

# PRO VLA

PROFESSIONAL TWO CHANNEL VACTROL/TUBE  
LEVELING AMPLIFIER



## USER'S GUIDE



**A R T**  
APPLIED RESEARCH AND TECHNOLOGY

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## Introduction

Thank you for purchasing Applied Research and Technology's PRO VLA. Offering a superb level of sound quality, the PRO VLA has a unique design which will enhance the sonic textures of your audio system for years to come.

## Registration

If you haven't done so already, please take the time to fill out the User Registration Card for your purchase. Having you in our data base allows us to keep you informed of updates, application notes, and new product introductions. It only takes a moment and will ensure you are constantly up to date with your purchase.

Fill in the following for your future reference:

Date of purchase: \_\_\_\_\_

Purchased From: \_\_\_\_\_

Serial Number: 212-\_\_\_\_\_

## Features

The PRO VLA is one of the finest audio compressors available. Developed in partnership with studio and live sound engineers, the PRO VLA possesses a "sound" that is not available from any other compressor on the market - at any price! A member of the A R T Reference Series, the PRO VLA was designed and constructed with the absolute best components, assuring a lifetime of quiet, reliable performance. The PRO VLA offers:

- Two channel Opto-isolator (Vactrol)/tube-based Leveling Amplifier
- Stereo linking of channels
- Hand selected 12AX7 Tubes
- Vactrol - Optical electronic isolators
- Non-VCA design = transparent, classic sound
- VU metering of input and output levels
- XLR balanced inputs and outputs
- 1/4" TRS active balanced inputs and outputs
- Variable threshold ratio
- Auto and Fast attack and release settings
- Variable Threshold rotary controls
- Variable Output level rotary controls
- 10 segment Gain Reduction LED Array
- 10Hz to 20kHz Frequency Response (+/-0.5dB)
- > 100dB Dynamic Range
- Extremely low noise (-99dBm 'A' weighted)
- Internal power supply
- 5-year parts and labor warranty
- Designed and manufactured in the USA



The PRO VLA is member of A R T's Reference Series of professional signal processing products.

## OVERVIEW

### Design

The PRO VLA (Vactrol-based Leveling Amplifier) is a multi-purpose tool for audio engineering and recording. Enclosed in a 2U (3.5" high) rack-mountable chassis are two independent channels of analog compression designed to work seamlessly with any recording, sound-reinforcement, or electronic instrument setup.

A R T's PRO VLA circuitry is a hybrid design utilizing the latest and most advanced solid state and tube technology. Using a transformerless design throughout, the PRO VLA maintains exceptional signal integrity and extremely low noise. Its VCA-less design utilizes optical electronics (Vactrol) coupled with a 12AX7 vacuum tube gain stage for superior musical performance.

The PRO VLA is a soft knee leveling amplifier by design. Although it is capable of providing a thoughtfully "squashed" signal, the PRO VLA was designed to excel in areas where transparent, expressively musical dynamics control is desired.

### Application

Compression is used to alter the dynamic range of a signal. In recording and live sound situations, compression and limiting is necessary to manage sounds with wide dynamic ranges. Dynamic Range is measured as the difference between the loudest and softest level of a signal. (i.e. from a scream to a whisper). Once a signal rises above or falls below the set threshold (selectable signal level), the compressor automatically changes its gain to raise or lower the overall signal level. Think of this as manually moving a fader up and down to try to keep a signal at a consistent level.

Limiting can be described as a "ceiling". When using a limiter, once the signal level reaches the threshold, it is unable to go any louder - it is limited to a desired level.

In addition to making signal levels more manageable, it is common practice to apply compression or limiting to a signal to make it louder or more "in-your-face". The benefit of using the PRO VLA for these applications is in its design. By utilizing opto-electronics, the PRO VLA allows you to add more compres-

sion without sounding like you're squashing the daylights out of the signal. Unlike typical compressors which use VCA's to control level detection, the PRO VLA is very musical. The nature of its operation is much like the way your eye adjusts to light. Just as your eye transparently adjusts to changes in light, the PRO VLA adjusts to changes in signal level.

