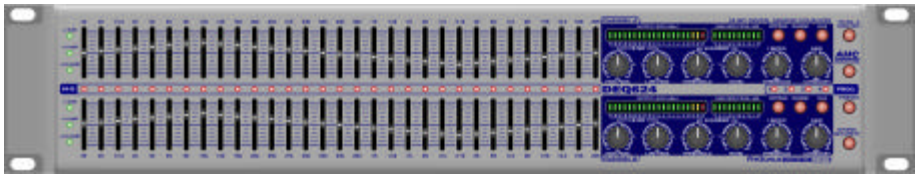
DEQ 624

Digital Stereo Graphic Equalizer
Plus Dynamics Processing



User's Manual

DEQ 624

D I G I T A L S T E R E O E Q U A L I Z E R

P L U S D Y N A M I C S P R O C E S S O R

USERS MANUAL

Version 1.0

PreSonus Limited Warranty

PreSonus Audio Electronics Inc. warrants this product to be free of defects in material and workmanship for a period of one year from the date of original retail purchase. This warranty is enforceable only by the original retail purchaser. To be protected by this warranty, the purchaser must complete and return the enclosed warranty card within 14 days of purchase. During the warranty period PreSonus shall, at its sole and absolute option, repair or replace, free of charge, any product that proves to be defective on inspection by PreSonus or its **authorized service representative**. To obtain warranty service, the purchaser must first call or write PreSonus at the address and telephone number printed below to obtain a Return Authorization Number and instructions of where to return the unit for service. All inquiries must be accompanied by a description of the problem. All authorized returns must be sent to the PreSonus repair facility postage prepaid, insured and properly packaged. PreSonus reserves the right to update any unit returned for repair. PreSonus reserves the right to change or improve the design of the product at any time without prior notice. 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. Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this limited warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. In no event will PreSonus 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 form state to state. This warranty only applies to products sold and used in the United States of America.

Limited Warranty Outside of The U.S.

PreSonus Audio Electronics products are warranted only in the country where purchased, through the authorized PreSonus distributor in that country, against defects in material and workmanship. The specific period of this limited warranty shall be that which is described to the original retail purchaser by the authorized PreSonus dealer or distributor at the time of purchase. PreSonus does not, however, warrant its products against any and all defects: 1) arising Out of materials or workmanship not provided or furnished by PreSonus, or 2) resulting from abnormal use of the product or use in violation of instructions, or 3) in products repaired or serviced by other than authorized PreSonus repair facilities, or 4) in products with removed or defaced serial numbers, or 5) in components or parts or products expressly warranted by another manufacturer. PreSonus agrees, through the applicable authorized distributor, to repair or replace defects covered by this limited warranty with parts or products of original or improved design, at its option in each respect, if the defective product is shipped prior to the end of the warranty period to the designated authorized PreSonus warranty repair facility in the country where purchased, or to the PreSonus factory in the U.S., in the original packaging or a replacement supplied by PreSonus, with all transportation cost and full insurance paid each way by the purchaser or owner. All remedies and the measure of damages are limited to the above services. It is possible that economic loss or injury to person or property may result from the failure of the product; However, even if PreSonus has been advised of this possibility, this limited warranty does not cover any such consequential or incidental damages. Some states or countries do not allow the limitations or exclusion of incidental or consequential damages, so the above limitation may not apply to you. Any and all warranties, express or implied, arising by law, course of dealing, course of performance, usage of trade, or otherwise, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to a period of two years from either the date of original retail purchase or, in the event no proof of purchase date is available, the date of manufacture. Some states or countries do not allow limitations on how long an implied warranty last, so the above limitations may not apply to you. This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state, country to country.

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OVERVIEW

1.1 INTRODUCTION

Thank you for purchasing the PreSonus DEQ 624 Digital Stereo Graphic Equalizer plus Dynamics Processor. This Digital Graphic Equalizer has been designed using advanced technology and state of the art components to deliver crystal clear audio for an infinite period of time. We believe the DEQ 624 to be an exceptional product and an exceptional value. Feel free to contact us at 1-800-750-0323. We value your suggestions and your comments. PreSonus Audio Electronics is committed to constant product improvement. The best way for us to be successful in this endeavor is by listening to the *experts* on our gear, our valued customers. We appreciate the support you have shown us through the purchase of this product.

