
Owner's Manual

MODEL LS25

STEREO PREAMPLIFIER

audio research
H I G H D E F I N I T I O N[®]

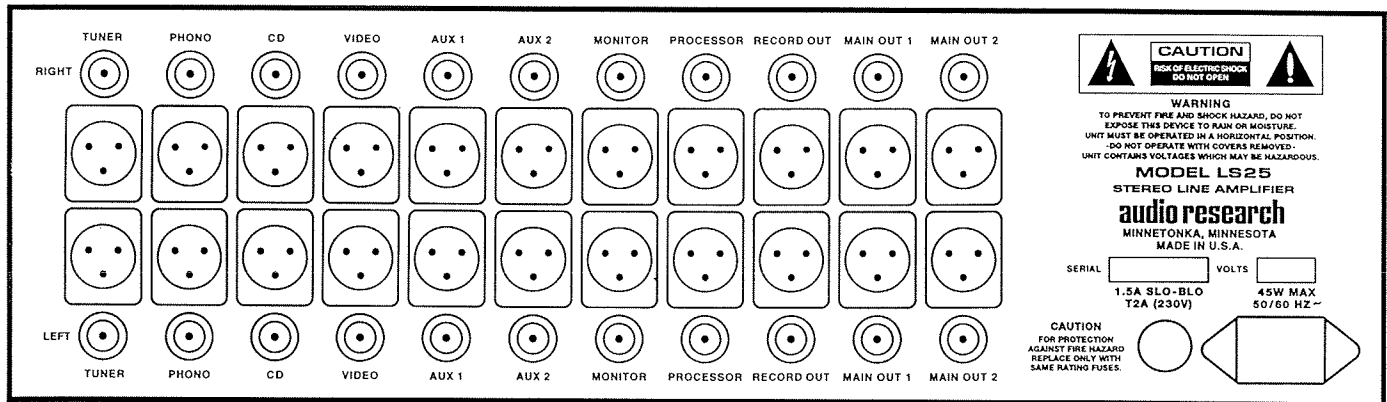
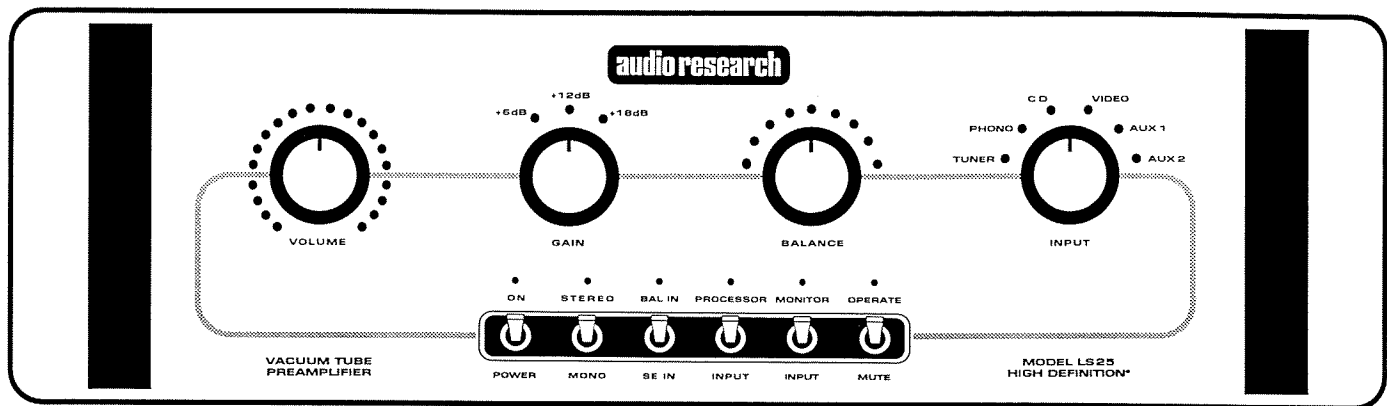
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Addendum to LS25 Owner's Manual pertaining to LS25MKII version.

The information in the LS25 Owner's Manual applies to the LS25MKII, but with the following changes for the MKII version:

The LS25MKII uses two 6H30 tubes instead of the four 6922 tubes in the original LS25.

