

CLASSIC 150
MONAURAL POWER AMPLIFIER
OWNER'S MANUAL

8-15-88

audio research
HIGH DEFINITION®

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PREFACE

Please take time to carefully read and understand the following instructions before you install or attempt to operate your CLASSIC 150 hybrid power amplifier. Familiarizing yourself with pertinent 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.

INTRODUCTION

The CLASSIC 150 is a new monoblock "hybrid" power amplifier rated at 150 watts into 2, 4 or 8-ohm speaker loads. Like previous Audio Research hybrid designs, the CLASSIC 150 features all-FET input stages and eight (8) 6550 power output tubes, transformer-coupled. Internal fan cooling (2-speed) is standard as well. But there the similarities end -- because the CLASSIC 150 combines patented Audio Research cross-coupling circuitry with classic triode operation.

Triode operation, properly implemented, can have two very important benefits. It can result in significant sonic improvement over more contemporary and conventional tube output circuits, yielding richer and more lifelike musical performance. And, the output tubes themselves are subjected to fewer, and less potentially destructive, stresses -- primarily because the screen grids are not stressed oppositely to the plates with the music signal. Tube service life should be significantly improved.

The only penalty for triode operation is that the cost-per-watt of output power is somewhat greater. However, "triode watts" tend to have the same advantage over other "tube circuits" that other tube circuits have over "transistor watts." Thus when applied to a highly sophisticated amplifier like the CLASSIC 150 -- with custom wide-bandwidth output transformer, precision components, all discrete circuitry and massive, fully regulated power supply -- the end result is more "music per dollar" than any other Audio Research amplifier ever offered.

We believe you'll find the CLASSIC 150 a revelation in musicality, naturalness and ease of reproduction. Crucial midrange and upper bass frequencies are full and harmonically rich, yet without the smearing of fine detail or loss of transient clarity common to lesser tube designs. You'll hear this immediately on strings, woodwinds, piano and brass instruments. Stage presentation is remarkably three-dimensional, with sonic images well sorted out front-to-back and across the stage. There is a feeling of "air" around individual performers (if it's on the source material), within a richer ambient envelope.

With 150 sturdy "triode" watts at hand, a pair of CLASSIC 150s yield a sense of ease and unstrained grace to a variety of musical program. Clipping is handled with less obtrusive sonic effects than any other amplifier we've heard.

A wide variety of loudspeaker designs will yield highly satisfying musical results when driven by a pair of CLASSIC 150s using high-quality speaker cables (we recommend Audio Research LitzLine™ speaker wire). It is important that you follow carefully your loudspeaker manufacturer's recommendations for proper set-up and amplifier connection. Your Audio Research dealer can also be of assistance in fine-tuning your system.

CONSTRUCTION AND TESTING

Like every Audio Research product, your CLASSIC 150 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 military electronics, aircraft electronics and scientific instruments. To assure performance standards, each CLASSIC 150 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. 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. It is also important, again because of the unit's weight, to pack each tube individually in its own carton.

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.

REMEMBER: Remove all vacuum tubes from their sockets and package them in the individual cartons to avoid damage in shipment. Mark each tube with its "V" number so that proper relocation can occur at re-installation.

UNPACKING

The CLASSIC 150 is packed within two cartons (inner and outer) which have polyfoam 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 in 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 center of the work area and with a knife or razor blade 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 foam filler panels aside. Now slit the inner carton's bottom flaps taped edges. 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 CLASSIC 150 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 screwdriver (for cover removal)
- 1 - Plastic screwdriver (for adjustments)
- Spare Fuses:
 - 2 - 1/2 Amp AGC 250V normal-blow with 100V, 120V and 220/240V units
 - 2 - 7 Amp MDX 125V slo-blow with 120V units
 - 2 - 8 Amp MDX 125V slo-blow with 100V units
 - 2 - 4 Amp MDA 250V slo-blow with 220/240V units

WARNINGS

1. To prevent fire or shock hazard, do not expose your CLASSIC 150 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 12-gauge, 3-conductor power cord on your CLASSIC 150 is equipped with a standard three-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 at individual fuse holders.

