


Vaunix Technology Corporation



Lab Brick Family of Digital Attenuators

OPERATION MANUAL

Operation Manual	
Lab Brick Digital Attenuators	

Certification

Vaunix Technology Corporation certifies that this product met its published specifications at the time of shipment from the factory.

Warranty

Lab Brick Digital Attenuators are warranted against defects in material and workmanship for a period of one year from the date of shipment.

LIMITATION OF WARRANTY

The foregoing warranty does not apply to connectors that have failed due to normal wear. Also, the warranty does not apply to defects resulting from improper or inadequate maintenance by the Buyer, unauthorized modification or misuse, or operation outside of the environmental specifications of the product.

No other warranty is expressed or implied, and the remedies provided herein are the Buyer's sole and exclusive remedies. Vaunix Technology Corporation shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

NOTICE

Vaunix has prepared this manual for use by Vaunix Company personnel and customers as a guide for the proper installation, operation, and maintenance of Vaunix equipment and computer programs. The drawings, specifications, and information contained herein are the property of Vaunix Technology Corporation, and any unauthorized use or disclosure of these drawings, specifications, and information is prohibited; they shall not be reproduced, copied, or used in whole or in part as the basis for manufacture or sale of the equipment or software programs without the prior written consent of Vaunix Technology Corporation.

This ISM apparatus meets all requirements of the Canadian interference-Causing Equipment regulations.

Ce generateur de fequence radio ISM respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This instruction complies with the WEEE Directive (2002/96/EC) marking require- ment. This affixed product label indicates that you must not discard this electrical/ electronic product in domestic household waste.



To return an unwanted instrument, contact Vaunix Technology Corporation.



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1 General Information

This guide contains information on the installation, operation and specifications of the Lab Brick® Family of Digital Attenuators.

1.1 General Safety Information

To prevent the risk of personal injury and loss related to equipment malfunction, Vaunix Technology Corporation provides the following safety information. For your own safety please read this section before operating the equipment.

Warning

Before connecting your Lab Brick Digital Attenuator to other instruments ensure that all instruments are connected to earth ground. Any interruption of the earth grounding may cause a potential shock hazard.

Caution

- The Lab Brick Digital Attenuator contains components which are sensitive to Electrostatic Discharge (ESD). Proper ESD precautions must always be maintained while using this equipment.
- This equipment has no serviceable parts.
- To prevent the risk of electrical shock or damage to precision components, do not remove the equipment covers.
- Unauthorized entry into the unit voids all warranties.

2 Getting Started

Prior to installing your Lab Brick Digital Attenuator, verify the contents of the package.

The package should contain:

Lab Brick Digital Attenuator

USB Cable

Flash Drive containing the manual and the Graphical User Interface program

2.1 System Requirements

The Lab Brick Digital Attenuator runs from a standard PC or lap top computer with a minimum of one USB connection.

The attenuator is powered with +5V supplied through the USB port of the computer, self-powered USB hub, or +5V USB wall power supply.

The stand-alone Graphical User Interface, accessible through the USB port, runs on the Windows operating system.

The Lab Brick devices also operate on Linux platforms using supplied drivers.

The attenuator is powered through the USB port. No other AC or DC supply is required as the power for this unit is delivered from a USB port on the computer or a self powered USB hub.

2.2 Installation of the Graphical User Interface

The Lab Brick is controlled through the GUI program that is supplied on the provided USB flash drive and also available for download from the Vaunix website. To install the GUI proceed with the following steps:

- Insert the supplied USB flash drive into an available USB port on the computer
- Run the program "Setup.exe"
- Follow the instructions on the screen
- After Installation is complete, remove the USB flash drive

2.3 Using the Lab Brick Digital Attenuator

Start the Lab Brick program by selecting the Lab Brick Icon or selecting the Lab Brick program from the Start Menu on the computer. Attach the supplied USB cable to the Lab Brick Digital Attenuator and the USB port on the computer. The green LED on the Lab Brick will illuminate as communication with the computer is automatically established. The GUI program will recognize the device and display the model number and serial number in the title bar and lower left corners respectively. The Lab Brick is now ready for operation.

2.4 Using Multiple Lab Brick Digital Attenuators

Users may operate and control multiple Lab Bricks from a single computer.

2.4.1 Multiple Windows GUIs

Start the Lab Brick GUI as described in section 2.3 for each Lab Brick Digital Attenuator that you will control from the computer. Connect each Lab Brick either directly to the USB port or through a self powered USB hub to the USB port of the computer. The green LED on each Lab Brick will illuminate as communication with the computer is automatically established. Each GUI application will automatically connect to one Lab Brick. The GUI will display the model number and serial number of the connected device in the title bar and lower left corners respectively.