NOTE: 6922 tubes cannot be substituted in place of the 6H30 tubes used in the LS25MKII because of different heater currents. Likewise, 6H30 tubes cannot be substituted in place of the 6922 tubes used in the original LS25.

The new +12VDC output jack (100mA max) located on the LS25MKII rear panel provides continuous control voltage for remote start relays in power amplifiers and other electronics, whenever the LS25MKII is turned ON.

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Preface

Please take time to carefully read and understand the following instructions before you install or attempt to operate your Audio Research LS25 preamplifier. Becoming familiar with the product and its correct operating procedures will help assure you of maximum musical enjoyment and reliable operation. The effort you invest now will be well rewarded in the years ahead.

Warnings

1. To prevent fire or shock hazard, do not expose this product to rain or moisture.
2. This unit operates on voltages which can cause serious injury or death. Do not operate with covers removed. Any necessary servicing should be carried out by your authorized Audio Research dealer or other qualified electronics technician.
3. The power cord on this unit is safety-tested and is equipped with a proper grounding plug. If used normally, it will provide a safe earth ground connection of the chassis. Defeat of the grounding plug or replacement of the plug or power cord, or any unauthorized modification of the active circuitry or controls of this unit, automatically voids warranty coverage, and could cause injury or death.
4. For safe operation and protection against fire hazard, replace fuses only with those of the same type and rating as those supplied with this unit.

Packaging

Save all packaging accompanying this product. You have purchased a precision electronic instrument, and it should be properly cartoned any time shipment becomes necessary. It is very possible that this unit could be damaged during shipment if repackaged in cartoning other than that designed for it. The original packaging materials help protect your investment from unnecessary damage, delay and added expense whenever shipment of this unit is required.

Note: This unit has been shipped with the vacuum tubes installed in a protective foam block under the top cover. Using 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 block with your carton.

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

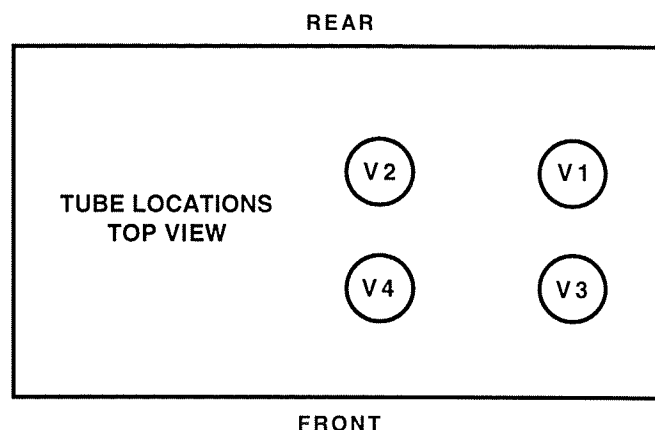


Diagram indicates relative positions of all (4) tubes located on one circuit board as viewed from the front and looking down from above the preamplifier.

Description of Controls

VOLUME CONTROL: The Volume control of the LS25 preamplifier is a departure from the traditional mechanical volume control potentiometer. Instead, there is a 2-way switch with a spring-loaded center return position that electronically adjusts volume level either a step at a time or continuously. By turning the switch clockwise and releasing it quickly, the volume level increases a step at a time. A counter-clockwise turn and release of the control decreases the volume level a step at a time. Holding the Volume control in either direction continuously adjusts the volume level in the respective direction. The selected volume setting is indicated by the illuminated LED position within the LED volume range arc, analogous to a "traditional" volume control level setting. The Volume control adjusts the signal output level of the LS25 over a range from -70dB (decibels) to the maximum dB setting selected with the Gain selector.

GAIN SELECTOR: The Gain selector limits the input level to the LS25, resulting in a maximum of +6dB, +12dB or +18dB gain to the balanced outputs (0dB, +6dB or +12dB gain to the single ended outputs). This allows limiting the output of "hot" high-gain signal sources to the preamplifier's input circuitry and prevents potential overloading. Properly used, this results in extremely wide signal input range capability while preserving optimum use of the Volume control. For each input source, simply set the Gain selector at the highest of the three gain settings that allows you to use the Volume control over the desired range without audible distortion on peak levels from your program source. Once you have selected the optimum gain setting for a given input, the LS25 will "memorize" it and return to

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that gain setting each time you select that input. Note that the Gain selector defaults to the +18dB setting for each input unless another is selected.

