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# Owner's Manual

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**Model**  
**REFERENCE PHONO 2**  
**PREAMPLIFIER**

**audio research**  
**H I G H D E F I N I T I O N<sup>®</sup>**

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## Model Ref Phono 2

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## Preface

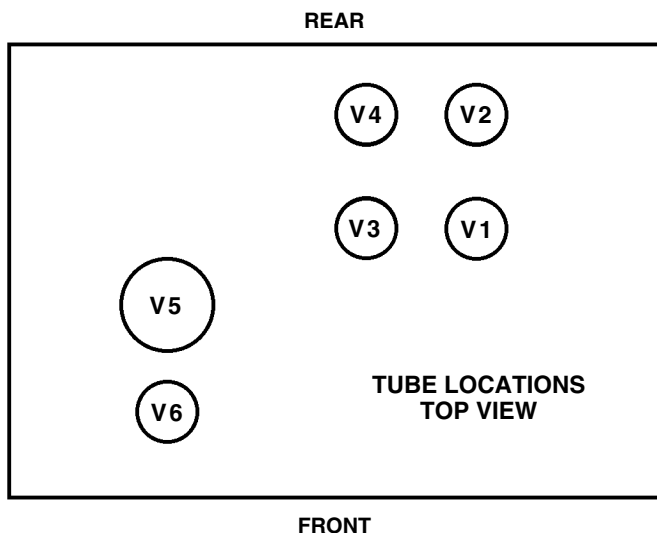
Please take the time to carefully read this instruction manual prior to installation or use of your Ref Phono 2 phono preamplifier. Because it is a highly advanced electronic instrument, there are several facts and procedures you should know before you place it in operation.

Just as you would not purchase and attempt to operate an expensive camera, computer system or high-performance automobile without first learning something about performance parameters and correct operating procedures, so too your phono preamplifier requires some familiarization before you make it part of your music reproduction system. Your reward, in terms of maximum performance and a long service life, will be well worth the effort.

## Warnings

1. To prevent fire, or shock hazard, do not expose your Ref Phono 2 to rain or moisture.
2. This unit contains voltages which can cause serious injury or death. Do not operate with cover removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.
3. The power cord on your Ref Phono 2 is equipped with a standard three-prong grounding plug. For absolute protection, **do not defeat the ground power plug**. This provides powerline grounding of the Ref Phono 2 chassis to provide absolute protection from electrical shock.
4. For continued protection against fire hazard, replace the fuse only with the same type and rating as specified at the fuse holder.

**DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT BEFORE INSTALLING THE VACUUM TUBES IN THEIR PROPER SOCKETS.**



## Packaging

Save all packaging in a dry place away from fire hazard. Your Ref Phono 2 phono preamplifier is a precision electronic instrument and should be properly cartoned any time shipment is made. You may not have occasion to return your unit to the factory for service, but if that should prove necessary, or other occasion requiring shipment occurs, the original packaging will protect your Ref Phono 2 from unnecessary damage or delay.

Note that your Ref Phono 2 has been shipped with the vacuum tubes installed in protective foam blocks under the top cover. With the Ref Phono 2 unplugged, use a phillips-head screwdriver to loosen the fastening screws, remove the top cover and set aside. Install the numbered tubes in their respective sockets, refasten the top cover and store the foam blocks with your carton.

## Front Panel Controls

**POWER ON/OFF:** The unit is off when the front panel display (including the pilot light when in display "Off" mode) is completely unlit. Unit defaults to "Off" whenever it is unplugged and then plugged in. When first plugged in and the power switch is pressed, MUTE ON will flash on the display for 40 seconds during the auto muting warm-up cycle. When the MUTE ON indicator stops flashing the unit initially defaults to INPUT 1 and is ready to operate.

**MUTE:** After completion of the 40-second warm-up cycle, pressing mute button once will unmute unit and display will read MUTE OFF. Press mute button again to mute unit (display will read MUTE ON.)

**INPUT:** Selects INPUT 1 or INPUT 2, indicated on display. When switching inputs, individually selected GAIN, LOAD and RIAA/alternate Decca or Columbia EQ settings are retained for each input position.

**GAIN:** Selects between LOW (51dB BAL, 45dB SE) and HIGH (74dB BAL, 68dB SE) gain settings. When switching from LOW to HIGH gain position, unit automatically defaults to MUTE ON status each time as a precaution and reminder to lower the volume level of your preamplifier, to prevent possible system overload and damage to loudspeakers. The 23dB gain difference between the LOW and HIGH gain positions is substantial.

**LOAD:** Pressing the LOAD button allows the user to step through six pre-set cartridge resistance loading options (47K, 1000, 500, 200, 100 and 50 ohms) as well as a custom value resistive loading option. Contact your Audio Research dealer or Audio Research Customer Service (763-577-9700) for assistance with custom loading setup procedure. The display will indicate the currently selected load resistance for each input setting. It is suggested that you select the loading value nearest the cartridge manufac-

turers loading recommendation to begin with and then listen to alternate loading if desired.

