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HIGH DEFINITION®

Reference Phono 3

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Thank you for choosing the Reference Phono 3 to be a part of your high performance music listening system. Since 1970, Audio Research has been creating some of the world's finest audio equipment. Each piece is handcrafted in Minnesota, and has been designed to provide many years of listening enjoyment.

We understand you are eager to begin listening; however, please take a few minutes to read through this guide for useful information concerning the operation of your new phono preamplifier. Once installed, please allow an appropriate break-in period to fully appreciate the benefits this preamplifier will provide to your system.

After reading the user guide, if you have any further questions regarding your phono preamplifier, contact your dealer or Audio Research customer service - they will be happy to help you make the most of your new component.

Happy Listening!

**Thank You.**

# Contents

## **Warnings** 5

### **Installation**

Before Operating the Reference Phono 3	6
In Your System	7
A Note about Vacuum Tubes	7

### **Connections**

Back Panel Connections	8
Input Connectors	9
Output Connectors	9
Record Output	9
A.C. Power Connection	9
RS-232 and IR Input	9

### **Maintenance**

Vacuum Tubes	18
Service	18
Cleaning	18
Disposal and Recycling Guidelines	18
Fuse Values and Locations	19

## **Warranty** 20

## **Specifications** 21

### **Operation**

10	Front Panel Controls and Display
11	Start-Up
11	Shut-Down
11	Break-in
12	Front Panel Controls
12	Remote Only Functions

### **Settings Menu**

14	System Settings - Menu Tree
15	Settings Menu
15	Auto Shutdown
16	Cartridge Settings
16	Tube Hours
17	Display Brightness
17	Equalization

## Warnings

To prevent fire or shock hazard, do not expose your Reference Phono 3 to rain or moisture.

Do not place objects containing water on top of this unit.

This unit contains voltages which can cause serious injury or death. Do not operate with covers removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.

The detachable power cord on your Reference Phono 3 is equipped with a heavy gauge, 3-conductor (where applicable) cable and a standard three-prong grounding plug. For absolute protection, do not defeat the ground power plug. This provides power line grounding of the Reference Phono 3 chassis to provide absolute protection from electrical shock.

The appliance coupler (a.c. power connector) at the rear of this unit must be accessible for emergency power disconnect.

The power button on the front of this unit, when off, does *not* disconnect all power from this unit. This unit is in sleep mode when not on.

For continued protection against fire hazard, replace the fuse only with the same type and rating as specified at the fuse holder (see page 19 for fuse information).

This unit is RoHS compliant.

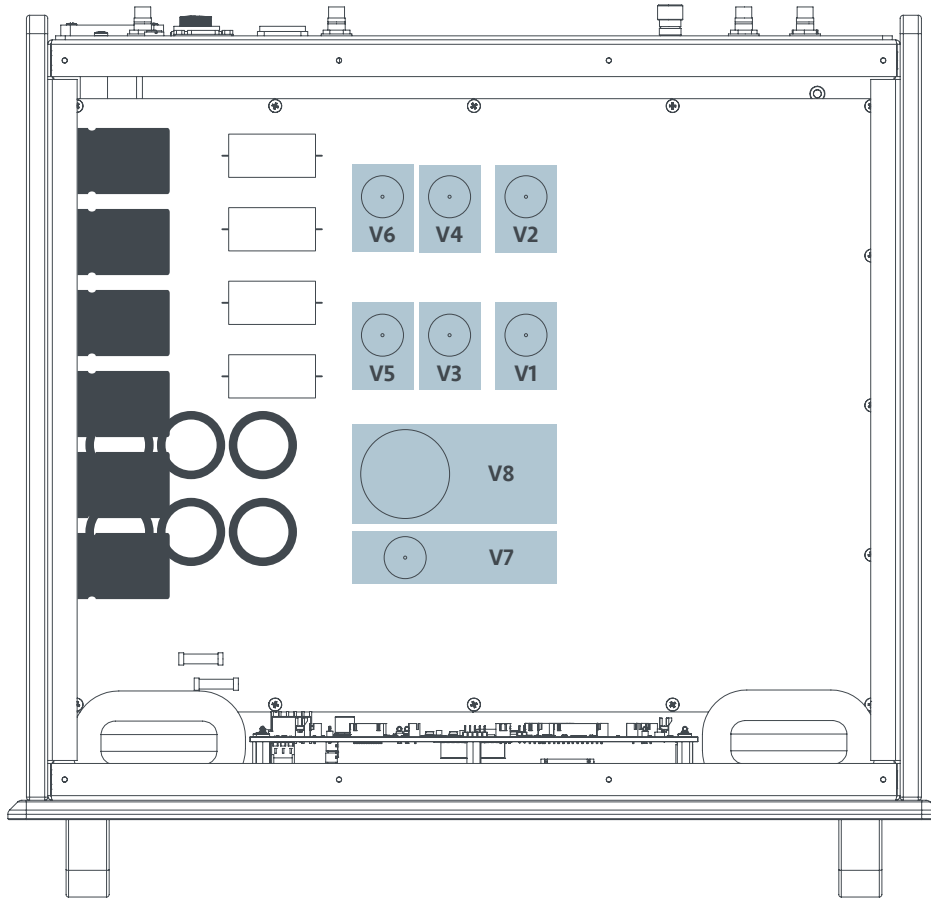
The Reference Phono 3 has automatic muting to help protect system components in the event of low line voltage. When sensing low line voltage, the preamp displays 'Low Line' and automatically goes into 'Mute'. This condition will persist until the line voltage returns to a safe operating level; please note the unit will remain in 'Mute' even after 'Low Line' no longer appears.

