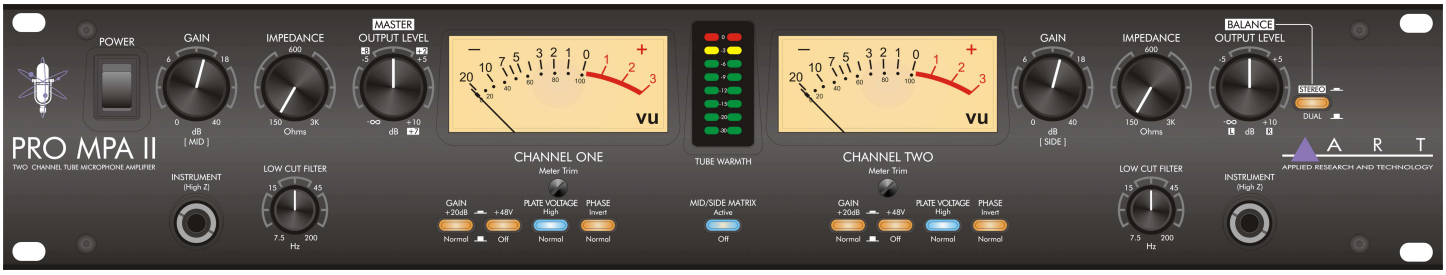
PRO MPA II

TWO CHANNEL TUBE MICROPHONE AMPLIFIER



USER'S MANUAL

A R T

APPLIED RESEARCH AND TECHNOLOGY

IMPORTANT SAFETY INSTRUCTIONS – READ FIRST

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure. Voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read manual.

Read instructions:
Retain these safety and operating instructions for future reference. Heed all warnings printed here and on the equipment. Follow the operating instructions printed in this user guide.

Do not open:
Aside from two vacuum tubes, there are no user serviceable parts inside. Refer any service work to qualified technical personnel only.

Power sources:
Only connect the unit to mains power of the type marked on the rear panel. The power source must provide a good ground connection.

Power cord:
Use the power cord with sealed mains plug appropriate for your local mains supply as provided with the equipment. If the provided plug does not fit into your outlet consult your service agent. Route the power cord so that it is not likely to be walked on, stretched or pinched by items placed upon or against.

Grounding:
Do not defeat the grounding and polarization means of the power cord plug. Do not remove or tamper with the ground connection on the power cord.

Ventilation:
Do not obstruct the ventilation slots or position the unit where the air required for ventilation is impeded. If the unit is to be operated in a rack, case or other furniture, ensure that it is constructed to allow adequate ventilation.

Moisture:
To reduce the risk of fire or electrical shock do not expose the unit to rain, moisture or use in damp or wet conditions. Do not place a container of liquid on it, which may spill into any openings.

Heat:
Do not locate the unit in a place close to excessive heat or direct sunlight, as this could be a fire hazard. Locate the unit away from any equipment, which produces heat such as: power supplies, power amplifiers and heaters.

Environment:
Protect from excessive dirt, dust, heat, and vibration when operating and storing. Avoid tobacco ash, drink spillage and smoke, especially that associated with smoke machines.

Handling:
To prevent damage to the controls and cosmetics avoid rough handling and excessive vibration. Protect the controls from damage during transit. Use adequate padding if you need to ship the unit. To avoid injury to yourself or damage to the equipment take care when lifting, moving or carrying the unit.

Servicing:
Switch off the equipment and unplug the power cord immediately if it is exposed to moisture, spilled liquid, objects fallen into opening, or the power cord or plug becomes damaged during a lightning storm or if smoke odor or noise is noted. Refer servicing to qualified technical personnel only.

Installation:
Install the unit in accordance with the instructions printed in the user manual.

