

## Z+ Series Quick Start Guide



IA710-04-04G

**REVISION HISTORY**

Date	Revision	Issue
Oct. 2002	Initial Revision	
2002~2020	A~F	Controlled by ECO.
May. 2020	G	<ol style="list-style-type: none"><li>1. Remove CD-ROM.</li><li>2. Update links to refer to TDK-Lambda Web-Page.</li><li>3. Combine with IA710-04-05C (VIRTUAL PANEL, FUNCTION GENERATOR, OUTPUT DATA LOGGER USER MANUAL).</li></ol>

**Figures:**

Figure 1.....	6
Figure 2.....	6
Figure 3.....	7
Figure 4.....	7
Figure 5.....	7
Figure 6.....	8
Figure 7.....	8
Figure 8.....	9
Figure 9.....	9
Figure 10.....	10
Figure 11.....	10
Figure 12.....	11
Figure 13.....	13
Figure 14.....	16
Figure 15.....	16
Figure 16.....	18
Figure 17.....	18
Figure 18.....	19
Figure 19.....	19
Figure 20.....	20
Figure 21.....	20
Figure 22.....	21
Figure 23.....	21
Figure 24.....	23
Figure 25.....	24
Figure 26.....	25
Figure 27.....	26
Figure 28.....	27
Figure 29.....	28
Figure 30.....	29
Figure 31.....	30
Figure 32.....	30

## 1. Table of Contents

<b>2. GENERAL INFORMATION .....</b>	<b>5</b>
<b>3. SYSTEM INTRODUCTION.....</b>	<b>5</b>
INTRODUCTION.....	5
COMMUNICATION INTERFACE .....	5
SOFTWARE REQUIREMENTS .....	5
MINIMUM HARDWARE REQUIREMENTS.....	5
<b>4. APPLICATIONS AND LABVIEW RUN-TIME INSTALLATION .....</b>	<b>6</b>
<b>5. USB DRIVER INSTALLATION .....</b>	<b>7</b>
<b>6. ADD NEW LAN DEVICE.....</b>	<b>9</b>
<b>7. Z+ WAVEFORM CREATOR .....</b>	<b>11</b>
INTRODUCTION.....	11
INTERFACE TAB.....	11
TRANSIENT TAB .....	13
<b>8. Z+ VIRTUAL FRONT PANEL .....</b>	<b>16</b>
MAIN FEATURES .....	17
<i>Common Features .....</i>	<i>17</i>
<i>Virtual Front Panel (VFP).....</i>	<i>17</i>
<i>Status Logger.....</i>	<i>17</i>
<i>Waveform Profiler.....</i>	<i>17</i>
<i>V/I Graph.....</i>	<i>17</i>
<i>Advanced Settings.....</i>	<i>17</i>
APPLICATION RUN.....	18
VIRTUAL FRONT PANEL (VFP).....	19
STATUS LOGGER .....	20
WAVEFORM PROFILER .....	21
V/I GRAPH.....	24
ADVANCED TAB .....	25
FUNCTION GENERATOR.....	26
<b>9. Z+ CONTROL APPLICATION .....</b>	<b>28</b>

## 2. General Information

Documentation (including this Manual) is subject to change without notice. Refer to TDK-Lambda Technical Data web page for an up-to-date documentation:

<https://www.emea.lambda.tdk.com/uk/technical-data/data.aspx?resource=Installation-Manuals>

Drivers and GUIs are updated periodically to support new features. Refer to TDK-Lambda Technical Centre web page for up-to-date drivers and GUIs:

<https://www.emea.lambda.tdk.com/uk/technical-centre/software-tools.aspx>

## 3. System Introduction

### Introduction

This software is applicable to TDK-Lambda Z+ series power supplies only.

### Communication Interface

There are four types of communication interfaces between a PC to a power supply:

- RS232/RS485
- USB
- Ethernet (LAN)
- GPIB (IEEE)

### Software Requirements

- Microsoft Windows 10 (64bit)
- Microsoft Excel 2007 or higher, supporting \*.xlsx format (only if Store/Load functions are required)

### Minimum Hardware Requirements

- Intel i3 processor or above
- At least 20GB hard disk space
- At least 4GB memory
- Display resolution: 1280x768 (Scale and layout set to 100%)

## 4. Applications and LabVIEW Run-Time Installation

1. Navigate to: <https://www.emea.lambda.tdk.com/uk/technical-centre/software-tools.aspx>
2. Click on Z+ tab.
3. Three GUIs are available, Z+ Virtual Front Panel and Z+ Waveform Creator and Z+ Control. Download zipped files to your PC.
4. Files are compressed in a zip format; decompress zipped files (it is very important to preserve files and directories structure, as an application might contain folder/s. Refer to Figure 1 for an example of Z+ Virtual Front Panel folder structure).

Name	Date modified	Type	Size
data	24/02/2019 12:25	File folder	
Z+ Virtual Front Panel.aliases	26/10/2017 14:55	ALIASES File	1 KB
Z+ Virtual Front Panel	26/10/2017 17:00	Application	4,695 KB
Z+ Virtual Front Panel	26/10/2017 14:55	Configuration sett...	1 KB

Figure 1

5. Launch GUI via executable file (\*.exe). Might pop-up an error message, click Yes to download LabVIEW Run-Time Engine from NATIONAL INSTRUMENTS web page.

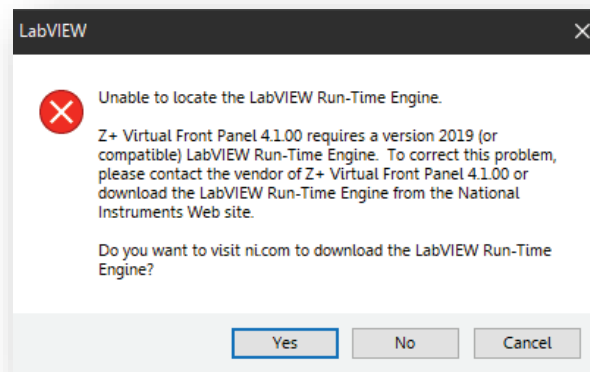


Figure 2

6. On NATIONAL INSTRUMENTS LabVIEW download page, select the following fields:
  - Supported OS: Windows.
  - Version: 2019 SP1.
  - Included Editions: Runtime.
  - Application Bitness: 64-bit (tested with 64-bit only; for 32-bit OS, select 32-bit).
 Click DOWNLOAD button (please note that NATIONAL INSTRUMENTS account is required; Click Create Account to create a new account if you do not own one already), follow on-screen instructions to finish installation process.

### NOTES

1. USB driver must be installed prior USB cable connection. For USB driver installation, refer to USB Driver Installation (Chapter 5).
2. LabVIEW Run-Time engine version 2019 (or compatible) must be installed.
3. To communicate via LAN interface, refer to Add new LAN device (Chapter 6).

## 5. USB Driver Installation

1. Navigate to: <https://www.emea.lambda.tdk.com/uk/technical-centre/software-tools.aspx>
2. Click on Z+ tab.
3. Z+ USB Drivers is available. Download zipped files to your PC.
4. File is compressed in a zip format; decompress zipped file (it is very important to preserve files and directories structure, as an application might contain folder/s. Refer to Figure 3 for an example of Z+ USB Drivers folder structure).

Name	Date modified	Type	Size
x64	25/05/2020 15:05	File folder	
x86	25/05/2020 15:05	File folder	

Figure 3

5. Navigate to x64 folder for 64-bit operating system; Navigate to x86 folder for 32-bit operating system. Launch dpinst.exe
6. Press "Next >". Driver installation will start.

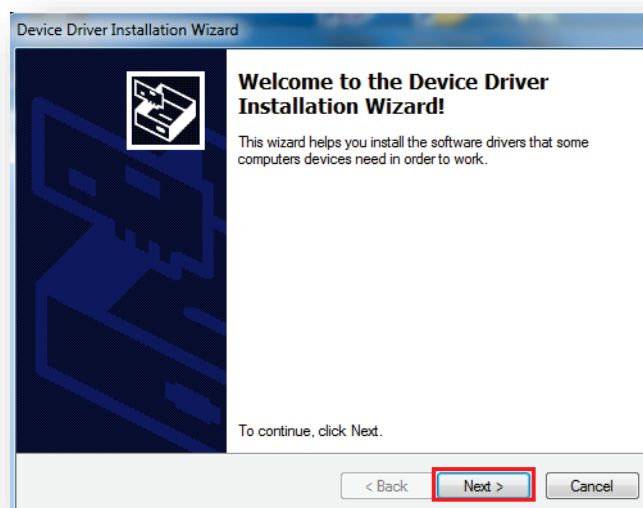


Figure 4

7. Press "Install" to install USB device software.

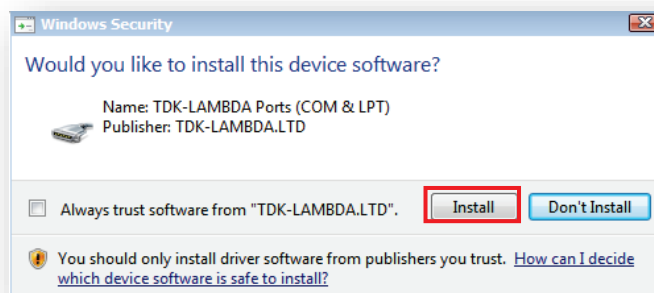


Figure 5

8. USB driver is installed as an additional serial port {i.e.: serial port (COM19)}.

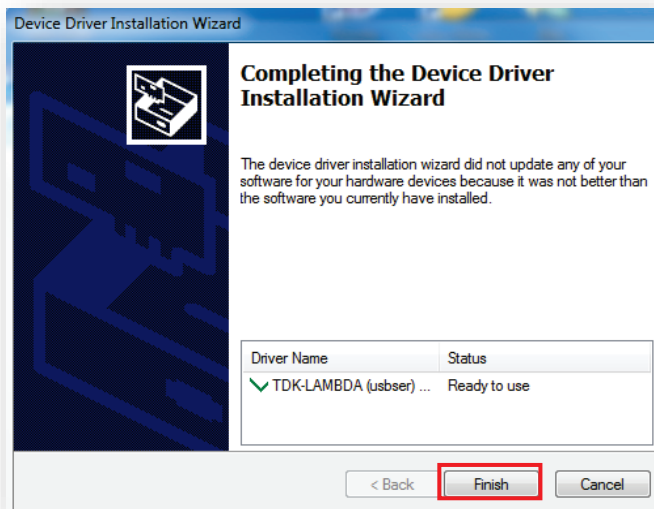


Figure 6

9. Connect Power Supply to a PC using USB cable.
10. Refer to Device Manager, Power Supply is detected as “Z+ serial port” {i.e.: serial port (COM19)}.