## SETTING UP

### Unpacking

Your PRO VLA was packed with care at the factory. The shipping carton was designed to protect it during initial shipment. Please retain this carton for use in transporting the PRO VLA when it is not installed in a rack, or in the unlikely event that you need to return your PRO VLA for servicing.

The shipping carton should contain:

- The PRO VLA
- The owner's manual
- User Registration Card

### AC Power Hookup

The PRO VLA has an internal power supply designed to operate at 100 to 125VAC, 50 to 60Hz. Units manufactured for use outside of the United States of America have been modified to comply with the required electrical specifications. Under no circumstances should the power cable be altered. If the cable becomes cut or damaged, discontinue its use and have it replaced before operating the Pro VLA.

### Audio Connections

Audio connections to and from the PRO VLA are balanced XLR (Pin 2 Hot (+), Pin 3 Cold (-), Pin 1 Ground) and active balanced 1/4" TRS (Tip = Hot (+), Ring = Cold (-), Sleeve = Ground). Unbalanced 1/4" cables may be used with no damage to the PRO VLA. We recommend using only high-quality cables equipped with the appropriate connectors.

### Installation

The PRO VLA may be employed in a number of setups including:

- Between a microphone preamplifier and a mixer, digital multi-

track recorder, DAT machine, hard disk recorder, or analog recorder.

- In a mixer's channel insert points.
- Between a microphone preamp and signal processors.
- Between preamplified electronic musical instruments (synthesizers, guitars, bass, samplers, acoustic instruments with pickups) and other line level equipment.

Note: the PRO VLA should be securely mounted in a standard 19" rack.

### **SAFETY PRECAUTIONS**

**Warning:** To avoid the risk of shock or fire, do not expose this unit to moisture. Do not remove metal panels from chassis parts. Removing the chassis from its cabinet parts exposes dangerous high voltages. There are no user-serviceable parts inside. Hazardous voltages are present inside the chassis. Refer all servicing to qualified personnel.

**Caution:** If your power cord becomes damaged and must be replaced, always replace it with the proper type (3 prong).

### **POWERING UP**

When the power switch is turned on, the VU meters will light. LEDs will light if its associated switch is in its "in" position. Power on the PRO VLA *before* any monitoring levels or power amps are turned on.

Like all tube-based equipment, the PRO VLA needs to warm up to operating temperature. The 12AX7 tubes will reach operating temperature within one to three minutes. During this warm up period you may experience variations due to the THD of the tubes stabilizing. This is normal and the PRO VLA will provide consistent results once this warm up period is over.

If the PRO VLA fails to power up when the power switch is turned on, check to see that its power cord is plugged into an active outlet. If the unit still fails to operate properly, turn it off and unplug it. Then consult your dealer or A R T's Customer Service department.

## **FRONT PANEL CONTROLS & INDICATORS**

### **Power**

The Power switch supplies and removes power from the unit. The PRO VLA should be powered "on" with all monitor levels turned down to protect against any "thumping" caused by gain settings. Likewise, the PRO VLA should be turned "off" after turning all monitor levels down.

### **Threshold Control**

The Threshold control sets the point at which the PRO VLA will act on a signal. Turning this control counter-clockwise lowers the threshold (adding more compression to a signal). Turning this control clockwise raises the threshold.

Setting the Threshold control is dependent on the input signal. The output from a guitar might be -20dB to -10dB, where the level from an insert on a console might be -10dB to +15dB. The easiest way to set the threshold control is to start with the control fully clockwise. Slowly turn the control counter-clockwise (lowering threshold) until you see the yellow Threshold LED light. Now adjust the control (either lower or higher) until you have the amount of compression you desire. Use the Gain Reduction meter as a visual guide to the amount of compression applied.