ART PRO MPA II
TWO CHANNEL MICROPHONE AMPLIFIER

LIST OF FIGURES

INTRODUCTION

Thank you for purchasing Applied Research and Technology's PRO MPA II. Offering a superb level of sound quality, the PRO MPA II has a unique design that will enhance the sonic textures of your audio system for years to come. The ART PRO MPA II microphone preamplifier features a new low noise, high performance preamplification circuitry, designed for superior audio fidelity. Building upon the quality and success of great sounding products like the Pro MPA and MPA GOLD, ART engineers set out to develop the next generation of professional microphone preamplifier. PRO MPA II is the culmination of years of research and development, and sets a new standard for quality and value. Professional features and spectacular tone are what make the PRO MPA II™ a world-class microphone preamplifier.

The PRO MPA II's impressive feature set includes:

- Variable input impedance for flexible microphone voicing (150 Ohms to 2400 Ohms).
- Selectable plate voltage
- Large VU meters
- Front accessible meter trim
- Discrete class A input microphone preamplifier
- Low noise at low gains
- Low THD
- Wide frequency response
- Front accessible Instrument Input Jack
- Very high input impedance
- Mid/Side micing support
- +4dBm/-10dBV output level selection
- Switch selectable Stereo/Dual operation of the output controls
- Automatically switches to the instrument input when you plug in

The signal path of PRO MPA II consists of a discrete class A microphone pre-amp followed by a Low Cut Filter, a balanced differential tube circuit with a 20dB Gain switch and then the phase switch. The Mid/Side Matrix switch sums the adjacent channel to decode left and right information following the gain switch function and before the output level control. The Tube Warmth display monitors the signal level before the output level control as well. The analog meter monitors the output level of the PRO MPA II before the +4/-10 switch but after the output level control.
The PRO MPA II is an attractively styled processor, with a black anodized front panel and matching knobs. The switches on the PRO MPA II are backlit and illuminate when depressed.

