

PRO MPA

Professional Two Channel Tube Microphone
Preamplifier



USER'S GUIDE



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Introduction

Thank you for purchasing Applied Research and Technology's PRO MPA. Offering a superb level of sound quality, the PRO MPA 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: 210-_____

Features

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

- The "SOUND"! - (not available elsewhere)
- Two independent channels of operation
- VU metering
- Unique 10 segment Tube Character Array
- Variable high pass filter
- XLR balanced inputs and outputs
- 1/4" TS unbalanced inputs and outputs
- Hybrid- 12AX7/ Triple differential transistor gain stages
- +48V Phantom power
- Phase reversal
- Over 70dB of gain
- Independent input and output level controls
- >100dB dynamic range
- Internal power supply
- 5-year warranty
- Designed and manufactured in the USA



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

OVERVIEW

The PRO MPA (Microphone Pre 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 microphone preamplifiers designed to work seamlessly with any recording, sound-reinforcement, or electronic instrument setup.

ART's PRO MPA circuitry is a hybrid design utilizing the latest and most advanced solid state and tube technology. Using a transformerless design throughout, the PRO MPA maintains exceptional signal integrity and extremely low noise. The Active balanced input utilizes a hybrid, triple-differential transistor design, providing extremely low noise and excellent CMRR. A second stage 12AX7A tube running on a regulated DC voltage provides an additional 40 dB of gain. The design causes the tube to overload before the input or output stage. This allows the user to manipulate the tube gain to meet their sonic requirements. The 1/4" input has a high impedance, which prevents the loading of any device connected to it and makes the PRO MPA perfect for DI or line level applications.

SETTING UP

Unpacking

Your PRO MPA 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 MPA when it is not installed in a rack, or in the unlikely event that you need to return your PRO MPA for servicing.

The shipping carton should contain:

- PRO MPA with the same serial number as shown on the shipping carton
- The owner's manual
- User Registration Card

AC Power Hookup

The PRO MPA 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 cir-

cumstances should the power cable be altered. If the cable becomes cut or damaged, discontinue its use and have it replaced before operating the Pro MPA.

Audio Connections

Audio connections to and from the PRO MPA are balanced XLR (Pin 2 Hot (+), Pin 3 Cold (-), Pin 1 Ground) and unbalanced 1/4" (Tip Hot (+), Sleeve Ground). We recommend using only high-quality cables equipped with the appropriate connectors.

Installation

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

- Between a microphone 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 and signal processors.
- Between electronic musical instruments (synthesizers, guitars, bass, samplers, acoustic instruments with pickups) and down line gear.

Note: the PRO MPA 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 "on" position. It is important to remember to turn the PRO MPA on before any monitoring levels or power amps are turned on. The PRO MPA has the ability to add over 60dB of gain to its input signal. This

can cause the PRO MPA to produce a “thump” on power up and power down.

If the PRO MPA 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 MPA should be powered “on” with all monitor levels turned down, or off, to protect against any “thumping” caused by high gain settings. Likewise, the PRO MPA should be turned “off” after turning all monitor levels down.

Input Level Control

The Input Level Control sets the amount of input gain of the PRO MPA. Turn the control clockwise to increase gain and counterclockwise to decrease gain. You may control two ranges of gain with this control, +26 to +60dB and +6 to +40dB. Selection of the gain range is made with the +20dB gain switch. When setting the Input Level Control, refer to the 10 segment Tube Character Array for a visual reference to the PRO MPA's internal signal levels (applied gain).

Output Level Control

The Output Level Control sets the output level of the PRO MPA. When the control is fully counterclockwise, there is no output level. Turning the control clockwise increases the level of the output to a maximum of +10dB of gain. This gain is in addition to the existing input gain. When setting the Output Level Control, refer to the Vu Meter for an accurate level leaving the PRO MPA.

+20dB Gain/ Norm Switch

Use the +20dB Gain/ Norm switch to set the gain range of the Input control. When the switch is in the out (Normal) position the gain range is +6 to +40dB. Depressing the switch adds 20dB of gain. With the switch in, the gain range is +26 to +60dB. With most microphone applications you'll find using the

PRO MPA with the +20dB gain switch in is needed. Use the setting that best fits your application.