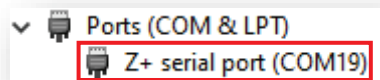


Figure 7

11. Select USB communication interface from Power Supply Front Panel menu (refer to Z+ User Manual – IA710-04-01\_).



## 6. Add new LAN device

1. NI-VISA is required to communicate via LAN interface. Download NI-VISA from the following link: <https://www.ni.com/en-il/support/downloads/drivers/download.ni-visa.html#306043>
2. On NATIONAL INSTRUMENTS NI-VISA download page, select the following fields:  
Supported OS: Windows.  
Version: 18.5.  
Included Editions: Full.
3. Click DOWNLOAD button (please note that NATIONAL INSTRUMENTS account is required; Click Create Account to create a new account if you do not own one already), follow on-screen instructions to finish installation process.
4. Launch NI MAX program (the application is installed along with NI-VISA).



Figure 8

5. Select “Devices and Interfaces”>>Select “Network Devices” (1).
6. Select “Add Network Device” (2) -> “VISA TCP/IP Resource...”

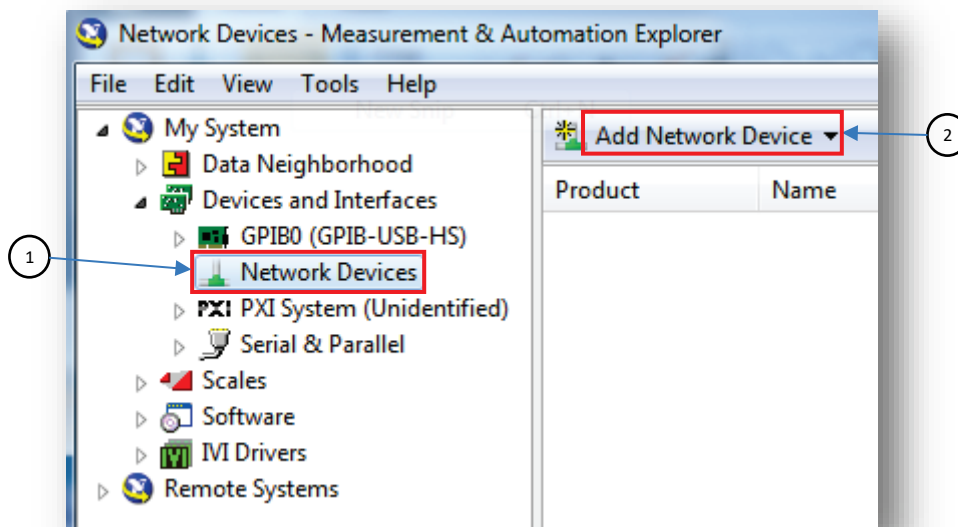


Figure 9

7. Select “Auto-detect of LAN Instrument”. Press “Next >”.

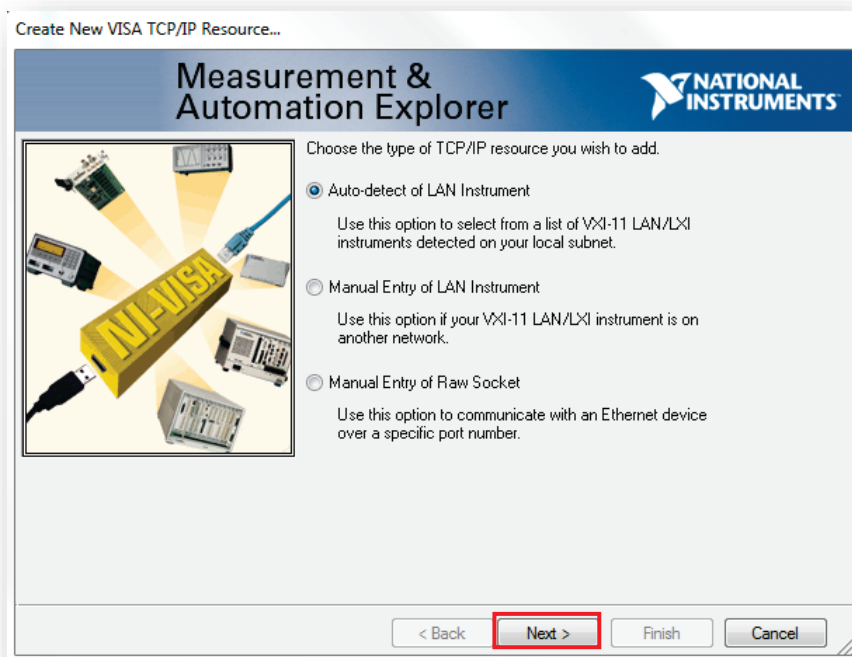


Figure 10

8. The system should automatically find connected LAN devices.
9. Press “Finish” button.

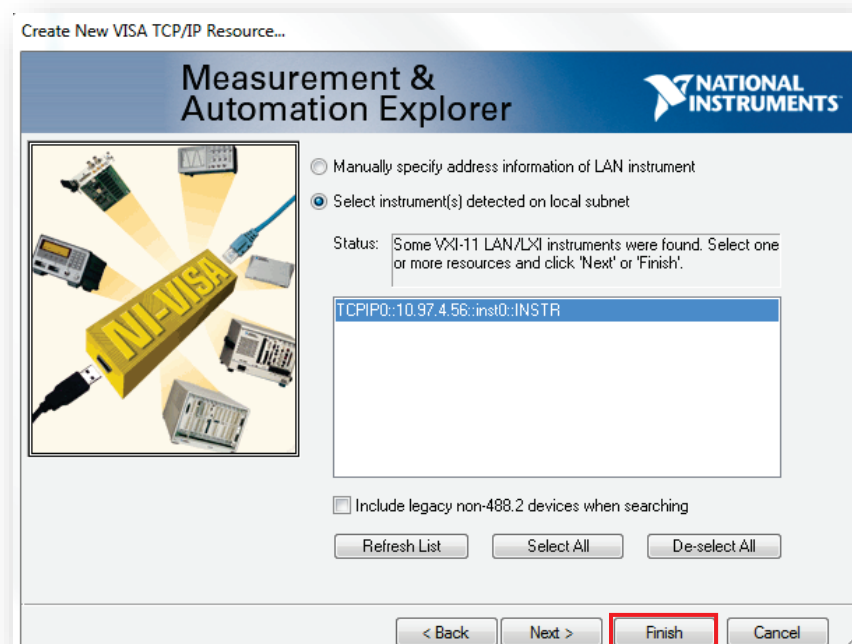


Figure 11

10. Close NI MAX.

## 7. Z+ Waveform Creator

### Introduction

The application is provided to help the user to create and trigger different sequencing profiles. The sequences include voltage or current settings in LIST, WAVE and FIX modes.

- LIST Mode – Set voltage or current level and dwell time (length of each step).
- WAVE Mode – Set voltage or current level and time (slope of each step).
- FIX Mode – Set voltage or current level following trigger event.

In addition, the application stores/loads created sequences into/from Power Supply EEPROM. The user has the option to load a sequence from a file stored in a PC, or store a sequence from the Power Supply to a file.

### INTERFACE Tab

Communication settings and parameters initialization.