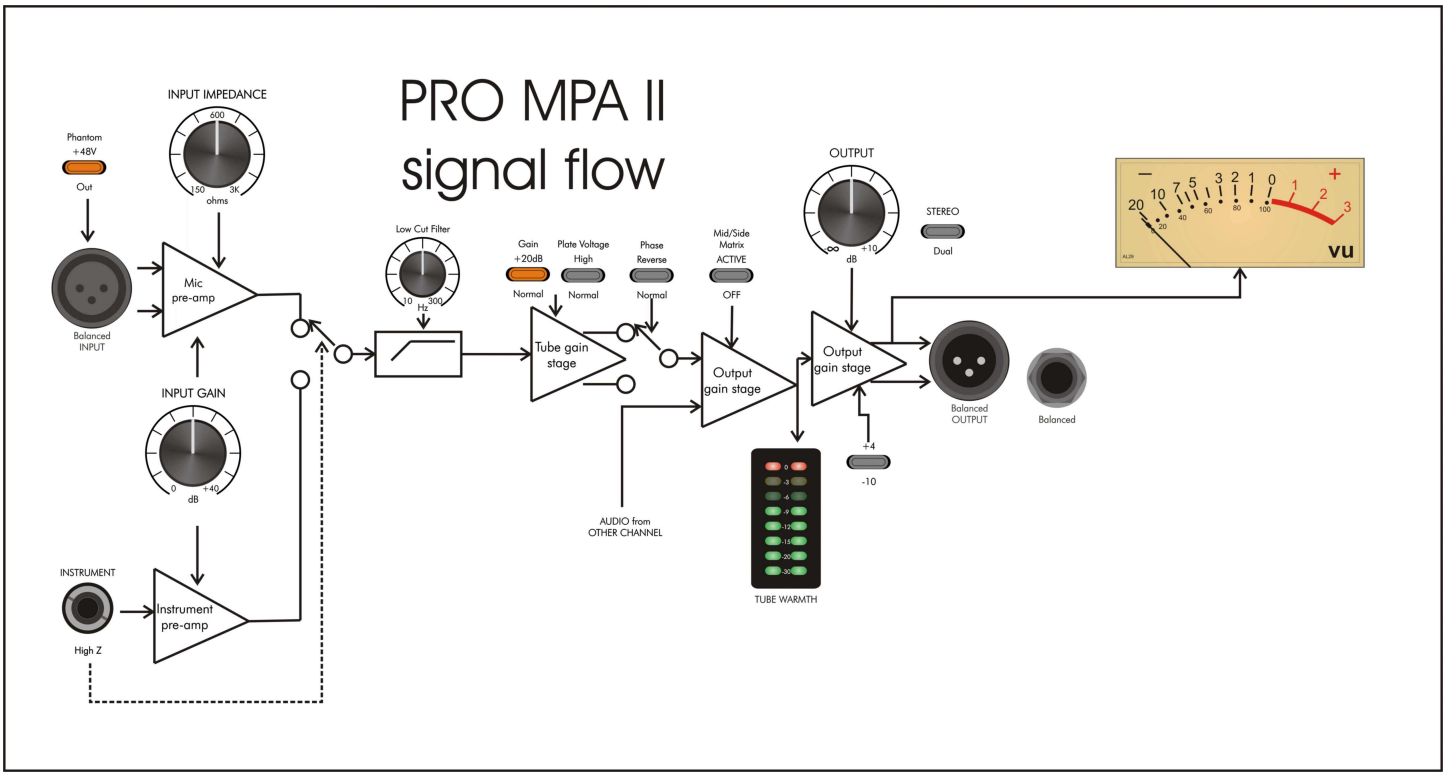
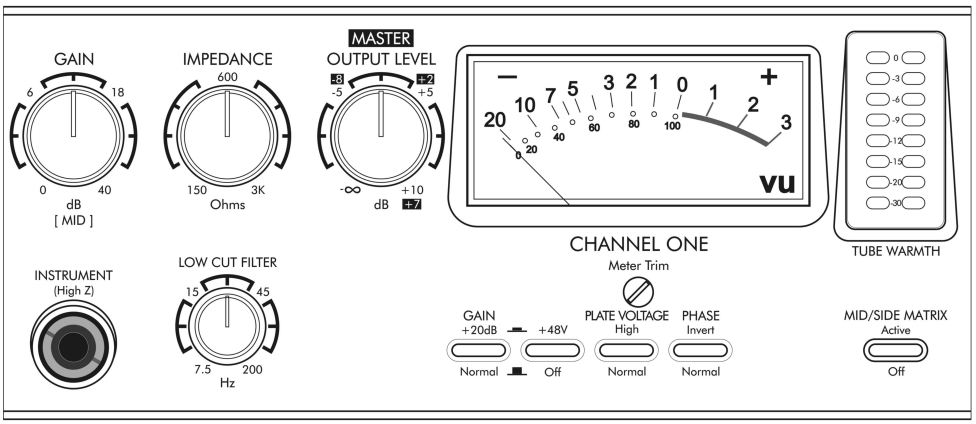


Figure 1 – Block Diagram

FRONT PANEL CONNECTIONS AND CONTROLS



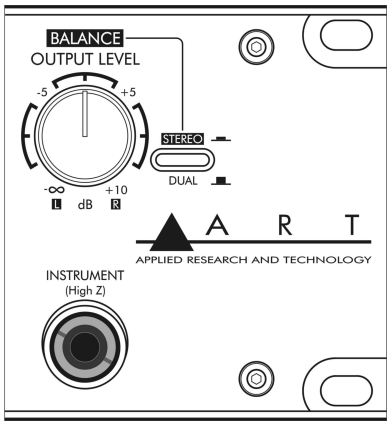


Figure 2 – Front controls

INPUT GAIN control

This control optimizes the input signal level before the tube gain is applied. Both Microphone and Instrument input gains remain the same and are affected by this adjustment. Input gain can be adjusted from 0dB (for line level signals) to 40dB of gain.

The analog meters are used to see the effects of the input gain setting.

Additional gain is available via the Gain switch (+20dB) and the Analog Output control (+10dB) for a maximum of 70dB total.

