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# Owner's Manual

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## **Model HD220**

**STEREO POWER AMPLIFIER**

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

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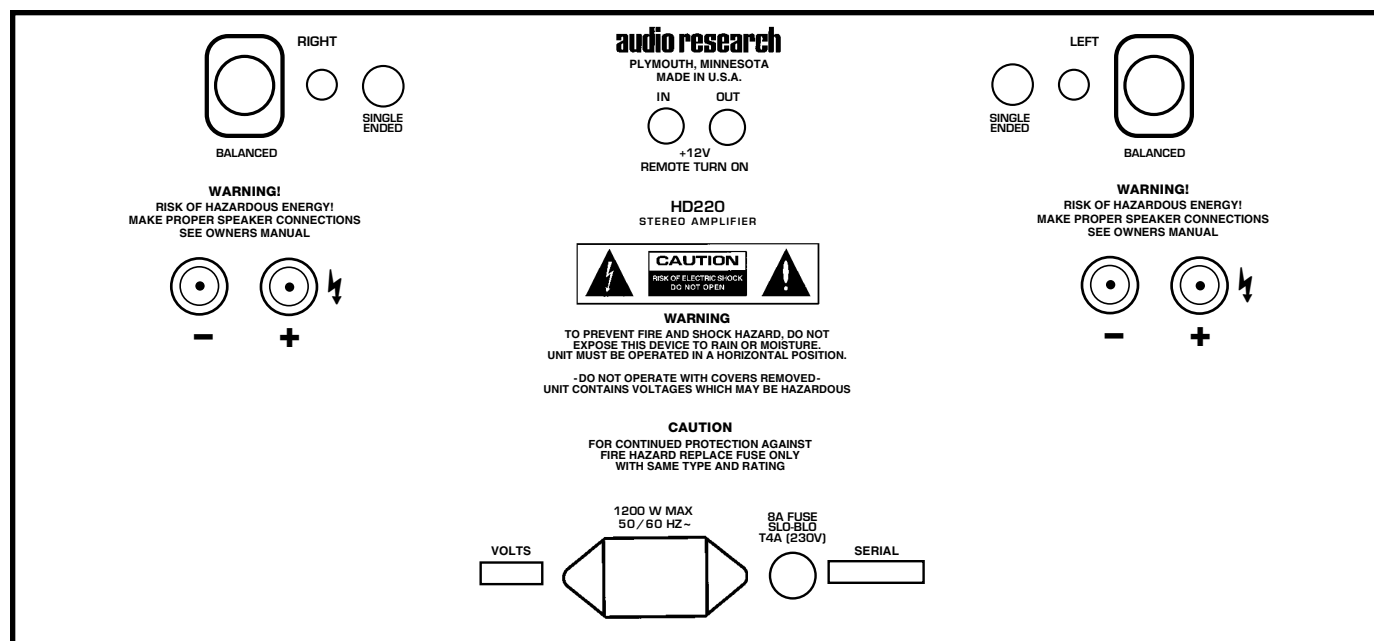
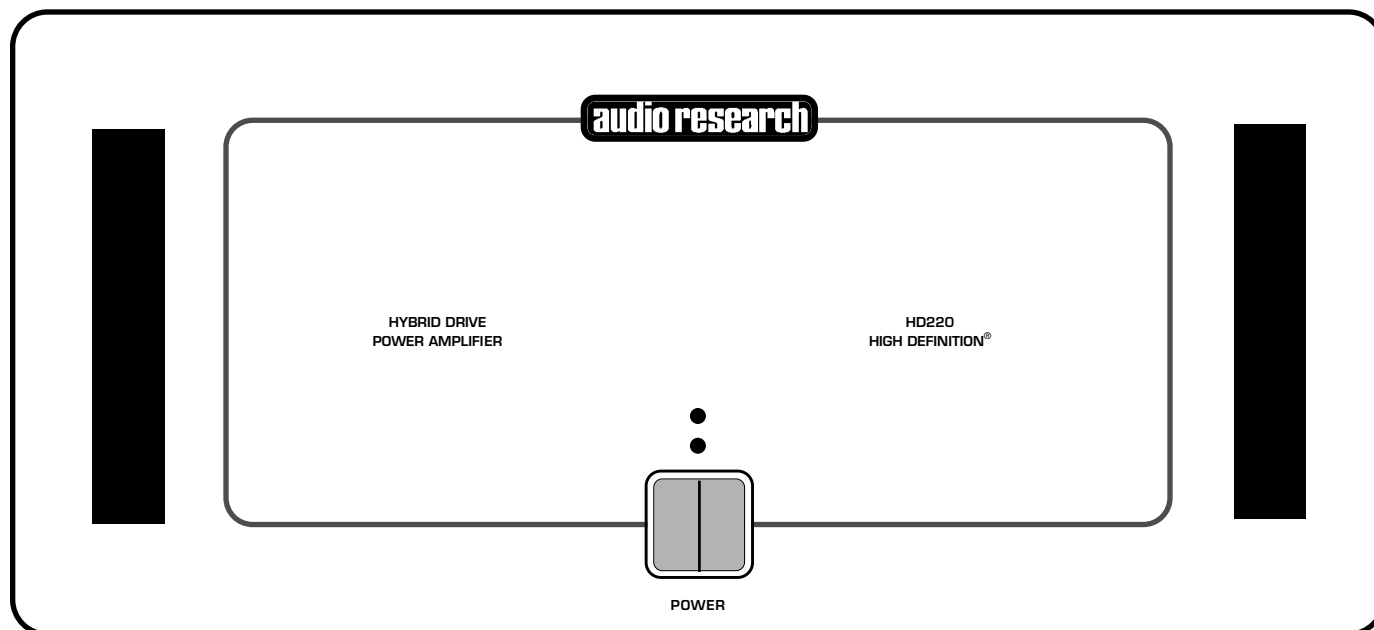
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## Preface