Note that automatic muting is only designed to protect against power line interruptions or severe voltage drop. It will not mute in the event of subsonic transmissions from a faulty input source, amplifier failure or speaker malfunction.

### ***A note about packaging...***

Save all packaging in a dry place away from fire hazard. Your Reference Phono 3 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 Reference Phono 3 from unnecessary damage or delay.

# Installation



## **Before operating the Reference Phono 3**

Your Reference Phono 3 preamplifier is shipped with the vacuum tubes packed in a separate foam-lined carton. These must be unpacked and installed before you attempt to operate the phono preamplifier. Included are six 6H30 tubes for the analog stage, and a 6H30 and 6550WE used in the power supply. Proceed according to the following instructions.

Remove all screws fastening the top cover. Carefully remove each vacuum tube from its protective foam and match its location 'V' number (written on the base of the tube) to the 'V' number printed next to each socket. Firmly seat each tube in its matching socket, taking care to 'key' the tube pins to the socket holes. Retain the tube carton with other packing materials for possible future use.

Refasten the top cover on the phono preamplifier.

# Installation

## ***In your system***

To ensure normal component life and safe operation this unit must be operated only in an upright position. Adequate airflow and proper cooling can occur only if there is no restriction above and behind the unit and on either side.

The special non-marring elastomer feet provide adequate spacing and stability only on a smooth, hard surface, and also assist to isolate the phono preamplifier from spurious vibrations. For upright stability and best performance, never operate the unit while it is sitting on a soft surface such as a thick rug or carpet.

Due to its weight, this preamplifier must be supported on a surface specifically rated for such a load. Check with the manufacturer of your support system to be sure it is rated to handle this weight.

If the unit is to be operated in an enclosure such as an equipment rack, make certain that adequate airflow above and to each side of the unit is provided. Audio Research recommends a minimum of 6-8 inches (15-20 cm) of clearance above the Reference Phono 3 to maintain proper ambient operating temperature.

The 'ambient' operating temperature should never exceed 120° F or 49° C. Improper installation will cause premature tube failure and will affect your warranty, as well as the service life of the unit.

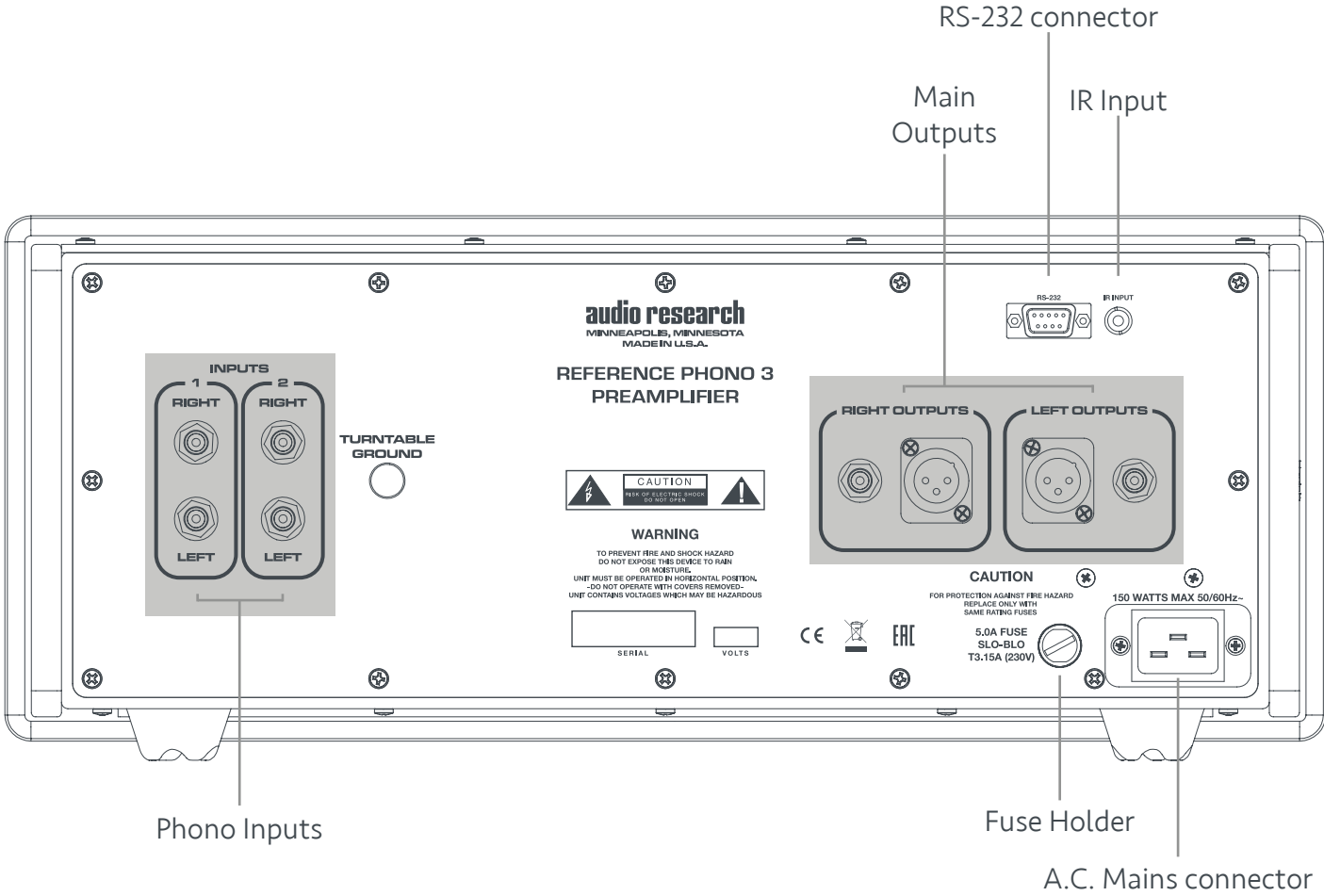
It is normal for a vacuum tube preamplifier to run quite warm, and if used for prolonged periods, hot to the touch. All components within are, however, operated at safe, conservative levels and will not be improperly affected thereby, providing the requirements outlined above are adhered to.

