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# Owner's Manual

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## **Model VT130SE**

**STEREO POWER AMPLIFIER**

**audio research**  
HIGH DEFINITION®

5740 GREEN CIRCLE DRIVE / MINNETONKA, MINNESOTA 55343-4424 / PHONE 612/939-0600 FAX 612/939-0604

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## Introduction

Please take time to carefully read and understand the following information and instructions before you install or attempt to operate your Audio Research VT130SE power amplifier. Becoming familiar with important facts about your amplifier and its correct operating procedures will help assure you of maximum musical satisfaction and reliable operation. The effort you invest now will be well rewarded as time goes by.

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The VT130SE vacuum-tube stereo audio power amplifier provides an expression of the state-of-the-art in vacuum-tube technology as it exists today at Audio Research Corporation. The design objectives for this product were two-fold: 1) to provide an amplifier that would allow the improvements in musical accuracy of such products as the LS2, LS5, PH2, etc., to be fully realized, and 2) to provide an all-vacuum tube amplifier that would approach the reliability of good solid state amplifiers.

The VT130SE is housed in a massive heli-arc welded chassis and fully ventilated top cover. Using 4 matched pair of 6550 output tubes, two 12 BH7 driver tubes and four 6922 dual triodes for input-stage gain, the VT130SE is rated at 110 watts per channel R.M.S. The amp is fully balanced input-to-output, and uses a combination of ultralinear operation with Audio Research patented partial cathode coupling in the output stage. This output configuration exhibits minimal sensitivity to variance in loud-speaker impedance. The power supply bulk energy storage is rated at 280 joules and power supply regulation is all solid-state, while all gain is supplied by vacuum tubes. Parts quality is the best currently available, and the overall circuit layout is maximized for sonic purity.

It should be expected that this amplifier will produce musically satisfying results for as long as you care to own it.

## Construction and Testing

Like every Audio Research product, your VT130SE power amplifier has been designed and carefully handcrafted in the U.S.A., using precision mechanical parts, electronic components and assembly procedures similar to those used in the manufacture of scientific equipment and musical instruments. To assure consistent performance standards, each VT130SE is visually inspected at several assembly points, test run, electronically tested and sonically evaluated prior to shipment.

This time-consuming perfectionist approach to the design and manufacture of audio equipment is intended to provide you with the best in musical satisfaction and lasting value.

## Packaging

Save all the packaging in a dry place. Your Audio Research amplifier is a precision electronic instrument and should be properly cartoned any time shipment is made. Because of its weight, it is highly probable that the unit will be damaged during shipment if repackaged in cartoning other than that designed for the unit.

You may not have occasion to return the unit to the factory for service, but if that should prove necessary or other occasion to ship it occurs, the original packaging may save your investment from unnecessary damage, delay and expense.

## Unpacking

The VT130SE is packed within two cartons (inner and outer) which have impact-absorbing panels in between. Because of the weight of the unit and because it is a precision electronic instrument it is necessary to take reasonable care of its unpacking and preparation for use.

It is best to have a large, open work area with two people available to help. Set the carton upright in the



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center of the work area and with a small knife carefully slit the taped edges of the outer carton's top flaps. Fold the flaps to the sides and while holding the inner carton in place, roll the unit upside down. You can now lift the outer carton off and set it and the filler panels aside. Now slit the inner carton's taped seams on the bottom (now facing upward). Again, fold the flaps over and while holding the unit in, roll it over as before. You can now lift the inner carton off to find your VT130SE sitting upright, undamaged and uncartoned. Carefully remove the plastic wrap. Now, while you remember how, reassemble the carton system for future use.

## Accessories

1 – Phillips-head screwdriver for cover removal

User replaceable spare fuses include:

1 – 1/4 Amp AGC 250V normal-blow (Internal)

1 – 6 1/4 Amp MDX 125V slo-blow with 120V units

1 – 7 Amp MDX 125V slo-blow with 100V units

1 – 3 Amp MDQ 250V slo-blow with 220V/240V units

## Warnings

1. To prevent fire or shock hazard, do not expose your VT130SE to rain or moisture.
2. 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.
3. The 16-gauge, 3-conductor power cord on your VT130SE is equipped with a standard 3-prong grounding plug. If used normally, it will provide a safe earth ground connection of the chassis. Refer to the section on "AC Power Connections" for detailed information.