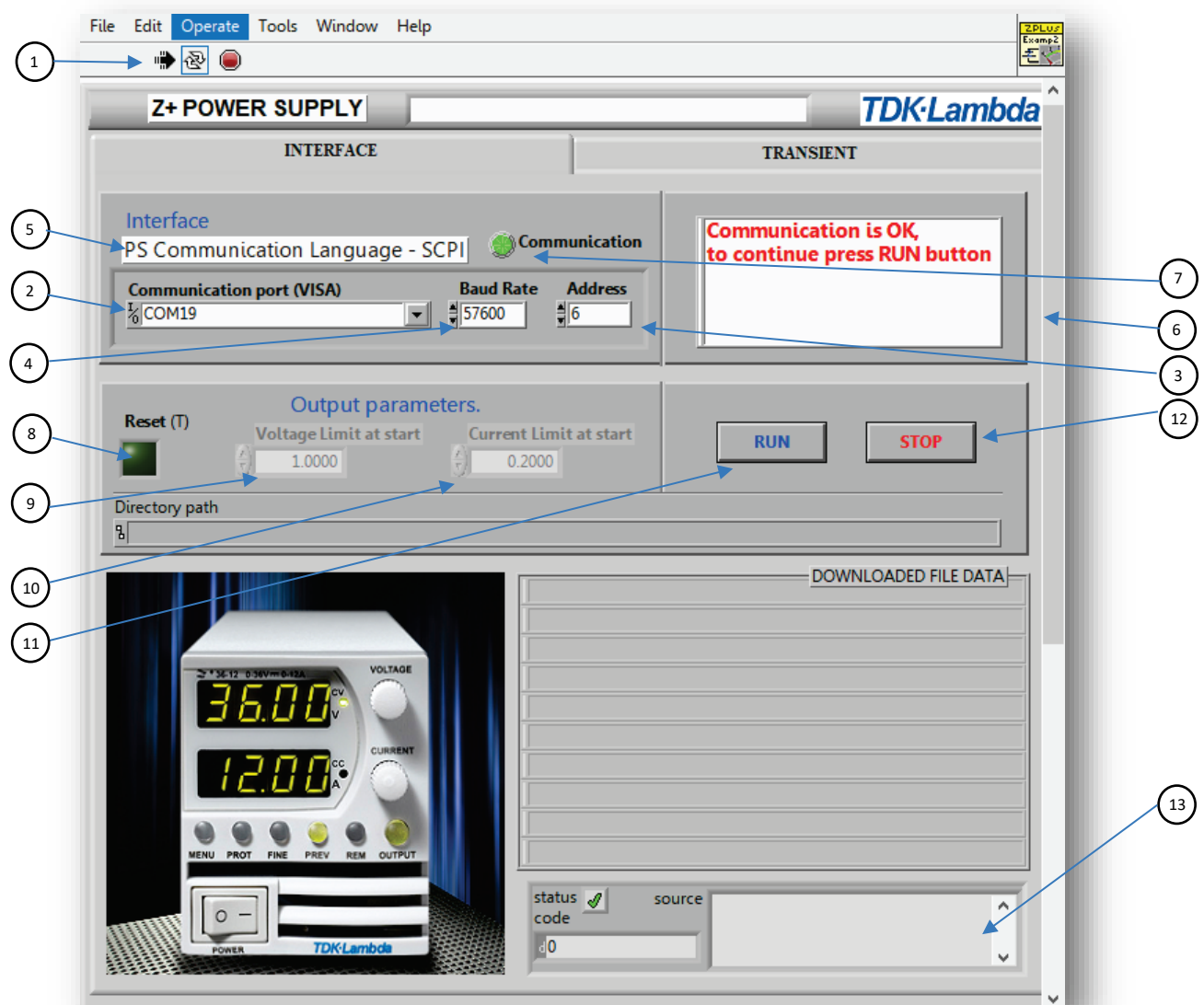



Figure 12

1. Press  button (1) to run the application (when launched, automatically set to run mode).
  - 1.1. Visa resource name, select COM port for RS232/485 and USB, GPIB::x::INSTR for GPIB or TCPIP::x::INSTR for LAN (Refer to chapter 6). Select “Refresh” to update connection (2).
  - 1.2. Address, select Power Supply address (3).
  - 1.3. Baud Rate, select Baud Rate for RS232/485 and USB mode only (4).
  - 1.4. Language, for information only. Application supports SCPI language (5).
  - 1.5. Communication status log (6) and LED indicator (7). When communication is OK, LED illuminates solid Green color. If Communication LED stays RED, communication has not been established. Confirm that Power Supply settings correspond to PC configuration.
  - 1.6. Initialization Parameters (optional), it is possible to set initial Power Supply parameters. Thick “Reset” (8), enter initial Voltage (9) and Current (10).
2. Green Color LED indicator (7) activate, press “RUN” (11) button. The INTERFACE tab immediately switches to the TRANSIENT tab.
3. To stop the application, press “STOP” button (12).
4. In case of an error or VISA failure, an error is displayed (13).

#### **NOTES**

1. Application supports SCPI communication language only. Remember to set Power Supply to SCPI language (5).
2. Baud Rate selection is available in RS232/485 and USB communication interfaces.
3. Baud Rate is fixed to 57600bps for LAN and Optional (i.e. IEEE) communication interfaces.
4. Setting Baud Rate in USB communication interface affects only RS485 retransmit speed.

## TRANSIENT Tab

Profile / Sequence settings

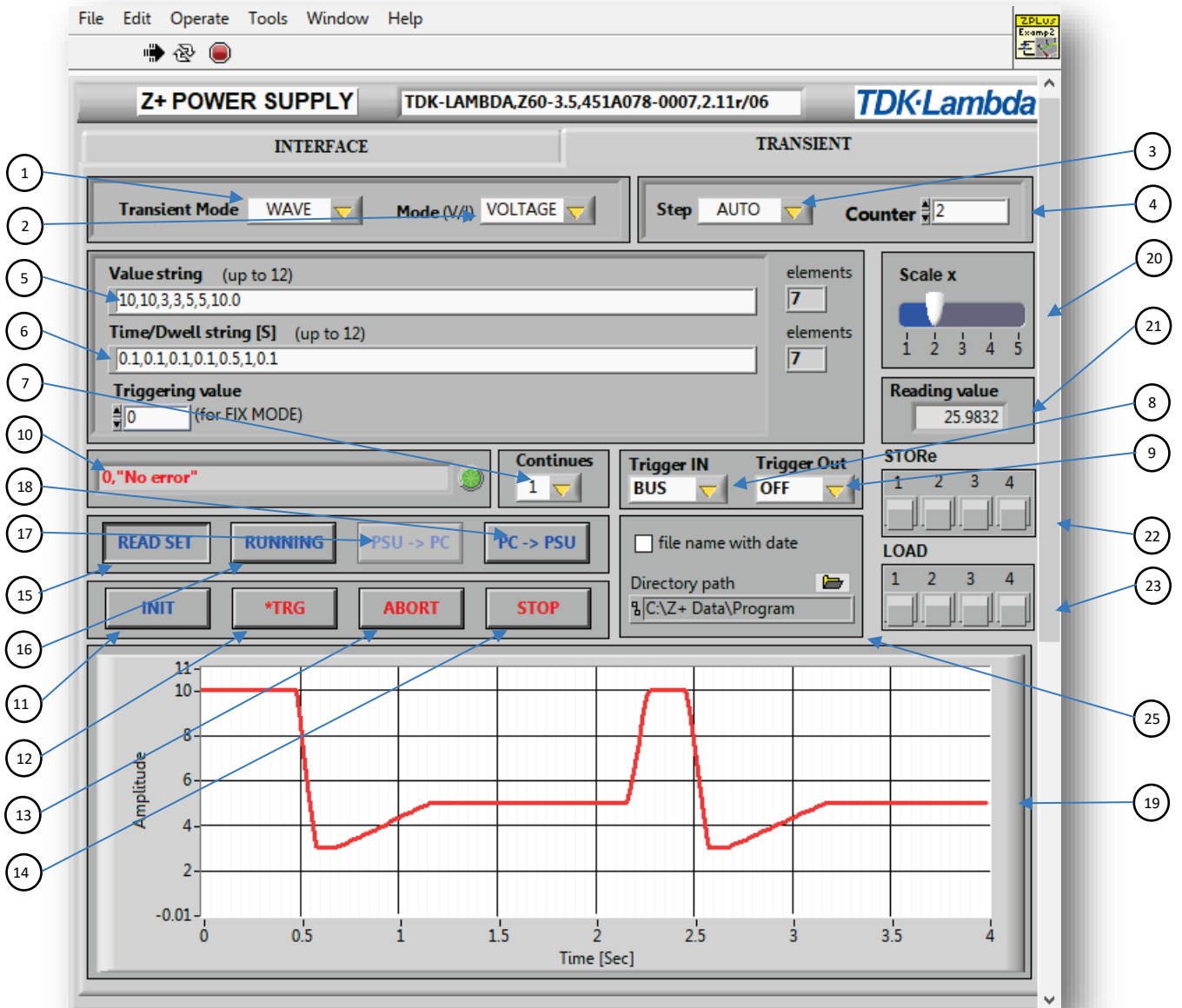


Figure 13

## 1. Sequencer Settings.

- 1.1. Transient Mode, select WAVE, LIST or FIX mode (1).
- 1.2. Mode (V/I), select VOLTAGE or CURRENT mode (2).
- 1.3. Step, select AUTO or ONCE (3)
- 1.4. Counter, set number of iterations: 1-9999. Inf or any value out of 1 ~ 9999 range, interpreted as infinity (4).
- 1.5. Formation Mode, select MAIN for user-programmed waveform (any waveform), SINE for Sinus waveform, SQUARE for Square waveform, TRIANGLE for triangle waveform or SAWTOOTH for Sawtooth waveform.
- 1.6. Value String, enter up to 12 Voltage or Current values (according to Mode (V/I selection (2))) (5). Elements counter is located to the right of the row.
- 1.7. Time/Dwell String [S], enter up to 12 Time (in Wave mode) or Dwell (in List mode) values (6). Elements counter is located to the right of the row.

### NOTES

1. The number of elements in Value string (5) must be equal to the number of elements in Time/Dwell string [S] (6).
2. "." (dot) - Used for decimal numbers.
3. "," (comma) – Used for values separation.

- 1.8. Continuous, defines if trigger state is automatically re-initialized (Continuous = 1) or idle (Continuous = 0) after finishing a sequence (7).
- 1.9. Trigger IN Source, defines input trigger source. BUS (Communication command or Front Panel), EXT (external pulse) (8).
- 1.10. Trigger OUT Mode, select output trigger pulse mode: OFF, TRIG or FSTR (9).