Please take time to carefully read and understand the following instructions before you install or attempt to operate this equipment. 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

## 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.

## Accessories

- 1 – Phillips head screwdriver for cover removal
  - 1 – Plastic screwdriver for bias adjustments
- User replaceable spare fuses include:
- 1 – 8 Amp MDL slo-blo with 120V units or 100V units
  - 1 – T4A 250V slo-blo with 220V/240V units

## Warnings

1. Do not touch hot tubes. Keep away from children.
2. To prevent fire or shock hazard, do not expose your HD220 to rain or moisture.
3. 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.
4. The 12-gauge, 3-conductor detachable power cord on your HD220 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.
5. For continued protection against fire hazard, replace fuses only with the same type and rating of fuses as specified.

## Warning!

**Read Owner's Manual before installing or operating this product!**

**Do not attempt to install or remove any vacuum tubes unless this unit is turned off and disconnected from the A.C. power outlet. Unit should be connected to the A.C. outlet and turned on only after all vacuum tubes have been installed and appropriate panels have been replaced and fastened. See owner's manual for installation instructions.**

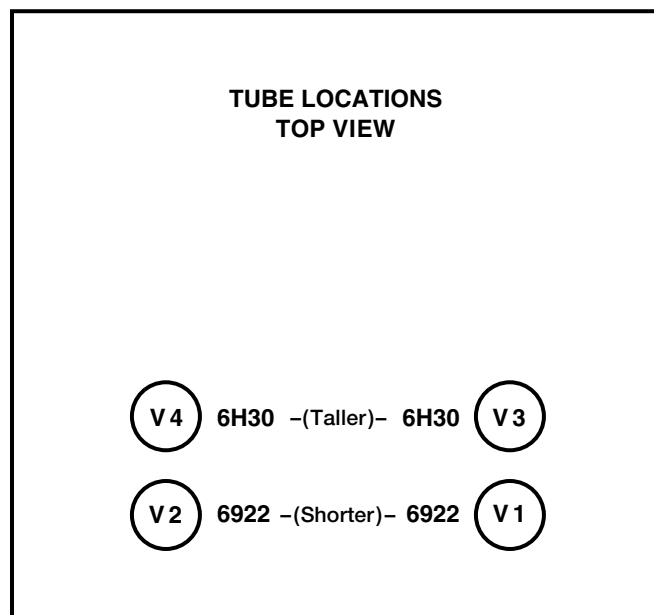
**Before replacing vacuum tubes, turn off unit, disconnect from A.C. outlet and allow installed tubes to cool before attempting to remove them. Hot tubes may cause burns or other injury if not allowed to cool before removal.**

**When removing or installing tubes, do not touch tube socket contacts or other components as the circuit may retain sufficient levels of voltage and current to cause injury or death.**

**Contact your dealer or Audio Research Customer Service (763-577-9700) if you have any questions about installing or replacing vacuum tubes in this unit.**

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

REAR



FRONT

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## Vacuum Tubes and Preparation for Use

Your HD220 amplifier is shipped with the vacuum tubes packed in a foam block. These must be unpacked and installed before you attempt to operate the amplifier. Included are two 6922 dual triodes, and two 6H30 dual triodes used in the input/driver stage. Proceed according to the following instructions.

Carefully remove each vacuum tube from the 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 foam blocks with other packing materials for possible future use. Refasten top cover on amplifier.

Life expectancy of the vacuum tubes in the HD220 is up to 4000 hours.