Because all Ref Phono 2 front panel functions are duplicated on the remote, you may listen to loading sonic changes from the listening position by selecting different loads via their individual buttons on the remote. (Note that depending on the phono cartridge the volume level may decrease as lower loading values are selected.)

**RIAA:** Selects between RIAA, early COLUMBIA stereo and early DECCA stereo LP phono equalization curves.

## Remote Control Functions

In addition to all of the front panel control functions, the remote also accesses the following functions.

**DISPLAY DOWN/DISPLAY UP [DSP DN/DSP UP]:** Decreases/increases display intensity, offering 6 levels of brightness and display "off". If display "off" is selected, a small pilot light remains illuminated in the center of the display window as a reminder the unit is turned on. In display "off" mode the display will illuminate for 10 seconds when any button (except Power on/off) is selected, allowing for control function navigation.

**HOURS:** When pressed, displays number of operating hours vacuum tubes have been in service. **WARNING:** after replacing tubes, this function should be reset to "0" only by a qualified technician. Hours display can be reset to "0" by pressing square black button located on upper right corner of vertical circuit board directly behind display window inside of the chassis. The preamp must be "On" to reset function—the service technician must be careful to avoid any contact with other circuit components during reset operation. Contact Audio Research customer service (763-577-9700) for information regarding this procedure.

## Connections

**INPUT CONNECTORS:** There are two sets of RCA input connectors, for connecting multiple turntable/toner arm cables.

**OUTPUT CONNECTORS:** There is one set of BAL and one set of RCA output connectors for connecting to line inputs (Direct, Aux, Phono, Tuner, etc.) of your line stage/preamplifier.

All input/output connectors are gold plated and RCAs connect "ground" before "hot". On disconnect, "hot" is disconnected first.

**NOTE:** A "passive" line stage is not recommended for use with the Ref Phono 2 as it may not provide the gain necessary to amplify the output of the Ref Phono 2 to adequate levels to the power amplifier.

## Installation Instructions

While the Ref Phono 2 does not dissipate an unusual amount of heat, it is important that it have a reasonable air-flow to assure long, trouble-free operation. In addition, the following installation guidelines will help insure maximum sonic performance as well as reliable service.

1. Upright and horizontal mounting is required if extended operation (longer than one hour) is contemplated.
2. Do not "stack" equipment on top of the Ref Phono 2 or the Ref Phono 2 on top of other equipment: not only could this cause overheating, but "hum" may be introduced into the phono circuits from the proximity of the power transformer of the other equipment.
3. Do not place or operate unit on a soft or irregular surface such as a rug. This will prevent proper ventilation.
4. Do not operate unit without the top and bottom covers installed. These are required both for safety as well as shielding from interference (except in service operations).
5. In a cabinet installation which has an enclosed back, an exhaust fan is desirable so as not to operate the Ref Phono 2 in overheated ambient air. Operation of vacuum tube equipment for long periods of time in hot ambient air will shorten tube life and increase chance of failure of other component parts.

## Operating/Start-up Procedure

1. Secure connections between turntable, Ref Phono 2, and line stage preamplifier. Note: Given the advanced performance capabilities of the Ref Phono 2, it is extremely important that high-quality interconnects be used for connection to ancillary electronics.
2. Plug 3-prong power cord into a grounded AC wall receptacle.
3. Turn Power switch "on." The display will light and MUTE ON will flash for approximately 40 seconds while the power supply stabilizes, indicating operation of the automatic muting circuit. After this warm-up period MUTE ON will stay on, indicating the Ref Phono 2 is ready for operation.
4. Select proper input, gain cartridge loading and EQ, then unmute and play. (see Front Panel Controls section.)

Note: For maximum sonic performance, a warm-up period of at least one hour is recommended.

## Servicing

Because of its careful design and exacting standards of manufacture, your Ref Phono 2 should normally require only minimal routine service to maintain its high level of performance.

**CAUTION:** Your Ref Phono 2 contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

The vacuum tubes inside your Ref Phono 2 are 6H30 dual triodes and a 6550C. With normal use they should last approximately 2,000 to 4,000 hours.

## Cleaning

To maintain the visual appearance of your Ref Phono 2 phono preamplifier, occasionally wipe the front panel and top cover surfaces with a soft damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should **not** be used as they will damage the "brushed" grain of the front panel finish. A dry 2-inch pure bristle paint brush works well to remove dust from bevels, reliefs and switches.



## Disposal and Recycling Guidelines

To dispose of this electronic product, do not place in landfill. In accordance with the European Union Waste Electrical and Electronic Equipment (WEEE) directive effective August 2005, this product may contain regulated materials which upon disposal require special reuse and recycling processing.

Please contact your dealer or importing distributor for instructions on proper disposal of this product in your country. Or, contact Audio Research Corporation (763-577-9700) for the name of your importing distributor and how to contact them.

Packing and shipping materials may be disposed of in a normal manner.

