 GRL 🛛 🗸	DPWR Function	nality											:
API Graph	2 Port Selection Uve Update Graph Plot Update Data	IP Address : 192.168.0.1 Connect GRL-USB-PD-TC Not Connected Po/BC12	IP Address : 192.168.0.30 Connect GRL-USB-PD-TC Not Connected Poysc 12 0 01	IP Address : 192.168.0.25 Connect GRL-USB-PD-TC Not Connected P0/BC 12 © 05	IP Address : 192.168.0.16 Connect GRL-USB-PD-TC Not Connected Poyrs 1.2 0 0 s	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected PO/8C 12 0 04	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected Ports 12 0 04	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected PO/BC12 © 06	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected Poac 12 0 06	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected Po/ac 12 0 06	IP Address : 192.168.0.4 Connect GRL-USB-PD-TC Not Connected Poysc 12 © 05)(1)	
Loopback (?) Help	Mode Selection Sink Source DRP Get Mode	Prese to the second sec	Prese Uto EN-O-TX HS/ISS OF LK O-TX HS/ISS OF LK O-TX From Provide The Provide VBUS : VEONN : Temp: 0 deg C	Press 0 VES EN/OFTX 0 HK/SS DF14X 0 HO-N Src Re-Advert 0 VEU/No VBUS : VCONN : Temp: 0 deg C	VIEW END-TX HISSS DT LX HISSS DT LX PAN Sec Re-Adent Vier/No VBUS : VCONN : Temp: 0 deg C	Prese UND END-TX HAS DT-LK HO-NS STC Re-Adert Mm / No VBUS : VCONN : Temp: 0 deg C	Prever Utbis EN-O-TX HS/SS DT-LX PO-N Sec Re-Advert Vers/No VBUS : VCONN : Temp: 0 deg C	Preset This EVUD TX HIS/SS DT LX HO PO-N Sice Re-Advert Teer / No VBUS : VCONN : Temp: 0 deg C	Preser Union ENUO-TX HSUSS DT-LK PO-N Set Re-Advet Yes/No VBUS : VCONN : Temp: 0 deg C	Prese UNUS END-TX BHOS DT-LK BHOS DT-LK BHOS PD-N Src Re-Adert BHOS VBUS : VCONN : Temp : 0 deg C	Vew Constant	All Ports	2
ſ	Imp: Ddrg C										Gear		

Figure 18. GRL-V-DPWR API Test Software API Tab Screen

Below describes each pane (as numbered in Figure 18 above) on the API tab screen:

5.2.1 (1) GRL-V-DPWR Connection Pane

In this pane the user can select to control any active GRL-V-DPWR tester hardware port(s) connected to the control computer. Enter the **IP Address** of the GRL-V-DPWR tester hardware and click on the **Connect** button. The IP address will be displayed below the Connect button of the respective port when connected successfully.



5.2.2 (2) GRL-V-DPWR Port Selection & Live Data Update Pane

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

- 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 hardware tester for the connected port(s).
- Select the **Graph Plot** checkbox and click on the **Update Data** button to plot live graph traces for the connected port(s). The graph trace plots can be viewed in the Graph tab (see Section 5.3).

5.2.3 (3) GRL-V-DPWR Mode Selection

The user can set the Sink/Source/Dual Role Power (DRP) power role for the GRL-V-DPWR tester hardware by clicking on the respective button. Otherwise click on the **Get Mode** button to request the power capabilities of the tester hardware.

5.2.4 (4) GRL-V-DPWR Programming Pane

In this pane the user can perform USB Power Delivery (PD) related operations for the Sink or Source power role, perform firmware update and configure various controls / functionalities:

Sink Source Configuration Port Verification	
USB PD Function Verification	Quick Charge Verification
PD Contract : Attach Detach	QC 2.0 / 3.0 : QC3.0 · Enable Disable
DUT Source Caps : Read Source Capabilities	12V 12 V Set
Select PD0 : NONE NONE Max Current / Volt : 0 Request Opp Current : 0 PD PD Message : PD 2.0 Ping Messag * Send	Cable Configuration Cable Selection : • Type C Cable Cable Emulation : Config3A ACK Configure
Measurement : VBUS VCONN	Quick Test
	Source Extended Test: Test
Electronic Load Verification	Spec Revision Test : Test
VBUS Current : CCMode	PDO Load Test : Test
VCONN Current: CCMode CC1 0 A Set	Cable Flip Test : Test 5 No of times
VBUS E-Load Off VCONN E-Load Off	OCP Test : Test 100 mA
Set Auto Eload : PD Mode v 0 % Enable Disable	