## ***A Note about Vacuum Tubes***

The vacuum tubes in your Reference Phono 3 have been burned in, tested and electrically matched to provide the best performance and reliability of your preamplifier. That said, vacuum tubes must be replaced from time to time. The 6H30 tubes in the Reference Phono 3 should have an expected life of approximately 4,000 hours, while the 6550WE tube in the power supply should have a life expectancy of approximately 2,000 hours. These life expectancies are only approximate.

# Connections

## Back Panel Connections





# Connections

## **Input Connectors**

The Reference Phono 3 provides two sets of input connectors, labeled Input 1 and Input 2. Both input connectors are single-ended.

## **Output Connectors**

Two pairs of balanced and single-ended main outputs are provided. The outputs are connected in parallel. If using both outputs simultaneously, the combined input impedance of the preamplifier being driven by the Reference Phono 3 must be greater than or equal to 20k Ohms.

## **A.C. Power Connection**

It is important that the Reference Phono 3 be connected via its supplied 20 amp IEC 12-gauge power cord to a secure, dedicated A.C. power receptacle. Never connect to convenience power receptacles on other equipment. Only use the power switch on the front of the Reference Phono 3 for On/Off control of the preamplifier, or the IR input, RS232 or remote control.

## **RS-232 Input**

The RS-232 input allows connection of a control or automation system.

## **IR Input**

The IR input allows a remote IR sensor or repeater system to be connected to the Reference Phono 3 for control purposes, utilizing a standard mono 1/8" connector.