2.4.2 Multi-Attenuator Windows GUI

The multi-attenuator Windows GUI can operate up to 8 supported attenuators. The attenuators are assigned as group A and group B. Each group of attenuators are controlled independently from the other.

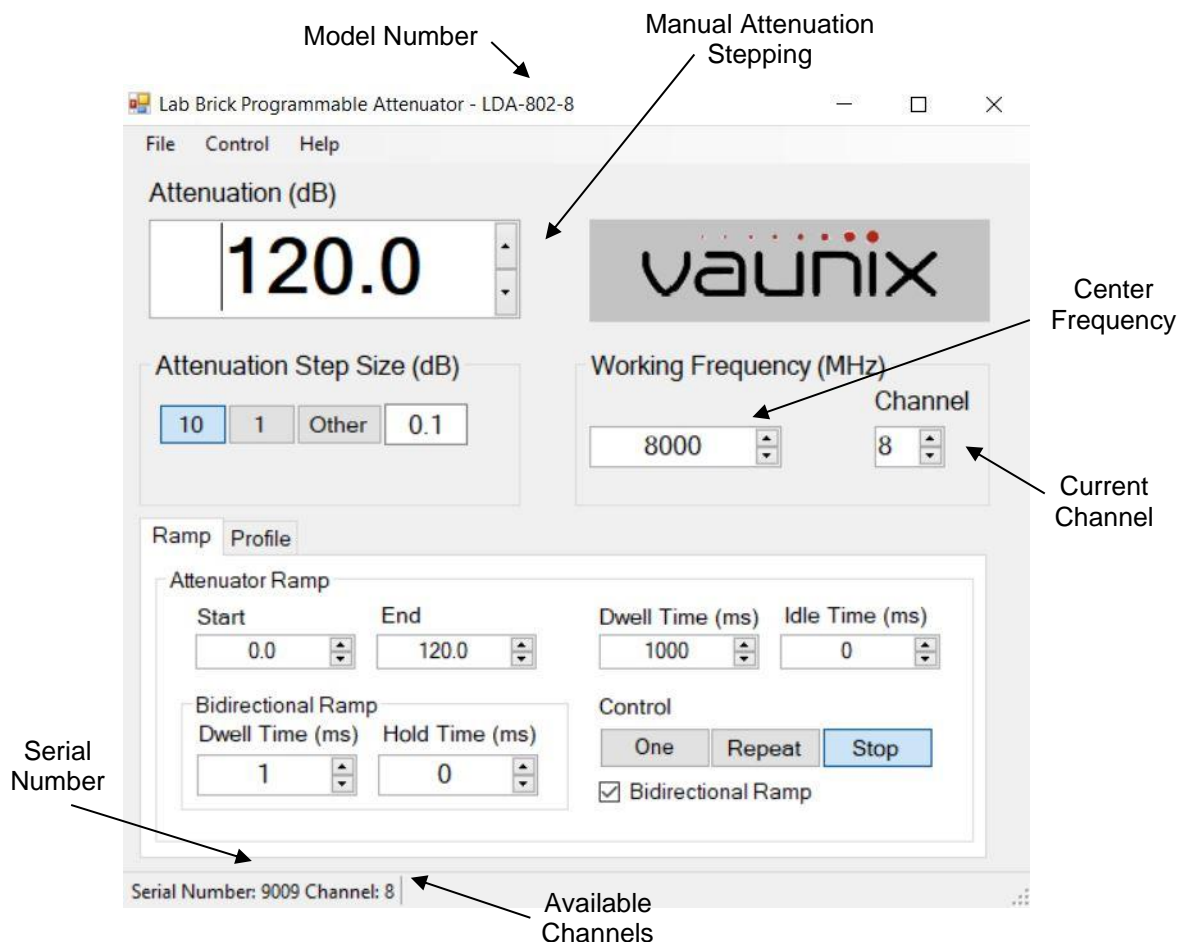
2.4.3 Customized Programs

All attenuator products can be controlled from customized programs using the supplied DLL files, Linux drivers and LabVIEW drivers. In each case, the user can control any number of attenuator devices up to the 127 USB devices allowed by USB protocol.

3 Operating Features and Controls – USB GUI

The general operation of the Lab Brick Digital Attenuator is designed by the Vaunix engineers to be intuitive and easy to use. This section describes the available features of the Lab Brick Digital Attenuator

3.1 Attenuation



3.1.1 Manual Attenuation

The attenuation level is set using the Attenuation field found on the top of the GUI. Simply type the desired attenuation level into the window and hit the “Enter” key on your computer keyboard. The attenuation level will immediately be set.