Please pay close attention to how you connect your DEQ 624 to your system. Improper grounding is the most common cause of noise problems found in studio or live sound systems. We suggest that you scan this manual before hooking up your unit to familiarize yourself with its features and functions.

Good luck and enjoy your DEQ 624!

1.2 FEATURES

The following is a summary of your DEQ 624's features:

- ? **24-Bit Digital Signal Processing.** The **DEQ 624** utilizes 24-Bit resolution for accurate processing of analog signals.

- ? **Dual 31 Band Equalizers.** Each channel of the Graphic Equalizer section of the **DEQ 624** is comprised of 31 digital EQ encoders. These digital EQ encoders are centered in 1/3rd octave increments from 20 *Hz* to 20 *kHz.*

- ? **Separate High Pass & Low Pass Filters for each channel.** Each channel of the **DEQ 624** is provided separate High and Low Pass filters. The Low Pass Filter is variable from 10 *kHz* to 20 *kHz.* The High Pass Filter is variable from 10 *Hz* to 410 *Hz.*

- ? **Expander.** Both channels have separate Expanders with Ratio and Threshold controls for minimizing system noise.

- ? **Limiter.** Each channel of the DEQ 624 is equipped with a "Brick-wall" limiter **(Ratio=Inf: 1)** with a Threshold control to provide protection from extreme transients. This feature is designed to protect the system components and the listener.

- ? **HI Q.** Selecting HI Q alters the characteristics of the equalization of the DEQ 624. The center frequency remains fixed for both Normal Q and HI Q; however, in HI Q the effect on adjacent frequencies is less pronounced. Normal Q is 1/3rd octave bandwidth **(Q=4.32)** and Hi Q is1/8th octave bandwidth **(Hi Q=11.54)**

- ? **Range.** The degree of control of the digital encoders in the DEQ 624 Graphic Equalizer section can be altered by engaging the Range control switch located in the Dynamics/Master control section. A choice of +? / ?? dB???? ???? dB?and ??? ???? dB can be chosen by pressing the Range switch. The selected Range is indicated by LED's located at the extreme left side of the Graphic Equalizer section. Changing the Range selection for a channel changes the range for all EQ encoders on a channel.

- ? **Bypass.** Engaging the Bypass switch routes the signal from input to output by way of a hard-wire bypass (On-board metering continues to monitor processed signal; not bypassed signal).

- ? **4 User-Programmable Presets.** Four user-determined setups can be stored in the DEQ 624. This is accomplished by storing a "snapshot" of the settings of the various controls of the front panel of the unit into one of the four preset positions provided for this purpose. A Store switch

and a Preset switch can be found in the Dynamics / Master control section to activate this feature. Pressing the Preset switch cycles through the Four Presets and the Manual position.

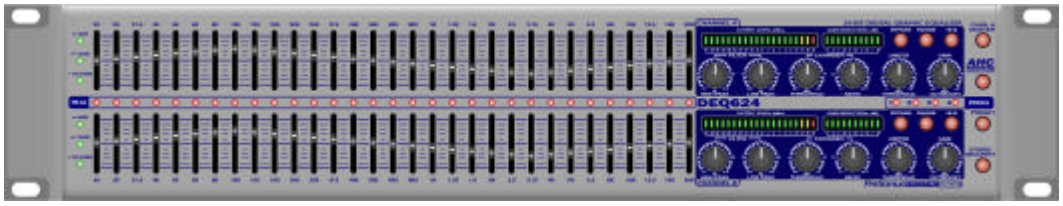
- **Front Panel Security Lock-Out.** The security lock-out feature allows the operator of the **DEQ 624** to defeat the front panel controls of the unit when in Preset mode. Inadvertent or intentional alteration of the unit's controls will have no effect on the Preset governing the signal being processed. Entering a user-created three-switch code combination restores complete operation of the unit's front panel controls.