5.2.4.1 Sink Tab

Figure 19. Sink Mode Operations

If the Sink or DRP power role is set for the GRL-V-DPWR tester hardware, the user can perform the following operations:



5.2.4.1.1 USB PD Function Verification Panel

- **PD Contract**: Attach or detach the DUT during USB Power Delivery contract negotiation by clicking on the respective button.
- **DUT Source Caps**: Read the Source capabilities of the DUT by clicking the button.
- Select PDO, Max Current / Volt and Opp Current: Select a Power Delivery Object (PDO) to be requested for the specified Load current and Operating current by selecting the **Request** button.
- **PD Message**: Select the USB Power Delivery specification standard of either 2.0 or 3.0 and the protocol message type to be sent and click on the **Send** button.
- **Measurement**: Select VBUS or VCONN to measure by clicking on the respective button.

5.2.4.1.2 Electronic Load Verification Panel

- **VBUS Current**: Select the constant current (CC) or constant resistance (CR) mode and enter the current rating to test against and click on the **Set** button.
- **VCONN Current**: Select the CC1 or CC2 pin, constant current (CC) or constant resistance (CR) mode and enter the current rating to test against and click on the **Set** button.
- VBUS E-Load Off / VCONN E-Load Off: Select the respective buttons to enable or disable E-Load for VBUS and VCONN.
- Set Auto Eload: Select from the following modes to be applied as automatic E-Load and enter the corresponding range value and click on the **Enable** or **Disable** button respectively.
 - PD Mode When enabled, this feature allows the user to limit the E-Load current draw within a range of 0 to 100%, ensuring that the requested PDO current draws in accordance with the specified percentage from the maximum current limit of the PDO.
 - QC Mode When enabled, this feature allows the user to draw E-Load current within a range of 0 to 3 A. [Note: Before using this feature, make sure to configure the Qualcomm[®] Quick Charge[™] (QC) parameters from the Quick Charge Verification panel (see Section 5.2.4.1.3 below).]
 - **Type C Mode** When enabled, this feature allows the user to draw E-Load current within a range of 0 to 3 A. [*Note: Before using this feature, make sure to configure the GRL-VDPWR tester hardware as a USB Type-C Sink using the "Config Tester as Type-C" settings from the Configuration tab (see Section 5.2.4.3).]*



5.2.4.1.3 Quick Charge Verification Panel

• **QC 2.0 / 3.0**: Select the Qualcomm[®] Quick Charge[™] (QC) specification if supported by the DUT and click on the button to enable or disable QC respectively. Select or enter the voltage rating to test against and click on the **Set** button.

5.2.4.1.4 Cable Configuration Panel

- **Cable Selection**: Select the standard USB Type-C cable or GRL-SPL/GRL-USB-PD-STC cable ("Special Cable") that is used to connect the DUT to the active tester ports and click on the **Configure** button.
- **Cable Emulation**: Select the 5 A or 3 A configuration mode with ACK, NAK or IGNORE command for the test cable and click on the **Configure** button. The GRL-VDPWR tester hardware will be configured as a cable for 3 A, 5 A capability without dependency of the EMCA cable.

5.2.4.1.5 Quick Test Panel

This feature facilitates the verification of a specific sequence of tests for the DUT.

- **Source Extended Test**: This feature assesses DUT's that can provide extended capabilities. To run the test, click on the **Test** button, and examine the output window for results.
- **Spec Revision Test**: Use this feature to check the revision level of the DUT by clicking on the **Test** button and examining the output window for results.
- **PDO Load Test**: This test verifies the DUT's ability to handle PDO's under various loads, ranging from minimum to maximum. To run the test, click on the **Test** button, and examine the output window for results.
- **Cable Flip Test**: This feature allows the user to effortlessly change the cable orientation without requiring any physical manipulation. [Note: This feature only works with the GRL-SPL/GRL-USB-PD-STC ("Special Cable") or USB pass through cable]. To run the test, enter the number of times to flip the cable and click on the **Test** button, and examine the output window for results.
- **OCP Test**: This feature tests the Over-Current Protection (OCP) level of each PDO within the DUT's source capabilities. To run the test, enter the starting point of current to start searching for the OCP trigger and click on the **Test** button, and examine the output window for results.