3.1.2 Configuring the Manual Attenuation Step Size

The attenuation may also be controlled by using the up and down arrows adjacent to the Power field. Use the controls directly below the Attenuation field to set the desired step size. Quick select buttons are available for fixed step sizes of 10 dB and 1 dB. Custom step sizes may also be used by selecting “Other” and entering the desired step sizes.

3.1.3 Configuring the Automated Attenuation Step Function

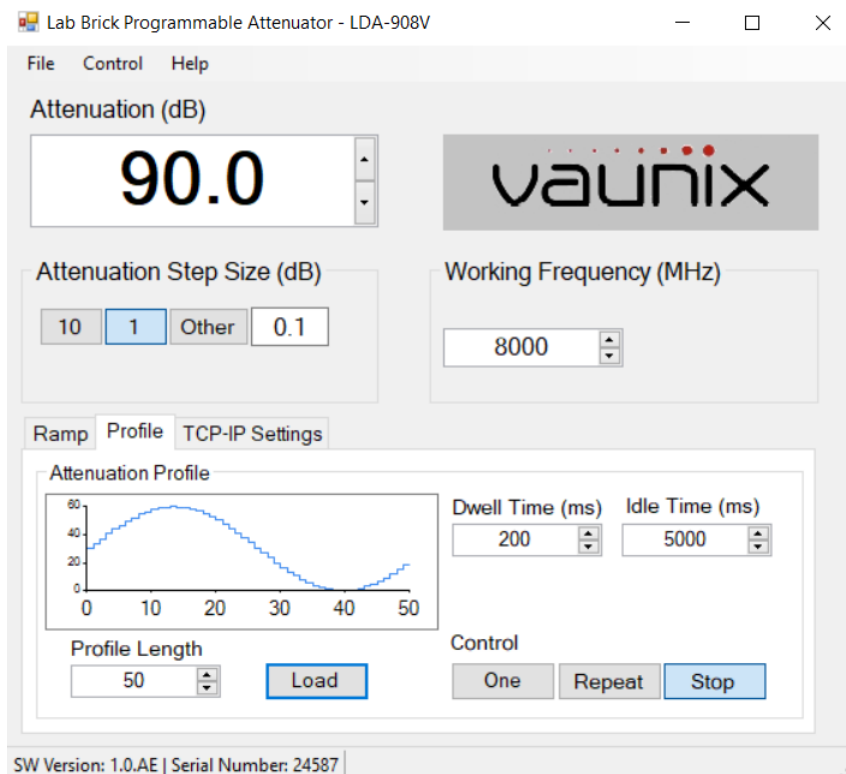
The Lab Brick can be configured to automatically step through a range of attenuation. The user must specify the starting attenuation level, final attenuation level, step size, dwell time and time between repeating sweeps. The starting and ending attenuation levels can be configured over the full attenuation range of the device. The dwell time may be configured from 1 millisecond to 500000 milliseconds per step. The step size is configured as described in section 3.1.2. The attenuation level may increase or decrease during the sweep depending if the starting attenuation is higher or lower than the ending attenuation setting.

When the bidirectional ramp box is selected, the bidirectional dwell time and hold time must be specified. The bidirectional dwell time defines the time at each attenuation setting from the end attenuation to the start attenuation. The Hold time refers to the time to wait after the ramp is completed.

By selecting the “One Time” control button, the Lab Brick attenuator will sweep from the start to the end attenuation level. Upon completing the sweep, the Lab Brick output will stay at the end attenuation setting. The user may stop the sweep at any time by selecting the “Stop” button.

By selecting the “Repeat” control button, the Lab Brick will repeatedly sweep from the start to the end attenuation level. The user may stop the sweep at any time by selecting the “Stop” button.