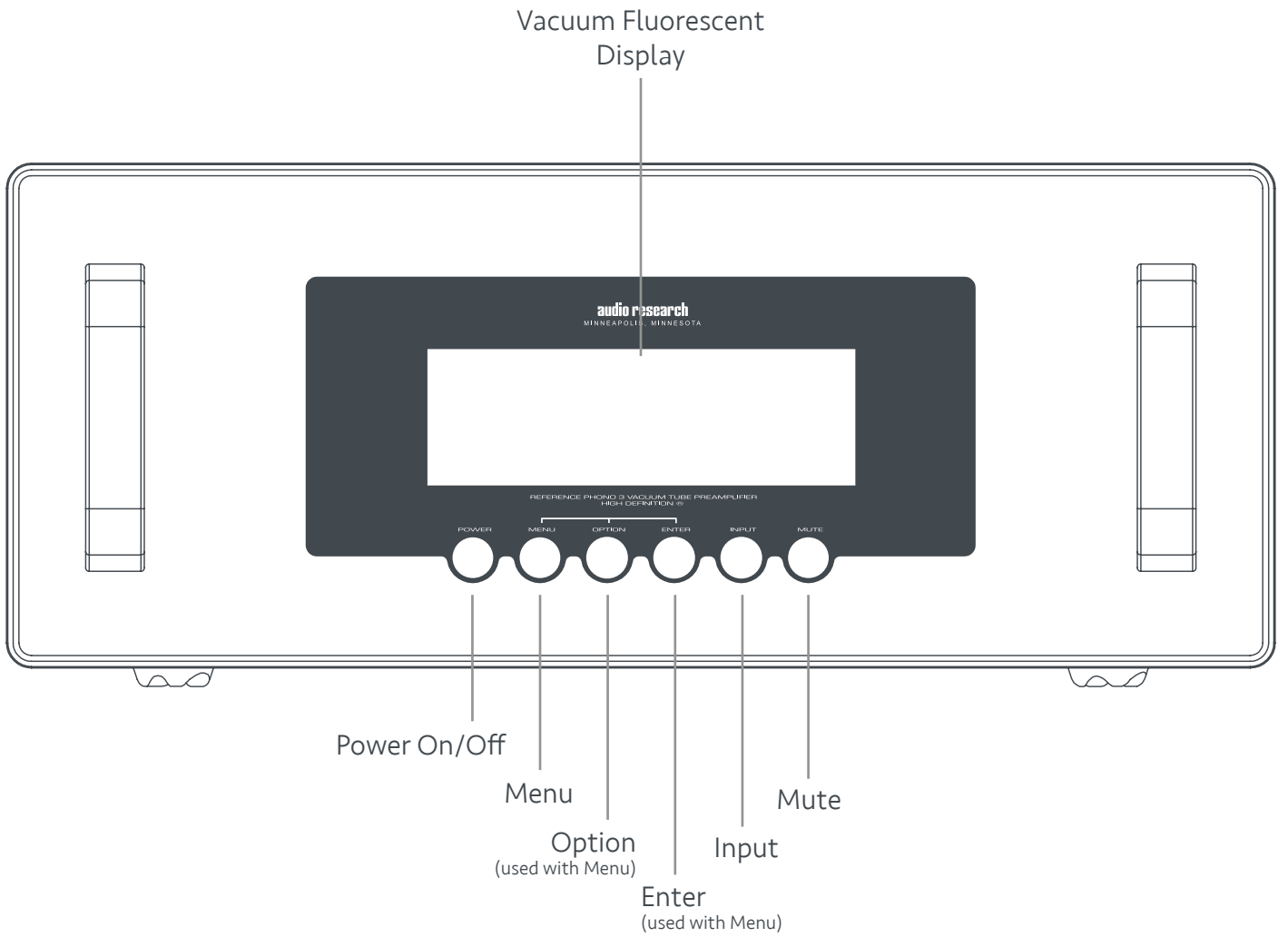
## **Important**

Use the best available speaker wires and interconnects. Audio Research cannot emphasize this enough. As better components and systems are developed, it becomes increasingly important to avoid the limitations of inferior system interconnections.

It is important sonically that your entire system be connected so that the audio signal arriving at the speakers has correct, or 'absolute' polarity (i.e., non-inverted).

# Operation

## Front Panel Controls and Display



# Operation

## **Start-Up**

- Secure all rear-panel connections between Reference Phono 3, preamplifier, and input sources.
- Plug three-prong power cord from rear of chassis into grounded A.C. wall outlet. The Power switch defaults to 'off' when the unit is plugged into a power receptacle.
- Press power switch (either on the remote or front panel). The phono preamplifier will begin the warm-up sequence, which lasts approximately two minutes, during which 'MUTE' will flash on the display. After the warm-up sequence is complete, the unit will be muted. Depress the front panel 'MUTE' button or the Mute button on the remote to initiate normal operation. You may depress the Mute button prior to the unit completing the warm-up cycle; 'MUTE OFF' will flash on the display until the warm-up cycle is complete.
- Select input source and adjust the volume on your preamplifier as necessary.

## **Note**

The two minute warm-up time is required for the circuit to come to an appropriate operating temperature, as well as for the power supply to stabilize. This is a normal function of the Reference Phono 3.

## **Shut-Down**

- Activate 'MUTE' function.
- Turn off power amplifier(s).
- Turn off preamplifier.
- Press Power switch to 'off' on Reference Phono 3.
- Turn off input sources.

## **Note**

The Reference Phono 3 should be turned on before the preamplifier or amplifier in your system. If the Reference Phono 3 is turned on after the preamplifier and amplifier, it will amplify any extraneous turn-on noises the Reference Phono 3 might generate, which could potentially damage the loudspeakers. Good operating practice dictates that the amplifier should be turned on last, and turned off first in an audio system.

## **Break-in**

All quality stereo equipment benefits from a break-in period; during this time, the various components, wiring and solder connections change as electrical signals pass through them. While your Reference Phono 3 will sound fantastic out of the box, it will only improve with continued use.

# Operation

## Front Panel Controls

The Reference Phono 3 has six buttons: Power, Menu, Option, Enter, Input, and Mute.

### **Power On/Off**

Supplies power from the A.C. wall outlet to preamp; indicated by active display window. The Reference Phono 3 requires approximately 2 minutes to warm up; this time is required to stabilize the circuitry. See 'Start-Up Procedure' on page 11 for details.