PREPARATION FOR USE

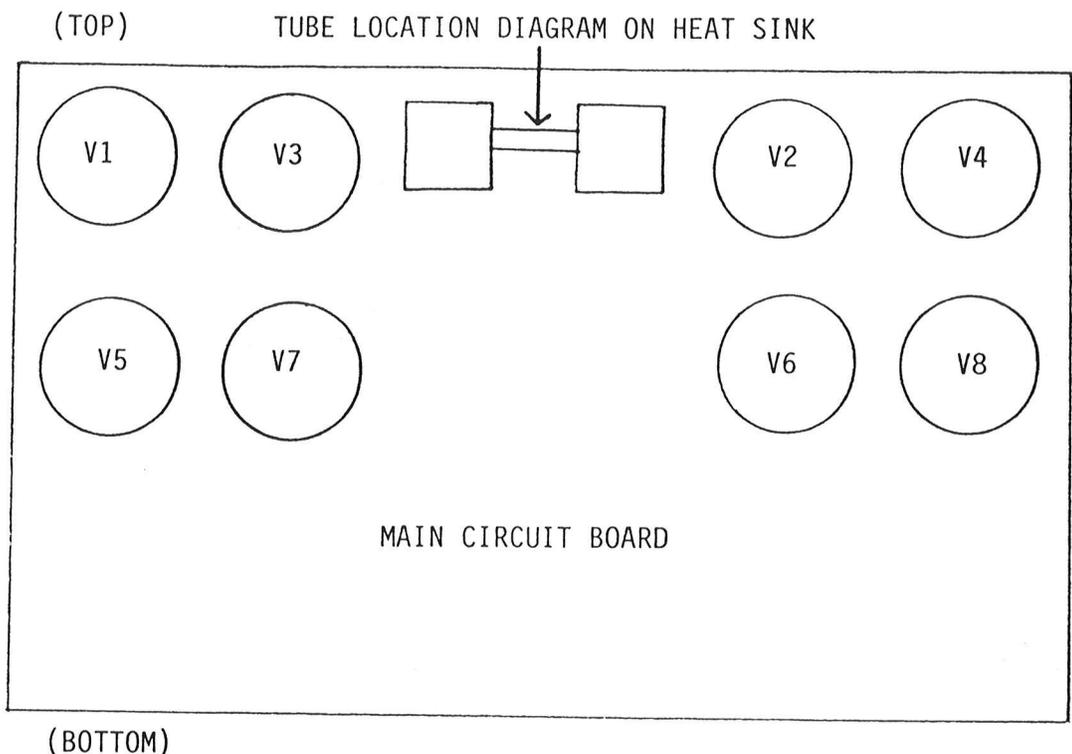
Your CLASSIC 150 amplifier is shipped with all of the vacuum tubes removed, packaged and wrapped so that they will not be broken or internally damaged in shipment. It is necessary to install these before using your amplifier.

Your CLASSIC 150 utilizes a total of eight (8) vacuum tubes. All are type 6550 power output tubes.

These tubes are packaged separately in individual cartons located under the protective cage. It is important to carefully install these vacuum tubes in their proper locations, observing the "V" markings on each tube and their corresponding sockets. A tube location chart is included on the next page. Proceed as follows:

- A. Using the Phillips screwdriver provided, remove the top cage, momentarily setting it and the screws aside.
- B. Remove the 8 tubes individually from their cartons and insert them in their proper sockets.
- C. Re-install the protective cage.
- D. Save the Phillips screwdriver and the vacuum tube cartons for possible future use. Storing these items within the CLASSIC 150 packaging carton is a good way to assure finding them again.

Note: Contact enhancers -- such as the commercial preparation "Tweek" -- 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.



FRONT PANEL CONTROLS

The front panel has:

- | | |
|-----------------|--------------------------|
| 3 Switches: | 1 - Power Line On-Off |
| | 1 - Standby/Operate |
| | 1 - Hi-Lo Fan |
| 2 Fuse Holders: | 1 - Power Line |
| | 1 - High Voltage |
| 4 Indicators: | 1 - Power "ON" (Green) |
| | 1 - Standby (Yellow) |
| | 1 - Operate (Green) |
| | 1 - High Voltage (Green) |

USE OF CONTROLS

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

STANDBY-OPERATE SWITCH: Because of the CLASSIC 150's high power capability (a total of 150 watts available at "clipping"), and its relatively high input power requirements (approximately 440 watts at idle, with peaks up to 650 watts), a "Standby" switch has been provided. This switch, which increases the bias on the output tubes so that they are "cut off" or in a non-conducting state, reduces the power consumption to approximately 160 watts.