### NOTE

Refer to Power Supply user manual for further explanation regarding FSTR Trigger OUT Mode.

- 1.11. Refer to error message during insertion or selection of parameters (10).

## 2. Execution Controls

- 2.1. INIT button, initialize sequencer and trigger system (11).
- 2.2. \*TRG button, generate trigger for BUS (8) mode (12).
- 2.3. ABORT button, abort sequence execution (13).
- 2.4. STOP button, ABORT sequence execution, stop application and free up communication port (14).

### NOTES

1. Press STOP button prior closing the application. Closing the application without pressing STOP button does not release the connected COM port.
2. The 'X' button (application close at the top-right corner) is disabled until STOP button is pressed to assure COM port release.

### 3. Auxiliary Controls

- 3.1. READ MEAS/READ SET button, select measurement values graph view or setting values graph view (15).
- 3.2. RUNNING/FREEZE button, select to update (running) graph or freeze graph (16).
- 3.3. PSU -> PC button, upload a sequence from a Power Supply to a PC (17). Refer to item 6 (PSU - > PC Upload) below.
- 3.4. PC->PSU button, download a sequence from a PC to a Power Supply (18). Refer to item 7 below (PC -> PSU Download).

### 4. Graph & Auxiliary Graph Control

- 4.1. Graph view, displays measured values or setting values (19), selected by (15)
- 4.2. Scale x, select Graph (19) time scale (20).
- 4.3. Read value, view preset read-back value (21).

### 5. Store / Load

- 5.1. Store a sequence into Power supply memory cell (22), select cells 1 ~ 4.
- 5.2. Load previously stored sequence from Power Supply memory (23), select cells 1 ~ 4.

### NOTE

Continuous setting (7), Trigger IN Source, Trigger IN Delay and Trigger OUT Mode parameters are not stored/loaded into/from Power Supply memory.

### 6. PSU - > PC Upload

The function uploads data from Power Supply memory cell (17). Step setting, Counter setting, Continuous state setting, Trigger IN Source, Trigger IN delay, Trigger OUT Mode and stored cell number are saved as a script, \*.txt file.

- 6.1. Create a sequence using controls (1) ~ (9), store data by Store function (22) in any memory cell 1~ 4, or load data by Load function (23) from any memory cell 1 ~ 4.
- 6.2. Press PSU -> PC button (17) to open file dialog.
- 6.3. Enter File Name, press OK.

### 7. PC -> PSU Download

The function downloads a script data \*.txt file into Power Supply memory.

- 7.1. Press PC -> PSU button (18).
- 7.2. Choose a script file, press OK.
- 7.3. Press INIT button (11), press \*TRG button (12) or provide an external trigger, according to Trigger IN Source (8) setting.

## 8. Z+ Virtual Front Panel

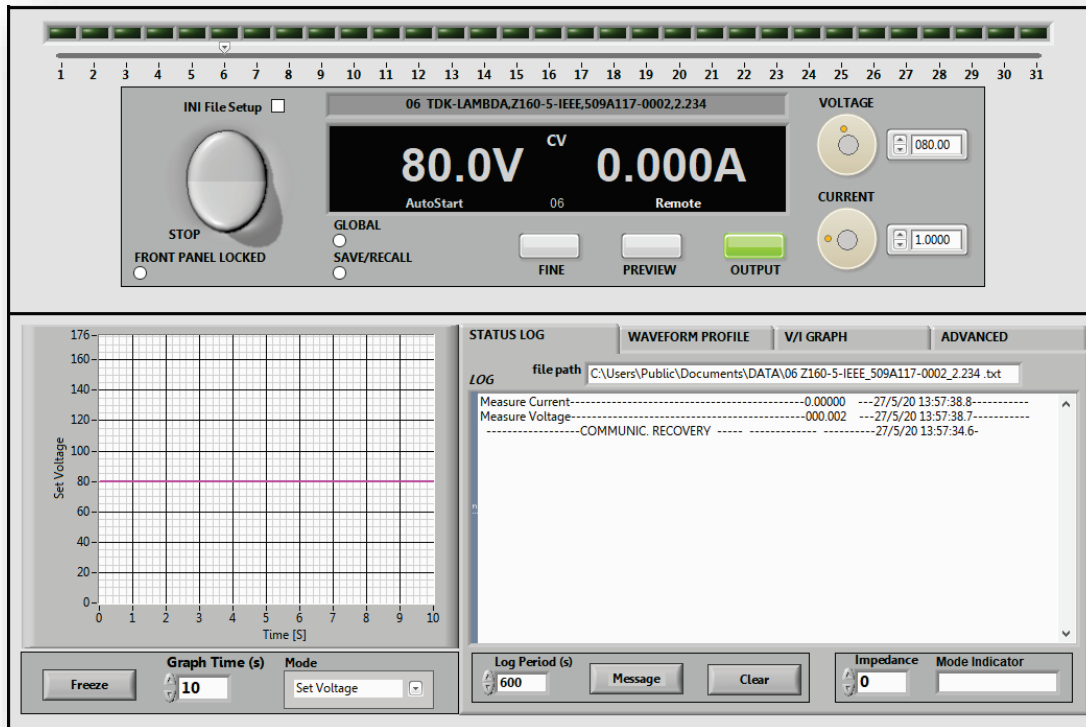


Figure 14

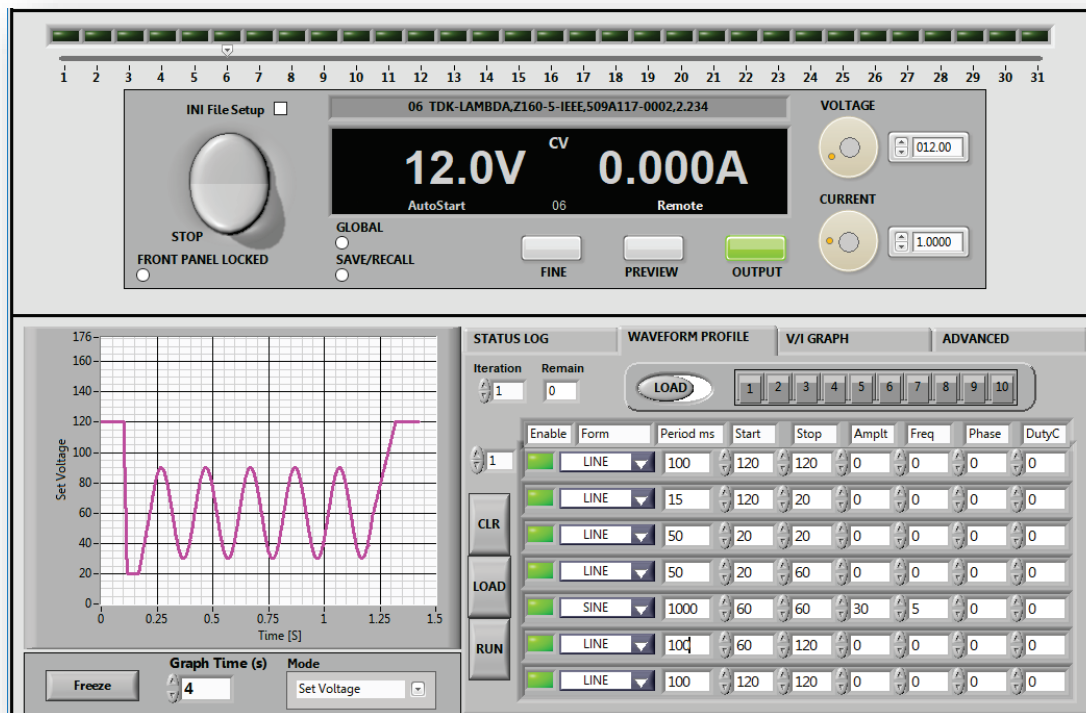


Figure 15



## MAIN FEATURES

### Common Features

- 1.1. Advanced communication parameters setting at application start-up: Manual or by \*.ini script file.
- 1.2. Automatic communication recovery in case of operation fault as soon as the unit is ready.
- 1.3. SCPI Language communication protocol.

### Virtual Front Panel (VFP)

- 2.1. Control and monitor of Power Supply functions (i.e. output ON/OFF, Voltage/Current).
- 2.2. Output status, encoder setting and indication.
- 2.3. Informative parameters status bar.
- 2.4. Front Panel Menu control.
- 2.5. Simple switch for individual & global commands.
- 2.6. Virtual Panel controls lock.
- 2.7. Power Supply settings save and recall function.

### Status Logger

- 3.1. Log Power Supply real-time output voltage and current with pre-defined period.
- 3.2. Store Log date & time of each unit in a separate file.
- 3.3. Log fault and recovery events.
- 3.4. Log Virtual Front Panel events affecting output status.
- 3.5. Log up to 31 units at a time.
- 3.6. Clear log data & file.

### Waveform Profiler

- 4.1. Create custom profiles consisting of Line (Slope), Sine, Square, Triangle or Sawtooth.
- 4.2. Enable/Disable profile segments.
- 4.3. Edit stored profiles.
- 4.4. Load previously generated and stored profiles in excel file format (\*.xlsx).
- 4.5. Up to 10 memory cells to store profiles.
- 4.6. Graphical profile view.
- 4.7. Repeat a profile with pre-defined number of iterations.

### V/I Graph

- 5.1. Display Power Supply operation limits.
- 5.2. Display settings limits.
- 5.3. Display real-time operation point.
- 5.4. Calculate output impedance ("load resistance").