### **Menu**

The menu button enters the setup menu of the Reference Phono 3 to allow customizing certain settings of the preamplifier. See page 15 for further details about using the setup menu.

### **Option**

The Option button is used in conjunction with the Menu button to select the various options in the settings menu.

### **Enter**

The Enter button is used in conjunction with the Menu button to make changes to the systems settings of the Reference Phono 3.

### **Mute**

When activated, Mute electrically disables all outputs of the phono preamplifier; indicated by 'MUTE' in display window, in the bottom right corner. This control should be activated before switching inputs, changing connections or shutting down your audio system to help protect your amplifier and speakers from unexpected signal pulses.

## Remote Only Functions

In addition to the controls found on the front panel, the remote control offers access to the following additional features of the Reference Phono3:

### **Hours**

Pressing the 'HOURS' button will display the total accumulated hours of operation for the Reference Phono 3. This is useful to determine the approximate number of hours the vacuum tubes have been in use. After five seconds, the display will revert to the normal operation screen. After replacing vacuum tubes, the hours counter should be reset (see instructions under 'Settings Menu' on page 16).

### **Note**

The installed 6H30 vacuum tubes have an average life span of approximately 4,000 hours, and the 6550WE has an average life span of approximately 2,000 hours. After this time, we recommend replacing them to maintain the best performance of your preamplifier.

### **Gain**

The 'LO GAIN' and 'HI GAIN' buttons switch between the two gain settings of the Reference Phono 3. When switching from LOW to HIGH gain position, the phono preamplifier mutes as a precaution and reminder to lower the volume level of your preamplifier, to prevent possible system overload or damage. The 23dB gain difference between the LOW and HIGH gain positions is substantial.

# Operation

## **Display Brightness Adjustment**

The front panel display has six brightness settings, as well as the ability to dim the display completely. To change the brightness, use the 'DSP UP' or 'DSP DN' buttons on the remote. Note that when the display is completely dimmed, a small square appears in the middle of the display to indicate the unit is powered on.

## **Input Select Buttons**

The input buttons labeled 'INPUT 1' and 'INPUT 2' allow direct selection of the two inputs available on the Reference Phono 3.

## **Cartridge Load**

The six numbered buttons (47k, 1000, 500, 200, 100 and 50 Ohms) as well as the 'CUSTOM' button provide resistive loading options for the Reference Phono 3. 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 manufacturers loading recommendation to begin with and then listen to alternate loading if desired. (Note that depending on the phono cartridge, the volume level may decrease as lower loading values are selected.)

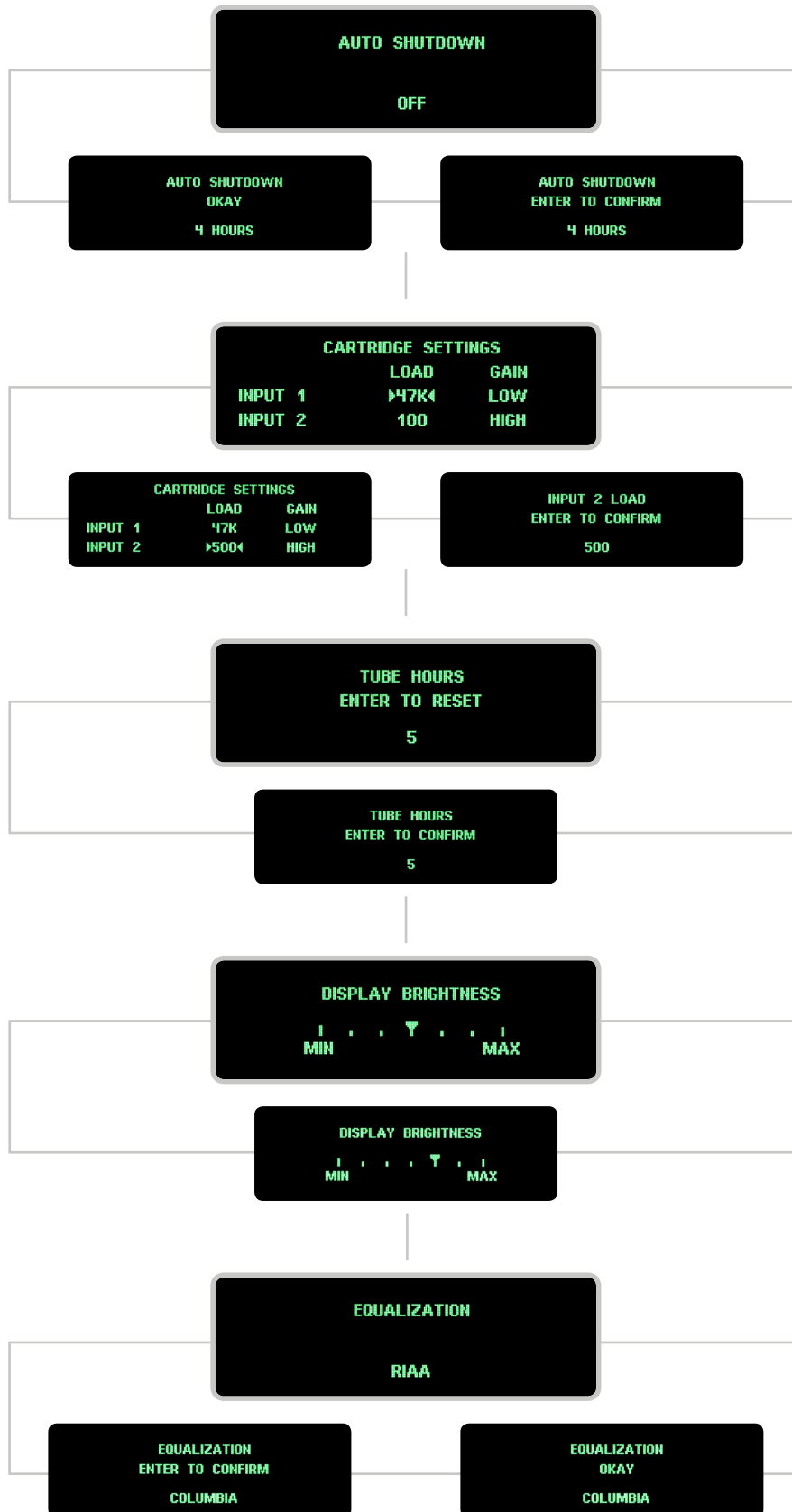
For further information regarding the custom loading, contact your Audio Research dealer or Audio Research Customer Service. If no resistors have been installed for the custom loading, the default value is 47k Ohms.