The purpose of this switch is to allow maintenance of the CLASSIC 150 at operating temperature so that the serious listener can return it to full operation without a one-half hour wait for full stabilization of circuits and maximum sonic performance. It also reduces stress upon the output tubes between periods of active operation and thus helps prolong tube life.

Note: Audio Research does not recommend leaving your CLASSIC 150 in "standby" 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.

The CLASSIC 150 will in fact operate or play in the "Standby" mode. However, the output tubes operate in a Class C condition which will, of course, yield serious sonic distortion. Operation in this mode will not harm the amplifier, but sonic performance will be unacceptable. If you notice distorted sound when other operational functions appear normal, then check the "Standby-Operate" indicator lights to determine that the "Standby" mode is not activated. Yellow indicates "Standby;" green indicates "Operate."

HI-LO FAN SWITCH: The "Hi-Lo" fan switch allows selection of two levels of cooling efficiency for the power output tubes. The higher level will help prolong tube and component life by reducing operating temperatures during extended periods of high-volume play. During low-volume play, however, the "Hi" mode may be noticeable as additional ambient room noise. The "Lo" setting should be selected under these circumstances, as well as for extended "Standby" use.

FOR EFFICIENT FAN OPERATION: To insure smooth start-up of fans under all line voltage conditions, set to "Hi" mode before turning on power. Once fans are up to speed, set to "Lo" and mode to "Operate." This will normally reduce warm-up time needed for superior sonics to approximately 15 minutes (particularly after several weeks' "break-in" use). When you are through listening, set fans to "Hi" and mode to "Standby" for at least 5 minutes prior to shutdown, or prior to extended "Standby" mode with fans on "Lo." This will insure uniform cooling of internal components and help maximize tube life.

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 five (5) special non-marring elastomer feet provide adequate spacing only from a smooth, hard surface. Never operate the unit while it is sitting on a surface such as a rug or carpet.

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. Audio Research Corporation Rack Mount Ventilators (RMV-3) must be used above and below each unit. 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.

CONNECTION INSTRUCTIONS

The rear panel has:

- Input Connector
- Input Attenuator Switch
- Output Barrier Terminal Block
- Power Line Cord

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.

CAUTION - DO NOT CONNECT GROUNDED LOADS TO BALANCED OUTPUTS. Your CLASSIC 150 provides both balanced and unbalanced output connections to accommodate virtually all types of speaker systems. However, it is very important to determine which connections are appropriate for your system.

For best sonic performance all Audio Research tube and hybrid amplifiers, including the CLASSIC 150, have balanced output stages with partially cathode-coupled circuits. Most conventional speakers have no common connections between the left and right stereo speakers, and are ideally suited for "balanced line" connections. Screw terminals are provided on the CLASSIC 150 for 2-ohm, 4-ohm or 8-ohm balanced loads. Balanced merely refers to both wires in each speaker cable being driven with equal signal voltages with opposite polarities, with neither wire connected to a common ground terminal.

Most electrostatic loudspeakers are well suited to balanced connections, even though they may have power cords from left and right speakers connected to a common AC power receptacle. The speaker connections themselves are still fully isolated from any common ground connection.

Some complex loudspeaker systems, such as the bass section of Infinity RS-1 systems, for example, utilize a common ground connection between the left and right speakers for special electronics that serve both channels. These special electronics may be crossover networks preceding the power amplifiers, or motional feedback from the speakers, or for amplified center-channel sub-woofers, or other special

effects. These unbalanced systems may not be identified by the term "unbalanced." If in doubt, consult your speaker instruction manual, speaker dealer or speaker manufacturer.

Many headphone/speaker switching systems also use common grounding. These, too, are unbalanced loads and must be connected accordingly.