### Advanced Settings

- 6.1. Comprehensive registers monitor.

#### NOTE

Maximum available time per single sequence (single iteration) for the whole profile is 6E+5 [mSec].
---

## Application Run

1. Press arrow to RUN the application

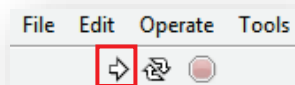


Figure 16

2. Communication Setup window appears

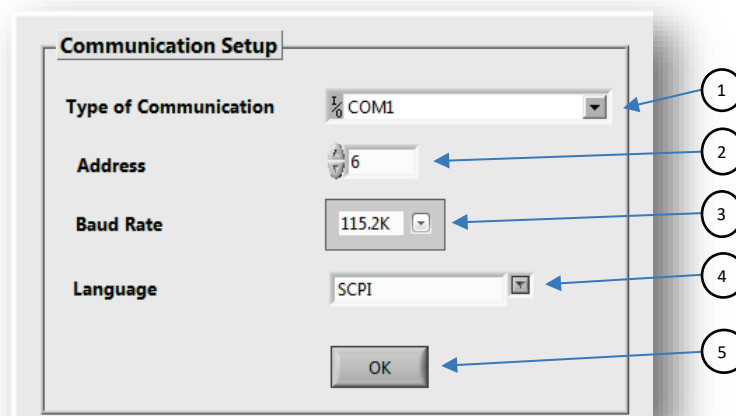


Figure 17

There are two options to set communication parameters:

- 2.1 Manual: Select required communication parameters: Type of Communication (1), Address (2), Baud Rate (3) and language (4), refer to Figure 17.

### NOTE

Language is displayed for information only. SCPI is the only available option, selected by default.

- 2.2 Pre-Defined setup will be loaded from Configuration.ini file. File could be edited manually prior activation. Pre-Configured parameters should be adapted according to the required communication parameters, refer to Figure 19, section 1.5 under Virtual front Panel (VFP) Controls.

### NOTES

1. Pre-Defined method can be selected before running step 1.
2. Configuration.ini file location path: C:\Program Files(x86)\TDK-LAMBDA\Z+\data.

3. Press "OK" (5) to accept parameters

## Virtual Front Panel (VFP)

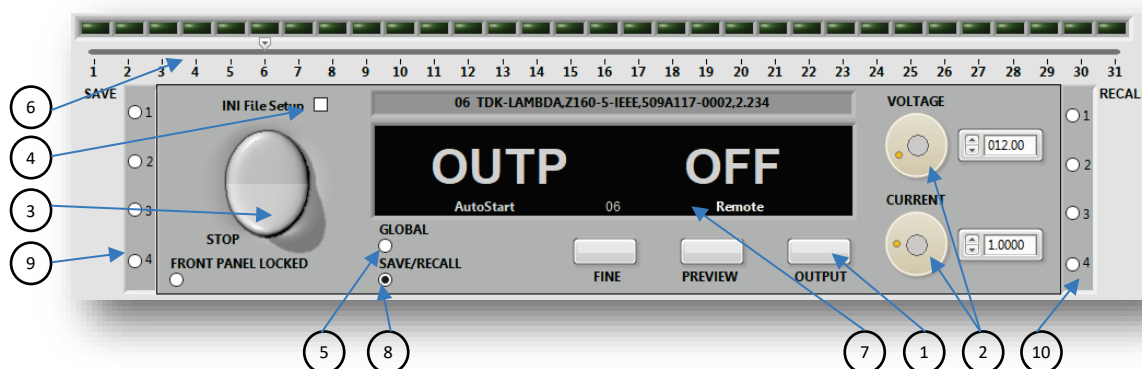


Figure 18

### 1. Virtual Front Panel (VFP) Controls

- 1.1. Output button (1), enable/disable Power Supply output.
- 1.2. Setting Encoders (2), there are four independent encoders to control Voltage, Current. Close to each encoder, there is a field to enter values directly, or increase/decrease a value using up/down arrows.
- 1.3. Stop button (3), stop application and communication with the Power Supply.

#### NOTE

Always use the Stop button prior closing the application. Stop button releases the communication (COM) port to allow other applications to communicate with the Power Supply. To close the application, first press Stop button.

- 1.4. INI File Setup (4), select the function to run script pre-configuring application parameters. Running Configuration.ini file skips communications' setting procedure. Refer to Figure 19 for a script example.

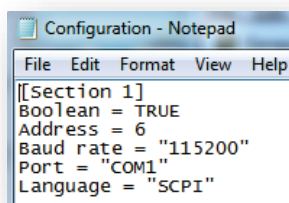


Figure 19

- 1.5. GLOBAL (5), select the function to set Voltage, Current, Output ON/OFF commands to global.
- 1.6. Address Bar (6), select Power Supply address to control and monitor.
- 1.7. Display (7), refer to Virtual Front Panel (VFP) Display section.
- 1.8. Select SAVE/RECALL button (8) to allow SAVE (9) and RECALL (10) main parameters by selection properly button. For parameter list Refer to table 5-7 in Z+ User Manual.

## 2. Virtual Front Panel (VFP) Graph

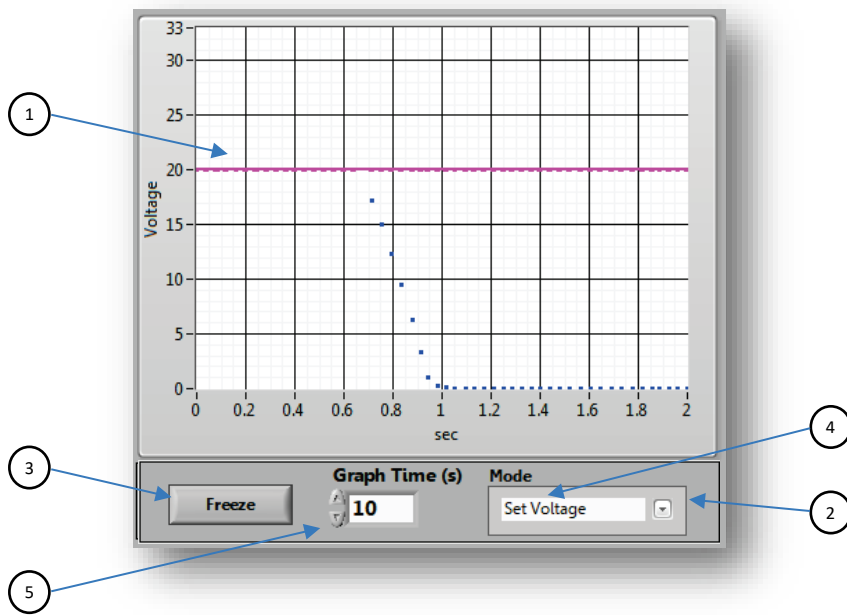


Figure 20

- 2.1. Real-time graphical view of Voltage or Current setting and measurement (1).
- 2.2. Voltage / Current selector (2), select to view Voltage or Current.
- 2.3. Freeze (3), graph to capture Voltage or Current setting/measurement.
- 2.4. Setting/Measure (4), click to show Setting and/or Measure value/s
- 2.5. Scale (s) (5), scale X-axis (time) to define capture length.

## Status Logger

### 1. Status & Events Log

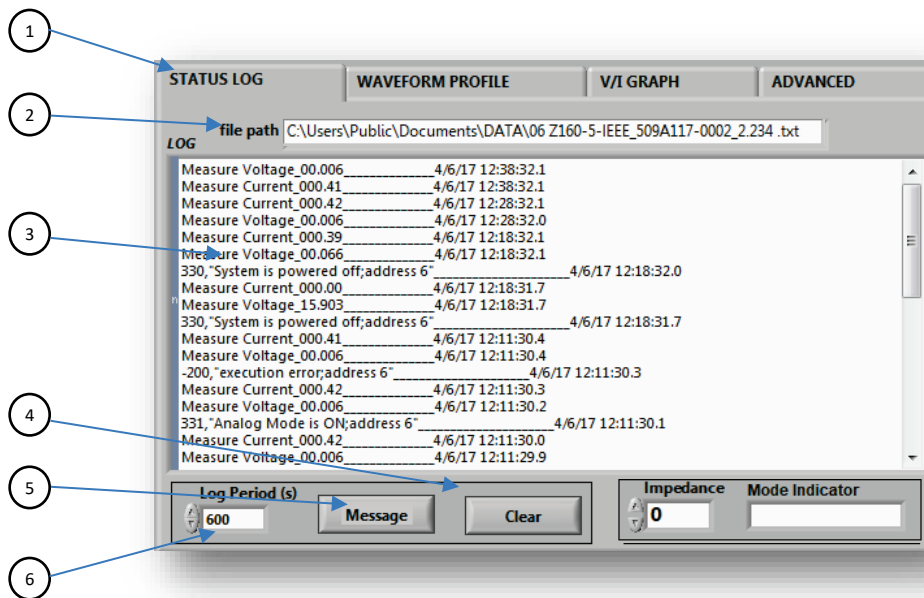


Figure 21

- 1.1. STATUS LOG (1), log messages and/or events tab.
- 1.2. File path (2), displays the path of the log file in \*.txt format. File name includes Power Supply address, model, serial number and main firmware revision.
- 1.3. Status log (3), window that logs messages and/or events including measured Voltage and Current, faults and events.
- 1.4. Clear (4), pressing the button clears log window and file.
- 1.5. Message / All Events button (5), pressing the button toggles log options. Messages Mode logs Voltage, Current and system faults/standard events. All Events Mode logs, in addition to Message Mode, VFP (Virtual Front Panel) settings change.
- 1.6. Log Period (s) (6), defines the delta time between message logs.
- 1.7. The application allows log of more than one Power Supply, by enabling the log of additional (RS-485) units. Up to 31 devices can be logged in total. The green buttons in Figure 22 should be enabled, only status is logged. Each Power Supply has its own unique log file named by the unique address, model, serial number and main firmware revision.