4. For continued protection against fire hazard, replace fuses only with the same type and rating of fuses as specified.

## Preparation for Use

Your VT130SE amplifier is shipped with the vacuum tubes packed in individual protective cartons. These must be unpacked and installed before you attempt to operate the amplifier. Proceed according to the following instructions.

1. Using the Phillips-head screwdriver provided, remove the top cover assembly, setting it and the retaining screws aside.
2. Carefully remove each vacuum tube from its carton and match its location number (written on the base of the tube and on its protective carton) to the 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 holds. Retain the tube cartons with other packing materials for possible future use.
3. Once all vacuum tubes have been installed, reposition the top cover assembly over the chassis and, re-install the screws.

**Note:** Contact Enhancers are not recommended for use on vacuum tube contact pins. With continual exposure to heat and air, these substances can form gummy, dust-collecting residues which actually reduce contact and degrade sonic performance. Proper external use of these preparations — on interconnect plugs, speaker connections, etc. — is subject to the discretion of the owner.

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## Use of Controls

**POWER-ON SWITCH:** Initiates/terminates AC line power to the amplifier. Function indicated by green LED above toggle switch.

**Note:** Audio Research does *not* recommend leaving your VT130SE "on" 24 hours a day as is the custom of some audiophiles to achieve maximum sonic performance on demand. While this is often recommended for solid-state equipment, Audio Research does not recommend this procedure for vacuum tube power amplifiers. (2,000 hours of tube life will pass by in 84 days!)

## Installation

To insure normal component life and safe operation this unit **must be operated only in a horizontal (upright) position**. Adequate air flow and proper cooling thereby can occur only if there is no restriction **below, behind and above** the unit.

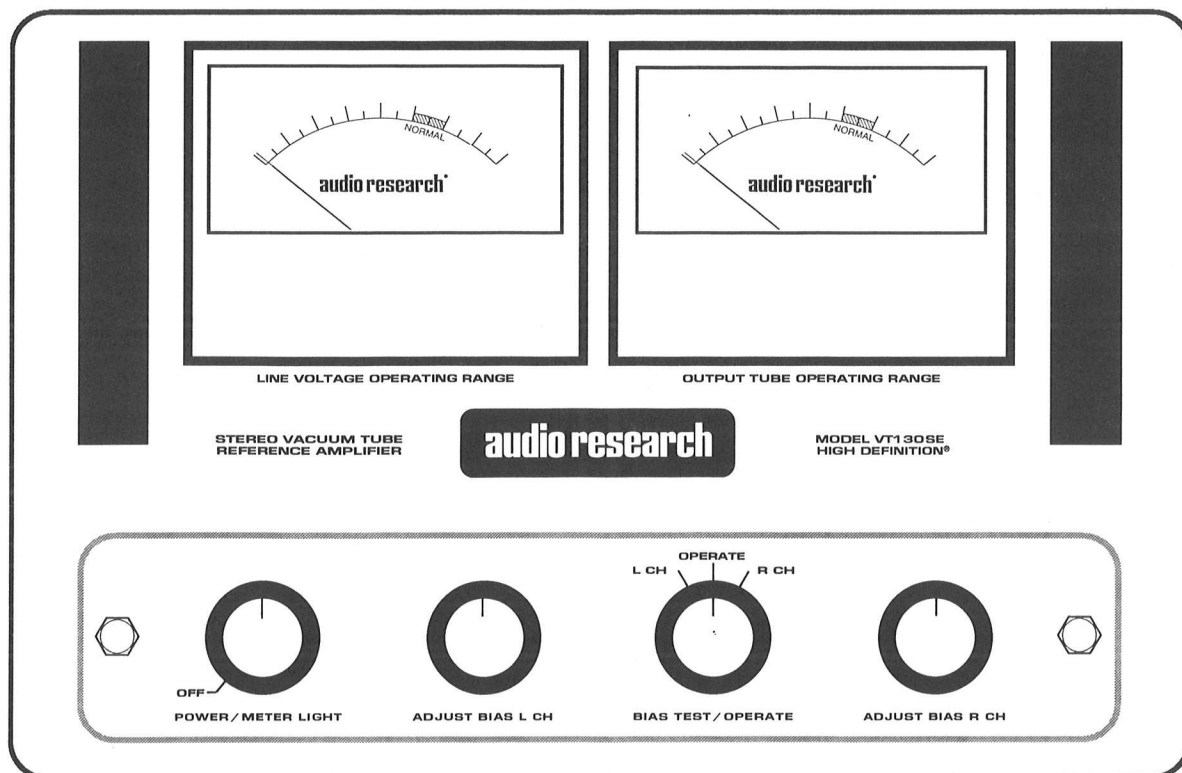
The eight (8) special non-marring elastomer feet provide adequate spacing only from a smooth, hard surface.

