

Audible Illusions

MODULUS 3A

PREAMPLIFIER

OWNERS MANUAL

The AUDIBLE ILLUSIONS MODULUS 3A preamplifier is designed to provide you with many years of listening pleasure. To ensure that you receive the best results from this component, YOU MUST READ THIS MANUAL before attempting to operate the unit.

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1.0 INTRODUCTION

Congratulations on your purchase of the Audible Illusions Modulus preamplifier.

In purchasing the Modulus you have joined thousands of others who are enjoying a unique concept in vacuum tube design. Using a revolutionary Class A triode circuit coupled with only the finest parts and construction quality, the Modulus 3A establishes a new benchmark for both performance and affordability.

Historically, tube circuits have suffered from bad passive parts, weak power transformers, and noisy power supplies that are unstable at lower frequencies. Other problems include cluttered circuit designs employing cathode followers and cascoding of gain stages. We've found the resulting image instability, tubby bass response, excessive noise, and dark, recessed sound to be totally unacceptable.

The Modulus 3As circuit is at the forefront of modern vacuum tube design. The unique cascade-type phono circuitry and the no-feedback line stage contribute significantly to providing clean, open sonics. An outboard low-impedance power supply provides excellent bass definition and dynamics. Premium imported vacuum tubes, proprietary polypropylene and polystyrene capacitors, and precision film resistors contribute further to the Modulus 3As superior musical reproduction.

Your Modulus was designed to amplify the signal from the latest generation of state-of-the-art moving magnet and medium-to-high-output moving coil cartridges as well as the best digital sources. We recommend that your associated components and interconnect cable be of the highest quality to fully realize the Modulus' sonic attributes.

For those who own a "low output" moving coil cartridge, an optional factory-installed moving coil board is available.

Assuming proper attention to set-up, we feel that the Modulus 3A will bring you a whole new perspective in the enjoyment of recorded music.

Good listening,

AUDIBLE ILLUSIONS

2.0 INSTALLATION

After unpacking your preamplifier, **SAVE THE SHIPPING CARTON AND PACKING MATERIAL** as this will provide the best protection should you decide to transport your preamplifier.

The Audible Illusions Modulus preamplifier is designed for either shelf placement or rack-mount installation. Should you desire to rack-mount the preamplifier, use nylon washers between the heads of the mounting screws and the front panel. This will prevent marring of the front panel surface by the mounting screws.

In choosing the physical location for your Modulus Three, please observe the following guidelines

AVOID PLACEMENT NEAR ANY STRAY MAGNETIC FIELDS such as transformers, AC line cords, motors, etc. This will prevent the preamplifier from becoming a source of amplified hum and noise. Avoid stacking a digital processor directly above or below the Modulus for the same reason. Use the same precaution should an outboard moving coil pre-preamplifier be used.

ALLOW FOR SUFFICIENT VENTILATION.

DO NOT place your preamplifier on top of any heat source. The perforated cover should never be allowed to become hot to the touch during operation. **MINIMUM VERTICAL CLEARANCE IS FOUR INCHES.** Any component damage caused by excessive heat build-up due to improper installation will void the warranty.

DO NOT USE LONG RUNS OF HIGH CAPACITANCE INTERCONNECT CABLES. Even 15 feet of these cables tend to roll off high frequencies.

KEEP AC WIRES AT LEAST FOUR INCHES AWAY FROM INTERCONNECTS AND SPEAKER CABLES. If possible, avoid running AC cables parallel to your other wires.

NOTE: For convenience, particularly with multi-amplified speaker systems, arrange for all amplifiers to be switched on and off by **ONE AC OUTLET.** Switchable power distribution strips are recommended for this purpose. **MAKE SURE THAT THE COMBINED AC RATINGS OF YOUR AMPLIFIERS DO NOT EXCEED THAT OF THE POWER DISTRIBUTION STRIP.** ALLOW YOUR MODULUS TO BE OPERATED INDEPENDENTLY OF THIS STRIP.

2.0 INSTALLATION (continued)

AVOID IMPEDANCE MISMATCH.