Unbalanced loads must be connected to the unbalanced (one side grounded) output terminals on the CLASSIC 150. Connections are provided for 1-ohm and 2-ohm unbalanced loads. Higher speaker impedances should be connected to the 2-ohm output. These unbalanced outputs are non-inverting (or in-phase) and do not require any phase reversals elsewhere in the system.

If unbalanced loads are inadvertently connected to CLASSIC 150 balanced outputs, severe distortion, greatly reduced output power, large thumping oscillations or blown fuses may result. Caution should be taken when connection the CLASSIC 150 to bench test systems including distortion analyzers, etc. Connect CLASSIC 150 balanced outputs only to test equipment having balanced input provisions. If in doubt, connect the CLASSIC 150 unbalanced outputs.

Note that the CLASSIC 150 is a non-inverting or in-phase amplifier, regardless of whether balanced or unbalanced outputs are used. It is important sonically that your entire system be connected so that the audio signal arriving at the speakers has correct absolute polarity, or is non-inverted. Connect the black or "-" speaker terminal to the wire that connects to the LO or "-" terminal on the CLASSIC 150. Connect the red or "+" speaker terminal to the wire that connects to the HI or "+" terminal on the CLASSIC 150. Use the best available speaker cables and tighten the screw terminals securely with a large screwdriver to ensure best sonic results.

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 CLASSIC 150 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 CLASSIC 150 amplifiers be connected to a wall AC power receptacle, or a similar heavy-duty source. They must not be connected to convenience receptacles on preamplifiers, etc., or the full sonic capabilities of both the CLASSIC 150s 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 CLASSIC 150 is actually used for on/off control of each amplifier. The AC power source for each pair of CLASSIC 150 amplifiers must be capable of supplying 20 amperes for 100 or 120 volt units, or 10 amperes for 220 or 240 volt units.

For the very best performance on domestic 100 or 120 volt circuits, each pair of CLASSIC 150s should be connected to their own AC power circuit branch, protected by a 20 amp breaker. The preamplifier and other audio equipment should be connected to a different power circuit and breaker. If the power receptacle for the CLASSIC 150s is more than 25 feet from the building power entrance and breaker box, it would be preferable to use installed wiring capable of 40-60 amperes to minimize voltage drop, still using a 20 amp breaker. Avoid the use of extension cords. If they must be used on a temporary basis, use 12-gauge or heavier cords.

The CLASSIC 150 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 CLASSIC 150 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 CLASSIC 150, 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 front of the CLASSIC 150 in the OFF position before connecting the power line cord to AC power.

OPERATING PROCEDURE

1. Make sure you have read and complied with the INSTALLATION and CONNECTION instructions prior to attempting operation.
2. Make sure your CLASSIC 150s are 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. The OPERATE-STANDBY switch may be set in either mode, depending upon how soon you plan to begin listening.
5. The HI-LO FAN switch should be set on "Hi" to insure smooth start-up of fans under all line voltage conditions (see USE OF CONTROLS and INSTALLATION).
6. Turn the POWER switch from "Off" to "Power." The green "Power" LED indicator should glow immediately, as should either the green "Operate" or yellow "Standby" LED indicators (depending upon the setting chosen for that switch). Approximately one (1) second later the green "High Voltage" fuse LED should also light up, indicating the proper operation of the high-voltage circuits. NOTE: If the "Power" or "High Voltage" indicator lamps fail to light, turn the "Power" switch to "Off" and check the appropriate fuses for possible failure. Extra fuses for both powerline and high-voltage circuits are packed with your CLASSIC 150.
7. Your CLASSIC 150 should now operate satisfactorily. However, with unit on "Standby," a full stabilization or warm-up time of approximately 1 1/2 hours is recommended for best sonic performance. To reduce warm-up time to approximately 15 minutes, set fans to "Lo" and mode to "Operate." See discussion of fans in USE OF CONTROLS section.

8. The Input Level Attenuator Switch is located on the back chassis of the CLASSIC 150. It has five (5) positions, marked in -6dB increments, ranging from "0" attenuation to complete "Mute." For best sonics, keep the Attenuator at "0" (maximum). Although there is only very minor sonic degradation using the Attenuator Switch, this switch can be useful with high-efficiency speakers, or when the preamplifier used has excessive gain. When changing input connectors, turn the Attenuator on each CLASSIC 150 all the way down to "Mute," and switch the amplifiers to "Standby" to fully protect your loudspeakers.

