



PEQ-1549

LEGENDS 500

PARAMETIC EQUALIZER

Owner's Manual



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Atlanta, GA USA
<http://www.rtzaudio.com>

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TABLE OF CONTENTS

1	WELCOME!	1
2	OVERVIEW	1
	2.1 FREQUENCY RANGE	1
	2.2 I/O DESCRIPTION.....	2
3	FRONT PANEL CONTROLS	3
	3.1 SIGNAL PRESENT AND OVERLOAD INDICATOR LED'S.....	4
	3.2 POWER STATUS INDICATOR LED.....	4
	3.3 EQ ENABLE.....	4
	3.4 LOW-PASS CORNER FREQUENCY.....	4
	3.5 HIGH-PASS CORNER FREQUENCY	4
	3.6 FILTER ENABLE	4
	3.7 HF SHELF MODE ENABLE	4
	3.8 HF CUT/BOOST.....	4
	3.9 HF CENTER FREQUENCY	4
	3.10 HF HIGH-Q ENABLE	5
	3.11 HF AIR BAND MODE SHIFT.....	5
	3.12 HM CUT/BOOST	5
	3.13 HM CENTER FREQUENCY	5
	3.14 HM HIGH-Q ENABLE.....	5
	3.15 HM 2X BAND MODE SHIFT.....	5
	3.16 LM CUT/BOOST.....	5
	3.17 LM CENTER FREQUENCY.....	5
	3.18 LM HIGH-Q ENABLE SWITCH.....	5
	3.19 LF SHELF MODE ENABLE.....	5
	3.20 LF CUT/BOOST	6
	3.21 LF CENTER FREQUENCY.....	6
	3.22 LF HIGH-Q ENABLE	6
4	FILTER RESPONSE PLOTS	7
5	INSTALLATION AND CONNECTIONS	9
	5.1 ENVIRONMENTAL CONSIDERATIONS.....	9
	5.2 CLEANING THE UNIT.....	9
	5.3 MODULE CONNECTIONS.....	10
6	USING THE PEQ-1549	11
	6.1 EQ BASICS	11
	6.2 CONTROL SETTINGS	11
7	SPECIFICATIONS	12
8	BLOCK DIAGRAM	13
9	LIMITED WARRANTY	14

1 Welcome!

Thank you for purchasing your new PEQ-1549 parametric equalizer. 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 PEQ-1549 is designed to deliver a lifetime of 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 packed prior to shipment. Any unauthorized modifications may destroy the unit or severely degrade performance and void the warranty.

2 Overview

The PEQ-1549 is a parametric equalizer designed for the popular 500 Series modular rack style format. It is well suited for professional recording, sound reinforcement, broadcast or any application where high quality equalization is required.

The PEQ-1549 is a four band state-variable parametric equalizer with high-pass and low-pass filter section. The state-variable design allows the filter parameters in each band to be varied independently and without interaction. The four bands cover frequencies up to 35 kHz and are divided as follows:

2.1 Frequency Range

HF	High Frequencies (dual band) Normal mode: 1.5 kHz to 16 kHz Air-Band Mode: 3.4 kHz to 35 kHz
HM	High-Mid Frequencies (dual band) Normal Mode: 350 Hz to 7.5 kHz 2X Band Mode: 680 Hz to 16 kHz
LM	Low-Mid Frequencies from 210 Hz to 2.3 kHz
LF	Low Frequencies from 30 Hz to 320 Hz

Additionally, the PEQ-1549 contains a high-pass and low-pass filter section that may be switched in/out as needed for maximum flexibility. The filter provides the following filter sections:

HP	High-Pass (Low-Cut) from 25 Hz to 1.2 kHz
LP	Low-Pass (High-Cut) from 2.5 kHz to 35 kHz