There is an optimum load for every electronic component. For example, cartridge manufacturers recommend load variations for their products, and most amplifiers are designed to work efficiently into a 4, 8, or 16Ω (ohm) load. This is a much overlooked and misunderstood subject in dealing with preamplifier loads as amplifier impedances differ and electronic crossovers exert their own impedance effects. Fortunately, the majority of power amplifiers have an input impedance in the 50kΩ range. Thus your Modulus 3A preamplifier is optimized for a 45kΩ load with an accurate range of 20kΩ to 400kΩ. Many Modulus owners use their preamps with amplifiers above and below the recommended range and obtain excellent results. If your amplifier has an input impedance beyond this range, we recommend that, before doing anything, you listen carefully to your system with the Modulus 3A installed. Systems vary, and the effects of the impedance differences may, in your systems case, be entirely negligible. If you determine that a noticeable frequency imbalance exists, it is a simple matter to bring the amplifiers load into efficient balance with your Modulus 3A by adjusting the amplifiers input impedance. This can easily accomplished by any competent technician.

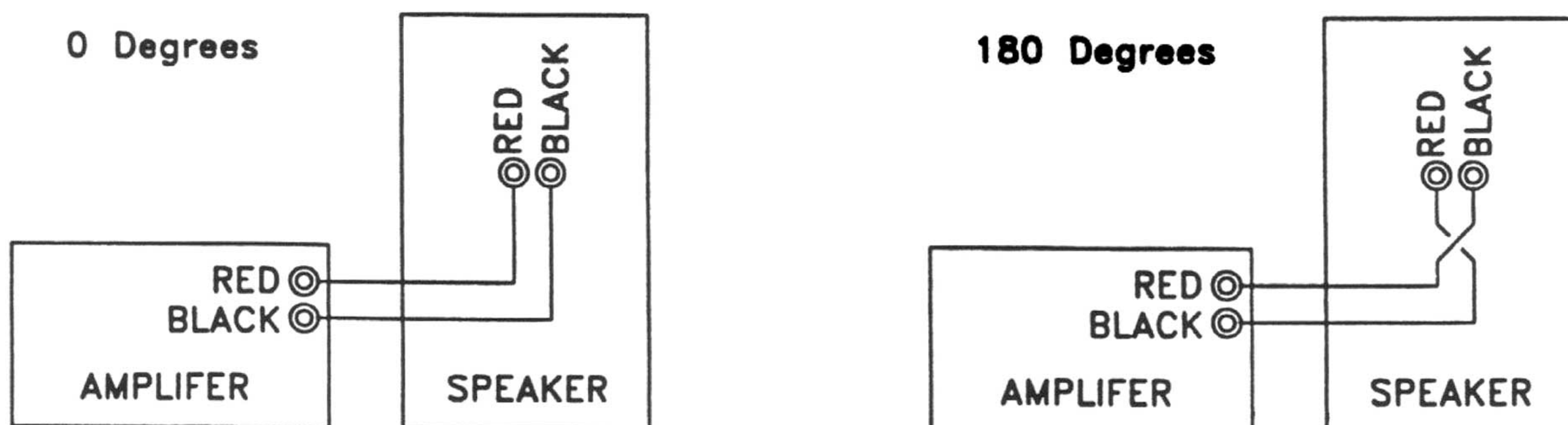
ABSOLUTE PHASE POLARITY.

The purist line stage design of the Modulus 3A rejects the addition of phase inversion circuitry. The Modulus 3As circuit polarity is as follows:

All Inputs through MAIN OUT: INVERTING

All Inputs through TAPE OUT: NON-INVERTING

What this means is that, in order to maintain correct system polarity, it will be necessary to REVERSE THE POLARITY OF YOUR SPEAKER CONNECTIONS. This is easily done by switching the positive/plus (red) and negative/minus (black) connections on your speakers ONLY (see diagram). In a bi-amplified system, we feel it is also necessary to reverse the leads to your subwoofer(s), if possible. You can check your results with a suitable test record or CD. (The Chesky Jazz Sampler and Audiophile Test Disc Vol. 1 is highly recommended.)