- **AHC-Adaptive Hum Cancellation.** This is a proprietary feature of the PreSonus DEQ 624. Annoying 50 Hz /60 Hz system hum caused by grounding problems can be greatly reduced without effecting program content by simply by engaging AHC.

- **Channel A Master.** The Channel A Master switch slaves the controls of Channel B to Channel A for ease of set-up.

2.1 FRONT PANEL BASIC LAYOUT

The front panel of the DEQ 624 is divided into two sections:



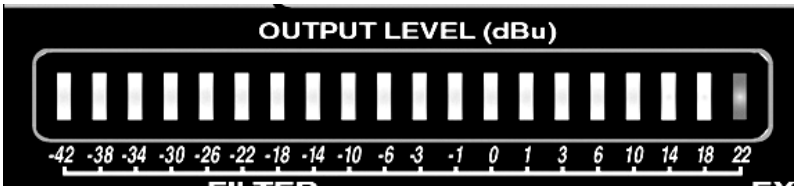
Dual 31 Band Graphic Equalizers

Dynamics / Master Control

The Dynamics / Master control section of the DEQ 624 occupies the right side of the front panel and contains the Limiter, Expander, Filters, Gain control, HI Q switch, Range switch, Bypass, Channel Master A, AHC, Program LED's, Preset switch, Store / Security switch, Output Level Meter and, Gain Reduction Meter for both channels.

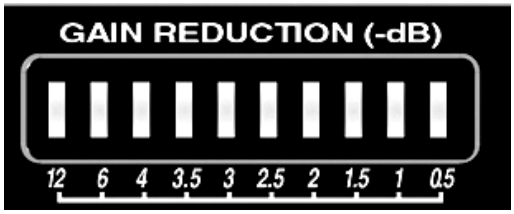
The Graphic Equalizer section contains Range LED indicators, 31 EQ encoders for each channel and the 31 HI Q Active LED Indicators.

Dynamics/Master Control



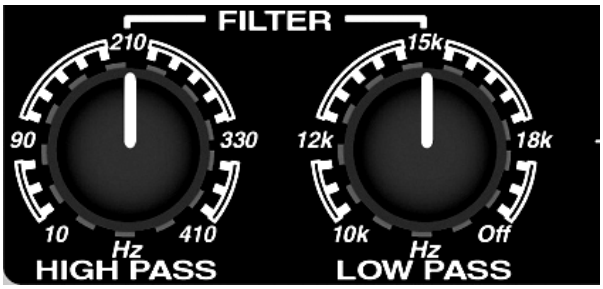
Output Level Meter

The output of each channel of the DEQ 624 can be monitored by way of dual twenty segment LED meters contained in the Dynamics / Master section. These meters display the output of channels A and B, respectively, from – 42*dBu* to +22*dBu* . A peak hold function has been incorporated into the output meters to facilitate monitoring extremely fast transients. The peak hold lasts for approximately 3 seconds. The Output Level meter continues to monitor processor activity in Bypass mode.



Gain Reduction Meter

The Gain Reduction Meters of the DEQ 624 monitor the activity of both the Expander and Limiter. These 10 segment LED meters are calibrated in increments from ???dB to ???dB and show the amount of Gain Reduction applied by the dynamics processors. The Gain Reduction meter continues measuring processor activity in Bypass mode.



Filter – High Pass / Low Pass

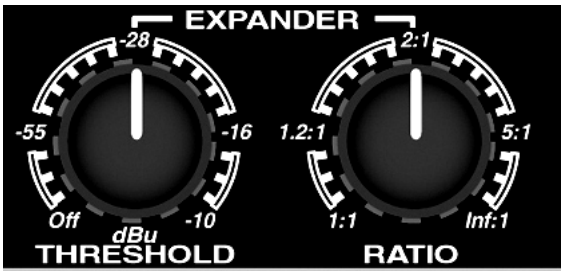
HIGH PASS FILTER

The High Pass filter control is variable from 10 *Hz* to 410 *Hz*. The High Pass filter is always active. Signals above the user-selected frequency point go through, i.e. pass unaffected. The variable filter control can be rotated fully counter-clockwise (10Hz) to effectively take it out of the spectral range of audio.