## **EQ**

The Equalization feature allows different EQ curves to be employed for listening. You will find that most of your record collection will be listened to using the 'RIAA' curve. However, some early Columbia and Decca stereo recordings utilized a different EQ curve; for this purpose, the 'DECCA' and 'COLUMBIA' options have been included in the Reference Phono 3. To change the equalization curve, select one of the three buttons (RIAA, DECCA, and COLUMBIA). Note that the EQ setting is global, and not specific to an input.

# Operation

## System Settings - Menu Tree



# Operation

## Settings Menu

The Reference Phono 3 has been designed with a simple, intuitive menu to allow adjustment of the various features of the phono preamplifier. To adjust the settings, press the 'MENU' button on the remote or front panel. If no further action is taken with the preamplifier or remote for five seconds, the Reference Phono 3 reverts back to its normal operation screen. Continuing to press the 'MENU' button will step you through the different setting options:



While a menu item is displayed, press 'OPTION' on the front panel or remote to adjust the settings of that particular selection. After making the appropriate change, pressing the 'ENTER' button will confirm the new setting, and the display will show 'OKAY' for five seconds before reverting back to the normal operation screen.

## Note

For the following menu settings, please refer to the menu tree on page 14 for examples of the front panel display.

The 'MENU', 'OPTION', and 'ENTER' buttons (found on the front panel and remote) are used to make changes to the menu settings. Note that the 'MENU' button can also be used to back out of a menu selection, returning to the main settings options.

## Auto Shutdown

The Reference Phono 3 is equipped with an auto shut-off feature, designed to turn the preamplifier off after a period of time during which it is not used. The auto shut-off feature senses any interaction with the preamplifier, such as button presses, changing the volume, remote usage, etc. To change/disengage the auto shutdown feature, press the 'MENU' button until the 'AUTO SHUTDOWN' screen is displayed. Pressing the 'OPTION' button on the front panel or on the remote, the Reference Phono 3 will scroll through the options for 'off' (no auto shutdown), or 1-8 hours. Once you have made a selection, press 'ENTER' to confirm. The display will show 'OKAY' before reverting back to the normal operation screen.

## Note

The auto shutdown feature is not in the signal path of the phono preamplifier and has no deleterious sonic effect.

# Operation

## **Cartridge Settings**

The Cartridge Settings menu offers independent load and gain settings for the two inputs on the Reference Phono 3. The settings are stored in the unit's memory and will be retained until changed.

To change the cartridge settings, press the 'MENU' button until the Cartridge Settings menu is displayed. Pressing the 'OPTION' button will toggle across the adjustable settings. Once the desired setting to be changed is reached, press the 'ENTER' button. The next screen will allow adjustment of the particular chosen setting; to change the value, press the 'OPTION' button to toggle through the setting options. Once the preferred setting is reached, press 'ENTER' and the display will read 'OKAY' and the new setting will be displayed on the main screen.

### **Note**

Both the load and gain settings for each input can be changed directly from the remote control using the number buttons at the top, and the 'HI GAIN' and 'LO GAIN' buttons.

## **Tube Hours**

The tube hours display shows the accumulated time the Reference Phono 3 has been powered on. This is useful for determining the number of usage hours of the installed vacuum tubes.