The combination of these controls allows the user to adjust the signal level through the tube section, providing more or less “tube” sound as needed. To obtain more “tube’ sound, increase input gain, use the +20dB Gain switch, “normal” plate voltage, and less Analog output gain.

Both the microphone and instrument inputs are optimized for their respective sources as far as signal levels and noise performance. Running most of the gain on the input generally provides the best performance of the PRO MPA II. Refer to the section titled “Obtaining the best noise performance with the PRO MPA II for more detailed instructions on setting the Input Gain control for the best results.

INPUT IMPEDANCE control

This knob controls the Mic/line input amplifier impedance. This function allows variable voicing of any microphone.

Refer to the application section titled “Adjusting the Input Impedance” for more information on making the most of this function.

The ¼-inch instrument input is NOT affected by this control, and remains high (>1M Ohm) impedance.

LOW CUT FILTER control

The Low Cut Filter is a single tuned High Pass Filter that is frequency tunable. The input signal can be filtered to remove “pops” or other extraneous low frequency information. This control moves the rolloff frequency from 10 Hz (fully CCW) to 200 Hz (fully CW). Since it is single tuned, it preserves some low frequency content so its use is less obtrusive. It is especially useful in close mic’d applications.

GAIN switch

The Gain switch is used in conjunction with the input gain control to adjust signal levels through the PRO MPA II. When depressed, the tube circuit provides 20dB more gain in the signal path. This also has the effect of driving the tube harder and making the tube the dominant source of gain and overload character.

PHANTOM switch

Phantom power on the microphone input is turned on and off with this switch. Depressing the switch will power condenser microphones and other 48volt phantom powered devices. Phantom power is supplied to pins 2 and 3 of the input jack.

NOTE:

1. Dynamic microphones are NOT affected by Phantom power, although it should be turned off when using dynamic microphones or line level inputs.

2. Although the 48volt phantom power ramps up and down slowly it may still create a pop. Mute the output of the PRO MPA II when engaging or disengaging phantom power to prevent damage to equipment following the PRO MPA II.

PHASE switch

The Phase switch can invert the phase of the audio signal path in either channel. The Phase switch is located after the tube circuit in the signal path, so you can hear slight differences between different phase selections in the “normal” plate voltage mode near saturation. There are a number of reasons why adjusting the phase is needed these include, wiring errors and inversions in some audio equipment. Some microphones sound different depending on the phase chosen.

If two microphones are out of phase, they may cancel at various frequencies (depending on the distance between them). If this happens, try changing the phase of one of the microphones and see if there is an improvement.

PLATE VOLTAGE switch

This switch sets both the tube bias point and the plate voltage level the balanced differential tube circuit runs at. The amount of headroom is adjusted by using the Gain switch and the input Gain control. The PRO MPA II takes about 10-30 seconds to smoothly transition from one mode to the other. There is a slight increase in gain in the “High” plate voltage mode.

In the “Normal” (OUT) position, the tube distortion gradually rises until it smoothly clips. The tube is run almost completely open loop in this mode, providing a musical tube “crunch” when overdriven with a natural recovery from clipping. The tube section can be more easily overdriven when the gain switch is in. This mode brings out the harmonics in the input sources, particularly stringed instruments.

The tube circuit runs extremely clean in the “High” (IN) position of the plate voltage switch. As signal levels rise distortion remains very low until within 6dB of clipping, where the overload characteristics smoothly limit the signal swing. There is increased bandwidth (>100KHz), and headroom in this mode as well.

MID/SIDE MATRIX switch

The Mid/Side Matrix switch is used to decode Left/Right information when using two mics aligned for stereo recording.

You can use either two figure-eight pattern mics or one omni-directional and one Figure-eight mic. Refer to the APPLICATIONS section titled “Using the Mid/Side mode” for more info on how to apply this function with your mics.