Phase Switch

The Phase Switch is provided to reverse the phase of a signal. This switch works on Pins 2 and 3 of the XLR Output jack of the channel. The Phase switch also reverses the polarity of the 1/4" output jack. In the Normal position, the signal is in-phase. In the Reverse (or “in”) position, Pins 2 and 3 are reversed as the signal is changed to 180 degrees out of phase. The Phase LED will illuminate when the Phase Switch is in its “reverse” position.

In multiple microphone applications, the placement of the microphones can affect the phase of a signal. If two microphones pick up the same signal from different locations, the result can be a hollow or frequency “shifted” sound. In some cases it may sound as if an instrument disappears if it happens to be 180 degrees out of phase. Depressing the Phase switch of one channel can remedy this problem. Likewise, if a microphone cable is wired incorrectly, when used with a properly wired cable the signal will be out of phase.

**Note: for single microphone applications switching the phase switch in and out will produce little to no change in the output signal.

Phantom Power Switch

Each channel of the PRO MPA can power any microphone needing +48 volts DC Phantom power. The Phantom power is engaged and disengaged with this switch. The Phantom Power LED will illuminate when Phantom Power is “on”. Phantom power is supplied to pins 2 and 3 of the XLR input jack.

**Note: Be sure to turn down or mute the output of the PRO MPA when engaging or disengaging Phantom power. Additionally, when disengaging, allow 30 - 45 seconds for the power to completely dissipate. Most microphones will make a sound like air leaking from a tire when phantom power is disconnected, but some can make some very nasty low rumbles and whines as well.

**Another Note: Dynamic microphones should not be affected or damaged if they are plugged into a line where Phantom

power is present. However, if the mic doesn't need it, don't use it. Some things are best left untested!

HPF (High Pass Filter) Control

The HPF is a low frequency roll-off intended for use to "tune out" unwanted rumbling or breath noises. A High Pass Filter allows frequencies above its set point to pass unaffected while gently rolling off frequencies below its set point. The range of the PRO MPA's HPF is 7Hz to 150Hz with a slope of 6dB per octave. This gentle slope allows unwanted low frequency information to be rolled off while not affecting the tonality of the input signal. In its fully counter-clockwise position, the filter has a set frequency of 7Hz which can be considered "bypassed" or off. The filter is located after the Input Level Control and before the tube circuitry.

Tube Character 10 Segment LED Array

Ten LEDs are provided on each channel which display how the tube gain is affecting the input signal. These LEDs are calibrated with the tube circuitry to give you an accurate visual of its output signal (**Note: these LEDs are pre-output level control). Use this meter as a visual for setting the Input level to the PRO MPA. The first four LEDs are labeled Clean. The tube is producing a clean output when this LED is lit.

The next four LEDs are labeled "warm". This is the optimal operating range for the PRO MPA. At this level, the tube is producing an output signal which most would term "warm". Whatever you would like to call it is fine. You'll find the output signal has an enhanced bottom to low mid quality with smooth high frequency detail.

The last two LEDs are labeled "Clip". The first LED will light approximately 6dB before audible distortion occurs. If this light flickers, do not panic. The unique design of the PRO MPA allows the tube to distort well before any other gain stage. When a tube goes into distortion it is a gradual process and tends to sound pleasing for a range before it turns into a distortion box. After some use you'll find the "sweet spot" of the PRO MPA is with this light flashing fairly regularly. You may find a "clipped" level is suitable for some applications.

**Note: Use the Tube Character Array to aid in setting the Input

Level Control.

VU Level Meter

Each channel of the PRO MPA has a backlit VU meter showing its output level. The "0" level is calibrated to +4dBu. Use the VU meter when adjusting the Output Level Control to aid in sending the proper level to your next piece of equipment.

REAR PANEL CONNECTIONS

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

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

Input

Ideally, one input jack per channel should be used at a time. However, because of its design, the PRO MPA can be hard-wired into a rack without having to disconnect the XLR inputs when using the 1/4" jacks. If no load is placed on the XLR input (no instrument or microphone connected) the 1/4" jack will function as if there was nothing connected to the XLR input. Both PRO MPA inputs may be used simultaneously. However, the two signals will sum and the signal present at the XLR jack will tend to attenuate the signal of the 1/4" input.