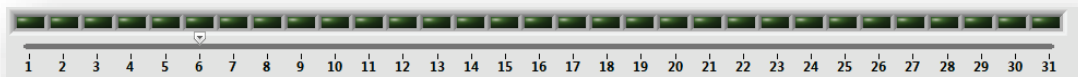


Figure 22

**NOTE**

Minimum Log Period is 1sec.

**Waveform Profiler**

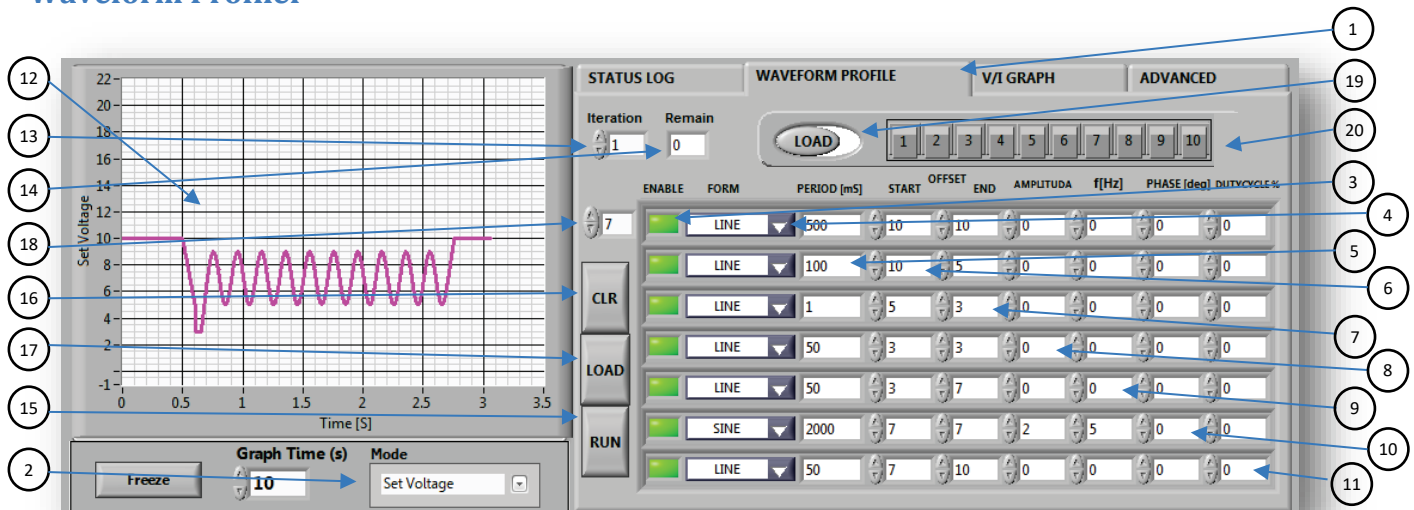


Figure 23

**NOTE**

Maximum available time per single sequence (single iteration) for the whole profile is 6E+5 [mSec].

## 1. Profile Creation

- 1.1. WAVEFORM PROFILE (1), sequencer tab.
- 1.2. Select Graph mode (2), create a sequence of Voltage or Current.
- 1.3. Configure sequence (profile) parameters:
- 1.4. Enable a row to program a sequence segment (3) by activating the green rectangle.
- 1.5. Select a form (4), NONE, LINE, SINE, SQUARE, TRIANGLE or SAWTOOTH.
- 1.6. Set a period (5) in milli-seconds.
- 1.7. Set start (6) and end (7) offset points of a segment.
- 1.8. Set amplitude (8), not required for a LINE form.
- 1.9. Set frequency (9), not required for a LINE form.
- 1.10. Set phase (10), optional parameter, not required for a LINE form.
- 1.11. Set duty cycle percentage (11), for a SQUARE form only.

### NOTE

The pre-programmed sequence is seen in the real-time graph view windows (12).

- 1.12. Set Iteration N value (13), N represents the number of iterations to perform the sequence. Refer to the Remain (14) cell to monitor the amount of remaining iterations.

### NOTE

If 7 segments are not enough to complete a sequence, refer to table row selector (18). Increase the number to configure additional table rows.

- 1.13. Press RUN button (15) to run the sequence (profile).

### NOTE

To clear the profile (reset all segments to the initial state), press CLR button (16).

## 2. Data Store (Save Profile)

- 2.1. Set STORE/LOAD selector to STORE (19).
- 2.2. Select memory cell, press a number 1 ~ 10 (20).
- 2.3. Confirmation windows pops up. Click "Yes" to acknowledge store operation.

**NOTES**

1. The profile is stored in an excel file format (\*.xlsx). File path: C:\Users\Public\Documents\Profile. File name: Waveform Profile.xlsx.
2. Each memory cell is stored in a dedicated sheet in the excel file.
3. There is an option to edit the excel file manually: Add/Remove rows, edit parameters and/or form. Refer to Figure 24 for an example. It is mandatory to preserve file structure for correct operation.

	A	B	C	D	E	F	G	H	I	J
1	24/07/2014	09:36								
2	Enable	Form	Period ms	Start	Stop	Ampl	Freq [Hz]	Phase [deg]	DutyC [%]	
3	ON	NONE	0	0	0	0	0	0	0	0
4	ON	LINE	1000	12	10	0	0	0	0	0
5	ON	SINE	1000	10	10	2	3	0	0	0
6	ON	SQUARE	1000	12	12	3	2	0	0	40
7	ON	TRIANGLE	1000	7	7	4	2	0	0	0
8	ON	SAWTOOTH	1000	12	12	3	3	0	0	0
9	OFF	NONE	0	0	0	0	0	0	0	0
10	OFF	SQUARE	1000	12	12	3	2	0	0	50
11										
12										
13										
14										
15										

Figure 24

3. Data Load (Load Profile)

- 3.1. Set STORE/LOAD selector to LOAD (19).
- 3.2. Select memory cell, press a number 1 ~ 10 (20).
- 3.3. Set number of interactions (13).
- 3.4. Press RUN button (15).

**NOTES**

1. Remember to set the number of iteration (13) after loading a sequence.
2. Profiles table (Figure 24) is cleared in case any other Power Supply address is selected.
3. To repeat a loaded profile, press LOAD button (17) followed by RUN button (15).

## V/I Graph

### 1. CV/CC Mode

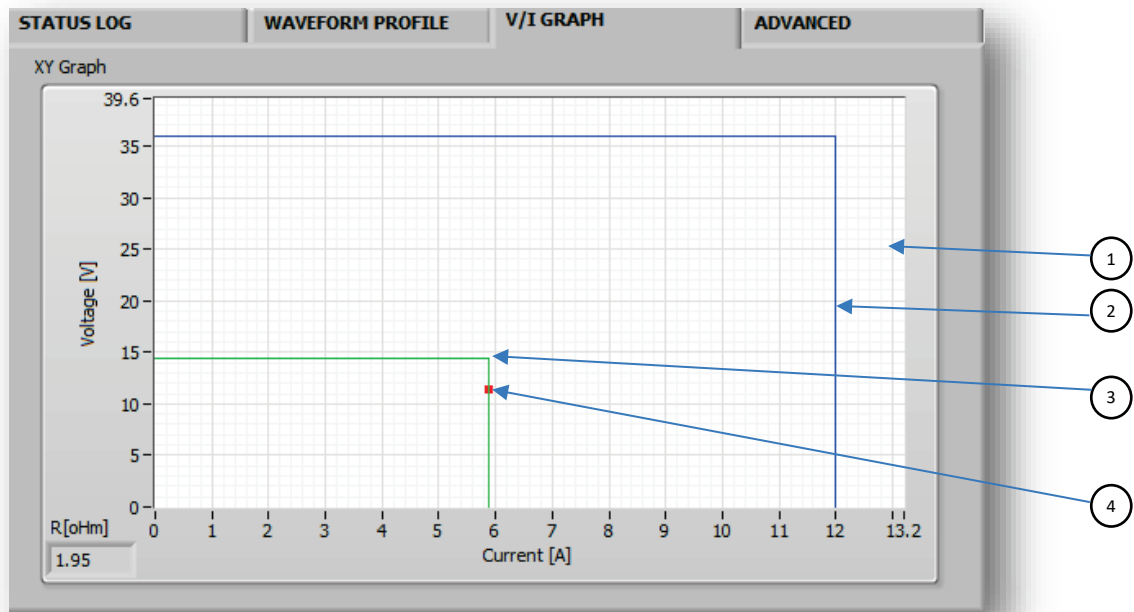


Figure 25

- 1.1. Operation Graph area (1).
- 1.2. Voltage / Current Rated parameters in blue color (2).
- 1.3. Voltage / Current Settings parameters in green color (3).
- 1.4. Operation point (4).