OUTPUT LEVEL control

The output signal level at the rear output jacks is adjusted by this control. It can provide from +10dB of gain (fully clockwise) to completely muted. You can see the effects of this adjustment reflected in the analog meters.

STEREO/DUAL switch

The STEREO/DUAL switch selects the operation of the output control knobs. Stereo mode gains and operation are marked with reversed out text.

In Stereo mode, CH1 output adjusts the output gain of both channels and CH2 output control acts as a power summed Balance control. There is a slight drop in output level in stereo mode when the Balance knob is centered vs. at one extreme or another.

When the switch is in the “Dual” position the output controls act on only their respective channels.

+4/-10 switch (rear panel)

The +4/-10 switch is used to set the output level of the PRO MPA II for the appropriate system levels. This feature allows you to match 0 VU on the meters of the PRO MPA II and your mixer or other equipment.

When depressed, 0 VU on the output meter corresponds to +4dBu on the outputs. In **–10** mode, the output level measures –10dBV.

Meter Trim

The Meter Trim is used to adjust the Meter’s “0” point when. This may change if the unit is NOT mounted with the front panel perpendicular to the floor.

Using a small flat-blade screwdriver you can mechanically fine-tune the meter indicator position if, for example, it does not rest at the leftmost position when the unit is OFF.

Adjustments for feedback readings, when the unit is in use, are internal and are not user serviceable.

Front Panel connections

Instrument Inputs

The ¼-inch jacks on the front panel serve as an instrument input. The input impedance is always >1M Ohm and the gain can be adjusted by the Input gain control. The maximum input signal level is +17dBu (5V RMS) @ minimum input gain.

When you plug into this jack it DISABLES the balanced input on the rear of the unit. This feature allows you to keep the rear input patched in, and use the instrument input to switch to a different source. The instrument input allows the PRO MPA II to serve as a great DI device as well.

Rear Panel connections

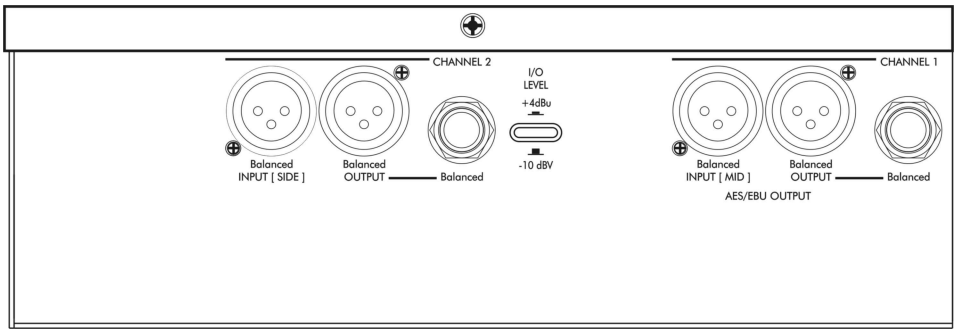


Figure 3 – Rear connections

Balanced Inputs

The PRO MPA II 's XLR connectors follow the AES standard of Pin 1 = Ground, Pin 2 = Hot (+), Pin 3 = Cold (-). The Balanced inputs have an input impedance that is variable from 150 to 3K Ohms via the front panel control. The Maximum input level is +19dBu balanced and +17dBu unbalanced.

Balanced Outputs

The PRO MPA II 's flexible active balanced outputs are available on both ¼-inch and cannon connectors. They offer low impedance for driving long cable runs and are intelligent enough to maintain the same output level whether it is balanced or unbalanced.

The PRO MPA II 's XLR connectors follow the AES standard of Pin 1= Ground, Pin 2= Hot (+), Pin 3= Cold (-). The balanced ¼-inch phone jacks are typical Tip = Hot (+), Ring = Cold (-), Sleeve = Ground Maximum output level is +27 balanced and +20 unbalanced.

