



9762A

LEGENDS 500

MICROPHONE PREAMPLIFIER

Owner's Manual



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1 Welcome!

Thank you for purchasing your new Model 9762A Legends 500 Series microphone preamplifier! Before operating or installing the unit, please read this manual thoroughly and retain it for future reference. Additional copies of this manual are available upon request or from our website at <http://www.rtzaudio.com>.

All units are carefully packed to endure the rigors of shipping and handling. However, please inspect all contents and packaging immediately upon receipt. Please report any problems to us immediately. In the event of damage, retain all shipping and packaging materials for shipper damage claims inspection.

The 9762A is designed to deliver a lifetime of musical pleasure and trouble free operation. If you experience any problems or difficulties, please contact us directly. Do not attempt to modify, alter or repair the unit yourself. Each unit has been carefully tested and calibrated for proper operation. Any unauthorized modifications may destroy the unit or severely degrade performance and void the warranty.

2 Overview

The 9762 preamplifier is designed to emulate the vintage 1970s large format consoles (i.e. Neve 1073 Series) yet provide a more open and detailed sound by using modern components and transformers. We use a super high quality input transformer (manufactured by Lars Lundahl of Sweden) with excellent sonic performance. This transformer is considered by many to be one of the world's finest input transformers. The preamp gain blocks and gain structure have been carefully optimized to match the input transformer impedance characteristics as closely as possible. This combination of classic circuitry and a modern input transformer allows the 9762 to deliver a classic super fat sound with the benefit of increased high-end openness and clarity.

The standard unit contains a single channel of high gain amplification capable of providing up to 75 dB of gain. The microphone input and line output signals are fully transformer balanced and isolated. The (DI) instrument input is unbalanced. Standard features include +48V Phantom power, polarity (phase) reverse, DI input source select, microphone impedance select and HPF (high pass filter) options. The 9762A is a high performance preamplifier designed for the popular 500 Series modular rack style format. It is well suited for professional recording, sound reinforcement, broadcast or any application where a high quality preamplifier is required.

3 Installation and Connections

The 9762A is designed for standard API™ 500 Series compatible modular rack systems. Ideally, the rack should be mounted where cool air flows across the rack and modules. Do not obstruct the flow of air around and across or through the preamplifier module or rack. In tight equipment enclosures, consider placing a ventilated rack panel between racks to allow increased airflow. Do not place the rack or module unit near strong magnetic fields and noise sources such as power amplifiers, console power supplies, transformers, motors, florescent lighting, computers, etc.

3.1 Environmental Considerations

The 9762A is designed to operate reliably over a wide range of ambient temperatures. Always provide proper ventilation to avoid overheating conditions. This extends component life and provides maximum operational stability of the circuits. Ideally, the 500-series mainframe housing the module should be mounted in a rack where cool air flows around all sides of the rack and unit.

The 9762A is fully transformer isolated to help reduce interference and hum from outside sources. However, the unit should not be placed near strong magnetic fields or noise sources such as power amplifiers, power supplies, transformers, motors, florescent lighting, computers, etc. Mount the power supply away from the module rack or other audio gear to avoid magnetic field radiation. This is especially true of the line output transformer (or output transformers in any other modules, RTZ or not)

3.2 Cleaning the Unit

The 9762A is painted with a durable epoxy paint, but always use care not to scratch the finish or metal. Do not use harsh cleaners or chemicals to clean the unit or knobs. Use alcohol or a mild window glass cleaner with a cotton ball to clean the control surfaces. Do not spray any cleaners on the PCB or faceplate to avoid seepage into the unit and or possible damage to the PCB or components.

WARNING

NEVER INSERT THE 9762A MODULE INTO A RACK WITH POWER APPLIED; DOING SO WILL LIKELY DAMAGE THE MODULE AND VOID THE WARRANTY. NONE OF THE 500-SERIES RACKS ARE DESIGNED TO ALLOW HOT-SWAPPING MODULES. DOING SO COULD DAMAGE THE MODULE BEING INSTALLED, AND/OR OTHER MODULES ALREADY INSTALLED, AND/OR THE RACK ITSELF. TO AVOID DAMAGE, ALWAYS POWER THE RACK DOWN WHEN INSTALLING ANY MODULE.

