

# AEA RPQ<sup>3</sup>

## OWNER'S MANUAL



2-CHANNEL RIBBON PREAMP WITH EQ

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*But it's great on every mic*

# WELCOME

Congratulations on your purchase of the AEA RPQ3 microphone preamplifier, AEA's third iteration of our low noise, ultra-high gain and impedance architecture. Inspired by its older siblings the RPQ and the RPQ2, the RPQ3 improves upon a trusted blueprint using the most up-to-date technology available. At AEA, we put the same thought and care into our preamps as we put into the development of our microphones: sonic quality comes first.

Since 2006, AEA's preamps have surpassed the limitations of 20th century electronics, allowing you to fully appreciate the sonic complexities of your microphone. The RPQ3 leans on the side of neutral but is unlike other "clean" preamps because of its rich and musical tonality. It offers up to 85 dB of effortless gain for any microphone, as well as an expanded EQ section that allows you to finely tune your signal.

Your RPQ3 is 100 percent handcrafted in Pasadena, California. AEA is a family-owned company with a small crew of skilled technicians, many of whom are musicians themselves. Proudly independent, we still manufacture all our ribbon microphones and preamps by hand, in-house, from locally sourced parts. We hope the RPQ3 helps capture many magical musical performances. Read this manual thoroughly to make sure you get the best sound and longevity from your new preamp. We invite you to become part of the AEA community by sharing your experiences with the RPQ3 via email, phone, or our social media channels.

*The AEA team*

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# INTRODUCTION

Based on the circuit design of our celebrated RPQ2, the RPQ3 features a powerful combination of ultra-low noise, low-distortion op-amps, ultra-high 68 k $\Omega$  input impedance, and 85 dB of clean gain, all packaged in a durable full-rack chassis. The RPQ3 also includes an expanded EQ section with boost and cut controls for both low and high end as well as a new low-end frequency sweep to identify and eliminate rumbles and resonances. The RPQ3 was designed to work great on passive ribbon microphones, however, when a preamp works well with a passive ribbon microphone, it will excel on every microphone. At once open, transparent, and musical, the RPQ3 is a versatile tool for the front end of any signal path. As with all AEA electronics, the circuit in the RPQ3 was designed by Fred Forssell.

## WARRANTY

Your RPQ3 comes with a one-year limited warranty on parts and labor\*. **Registering your preamp within 90 days will extend the warranty to three (3) years.** Scan the QR code or visit our [website](#) to register.

\*AEA is not responsible for shipping costs



## SUPPORT

If you should encounter any problems with your preamp or have questions regarding using the RPQ3 in specific applications, please contact our customer support team at [support@ribbonmics.com](mailto:support@ribbonmics.com) for the quickest response.

To contact us by phone, please call 626-798-9128 from 9:00 a.m.-5:00 p.m. PST Monday-Friday. AEA's repair center is located at 1029 N. Allen Ave, Pasadena, CA 91104, U.S.A.

# GENERAL GUIDELINES

To maintain the best performance from your new AEA RPQ3 preamp, take note of these two requirements:

- 1) Never place preamp in close proximity to electromagnetic fields or hot surfaces. Electromagnetic fields created by power transformers, motors, or RF transmitters can potentially damage or interfere with the preamp functionality. Make sure to keep your preamp away from these sources in addition to hot surfaces.
- 2) Before turning on the power, all connections to the preamp should be made and the Gain and Output Level controls set at their minimum settings. Be sure to examine your signal chain before powering up the preamp to ensure sudden loud noises are not emitted which could damage your system or hearing.

## INPUT IMPEDANCE

Passive ribbon microphones and numerous moving coil dynamic microphones are very particular about how they interact with preamps and their respective impedances play an important part in this. Since passive ribbon microphones and some dynamic microphones generally have a very high impedance, they are sensitive to what is referred to as "loading." The lower impedance a mic must drive, the harder the mic has to work. If the input impedance of a preamp is too close to the impedance of the microphone, it may exhibit increased distortion, decreased headroom, poor transient response, and less overall frequency response. There are no negative consequences to using high input impedance preamps.