Output

Both balanced and unbalanced output connections may be used simultaneously. This is particularly useful when using the PRO MPA as a direct box for instruments or line level signals.

**Note: If you experience a grounding hum when using both output connectors (one to the console, one to an instrument amp) simultaneously, a ground loop may be the problem. To remedy this problem, disconnect the ground wire (pin 1) from the XLR cable plugged into the PRO MPA's output (or use a ground-lifted cable). This interrupts the ground path and therefore breaks the loop.

APPLICATIONS

Microphone Preamp

The main application of the PRO MPA is a microphone preamplifier. Plug any microphone directly into either input and set the input and output controls to provide an appropriate level into the next stage of your system.

DI (Direct Input)

The PRO MPA is ideal for use as a DI box. Plug the instrument into either input and use the XLR or 1/4 (or both) outputs to connect to your recorder, board or PA system. Experiment with different Input Level settings for different textures.

Mastering (2-mix processing)

Because of its low noise and excellent tonal qualities, the PRO MPA is ideal for running mixes through before recording to DAT or cassette. Used as a mastering device, the PRO MPA is capable of adding warmth and, if set properly, gentle tube compression to the incoming signal.

Low noise and variable Input and Output level controls make the PRO MPA ideal for level matching material in post production situations.

Special Effects

For industrial, metal, or just "flavor" textures, experiment with the PRO MPA. Cascading the channels can produce overdrive and tube distortion that can add interesting textures when blended with vocals and different instruments. Placing signals purposely out of phase can yield interesting results. No harm will come to the PRO MPA with this type of experimentation. However, be sure to have output and monitoring levels turned DOWN before "testing" the sound. When running one channel into another (cascading), you have the potential for upwards to 120 to 140dB of gain.

WARRANTY AND SERVICE INFORMATION

Limited Warranty

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

Applied Research and Technology, Inc. (A R T) warrants to the original purchaser that this product is free from defects in workmanship and materials for a period of five years from the date of purchase. A R T 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 and make additions or improvements upon this product without any obligation to install the same on products previously manufactured.

A R T should not be liable for any consequential damages, including without limitation damages resulting from the 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. products.

SERVICE

The following information is provided in the unlikely event that your unit requires service. Use this procedure to return units in the United States only. For service outside the United States, please contact your authorized A R T distributor.

1) Be sure 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 description of the problem, including how and when the problem occurs.

3) Call the factory for a Return Authorization (RA) number.

4) Pack the unit in its original carton or 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 under the address.

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 the description of the problem.

6) Ship the unit to:

Applied Research and Technology, Inc.
215 Tremont Street
Rochester, NY 14608
Atten: Repair Department
R.A.# _____

7) Contact our Customer Service department at 716/436-2720 for your Return Authorization number or questions regarding your repair. Customer Service hours are Monday through Friday 8:30AM to 4:30PM Eastern time.

A R T P R O M P A S P E C I F I C A T I O N S

Dimensions:	3.50" H x 19" W x 6.5" D
Input Connections:	XLR (balanced), 1/4" unbal.
Output Connections:	XLR (balanced), 1/4" unbal.
Input Impedance: XLR, 1/4"	1.67k ohms, 840K ohms
Output Impedance: XLR, 1/4"	600 ohms, 300 ohms
Maximum Input Level: XLR	+17dBu
Maximum Input Level: 1/4"	+20dBu
Maximum Output Level: XLR	+28dBu
Maximum Output Level: 1/4"	+22dBu
CMRR	>90dB (typical @ 1kHz)
Frequency Response	20Hz to 40kHz (+0, -1dB)
Dynamic Range	>100dB (20Hz to 20kHz)
Total Harmonic Distortion (THD)	<0.1% (typical)
Maximum Gain: XLR to XLR	>72dB
Equivalent Input Noise (EIN)	
XLR to XLR (shorted input)	>-124dBu unweighted >-133dBu ('A' weighted)
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.

Applied Research and Technology, Inc. (716) 436-2720 (Phone)
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..

Look for the A R T folder on America Online in Craig Anderton's Stage Studio and Sound (keyword "SSS") under the Manufacturer Supported Forums. Email us at artroch@aol.com

Look for the A R T supported area in the MIDI Forum B area on CompuServe (Go MIDI). CompuServe address: 76702,3700. Email us at artroch@cis.compu-serve.com

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

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