3.3 Module Connections

Install the module in a 500 rack (always with the rack powered down) and verify that the XLR input and output cables are connected properly. In some cases you may wish to lift the ground wire from pin 1 of the output signal XLR cable to “float” the ground and create a “telescopic shield”. This method provides full ground loop isolation since the 9762A is fully transformer isolated.

The 9762A is designed for balanced mode operation as typically found in professional studio installations. While it can be wired for unbalanced operation, we highly recommend using balanced mode operation for reduced hum and interference. If you must wire the unit for unbalanced operation, keep the cables as short as possible. Connect pin-3 of the rack output signal connector to ground for unbalanced operation. Note: the transformer coupled output means that you **MUST** connect pin 3 to ground for unbalanced operation. It's best to carry pin-3 all the way to the unbalanced input and ground it there.

Power up the rack after all the I/O cables and connections are properly established. The 9762A VU and signal LED's should illuminate when the rack is powered up. If the LED's fail to illuminate, check that your mainframe has the correct +/- 16V power and that no fuses are blown.

Table 1: Edge Finger Pin Definitions

Pin#	Description
1	CHASSIS GROUND
2	OUTPUT '+' (+4 dBm)
3	N/C
4	OUTPUT '-' (+4 dBm)
5	AUDIO GROUND
6	N/C
7	N/C
8	INPUT '-' (+4 dBm)
9	N/C
10	INPUT '+' (+4 dBm)
11	N/C
12	+16 VOLTS DC
13	POWER GROUND
14	-16 VOLTS DC
15	+48 VOLTS DC

4 Design Features

The 9762A has been designed and built with great attention to detail. In particular, the input transformer and gain switching network have been painstakingly matched and optimized to present the proper load impedance to the microphone transformer (and hence, the microphone) at all gain settings. This refinement, combined with a super high quality input transformer, gives the 9762A a more detailed sound when compared to vintage units.

The module's PCB carrier and faceplate are made of heavy gauge steel for extra strength and maximum magnetic shielding. The PCB is a four layer design with full ground plane shielding to serve as a signal reference plane internally for maximum signal isolation and ground shielding.

4.1 Input Stages

The input transformers are optimized for 200-Ohm impedance microphones or other devices having 200-Ohm source impedance. The LO-Z impedance select switch configures the transformer input for either 50-Ohm (LO-Z) or 200-Ohm source impedance. Keep in mind that the impedance select switching is accomplished by configuring the input transformer primary wiring as either a series or parallel circuit, which affects the transformer's turns ratio. By nature, the impedance switching affects the signal level by roughly 6 dB when switching impedances. Miniature sealed gold contact relays are used for all audio switching functions and maximum reliability.

A separate high impedance FET buffer stage is used in the instrument direct input (DI) stage. The FET input buffer stage serves as a high impedance conversion stage designed to prevent loading of the instrument pickups. The DI switch allows manual selection of the DI or microphone input source. Additionally, the DI select switch may also serve as a channel mute switch when the DI or microphone input is not in use.

4.2 Phantom Power

The phantom power switching circuitry uses a smooth power ramping design to help reduce pops and clicks during switching. The phantom voltage ramps up slowly when enabled and ramps down quickly when disabled. Phantom power may also be completely disabled via DIP switch S1 located on the lower PCB near the edge fingers. Phantom power is fully protected against continuous shorting via each channel's current limiting resistors.

4.3 Gain Blocks and Metering

The 9762 provides up to 75 dB maximum gain using a dual gain block type design. Gain is selectable from -20 dB to -75 dB in 5 dB increments via the twelve position rotary switch. At higher gain settings (above -50 dB), a second gain block is inserted into the signal path for additional gain and increased headroom. The input signal stages are designed for maximum headroom throughout the audio path at any gain setting.