BALANCE CONTROL: Similar in operation to the Volume control, rotating the Balance control switch to the left (counter-clockwise) decreases the right channel volume level proportionally, shifting the sonic image to the left. Rotating the knob to the right (clockwise) shifts the sonic image to the right. LED illumination indicates the degree of off set in either channel direction, with illumination of the center LED indicating a normal, centered channel balance setting.

Note that the LS25 has over 100 individual steps across the Volume control adjustment range and 20 LEDs for the control. The corresponding LED position that is illuminated for a given Volume or Balance control setting serves as a general level indicator and will remain lit for several individual adjustment steps before an adjacent LED illuminates.

INPUT SELECTOR: Indicates selection of various source material options: "Tuner" for AM/FM radio tuners; "Phono" for phono preamplifiers; "CD" for compact disc players or digital-to-analog processors; "Video" for audio output from HiFi videotapes, laser discs, or broadcasts; "Aux" (1-2) for any additional high level source—tape, tuner, CD, video, etc.

Turning and releasing the spring-loaded Input selector or Gain selector switches in either direction steps through their respective options which are indicated by LED illumination.

POWER ON/OFF SWITCH: Supplies power from AC wall outlet to LS25 when switched to the "On" position (indicated by illuminated LED). In the event of loss of power to the LS25 while it is turned on, the Power On/Off switch will default to the "Off" position when power is restored. If the LS25 is unplugged the Power On/Off switch will default to the "Off" position when it is plugged in again. In each instance you must manually select the Power switch "On" position to begin operation of the unit.

STEREO/MONO SWITCH: Use the stereo setting for stereophonic and other multi-channel recordings. For maximum noise cancellation, use the mono setting for monophonic (single-channel) recordings. The mono setting is also useful to check for a centered image on a monophonic recording to verify proper left/right system channel balance.

BAL IN (BALANCED INPUT) / SE IN (SINGLE-ENDED INPUT) SELECTOR: Each of the 8 sets of inputs on the rear panel (chosen via the front panel Input selector switch and Processor and Monitor switches) will accept either a balanced or single-ended pair of connectors.

***Note:** Although you may connect as many as 8 input sources at once to the LS25, only one pair of input cables—either balanced or single-ended—should be connected to any one of the LS25 inputs at a time. Connecting both balanced and single-ended sources simultaneously to the same input may seriously degrade the sound.*

By connecting your source components per the following procedure, the LS25 will automatically configure each input connection internally as a balanced or single-ended source whenever it is selected for use. Anytime an input source component is being connected to the LS25, set the Input selector switch in the position which corresponds to the labeled rear input jacks you are connecting the source component to (in the case of the Processor and Monitor inputs, the respective processor and monitor toggle positions must be activated). Then set the Bal In/SE In switch in the position corresponding to the balanced or single-ended output of that source component. (The LED above the Bal In/SE In selector switch illuminates when the balanced input configuration setting is active, and is off when at the single-ended input setting).

Note that when making a new input source component connection to the LS25, the Bal In/SE In switch defaults to the "Bal In" balanced input setting during the above connecting procedure unless manually overridden by selecting the "SE In" single-ended input switch position.

PROCESSOR/INPUT SWITCH: In the "Processor" position (LED lit) this switch bypasses all rotary front panel control functions (all rotary function LEDs except the Gain selector +18dB LED are unlit) and is at unity gain, allowing an external video processor to control the system when used in a surround sound audio/video mode. In the "Input" position normal program source selection is controlled by the Input selector (Tuner, Phono, CD, Video, Aux 1 and Aux 2). Note that when returning to the "Input" position after use of the "Processor" switch position, the Volume control will be at minimum level setting.