ADJUSTMENT PROCEDURE

The CLASSIC 150 utilizes very high quality, commercial and computer grade components which, together with conservative operation of all components and tubes, will provide long service life, if installed and operated within the parameters outlined in this Manual.

The output tubes, for example, are operated with electronically regulated "bias" voltage. With this voltage regulated the variation in output tube idle current for varying line voltage becomes normally unimportant.

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

CAUTION: The following internal procedure should not be attempted by the owner unless he is technically qualified. There are high voltages and currents within this unit which can be lethal under certain conditions. All internal adjustments should be accomplished by a qualified individual. It is necessary to remove the top cover from the CLASSIC 150 for the following adjustment. Unit should be off before removal of cover.

Only the output tube idle current (bias voltage) requires adjustment in the CLASSIC 150. Use the plastic alignment tool provided for this internal adjustment.

The output stages of the CLASSIC 150 are partially cathode-coupled "push-pull Class AB₁," 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 75mA. 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 32 watts of their 48 watt rating (42 watt plate, 6 watt screen). This point of operation provides "enriched" Class AB₁, 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 regulated. 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.

Make sure that ventilation requirements are met as described under INSTALLATION to prolong tube and other component life.

For best results operate and adjust the CLASSIC 150 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 15-20 minutes of uninterrupted stabilization time in the "Operate" mode.

A digital voltmeter capable of accurate measurements with 0.1mVDC resolution is preferred for accurate adjustment (must have 3 1/2 digit display). Use the plastic alignment tool provided to make the adjustments.

The four test points of the CLASSIC 150 are approachable from the rear side of the main circuit board, and are referred to in the circuit schematic as TP1-TP2 and TP3-TP4.

Adjust the output "bias" voltage for 30mVDC (.03 Volt D.C.) between TP1-TP2 and between TP3-TP4.

SERVICING

Because of its careful design and exacting standards of manufacture, your CLASSIC 150 amplifier should normally require only minimal service to maintain its high level of performance.

CAUTION: The CLASSIC 150 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 eight (8) vacuum tubes inside the CLASSIC 150 are high-quality 6550 power output tubes. Their playing life will be extended considerably by switching the CLASSIC 150 to "Standby" whenever your system is not in active use. Replacement tubes need not be matched, although slightly better sonic performance will result if matched sets are used. (Your CLASSIC 150s come from the factory with matched sets installed.) Reliable, matched, low gas 6550 tubes -- such as those available from Audio Research -- are strongly recommended for maximum performance and longevity. Check bias adjustment after replacing tubes.

Additional questions regarding the operation, maintenance or servicing of your CLASSIC 150 amplifier may be referred to the Customer Service Department of Audio Research Corporation: 612/566-7570.

CLEANING

To maintain the visual appearance of your CLASSIC 150 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.

"TUBE SAVER" PROTECTION CIRCUIT

Your CLASSIC 150 amplifier includes a remarkable circuit called the "Tube Saver." It is a comprehensive overload protection circuit that will improve the service life and reliability of your CLASSIC 150.

Under normal listening conditions, you will not notice the function of the "Tube Saver." You may play the CLASSIC 150 as loud as you wish, within the capabilities of your speakers (and your neighbors). Even severe load mismatching is permissible, as low as 1/3 of the rated impedance, and even lower at high frequencies.

However, if an abnormal overload condition is detected that could potentially damage the tubes, the protection circuit will immediately shut down the CLASSIC 150. It will indicate this by dimming the Screen LED indicator on the front panel. The amplifier will remain in the protection mode until it is reset by turning off the power switch and waiting 30 seconds for the tubes to cool off and capacitors to discharge safely. Then the power switch may be returned to ON and listening may resume in a few seconds as the tubes warm up.