Recommended Modulus 3A Installation

3.0 POWER ON/OFF - AUTOMATIC MUTING/STANDBY MODE

CAUTION: The Modulus 3A preamplifier design uses high-current tube technology to produce its exceptional sonic performance. **HOWEVER, ALL VACUUM TUBE PREAMPLIFIERS ARE SUSCEPTIBLE TO SUB-SONIC TRANSIENTS DURING POWER ON AND OFF AND WARM-UP TIME.** We therefore suggest the following turn-on/ turn-off procedure:

POWER ON

- 1. Make sure that all power amplifier(s) are OFF.**
- 2. Be sure the preamplifiers MUTE SWITCH is ON.**
- 3. Depress the POWER SWITCH to ON. The LED will turn YELLOW then GREEN.**
- 4. Wait an additional 30 seconds before switching on the power amplifiers.**
- 5. Turn OFF the MUTE SWITCH.**
- 6. Adjust the VOLUME CONTROLS for comfortable listening**

POWER OFF

- 1. Depress the MUTE SWITCH.**
- 2. Turn the power amplifiers OFF.**
- 3. Wait 15 seconds for the power supplies in the amplifiers to decay to zero volts.**
- 4. Switch the Modulus 3A preamplifier OFF. The preamplifiers LED will turn RED.**

(NOTE: Please refer to page 5 section 4.6 - POWER.)

AUTOMATIC MUTING

Audible Illusions has devised a method in which automatic muting can be incorporated into the Modulus circuitry without degradation of sound quality. This means that if your power amplifier is turned on before you turn on your preamplifier, your amplifier and speakers will not be subjected to the large DC transient surge that tube preamplifiers emit during turn-on and warm-up.

The electrical operation of this circuit is quite simple. Upon turning on your preamplifier, you will notice that the red pilot light turns yellow for at least 30 seconds during which time the preamplifier output is automatically closed while its circuit comes to operational stability. When the preamp is ready for play, the LED will turn green. Upon TURN-OFF, (or in case of AC line failure), this circuit protects your amplifier and speakers.

STANDBY MODE

Even when the Modulus is turned off, as long as the Modulus' power supply is connected to a "live" AC outlet, the red LED indicates that the unit is in "standby" mode. This means a specially-designed circuit is in operation, feeding a small amount of power to the tubes - just enough to keep them warm. This helps prolong tube life by avoiding "cold starts", that is, having the tubes subjected to full turn-on voltage while cold - a major factor in tube deterioration. This circuit also allows the Modulus to come to critical listening operation within 10-15 minutes rather than several hours.

4.0 FRONT PANEL CONTROLS

4.1 VOLUME

The amount of signal voltage applied to the line stage for each channel is regulated by separate volume controls. The relative signal of the BALANCE and VOLUME LEVEL is set with these controls. Adjust the balance/volume level of each control in the position that results in the best stereo image and volume level at your listening position.

4.2 INPUT SELECTOR

Selects Compact Disc, Digital Tape, Phonograph, Tuner, Video, or Auxiliary inputs.

4.3 SOURCE / TAPE

Switches between sources chosen from INPUT SELECTOR or TAPE INPUT.

4.4 FILTER

When depressed, this low frequency (-6dB/10Hz) filter reduces the subsonic rumble caused by warped records.

4.5 STEREO / MONO

When depressed, a mono signal is coupled to the line stage.

4.6 POWER

The AC power is ON when the preamplifier is connected to AC. The RED LED indicates that the unit is in STANDBY mode; The GREEN LED indicates that the unit is operational. The LED will turn YELLOW between standby and full operation.

4.7 MUTE

When the MUTE button is depressed, the output of the preamplifier is grounded. Thus, the VOLUME CONTROL position need not be altered when listening is interrupted. Note that this switch functions independently of the main output relay muting circuit. It is also good practice to leave the MUTE DEPRESSED when music is not being played.

4.8 LOW LIGHT CONTROL KNOB ILLUMINATION

Special control knob lights have been incorporated to better facilitate operation in reduced lighting.