### **Ratio Control**

The Ratio Control selects the "amount" of compression applied to the input signal once that signal reaches or exceeds the threshold. This compression amount is expressed as a ratio of input to output. For example if a 4:1 compression ratio is chosen, for every 4dB over the threshold the input signal rises, the output level only rises by 1dB. In this case if the input signal was 12dB over the threshold, the output level would rise by only 3dB.

Generally compression ratios of 10:1 and greater are considered limiting.

The range of the Ratio control is 2:1 to 10:1. The PRO VLA may be used as either a compressor or limiter.

### **Output Control**

The Output control sets the output gain of the PRO VLA. When the control is fully counterclockwise, the output level of the PRO VLA is attenuated by -83dB. Turning the control clockwise adds gain (sometimes called “make-up” gain). Since levels can be decreased when compression is applied, the PRO VLA has the ability to apply gain to bring the processed signal back up to unity (same as input level). To properly set the output level, adjust the Output Control while switching between Active and Bypass. When these two levels are equal in volume, the output control is set properly.

### **VU Meter - Input/Output Switch**

The VU Meter Input/Output Switch toggles the VU meter between displaying either input or output signal levels. The Input setting is the signal entering into the PRO VLA. The Output setting is the signal (post-process) leaving the PRO VLA. In stereo applications, place one switch in the Input position and one switch in the Output position. This enables you to see both levels at a single glance of the meters.

Note: The Zero (“0”) level of the VU meter is calibrated at +4dBm when using the XLR connectors into a 600 Ohm load - or - when using the 1/4” outputs into a high impedance load.

### **Attack Time Switch**

The position of the Attack Time switch selects the attack characteristics for the channel of the PRO VLA. Attack Time refers to how quickly compression is added after the input signal rises above the Threshold. Since different signals have different attack characteristics, it is important for a compressor to have different settings which allow the action of the compressor to sound more natural. The “out” position is the “Auto” setting. The Auto setting is a program dependant attack time with 20ms being the *slowest* the PRO VLA will take to achieve 20dB of compression. In other words, the Attack Time circuitry in the PRO VLA is designed to “adapt” to the signal characteristics of the signal you are processing. The “in” position is the “Fast” setting. This setting has a fixed attack time of 2ms. The Fast setting is ideal for punchy, repetitive signals.

### **Release Time Switch**

The position of the Release Time switch selects the release char-

acteristics for the channel of the PRO VLA. Release Time refers to how quickly the channel returns to unity gain (no compression) after the input signal falls below the Threshold. Again, since different signals have different decay characteristics, it is important for a compressor to have different settings which allow the action of the compressor to sound more natural. The “out” position is the “Auto” setting. The Auto setting is an automatically adjusting (sometimes called “program dependent”) release time with a range of 100ms to 3 seconds. The “in” position is the “Fast” setting. This setting has a fixed release time of 300ms. The Fast setting is ideal for punchy, repetitive signals. Use the “auto” setting when the signal has varying characteristics (long decaying notes alternating with quick notes, mix material, etc.).

### **Bypass Switch**

A Bypass switch is included on each channel of the PRO VLA to enable you to remove the unit from your signal chain. When set to its “in” position, the channel of the PRO VLA allows signal to pass from the input jacks to the output jacks with no processing. The LED will illuminate to inform you the channel is bypassed. In its “out” position, the PRO VLA is active and the input signal is processed. Use the Bypass switch when setting the PRO VLA’s Output Level to achieve unity (no boost or cut) gain. Unity gain is achieved when the active level is the same as the bypassed level.

### **Stereo Link/ Dual Mode Switch**

The PRO VLA may be used as two independent channels of compression/limiting or as a stereo processor. When the Stereo Link/Dual Mode switch is in its “out” position, the PRO VLA operates as two independent channels. With the switch in its “in” position, the PRO VLA is a stereo unit. In this Linked mode the Threshold, Ratio, Attack and Release controls of channel #1 are used to control both channels of the PRO VLA. You’ll notice these controls on channel #2 are inactive when the Stereo Link/Dual Mode switch is “in”. This design is common among professional compressors. It ensures that each channel of the stereo input signal is processed identically to prevent any shifting or distortion of the stereo image. The Output controls remain independent in the Link Mode to allow for level matching. The LED will light when the switch is in the “in” (linked) position.