5.2.4.2 Source Tab

Sink	Source	Configuration	Port Verification	
Source Capabil Source PD Max Currrer	lities Configuration O (V) :	n 5 1		+
				-
				PDO Clear All
Source Quick (Charging / Testing	,		
Q	C 2.0 :	En	able	lisable
	OCP :	% En	able	lisable
DUT Sink	Caps : Get Sink	Cap Message 🔻	Set	

Figure 20. Source Mode Operation

If the Source or DRP power role is set for the GRL-V-DPWR tester hardware, the user can create a custom USB Power Delivery source for the DUT as follows:

5.2.4.2.1 Source Capabilities Configuration Panel

Source Capabilities Co Source PDO (V) :	nfiguration	
Max Currrent (A) :	3	
	PDO#1 Fixed : 5V 3A PDO#2 Fixed : 9V 3A PDO#3 Fixed : 12V 3A	^ + -
	PDO#4 Fixed : 15V 3A PDO#5 Fixed : 20V 3A	Load
	PDO#6 Variable : (3.3 ~ 16)V 3A PDO#7 Variable : (3.3 ~ 21)V 3A	Clear All

Figure 21. Source Capabilities Configuration Example

- **Source PDO (V) & Max Current (A)**: Set the Source PDO using the voltage and current sliders or type in the values. If the DUT supports Programmable Power Supply (PPS) power profiles, select the **PPS** check box and enter the APDO's values. To add more than one PDO with different voltages/current, click on the '+' button on the right and similarly set the voltage/current values for each added PDO.
- In case you want to remove an added PDO from the list, select the specific PDO and click on the '-' button on the right. To remove all added PDO's from the list, click on the **Clear All** button on the right.



- To load previously saved emulated USB Power Delivery source capabilities, click on the **Load PDO** button on the right.
- You can add up to a total of seven PDO's / APDO's (PPS) or a mixture of both PDO's and APDO's in order to fulfil the required source caps.

5.2.4.2.2 Source Quick Charging / Testing Panel

- **QC 2.0**: This feature enables the GRL-V-DPWR tester to offer QC functionality, allowing it to connect to any DUT which has QC access to utilize this feature. Select the respective buttons to enable or disable this feature.
- **OCP**: This feature allows the user to set the OCP level for the Source (GRL-V-DPWR tester). Based on the current request from the Sink, the Source will attempt to send a Hard Reset message when over-current protection engages followed by an Alert Message indicating an OCP event once an Explicit Contract has been established. Enter the OCP level % and select the respective buttons to enable or disable this feature.
- **DUT Sink Caps**: This feature allows the user to obtain the DUT's Sink capabilities along with raw data by clicking on the **Set** button and examining the output window for the data.

Sink Sou	rce Configuration Port Veri	ication	
- Firmware Configuratio	on None Update Version	The second s	
Configuration		-	RunTime Ip Configuration
Reset Controller :	Reset		IPaddress : 192.168.0.1 Configure Disable
Tester Card Power :	On Off]	SubnetMask: 255.255.255.0
Ra Assert :	RaDisable × Apply]	
Cable Flip Test :	Flip]	
Sys serial number :	Get]	
LED Status details :	Get]	
State Management :	Reset]	
VBUS Selection :	Type C VBUS O EXT VBUS	Configure	
Config Tester as TypeC :	Sink V RpValue :	3A ^v Enable Disable	

5.2.4.3 Configuration Tab

Figure 22. Configuration Tab

In this tab the user can configure and apply various GRL-V-DPWR controls / functionalities as follows:

5.2.4.3.1 Firmware Configuration Panel

• **Firmware Update**: Select from the drop-down menu to perform firmware updates for the Connectivity Manager, PPS, controller card, tester card, USB Power Delivery controller, E-



Load and SSBL on the GRL-V-DPWR hardware 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-DPWR tester hardware. Refer to Section 5.2.7 for details.