The ultra-high gain JFET circuit has two input impedances: 11.3 k $\Omega$  with phantom power "ON" and 68 k $\Omega$  with phantom power "OFF." The 68 k $\Omega$  brings out the best in passive ribbons and tube mics, and also provides a unique balanced input for vintage, high-impedance dynamic mics. This versatility ensures the highest sensitivity, bandwidth, transient response, and clarity possible for a wide variety of microphones.

# FRONT PANEL GUIDE



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- 1    2    3    4    5    6 7 8    9    10 11 12    13    14 15

## 1 - Insert switch:

OUT is Mic Input mode; IN is Insert mode which sends the preamp signal out the Line Out ¼" jack and switches the pre-  
eq input to the Line Input ¼" jack on the rear of the unit. The LED below the switch will indicate when the insert is engaged.

## 2 - Mic Gain rotary switch:

This twelve-position switch selects from +7 dB to +65 dB of preamplifier gain.

## 3 - Phantom Power (P48) switch:

OUT is off; IN applies full-spec P48 phantom power to the input. The red LED below the switch will indicate when P48 phantom power is engaged.

## 4 - Polarity Invert switch:

OUT is normal; IN is inverted.

## 5 - Output Level control:

This continuously variable control provides up to +20 dB additional output gain following the optional CurveShaper™ EQ circuitry. Fully counter-clockwise -- 0 dB -- indicates unity.

## 6 - EQ IN switch:

OUT bypasses the EQ circuitry; IN engages the EQ circuitry. Note, the LF (ref. #8) and/or HF (ref. #11) must also be engaged to use the EQ. The EQ IN switch allows for easy A/Bing with and without EQ.

**7 - GAIN RANGE +/- 10 dB switch:**

OUT is bypass, IN changes the +/-20 dB gain ranges on the LF GAIN (ref. #9) and the HF GAIN (ref. #12) to +/-10 dB, which allows for more accuracy in dialing in EQ

**8 - Low Frequency (LF) In switch:**

OUT is bypass; IN inserts the 20 dB boost/cut shelving filter and variable frequency sweep. The green LED below switch will indicate when LF EQ is engaged.

**9 - Low Frequency Curve Gain control:**

This continuously variable control adjusts the LF gain from -20 dB to +20 dB; the slope of the CurveShaper™ EQ varies as Curve Frequency and Curve Gain settings interact.

**10 - Low Frequency Filter control:**

This continuously variable control adjusts the -3 dB break-frequency (as measured at full cut; -20 dB on the LF Gain) of the filter from 40 Hz to 675 Hz; maximum LF reduction is -20 dB.

**11 - High Frequency (HF) In switch:**

OUT is bypass; IN inserts the HF EQ circuitry. The green LED below switch will indicate when HF EQ is engaged.

**12 - High Frequency Curve Gain control:**

This continuously variable control adjusts the HF gain from -20 dB to +20 dB; the slope of the CurveShaper™ EQ varies as Curve Frequency and Curve Gain settings interact.

**13 - Curve Frequency control:**

This continuously variable control adjusts the +3 dB break-frequency (as measured at full boost; +20 dB on the HF Gain) from 2 kHz to 28 kHz.

**14 - Audio Signal Level indicators:**

The green LED snaps on at -20 dBu to indicate the presence of signal. The yellow LED snaps on at 0 dBu. The red LED snaps on at +20 dBu to warn of approaching signal overload.

**15 - Power Switch:**

OUT is off; IN powers on unit.

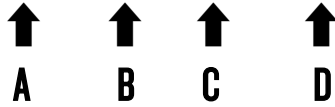
Green LED above the switch will indicate that the unit is on.







# REAR PANEL GUIDE



## **A - Balanced Output - XLR:**

Female three-pin XLR: pin-1 is ground, pin-2 is high (+), and pin-3 is low (-).

