



Pro Channel II™

Tube Preamp - Opto compressor - EQ

USER'S GUIDE



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 one vacuum tube, 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 guide.

Pro Channel II™

Tube Preamp - Opto compressor - EQ

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INTRODUCTION

The ART Pro Channel II™ is the answer to your recording and computer audio interface needs. Our second-generation discrete Class-A microphone preamp provides clean quiet gain while maintaining incredible transparency. A powerful dynamics processor subtly controls transients and noise of the most demanding sources. The ART Pro Channel II™'s semi-parametric EQ offers wide tune-ability and can be patched before OR after the dynamics processor. Separate insertion jacks allow you to use your favorite external signal processing gear immediately after the Mic preamp and before the EQ and dynamics processor. Both analog and LED meters provide a detailed indication of audio levels.

INSTALLATION

The ART Pro Channel II™ may be used in a wide variety of applications and environments. In a rack-mountable, all-steel enclosure, the unit is designed for continuous professional use. Mounting location is not critical, however for greater performance reliability we recommend that you not place the unit on top of power amps, or other sources of heat and/or strong magnetic fields. The tube circuitry needs about a minute to “warm up” and stabilize from a cold power up.

AC Power Hookup

The ART Pro Channel II™ has an internal power supply. Only connect the unit to mains power of the type marked on the rear panel. The power source must provide a good ground connection, and the ground pin on the mains plug should never be defeated.

Analog Audio Connections

Audio connections to and from the Pro Channel II™ are:

Front panel Instrument input:	[1/4"] Tip = Hot (+), Sleeve = Ground
Rear panel balanced input:	[XLR] Pin 2 = Hot (+), Pin 3 = Cold (-), Pin 1 = Ground
Rear panel balanced output:	[XLR] Pin 2 = Hot (+), Pin 3 = Cold (-), Pin 1 = Ground
Rear panel 1/4" output:	Tip = Hot (+), Ring = Cold (-), Sleeve = Ground
Rear panel 1/4" insert inputs:	Tip = Hot (+), Sleeve = Ground
Insert Outputs:	Tip = Hot (+), Sleeve = Ground

FRONT PANEL CONTROLS and JACKS

Mic Preamp Controls

The Pro Channel II™ input consists of a discrete Class-A differential preamp. The circuit is optimized for low impedance microphones as well as line level signals. Up to 56dB of gain is available from this stage. The output can be inverted using the INVERT switch.

The impedance of the rear XLR input is continuously variable for fine-tuning the preamp to a wide variety of mics. Phantom power is available on the XLR input as well.

A selectable low-cut filter removes rumble, wind noise, and pops, thereby increasing clarity.

Instrument Input

The 1/4" T/S jack on the front panel provides a high impedance unbalanced input, and when used, automatically switches off the mic pre-amp. (The rear XLR balanced input is lower impedance and is part of the mic pre-amp. The rear jack is not intended to be used with high impedance microphones or instruments.)

Gain Control

This control adjusts both the mic pre-amp gain as well as the instrument input gain. The gain marked applies to the mic pre-amp without the GAIN switch depressed. Refer to the APPLICATIONS section to learn how to optimize the gain control for low noise operation.

Impedance Control

This knob sets the load impedance at the rear panel XLR input of the Pro Channel II™. Use the IMPEDANCE CONTROL to subtly tune the sound of your microphone. Various microphones will change their sound at differing load impedances. The correct setting is subjective. Adjust this control to personal taste.

GAIN Switch

This switch increases the tube gain by 20dB to support low output mics and instruments. It should only be used when the GAIN control cannot provide enough gain.

Phantom Power Switch

The switch safely applies +48Volt phantom power to the XLR input. Use phantom power only when the microphone that you are using requires it. Doing so will extend the life of the Pro Channel II™ as well as reducing the possibility of shock hazard.

Invert Switch

This switch selects the output phase of the Pro Channel II™. There is a 180 degree phase shift through the Pro Channel II™ preamp section when lit.