5.2.4.3.2 Configuration Panel

- **Reset Controller**: Perform a reset for the GRL-V-DPWR tester hardware by clicking on the **Reset** button.
- **Tester Card Power**: Turn on or off the power for the active tester ports by clicking on the respective button.
- **Ra Assert**: The "Ra Assert" function is utilized to control current in specific CC lines. When using the GRL-SPL test cable for testing, the user can select from the drop-down menu to enable or disable "Ra" on CC1, CC2, or both CC lines of the cable. Once selected, click on the **Apply** button. [Note: Before asserting the "Ra", it is important to detach the DUT. After the assertion, re-attach the DUT.]
- **Cable Flip Test**: This feature allows the user to effortlessly change the cable orientation without requiring any physical manipulation. [Note: This feature only works with the GRL-SPL/GRL-USB-PD-STC ("Special Cable") or USB pass through cable]. To run the test, click on the **Flip** button, and examine the output window for results.
- **Sys serial number**: Click on the **Get** button to acquire the serial number of the GRL-V-DPWR tester hardware which will be displayed in the output window.
- **LED Status Details**: Click on the **Get** button to acquire the status of the active tester port LED components which will be displayed in the output window.
- **State Management**: This feature facilitates getting back the GRL-V-DPWR tester hardware's previous data even after reset.
- **VBUS Selection**: Select the USB Type-C or External VBUS to be used and click on the **Configure** button.
- **Config Tester as Type-C and RpValue**: Set the GRL-V-DPWR tester hardware to act as a USB Type-C based Sink or Source by selecting the respective Sink or Source role. If the USB Type-C Source is selected, select the Rp value* and click on the **Enable** button. To disable this feature, click on the **Disable** button.

* An Rp value change is only applicable for the USB Type-C source device which involves altering the pull-up resistor value on the Configuration Channel (CC) pins of the source device. This change signals different current-carrying capabilities to the sink device, enabling proper negotiation of USB power delivery requirements. Setting the Rp value enables the source device to communicate its power capabilities to the sink device and helps the sink device draw the required current in order to prevent overcurrent situations.



5.2.4.3.3 RunTime IP Configuration Panel

• **IP Address and Subnet Mask**: This feature facilitates changing the IP address and subnet mask for the GRL-VDPWR tester hardware in real-time. It allows the user to replace the existing IP address/subnet mask with a new one of their choice. To configure the IP address/subnet mask, click on the **Configure** button, and to retrieve the original IP address/subnet mask, click on the **Disable** button.

5.2.5 (5) GRL-V-DPWR API Activity Log Pane/Output Window

This pane/output window displays a log of all user activity and test results in the API Tab screen.

5.2.6 (6) Save / Clear GRL-V-DPWR Configuration

Click on the **Save** button to save the configuration made to the GRL-V-DPWR tester hardware or click on the **Clear** button to remove all existing configuration.

5.2.7 Update GRL-V-DPWR Firmware

5.2.7.1 Accessories Required for GRL-V-DPWR Firmware Update



USB Type-A to Type-B Cable – Standard USB Type-A to Type-B Programming cable used to connect to GRL-V-DPWR USB port for Connectivity manager firmware update.



USB Type-A to Mini-B Cable – USB Type-A to Mini-B Programming cable used to connect to GRL-V-DPWR 'E-Load FW Update' port for firmware update.

Use the procedure below to perform firmware update in the order of the following sequence:

- Connectivity Manager (CM core)
- PPS (CPU2)
- Controller card (CPU1)
- Tester card
- USB Power Delivery controller
- E-Load



5.2.7.2 Connectivity Manager (CM Core) Firmware Update

The USB Type-A to Type-B cable is required for updating the CM core firmware. Connect the cable in between the GRL-V-DPWR tester hardware and the control PC as shown in Figure 23 below:



USB Type-A to Type-B Cable



GRL-V-DPWR Tester USB Type-B Port



Control PC USB Type-A Port

Figure 23. CM Core Firmware Update Cable Connections

Procedure:

4. In the API tab screen, navigate to the Configuration tab as shown below:



Figure 24. Configuration Tab for Firmware Update



5. Select the CM core component from the **FW Update** drop-down menu as shown below:



- Figure 25. Select CM Core from FW Update Menu
 - 6. Click on the **Update** button and the following pop-up message will appear. Select the USB serial COM port and click on the **Done** button.