## **B - Balanced 1/4" TRS Line In:**

Line Input mode connector. Bypasses the mic preamp gain stage to accommodate line-level signals. Depress the INSERT switch (ref. #1) to utilize this Line Input mode input.

## **C - Balanced 1/4" TRS Line Out:**

Direct output of preamp gain stage before EQ and Output Level control. Note: this output always outputs a signal, whether or not the INSERT is engaged. This allows for an optional dry signal recording as well.

## **D - Balanced Input - XLR:**

Mic Input mode connector. Male three-pin XLR: pin-1 is ground, pin-2 is high (+), and pin-3 is low (-).

Note: Balanced 1/4" TRS is tip high, ring low, sleeve ground

# INSERT/LINE INPUT MODE

Line Input mode bypasses the mic preamp stage to accommodate line-level signals. Depressing the Insert switch bypasses the first gain stage and routes the signal from the Line Input connector straight to the optional CurveShaper™ circuitry and Output Level control (ref. #5). The illuminated green LED below the Insert switch indicates when the insert is active. Plug line level signal sources into the Line In connector (ref. B) located on the back panel.

Insert mode allows you to insert compressors or other effects between the preamp and CurveShaper™ EQ section. While the Insert switch is depressed, the preamp section of the RPQ3 is still active; however, it is independent of the Output Level control and CurveShaper™ EQ circuitry. To use the inserts with an effect, plug a mic into the XLR Input (ref. D) and take the 1/4" balanced Line Out (ref. C) into another piece of hardware such as a compressor. Connect the output of the compressor and plug it directly into the 1/4" Line In (ref. B). The standard XLR Output (ref. A) is the post-EQ output.

## OUTPUT CONNECTIONS

In Mic mode (meaning the insert is not engaged), the XLR Input routes through the preamp gain stage, optional CurveShaper™ EQ, and Output Level control to the XLR output. You may also use the 1/4" Line Out (ref. C) simultaneously as an auxiliary output of the preamp gain stage. Signals running through the XLR input (ref. D) in Insert mode will pass through the preamp gain (ref. #2) stage and 1/4" Line Out. In Insert mode, sources plugged into the line connector will bypass the preamp gain stage and route through the optional CurveShaper™ EQ and Output Level control to the XLR Output.

The output of the RPQ3 emulates a transformer-coupled output and can be used as either a balanced or unbalanced signal (depending on how your cable/system is configured). When balanced, the maximum output level is +27 dBu; when unbalanced, the maximum level is +21 dBu. (These are as measured into a 600  $\Omega$  load; the recommended load is > 10 k $\Omega$ ; 0 dBu = 0.7746 V rms.) When unbalancing the XLR Output, pin-3 must be tied to ground at the receiving end (i.e. the input of the following device). Do not tie pin-3 to ground directly at the output of the RPQ3. We recommend testing your cables regularly to be sure that they are in proper working order.

# SETTING THE GAIN

The RPQ3's minimalist JFET circuit design delivers up to 85 dB of clean, quiet gain. With extended bandwidth from below 10 Hz to beyond 200 kHz, it delivers effortless dynamic range and transient response that complements all microphones.

As with any piece of audio equipment, setting and maintaining proper signal levels is critical to obtaining optimum performance. If the level is set too low, noise performance is sacrificed; if the level is too high, there's a risk of overload distortion.

Setting the AEA RPQ3 gain begins by setting the first stage GAIN and second stage OUTPUT knobs fully counterclockwise. The first stage GAIN control has 12 precision steps from +7 dB to +65 dB. The second stage OUTPUT potentiometer knob when all the way down (counterclockwise) adds no gain, and all the way up adds +20 dB. The three LEDs: green, yellow and red (ref. #14) snap on at -20, 0, and +20 dBu to indicate signal activity.