MONITOR/INPUT SWITCH: In the "Monitor" position (LED lit) this switch routes the Monitor input signal to the Main outputs. The Input selector indicates what is routed to the Record out. In the "Input" position the program source is controlled by the Input selector (Tuner, Phono, CD, etc.).

Note that the gain of the LS25 through the Monitor input is not adjustable by the Gain selector, and is fixed at +18dB (the Gain selector LEDs are unlit in the "Monitor" position).

OPERATE/MUTE SWITCH: The "Mute" position (indicated by dim LED illumination), shorts the main outputs of the preamplifier to allow listening interruptions for telephone answering or other reasons. This switch should always be activated between listening uses and while changing any connections or switching inputs, in addition to turning the

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Volume control down. These two simple precautions will prevent inadvertent misuse of your LS25 and help protect your power amplifier(s) and speakers from unexpected transient signal pulses. In "Operate" position (bright LED illumination), this switch allows the signal to pass normally to the outputs.

CAUTION: Do not turn up the Volume control beyond normal listening positions when the LS25 is in the Mute mode. Always turn the Volume control down when changing program sources, even when it is muted.

OPERATE/MUTE CIRCUIT LED: Note that for approximately 40 seconds after start-up this LED will flash, indicating proper operation of the automatic muting circuit. After this automatic muting period, the LS25 will remain in the "Mute" position until the "Operate" position is selected.

DEFAULT SETTINGS: On initial power up, the LS25 will begin operation at the following settings:

- | | |
|------------------|---------------------------|
| • Minimum volume | • Stereo |
| • +18dB gain | • Bal In |
| • Center balance | • Input (Processor/Input) |
| • CD input | • Input (Monitor/Input) |
| | • Mute |

If the LS25 is powered up after being unplugged or losing power from the outlet, the above default settings will be maintained except for the Gain and Bal/SE switches, which will always return to their last settings prior to the power interruption.

On subsequent normal turn on, (with unit left plugged into a continuously live power outlet), the LS25 will resume operation at the last selected front panel settings, with the exception of the Volume control which will be at the minimum level, and the Operate/Mute switch which will be in the "Mute" position.

RESETTING CONTROLS: To avoid discharging static to the LS25 controls, contact another surface (such as a metal equipment rack) to drain away the charge before touching the LS25. If a static charge should "lock up" the micro-processor, making the front panel controls inoperable, put the LS25 in mute, power down the system and turn off and unplug the LS25 from its power receptacle. After waiting a few seconds plug in the LS25 and power it up with the rest of the system; the controls should resume normal operation. If the problem persists, contact your dealer or Audio Research Customer Service at 612-939-0600, CST.

USE OF REMOTE CONTROL UNIT: All front-panel functions except Gain and Bal In/SE In switching are duplicated on the remote control unit for the LS25.

The life of the batteries in the remote control is about 1 year. For replacement use only batteries of the type RO3, UM4 or AAA.

Connections

INPUT CONNECTORS: All are clearly marked to indicate use. The inputs are 120K ohms impedance balanced, and 60K ohms single-ended.

MAIN OUTPUT CONNECTORS: For maximum flexibility, there are 2 sets of single-ended and 2 sets of balanced output connectors. Any or all 4 sets may be connected simultaneously to your power amplifier(s) or electronic crossover as necessary.

NOTE: The XLR connector pin leads are as follows: 1-shield; 2-positive; 3-negative. If used with a power amplifier which utilizes different pin leads for positive, negative and/or shield, the signal being fed to the loudspeakers will be incorrect. Please consult your Audio Research dealer.

At the performance level of the LS25, high-quality audio signal interconnect cables are critical to preserving maximum fidelity. Audio Research RFI-shielded or unshielded interconnect cables are highly recommended for connection to your power amplifier(s) and to other ancillary equipment. See your authorized Audio Research dealer for recommended lengths.

RECORD OUTPUT CONNECTORS: The LS25's Record outputs (labeled "Record Out") should be connected to your tape deck's "REC" or "LINE" inputs. These outputs supply whatever is selected by the Input selector control to the tape deck for recording. Level is non-variable and approximately the same as the selected input source.