The SP (signal present) and OL (overload) LED's provide input stage signal monitoring. In normal use the OL should not light to prevent signal distortion. The signal quality degrades rather quickly once the OL threshold is reached. The SP and OL LED's monitor channel activity and clipping for the signal source currently selected by the DI switch.

The eight LED VU meter monitors the master output level from the line amplifier stage. The first LED lights at around -20 dB with subsequent steps at -10 dB, -6 dB, -3 dB, 0 dB, +3 dB, +10 dB and +18 dB. The master LEVEL control is used to trim the output level using the VU meter as a level reference.

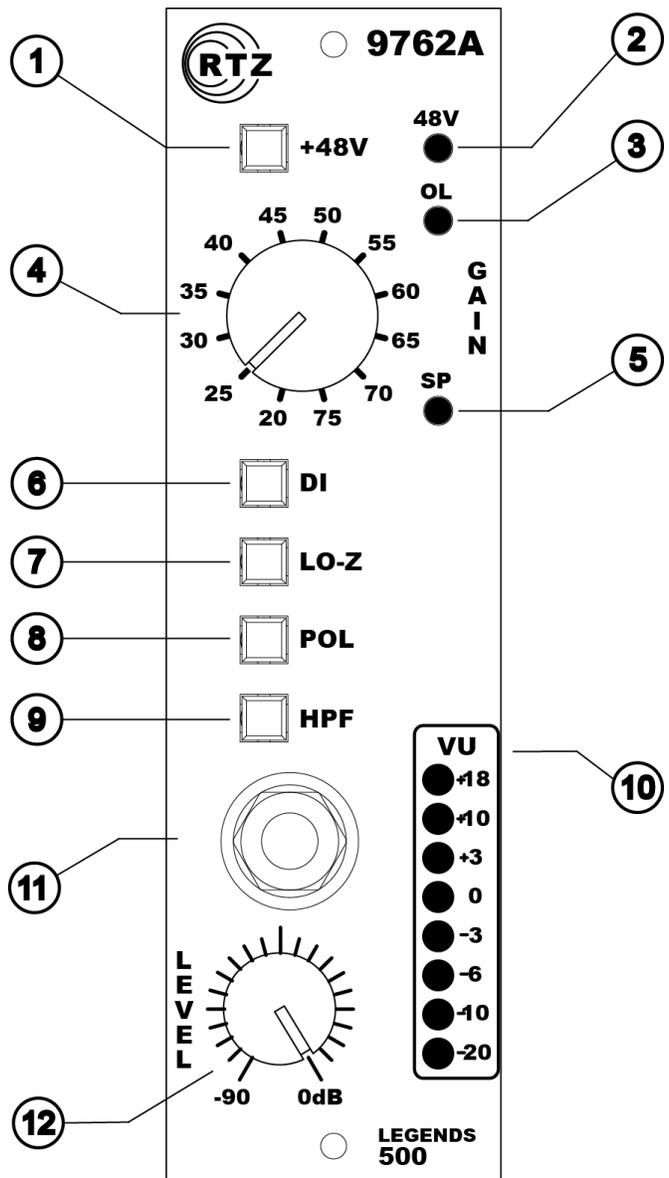
4.4 Line Amplifier Stage

The line amplifier stage input level is controlled by the master LEVEL control. The LEVEL control acts as a channel fader to trim the line amplifier output as needed. In general, the LEVEL control should be set to the maximum position (fully CW) and the input GAIN control is then adjusted to obtain the desired output signal level. If the output signal is slightly "hot", use the LEVEL control to trim the output level back to obtain the desired output signal level.

In situations where distortion or warmth is desired, the input GAIN setting may be set "hot" and the output LEVEL control is used to trim the output back to a suitable level. Use care with this technique to avoid overdriving the input stage excessively as the signal becomes very ugly sounding at extremes. Also, keep in mind the line amplifier stage is capable of delivering very large output level swings (around 40V peak-to-peak!); excessive signal levels could damage the input stages of gear being driven by the 9762.