See *A Note about Vacuum Tubes* on page 7 for specific information regarding the tubes in the Reference Phono 3.

To reset the tube hours counter, press the 'MENU' button until 'TUBE HOURS' is shown. Press the 'OPTION' button to display 'ENTER TO RESET'. Press 'ENTER', and the display will read 'ENTER TO CONFIRM'. A final press of the 'ENTER' button will reset the tube hour counter to 0 and the display will show 'OKAY'.

### **Note**

Once the hour counter has been reset, the total accumulated hours cannot be recalled.



# Operation

## **Display Brightness**

The display brightness feature offers six different settings (including off) for the vacuum fluorescent display on the front panel. When the lowest setting (off) is selected, the display will remain on for five seconds after any button is pushed, after which it will revert to a black screen with a small, illuminated square in the center to indicate the unit is powered on. To change the display brightness, press the 'MENU' button until 'DISPLAY BRIGHTNESS' appears. Press the 'OPTION' button. Continue to press the 'OPTION' button to change the display brightness to your preference. Once you have selected the appropriate brightness, there is no need to press 'ENTER' or any further buttons.

## **Note**

The remote control offers direct control of the display brightness via two buttons labeled 'DISP UP' and 'DISP DN'. You can choose to use these buttons as an alternate to the settings menu.

## **Equalization**

The Equalization feature allows different EQ curves to be employed for listening. To change the EQ settings, press the 'MENU' button on the front panel or the remote until the display shows 'EQUALIZATION' with the currently selected setting below. Press the 'OPTION' button to toggle through the three settings, and press 'ENTER' when the appropriate setting is selected.

## **Note**

The equalization settings can be changed directly from the remote control by selecting one of the three EQ buttons located at the bottom, 'RIAA', 'COLUMBIA', and 'DECCA'.

# Maintenance

## **Vacuum Tubes**

It is recommended that you replace the 6H30 vacuum tubes of your Reference Phono 3 in sets. All of the tubes in your preamplifier have been matched to have similar operating characteristics, to provide the best sound quality and reliability.

## **Servicing**

Because of its careful design and exacting standards of manufacture, your Reference Phono 3 preamplifier should normally require only minimal maintenance to maintain its high level of performance.

Should you need service, please contact your authorized Audio Research dealer or other qualified technician. Additional questions regarding the operation, maintenance or servicing of your preamplifier, please contact the Customer Support Department of Audio Research Corporation at [service@audioresearch.com](mailto:service@audioresearch.com) or call 763-577-9700. You may also initiate a service request by visiting the Audio Research website ([www.audioresearch.com](http://www.audioresearch.com)) and selecting 'Service Repair' at the top right of the home page.

## **Caution**

Your Reference Phono 3 preamplifier contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Even with the power turned off, a charge remains in the energy storage capacitors for some time.

## **Cleaning**

To maintain the new appearance of this preamplifier, occasionally wipe the front panel and top cover 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 anodized finish of the front panel. A small, soft paintbrush is effective in removing dust from bevels, and other features of the front panel.



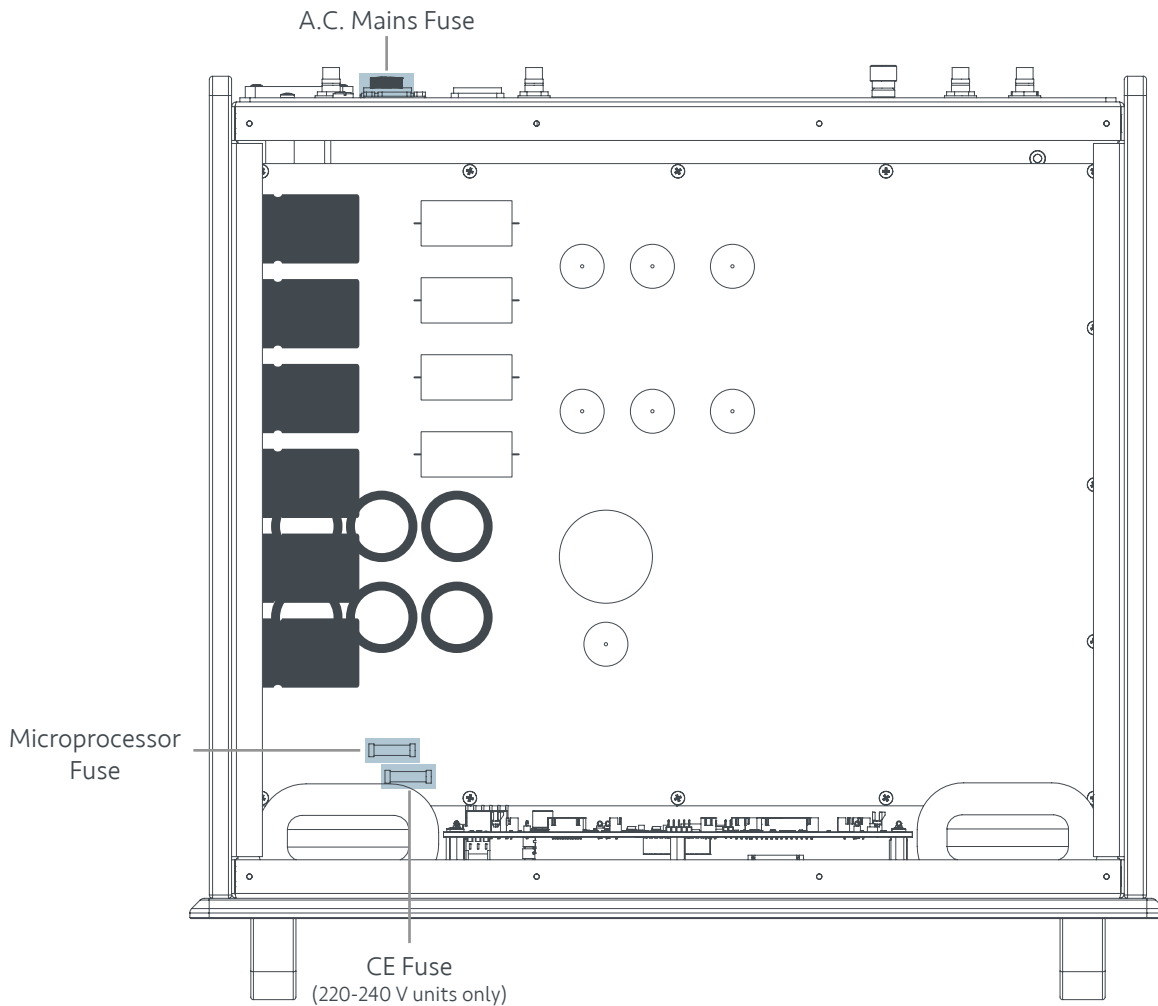
## **Disposal and Recycling Guidelines**