## ADVANCED Tab

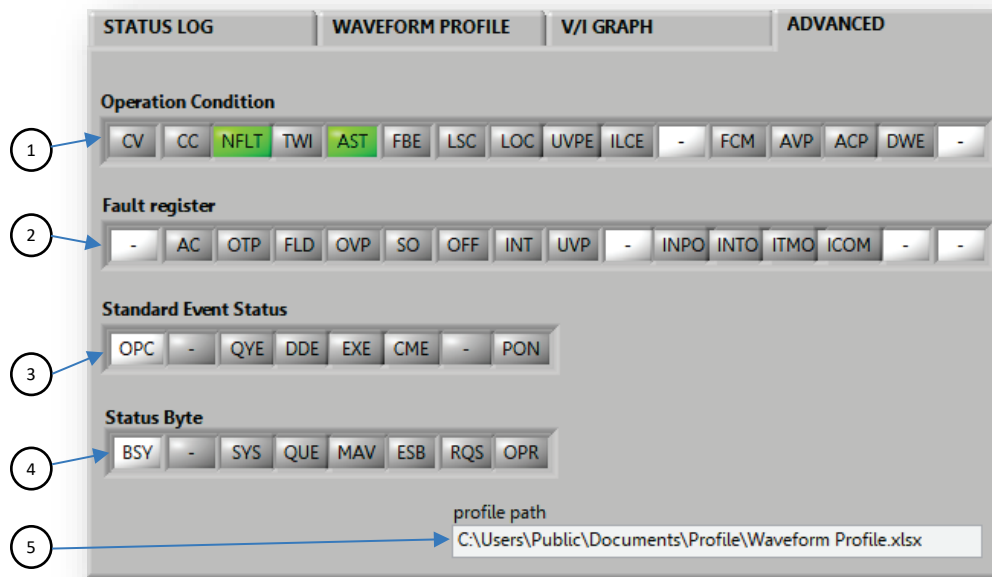


Figure 26

### 1. Registers View

- 1.1. Operational Register (Status Register) view (1).
- 1.2. Questionable Register (Fault Register) view (2).
- 1.3. Standard Event Status Register view (3).
- 1.4. Standard Byte Register view (4).
- 1.5. Profile path (5), set location to store waveform profiles.

Function Generator

NOTE

The function is not applicable for LAN.

1. The function enhances the ability of internal PSU advance waveform function and allows creation of sine, triangle and square waveforms. SCPI mode, Baud Rate 57600 recommended. Each profile may contain up to 99 segments. The profile may be iterated up to 9999 times. The function allows store/load up to 10 profiles.

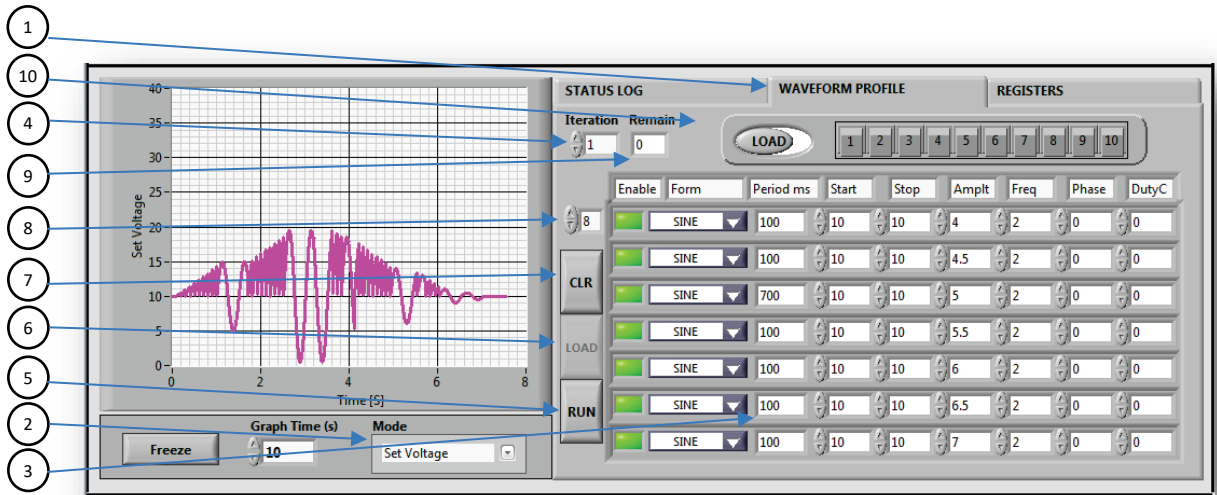


Figure 27

2. To create any profile:
  - 2.1. Select "WAVEFORM PROFILE" (1). Refer to Figure 27.
  - 2.2. Select Graph mode: (2)
    - Set Voltage - Graph shows Programming Voltage and PSU receives voltage setting commands.
    - Measure Voltage - Graph shows Measured Voltage and PSU receives voltage setting commands.
    - Set Current - Graph shows Programming Current and PSU receives current setting commands.
    - Measure Current - Graph shows Measured Current and PSU receives current setting commands.

2.3. Define table parameters (3)

- 2.3.1 Enable row of profile segment.
- 2.3.2 Select data form.
- 2.3.3 Set period of segment. (For all forms).
- 2.3.4 Set start and stop offset points of segment (for all forms). Refer to Figure 26.
- 2.3.5 Set amplitude of waveform (for all forms except line).
- 2.3.6 Set frequency. (For all forms except line).
- 2.3.7 Set phase. (Optionally, for all forms except line).
- 2.3.8 Set Duty Cycle. (For square).
- 2.3.9 Set Iteration control value N to repeat profile N times. (4).
- 2.3.10 Press “RUN” button to RUN created profile (5).
- 2.3.11 Press “LOAD” (6) button to repeat the profile and then “RUN” (5).
- 2.3.12 Press Clear button (7) to reset table.
- 2.3.13 Table row scrolling (8).
- 2.3.14 Indicator Remain shows remain interactions (9).

**NOTE**

Press row enable button to include a profile segment.

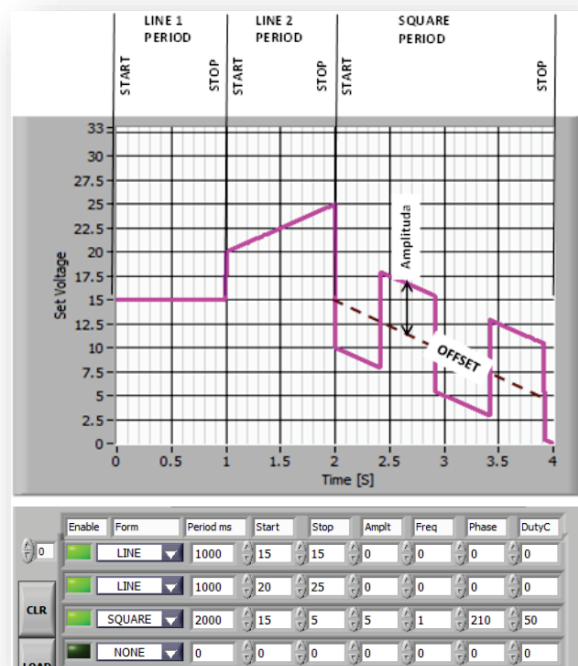


Figure 28

## 9. Z+ Control Application

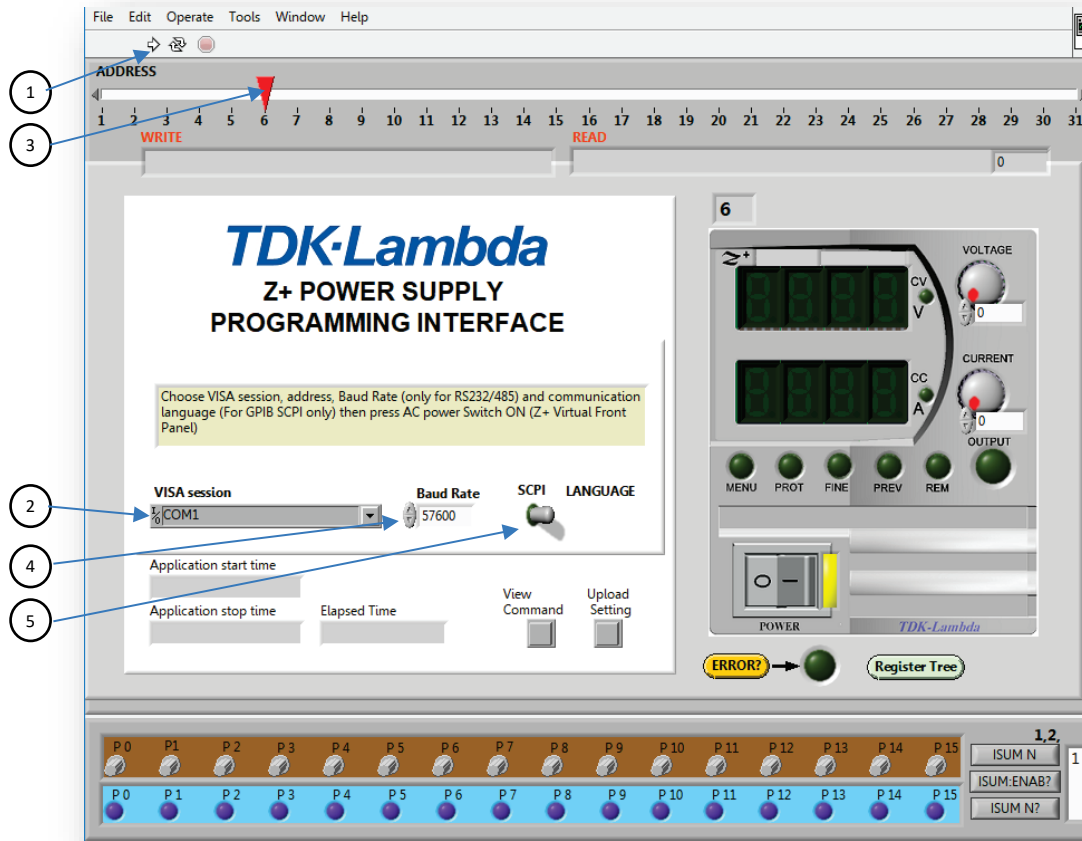



Figure 29

3. Press  button (1) to run the application (when launched, automatically set to run mode).
  - 3.1. Visa resource name, select COM port for RS232/485 and USB, GPIB::x::INSTR for GPIB or TCPIP::x::INSTR for LAN (Refer to chapter 6). Select "Refresh" to update connection (2).
  - 3.2. Address, select Power Supply address (3).
  - 3.3. Baud Rate, select Baud Rate for RS232/485 and USB mode only (4).
  - 3.4. Language. Application supports SCPI/GEN language (5).