2.2 I/O Description

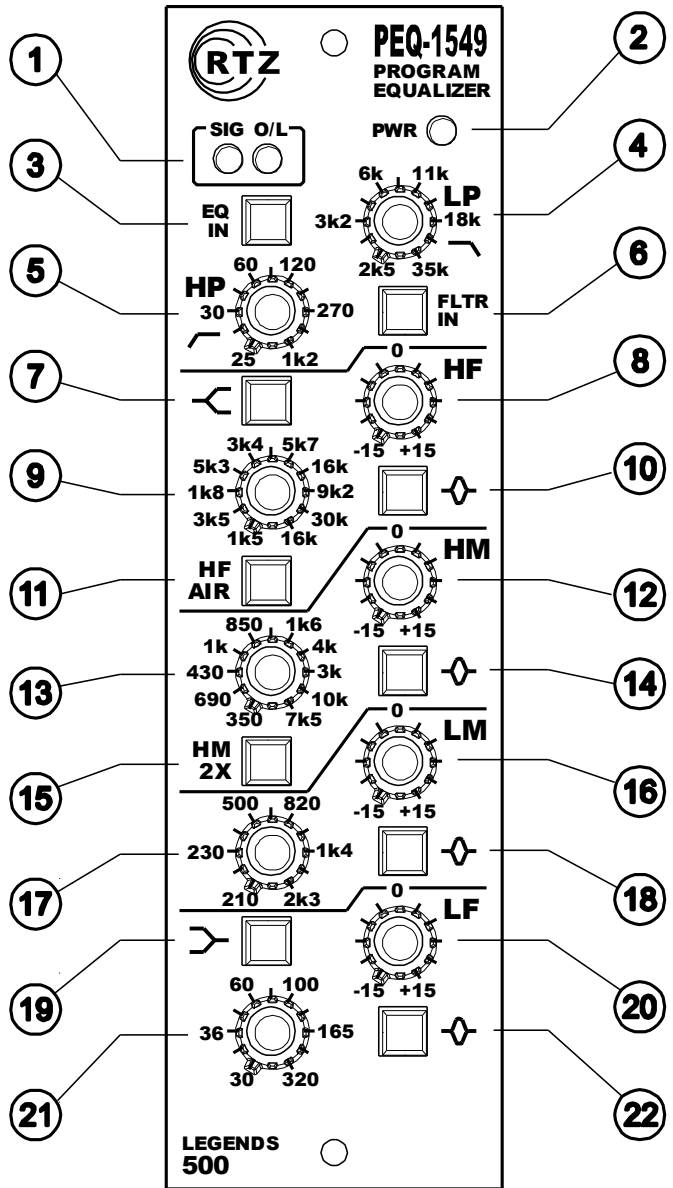
The PEQ uses a balanced line driver capable of driving balanced or unbalanced loads. An isolation transformer is available as an accessory at extra cost. It mounts within the module and must be ordered at time of purchase. The input stage is a fully differential solid-state receiver with exceptional low distortion performance and high CMRR. Both stages provide generous headroom and excellent distortion performance.

Table 1: Edge Finger Pin Definitions

PIN	DESCRIPTION
1	CHASSIS GROUND
2	OUTPUT '+' (+4 dBm)
3	OPTION-B (1/4" TIP)
4	OUTPUT '-' (+4 dBm)
5	AUDIO GROUND
6	STEREO LINK
7	OPTION-A (1/4" RING)
8	INPUT '-' (+4 dBm)
9	OPTION-A (1/4" TIP)
10	INPUT '+' (+4 dBm)
11	N/C (GAIN ADJ, BUSS FEED)
12	+16 VOLTS DC
13	POWER GROUND
14	-16 VOLTS DC
15	+48 VOLTS DC

3 Front Panel Controls

1. Signal Present and Overload Indicator LED's
2. Power Status Indicator LED
3. EQ Enable
4. Low-Pass Filter Corner Frequency
5. High-Pass Filter Corner Frequency
6. High/Low Pass Filters Enable
7. High-Frequency Shelf Mode Enable
8. High-Frequency Cut/Boost
9. High-Frequency Center Point
10. High-Frequency High-Q Enable
11. High-Frequency Air Band Mode Select
12. High-Mid Cut/Boost
13. High-Mid Frequency Center Point
14. High-Mid High-Q Select
15. High-Mid 2X Band Shift Enable
16. Low-Mid Cut/Boost
17. Low-Mid Frequency Center Point
18. Low-Mid High-Q Select
19. Low-Frequency Shelf Mode Enable
20. Low-Frequency Cut/Boost
21. Low-Frequency Center Point
22. Low-Frequency High-Q Select



3.1 Signal Present and Overload Indicator LED's

The SIG LED indicates when a signal is present at the output of the EQ and illuminates at -20dBu. The O/L illuminates at +20dBu output level to indicate the unit is near clipping.