Installation Instructions

While the LS25 does not dissipate an unusual amount of heat, it is important that it be provided with reasonable airflow 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 suggested if extended operation (longer than one hour) is contemplated.
2. Do not stack the LS25 on top of a power amplifier; not only could this cause overheating, but hum may be introduced into the LS25 from the proximity of the amplifier's power transformer.
3. Do not place or operate your LS25 on a soft or irregular surface such as a rug. This will prevent proper ventilation.
4. Do not operate your LS25 without the top and bottom covers installed. These are required both for safety as well as shielding from interference (except in service operations).
5. If rack mounting is employed, use Audio Research Rack Mount Ventilators (RMV-3) below and above your LS25.

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6. In a cabinet or rack-mount installation which has an enclosed back, an exhaust fan is desirable so as not to operate the LS25 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 Procedure

Start-Up:

1. Secure all rear-panel connections between LS25, power amplifier(s) and input sources.
2. Plug 3-prong powerline cord from rear of LS25 into grounded AC wall receptacle. (Power On/Off switch defaults to "Off" position when unit is plugged into power receptacle.)
3. Turn Power switch to "On". The Operate/Mute LED will flash for approximately 40 seconds while the power supply stabilizes, indicating operation of automatic muting circuit. After this automatic muting period, the LS25 will remain in the "Mute" position until the "Operate" position is selected.

Note: For superior sonic performance, a warm-up period of at least one hour is recommended. In addition, your LS25 may be safely left "on" continuously for maximum performance at all times, but at the expense of higher maintenance costs (more frequent tube replacement).

4. Turn Input selector to source desired; set switch options to positions desired.
5. Activate input source, then deactivate Mute switch and adjust Volume control as necessary.

Shut-Down:

1. Set Mute switch to "Mute" position.
2. Turn Volume control counter-clockwise to minimum level setting.
3. Turn off power amplifier(s).
4. Turn off all input sources.
5. Set LS25 Power switch to "Off" position.

Tape Recording Procedure

When using the LS25 as a control center for recording, the program source to be recorded must be connected to one of the six inputs controlled by the Input selector switch or to the Processor input. This routes the selected program to the Record output.

Note: If the Processor input is activated by selecting the "Processor" switch position, all other inputs and their respective LEDs will be deactivated. When recording from the Processor input to the Record out of the LS25, the level of the recording will be dependent on the level setting of the processor.

If you own a three-head tape deck, and wish to monitor the actual tape while making a recording (for a true "A-B" comparison of signals before and after recording), connect the tape deck output to the Monitor input.

It is also possible to dub from one tape deck to another. Simply connect the output from one tape deck to an unused set of inputs controlled by the Input selector (Tuner, Phono, CD, etc.) on the LS25. This signal will then be routed to the second tape deck through the Record output when the appropriate input is selected on the Input selector.

Muting Provisions

The LS25 has several provisions to help protect against misuse of the exceptional dynamic range and wide bandwidth that it offers. It is not subject to damage itself, but some power amplifiers and speakers are more limited in their ability to withstand signal extremes. These provisions, both manual and automatic, are designed not to interfere with the listening experience, while giving reasonable protection against warm-up surges and power line interruptions. However, for absolute protection of associated equipment some operator understanding and responsibility are required.

Initial "settling" time of all circuit parameters within the LS25 requires approximately 5 to 10 minutes. The automatic muting circuitry timer is adjusted for about 40 seconds because recurrent interruption "settling" time is much less.

The Operate/Mute switch allows manual disabling of the LS25 outputs during the switching of equipment. Use of this switch will minimize stress on your amplifier even if it is "off". It is also highly recommended that manual muting be employed during turn-off for maximum protection.

While it is true that the automatic muting will provide reasonably adequate protection against speaker burnout during these periods, it has limitations. After the 40-second point, the automatic timer "releases" the output if the "Operate" position of the Operate/Mute switch is selected. Although this is normally adequate protection, utilization of the manual mute provision will completely avoid stress to your speakers.

Some solid-state power amplifiers have a DC offset present at their input connections. (This, of course, should not be.) Operation of the manual Mute switch with such an amplifier connected will result in a "click" or "pop" in your loudspeaker (commensurate in level with the amount of the offset) each time the switch is activated. Repair or replacement of such amplifiers is suggested.

