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HIGH DEFINITION®

LS28

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Thank you for choosing the LS28 as part of your high performance music 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 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 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.

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Warnings

- To prevent fire, or shock hazard, do not expose your LS28 to rain or moisture.

- Do not place objects containing liquids 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 LS28 is equipped with a heavy gauge, 3-conductor 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 LS28 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. (In sleep mode, the tubes and audio circuit are powered off; the microprocessor that operates the LS28 remains 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.

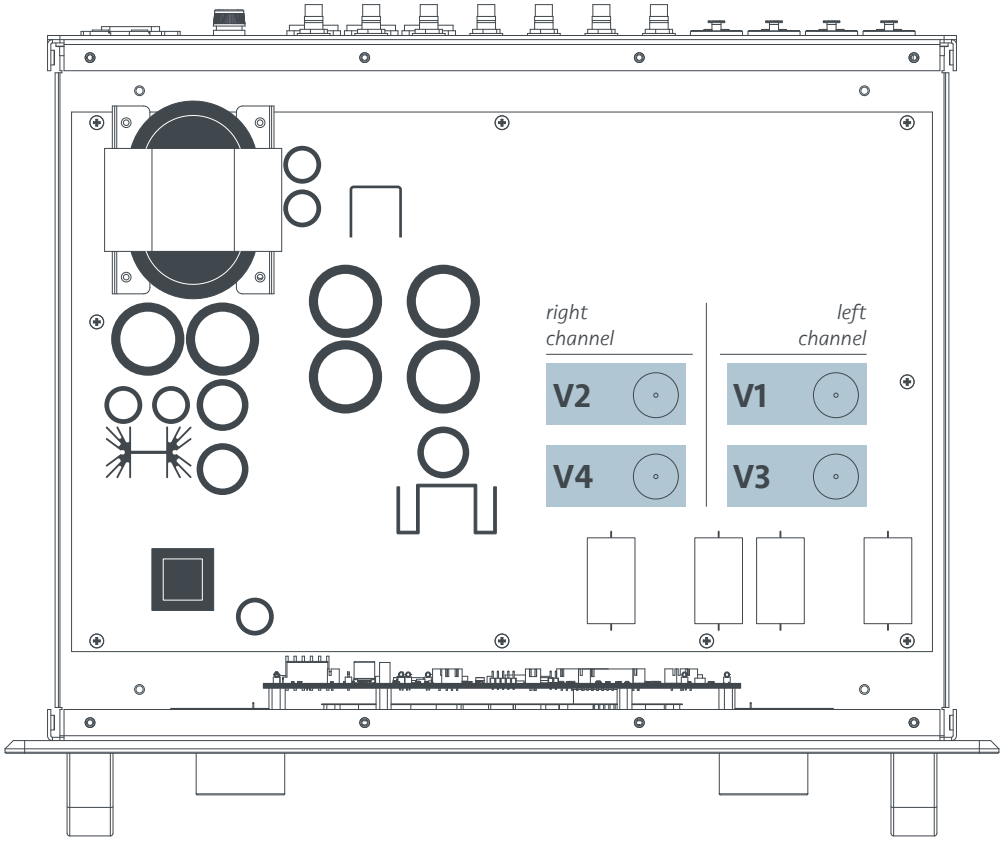
- The LS28 has automatic muting to help protect system components in the event of low line voltage. When sensing low line voltage, the preamp displays 'Low Line' and automatically goes into 'Mute'. This condition will persist until the line voltage returns to a safe operating level; please note the unit 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 LS28 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 another occasion requiring shipment occurs, the original packaging will protect your LS28 from unnecessary damage or delay.

Installation



Before operating the LS28

Your LS28 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 preamplifier. Included are four 6H30 tubes for the analog stage. 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 on the circuit board. 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 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 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 LS28 to maintain proper ambient operating temperature.

- The 'ambient' operating temperature should never exceed 30° C, 86° F. Improper installation will cause premature tube failure and will affect your warranty, as well as the service life of the unit.