3.2 Power Status Indicator LED

This LED indicates the unit is powered and ready for operation when illuminated.

3.3 EQ Enable

The EQ is engaged via direct relay bypassing when this switch is in the depressed state. The ENTIRE unit is hard-wire bypassed when the switch is in the OUT position or if the power supply should fail. Refer to the Block Diagram in Section 7.

3.4 Low-Pass Corner Frequency

This control selects the LP filter (high-cut) corner frequency. All frequencies above the corner frequency will be attenuated 12dB/octave while all frequencies below cutoff are passed.

3.5 High-Pass Corner Frequency

This control selects the HP filter (low-cut) corner frequency. All frequencies below cutoff will be attenuated at 12dB/octave while all frequencies above cutoff are passed.

3.6 Filter Enable

This switch enables the HP and LP filter section. The filters are enabled with this switch in the depressed state and disabled in the non-depressed state. Refer to the Block Diagram in Section 7.

3.7 HF Shelf Mode Enable

This switch enables the HF shelf mode operation for the HF band. The EQ works in normal peak/dip mode when the shelf switch is in the non-depressed state and the HF control sets the center frequency point. In the depressed state, the EQ operates in shelf mode and the HF control selects the corner frequency. In shelf mode frequencies above the corner are boosted or cut up to the corner frequency, after which the boost or cut action flattens out and the gain remains constant for frequencies above the corner frequency. Note the High-Q switch has no effect when shelf mode is active.

3.8 HF Cut/Boost

This control boosts or cuts the frequency set by LF control up to +/-15dB. The LF response is flat with this control set to the center position.

3.9 HF Center Frequency

This control sets the HF center point frequency for shelf and peak/dip mode. Normally the HF frequency range is from 1.5 kHz to 16 kHz.

3.10 HF High-Q Enable

This switch enables High-Q filter response when depressed and the filter has very sharp peak/dip response in this mode. The response is broad in the non-depressed state.

3.11 HF AIR Band Mode Shift

This mode shifts the HF response range to the air range of 3.4 kHz to 35 kHz. Normally the HF response is from 1.5 kHz to 16 kHz with this switch in the non-depressed state.

3.12 HM Cut/Boost

This control boosts or cuts the frequency set by HM control up to +/- 15dB. The HM response is flat with this control set to the center position.

3.13 HM Center Frequency

This control sets the HM center point frequency for shelf and peak/dip mode. Normally the HM response range is from 350 Hz to 7.5 kHz.

3.14 HM High-Q Enable

This switch enables High-Q filter response when depressed and the filter has very sharp peak/dip response in this mode. The response is broad in the non-depressed state.

3.15 HM 2X Band Mode Shift

This mode shifts the HM response range to 680 Hz to 16 kHz. Normally the HM response is from 350 Hz to 7.5 kHz with this switch in the non-depressed state.

3.16 LM Cut/Boost

This control boosts or cuts the frequency set by LF control up to +/-15dB. The LF response is flat with this control set to the center position.

3.17 LM Center Frequency

This control sets the LM center point frequency for shelf and peak/dip mode. Normally the LM frequency range is from 210 Hz to 2.3 kHz.

3.18 LM High-Q Enable Switch

This switch enables High-Q filter response when depressed and the filter has very sharp peak/dip response in this mode. The response is broad in the non-depressed state.

3.19 LF Shelf Mode Enable

This switch enables the LF shelf mode operation for the LF band. The EQ works in normal peak/dip mode when the shelf switch is in the non-depressed state and the LF control sets the center frequency. In the depressed state, the EQ operates in shelf mode and the LF control selects the corner frequency. In shelf mode frequencies below the corner are boosted or cut up to the corner frequency, after which the boost or cut action flattens out and the gain remains constant for frequencies

below the corner frequency. Note the High-Q switch has no effect when shelf mode is active.