LOW PASS FILTER

The Low Pass filter control is variable from 10 *kHz* to 20 *kHz*. The Low Pass filter allows signals below the user-selected frequency to pass. The 20 *kHz* position on the variable frequency control is located at the fully clockwise position and is labeled Off. Intuitively the Off label is correct as the bandwidth of the DEQ 624 is 20 *Hz* to 20*kHz*, therefore,

selecting 20 *kHz* allows all frequencies from 20 *kHz* and below to pass through unaffected, effectively turning the Low Pass filter "Off".



Expander

The DEQ 624 Expander is provided to eliminate system noise. The Expander is controlled by selecting a threshold point for downward expansion to begin and by selecting a ratio, which controls the amount of downward expansion.

THRESHOLD

The Expander Threshold control is variable from ???dB to Off .

RATIO

The Ratio control is variable from ?? to Infinity??.

Limiter

A "Brick Wall" Limiter is available to each channel of the DEQ 624. The limiter will protect system components and listeners from destructive transients by providing an electronic barrier which signals rising above the user-determined threshold will not be allowed to cross.

THRESHOLD

The Threshold control for the Limiter is calibrated from ? *dBu* to Off.

Gain

A Gain control on each channel of the DEQ 624 is the last controller in the signal path and is used to compensate for signal level loss from dynamics processing. The control is centered at ? and with a Cut / Boost capability from ??? *dBu* to ??? *dBu.*

Bypass

A Bypass switch on each channel redirects signal to a hard-wire bypass connection that takes the DEQ 624 circuitry out of the signal path. This switch lights up when Bypass is ON. The DEQ 624 metering system continues to monitor processor activity in Bypass mode.

Range

Each channel has a Range switch for selecting the range of control for the graphic equalizer section's digital EQ encoders. One of three LED's per channel located at the extreme left side of the face of the unit light up when selected to indicate the current range for the graphic equalizer's digital encoders. A lighted Red LED indicates a range of ?or?? dB; a lighted Amber LED indicates an available range of ?or??? dB and a Lighted Green LED indicates a selected range of ??? or ??? dB. The selected range for a channel is applied to all digital EQ encoders in Manual mode or when setting up a program to be stored in a Preset position. If a set-up procedure is begun and a change in the range of control of the encoders is

desired, it is probable that any EQ encoder choices made before the alteration in range will require resetting. Range selection for each channel is global and is applied to all channel EQ encoders.

HI Q

Normal Q (Q???? of the DEQ 624 is divided into bandwidths of 1/3rd octave from 20 *Hz* to 20 *kHz*. HI Q (Q????? resets the bandwidth to 1/8th octave. The center frequencies remain unchanged while the effect on adjacent frequencies is less pronounced in HI Q. Pressing the HI Q switch lights the switch and indicates HI Q is now available to be selected. A row of 31 Red LED's labeled HI Q can be found on the Graphic Equalizer section between the two rows of digital encoders. These are the HI Q Active indicators, which do not light unless a frequency has been selected for applying HI Q.

SELECTING AND SETTING HIQ

Begin by pressing the Channel A HI Q switch. This will light the Channel A HI Q switch in the Dynamics / Master Control section. This enables HI Q select /deselect mode for Channel A and **disables Channel B HI Q switch and the Preset switch**. Any HI Q Active LED's below any of the Channel A equalizer encoders in the Graphic Equalizer section that have HI Q enabled will now be lit.

The Graphic EQ section digital encoders are used to enable or disable HI Q. The speed at which the encoder is moved is used to select it for HI Q mode. Moving the encoder slowly does not select the encoder for HI Q but rather allows it to be read and updated normally. Moving the encoder quickly causes the Red HI Q Active LED beneath the encoder to blink and the Store / Security switch in the lower right-hand corner of the faceplate to blink. Pressing the Store / Security switch at this time latches the selected EQ encoder into HI Q. The HI Q Active LED beneath the selected encoder stops blinking and remains ON indicating the encoder is now in HI Q and the Store / Security switch light goes off. Adjusting the EQ encoder in HI Q mode results in a more focused manipulation of the selected frequency with reduced effect on adjacent frequencies.