PRO MPA II OPERATING INSTRUCTIONS

Obtaining the best noise performance with the PRO MPA II

Start by turning down the Input Gain knob and centering the Analog Output knob. The Analog meter will now indicate how much tube headroom there is. Set the +20dB switch to the out position.

Increase the Input Level knob until the meter reads above –10dB.

If you have turned the input knob fully clockwise and the indicated level is still below –10dB on the meter, center the input knob and depress the Gain switch. Increase the Input Gain until there is sufficient level.

This procedure optimizes the gain elements to provide the widest dynamic range possible.

Adjusting the Input Impedance

The same microphone can sound different on various pre-amps. One reason is that every pre-amp presents a different load to on its' input, some even change as gain is changed! Our third generation discrete front end was designed to be absolutely transparent. Every nuance of the microphone is maintained providing detail masked by inferior pre-amps. The Input Impedance control is one key element in providing new versatility in voicing microphones.

NOTE: the Input impedance control only affects the cannon connector inputs. The ¼-inch instrument input on the front panel is NOT affected by this control in any way. The instrument input impedance is ALWAYS ≥1M Ohm.

Dynamic microphones are affected as much as phantom powered units.

We provide a continuously variable impedance control to allow you to fine-tune the voicing, finding the perfect interaction between microphone and pre-amp.

Start by setting the centering the Input Impedance knob. This provides a 600-Ohm load.

Lower impedance loads will reject more noise picked up by cabling, and dampen microphone resonance.

Higher impedance settings provide a more "open" sound. Lower impedances tend to focus the sound more.

Setting the Tube Plate Voltage

The PRO MPA II allows the user select between one of two vastly different tube bias and power supply levels. The transition between either setting is smooth and quiet and the gain variation is minimal.

NOTE: It takes 15-30 seconds for the tube circuit to fully transition between either mode. During this time, the unit passes a signal and the only noticeable change is a slight increase in level in the "HIGH" setting.

The "Normal" setting produces a smooth transition from very clean low levels up to a "round" saturated clipping on peaks. This setting is reminiscent of old tube gear, and used to get the most tube-like sound out of the unit. Common uses include tracking with instruments.

The "High" setting of the plate voltage switch has increased bandwidth and headroom, very low distortion and runs extremely clean until it reaches a point of saturated clipping. The clipping is well controlled and still sounds natural. This setting is incredible on vocals.

Using the Mid/Side mode

The PRO MPA II is designed for stereo operation using the Mid/Side switch and two microphones. One of the mics needs to have a figure-8 pickup pattern.

Start by aligning two mics 90 degrees apart. Connect the mic facing front (with an omni-directional or cardiod pickup pattern) to CH1. Face the front of the figure-8 pickup mic to the left side and connect it to the CH2 input. Depress the Mid/Side Matrix switch and center both of the Output Gain controls. Adjust the Input gain controls to such that both meters show the same level with a sound source at least two feet in front of the forward mic.

The CH1 output is now the "Left" channel and the CH2 output is now the "Right" channel. Adjust the Output gain controls as needed for your system level.