If the unit is to be operated in an enclosure such as an equipment rack, make certain that adequate air flow above and below the unit is provided. 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 power amplifier 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.

## Front Panel Connections and Controls

- 1 – Power/Meter Light Control
- 1 – Left Channel Bias Control
- 1 – Bias Test/Operate Control
- 1 – Right Channel Bias Control
- 1 – Line Voltage Meter
- 1 – Output Tube Bias Meter





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## Rear Panel Connections and Controls

- 2 – XLR inputs (right and left)
- 1 – Power Cord
- 1 – Fuse Post
- 1 – LED On Indicator
- 8 – Output binding posts for various output impedances

## Connection and Control Instructions

The amplifier should always be turned on and off via its own power on-off switch. Because of the very high energy storage within this amplifier, special warm-up circuitry is provided which gets its sequencing from its own Power On-Off Switch. Further, other discrete components of an audio system should be turned on first. Otherwise, with some equipment, the amplifier will reproduce warm-up thumps, etc., some of which could be harmful to your speaker system. Audio Research preamplifiers have automatic warm-up muting, and are much less likely to exhibit this problem; however, good operating practice says ***“Turn the amplifier on last, and turn it off first.”***

The VT130SE input is “balanced” and therefore requires a preamplifier with a balanced output, or, the addition of an Audio Research BL1 between a single-ended output preamplifier and the input of the VT130SE.

Proprietary and non-twisting output connectors are employed for each impedance. Simply observe the legend, connecting your speakers to the appropriate set of binding posts for their rated impedance.

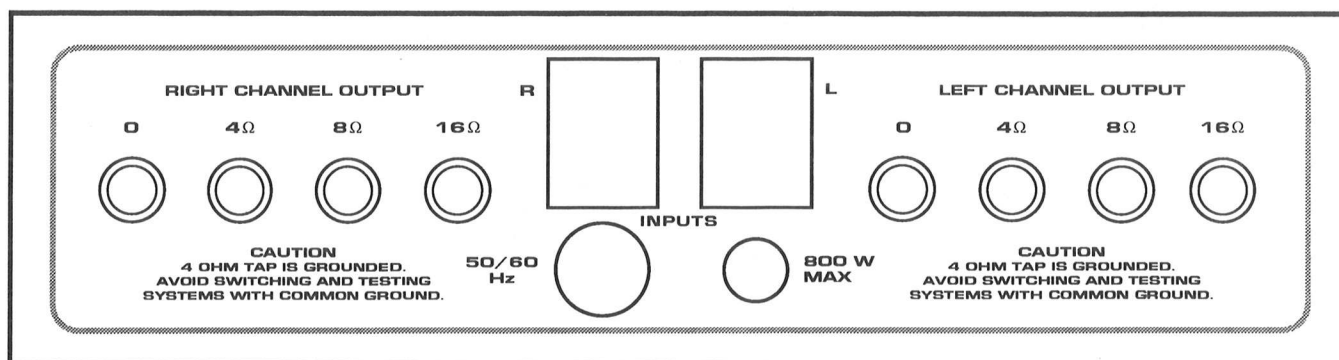
**IMPORTANT:** Use the best available speaker wires and interconnects. Audio Research cannot emphasize this enough. As better components and systems

are developed, it becomes increasingly important to avoid the limitations of inferior system interconnections. For best results we recommend Audio Research LitzLink® interconnects and LitzLine® speaker cables.