## Panel Controls

The front panel has:

- |                |                                   |
|----------------|-----------------------------------|
| 1 – Switch:    | 1 – Power line On-Off             |
| 1 – Indicator: | 1 – Power "on" LED (Green)        |
| 1 – Indicator: | 1 – Warmup "standby" LED (Yellow) |

## Use of Controls

**POWER-ON SWITCH:** Initiates/terminates AC line power to the amplifier. For first 40 seconds at turn on, yellow "standby" LED illuminates until unit is warmed up, then green "on" LED illuminates.

Note: Audio Research does **not** recommend leaving your HD220 "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 hybrid or vacuum tube power amplifiers. (2,000 hours of tube life will elapse in 84 days!)

## Installation

To insure normal component life and safe operation this unit **must be operated only in an upright position**. Adequate air flow and proper cooling can occur only if there is no restriction above and behind the unit and on either side. Be sure that airflow to the 12V D. C. cooling fans located on the rear panel is not blocked.

The special non-marring elastomer feet provide adequate spacing and stability only on a smooth, hard surface. **For upright stability, never operate the unit while it is sitting on a soft surface such as a thick rug or carpet.**

Due to its weight, this amplifier 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 air flow above and to each side of 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 the HD220 power amplifier to run moderately warm to the touch. All components within are operated at safe, conservative levels and will not be improperly affected, providing the requirements outlined above are adhered to. (Also see "Cooling Fans" section, page 4.)

## Connections

The rear panel has:

- 2 – RCA input connectors, for single-ended connections, L & R
- 2 – XLR input connectors, for balanced connection, L & R
- 4 – Output binding posts, (+) and (-), L & R
- 1 – Power line fuseholder
- 1 – Power line cord IEC connector for removable power cord (supplied)
- 2 – 12V remote start in and out jacks
- 2 – Switches for XLR or RCA input operation, L & R

**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 absolute polarity or phase (i.e. is **not** inverted). Connect the black or (-) speaker terminal to the wire that connects to the appropriate-channel (-) gold binding post on the amplifier. Connect the red or (+) speaker terminal to the wire that connects to the appropriate-channel (+) binding post on the HD220. Tighten the binding posts firmly to assure good contact for best sonic results.

For "bi-wired" loudspeaker systems (i.e. running separate wires to bass and treble speaker terminals), simply repeat the above instructions, taking care that all connections have the same (+) or (-) polarity.

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Connect the HD220 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.

**A.C. POWER CONNECTIONS:** It is important that the HD220 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 HD220 for On/Off control of the amplifier, or the 12V start-up trigger for remote installations.

The AC power source for the HD220 amplifier should be capable of supplying 10 amperes for 100 or 120 volt units, or 5 amperes for 220 or 240 volt units.

For the very best performance on domestic 100 or 120 volt circuits, the HD220 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.

The HD220 should be turned on **after** the other components of your system. If the HD220 is turned on before other components, the amplifier will amplify any extraneous turn-on noises those 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.**

The HD220 uses a grounding system that does not require a ground-lifter adaptor plug on the A. C. power cord to minimize hum. The power cord supplied with the HD220 has a standard grounding plug to provide maximum safety when properly connected to a grounded wall receptacle. If there is any question regarding proper grounding procedures in your installation, seek help from a qualified technician. Caution should be taken before using custom after-market power cords: they must be at least 12-gauge and have a standard grounding plug properly installed. These power cords are to be used with caution, at the sole risk of the owner.

If electronic crossovers or other AC powered equipment is used with the HD220 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.

## Balanced Operation

Balanced inputs can be used with a preamplifier (or electronic crossover, etc.) having balanced outputs. When using the balanced inputs, set two rear-panel toggles to BAL position. Disconnect any single-ended cables.

## Single-Ended Operation

Single-ended inputs should be used with a preamplifier (or electronic crossover, etc.) having single-ended outputs which does **not** invert overall phase or polarity. When using single-ended inputs, set two rear-panel toggles to SE position. Disconnect any balanced cables.

***Always place the power on-off switch on the panel of the HD220 in the "Off" position before connecting the power line cord to AC power.***

## Remote Turn-on Connections

The HD220 has a built-in 12VDC remote turn-on/off circuit for operation by a master control system in a home theater or large audio system. Use a 3.5mm (.140") diameter mono mini plug to connect to the +12V IN jack on the rear of the HD220. Two identical paralleled jacks are provided to allow chaining connections to control two or more HD220s or other equipment.

The +12V IN jack should be connected to the +12VDC output of the master control system, using a continuous +12VDC signal at 12mA per HD220 for the duration of amplifier on-time. Do not use a momentary or data pulse control signal.