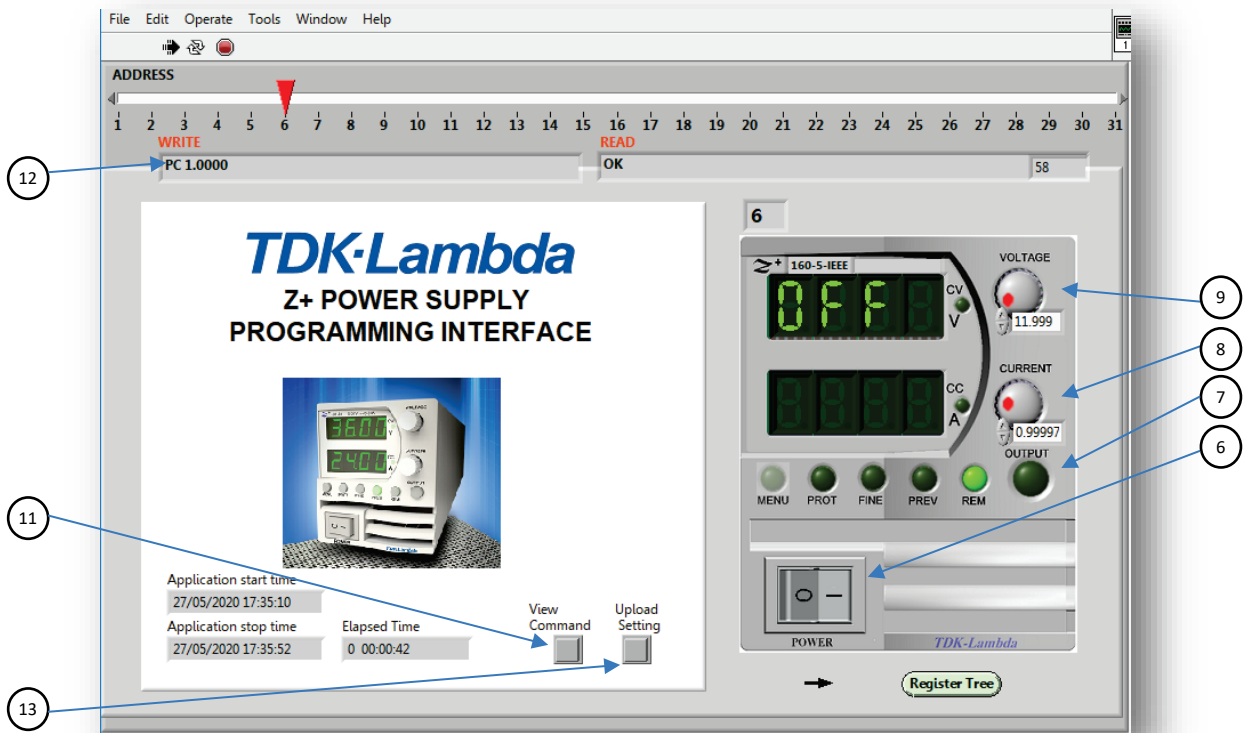


Figure 30

4. Switch ON Power switch (6). Refer to Figure 30.
5. Press OUTPUT button (7) to enable / disable power supply output.
6. Change Voltage and Current settings by voltage (9) and current (8) encoders.
7. Press PROT LED/Button (10) for protection setting. To return - press button again. Refer to Figure 30.
8. View command button (11) to show/hide command row (12).
9. Update setting (13) functions refresh all application controls and indicator settings according to PSU state.

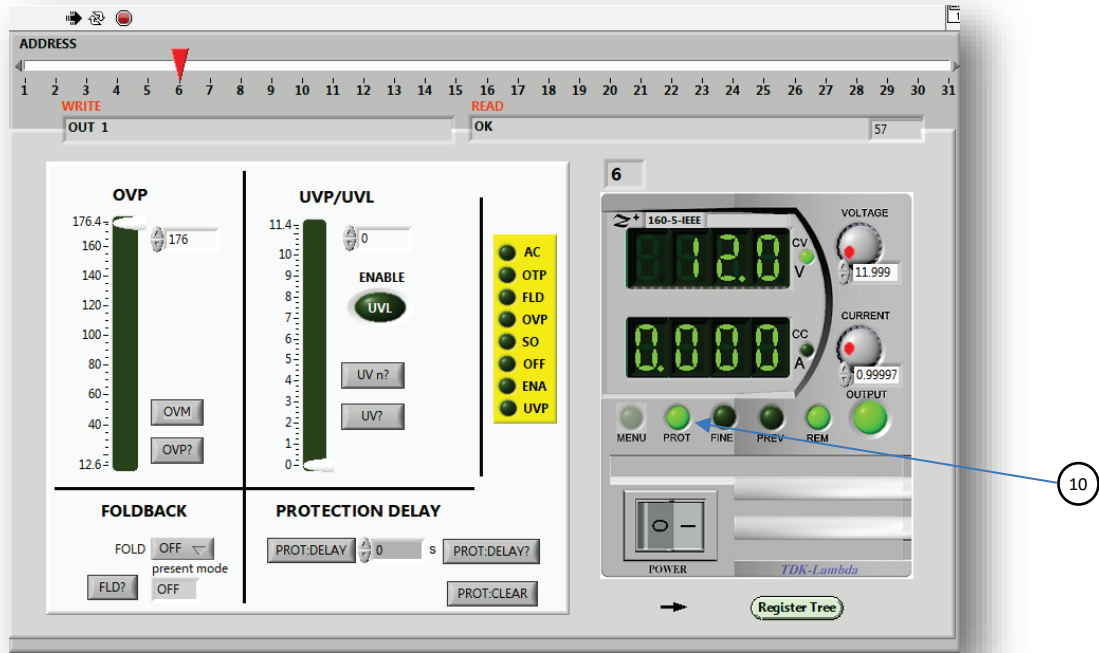


Figure 31

10. Press FINE LED/Button (14) for auxiliary commands and queries. To return - press the button again. Refer to Figure 32.

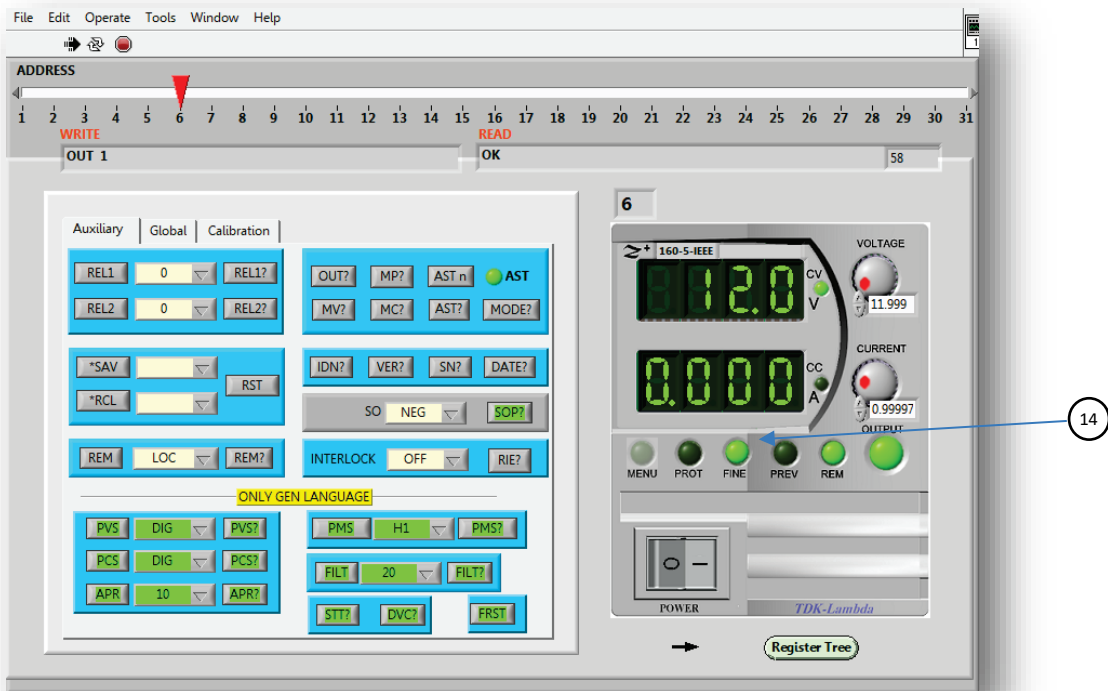


Figure 32

11. To STOP the application, set power switch (6) to the OFF position. Refer to Figure 30.