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The automatic muting operates as follows:

1. The manual Mute switch always disables all "main" outputs and overrides any automatic provisions, when the LS25 is turned on. (The "Operate" position of the manual Mute switch is functional only when the unit is not in the automatic mute mode.)
2. After completing the 40-second automatic muting cycle on turn-on, the LS25 will remain in the "Mute" position until the "Operate" position is selected.
3. The 40-second warm-up timer will restart and the LED will resume flashing automatically if low-line voltage (80-100VAC) occurs for 0.1 second or longer, but the unit will shut off as if unplugged if power is lost.

Note: Power supply regulation of the LS25 is effective down to 100VAC without serious sonic degradation.

4. The automatic muting of the LS25 is designed to be effective only against power line interruptions and power line failures. It will not mute against subsonic signal transmissions from your input source. ***Proper fusing of speakers is essential to protect against excessive audio level or power amplifier faults.***

Servicing

Because of its careful design and exacting standards of manufacture, your LS25 should normally require only minimal routine service to maintain its high level of performance.

CAUTION: Your LS25 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 LS25 are quality 6922/E88CC twin triodes, and with normal use should not need to be changed for approximately 4,000 hours of use. Replacement tubes should be of equivalent quality and are available from Audio Research.

Should service be necessary, please contact your Audio Research dealer, or Audio Research Customer Service at (612) 939-0600 (CST).

Cleaning

To maintain the new appearance of this unit, occasionally wipe the front panel and top cover with a soft, damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution or dilute isopropyl alcohol 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 paint brush is effective in removing dust from bevels, the recessed nameplate and other features of the front panel.

Limited Warranty

Audio Research Corporation products are covered by a 3-Year Limited Warranty (all products except CD players, transports, and vacuum tubes), a 2-Year Limited Warranty (CD players and transports), 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.

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Specifications

FREQUENCY RESPONSE: $\pm 5\text{dB}$, 1.0Hz to 100kHz
-3dB points below 0.2Hz and 400kHz.

DISTORTION: Less than .01% at 2V RMS BAL output.

GAIN: Main output: Selectable for each input: 18dB, 12dB, 6dB Balanced output. (12dB, 6dB, 0dB SE output.)
Record output: 0dB.

INPUT IMPEDANCE: 120K ohms Balanced, 60K ohms SE.
Inputs (8): Tuner, Phono, CD, Video, Aux 1, Aux 2, Monitor, Processor (XLR and RCA connectors).

OUTPUT IMPEDANCE: 650 ohms Balanced, 325 ohms SE
Main (2), 20K ohms minimum load and 2000pF maximum capacitance. Outputs (3): 2 Main, 1 Record (XLR and RCA connectors).

MAXIMUM INPUT: 28V maximum, BAL, 14V maximum SE (6dB gain).

RATED OUTPUTS: 2V RMS 1Hz to 100kHz into 200K ohm balanced load (maximum balanced output capability is 40V RMS at less than 0.5% THD at 1kHz).

CONTROLS: Volume (104 steps), Gain, Balance, Input.
Toggle switches: Power/Off, Stereo/Mono, Bal In/SE In, Processor/Input, Monitor/Input, Operate/Mute.

POWER SUPPLIES: Electronically-regulated low and high voltage supplies. Automatic 40 sec. warm-up/brown-out mute. Line regulation better than .01%.

NOISE: 14uV RMS residual IHF weighted balanced noise output with gain control at minimum (103dB below 2V RMS output).

TUBE COMPLEMENT: 4-6922/E88cc dual triode. (Vacuum tube audio circuit, solid-state power supply.)

POWER REQUIREMENTS: 100-135VAC 60Hz (200-270VAC 50/60Hz) 45 watts maximum.

DIMENSIONS: 19" (48 cm) W x 5.25" (13.4 cm) H (standard rack panel) x 11.75" (29.8 cm) D. Handles extend 1.50" (3.8 cm) forward of the front panel.

WEIGHT: 18 lbs. (8.2 kg) Net; 28 lbs. (12.7 kg) Shipping.

Specifications subject to change without notice.

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