## *First Stage GAIN Control Adjustment*

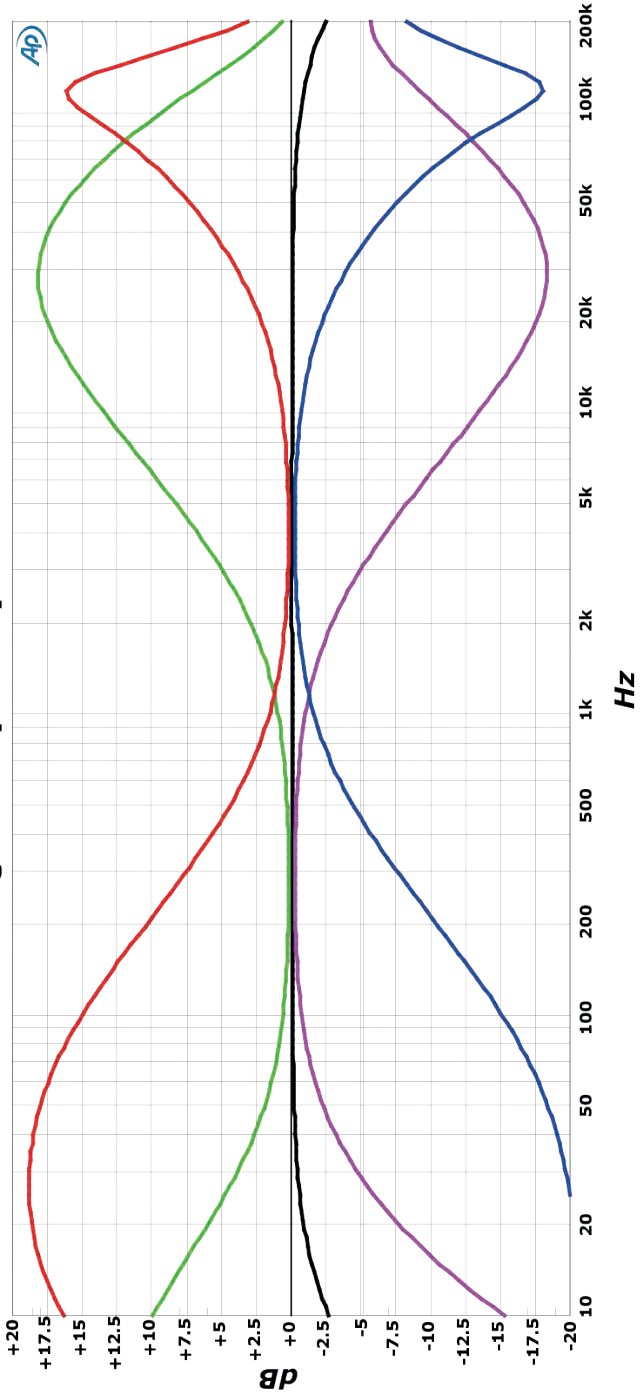
Connect the microphone and then, if needed, turn on phantom power. Have the performer(s) play a louder section and click up the GAIN (ref. #2) until the yellow LED usually lights and the red LED rarely lights.