Low Cut Control

This control allows adjustment of a 6dB/Oct high pass filter from 10Hz to 250 Hz. The filter is designed to remove rumble, pops, and wind noise, yet still sound natural.

Preamp Output Control

This control adjusts the output of the Preamp section allowing up to 10dB of gain or allowing you to mute the output when fully CCW.

Tube Voltage Switch

The vacuum tube preamp section can be adjusted to run at two different plate voltages. Refer to Figure 1 for the location of the switch.

Choose the “NORMAL” setting for adding warmth to the input signal. This setting has an increased amount of tube saturation at higher signal levels.

Choose the “HIGH” setting to increase overall gain, headroom, and bandwidth.

NOTE: The change between tube voltage modes is gradual, taking 10 to 20 seconds to be fully activated.



FIGURE 1 – Preamp section

Compressor Controls

The ART Pro Channel II™ Compressor section consists of an above threshold Optical Compressor/Limiter with adjustable slope. The attack and release controls allow a wide range of adjustment while the complex detector assures fast response without distortion.

Threshold Control

This control sets the level, above which the Compressor in the Pro Channel II™ starts to act on the input signal. As the control is turned clockwise, more input signal is required to begin reducing gain. The compression action can be seen in the Gain Reduction LED meter.

Ratio Control

The RATIO control sets the amount of gain reduction that takes place based on how far the input signal is over the threshold level (set by the THRESHOLD control). A good starting point for vocals is 2.5:1.

To have the unit act as a limiter, set the RATIO control to 4:1.



FIGURE 2 – Compressor Section

Attack Control

The ATTACK control sets the time it takes the Compressor/Limiter to respond to increases in signal level (by reducing gain). You can use this control to shape the “front end” of the dynamics envelope.

One example is to listen to a snare hit and adjust the attack control. A short attack makes the snare sound “thin”. As the attacks go longer (and the knob is turned clockwise) you should hear more of the thump in the compressed snare. The downside is that this creates an overshoot, (a large transient), the length of which is the time set by the ATTACK control.

Overshoots less than 1 msec are very hard to hear even when they are clipped. If the attack is set too fast, the gain may be reduced too much and thereby create a “pumping” sound¹. One way to eliminate this is to use the LOW CUT filter to remove plosive sounds in vocals that can make the detector overreact.

Release Control

The RELEASE control sets the time the Compressor/Limiter takes to increase the gain after the input level drops.

Longer settings maintain the dynamics of the input signal, while shorter settings reduce the dynamics. Shorter settings will also increase the apparent reverberation, and at extreme gain reduction settings, lead to “breathing” artifacts².

Compressor Output Control

The Output control can provide from 10dB of gain recovery to fully muting the output. It adjusts the output level provided to the COMP output jack.

Gain Reduction LED Meter

The GAIN REDUCTION meter displays the Compressor's attenuation action. The meter covers a very large range while offering high resolution.

¹ “Pumping” in a Compressor/Limiter sounds like the processor over-reacts to the increase in level and has reduced the volume too much.

² “Breathing” is the sound of the Compressor/Limiter turning up the gain so quickly you can hear breathing noises between words during vocal processing.

Semi-Parametric EQ

The ART Pro Channel II™ offers a four-band semi-parametric equalizer. The entire EQ can be bypassed with a single switch. Each band has ± 12 dB of control range.

The High and Low EQ bands are shelving type with a switch selectable turnover point.

The two Mid bands can be continuously tuned over a three octave range, plus a range switch adds another three octave range. You can adjust the filter "Q" to be either narrow or wide via separate switches.



FIGURE 3 – Equalizer Section

EQ Bypass Switch

This switch allows you to instantly set the EQ completely flat without losing the current EQ settings.

CLIP LED

This LED indicates clipping in any section of the Pro Channel II™.

You can isolate the source of the clipping to the INPUT section by reducing the Preamp output, if the clipping LED remains lit. If the Clip LED goes out, the clipping is in the compressor or EQ section.

You can prevent clipping in the EQ section by reducing the Compressor output.