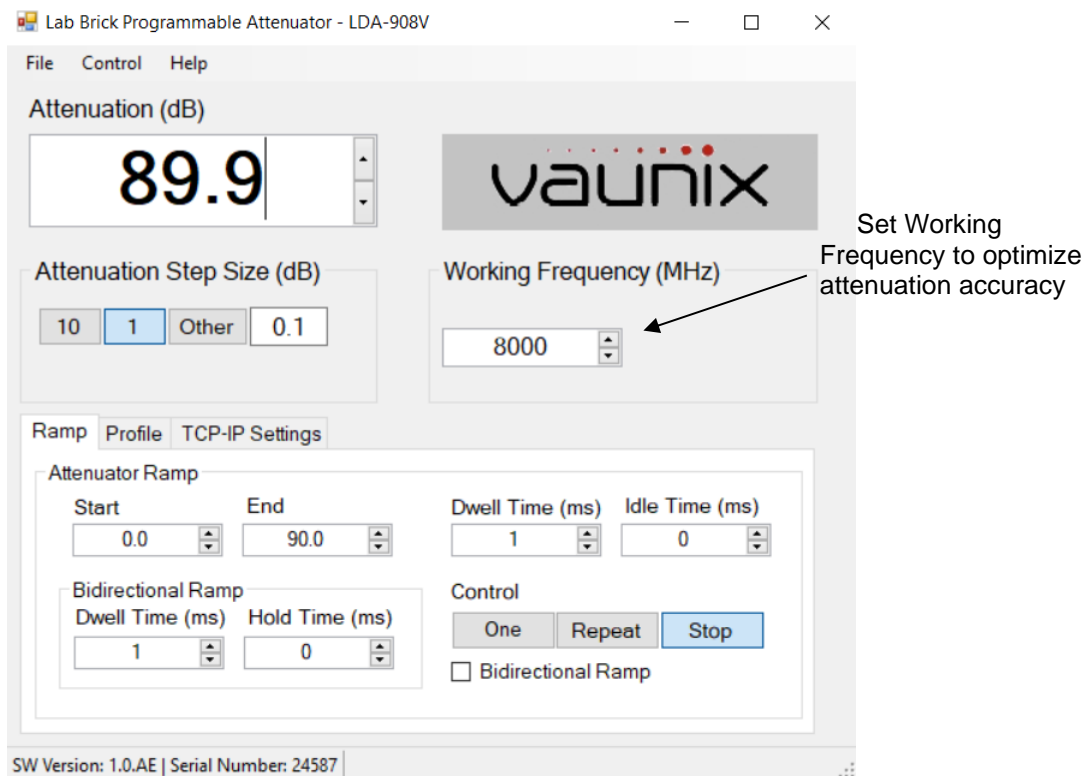
3.2 Attenuation Profile



The attenuation profile can be loaded with a .txt or .prf file.
The file format is: dwell time = time in seconds (ex. 0.200)
idle time = time in seconds (ex. 5.000)
length = number of attenuation points to follow (up to 1000 – model dependent)
atten 1
atten 2
atten 3 etc.

To load a profile, select Load from the GUI. Locate the desired profile file and select Open. A picture of the profile will appear on the GUI. The dwell and idle times may be modified on the GUI.

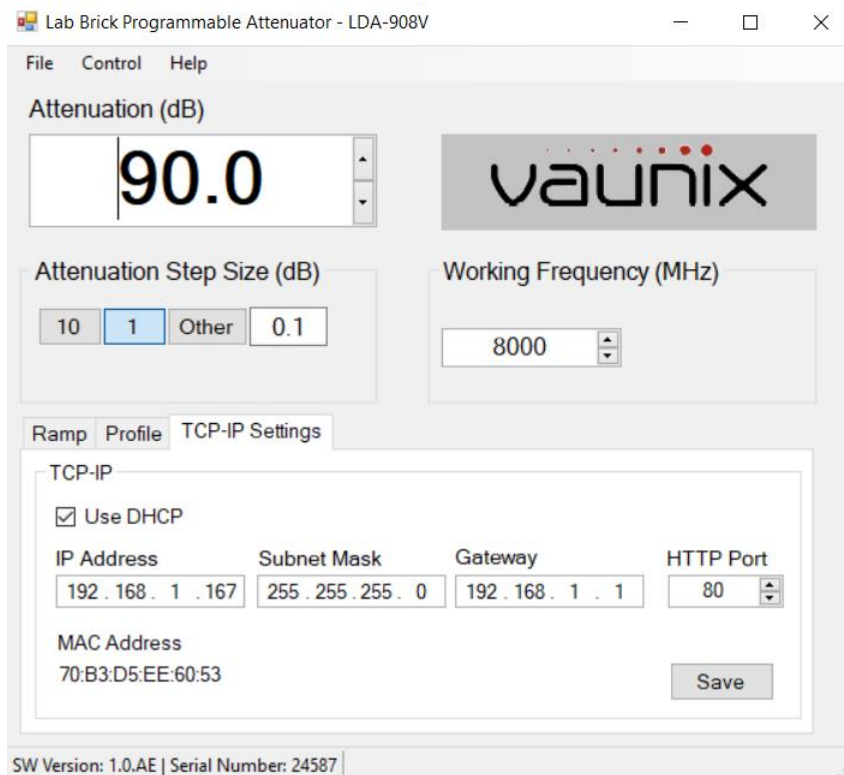
3.3 Working Frequency (0.1 dB step models only)



The working frequency is the center frequency of the band of operation. The attenuator automatically generates minor offsets in the attenuation level based on center frequency and set attenuation value to minimize attenuation error.

3.4 TCP-IP Settings

The TCP_IP settings can be configured using the TCP_IP tab on the Windows GUI.