Audio Research uses circuitry called “partial cathode coupling” in all of its vacuum tube and hybrid power amplifier designs. This requires the 4 ohm taps to be grounded, which is of no consequence when using most loudspeakers. Simply connect the “negative” speaker lead to “0” and the “positive” speaker lead to 4, 8 or 16 ohms, as required.

Some loudspeakers, or some speaker switch boxes, have “common ground” systems, either by hookup between the speakers or in a special crossover device. Most headphone adaptor boxes also have a common ground. In these instances it is important to connect the “negative” speaker leads (or headphone common leads) to the “4” ohm taps rather than the “0” ohm taps to avoid shorting the amplifier or causing monaural performance to occur. Use either “0” ohms or “16” ohms for the “positive” speaker leads. (The “0” ohm tap will provide an inverted signal.) Contact your authorized Audio Research dealer or Audio Research Customer Service Department for help with these special cases.

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). Connect the black or “–” speaker terminal to the wire that connects to the “0” terminal on the VT130SE. Connect the red or “+” speaker terminal to the wire that connects to the “4”, “8” or “16” terminal on the VT130SE. Use the best available speaker cables and tighten the terminals securely to ensure best sonic results.



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**MATCHING:** It is important to use as close as possible an impedance match between the amplifier and speaker for optimum transfer of power to the speaker with minimum distortion. In the case of speaker systems with significant variations in impedance throughout the frequency spectrum, such as most electrostatic types, determine the best impedance match empirically for best overall sonic results.

Connect the VT130SE input to the preamplifier or electronic crossover, using only the highest grade of audio interconnect cables. To avoid sonic degradation use the shortest practical length of cables.

**AC POWER CONNECTIONS:** It is essential that the VT130SE amplifier be connected to a wall AC power receptacle, or a similar heavy-duty source. If it is connected to convenience receptacles on preamplifiers, etc., the full sonic capabilities of both the VT130SE and the preamplifier may be compromised. Furthermore, the proper control of start-up and shut-down surges may not occur unless the power switch on the front of the VT130SE is actually used for on/off control of the amplifier. The AC power source for the VT130SE amplifier should be capable of supplying 15 amperes for 100 or 120 volt units, or 8 amperes for 220 or 240 volt units.

For the very best performance on domestic 100 or 120 volt circuits, the VT130SE should be connected to its own AC power circuit branch, protected by a 15 amp breaker. The preamplifier and other audio equipment should be connected to a different power

circuit and breaker. If the power receptacle of the VT130SE is more than 25 feet from the building power entrance and breaker box, it would be preferable to use installed wiring capable of 30 amperes to minimize voltage drop, using a 15 amp breaker. Avoid the use of extension cords. If they must be used on a temporary basis, use 14-gauge or heavier cords.

The VT130SE utilizes a compatible grounding system that generally does not require a "ground lifter" adapter plug on the AC power cord to minimize hum. The power cord on your VT130SE has a standard three-prong grounding plug to provide maximum safety when it is connected to a ground wall receptacle. If there is any question regarding the safety of grounding procedures, be certain to seek competent help with the installation.

If electronic crossovers or other AC powered equipment is used with the VT130SE it may be necessary to use "ground lifter" adapters on the power plugs of that equipment to minimize system hum. Generally, the lowest hum is achieved when the only direct connection between audio common "ground" and true earth ground occurs in the preamplifier, through its grounded power cord. Other equipment in the system should have some form of isolation to prevent ground loops and associated hum.

Always place the power on-off switch on the panel of the VT130SE in the "Off" position before connecting the power line cord to AC power.



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## Operating Procedure

1. Make sure you have read and complied with the INSTALLATION AND CONNECTION instructions prior to attempting operation.
2. Make sure your VT130SE is properly connected to a high-current power receptacle via the attached power cord (see CONNECTIONS).
3. Your preamplifier should be "On" and muted and/or set at minimum gain.
4. Your VT130SE will now operate satisfactorily. However, a full stabilization or warm-up period of at least one-half (1/2) hour is recommended for best sonic performance.

## Servicing

Because of its careful design and exacting standards of manufacture, your VT130SE amplifier should normally require only minimal service to maintain its high level of performance.