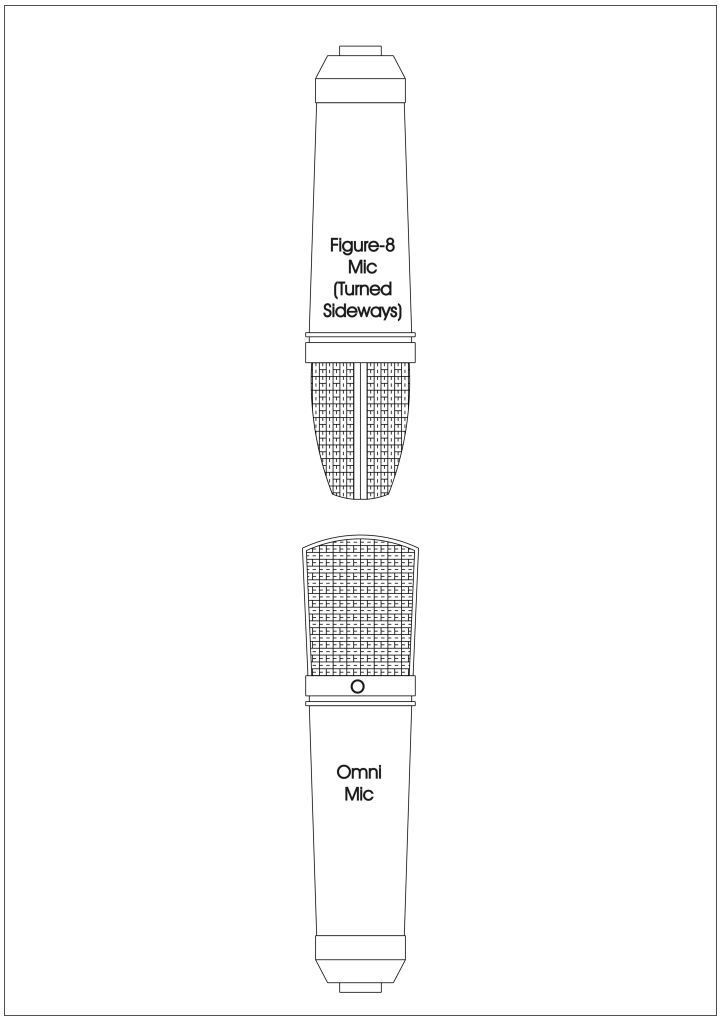


Figure 4 – Mid/Side Mic alignment

WARRANTY INFORMATION

Limited Warranty

Applied Research and Technology will provide warranty and service for this unit in accordance with the following warrants:

Applied Research and Technology (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 **three** years from the date of purchase. Applied Research and Technology 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 limitations 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 have other rights, which vary from state to state.

For units purchased outside the United States, an authorized distributor of Applied Research and Technology will provide service.

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, all cables are connected correctly, and the cables themselves are in working condition. You may want to consult with your dealer for assistance in troubleshooting or testing your particular configuration.

2. If you believe that the ART unit is at fault, go to **www.artproaudio.com.**
3. Select "*Support*", then "*Return Authorization Request*" to request a return authorization number.

4. If you are returning the unit for service, pack the unit in its original carton or a reasonable substitute. The original packaging may not be suitable as a shipping carton, so consider putting 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 note with the RA number and your contact information, including a return shipping address (we cannot ship to a P.O. box) and a daytime phone number, and a description of the problem, preferably attached to the top of the unit. Also include a copy of your purchase receipt.

Fill in the following information for your reference:

Date of purchase _____

Purchased from _____

Serial number _____

SPECIFICATIONS

Frequency Response	15Hz to 48 kHz (+0, -1dB) @ normal plate voltage 15Hz to 120 kHz (+0, -1dB) @ high plate voltage
Dynamic range	>110dB (“A” weighted)
CMRR	>90dB
THD	<0.005% (typical)
Equivalent Input Noise	-129dBu (XLR, “A” weighted)
Maximum Input Level	+19dBu (cannon)
Maximum Instrument Input	+17dBu
Input Impedance	150-3000 Ohms adjustable (XLR) >800K Ohms (Instrument)
Maximum Output Level	+27dBu (XLR)
Output Impedance	< 47 Ohms (XLR)
Maximum Gain	70dB
Meter Calibration	0 VU = +4dBu output (+4dB mode) 0 VU = -10dBV output (-10dB mode)
High Pass Filter	single pole, 10-200 Hz adjustable
Power Requirements	USA – 105 to 125 VAC / 60 Hz Export units configured for country of destination.
Dimensions: (HxWxD)	3.50-inch x 19.0-inch x 8.75-inch 88mm x 482mm x 222mm
Weight:	10.5 lbs. / 4.7kg

www.artproaudio.com
E-mail: support@artproaudio.com

PRO MPA II
TWO CHANNEL MICROPHONE AMPLIFIER

214-5004-204