The user has the option of assigning an IP address or selecting the check box to use DHCP. The subnet mask, gateway and HTTP Port are also user assignable. After the configuration is set, select “Save” followed by a power cycle of the attenuator. If DHCP was selected, return to the TCP-IP tab to view the IP address needed for use with the Ethernet GUI.

4 Operating Features and Controls – Ethernet GUI

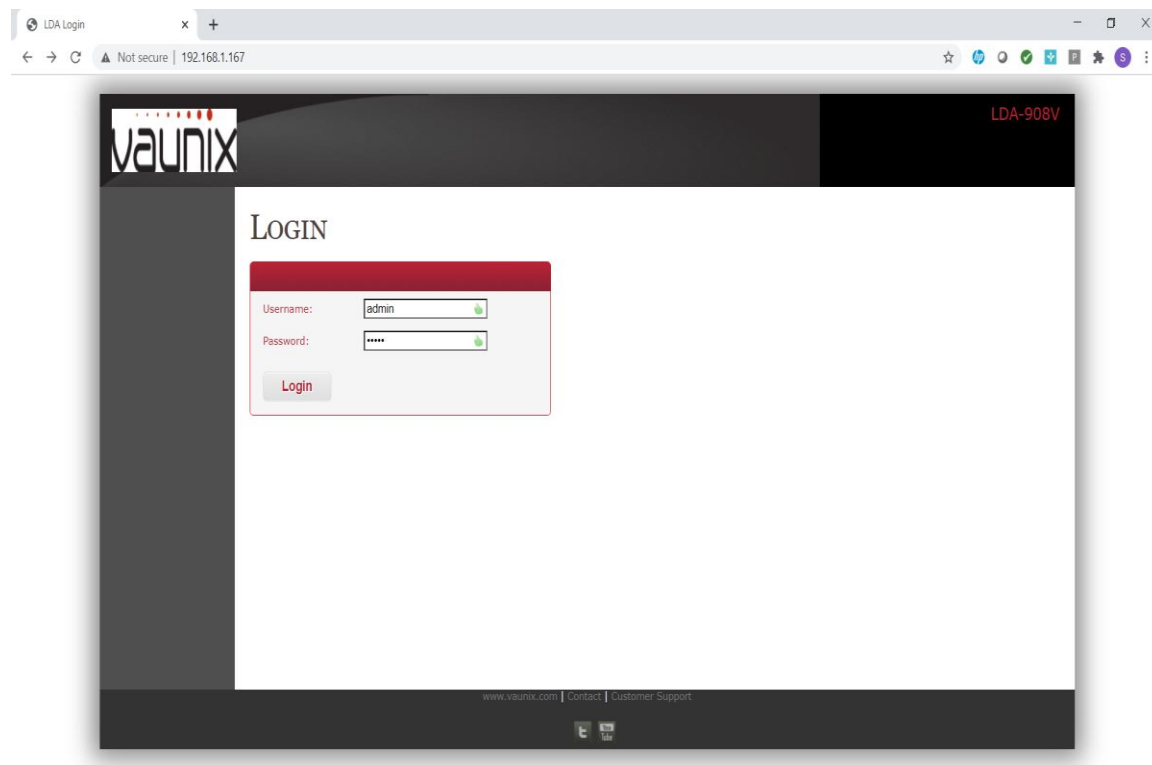
The use the web interface GUI, open an internet browser. Type the assigned IP address in the address bar.