### **Gain Reduction Meter**

Each channel of the PRO VLA has a ten segment LED gain reduction meter. These meters provide a visual indication of how much compression is taking place. The right-most LED in these meters is the Threshold LED. The Threshold LED will light when the input signal reaches the level set by the Threshold control. The range of the meter is -1dB to -30dB.

### **VU Level Meter**

Each channel of the PRO VLA has a backlit VU meter showing either the input or output level (switch dependant). The zero ("0") level is calibrated to +4dBm (with a 600 ohm load on the XLR output or a high impedance load on the 1/4" output). Use the VU meter to view input (unprocessed) and output (processed) levels. The meters are active when the PRO VLA is in bypass.

## **REAR PANEL CONNECTIONS**

It's easy to interface the PRO VLA with other equipment. Balanced XLR and balanced 1/4" phone, input and output connectors are located on the rear panel.

The PRO VLA's XLR connectors follow the AES standard of: Pin 1 = Ground, Pin 2 = Hot (+), Pin 3 = Cold (-). The balanced 1/4" phone jacks are typical TRS connections: Tip - Hot (+), Ring - Cold (-), Sleeve - Ground.

### **Input**

The PRO VLA provides both an XLR and 1/4" input jack. Both jacks are balanced. The 1/4" jack can be used with unbalanced signals by simply plugging in an unbalanced cable. The inputs are designed for use with line level signals ranging from -30dBm to +20dBm. While it is possible to plug an instrument directly into the PRO VLA, it is desirable to run the instrument into a preamp before the signal runs into the PRO VLA. This will provide a stronger signal and will keep noise to a minimum. Microphones must be run into a microphone preamplifier (like A R T's PRO MPA) before being run into the PRO VLA. Use the XLR input for use with equipment that provides an XLR output. Use the 1/4" input jack for balanced or unbalanced 1/4"

equipment.

Do not use both inputs on a channel at the same time.

### **Outputs**

The outputs of the PRO VLA are active balanced. You may use these in unbalanced configurations without harm to the output circuitry. Use the unbalanced 1/4" jack for sending your signal to amps, processors or other unbalanced configurations. Use the XLR output to send signals to equipment which accepts XLR connections. Both outputs may be used at the same time.

**\*\*Note:** If you experience a grounding hum when using both output connectors simultaneously, a ground loop may be the problem. To remedy this problem, disconnect (lift) the ground wire (pin 1) from the XLR cable plugged into the PRO VLA's output. This interrupts the ground path and therefore breaks the loop.

## **APPLICATIONS**

### **Compressor/ limiter**

The main application of the PRO VLA is to control the dynamic range of a signal level. Plug a line level (post preamplifier or other gain stage) source into either input and set the threshold and output controls to provide the desired amount of compression to the input signal.

### **Stereo mix and mastering**

Because of its low noise and excellent tonal qualities, the PRO VLA is ideal for running mixes through before recording to DAT, hard disk or analog recording devices. Used as a mastering device, the PRO VLA is capable of adding warmth and impact to the overall signal level. The PRO VLA is ideal for live use as well.

### **Vocal and instrument levelling**

The musical nature of the PRO VLA makes it ideal for use on a wide range of instruments and vocals. Place the PRO VLA into a channel insert, after a preamplifier, or from a direct output of a channel of a mixer. Adjust the controls of the PRO VLA to achieve the desired amount of compression.

### Tube Replacement

The two 12AX7A tubes in your PRO VLA have been specially selected and sorted to specific operating tolerances. The original tubes should provide years of trouble-free performance. In the event they need to be replaced, we recommend replacing them with tubes available from

A R T. We cannot guarantee consistent performance from "off-the-shelf" replacements.