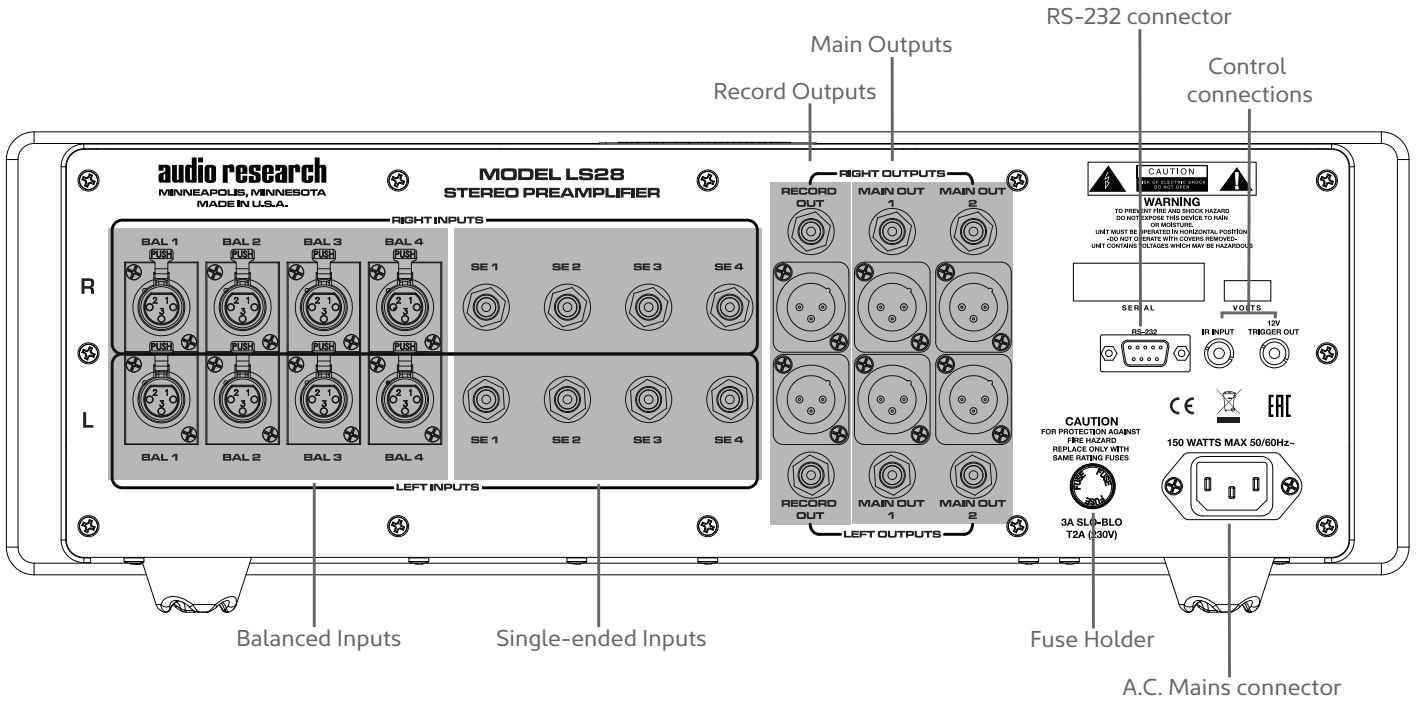
- It is normal for a vacuum tube preamplifier to run quite warm, and if used for prolonged periods, hot to the touch. All components within are operated at safe, conservative levels well within tolerances.

A Note about Vacuum Tubes

The vacuum tubes in your LS28 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 LS28 should have an expected life of approximately 4,000 hours. This life expectancy is only approximate.

Connections

Back Panel Connections



Connections

Input Connectors

The LS28 provides eight pairs of input connectors; four balanced and four single-ended, labeled BAL 1-4 and SE 1-4.

Output Connectors

Two pairs of BAL/SE main outputs are provided. The outputs are connected in parallel. If using both outputs simultaneously, the combined input impedance of the amplifier(s) being driven by the LS28 must be greater than or equal to 20k Ohms.

Record Output

The record output should be connected to your recorder's 'Record' or 'Line' inputs. These outputs provide a fixed-level two-channel signal (left and right) to your recorder from whichever input is selected. The non-variable output level will be the same as the output of the selected source.

It is possible to dub or copy from one recorder to another by connecting the output of the source recorder to an unused set of stereo inputs. The signal will then be routed to the Record Out connectors when that input source is selected.

Warning

Do not connect the record output directly to an amplifier. This will send full output (with no volume attenuation) to the amplifier(s), and could cause serious serious damage to the amplifier(s) or loudspeakers.

A.C. Power Connection

It is important that the LS28 be connected via its supplied 15 amp IEC 14-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 LS28 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 LS28 for control purposes, utilizing a standard mono 1/8" connector.