4.1 Username and Password

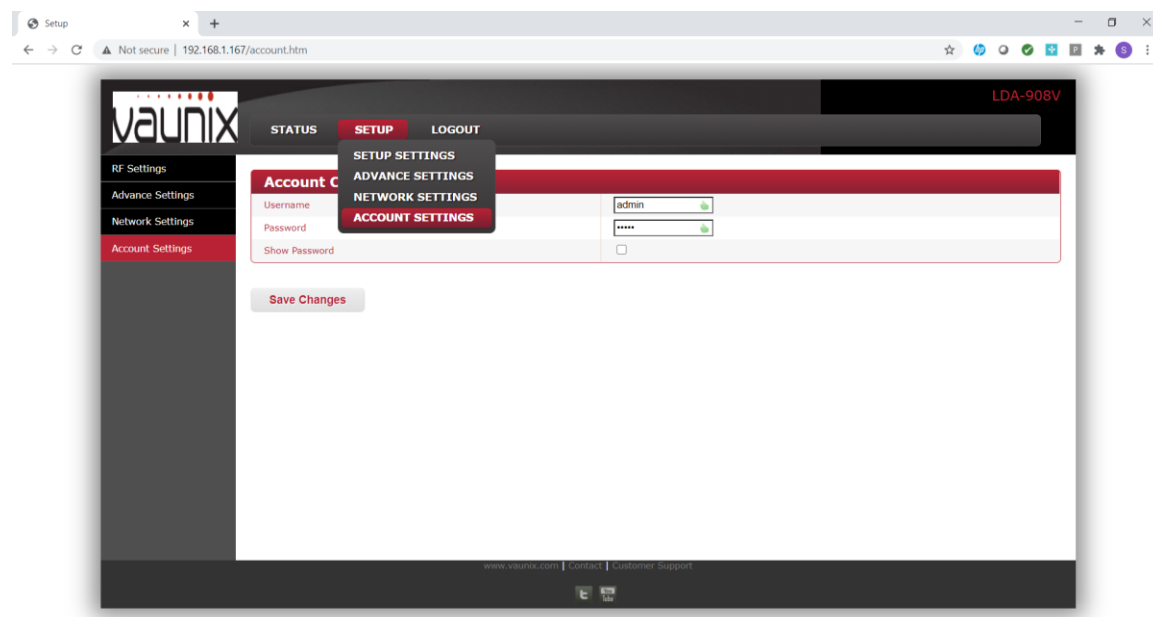
The attenuators default login information is as follows:

Username – **admin**

Password – **admin**




After the initial login, the username and password can be configured by navigating to “Setup” tab followed by “Account Settings”.



After changing the username and password, select “Save Settings”

4.2 RF Status

The status of the digital attenuator can be observed on the Status tab.



LDA-908V

STATUS

SETUP

LOGOUT

RF Status	
Channel #:	1
Frequency(MHz):	8000 [Min-Max(MHz):1-8000]
Attenuation(dB):	90.0 [Min-Max(dB):0-90.0]
RF State:	On

Ramp Configuration	
Control State:	Stop
Ramp Mode:	Up
Direction:	Unidirectional
Start:	.0
End:	90.0
Dwell Time(ms):	1
Idle Time(ms):	0
Bidirectional Dwell Time:	1
Hold Time:	0

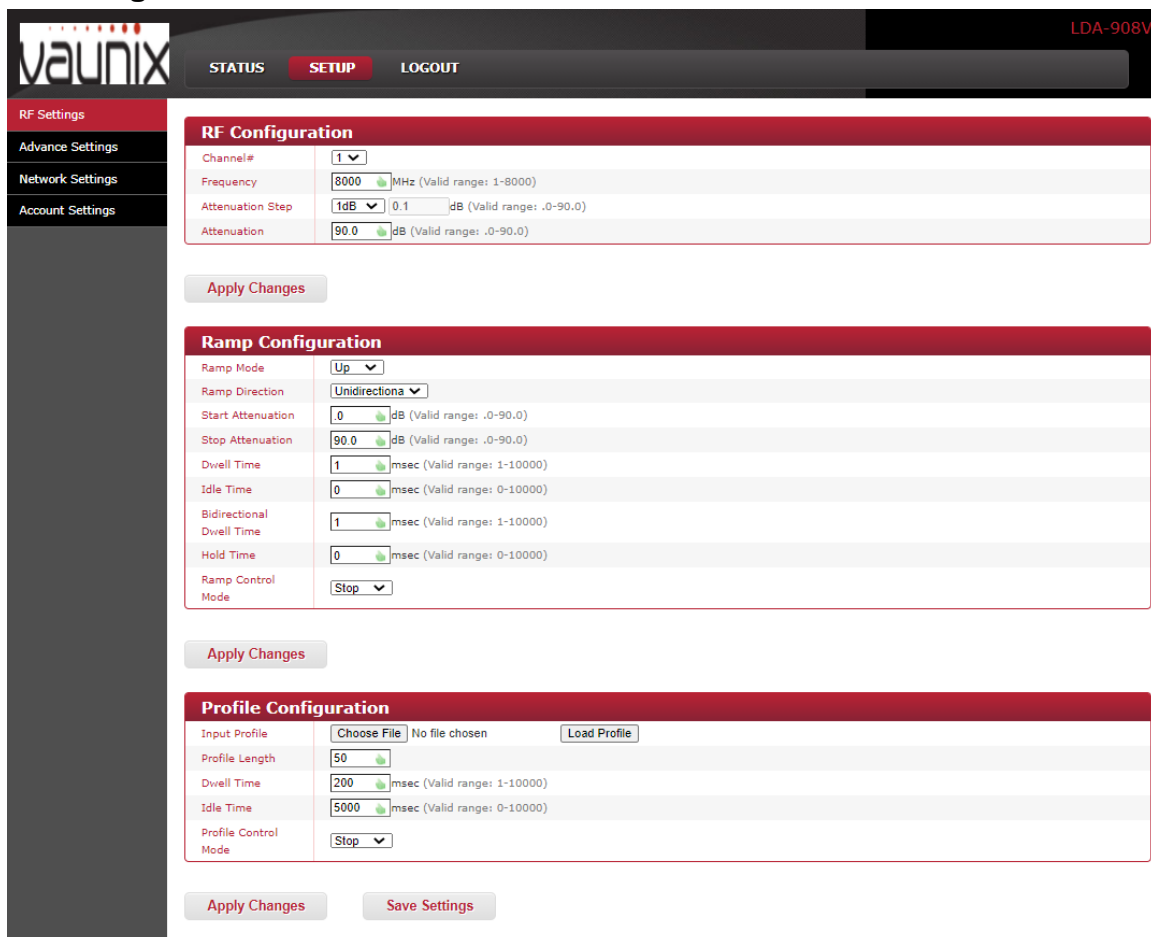
Profile Configuration	
Control State:	Stop
Profile Length:	50
Dwell Time(ms):	200
Idle Time(ms):	5000