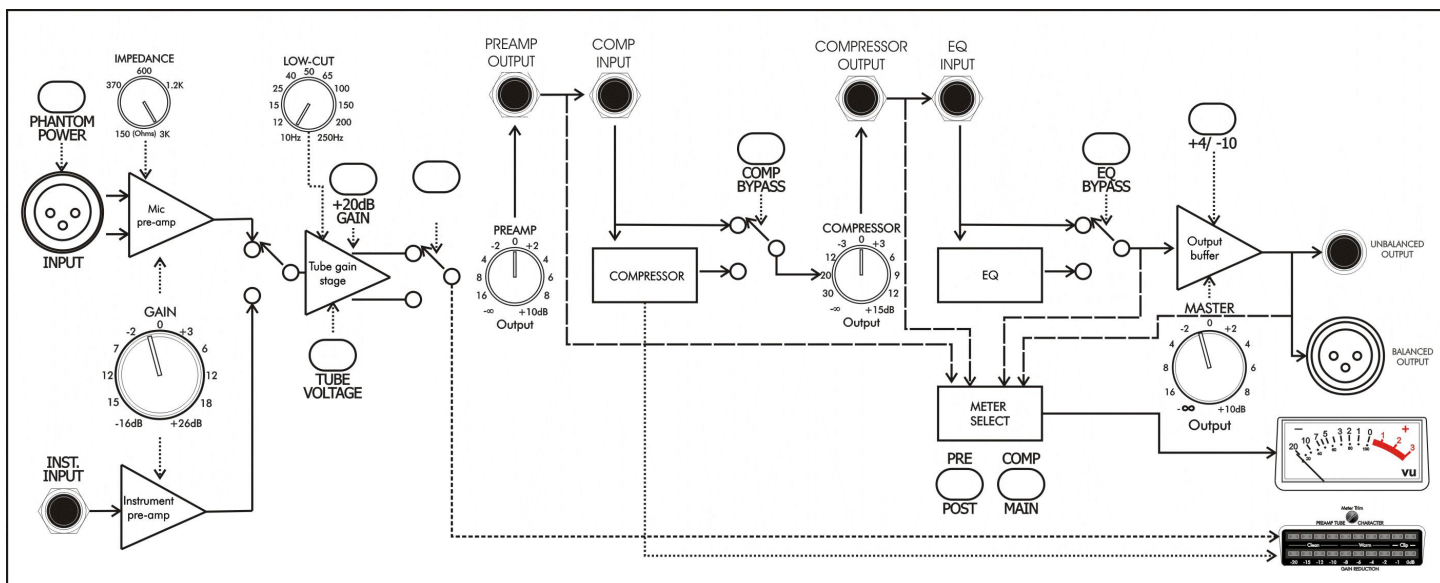


FIGURE 4 – Signal Flow Block Diagram

Master Output Control

The OUTPUT LEVEL control provides gain or attenuation to adjust for a variety of system operating levels. This control affects the levels sent to the A/D converter and to the balanced analog OUTPUT jacks.

Output Meters

The ART Pro Channel II™ provides both analog VU and LED level meters.

The analog VU meter displays the signal level various points of the processor depending on the setting of the VU Meter Switches. “0” VU on the analog VU meter corresponds to +4dBu on the balanced output.

The upper LED bargraph displays how hard the tube section is being driven (Warmth). The last two LEDs in the meter are marked “Clip” indicating that the preamp section's gain is set too high.

VU Meter Switches

These switches allow you to monitor the level at the Preamp output, Compressor output, EQ section or the Main output.

When both switches are out (POST/MAIN) the meter displays the output level at the Output jack of the unit.

When the Pre switch only is depressed (PRE/MAIN) the meter monitors the EQ section output (Pre output level control). The actual point that is monitored is After the EQ Bypass switch.

Depressing the Second switch allows you to see the levels before or after the Compressor. If Post is selected the signal after the Compressor Bypass switch is displayed (the same signal present on the Comp Out jack on the rear panel). Depressing the PRE and COMP switches select the output of the Preamp section (the same signal present on the Preamp Out jack on the rear panel).