Comport details		x
ComPortList :	COM7 : Standa 🗡	Refresh
Number :	COM7	Done
	Sto	р

- Figure 26. Select USB Serial COM Port
 - 7. The firmware update will start, and its progress can be observed from the following pop-up message as well as from the LCD display of the GRL-V-DPWR tester hardware showing '**CM-FW UPD...**'.

	GRL-USB-PD-TC	CH-FU UPD
COMPORT : Firmware Updating	PD/8c12	V-DPWR
Updating Connectivity Manager Fimware please wait.	Power Image: Constraint of the state of the	1000 Feltatatata 1 1 1
Progress 6 %	Port O	
		bhi si mi
Stop	VBUS Sense +	
Please do not use any function while firmware is updating	GRL	0

Figure 27. CM Core Firmware Update in Progress

USB-PD Dual Role & Data Loopback Test





8. Once the firmware update has completed successfully, check the LCD display of the GRL-V-DPWR tester hardware for the IP address. Establish connection for the tester hardware using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

- After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.
- If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.

5.2.7.3 PPS (CPU2) Firmware Update

Procedure:

- 1. Connect the GRL-V-DPWR tester hardware using an IP address and select a tester port to update the CPU2 firmware.
- 2. In the API tab screen, navigate to the Configuration tab. Select the PPS component from the **FW Update** drop-down menu as shown below:

Firmware Update :	None ~
	None
	Step 1 : Connectivity_Manager
	Step 2 : PPS
	Step 3 : Controller_Card
	Step 4 : Tester_Card
	Step 5 : PD_Controller
	Step 6 : Eload
	Step 7 : SSBL
	All

- Figure 28. Select PPS from FW Update Menu
 - 3. Click on the **Update** button and a pop-up message will appear. Click on the **OK** button.
 - 4. The firmware update will start, and its progress can be observed from the following pop-up message as well as from the LCD display of the GRL-V-DPWR tester hardware showing '**PPS-FW UPD...**'.



92.168.0.30 : Firm	ware Updating	
Updating PPS	Fimware please wait	
Progress 17 %		
	Stop	



Figure 29. PPS Firmware Update in Progress

5. Once the firmware update has completed successfully, check the LCD display of the GRL-V-DPWR tester hardware for the IP address. Establish connection for the tester hardware using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

- After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.
- If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.

5.2.7.4 Controller Card (CPU1) Firmware Update

Procedure:

- 1. Connect the GRL-V-DPWR tester hardware using an IP address and select a tester port to update the CPU1 firmware.
- 2. In the API tab screen, navigate to the Configuration tab. Select the Controller_Card component from the **FW Update** drop-down menu as shown below:



Figure 30. Select Controller Card from FW Update Menu



- 3. Click on the **Update** button and a pop-up message will appear. Click on the **OK** button.
- 4. The firmware update will start, and its progress can be observed from the following pop-up message as well as from the LCD display of the GRL-V-DPWR tester hardware showing '**CC-FW UPD...**'.

		USB-PD Dual Role & Data Loopback Tester
192.168.0.30 : Firmware Updating	GRL-USB-PD-TC	CC-FW UPD 192.168.0.4
Updating Control card Fimware please wait Progress 38 %	Politic 12 00 DE Power 00 VBUS	V-DPWR
	END-TX III III III III III III III III III I	
Stop Please do not use any function while firmware is updating	Port O O	

Figure 31. Controller Card Firmware Update in Progress

5. Once the firmware update has completed successfully, check the LCD display of the GRL-V-DPWR tester hardware for the IP address. Establish connection for the tester hardware using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

- After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.
- If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.

5.2.7.5 Tester Card Firmware Update

Procedure:

- 1. Connect the GRL-V-DPWR tester hardware using an IP address and select a tester port to update the tester card firmware.
- 2. In the API tab screen, navigate to the Configuration tab. Select the Tester_Card component from the **FW Update** drop-down menu as shown below:

USB-PD Dual Role & Data Loopback



Firmware Update :	None ~
	None
	Step 1 : Connectivity_Manager
	Step 2 : PPS
	Step 3 : Controller_Card
	Step 4 : Tester_Card
	Step 5 : PD_Controller
	Step 6 : Eload
	Step 7 : SSBL
	All

Figure 32. Select Tester Card from FW Update Menu

- 3. Click on the **Update** button and a pop-up message will appear. Click on the **OK** button.
- 4. The firmware update will start, and its progress can be observed from the following pop-up message as well as from the LCD display of the GRL-V-DPWR tester hardware:
 - Power LED ON
 - PD/N LED ON
 - DT/LK Blinking