Network Details	
Mode:	DHCP
Ip Address:	192.168.1.167
Subnet:	255.255.255.0
Gateway:	192.168.1.1
MAC:	70-b3-d5-ee-60-53

System Information	
Model Number:	LDA-908V
Serial Number:	24587
Version:	1.0.AE

This page will show the current attenuation setting, ramp configuration, profile configuration, network configuration, and the device specific information such as the model and serial numbers, and firmware revision.

4.3 RF Settings



The screenshot shows the Vaunix web interface for an LDA-908V device. The top navigation bar includes 'STATUS', 'SETUP', and 'LOGOUT'. The left sidebar lists 'RF Settings', 'Advance Settings', 'Network Settings', and 'Account Settings'. The main content area is divided into three sections:

- RF Configuration:**
 - Channel#: 1 (dropdown)
 - Frequency: 8000 MHz (Valid range: 1-8000)
 - Attenuation Step: 1dB (dropdown), 0.1 dB (Valid range: .0-90.0)
 - Attenuation: 90.0 dB (Valid range: .0-90.0)
 - Buttons: Apply Changes
- Ramp Configuration:**
 - Ramp Mode: Up (dropdown)
 - Ramp Direction: Unidirectional (dropdown)
 - Start Attenuation: 0 dB (Valid range: .0-90.0)
 - Stop Attenuation: 90.0 dB (Valid range: .0-90.0)
 - Dwell Time: 1 msec (Valid range: 1-10000)
 - Idle Time: 0 msec (Valid range: 0-10000)
 - Bidirectional Dwell Time: 1 msec (Valid range: 1-10000)
 - Hold Time: 0 msec (Valid range: 0-10000)
 - Ramp Control Mode: Stop (dropdown)
 - Buttons: Apply Changes
- Profile Configuration:**
 - Input Profile: Choose File (button), No file chosen, Load Profile (button)
 - Profile Length: 50
 - Dwell Time: 200 msec (Valid range: 1-10000)
 - Idle Time: 5000 msec (Valid range: 0-10000)
 - Profile Control Mode: Stop (dropdown)
 - Buttons: Apply Changes, Save Settings

4.3.1 RF Configuration

Under the RF Configuration category, the user can define the active **Channel#** from the drop-down menu. Any changes to follow will be applied to the selected channel only. The next category is **Frequency**. The frequency is only used to optimize the performance of the attenuator. It is recommended to use a frequency that is close to the frequency of the signals passing through the attenuator. The internal calibration will make finite adjustments to optimize the attenuation accuracy. The attenuator will continue to work across the full frequency band of the unit regardless of the frequency setting.

The **Attenuation Step** is selectable as 1 dB, 10 dB or other. If other is selected the user can define a step size of 0.1 dB to the maximum attenuation value. The Attenuation Step is used in the Attenuation window as well as for Ramp Configuration.

After configuration of the attenuation setting select “Apply Changes” to activate all modifications.

4.3.2 Ramp Configuration

Using the drop-down box, the **Ramp Mode** can be selected as Up or Down to define the initial direction of the attenuation ramp.

The **Ramp Direction** is selectable as Unidirectional or Bidirectional.

The **Start Attenuation** and **Stop Attenuation** are configurable over the full range of attenuation values. Start Attenuation can be above or below the Stop Attenuation setting.

The **Dwell Time** is the time between steps during the ramp.

The **Idle Time** defines the time to hold at the stop attenuation.

Bidirectional Dwell Time is the dwell time between attenuation steps on the return sweep of the attenuation ramp (from the Stop Attenuation to the Start Attenuation).

The **Hold Time** is the time between repeated bidirectional attenuation ramps.