5 Front Panel Controls

1. +48V Phantom Power Enable
2. +48V Power Status Indicator
3. Signal Overload (OL) Indicator
4. Gain Select Switch
5. Signal Present (SP) Indicator
6. Direct Input (DI) Source Select
7. Low-Z Microphone Impedance Select
8. Line Output Polarity Invert Select
9. 100 Hz High Pass Filter Enable
10. Line Output VU Meter Indicator
11. Direct Input - Unbalanced
12. Output Level Control



5.1 +48V Phantom Power Enable

This switch enables +48V phantom microphone power on the rear microphone input connector. The LED next to the switch lights when phantom power is active. The +48V switch controls circuitry that ramps the 48V power up or down gradually to reduce unwanted bangs or pops in the audio signal.

5.2 +48V Power Status Indicator

This LED indicates when phantom power is active. Note that the hardware switch S1 on the lower PCB near the edge fingers can be used to completely disable phantom power to the microphone; this feature is useful to protect ribbon microphones when used with the 9762A.

5.3 Overload Signal (OL) Indicator

This LED indicates signal overload/clipping conditions at the input gain block stages. In normal use the LED should not light or flicker. Reduce the input GAIN switch to lower the input gain and avoid clipping.

5.4 Gain Select Switch

The rotary gain switch has twelve positions that select the input sensitivity in 5 dB increments from -20 dB to -75 dB for a maximum gain of 75 dB. The unit is set to maximum gain in the fully CW position. Always start at the lowest gain setting and increase the gain to obtain the desired output level.

5.5 Signal Present (SP) Indicator

The SP LED indicates signal activity on the microphone input. The detector is sourced from the gain blocks prior to the line amplifier and output LEVEL control. This LED lights at around -30 dBu (referenced to 775 mV) to indicate activity.

5.6 Direct Instrument (DI) Source Select

The DI switch selects the preamp input signal from either the unbalanced DI input jack or the balanced Microphone Input connector on the rear panel. The DI input jack is selected in the depressed position; otherwise the balanced XLR microphone input connector is selected. Note that the DI switch may also serve as a "MUTE" switch when only one input source is being used.

5.7 Low-Z Microphone Impedance Select

This switch configures the input transformer for Low-Z impedance mode. The input transformer and circuitry is optimized for 50-Ohm microphones or other devices having 50-Ohm source impedance. In the non-depressed state the input transformer is configured for 200-Ohm source impedance. Note that the input signal level varies by approximately 6 dB when the switch is operated. Adjust the gain switch to compensate for the level change and to avoid masking the tonal differences between impedance settings when changing impedances.

5.8 Line Output Polarity Invert Select

This switch inverts the line output polarity (phase) in the depressed position. Normally the unit will be used with polarity in the non-inverted state, however you may use this switch to reverse the polarity if needed.

5.9 100 Hz High Pass Filter Enable

This switch enables the 100 Hz high pass filter (HPF). The HPF is 3dB down at 100 Hz and attenuates signals below this at a rate of 12 dB per octave. The HPF is useful to cut unwanted low frequency signals when less low frequency content is desired.

5.10 Line Output VU Meter Indicator

The eight LED's provide output VU Meter level indication sourced from the line output amplifier at +18, +10, +3, 0, -3, -6, -10 and -20 dB. The "0" LED indicates 0 dB output level referenced to +4 dBm.

5.11 Direct Input (DI) - Unbalanced

The Direct Input is designed for use with instrument sources and is buffered by a Hi-Z FET stage to avoid instrument pickup loading. The input connector accepts standard ¼" Phone Plugs in either TS (Mono – TIP, SLEEVE) or TRS (Stereo – TIP, RING, SLEEVE). Note that when TRS connectors are used, the RING and SLEEVE are both referenced to ground internally. The DI input may also be used as an unbalanced direct input, however, line level +4 dBu signal levels will most likely result in distortion. In this case, the signal level should be reduced from the source.