The following example illustrates enabling and disabling HI Q for the 1kHz EQ encoder for Channel A.

EXAMPLE

Enabling HI Q for 1 kHz (Channel A)

(HI Q is not enabled for any of Channel A's EQ encoders at the start of the sequence).

1. Press the Channel A HI Q switch. The Channel A switch lights up and none of the HI Q Active LED's in the Graphic Equalizer section are lit.
2. Move the Channel A 1 kHz EQ encoder quickly. This will start the HI Q Active LED beneath the 1 kHz EQ encoder of Channel A and the Store / Security switch light to begin blinking slowly.
3. Press the Store / Security switch. The HI Q Active LED below the 1 kHz remains on continuously and the Store / Security switch light goes OFF. The 1 kHz EQ encoder is now in HI Q.
4. Pressing the Channel A HI Q switch turns off both the HI Q switch light and the HI Q Active LED indicator beneath the Channel A 1 kHz EQ encoder. The resulting HI Q Boost / Cut of the Channel A 1 kHz EQ encoder remains.

Disabling HI Q

(The sequence begins with only the 1 kHz EQ encoder of Channel A HI Q enabled.)

1. Start by engaging the Channel A HI Q switch. The HI Q switch and the HI Q Active LED indicator below the 1 kHz EQ encoder of Channel A light up and remain ON.
2. Next, move the 1 kHz EQ encoder of Channel A quickly. This will cause the HI Q Active LED indicator below the 1 kHz EQ encoder of Channel A and the Store / Security switch to blink rapidly.
3. Pressing the Store / Security switch results in the HI Q Active LED indicator below the 1 kHz EQ encoder of Channel A and the Store /

Security switch light to go OFF. HI Q has now been de-selected for the Channel A 1 kHz EQ encoder.

4. Pressing the Channel A HI Q switch results in the Hi Q switch light going OFF and the unit to exit HI Q set-up mode.

   EQ encoders are updated when HI Q mode is selected. The effects of Boost / Cut are audible during this process. During HI Q mode, any EQ encoder may be toggled ON/OFF by repeating steps 2 and 3 of the preceding examples.

SOME IMPORTANT THINGS TO REMEMBER ABOUT HI Q:

1. **Only one EQ encoder at a time may be selected.**
2. **Once an EQ encoder has been activated it may be <u>de-activated</u> by:**
   - **A. Pressing the Store / Security switch**
   - **B. Turning the HI Q mode off by pressing the HI Q switch**
3. **The HI Q non-volatile memory is updated when the HI Q mode is switched OFF.**

R E M E M B E R : ***Selecting Channel A HI Q disables the Channel B HI Q switch and the Preset switch. Conversely, selecting the Channel B HI Q switch disables the Channel A HI Q switch and the Preset switch.***

Channel A Master

The Channel A Master switch is located in the upper right-hand corner of the faceplate. When the Channel A Master switch is selected, **all EQ encoders, controls and switches for Channel B are disabled.** Selecting the Channel A Master switch forces Channel B to use <u>all</u> of the settings of Channel A. When the Channel A Master switch is turned OFF, all of Channel B's controls become active.

Channel B

Channel B of the DEQ 624 is a duplicate of Channel A. All controls, encoders and LED indicators found on Channel A are found on Channel B.

REMEMBER: ***When Channel Master A is engaged, all of Channel B's controls are disabled!***

Adaptive Hum Cancellation (AHC)

Adaptive Hum Cancellation has been incorporated into the DEQ 624 for the express purpose of reducing 50 Hz or 60 Hz line noise. This very common audio artifact is typically caused by ground loops and can be successfully removed by AHC. AHC is in learning mode when turned OFF. While in this mode, AHC monitors the noise/hum level. Corrective waveforms are continuously updated based upon noise/hum coming into the unit. When AHC is turned ON the last corrective waveform is applied to the audio data. Should the noise level change and AHC become ineffective in controlling the noise/hum, it is then necessary to tum AHC OFF for a few seconds so it can adapt to the new noise level and then be selected again by pressing the switch to the ON position to resume operation.