5.0 REAR PANEL DESCRIPTION

5.1 PHONO / GND

The PHONO input accepts a moving magnet or medium-to-high output moving coil cartridge. If a moving coil pre-preamplifier is used, its output is connected directly to the PHONO inputs. The chassis GND post accepts the turntable ground wire. If an outboard phono stage is used (complete with its own RIAA circuitry), it is inappropriate to connect this through the preamplifier's PHONO stage as this already includes RIAA equalization; an outboard phono stage of this kind should be connected through either the TAPE IN inputs or the AUXILIARY inputs.

5.2 CD

Accepts analogue outputs from any Compact Disc player

5.3 DAT

Accepts analogue outputs from any Digital Audio Tape player.

5.4 TUNER

Accepts any high output FM tuner. Use the output level control on your FM tuner to adjust the FM level to approximately the same level obtained during phono playback.

5.5 TAPE IN

Accepts any standard reel-to-reel or cassette recorder input.

5.6 VIDEO

Accepts any Video input, e.g.: TV Audio out, Video Tape Audio out, LaserDisc Audio out, etc.

5.7 AUXILIARY

Accepts any high output device i.e., tuner, video, or tape. Use the output level control (if present) to match the output level obtained during phono playback.

5.8 TAPE OUT

Selected signal information present at the PHONO or LINE inputs will be presented to a tape recorder connected to the TAPE OUT.

5.9 MAIN OUT #1 & MAIN OUT #2

Connect MAIN OUT #1 directly to your power amplifier(s) or electronic crossover. MAIN OUT #2 is the same as MAIN OUT #1 but includes a 470Ω resistor in series with the output. This corrects for anomalies, i.e., tube "glare", that are exhibited in some brands of tubes. If you are running a long length (over 15 feet) of interconnect, it is best to use MAIN OUT #1.

WARNING! NEVER CONNECT THE "OUTPUT" OF YOUR TAPE DECK OR ANY OTHER SIGNAL SOURCE TO THE "TAPE OUTPUT" JACKS! CONNECT YOUR TAPE DECK "OUTPUTS" TO THE PREAMPS "TAPE INPUT" JACKS ONLY. AUDIBLE ILLUSIONS WILL NOT BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY IMPROPER CONNECTIONS OF THIS TYPE.

6.0 INTERNAL SWITCHES CAPACITOR BYPASS / LINE STAGE GAIN LIMITING

6.1 CAPACITOR BYPASS SWITCHES

A few customers and reviewers have stated a preference for removal of certain bypass capacitors in the line section. Rather than have our customers trying to physically remove these components, (and voiding their warranty in the process), we have installed four small "dip" switches, positioned behind tubes V-3 and V-4, to allow the owner of the unit to experiment with these capacitors for themselves. The Modulus 3A is shipped with the switches in the "on" position, meaning that the capacitors are in the circuit. When all four switches are set in the "off" position, the capacitors are effectively removed from the circuit. **(NOTE: IF YOU WANT TO CHANGE THE SWITCHES POSITION, ALWAYS REMEMBER TO TURN OFF THE MODULUS 3A AND UNPLUG IT BEFORE REMOVING THE TOP COVER!)** A small pen or screwdriver may be used to flip the switches. To accomplish the change, **ALL FOUR SWITCHES MUST BE EITHER ON OR OFF.** Refer to the CHASSIS LAYOUT DIAGRAM on page 12 for switch location and identification.

6.2 LINE STAGE GAIN LIMITING SWITCHES

Some of the new, high-output digital processors have sufficient signal available that, with a high-gain preamplifier such as the Modulus 3A, the volume controls can only be used within a small portion of their normal operating range. To better accommodate this situation, the Modulus 3A is now equipped with two red and white "dip" switches, located behind the V-3 and V-4 line stage tubes. When these switches are activated, the line stage gain is effectively reduced by approximately 7dB, allowing for a wider range of volume control settings. Refer to the CHASSIS LAYOUT DIAGRAM on page 12 for switch location and identification.

7.0 SERVICE INFORMATION

PLEASE READ CAREFULLY BEFORE ATTEMPTING SERVICE

CAUTION: Before removing the cover of your Modulus preamplifier, remember that **LETHAL VOLTAGES** are present on the circuit boards as well as the AC line voltage at the power transformer. The power supply energy storage capacitors can retain high voltages even after the unit is shut off. Allow at least **TWO MINUTES** after turn-off before touching any circuit component.