	GRL-USB-PD-TC	VDPWR-20220004 192.168.0.4
192.168.0.30 : Firmware Updating	PO/BC12 C DE Power C VIUS	V-DPWR
Updating Tester Card Fimware please wait	EN/D-TX: O H5/SS DT-LK PD-N	
Progress 1 %		
Stop Please do not use any function while firmware is updating	VBUS Sense	

Figure 33. Tester Card Firmware Update in Progress

5. Once the firmware update has completed successfully, check the LCD display of the GRL-V-DPWR tester hardware for the IP address. Establish connection for the tester hardware using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

• After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.



• If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.

5.2.7.6 USB Power Delivery Controller Firmware Update

Procedure:

- 1. Connect the GRL-V-DPWR tester hardware using an IP address and select a tester port to update the tester card firmware.
- 2. In the API tab screen, navigate to the Configuration tab. Select the PD_Controller component from the **FW Update** drop-down menu as shown below:

Firmware Update :	None	Ŷ
	None	
	Step 1 : Connectivity_Manager	
	Step 2 : PPS	
	Step 3 : Controller_Card	
	Step 4 : Tester_Card	
	Step 5 : PD_Controller	
	Step 6 : Eload	
	Step 7 : SSBL	
	All	

- Figure 34. Select USB Power Delivery Controller from FW Update Menu
 - 3. Click on the **Update** button and a pop-up message will appear. Click on the **OK** button.
 - 4. The firmware update will start, and its progress can be observed from the following pop-up message as well as from the LCD display of the GRL-V-DPWR tester hardware:
 - Power LED ON
 - DT/LK Blinking

Progres	s 2 %	-	



Figure 35. USB Power Delivery Controller Firmware Update in Progress



5. Once the firmware update has completed successfully, check the LCD display of the GRL-V-DPWR tester hardware for the IP address. Establish connection for the tester hardware using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

- After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.
- If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.

5.2.7.7 E-Load Firmware Update

The USB Type-A to mini-B cable is required for updating the E-Load firmware. Connect the cable in between the GRL-V-DPWR tester hardware and the control PC as shown in Figure 36 below:



Control PC USB Type-A Port



GRL-V-DPWR Tester E-Load Firmware Update mini-B Port

Figure 36. E-Load Firmware Update Cable Connections

Procedure:

- 1. Connect the GRL-V-DPWR tester hardware using an IP address and select a tester port to update the E-Load firmware.
- 2. In the API tab screen, navigate to the Configuration tab. Select the E-Load component from the **FW Update** drop-down menu as shown below:



Firmware Update :	None	,
	None	
	Step 1 : Connectivity_Manager	
	Step 2 : PPS	
	Step 3 : Controller_Card	
	Step 4 : Tester_Card	
	Step 5 : PD_Controller	
	Step 6 : Eload	
	Step 7 : SSBL	1
	All	

- Figure 37. Select ELoad from FW Update Menu
 - 3. Click on the **Update** button and check the output window for the E-Load firmware update status.

13:09:41.288 : 192.168.0.30 : Connecting
13:09:41.355 : 192.168.0.30 : Connected 13:09:43.064 : : Eload Port 1 Detected 13:09:44.087 : : Uploading Firmware
is is in the set of the producing this is a set of the

- Figure 38. Output Window Data
 - 4. After the firmware update has completed, a pop-up message will appear requesting a restart of the GRL-V-DPWR tester hardware.



- Figure 39. Request to Reboot Tester After Firmware Update Completed
 - 5. Once the GRL-V-DPWR tester hardware has rebooted, check the LCD display of the tester for the IP address. Establish connection for the tester using the IP address and check the version for verification by clicking on the **Version** button.

NOTE:

- After the firmware update has completed, if you are trying to re-connect the GRL-V-DPWR tester hardware, please wait for a few seconds. Failure in connection may occur if you try to connect the tester hardware immediately.
- If failure in the connection occurs multiple times during firmware update, re-start the GRL-V-DPWR tester hardware and please wait for some time to reboot. Then connect the tester hardware and perform the firmware update again.