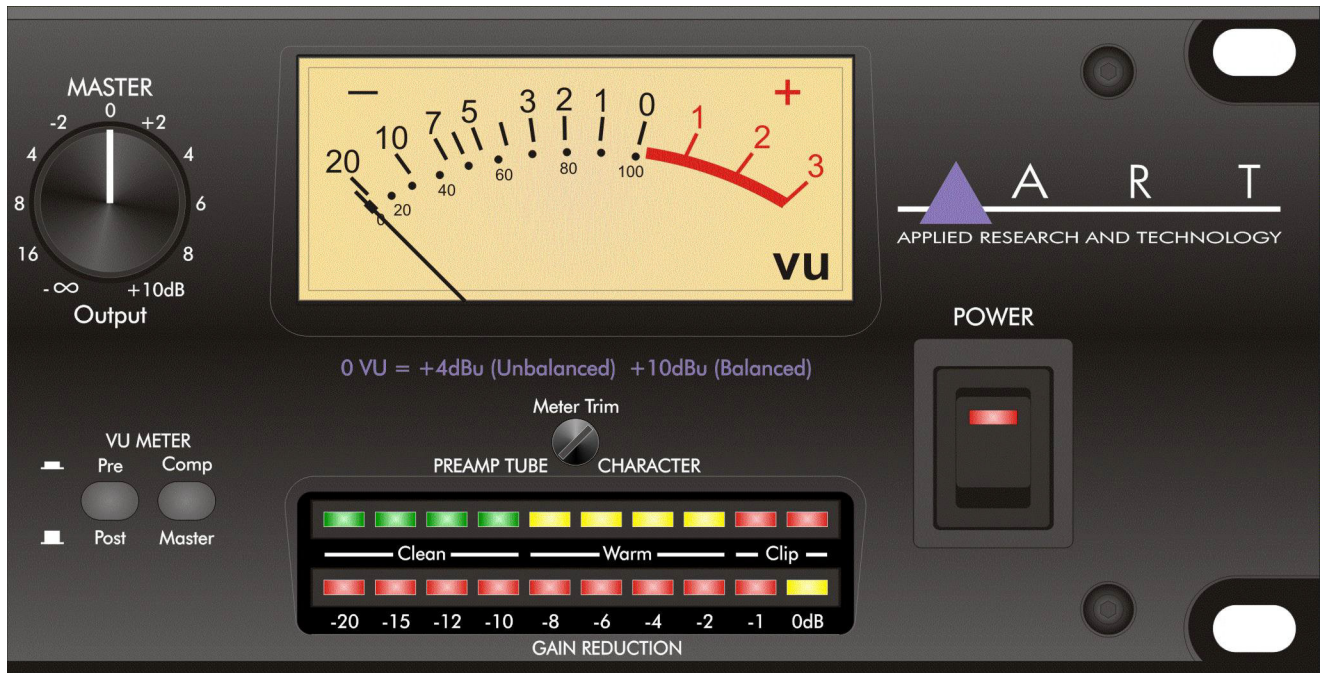


FIGURE 5 – Output Section

REAR PANEL CONNECTIONS

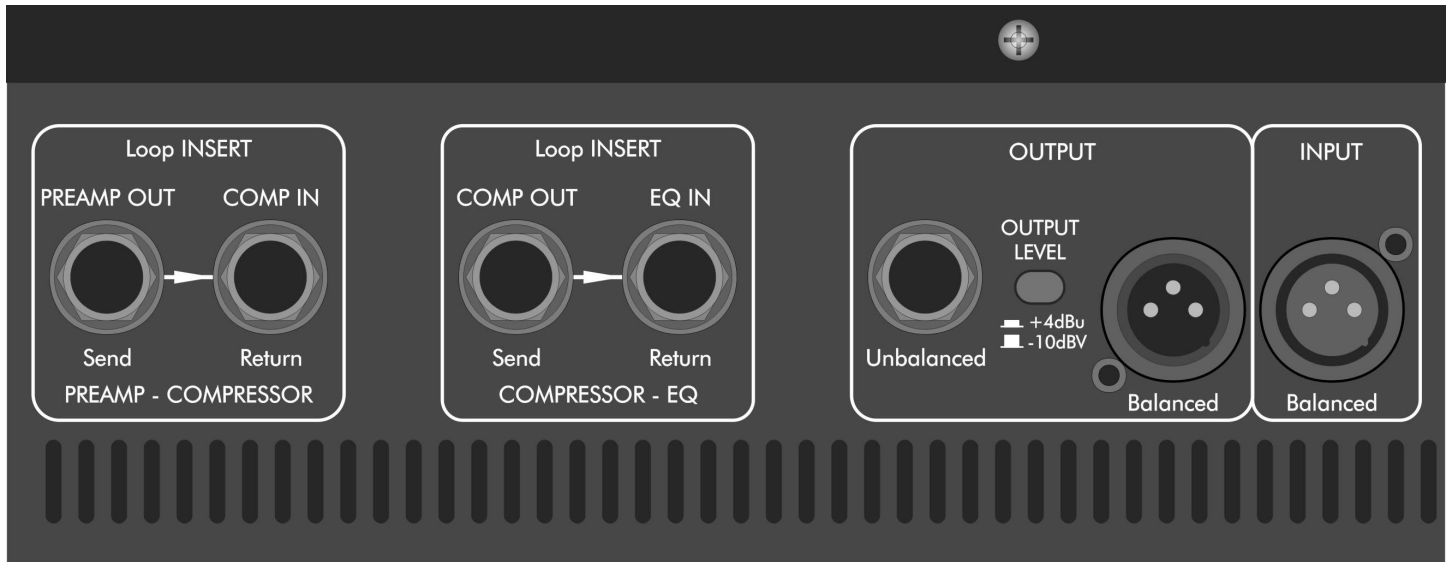


FIGURE 6 - Rear Jacks

INPUT Jack

This XLR jack provides balanced inputs to the microphone preamplifier. The input impedance of the XLR connection is variable by the front panel Impedance knob.

The Front panel 1/4" Instrument input overrides the rear jack when it is used.

PREAMP OUT Jack

This 1/4" T/S unbalanced jack provides a direct signal from the microphone preamplifier, ahead of the EQ and dynamics processors. This output can be used in conjunction with the INSERT INPUT jack to insert external signal processors between the main preamp section and the compressor of the Pro Channel II™.

COMP IN Jack

This 1/4" T/S unbalanced jack is an input to the EQ and dynamics processing sections. This input can be used in conjunction with the MIC PREAMP OUTPUT jack to insert external signal processors between the main preamp section and the EQ and dynamics processing of the Pro Channel II™.

COMP OUT Jack

This 1/4" T/S unbalanced jack provides a direct signal from the microphone preamplifier, ahead of the EQ and dynamics processors. This output can be used in conjunction with the INSERT INPUT jack to insert external signal processors between the main preamp section and the EQ and dynamics processing of the Pro Channel II™.

EQ IN Jack

This 1/4" T/S unbalanced jack is an input to the EQ and dynamics processing sections. This input can be used in conjunction with the MIC PREAMP OUTPUT jack to insert external signal processors between the main preamp section and the EQ and dynamics processing of the Pro Channel II™.

OUTPUT Jacks

The analog output of the Pro Channel II™ is available on both a 1/4" TRS balanced jack and an XLR jack. This output is active balanced, and will adjust to balanced or unbalanced termination without gain change.

OUTPUT LEVEL Switch

This switch optimizes the output level of the Pro Channel II™ depending on the equipment you are driving.

When this switch is in the out position, the balanced output measures -10dBV (about 0.3V RMS). This is the appropriate setting when connecting to most semi-pro or consumer equipment.

When depressed, the XLR output of the unit measures +4dBu (about 1.2 Volts RMS) when the Output Meter reads "0" VU. Use this setting when connecting up to professional line level gear.

APPLICATIONS

Bypassing Components Of The Pro Channel II™

To bypass the vacuum tube microphone preamp: Use the preamp INSERT INPUT jack instead of the Instrument or Mic input jack.