5.12 Output Level Control

The output level control acts as a master fader to facilitate fine trimming of the output signal level from -90 to 0 dB as required. In normal operation this control should be set to maximum level (fully CW position) and then trimmed back as needed to obtain the desired output signal level.

6 Operation

The 9762A is designed for convenience and ease of use. In general you should experiment with a variety of microphones, placements and settings to achieve best results. The 9762A works well with all types of balanced microphones (dynamic and condenser) and is exceptionally suited for use with ribbon type microphones.

The preamplifier may be located in the studio control room or in the recording room itself. Ideally there should be a minimum of additional cables, boxes or connectors between the unit and the microphones for best results. The use of high-quality microphones and cables with gold contacts are highly recommended.

6.1 Gain and Level Adjustments

In normal use the output LEVEL control should be set to the maximum position (fully CW). The LEVEL control acts as a master fader control for overall output level adjustment. The line amplifier input stage is sourced from the LEVEL control and provides up to 10 dB gain. Thus, the output LEVEL control is used for any adjustment or trimming of the master output level.

Typically the line output of the preamplifier directly feeds a track on a recorder or other piece of inline gear. Always start with the lowest setting on the GAIN switch (fully CCW in the –20 dB position) and increase the sensitivity to obtain the desired record level. If the output level is slightly higher than desired, trim the output level back using the LEVEL control.

The SP signal present indicator lights to indicate signal activity. Under normal operation, the OL overload indicator should not light for the most accurate results. Any clipping of the input stages will result in distortion. If clipping occurs, reduce the input GAIN sensitivity switch to an acceptable level. The output VU meter allows monitoring the output signal level while adjusting the GAIN and LEVEL controls.

6.2 Using the DI Input

Recall the DI source select switch selects the front panel instrument input jack in the depressed state. The DI input is primarily designed for use with electric guitar, bass or similar instruments. The DI input may also be used with other sources such as electronic keyboards if the source's output signal level is kept to a reasonably low level. However, line level signals of +4 dBm or greater will most likely result in distortion. The DI input is NOT a line input.

The DI switch also serves as a mute switch when only one input source is being used (either the DI input jack or the microphone input). For instance, if you are only using the microphone input and no cable is plugged into the DI instrument input, press the DI switch to mute the microphone input. The DI switch was added for this purpose rather than automatic DI jack insert switching.

6.3 Polarity and Impedance Selection

The POL polarity switch inverts the polarity (or phase) of the line output transformer. When the POL switch is depressed a relay inverts the line output transformer polarity. In most situations the polarity will be used in normal phase with the POL switch in the non-depressed state.

Low impedance microphone operation is enabled when the LO-Z impedance switch is in the depressed state. In most cases low impedance is desired for 50-Ohm impedance microphones. Most modern microphones expect a bridging load and the 9762's input circuitry accommodates this when the impedance switch is OUT.

Experiment with the LO-Z feature using a variety of microphones to obtain the best sound and tonal qualities. Note that the signal level is affected by roughly 5-6 dB when switching ratios. Adjust the GAIN switch to compensate for the level change and to avoid masking tonal changes as compared to the signal level change.

6.4 Using 48V Phantom Power

Notice the 48V LED gradually lights or dims when power is applied or removed. Special ramping circuitry ramps the voltage up and down when power is applied or removed to reduce large pops or bangs in the signal output. Allow a second or two for the phantom power to reach full voltage when enabled.

The phantom circuitry is protected against shorts for extended durations and provides up to 14 mA of current for each channel. However, you should always ensure the microphone or other phantom powered device is working properly when using phantom power. Improper use of phantom power may damage some microphones or other devices connected to the microphone input that are not intended for use in the presence of phantom power.

6.5 Line Output Transformer Termination

Jumper JP1 (see the Hardware Configuration Features section) on the lower PCB is used to enable or select the termination resistor on the line output transformer secondaries. In most situations termination should be enabled to assure the flattest frequency response. However, you may also disable termination to affect the sound in different ways depending on the source impedance. In many cases removing termination adds a slight amount of "air" to the signal due to the gentle HF rise property of the output transformer when operating un-terminated.