Presets

The DEQ 624 can store up to four programs. Stored programs can be recalled by selecting the desired program with the Preset switch located at the right end of the front panel of the unit. Pressing the Preset switch repeatedly cycles through the four Preset positions. Stopping on a program for approximately three seconds causes the stored program in that position to load and the unit to operate in that Preset mode (**NOTE: All EQ encoders, controls, and switches with the exceptions of the Store / Security switch and the Preset switch are disabled when a program is recalled).**

STORING PRESETS / PROGRAMS

The Store / Security switch is used to store Programs (**Note: Programs cannot be stored if Channel A HI Q, Channel B HI Q or the Preset switch are in the**

ON position).

Press and release the Store / Security switch. Notice that the Store / Security switch and the Program 1 LED are blinking rapidly. You can cycle through all 4 Program positions and back to Manual mode by simply pressing and releasing the Store / Security switch.

Go through set-up of the DEQ 624 to suit your requirements. After you have finished, be sure that Channel A HI Q, Channel B HI Q and Preset are not engaged. To create and save the current set-up as a program in position 1, press and release the Store / Security switch. This will cause both the Store / Security switch and the Program 1 LED to blink rapidly. Next, press and hold the Store / Security switch until the Preset switch lights and the Program 1 LED stops blinking and remains ON. The system set-up you've just completed is now stored in the Program 1 position and can be recalled by pressing Preset until the Program 1 LED comes ON. Four separate set-ups can be stored and recalled in this fashion.

It should be noted that updating a stored program is only possible if the unit controls have not been changed. If you want to tweak a stored program, you would have to first restore the controls to the position they were in when the original "snapshot" of the controls was stored to memory and then make your adjustments.

To clear all stored Presets. Turn the power to the DEQ 624 OFF. Power the unit back up while pressing the Channel A Master switch. This restores the four Preset positions of the unit to the factory default setting of Zero for all settings and overwrites all stored information.

Security

The controls of the DEQ 624 can be locked to prevent intentional or inadvertent alteration. The DEQ 624 must be in a Preset mode to utilize this security feature.

LOCKING THE DEQ 624

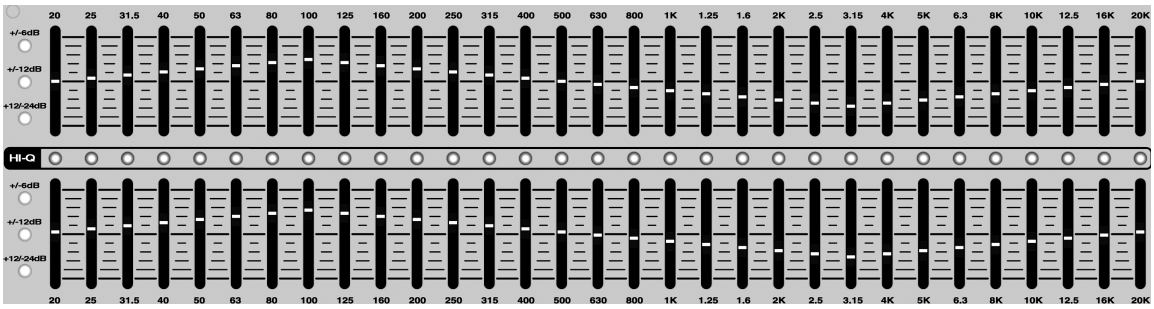
To lock the DEQ 624, make sure the unit is in Preset mode. Now, while holding down the Store / Security switch; push any three switches in the Dynamics / Master control section. You can choose to push the same switch three times, one switch twice and one other switch or three separate switches. Any combination of three switches while holding the Store / Security switch locks the front panel.