12V Trigger Out

The +12V DC trigger out jack provides the ability to remotely turn on and off other linked components such as power amplifiers having similar capabilities.

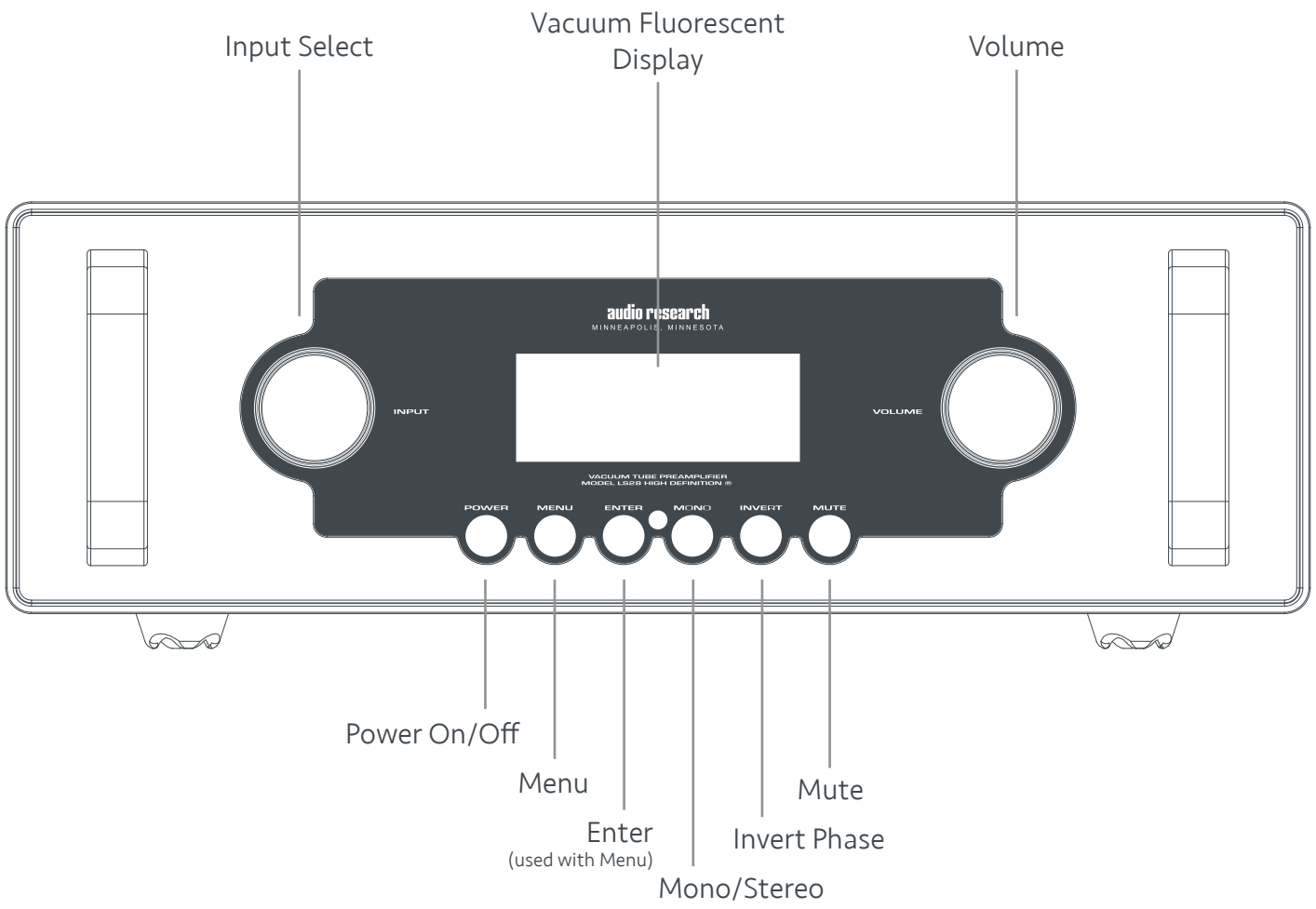
Important

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 LS28, power amplifier(s) 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 preamplifier will begin the warm-up sequence, which lasts approximately 45 seconds, 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 as necessary.

Shut-Down

- Activate 'MUTE' function.
- Turn off power amplifier(s).
- Press Power switch to 'off'.
- Turn off input sources.

Note

The LS28 should be turned on before the amplifier in your system. If the LS28 is turned on after the amplifier, it will amplify any extraneous turn-on noises the preamplifier or other source components 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 LS28 will sound fantastic out of the box, it will only improve with continued use.