7 Hardware Configuration Features

The 9762A is equipped with a number of hardware configuration features that may be controlled via jumpers and a DIP switch. The phantom power feed may be completely disabled and disconnected from the microphone input signal lines if desired. Configuration options are also available for the output transformer impedance strapping and termination.

7.1 Phantom Power Enable Switch (S1)

DIP switch S1 (see Figure 1) allows disabling all phantom power from the balanced microphone input lines. No phantom power can be applied to the microphone when this switch is disabled regardless of the +48V switch setting on the front panel. Although the +48V LED will continue to glow when the front panel +48V switch is enabled, no power flows to the microphone if S1 is on the OFF position.

Note that switch S1 is provided to ensure that phantom power can never be applied to a microphone by the preamp. Since certain types of microphones (ribbon, etc.) may be damaged by the application of phantom power, the 48V enable switch allows you to dedicate the preamp for use with microphones that can't tolerate phantom power.

7.2 Line Output Transformer Strapping (JP2)

The line output transformer has dual secondaries that can be configured in series or parallel mode via JP2 (see Figure 1). The table below shows the jumper settings for both strapping modes available. Note you should also change the termination select jumper JP1 to match line impedance strapping configuration for best frequency response.

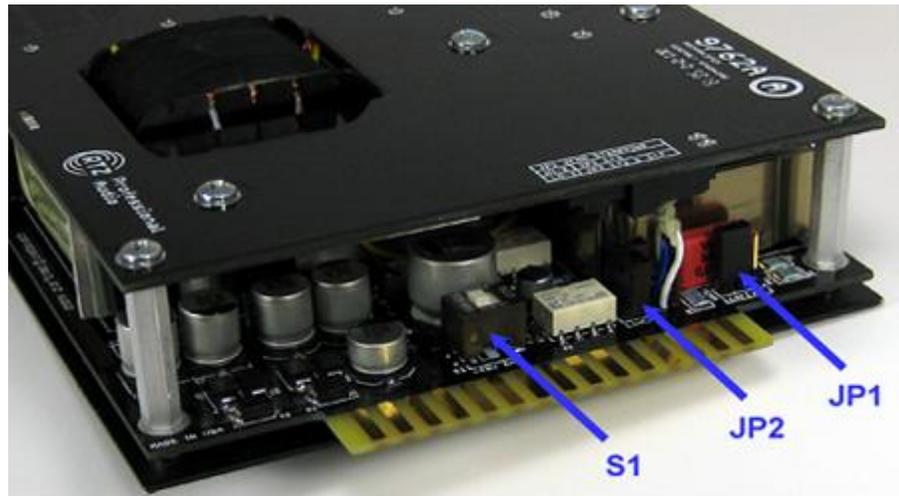
Table 2 – JP2 Output Transformer Strapping

Impedance	Jumper Settings
HI-Z (1.2K Ω)	Jumper Pins 1+3
LO-Z (600 Ω)	Jumper Pins 1+2 and 3+4

7.3 Line Output Transformer Termination (JP1)

Jumper JP1 (see Figure 1) allows selecting the transformer termination resistor to either 1.5K or 600 ohms. Note that the termination resistor should be set to match the line out transformer secondary strapping configuration as listed in Table 2.

Figure 1 – 48V Enable Switch and Transformer Jumpers



7.4 48V LED Configuration Options (JP3)

The 48V phantom LED may be configured to indicate the presence of phantom power in two modes. The use of external microphone splitter transformers (mainly in live sound) opens up the possibility that phantom power may be “back fed” into another preamp via the splitter transformer. If another preamplifier is connected to the splitter and is supplying phantom 48V, then the other preamplifier could see 48V applied to its input from the other preamp on the splitter as well.