The most common overload conditions that will initiate a protective shutdown are:

- A. SUBSONICS. Excessive input below 10Hz, such as dropping a tone arm, a large discharge of static electricity that is sufficient to disturb the voltage regulation in a preamplifier or program material with extremely loud "cannon shots" that extend below 10Hz. Preamp disturbances at very high gain settings may also trigger a protective shutdown. Some full-range electrostatic speakers may be more sensitive to subsonic overload shutdown because of transformer limitations in the speakers.
- B. SHORTED SPEAKER CABLES. The CLASSIC 150 will generally go into protective shutdown when the output is shorted, even at moderate listening levels.
- C. TUBE FAULTS. Occasionally a tube will exhibit a small arc discharge, which will cause protective shutdown. Generally the tube will resume normal operation when the CLASSIC 150 is turned off for 30 seconds and restarted, with no adverse affects.
- D. "DROPPED" TONE ARM. To avoid accidentally activating the protective shutdown by careless tone arm handling, we recommend reducing the preamp gain or muting the preamp when handling the turntable or tone arm.

"TUBE SAVER" CIRCUIT OPERATION

If your CLASSIC 150 goes into protective shutdown:

1. You may hear a tiny "tick" from the speaker at the moment of shutdown, and the output will be totally quiet.

2. Check the Screen LED, which will be dimmed to indicate protective shutdown. (If one or both LEDs are totally dark, switch power to Off and check fuses or power mains breakers.)
3. While the Screen LED is dimmed, shut the power toggle switch to Off.
4. Mute the preamp, or otherwise disable signal input to the CLASSIC 150.
5. Wait at least 30 seconds for the amplifier to cool off and reset.
6. Return power toggle switch to On and make sure the Screen LED is fully lit.
7. After an additional 30 seconds for the amplifier to restabilize, you may resume normal listening. If the CLASSIC 150 shuts down again, reduce playback level, try a different program source or check connections to isolate the cause. If the amplifier shuts down repeatedly with no input or load connected, get service assistance.

3-YEAR 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).
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 of the date of purchase or no later than the fifth anniversary of the date of shipment to the authorized Audio Research dealer, whichever comes first.
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. Vacuum tubes are warranted for 90 days. 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). 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
HIGH DEFINITION®

5740 GREEN CIRCLE DRIVE
MINNETONKA, MINNESOTA 55343-4424

WARRANTY OUTSIDE THE USA

Audio Research has formal distribution in many of the countries of the free world. In each country the Audio Research Importer has contractually accepted the responsibility for product warranty. Warranty should normally be obtained from the importing dealer or distributor from whom you obtain your product.

In the unlikely event of service need beyond the capability of the Importer, Audio Research does, of course, back up the warranty. Such product would need to be returned to Audio Research, together with a photostatic copy of the bill of sale.

CLASSIC 150 SPECIFICATIONS (AC line set @120V 60Hz for these specifications)

Power Output:

140 watts minimum continuous at 8 ohms from 10Hz to 20kHz with less than 0.8% total harmonic distortion (typically below .005% at 1 watt)

Approximate actual power available at "clipping": 150 watts (1kHz)

(Note that actual power output is dependent upon both line voltage and "condition" ie: 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) 7Hz to 100kHz

Input Sensitivity:

.6V RMS for rated output

Input Impedance:

60K ohms, nominal

Output Regulation:

Approximately 0.3dB. 8 ohm load to open circuit
(Damping factor approximately 30)

Negative Feedback:

20dB

Slew Rate:

25 volts/microsecond

Rise Time:

2 microseconds

Hum & Noise:

Less than 2mV RMS 90dB below rated output (broad-bandwidth unweighted, inputs shorted)

Power Supply Energy Storage:

Approximately 350 joules

Power Requirements:

105-125VAC 60Hz (210-250VAC 50Hz) 650 watts at rated output

440 watts at "idle" - 145 watts at "standby"

Dimensions:

19" (48 cm) W (standard rack panel x 10.5" (27 cm) H x 16" (41 cm) D (front panel back). Handles extend 1 5/8" (4.1 cm) forward of the front panel. Output connectors extend 1" behind rear panel.

Weight:

110 lbs. (50 kg) Net; 126 lbs. (57 kg) Shipping

Tubes Required:

4 - Matched pair 6550 (low gas) Power Output