To gain access to the vacuum tubes, remove all of the gold machine screws securing the top cover of the chassis. **BE SURE THAT THE UNIT IS UNPLUGGED FROM THE AC OUTLET** before reaching inside for any purpose.

7.1 VACUUM TUBES

The tubes used in your Modulus are premium quality and should last approximately 3000 hours. It is nonetheless advisable to check the tubes on a reliable tube tester twice a year. Refer to page 12 for tube location and section 8.1 for tube handling tips.

7.2 TROUBLESHOOTING

Should any difficulty arise with your Modulus, a tube failure would be the most likely cause. Before suspecting the preamp, always check your source components and interconnecting cables first. Cables can become intermittent if moved excessively. If the problem cannot be dealt with using the information in this section, consult with an authorized service facility or telephone the factory for assistance.

7.2a UNIT IS DEAD

If the front panel LED is not lit, the AC fuse has most likely been blown. **UNPLUG THE AC LINE CORD** and replace the transformer fuse in the outboard power supply with an identical 2 amp fast-blo type.

Before turning the unit back on, remove the top cover of the main chassis and inspect the 1 amp fuse on the circuit board next to the power switch. **IF THIS FUSE IS BLOWN DO NOT ATTEMPT TO REMOVE IT.** Consult with an authorized service facility or call the factory.

7.2b EXCESSIVELY NOISY PHONO STAGE OPERATION

Identify which channel is noisy. Switch tubes V1 and V2. If the noise was originally in the right channel and has traveled to the left channel, switch the tubes back and replace tube V1. Conversely, if the noise began in the left channel and moved to the right after switching the tubes, tube V2 is at fault. If switching the tubes made no difference, go to section 7.2c

7.2c EXCESSIVELY NOISY LINE STAGE OPERATION

Use the same procedure as outlined in section 7.2b with the line stage tubes V3 and V4. If the noise persists, then the replacement tube may be bad or it could be a problem with a circuit component.

7.2d PROBLEM NOT IDENTIFIED IN THIS GUIDE

Should your Modulus Three experience a problem not easily dealt with using the information in this guide, consult with an authorized Audible Illusions service center or the factory. The Modulus is a very straightforward design incorporating the highest quality parts. Because of this, component failure is rare, leaving only the tubes as suspect. Therefore, any failures other than those noted in this guide will probably require the attention of properly trained service personnel.

8.0 TUBE INFORMATION

8.1 MAINTENANCE AND HANDLING OF VACUUM TUBES

ALWAYS TURN YOUR MODULUS OFF AND UNPLUG THE UNIT FROM THE AC LINE BEFORE OPENING THE COVER. Also, let the tubes cool down for at least two minutes; they may be very hot to the touch. If at all possible, **DO NOT HANDLE TUBES WITH YOUR BARE FINGERS.** Try to use a paper towel or tissue to avoid getting body oils and dirt on the body of the tube. These can build up on the tubes glass envelope causing the tube to run hotter and shortening tube life. When removing a tube, grip the tube firmly at its base and, while rocking gently, pull straight up. If removal of all four tubes becomes necessary, make sure to mark each tubes location, returning them to their proper sockets. If your Modulus is accidentally dropped, check all tubes carefully for damage before putting the preamplifier back in service.

8.2 TUBE SELECTION

Use only replacement 6922, 6DJ8, E88CC, or ECC88 tubes recommended by Audible Illusions and obtained only from an authorized dealer. You will find your dealer helpful in answering any questions you may have regarding vacuum tubes. If your dealer cannot answer your questions, call or write us at the factory. Our advice is free; it is our sincere desire that your Modulus operate properly.

If you purchase tubes from other than an authorized dealer, we recommend the following brands:

Sovtek (Russian), Amperex (West German), Seimens (German), or Philips(Dutch). "New - Old Stock" (NOS) Amperex, Mullard, and Telefunken tubes are also acceptable.

Please understand that we reject at least half of all the tubes we test. Therefore, if you purchase raw, untested tubes without warranty, it is wise to order extras.