3.20 LF Cut/Boost

This control boosts or cuts the frequency set by LF control up to +/-15dB. The LF response is flat with this control set to the center position.

3.21 LF Center Frequency

This control sets the LF center point frequency for shelf and peak/dip mode. The LF frequency range is from 30 Hz to 320 Hz.

3.22 LF High-Q Enable

This switch enables High-Q filter response when depressed and the filter has very sharp peak/dip response in this mode. The response is broad in the non-depressed state.

4 Filter Response Plots

The following plots illustrate various examples of the equalizers frequency shaping capabilities.

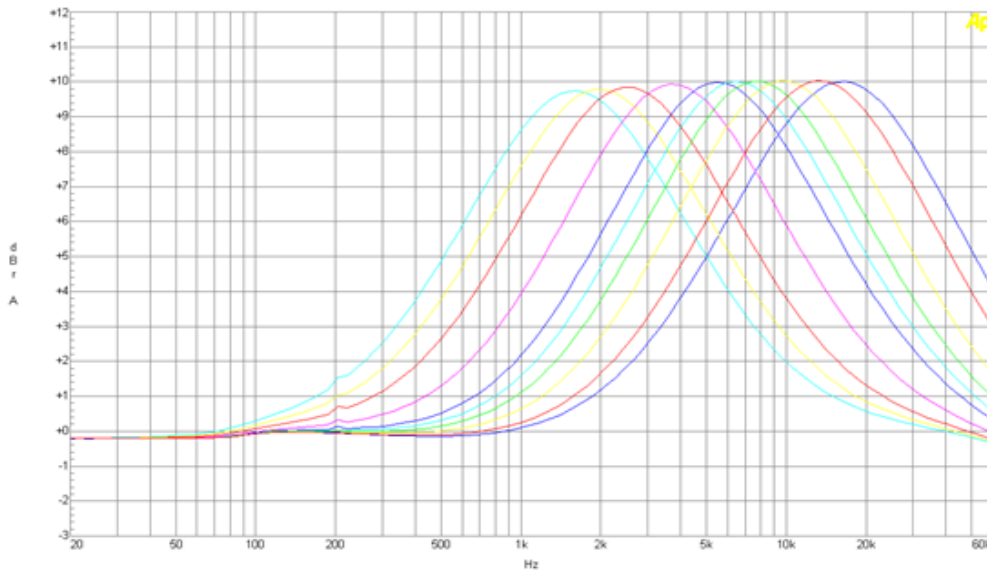


Figure 1: HF Boost at Various Points

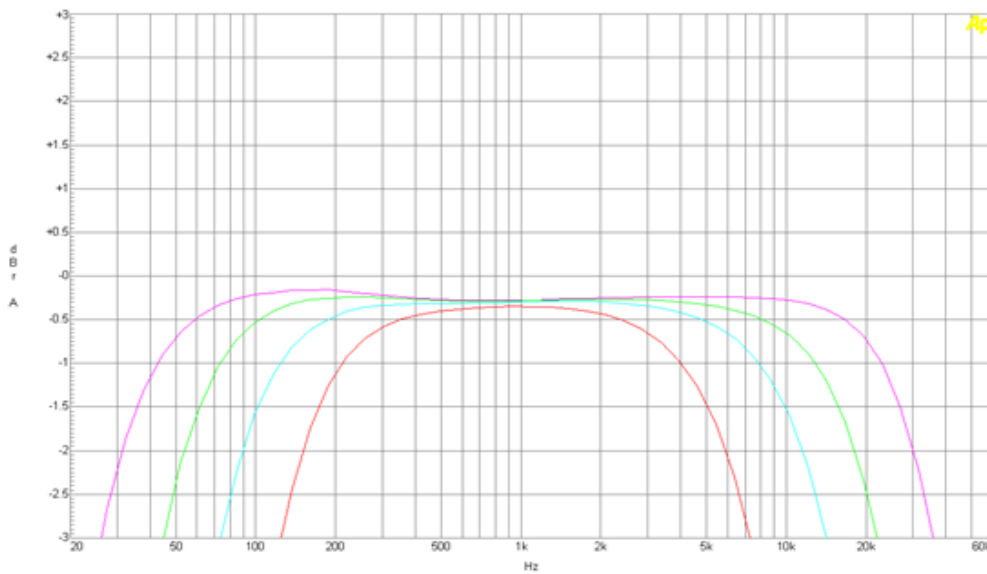


Figure 2: Combined LP and HP Filter

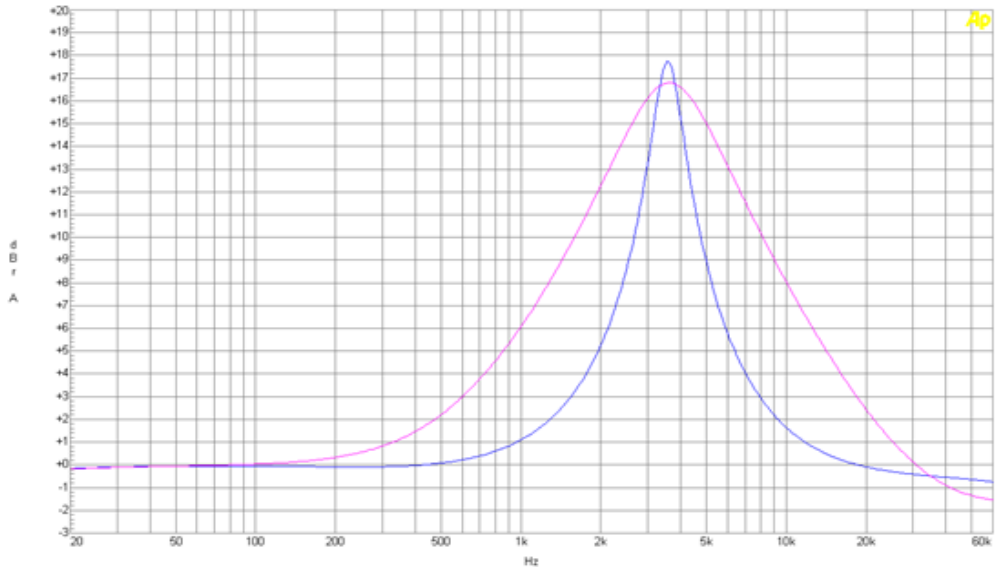


Figure 3: Normal and High-Q Mode

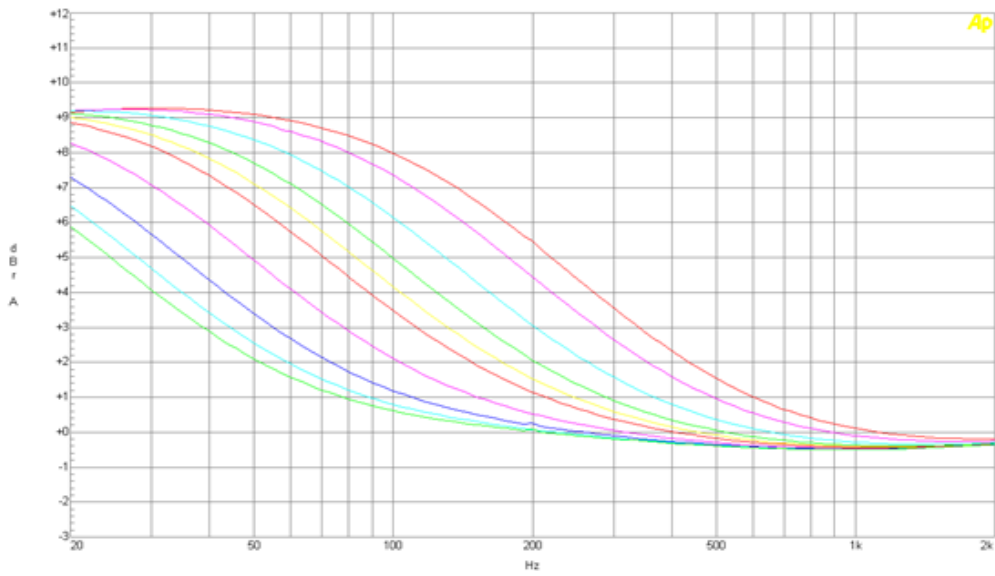


Figure 4: LF in Shelf Mode

5 Installation and Connections

The PEQ-1549 is designed for mounting in a standard 500 Series modular racks. In general the unit should work in any 500 Series compliant modular rack system providing +/-16V power at 120mA current per slot (e.g. API Lunch, Radial Workhorse). However, many types of racks and power supplies are available from various manufacturers, thus we can only guarantee the published performance specifications when used in the RTZ Audio UX410 rack system. Do not install the module in any rack not meeting the specifications listed in this document or damage and/or poor performance may occur.

5.1 Environmental Considerations