Operation

Front Panel Controls

The LS28 has two microprocessor-driven rotary controls and six buttons (Power, Menu, Enter, Mono, Invert, and Mute).

Left Rotary control (Input Select)

Select input by rotating the control to the left or right. The screen displays the current input on the left side of the display.

Right Rotary control (Volume)

Adjust volume (output level) up or down for both L and R channels. Volume control is also selectable via VOL UP and VOL DN buttons on the remote control. Volume adjustment is indicated in the display window by numeric digits on 0–103 scale.

Do not turn volume up beyond normal listening levels when 'mute' is engaged to avoid unexpected or possibly damaging sound levels. Reduce volume level whenever changing input sources, even when muted.

The right rotary control also functions to change settings when in menu mode.

Power On/Off

Supplies power from A.C. wall outlet to preamp; indicated by active display window. The LS28 requires approximately 45 seconds to warm up; this time is required to stabilize the vacuum tubes. See 'Start-Up Procedure' on page 11 for details.

Menu

The menu button enters the setup menu of the LS28 to allow customizing certain settings of the preamplifier. See page 15 for further details about using the setup menu.

Enter

The enter button is used in conjunction with the Menu button to make changes to the systems settings of the LS28.

Mono

Toggle between Stereo and Mono output.

Invert

The invert button allows the absolute phase of the recording to be switched between 'normal' (in-phase) and 'invert' (180° inversion).

Mute

When activated, Mute electrically disables all outputs of the preamplifier; indicated by 'MUTE' in display window, beneath the volume number. 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. When deactivated, 'MUTE' is cleared from the display window allowing normal operation.

Operation

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 LS28.

Hours

Pressing the 'HOURS' button will display the total accumulated hours of operation for the LS28. 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. After this time, we recommend replacing them to maintain the best performance of your preamplifier.

Input Select Buttons

The input buttons labeled BAL 1-4 and SE 1-4 allow direct selection of each of the eight inputs available on the LS28.

Display Brightness Adjustment

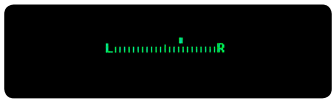
The front panel display has six brightness settings, as well as the ability to dim the display completely. To change the brightness, use the 'DSP UP' or 'DSP DN' buttons on the remote. Note that when the display is completely dimmed, a small square appears in the middle of the display to indicate the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

Balance

The Balance control adjusts the output from center position to the left or right channels, which in turn will shift the center point of the sonic image. This is useful in the event the main listening position is not centered between the speakers, or can help with certain room anomalies.



To adjust the balance, press the 'BAL L' or 'BAL R' button on the remote. The balance scale will appear in the middle of the display, and the indicator will move in the selected direction:

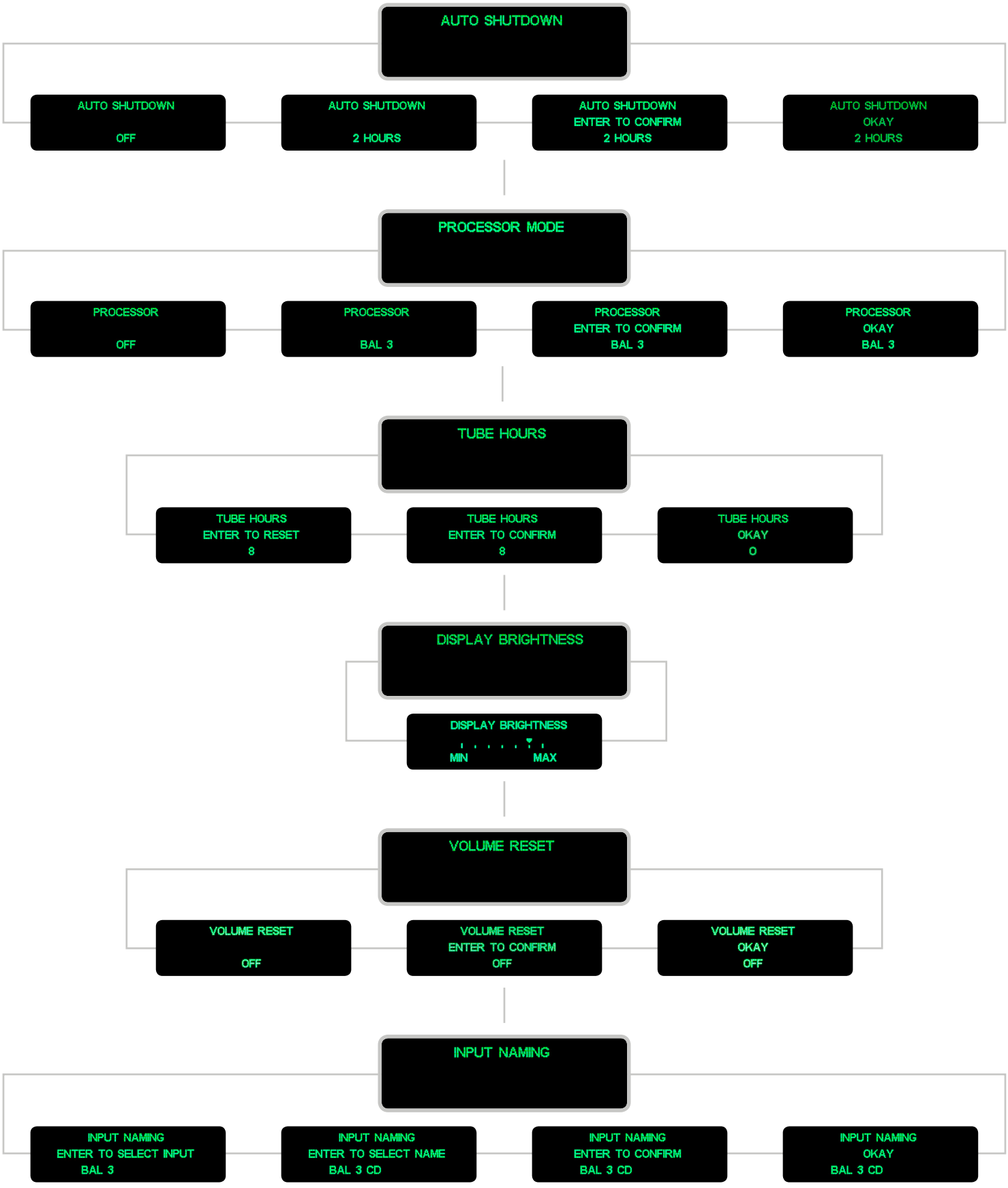


After five seconds of inactivity, the balance scale will disappear from the screen. If the balance has been shifted to the right or left, 'R+' or 'L+' will appear at the bottom left corner.



Operation

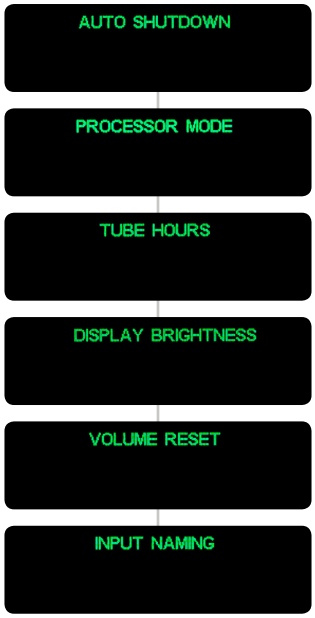
System Settings - Menu Tree



Operation

Settings Menu

The LS28 has been designed with a simple, intuitive menu to allow adjustment of the various features of the 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 LS28 reverts back to its normal operation screen. Continuing to press the 'Menu' button will toggle you through the different setting options:



While a menu item is displayed, press 'ENTER', followed by rotating the volume knob on the front panel, or using the volume up/down buttons on the remote to adjust the settings of that particular selecton. 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.

Both the 'MENU' and 'ENTER' buttons (found on the front panel and remote), as well as the volume knob (or the up/down volume buttons on the 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 LS28 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. Using the volume knob on the front panel, or the volume up/down buttons on the remote, you have the option 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 preamplifier and has no deleterious sonic effect on music playback.

Operation

Processor Mode

The LS28 has the ability to assign unity gain (also called 'pass through') to one of the eight inputs available in the event it will be integrated into a system with a secondary control device, such as a surround sound processor. When an input is assigned as the processor input, the volume control on the LS28 is disabled so that the processor's volume is the only control used.

To set up a processor input, connect the left and right output channels from your surround sound processor to the left and right inputs of your choice on the LS28. Press the 'MENU' button until 'PROCESSOR MODE' is displayed, and press 'ENTER'.