The front power rocker switch on the HD220 must be off to use the remote turn-on. The front power rocker switch may still be used when the remote turn-on is connected, but the remote will not turn the HD220 off if the front power rocker switch is left on. The front power rocker switch will not turn the HD220 off if the remote system is on.

The +12VDC remote jacks have polarity protection, so they will not operate if a -12VDC signal is accidentally connected, or if the control wires are reversed. The 12V remote relay in the HD220 has click suppression to protect circuits in the master control system.

## Operating Procedure

### Start-Up:

1. Secure input connection between the amplifier and your preamplifier; attach speaker leads to the appropriate output terminals.
2. Attach supplied power cord to rear IEC inlet of amplifier, and plug other end into grounded A. C. power receptacle.

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3. Turn on preamp and all other components; mute preamp output.
4. Turn HD220 front-panel control from off to on. Yellow "standby" warmup LED will light for 40 seconds, then green "on" LED will light and amp is ready to play.
5. Unmute preamplifier output, initiate source component signal, and adjust gain as appropriate.

## Shut-Down:

1. Mute preamplifier output.
2. Turn HD220 front-panel control from Operate to Off.
3. Turn off preamplifier and then the associated input source components.

## Start-Up Following "Protect" Shutdown

The HD220 amplifier uses a sophisticated, non-fused sensing circuit to protect the amplifier from DC at the output. This circuit also helps prevent damage to your loudspeakers.

When the amplifier senses a fault condition in either channel from excessive DC it will automatically shut off left and right outputs from the amplifier, and indicate this condition by extinguishing the green power LED. When the fault condition is ended, the amp will go through the 40 second warmup cycle (yellow LED "on") before resuming normal operation indicated by green LED "on"

If the amplifier fails to resume normal operation after attempting resetting due to a fault condition, contact your authorized dealer for further assistance.

## Cooling Fans

There are two D.C. cooling fans located at the rear of the HD220 to maintain proper operating temperature of the output devices. Do not operate the HD220 with fans disconnected or if one or both fans should stop running.

## Hour Meter

An LCD hour meter of elapsed tube operating time can be viewed through the top cover near the center, on the front circuit board. Displays accumulated hours of vacuum-tube service life. If the amplifier is unplugged from A.C. supply, total accumulated hours are retained. May be reset by qualified technician. Contact Audio Research Customer Service for more information about reset procedure.

## Servicing

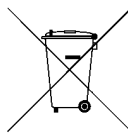
Because of its careful design and exacting standards of manufacture, your HD220 amplifier should normally require only minimal service to maintain its high level of performance.

**CAUTION:** The HD220 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.

Additional questions regarding the operation, maintenance or servicing of your amplifier may be referred to the Customer Service Department of Audio Research Corporation at 763-577-9700 (CST). 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 new appearance of this amplifier, 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 paint brush is effective in removing dust from bevels, the recessed nameplate 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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## Limited Warranty

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

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

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

## Specifications

**POWER OUTPUT:** 220 watts per channel into 8 ohms from 20Hz to 20kHz. 380 watts per channel into 4 ohms.

**POWER BANDWIDTH:** (-3dB points) 2Hz to 80kHz.

**FREQUENCY RESPONSE:** (-3dB points at 1 watt) 0.5Hz to 200kHz.

**INPUT SENSITIVITY:** 4.0V RMS BAL for rated output. (20.8 dB Bal gain into 8 ohms.)

**INPUT IMPEDANCE:** 300K ohms Balanced, 150k ohms SE.

**OUTPUT POLARITY:** Non-inverting. Balanced input pin 2+ (IEC-268).

**OUTPUT REGULATION:** Approximately 0.07dB 8 ohm load to open circuit (Damping factor approximately 130).

**OVERALL NEGATIVE FEEDBACK:** None.

**SLEW RATE:** 20 volts/microsecond.

**RISE TIME:** 1.6 microseconds.

**HUM & NOISE:** Less than 0.1mV RMS – 112dB below rated output (IHF weighted, input shorted).

**POWER SUPPLY CAPACITANCE:** 200,000 uF.

**POWER REQUIREMENTS:** 105-125VAC 60Hz (210-250VAC 50Hz) 750 watts at rated output (220 WPC 8 ohms) 1200 watts max (380 WPC 4 ohms) 250 watts idle.

**TUBES REQUIRED:** 2 – 6H30 Driver, 2 – 6922 Voltage amp.

**DIMENSIONS :** 19" (48.3 cm) W x 8.75" (22.2 cm) H x 19.5" (49.5 cm) D. Handles extend 1.5" (3.8 cm) forward.

**WEIGHT:** 58.9 lbs. (26.8 kg) Net; 73.8 lbs. (33.6 kg) Shipping.

Specifications subject to change without notice.

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