The PEQ-1549 is designed to operate reliably over a wide range of ambient temperatures. Always provide proper ventilation to avoid overheating conditions. This will extend component life and provide maximum operational stability of the circuits. Ideally, the module should be mounted in a rack where cool air flows around all sides of the rack and unit.

The PEQ-1549 is fully shielded by a durable steel enclosure to help reduce any interference from outside magnetic radiation. 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 if you have the optional output transformer (or output transformers in any other modules, RTZ or not)

5.2 Cleaning the Unit

The PEQ-1549 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. You may use alcohol or a mild window glass cleaner with a cotton ball to clean the control surfaces. Do not spray any cleaners on the unit or faceplate to avoid seepage into the unit and possible damage.

WARNING

NEVER INSERT THE PEQ-1549 MODULE INTO A RACK WITH POWER APPLIED; DOING SO WILL LIKELY DAMAGE THE EQ 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.

5.3 Module Connections

Install the module in a 500 rack and verify 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 XLR cable to “float” the ground and create a “telescopic shield”. This provides ground loop isolation if the PEQ-1549 has the output transformer option installed.

The PEQ-1549 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.

Power up the rack after all the I/O cables and connections are properly established. The PEQ-1549 power indicator LED should illuminate when the rack is powered up. If the LED fails to illuminate, check that your module rack has the correct +/- 16V power and that no fuses are blown. The LED only illuminates if both +/- power rails are available.