UNLOCKING THE DEQ 624

To unlock the DEQ 624, hold down the Store / Security switch and repeat the three-switch combination that was used to lock the unit.

(It is possible to over-ride the lockout feature. If you should forget your combination, you can power the unit OFF and power it back ON while holding down the Store / Security switch. This will restore full operation of the unit.)

31 BAND EQUALIZER SECTION



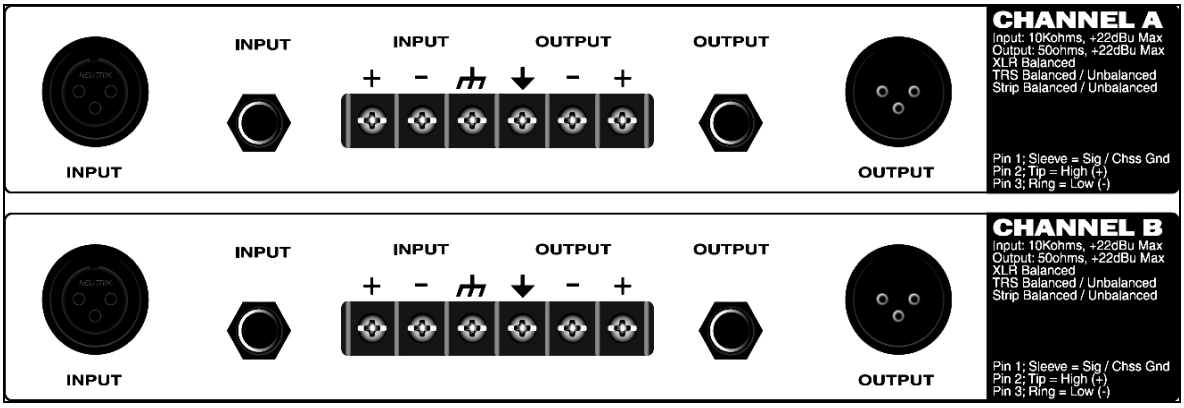
? **31 Digital Encoders per channel**

? ? ?? **6 dB (Red),** ? ?? **12 dB (Amber),** ? **12**?? **24 dB (Green) RANGE LED Indicators per channel**

? **31 HI-Q Active LED indicators**

2.4 BACK PANEL BASIC LAYOUT

Both channels of the DEQ 624 XLR inputs and outputs, ¼" TRS inputs and outputs and a Barrier Strip with inputs and outputs for versatile system connectivity.



2.7 POWER SUPPLY

The Power Supply for your DEQ 624 has been Factory Configured to use the voltage of the electrical current for the country of retail sale (USA = 115V). **WARNING: Attempting to operate this unit at voltages for which this power supply was not designed will void the manufacturer's warranty and may result in damage to the unit and injury or even death to the operator.**

4 TECHNICAL

DEQ 624 Technical Specifications:

Number of Channels	Two
Dynamic Range	>105dB
Noise Floor	-95dBu
Signal to Noise	?90dB
Power Supply Rejection	?98dB
Headroom	+22dBu
Frequency Response +/- 0.5dB	10Hz to 22kHz
Channel Gain	?20dB to +20dB
THD + Noise (Un-weighted)	0.005%
Input	
Input Impedance	12K?
Input Connectors51?	XLR,1/4"TRS, & Barrier Strip
Output	
Output Impedance	51?
Output Connectors	XLR,1/4"TRS, & Barrier Strip
Metering	
Level Meters - 20 Segment LED	?42dBu to +22 dBu
Gain reduction – 10 Segment LED	-0.5dB to – 12 dB
Power Supply	
Type	Linear
Input	115 / 230VAC (Factory Configured)
Power	20 WATTS
Main Connection	IEC receptacle
Size	2U Rack
Dimensions	19" X 9" X 3.5"
Weight	14 lbs.
Chassis	Steel/Aluminum

As a commitment to constant improvement, PreSonus, Inc. reserves the right to change any specification stated herein at any time in the future without notification.