9.0 MODULUS 3A PREAMPLIFIER SPECIFICATIONS

PHONO SECTION

Gain	28dB at 1kHz
THD	Less than .015% at 20kHz
Signal to Noise	74dB below a 5mV input - wideband
Phono Overload	1.2V rms at 1kHz (100kΩ load) 750mV rms at 1kHz (IHF load)
Input Impedance	47kΩ
Signal Phase	Non-inverting
Frequency Response	+/- 0.25dB of RIAA from 20 to 20kHz

HIGH LEVEL SECTION

Gain	30dB (@ 23dB with Gain Limiting switches engaged)
THD	Less than .15% at 1.5V rms out from 20 to 20kHz into a 50kΩ load Less than .12% at .5V rms out from 20 to 20kHz into IHF load
Signal to Noise	85dB below 1.5V rms - wideband
Overload	9V rms at 1kHz (50kΩ load)
Input Impedance	50kΩ line inputs, 100kΩ CD and DAT inputs
Signal Phase	Inverting
Frequency Response	Within 1dB from 2 to 100kHz measured with 1:1 probe / 100kΩ load
Slew Rate	50V per microsecond

OVERALL GAIN

58dB at 1kHz

OUTPUT IMPEDANCES

1.2k Ω Main Output, 150 Ω Tape Output

TUBE COMPLEMENT

**4-E88CC / 6922
1-spare tube is included with each unit**

10.0 WARRANTY INFORMATION

LIMITED WARRANTY

Audible Illusions warrants the Modulus 3A preamplifier to be free of defects in workmanship and materials, when operated according to the guidelines set forth in the Owners Manual, for a period of two (2) years from the date of purchase from an authorized Audible Illusions Dealer. Audible Illusions will repair or replace all components showing any defects, without charge for parts or labor to the purchaser, during the period of this warranty, subject to the following condition:

The warranty card must be mailed to Audible Illusions within ninety (90) days of purchase.

There is no evidence of surface damage or internal heat build-up from improper physical installation that could result in electrical component stress.

There is no evidence of unauthorized tampering with the circuitry or the enclosure for either modification or repair.

THERE IS NO EVIDENCE OF FAILURE TO FOLLOW MANUFACTURERS INSTRUCTIONS AS SET FORTH IN THIS OWNERS MANUAL

In addition, Audible Illusions assumes no liability to make repairs or replace the product components part if the serial number of said component or product has been altered, removed, or defaced in any manner. Audible Illusions will not compensate for repairs made by unauthorized persons.

VACUUM TUBES

The above limited warranty and conditions as stated apply to vacuum tubes, except that the period of warranty shall be ninety (90) days from the date of purchase.

MISCELLANEOUS

Any implied warranties relating to the Modulus 3A preamplifier shall be limited to the duration of this limited warranty. UNDER THIS LIMITED WARRANTY AUDIBLE ILLUSIONS SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT. Some states do not allow the exclusion of incidental or consequential damages. This warranty gives you specific legal rights which vary from state to state.