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.

# Maintenance

## Fuse Values and Locations



The Reference Phono 3 has three replaceable fuses to help protect the unit in the event of a spurious electrical surge or other situation. When replacing a fuse, please use only the specified rating and type. Using an improper rating or type, or bypassing the fuse, will not only void the warranty in the event of damage, but it could also cause serious system failure, fire, or personal injury.

### **A.C. Mains Fuse**

120 V units: 5A slow blow  
220-240 V units: T3.15A

### **CE Fuse**

220-240 V units only: T1A  
Note: 120 V units will have a wire jumper in place of the fuse.

### **Microprocessor Fuse**

120 V units: 250mA  
220-240 V units: T125 mA

## 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. The warranty terms are also available on the internet at [www.audioresearch.com/en-us/company/warranty-statement](http://www.audioresearch.com/en-us/company/warranty-statement). 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, 10 Hz to 60kHz; 3 dB points below 0.3Hz and above 300 kHz.

**Distortion:** Less than .002% at 1.0V RMS 1kHz output.

**Gain:** Selectable 51 dB (Low) and 73 dB (High) at 1kHz BAL; 45 dB (Low) and 67 dB (High) at 1kHz SE. (MC and MM compatible).

**Input Impedance:** 47k Ohms and 100 pF SE. Selectable loads: 1000, 500, 200, 100, 50 Ohms, and Custom.

**Output Impedance:** 400 ohms Balanced, 200 ohms SE. Recommended load 50k-100k Ohms and 100 pF. (10k Ohms minimum and 2000 pF maximum).

**Output Polarity:** Non-inverting.

**Phono Equalization:** (selectable) RIAA, Columbia, and Decca.

**Maximum Input:** 250 mV RMS at 1kHz (680 mV RMS at 10kHz) - Low Gain.

**Rated Outputs:** 2V RMS (1V RMS SE) into 200K ohm balanced load (maximum balanced output capability is 30V RMS at less than 0.5% THD at 1kHz).

**Controls:** 6 Push Buttons: Power, Menu, Option, Enter, Input, Mute.

**Power Supplies:** Electronically regulated low and high voltage supplies. Automatic 2 minute warm-up/brown-out mute. Line regulation better than .01%.

**Noise:** 0.28  $\mu$ V equivalent input noise, IHF weighted. Shorted (Low Gain) input (71 dB below 1mV 1kHz input). 0.082  $\mu$ V equivalent input noise (High Gain). (62 dB below 0.1 mV 1kHz input).

**Tube Complement:** (6)-6H30P dual triodes, plus (1 each) 6550WE and 6H30P in power supply.

**Power Requirements:** 100-135VAC 60Hz (200-270VAC 50/60Hz) 130 watts. Standby: 2 watts.

## Dimensions:

Width	19" (48 cm)
Height	7.8" (19.8 cm)
Depth	16.5" (41.9 cm)

Handles extend 1.6" (4 cm) forward of the front panel.

**Weight:** 32.5 lbs. (16.6 kg) Net; 49 lbs. (24 kg) Shipping.

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