## Limited Warranty

Audio Research Corporation products are covered by a 3-Year Limited Warranty, or a 90-Day Limited Warranty (vacuum tubes). This Limited Warranty initiates from the date of purchase, and is limited to the original purchaser, or in the case of demonstration equipment, limited to the balance of warranty remaining after original shipment to the retailer or importer.

In the United States, the specific terms, conditions and remedies for fulfillment of this Limited Warranty are listed on the warranty card accompanying the product in its shipping carton, or may be obtained from the authorized retailer or from the Audio Research Customer Service Department. Outside the United States, the authorized importing retailer or distributor has accepted the responsibility for warranty of Audio Research products sold by them. The specific terms and remedies for fulfillment of the Limited Warranty may vary from country to country. Warranty service should normally be obtained from the importing retailer or distributor from whom the product was purchased.

In the unlikely event that technical service beyond the ability of the importer is required, Audio Research will fulfill the terms and conditions of the Limited Warranty. Such product must be returned at the purchaser's expense to the Audio Research factory, along with a photocopy of the dated purchase receipt for the product, a written description of the problem(s) encountered, and any information necessary for return shipment. The cost of return shipment is the responsibility of the purchaser.

### Specifications

**FREQUENCY RESPONSE:**  $\pm 2$ dB of RIAA, 10Hz to 60kHz;  
3dB points below 0.5Hz and above 300kHz.

**DISTORTION:** .002% at 1.0V RMS 1kHz BAL output.

**GAIN:** Selectable 51dB (Low), 74dB (High) at 1kHz BAL;  
45dB (Low), 68dB (High) at 1kHz SE. (MC & MM compatible).

**BUTTONS:** Front (6) Power, Input, Gain, Load, RIAA, Mute.  
Remote adds "Hours" and "Display".

**INPUT IMPEDANCE:** 47K ohms and 100pF SE. Selectable  
loads: 1000, 500, 200, 100, 50 ohms and Custom.

**PHONO EQUALIZATION:** (Selectable) RIAA, Columbia, Decca.

**POLARITY:** Non-Inverting.

**OUTPUT IMPEDANCE:** 200 ohms SE, 400 ohms balanced.  
Recommended load 50K-100K ohms and 100pF. (10K ohms  
minimum and 2000pF maximum.)

**MAXIMUM INPUTS:** 250mV RMS at 1kHz (680 mV RMS at  
10kHz).

**RATED OUTPUTS:** 0.5V RMS 10Hz to 20kHz, 100K ohm  
load (output capability is 80V RMS BAL output at 1/2% THD at  
1kHz, 40V SE.)

**POWER SUPPLIES:** Electronically-regulated low and high  
voltage supplies. Line regulation better than .01%.

**NOISE:** 0.22uV equivalent input noise, IHF weighted, shorted  
(Low Gain) input (73 dB below 1mV 1kHz input). 0.055uV  
equivalent input noise (High Gain) (65dB below 0.1mV 1kHz  
input).

**TUBE COMPLEMENT:** (4) 6H30 dual triodes, plus (1 each)  
6H30, 6550C in power supply.

**POWER REQUIREMENTS:** 100-135VAC 60Hz (200-270VAC  
50/60Hz) 140 watts maximum. 2W standby. Line fuse 5A  
SLO BLO (T2A SLO BLO 230V).

**DIMENSIONS:** 19" (48 cm) W x 7" (17.8 cm) H (standard rack  
panel) x 15.5" (39.4 cm) D. Handles extend 1.5" (3.8 cm)  
forward of front panel.

**WEIGHT:** 27 lbs. (12.3 kg) Net; 38 lbs. (17.3 kg) Shipping.

Specifications subject to change without notice.

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## Specifications

**FREQUENCY RESPONSE:**  $\pm 2$ dB of RIAA, 10Hz to 60kHz;  
3dB points below 0.5Hz and above 300kHz.

**DISTORTION:** .002% at 1.0V RMS 1kHz BAL output.

**GAIN:** Selectable 51dB (Low), 74dB (High) at 1kHz BAL;  
45dB (Low), 68dB (High) at 1kHz SE. (MC & MM compatible).

**BUTTONS:** Front (6) Power, Input, Gain, Load, RIAA, Mute.  
Remote adds "Hours" and "Display".

**INPUT IMPEDANCE:** 47K ohms and 100pF SE. Additional  
selectable loads: 1000, 500, 200, 100, 50 ohms and Custom.  
(Custom loading value is factory set at 47K ohms unless  
specified otherwise.)

**PHONO EQUALIZATION:** (Selectable) RIAA, Columbia, Decca.

**POLARITY:** Non-Inverting.

**OUTPUT IMPEDANCE:** 200 ohms SE, 400 ohms balanced.  
Recommended load 50K-100K ohms and 100pF. (10K ohms  
minimum and 2000pF maximum.)

**MAXIMUM INPUTS:** 250mV RMS at 1kHz (680 mV RMS  
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