## WARRANTY AND SERVICE INFORMATION

### Limited Warranty

Warranty service for this unit will be provided by Applied Research & Technology, Inc. in accordance with the following warrant statement.

Applied Research & Technology, Inc. (A R T) warrants to the original purchaser that this product and the components thereof will be free from defects in workmanship and materials for a period of **five years** from the date of purchase. Applied Research & Technology, Inc. will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to the factory service department or authorized service center, accompanied by proof of purchase date in the form of a valid sales receipt.

**EXCLUSIONS:** This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

A R T reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured.

A R T shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may also have other rights which vary from state to state.

For units purchased outside the United States, service will be provided by an authorized distributor of Applied Research and Technology, Inc.

### SERVICE

The following information is provided in the unlikely event that your unit requires service.

- 1) Be sure that the unit is the cause of the problem. Check to make sure the unit has power supplied, all cables are connected correctly, and the cables themselves are in working condition.
- 2) If you find the unit to be at fault, write down a complete description of the problem, including how and when the problem occurs, and a description of your complete setup before calling Customer Service.
- 3) Call our Customer Service department for a Return Authorization (RA) number or questions regarding technical assistance. Customer Service hours are 9:00am to 6:00pm Eastern Time, Monday through Friday.
- 4) Pack the unit in its original carton or a reasonable substitute. The packing box is not recommended for a shipping carton. Put the packaged unit in another box for shipping. Print the RA number clearly on the outside of the shipping box. Print your return shipping address on the outside of the box.
- 5) Include with your unit: a return shipping address (we cannot ship to a P.O. Box), a copy of your purchase receipt, a daytime phone number, and a description of the problem. Keep your manual!
- 6) Ship your unit to:

APPLIED RESEARCH AND TECHNOLOGY, INC.  
215 TREMONT STREET  
ROCHESTER, NEW YORK 14608  
ATTN: REPAIR DEPARTMENT  
RA# \_\_\_\_\_

## A R T PRO VLA SPECIFICATIONS

Dimensions	19"W X 6.5"D X 3.5"H
Shipping Weight	9 Lbs
Input Connections	balanced XLR & 1/4" TRS
Output Connections	balanced XLR & 1/4" TRS
Input Impedance XLR, 1/4"	20K ohms, 1M ohms (unbal.)
Output Impedance XLR, 1/4"	600 ohm, 300 ohms (unbal - 600ohms bal.)
Maximum Input Level, XLR	+21dBm
Maximum Input Level, 1/4"	+21dBm
Maximum Output Level, XLR	+27dBu (RL = 100Kohms, THD = 5%)
	+21dBu (RL = 600ohms, THD = 5%)
Maximum Output Level, 1/4"	+21dBu (RL = 100Kohms, THD = 5%)
Frequency Response	10Hz to 20kHz (+/- .5dB)
Dynamic Range	>100dB (20-20kHz)
THD @ 0dBm out:	<0.1% (typical)
Equivalent Input Noise (EIN)	
XLR to XLR	-99dBm ('A' weighted)
1/4" to 1/4"	-97dBm ('A' weighted)
Attack Time	Fast 2ms, Slow 15ms (for 20dB compression)
Release Time	Fast-300ms, Slow 100ms-3sec.
Slope	Variable: 2:1 to >10:1
Max. Attenuation	30dB
Power Requirements:	100-125VAC, 25W - (USA)
	Internal fuse. Other power requirements configured for country of destination.

A R T retains a policy of constant product improvement. A R T reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured. Therefore, specifications are subject to change without notice.

Designed and manufactured in the United States of America.

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215 Tremont Street (716) 436-3942 FAX  
Rochester, NY 14608 USA

### **WE'RE ON-LINE!**

For Product information, questions, applications, tips, answers and general discussion with A R T employees, look for A R T on the Internet..

Check out our Web Page at: <http://www.artroch.com>

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