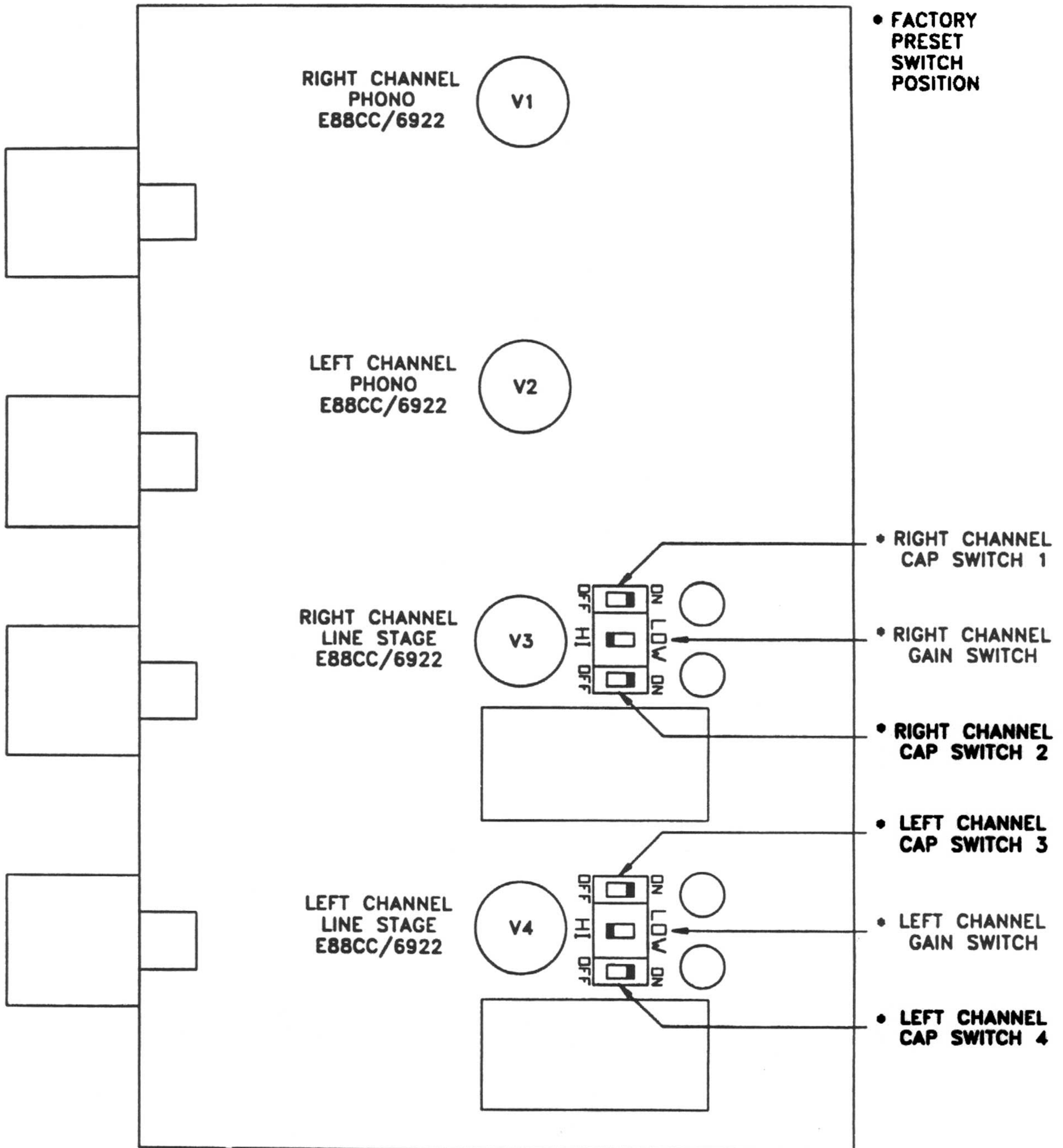
WARRANTY CLAIM

Buyers exclusive remedy under this limited warranty is the repair or replacement of defective components by the manufacturer or its authorized agent. To make a claim under this limited warranty, contact the factory directly for return authorization. Upon receipt of said defective unit, Audible Illusions will perform an inspection and, if necessary, repair the unit under warranty obligation. It is the responsibility of the purchaser to make sure the unit is returned for service. WARRANTY CARD MUST BE ON FILE WITH:

**AUDIBLE ILLUSIONS
P.O. Box 8
Pleasanton, CA 94566**

(510) 463-2381

11.0 Modulus 3A - CHASSIS LAYOUT DIAGRAM



**CAUTION: HAZARDOUS VOLTAGES PRESENT.
DO NOT OPERATE OR ADJUST WITH UNIT ON.
ALL CAP BYPASS SWITCHES MUST BE EITHER ON OR OFF.**

THE AUDIBLE ILLUSIONS MODULUS THREE PREAMPLIFIER: A BRIEF DISCUSSION OF APPLIED CIRCUIT TECHNOLOGY

Time and experience teach us many things. The single greatest challenge facing the audio engineer is to design a preamplifier, the heart of an audio system, that effectively amplifies low-level source signals without imparting any colorations of its own or degrading the delicate audio signal in any way. Having designed and manufactured thousands of high quality audio components, it is the considered opinion of Audible Illusions engineering that, for audio preamplifiers and line-level stages, vacuum tube-based designs are the most appropriate.