The **Ramp Mode** is selected from the drop-down menu as Stop, Once or Repeat. A repeating sweep can be stopped by changing the Ramp Mode to Stop.

After configuration of the ramp settings, the user must select “Apply Changes” for the settings to be applied.

4.3.3 Profile Configuration

The attenuation profile is loaded from a text file as discussed in section 3.2. The settings can be modified and run from the Profile Configuration window. The Profile Control Mode is selectable as Stop, Once or Repeat.

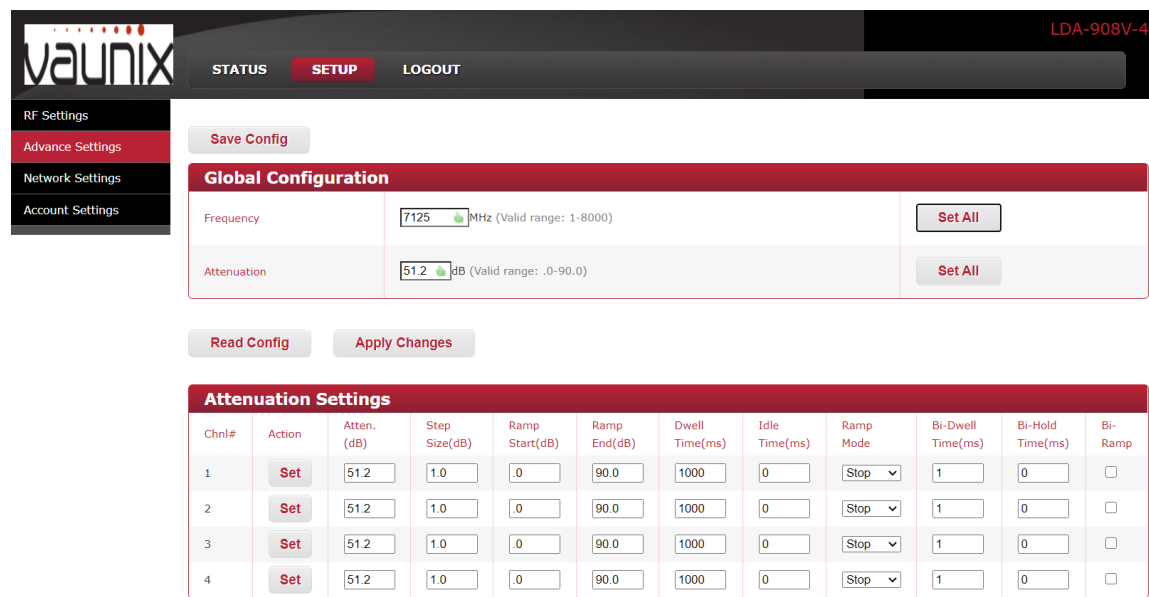
To activate the profile settings, the user must select “Apply Changes”.

4.3.4 Save Settings

The save settings button will store the user applied settings into memory. On subsequent power cycles of the attenuator, the device will start up in the saved state.

4.4 Advance Settings

The advance settings page is particularly useful for multi-channel attenuators such as products with 4, 8, 12, 16 and 64 channels.



Chnl#	Action	Atten. (dB)	Step Size (dB)	Ramp Start (dB)	Ramp End (dB)	Dwell Time (ms)	Idle Time (ms)	Ramp Mode	Bi-Dwell Time (ms)	Bi-Hold Time (ms)	Bi-Ramp
1	Set	51.2	1.0	.0	90.0	1000	0	Stop	1	0	<input type="checkbox"/>
2	Set	51.2	1.0	.0	90.0	1000	0	Stop	1	0	<input type="checkbox"/>
3	Set	51.2	1.0	.0	90.0	1000	0	Stop	1	0	<input type="checkbox"/>
4	Set	51.2	1.0	.0	90.0	1000	0	Stop	1	0	<input type="checkbox"/>

In the Global Configuration window, the user can define the optimized frequency of calibration as well as the attenuation to apply to all channels. After configuring the parameters, the user must select “Set All” to apply changes.

The Attenuation Settings window allows the user to configure each channel independently. The changes can then be applied one at a time by selecting “Set” next to the channel number or they can all be applied together by selecting “Apply Changes”. After the Set command or the Apply Changes command, it is important to select Read Configuration to verify the set parameters as they are not automatically updated.

5 Accessories

Vaunix offers a large variety of accessories to complement the attenuator products. The available accessories include:

- USB Hub
- Various types and lengths of USB cables
- Various types and lengths of RF cables
- Power Dividers
- USB Wall Power Supply

and much more. Please contact Vaunix Sales for additional products and details, volume pricing and customized solutions.