5.3 Graph Tab

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



Figure 40. GRL-V-DPWR API Software Graph Tab

5.4 Loopback Tab

	Loop Back Testing	
API	Devices List : No Device Connected Select Refresh	
	Selected Device : Not Selected	
Graph	Transferred Data :	
	Received Data :	
	Speed :	
Loopback	Status :	
?		
Help	Start Stop	

Figure 41. GRL-V-DPWR API Software Loopback Tab



Select this tab to perform data loopback testing. The user can select from the **Devices List** dropdown menu the DUT's with loopback capability that are connected to the active tester ports on the GRL-V-DPWR tester hardware. 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. The user can also choose to refresh the API tab screen by clicking on the **Refresh** button.

5.4.1 Perform Loopback Testing

The following procedure describes how to perform data loopback testing using the Loopback tab.

- Connect any USB Type-C cable to an active tester port of the GRL-V-DPWR tester hardware and check the enumeration status e.g., whether or not DT-LK, HS/SS & DE LED's are turned ON. If they are not turned ON, try detaching and attaching the cable or changing the cable to cause the loopback test to execute.
- 2. Navigate to the Loopback tab and check from the **Devices List** drop-down menu if the connected port loopback test is detected or not as shown in the following example:

API	Loop Back Testing Devices List :	GRL-LoopBack-1 Select Refresh
	Selected Device :	GRL-LoopBack-1
Graph	Transferred Data :	262144000 b
Graph	Received Data :	262144000 ь
	Speed :	160.8221 Mbps
Loopback	Status :	Running in GRL-LoopBack-1 Speed : HighSpeed USBSerialNumber : 202201106-01
Help		Start Stop

- Figure 42. Port Loopback Test Detection in Loopback Tab
 - 3. Once the connected port loopback test is detected in the drop-down list, click on the **Select** button and it will appear in the **Selected Device** field.
 - 4. Click on the **Start** button and check for the
 - Transferred Data
 - Received Data
 - Speed
 - Status



5. Once all of the above is verified, click on the **Stop** button to stop the loopback test.

Note: Loopback testing should be performed for the USB Type-C 2.0, USB Type-C 3.0, GRL-SPL, USB Type-A 2.0 and USB Type-A 3.0 cables.

5.5 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 43. GRL-V-DPWR API Software Help Tab Screen



6 Specifications

This section lists the specifications for the GRL-V-DPWR.

Note: Specifications are subject to change without notice.

6.1 Physical Specifications

Size	336.9 mm × 135 mm × 146.4 mm (13.26 inch × 5.31 inch × 5.76 inch)
Weight	5 kg (11.02 lbs)

6.2 Electrical Specifications

Rated Input Voltage	24 V DC
Rated AC Current	13 A
Rated Input Frequency	
Protection Class	1
Ingress Protection	IPX0

6.3 Operating Specifications

Operating Temperature	10°C to 40°C
Operating Humidity	30% to 75% RH
Operating Altitude	2000 m

6.4 Storage Specifications

Storage Temperature	10°C to 50°C
Storage Humidity	40% to 95% RH



6.5 Transportation Specifications

Transportation Temperature	5°C to 60°C
Transportation Humidity	25% to 95% RH



7 Maintenance and Repair

This section describes how to maintain, service, and repair a GRL-V-DPWR unit.

Caution: All disassembly and reassembly of this unit should be performed at an electrostatic discharge (ESD) protective workstation. Wear proper electrostatic grounding equipment at all times. Damage to electrical components could occur without proper ESD control.

7.1 General Maintenance and Care

7.1.1 Inspection and Cleaning

Inspect and/or clean the following on the GRL-V-DPWR whenever it is required:

- Check the connectors for dirty/corroded or damaged contacts.
- Clean the GRL-V-DPWR with any standard brushes to remove the dirt.

Caution: Do not use solvents such as alcohol, acetone, de-greasers, paint thinners, or other hydrocarbon-based type solvents to clean the CB40.

7.1.2 Mechanical Maintenance

The GRL-V-DPWR unit does not require periodic mechanical maintenance other than cleaning the external surfaces.

7.1.3 Electrical Maintenance

The GRL-V-DPWR unit does not require periodic electrical maintenance.

7.1.4 Calibration Maintenance and Intervals

The GRL-V-DPWR requires periodic calibration for the interval of 12 months.

7.1.5 Tools

M3*8 Star screwdriver

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