6 Using the PEQ-1549

There are no hard and fast rules for using any equalizer. Generally you should let your ears be the judge and experiment with various settings in order to achieve the proper sound balance best suited to your tastes. The PEQ-1549 can provide gentle equalization curves or it can provide aggressive cut and boost that allow you to carve up frequency bands in a variety of ways. Therefore, we suggest you liberally experiment with the EQ on a variety of source materials to become familiar with the sound and features of the unit.

6.1 EQ Basics

The PEQ-1549 contains four state variable filters that form the four parametric EQ sections with cut, boost, high-q and shelf mode options. The HP/LP filter section contains a high-pass and low-pass shelf type filter that limits the high or low frequency pass points.

A high-pass filter passes all signals above the corner frequency set by the HP control and gradually attenuates all signals 3dB below the corner frequency. It may be helpful to think of this as a “low-cut” filter. So, with the HP filter set at 60Hz, all frequencies below 60Hz will be attenuated and all frequencies above 60Hz will be passed. Note: the filter action below the corner frequency is gradual. This is NOT a “brick-wall” filter.

A low-pass filter attenuates all signals 3db above the corner frequency set by the LP control and passes all signals below the corner frequency. It may be helpful to think of this as a “high-cut” filter. Likewise, with the LP filter set at 6kHz, all frequencies above 6kHz will be attenuated and all signals below 6kHz will be passed. Note: the filter action above the corner frequency is gradual. This is NOT a “brick-wall” filter.