**CAUTION:** The VT130SE amplifier 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. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

The vacuum tubes inside the VT130SE are high-quality 6550, 12BH7, and 6922 types. Replacement output tubes should be matched for *best* sonic performance, although that is not a requirement for good sound. Reliable, matched, low gas 6550 tubes—such as those available from Audio Research—are strongly recommended for maximum performance and longevity. Observe the operating and adjustment procedure for adjusting bias when replacing any power output tubes.

## Adjustment Procedure.

After vacuum tube replacement, it is desirable to readjust the amplifier for optimum performance and tube life.

The output tube idle current (bias voltage) requires adjustment anytime one or more output tubes are replaced. A bias adjustment is also required if the 12BH7 driver tube is replaced.

The output stages of the VT130SE are partially cathode-coupled "push-pull Class AB<sub>1</sub>", utilizing our tightly-coupled output transformers which provide low distortion

and sonic accuracy. As shipped from the factory, the output "bias" adjustments are set for a nominal 65mA per tube with a stable power line voltage of 120VAC. (Export models are adjusted for each country's requirements.) Under these idle conditions the tubes are each dissipating approximately 28 watts of their 48 watt rating (42 watt plate, 6 watt screen). This point of operation provides "enriched" Class AB<sub>1</sub>, and will satisfy most critical listeners.

Although the main "B+" voltage to the output tubes will vary with line voltage, the "bias" voltage is electronically set. Because of this the change in operating point of the output stage does not vary significantly with reasonable changes in line voltage. It is therefore not normally necessary to readjust "bias" except when changing power output tubes or driver tubes. The output tubes, for example, are operated with electronically regulated "bias". With this voltage regulation the variation in output tube idle current for varying line voltage becomes normally unimportant.

For best results operate and adjust the VT130SE at 120VAC line voltage, or at the line voltage that is typical in the final installation. Adjustment must be made under zero-signal conditions after at least 20 minutes of uninterrupted stabilization time. First, switch the bias test control to "L CH". Turn the left channel bias control until the output tube range meter reads "Normal". Repeat the procedure for "R CH". Return the bias test control to "Operate". The VT130SE is now ready for use.

Additional questions regarding the operation, maintenance or servicing of your amplifier may be referred to the Customer Service Department of Audio Research Corporation: 612-939-0600. When ordering a service manual from Audio Research or an authorized dealer, be sure to identify the serial number on your amplifier.

## Cleaning

To maintain the visual appearance of your amplifier, 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 is effective in removing dust from hard-to-reach areas of the front and rear panels.



# Limited Warranty

## Terms and Conditions

### 1. LIMITED WARRANTY

Audio Research warrants the product designated herein to be free of manufacturing defects in material and workmanship, subject to the conditions hereinafter set forth, for a period of three (3) years from the date of purchase by the original purchaser or no later than five (5) years from the date of shipment to the authorized Audio Research dealer, whichever comes first, excepting vacuum tubes which are warranted for 90 days only (See 6), and CD players or transports, which are warranted for two (2) years from date of purchase (four (4) years from date of shipment).

### 2. CONDITIONS

This Warranty is subject to the following conditions and limitations. The Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused, or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than Audio Research or an authorized Audio Research repair center. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice. A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTOCOPY OF THE ORIGINAL PURCHASE RECEIPT. This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorized dealer and the price paid by the purchaser. Audio Research reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.

### 3. REMEDY

In the event the above product fails to meet the above Warranty and the above conditions have been met, the purchaser's sole remedy under this Limited Warranty shall be to return the product to Audio Research or an authorized Audio Research repair center where the defect will be rectified without charge for parts or labor, except vacuum tubes (See 6).

### 4. LIMITED TO ORIGINAL PURCHASER

This Warranty is for the sole benefit of the original purchaser of the covered product and shall not be transferred to a subsequent purchaser of the product.

### 5. DURATION OF WARRANTY

This Warranty expires on the third anniversary (second for CD players and transports) of the date of purchase or no later than the fifth anniversary (fourth for CD players and transports) of the date of shipment to the authorized Audio Research dealer, whichever comes first.

