



# ELECTRICAL AUDIO EApreq

The EApreq is a two channel transformer-based microphone preamp/equalizer. The preamp is designed to allow the character of the input transformer to color the sound with very little noise or amplifier distortion. The shelf eqs are boost only, to broadly add bass and/or treble when desired. A design premium was placed on long term reliability, and flexible application.

## The Basics

- Low distortion Lundahl input Transformer. Provides slight coloring as input level gets higher.
- -20dB input pad switch - sealed gold contact relay
- Polarity reverse switch - sealed gold contact relay across the output for quietest operation
- 48v phantom power switch - standard application
- 16-position, gold contact, rotary gain switch ranging from 20 to 65dB of gain, 3dB per step.
- Low and High frequency shelf boost eq. controlled with a solid multi-section gold contact switch, 5 gain positions. A sealed relay bypasses the eq circuit when not in use.
- DC servo for both preamp gain and shelf eq make-up gain amplifiers. This provides long term predictable operation and sonics, avoiding the gradual decline that comes with electrolytic capacitor-coupled circuitry
- Ground-sensing solid state balanced output amplifier capable of driving 600Ω loads with ease, balanced or unbalanced.
- Clear green LEDs indicating which shelf band is engaged.
- Bright, amber colored “peak” LEDs signal just before clipping.
- Low magnetic field radiating Mu-metal shielded toroidal power transformer
- Ridiculous multi-colored backlit logo badge to let you know the box is on.



## Operation & Theory



### Controls (from left to right)

#### **Gain**

16 position switch (3dB per step) controls the gain of the preamp. As labeled, the first position (knob at 6 o'clock) is 20dB of gain. The highest position is 65dB.

The choice of using a rotary switch vs. a pot was a deliberate one. With all the preamps we have at Electrical, the ones using high quality switches for the sensitive job of gain control have been the most reliable. Pots introduce their own nonlinearities, noise and distortion as they get old and exposed to the elements. If we can avoid future flakiness while adding precision and repeatability to the equation, all the better.

#### **-20dB (Pad)**

This is a non-audio switch which engages a relay, padding the input signal down 20dB. The relay (sealed gold contact) is ideally located between the phantom power drop resistors and the primary of the transformer. This means the routing of mic level signals is as direct as possible to the input transformer, and not loomed to the faceplate, or corrupted by a vulnerable open-frame switch. The pad resistors are matched where needed to 0.01%.

#### **Ø (Polarity Reverse)**

Again, a non-audio switch actuating a relay across the output, swapping the signals going to pins 2 and 3. This is the most silent location for a polarity reverse switch since there is no gain following it. This relay is also ideally located to keep the audio routing as direct as possible.

#### **48V (Phantom Power)**

This switch applies phantom power to the preamp input via tightly matched 6.81kΩ resistors. Wait until microphones are connected to the preamp before applying phantom power. It is a good idea to have the gain all the way down, and the pad applied when you do as well. Different microphones *wake up* differently, most create significant, low frequency pulses which can damage speakers.

#### **LOW BOOST**

This is the passive low frequency shelf eq gain control. There are six positions, the first being off. The second through sixth provide progressively more boost. When engaged, the green LED above turns on. This works as a good quick glance reminder that the shelf is being used.

Since the eq curve isn't uniform from one step to the next, it's best to describe the higher gain positions as simply "more". The shelf has been handy for adding a little more body to bass instruments, or thinner sounding microphones.

#### **HIGH BOOST**

This is the passive high frequency shelf eq gain control. The gain operates identically to the Low Boost. We've found this to be handy for brightening ribbon mics for vocals or drum overheads, and adding upper detail to acoustic instruments.

When both shelves are in the first position (off) a relay bypasses the eq circuit completely. This keeps the signal pristine, and lowers the over all noise floor of the channel.

#### **POWER SWITCH**

I can't recall what this does.

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## **Additional Usage Tips**

With the gain set to 20dB (lowest), and the -20dB pad engaged, you have close to unity gain\* and can use the preamp as a rough stereo eq. Make sure the phantom power is off.

The behavior of the preamp, and shelf eq are closely matched from one channel to the next. The shelf has a unique eq curve from one gain position to the next however. Knowing this, adjust to ear. The concept of these shelf eqs is that of simplicity. You should know within seconds whether or not the filters are adding something you like.

The Peak LED is calibrated to illuminate when the output level reaches at or just below the clipping point (depends on if the preamp's output is connected to an unbalanced or a balanced load).

The Preq comes with rubber feet on the bottom which can be easily peeled off to save space.

### **Rack Mounting:**

We recommend mounting to a rack with four screws, especially for a "mobile" setup. If you must use only two, mount the Preq through the bottom holes as opposed to something like, bottom left, top right. Mounting it from the bottom is best for even weight distribution across the faceplate. Any other arrangement will warp the chassis. This is true for all rack mounted equipment. But still, use four. Screws are cheaper than equipment.

\* Source impedance can have a slight influence on whether the pad will exactly match the first gain stage (20dB), so some variance depending on what device is connected to the inputs should be expected.

Serial Number \_\_\_\_\_

## **Warranty:**

We will provide repair service for component failures not related to gross user error for up to one year after purchase, and at our discretion beyond a year. User error is defined by exposing the EAPreq to liquids, physical shock, improper voltages, modifications, or any other crazy user abuse not customary to a professional studio environment.

## **Service and Warnings:**

There are no user serviceable parts inside.

Do not attempt to open for repair or curiosity. To do so puts the user at risk of injury. We are not liable for injury due to any kind of unauthorized modification or repair work.

Contact us at the number provided at the bottom of each page if there are any problems. Do not hire a third-party for repair work without consulting us.

Remember,

90% of audio problems come from poor connections. If you are experiencing problems, confirm that your signal path is good, swapping cables, and connections before concluding. Give us a call or email if issues arise or you have any operational questions.

Enjoy!

# ELECTRICAL AUDIO EAPreq

## TECHNICAL SPECIFICATIONS (preliminary measurements)

### GENERAL INFO

Switchable AC line voltage range 120/240 Volts, 50/60Hz AC service  
Quiescent power consumption (V x A) = 4.6 Watts  
Weight = 6 lbs  
Dimensions = 19" x 10" x 1.75"

### FREQUENCY RESPONSE

± .5dB from 7 Hz to 102 kHz (3dB down @116kHz)

### HEADROOM

Maximum Output level  
+28dBu Balanced 10kΩ Termination (typical modern equipment inputs)  
+27.5dBu Balanced 600Ω termination ("vintage" input impedance standard)  
+23dBu Unbalanced 10kΩ Termination (typical modern equipment inputs)

### NOISE AND DISTORTION

THD+N (1kHz, 35dB gain)	≤ .003%
THD+N (30Hz, 35dB gain)	≤ .012%
IMD (50Hz/7KHz)	≤ .0015%
Noise floor (22- 22kHz unweighted, lowest gain setting)	≤ -100dBu
Noise floor (22- 22kHz unweighted, lowest gain setting, eq engaged)	≤ -86.5dBu
Equivalent Input Noise (44dB gain, 150Ω input source, no eq)	≤ -128dB
Crosstalk Between Channels	≤ 125dB @1kHz ≤ 115dB @10kHz