Table 3 - 48V LED Indicator Configuration Jumper



Jumper JP3 allows for three configuration options for the +48V LED on the front panel as shown in the following table.

Table 4 – JP3 Front Panel 48V LED Configuration Options

Mode	JP3	Description
Auto	1 & 2	48V LED glows if the +48V phantom power switch is enabled or the unit is being “back fed” 48V from another microphone input source through a microphone splitter or other external source.
ON	2 & 3	The 48V LED only lights if the +48V phantom power switch is enabled. The LED will not light even if the unit is being “back fed” phantom power into the microphone input from another source.
OFF	(none)	The 48V will never light regardless of whether or not phantom is being applied internally or externally.

The 9762A ships with the 48V LED configured for “Auto” (pins 1 & 2) mode as the default mode operation. This is the preferred mode of operation in most cases and the 48V LED will indicate the presence of phantom power either internally by 9762A or externally from another source.

Note that you can completely disable the phantom power and LED via JP3 and the S1 DIP switch. The 48V LED can be disabled via JP3 and the power can be disabled via S1 such that all phantom power and features are disabled. Thus, the preamp can never apply phantom power to a microphone and the 48V LED and front panel switch are effectively disabled. These features allow you to dedicate the preamp module for use with non-phantom microphones if desired.

When S1 is used to defeat the possibility of phantom powering, it also disconnects the phantom feed resistors from the input wiring, resulting in the highest possible input impedance at the microphone input. This is the preferable way to use the preamp with ribbon microphones, however you may need the ability to use the 9762A with either type, in which case leaving S1 set for phantom powering is the proper option.

S1 is mounted somewhat internally to the module, and is not really meant to have its setting changed frequently. This causes wear to the edge connector contacts, which was not meant for frequent mate/unmate cycles.

8 Specifications

Recommended Source Impedance	200Ω balanced
Recommended 9762A Load:.....	Low-Z (600Ω)
Maximum Input Level	0 dBu
Output Level.....	+27 dBu Maximum
Maximum Gain	75 dB
Frequency Response	20 Hz to 50 kHz ±1.5dB
Output Distortion (THD+n).....	1% THD, 22kHz B/W Low-Z mode, 150-Ohms source, 27 dBu
Input Sensitivity	-75 dBu to -20 dBu for +4 dBu output
Input Referred Noise	-106dBu Unweighted Noise, Lo Z Mode 22kHz Bandwidth
Power Requirements.....	+/-16 VDC, 120mA
Temperature Range	10 C to 50 C
Shipping Weight	Approximately 2 lbs
Dimensions	5.25" (H) x 1.5"(W) x 5.6"(L)

9 LIMITED WARRANTY

RTZ Audio warrants this product to be free of defects in material and workmanship for a period of 5 years to the original owner. This warranty is enforceable by the original purchaser and is transferable to a subsequent single owner via resale by the current owner. The current owner must provide positive dated proof of the original purchase in the form of the original sales receipt, original canceled check, or other form of positive original proof.

To request warranty service, the owner must call or contact RTZ Audio in writing to obtain a return authorization and instructions concerning shipment. All authorized returns must be sent to RTZ Audio postage prepaid, insured and properly packaged. We recommend using a shipping method that provides delivery tracking. All warranty service returns must include positive proof of purchase, such as a copy of the sales invoice, from the original sale.

During the warranty period RTZ Audio shall, at its sole and absolute option, either repair or replace free of charge any product that proves to be defective upon inspection by RTZ Audio or an authorized repair representative.

This warranty does not cover claims for damage due to abuse, neglect, alteration or attempted repair by unauthorized personnel and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

IN NO EVENT WILL RTZ AUDIO BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES RESULTING FROM THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING AMONG OTHER THINGS, DAMAGE TO PROPERTY, DAMAGE BASED ON INCONVENIENCE OR ON LOSS OF USE OF THE PRODUCT, AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusion 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. This warranty only applies to products sold and used in the United States of America. For warranty information in all other countries, please contact RTZ Audio directly.

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