## Warranty Outside the U.S.A.

Audio Research has authorized distribution in many countries of the world. In each country, the authorized importing retailer or distributor has accepted the responsibility for warranty of products sold by that retailer or distributor. Warranty service should normally be obtained from the importing retailer or distributor from whom you purchased your product.

### 6. VACUUM TUBES

Vacuum tubes are warranted for the original 90-day period only.

### 7. DEMONSTRATION EQUIPMENT

Equipment used by an authorized dealer for demonstration purposes is warranted to be free of manufacturing defects in materials and workmanship for a period of three (3) years from the date of shipment to the dealer, or two (2) years in the case of CD players and transports. Vacuum tubes are warranted for 90 days. After the first year, demo equipment needing warranty service must be packed and returned to Audio Research by the dealer at his sole expense. Audio Research will pay return freight of its choice. A returned product must be accompanied by a written description of the defect on an AUDIO RESEARCH RETURNED GOODS AUTHORIZATION form. Dealer-owned demonstration equipment sold at retail within three (3) years of date of shipment to the dealer is warranted to the first retail customer to be free of manufacturing defects in materials and workmanship for the duration of the 3-Year Limited Warranty remaining (as measured from the date of shipment of the equipment to the dealer); this period of warranty is two (2) years in the case of CD players and transports. Vacuum tubes are not warranted for any period under these conditions of sale. In the event warranty service is needed under these conditions, the owner of the equipment must provide a copy of his purchase receipt, fulfilling the requirements described under "2. Conditions" above. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice.

### 8. MISCELLANEOUS

ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO THE PURCHASER. Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

### 9. WARRANTOR

Inquiries regarding the above Limited Warranty may be sent to the following address:

#### Audio Research

5740 Green Circle Drive, Minnetonka, Minnesota 55343-4424

ATTN: Customer Services.

In the unlikely event of service required beyond the capability of the importer, Audio Research will fulfill the conditions of the warranty. Such product must be returned at the owner's expense to the Audio Research factory, together with a photocopy of the bill of sale for that product, a detailed description of the problem, and any information necessary for return shipment.

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# Specifications

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## Model VT130SE

**POWER OUTPUT:** 110 watts per channel continuous at 16 ohms from 20Hz to 20kHz with less than 1.0% total harmonic distortion (typically below .05% at 1 watt).

Approximate actual power available at "clipping" 120 watts (1kHz). (Note that actual power output is dependent upon both line voltage and "condition" i.e.: if power line has high distortion, maximum power will be affected adversely, although from a listening standpoint this is not very critical.)

**POWER BANDWIDTH:** (-3dB Points) 15Hz to 80kHz.

**FREQUENCY RESPONSE:** (-3dB Points at 1 watt) 5Hz to 160 kHz.

**INPUT SENSITIVITY:** 1.2V RMS balanced for rated output.

**INPUT IMPEDANCE:** 200K ohms balanced.

**OUTPUT REGULATION:** Approximately 0.5dB 16 ohm load to open circuit (Damping factor approximately 16).

**OVERALL NEGATIVE FEEDBACK:** 20dB.

**SLEW RATE:** 17 volts/microsecond.

**RISE TIME:** 2.0 microseconds.

**HUM & NOISE:** Less than 0.5mV RMS – 98dB below rated output (IHF weighted, input shorted).

**POWER SUPPLY ENERGY STORAGE:** Approximately, 280 joules.

**POWER REQUIREMENTS:** 105-125VAC 60Hz (210-250VAC 50Hz) 620 watts at rated output, 900 watts maximum, 380 watts at "idle".

**TUBES REQUIRED:** 4 – Matched pair 6550 – Power Output; 2 –12BH7A Driver; 4 – 6922 input.

**DIMENSIONS:** 15.5" (39.4 cm) W x 10.9" (27.7cm) H (10.5" (26.7 cm) panel + .4" (1 cm) feet) x 22.75" (57.8 cm) D behind panel, including rear handles. Front handles extend 1.5"(3.8 cm) forward of .38" (1 cm) thick panel.

**WEIGHT:** 77 lbs. (35 kg) Net; 97 lbs. (44 kg) Shipping.

Specifications subject to change without notice.

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