Properly implemented, the inherent linearity, low TIM, and high overload margin of the vacuum tube voltage amplifier makes it a perfect device for this application.

Current Modulus circuitry emphatically demonstrates our philosophy that, in order to realize the full potential of the vacuum tube, simplicity of design is of utmost importance.

Using only four vacuum tubes, the Modulus provides all the basic requirements of a full-function, purist-oriented preamplifier, embodying all the sonic attributes desired by today's sophisticated audiophile and music lover.

Direct comparison with preamplifiers of overly-complex tube design allows one to appreciate the advantages gained with the Modulus' simpler, more elegant circuitry. In high-resolution audio systems the ear quickly discerns a loss of clarity and immediacy created by every unnecessary active device, capacitor, resistor, etc. in the circuit path. "Simpler is better" and the Modulus' more open sound bears this out.

Ongoing research by Audible Illusions engineers has produced some startling insights into widely accepted vacuum tube design theory. For example, the popular voltage gain technique known as the "cascode section" imparts its own masking effect on the musical waveform. This is because, in cascode mode, the audio signal must pass through two active elements in series with a resultant loss of clarity. In a well-designed tube circuit the theoretical advantage of the cascode becomes both undesirable and unnecessary.

Unlike many other preamplifiers, the Modulus Three's phono stage uses active RIAA equalization with a specially-designed, low feedback circuit. Some designers argue that feedback is correction after the fact and that passive equalization is preferable. An important discovery we've made was that active RIAA can be a better choice IF the feedback can be applied optimally. Using a minimal feedback approach, compensation is kept to the point where the circuit is not overdriven. This preserves the integrity of the transient signals with minimal distortion.

Another conventional design technique involves the use of a "cathode follower" as an impedance transformer and output buffer. Again, accepted theory assumes the superiority of this technique. As with the cascode section, however, the cathode follower not only introduces an additional active device to further degrade the signal path, it also produces a dynamic imbalance due to its inability to discharge its load capacitance as efficiently as it is able to charge it. The resulting inequality between the positive and negative half-cycles of the audio signal cause abnormal phase shifts in the circuit's frequency response. This practice is unnecessary since more ingenious methods exist to sufficiently lower output impedance and improve drive capability.

How to design without cathode followers? In order to preserve the frequency extremes of the circuit, care must be taken to avoid the loading effect of the potentiometer. If the "pots" impedance is too high it will magnify the capacitance at its output and roll-off the high frequencies. Conversely, a low impedance potentiometer would minimize this effect but would impose serious demands on the output of the phono stage. This is one reason why cathode followers are so popular; their primary function is to supply current. However, Audible Illusions has designed a specialized active gain stage that provides the necessary current directly, eliminating the need for a cathode follower.

In the Modulus, paralleled tube triodes operate in class A mode at a high bias current allowing them to drive low impedance controls or amplifiers, even with long interconnect runs. The single line stage is run "full on" with no feedback applied. Dynamic range is preserved and the overload margin is better than twice that of conventional line amplifiers. This single gain stage does everything required of a high-level amplifier and incorporates only one coupling capacitor at its output. This unique design sets a new standard for rise time and transient response in vacuum tube designs.

In implementing our circuit topology, the importance of quality parts and PCB layout cannot be overstressed. For long-term reliability, the Modulus uses mil-spec components throughout. Imported vacuum tubes and premium 1% resistors are used with only specially designed polystyrene and polypropylene capacitors in the circuit path. Unique OFC, double-sided, "star-grounded" circuit boards feature bare copper traces sealed with a special heat resistant solder mask. Precision machined metal parts are of non-magnetic aluminum. The preamplifier features seven power supplies with the three main supplies fully regulated. The audio signal only sees the finest components available, and then, only when necessary.

Through our exercise in creatively simple, elegant circuit design, we believe a significant series of veils have been stripped from the audio signal path, allowing the listener an ever deeper involvement in the experience of recorded music.