With 'PROCESSOR' displayed, turn the volume knob, or use the up/down volume buttons on the remote, to select the desired input for processor mode. Press the 'ENTER' button to select the input, and 'ENTER' once again to confirm the selection. The LS28 will display 'OKAY' and show the selected input on the bottom line.

When using the input selected for processor mode, note that in place of the volume number on the operation screen, a 'pass through' symbol will be shown.

Warning

When processor mode is assigned to an input, do *NOT* connect a source (such as a CD player or phono stage) to that input. This will send full output from the source to your amplifier(s), and could cause serious damage to your loudspeakers or amplifier(s) - not to mention your ears!

Tube Hours

The tube hours display shows the accumulated time the LS28 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 LS28.

To reset the tube hours counter, press the 'MENU' button until 'TUBE HOURS' is shown. Press the 'ENTER' button to display 'ENTER TO RESET'. Press 'ENTER' again 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 enter button. Using the volume knob on the front panel, or the up/down volume buttons on the remote, 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.

Volume Reset

The volume reset feature tells the LS28 to either remember the volume settings for each individual input, or to reset them to zero after a power off cycle. When volume reset is set to 'OFF', the LS28 will also remember settings after a power cycle.

To change the status of the volume reset, press the 'MENU' button until the display reads 'VOLUME RESET'. Press 'ENTER', and use the volume knob on the front panel, or the up/down volume buttons on the remote, to select 'ON' or 'OFF'. Press 'ENTER' to choose the appropriate setting, and 'ENTER' once again to confirm. The display will read 'OKAY' and show the current setting for volume reset.

Input Naming

The LS28 is pre-loaded with a selection of names which can be assigned to the eight inputs of the preamplifier, allowing for easier identification of the various inputs. When selected, the chosen input name will display above the default name (BAL 1, SE 3, etc.) on the normal operation screen.

To select an input name for any of the inputs, press the 'MENU' button until 'INPUT NAMING' is displayed. Press the 'ENTER' button, and use the volume knob on the front panel, or the up/down volume buttons on the remote, to select the desired input for naming. Press 'ENTER' to engage the naming utility, and using the volume knob or up/down volume buttons, select the appropriate name for the input. Press 'ENTER' a final time to confirm the input name. The display will show 'OKAY'.

Maintenance

Vacuum Tubes

It is recommended that you replace the 6H30 vacuum tubes of your LS28 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 LS28 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. 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 or call 763-577-9700. You may also initiate a service request by visiting the Audio Research website (www.audioresearch.com) and selecting 'Service Repair'.

Caution

Your LS28 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 hours, or even days.

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.

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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. 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: +0-3dB, 0.4Hz to 200kHz at rated output (Balanced, 200k ohms load).

THD + noise: Less than .007% at 2V RMS BAL output.

Dynamic Range: >122 dB (AES17)

Gain: Main output: 18.5dB Balanced output, 12.5dB SE output. Record out: 0dB (Processor input: 0dB BAL output).

Input Impedance: 100K ohms Balanced, 50K ohms SE. Inputs: 4 balanced, 4 single-ended. Assignable processor passthrough.

Output Impedance: 600 ohms Balanced, 300 ohms SE Main (2). 20K ohms minimum load and 2000pF maximum capacitance. Outputs (3): 2 main, 1 record out (XLR and RCA connectors).

Output Polarity: Non-inverting.

Maximum Input: 16V RMS BAL, 8V RMS SE.

Rated Outputs: 2V RMS (1V RMS SE) into 200K ohm balanced load (maximum balanced output capability is 17V RMS at less than 0.5% THD at 1kHz).

Crosstalk: -105dB or better at 1kHz.

Controls: Rotary encoders: Volume (103 steps), Select Input. Push Buttons: Power, Menu, Enter, Mono, Invert, Mute.

Power Supplies: Electronically regulated low and high voltage supplies. Automatic 45 sec. warm-up/ brown-out mute. Line regulation better than .01%.

Noise: Less than -100 dBv at maximum volume (103).

Tube Complement: (4)-6H30P dual triodes.

Power Requirements: 100-125VAC 60Hz (200-250VAC 50/60Hz) 130 watts. Standby: 2 watts.

Dimensions:

Width	19" (48 cm)
Height	6.5" (13.7 cm)
Depth	13.7" (34.8 cm)

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

Weight: 15.9 lbs. (7.2 kg) Net; 24 lbs. (10.9 kg) Shipping.

FOUNDATION
SERIES

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3900 Annapolis Lane North
Plymouth, MN 55447
www.audioresearch.com

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