6.2 Control Settings

Generally it's best to start with all the cut/boost controls in the center zero position and the HP/LP filter section in bypass mode. The unit will pass all signals in unaltered form with all cut/boost controls centered and the HP/LP filters bypassed. You should be able to switch the equalizer in and out using the EQ IN switch with no noticeable effect on the audio or signal levels.

Once you've established the base center points, you should then experiment with the HF, HM, LM and LF frequency controls and then cut or boost to explore with your ears. The HI-Q switch shifts the peak/dip response into a sharp curve to allow isolating particular frequencies. The peak/dip response is fairly broad with the HI-Q switch disabled in the out position and gives wide cut/boost response around the center frequency.

The HF and LF controls also operate in shelf mode by with the shelf switch (switches #7 and #19) in the depressed state. In shelf mode the HF response attenuates everything below the center frequency, while the LF shelf mode attenuates everything above the center frequency. Note the HI-Q control for the associated band has no effect when shelf mode is enabled.

7 Specifications

Input Level.....	+4 dBu Nominal +24.5 dBu Maximum
Output Level.....	+4 dBu Nominal +27.5 dBu Maximum
Input Impedance	48K Ohms Differential
Output Impedance.....	50 Ohms
Output Distortion (THD+n).....	0.003% @ 1kHz (22Hz to 22kHz @ +24dBu)
Frequency Response	10Hz (-0.5dB) to 50kHz (-0.5dB) Test Conditions: +4dBu input signal All Cut/Boost Controls at "0"
Residual Noise Measurement	-85dBu (22Hz-22kHz) -75dBu (10Hz-80kHz) Test Conditions: Balanced Input 150 Ohms Source Impedance All Cut/Boost Controls at "0"
Power Requirements.....	+/-16 VDC, 130mA
Temperature Range	10 C to 50 C
Shipping Weight	Approximately 1.7 lbs
Dimensions	5.25"(H) x 1.5"(W) x 5.6"(L)

NOTE: All controls are set to FLAT (no cut or boost) with the EQ and FILTER engaged for input/output level measurements, distortion/noise measurements and frequency response measurements.

8 Block Diagram

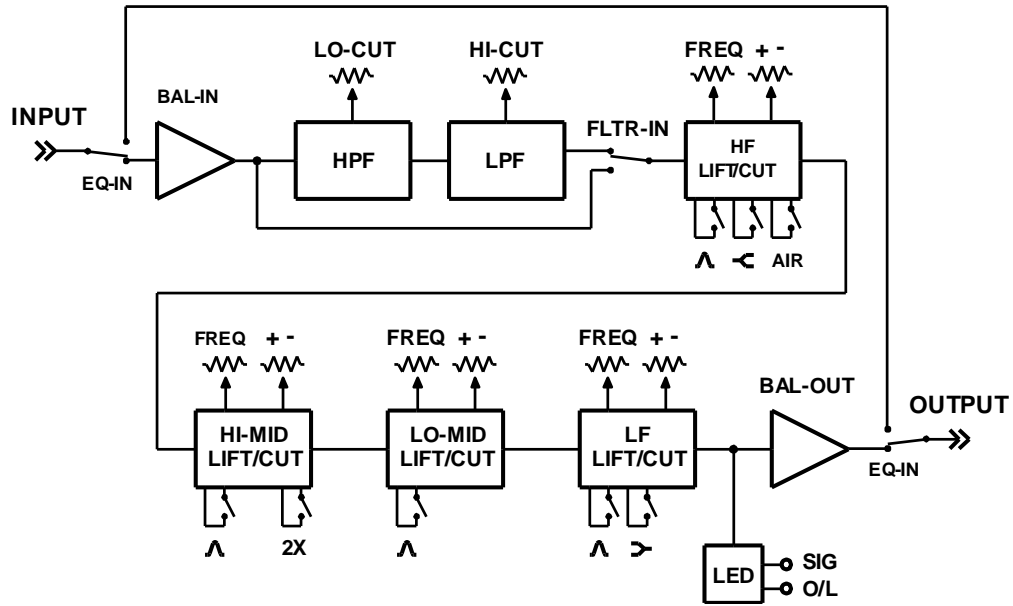


Figure 5: Block Diagram

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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