To bypass the Compressor/Limiter: Use the COMP bypass switch.

To bypass the EQ: Use the EQ bypass switch.

Optimizing The Preamp For Lowest Noise

The preamp of the ART Pro Channel II™ can be optimized for low noise by combining use of the PAD and Input GAIN control for mic and line level signals. NOTE: The PAD control has no effect on the INSTRUMENT INPUT (Front panel 1/4" input of the INPUT combo jack).

First, bypass the Compressor/Limiter, Expander/Gate and EQ. Next center the OUTPUT LEVEL control to "0" dB of gain. The OUTPUT LEVEL LED meter can now be used to correctly indicate the clip level of the input stage.

Second, start with the PAD in the "OUT" position and the GAIN control centered. Refer to the OUTPUT LEVEL LED meter's peak-hold function. Make sure that this meter never indicates clipping (the red LED is held on after a transient). The peak-hold indicator can be in the "yellow" range or in the -5dB range of levels.

If the signal level is too high, depress the PAD switch.

Third, adjust the GAIN control to keep the peak levels in the -5dB range of the OUTPUT LEVEL LED meter.

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. 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 that the unit is the cause of the problem. Check to make sure the unit has the proper 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.
- 3) Contact our Customer Service department via our website at: <http://www.artproaudio.com> and go to our "Resources" page and fill out our "Return Authorization Request" form. Your report will be submitted to our service department for immediate evaluation.
- 4) We will contact you with an RA number, shipping address and instructions as soon as we process your request and determine the best course of action.
- 5) Pack the unit in its original carton or a reasonable substitute. The packing box is not recommended as a shipping carton. Put the packaged unit in another box for shipping. Print the RA number clearly under the address.
- 6) 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.
- 7) Ship the unit to us with your chosen carrier or delivery service.

Fill in the following information for your reference:

Date of purchase _____

Purchased from _____

Serial number _____

SPECIFICATIONS

Input Impedance

Mic	150 to 3.4K Ohms, variable
Instrument	2.5M Ohms
Preamp Insert.....	7.5K Ohms

Output Impedance

Balanced Output.....	600 Ohms balanced
Unbalanced Output	300 Ohms
Insert Outputs.....	300 Ohms

Frequency Response

Analog In to Analog Out	12 Hz to 100 KHz +0, -1 dB
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THD

1 KHz	≤ .015% typical
20 to 20 KHz	≤ .033% typical

Equivalent Input Noise

Mic/Line	-128 dBu, Input shorted, Max gain, "A" weighted
Instrument	-109 dBu, Input shorted, Max gain, "A" weighted

Maximum Input Level

Mic	+18 dBu balanced
Instrument	+15 dBu

Maximum Gain

Mic	70 dB (XLR to balanced output)
Instrument	64 dB (1/4" to balanced output)

Maximum Output level

Balanced	+24 dBu
Unbalanced	+20 dBu
Output Level At Meter 0 VU	+4 dBu/-10dBV

Preamp

Microphone Gain	0 dB to +56 dB
Instrument Gain.....	+3 dB to +50 dB
Low Cut Filter	10 - 250 Hz, 1-pole, 6 dB/Octave

EQ

Boost/Cut	+12 dB on each band
Low Freq. Tuning	40 / 120 Hz Selectable
MID 1 Freq. Tuning.....	20 Hz to 2 KHz continuously variable
MID 2 Freq. Tuning.....	200 Hz to 20 KHz continuously variable
High Freq. Tuning.....	6 KHz / 18 KHz Selectable

Compressor/Limiter

Attack Time	250 uSec. to 100 mSec.
Release Time	100 mSec to 3 Sec.
Compression Ratio	2:1 to 30:1

Dimensions 3.50" H x 19.0" W x 9.17" D

Weight..... 11 lbs.

Power Requirements..... USA – 105 to 125 VAC/ 60 Hz Export units configured for country of destination.

Note: 0 dBu = 0.775 VRMS, 0 dBV = 1 VRMS

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

NOTES



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