## *Second Stage OUTPUT Gain Trim*

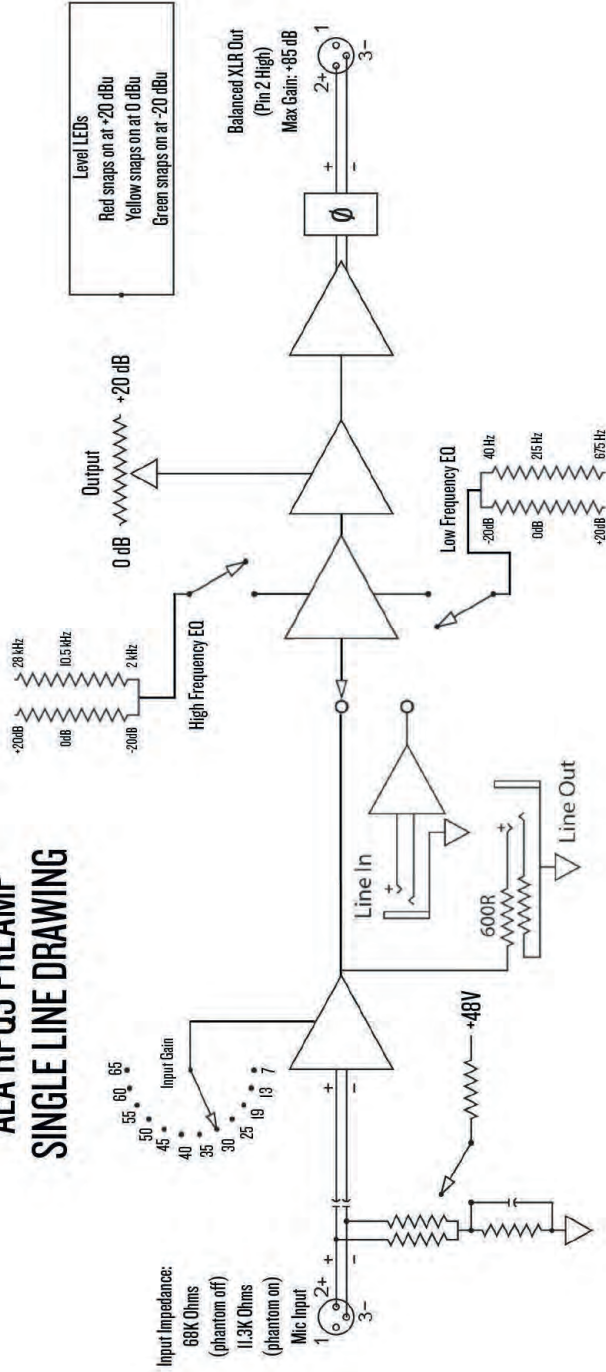
The OUTPUT Control (ref. #4) potentiometer adjusts gain from 0 dB (unity gain) at the bottom to +20 dB gain when fully turned up. Like the 12-step GAIN control, the 0 dB and +20 dB OUTPUT positions are accurate and repeatable. Approximate OUTPUT gain at 9, 12, and 3 o'clock are +3 dB, +7 dB, and +17 dB. The red LED lights 7 dB before clipping with a balanced load, so listen carefully to see how it sounds when the red LED lights up more often.

We actively encourage users to visit [AEAribbonmics.com](http://AEAribbonmics.com) to access our comprehensive collection of in-depth articles and tutorials featuring AEA products, along with a library of audio and video demonstrations of the products in action.

# RPQ3 Frequency Curves



# AEA RP03 PREAMP SINGLE LINE DRAWING



RP03 Single Line Drawing

# SPECIFICATIONS

**Max Gain at 1kHz:** 85 dB  
**EIN (Max Gain 22 Hz to 22 kHz):** -130 dBu (typical), 40  $\Omega$  source unweighted  
-128 dBu (typical), 150  $\Omega$  source unweighted

**Frequency Response:** 30 dB gain: (-0.6 dB 10 Hz, -3 dB 160 kHz)  
85 dB gain: (-3 dB 10 Hz and 160 kHz)

**THD+N:** 0.0018% (1 kHz, 22 Hz-22 kHz @30 dB Gain  
+4 dBu output)

**XLR Output Maximum Level:** +27 dBu into 600  $\Omega$  load

**Input Impedance:** 68 k $\Omega$   
**Input Impedance (P48 Engaged):** 11.3 k $\Omega$   
**Output Impedance:** 50  $\Omega$

**Max Input Signal Level:** +20 dBu (minimum gain)  
**Mic Gain Control:** 12-position switch from +7 dB to +65 dB  
**Output Trim:** Continuously variable from 0 dB to +20 dB

**EQ Circuitry:** First order shelving response

- 20 dB max boost/cut high range, 10 dB max boost/cut low range
- Low frequency sweep continuously variable 40 Hz to 675 Hz
- High frequency sweep continuously variable 2 kHz to 28 kHz

**Input and Output XLR Polarity:** Pin 2 high

**LED Signal Level Indicators:** Green LED  $\cong$  -20 dBu;  
Yellow LED = 0 dBu;  
Red LED  $\cong$  +20 dBu (clipping +27 dBu)

**Dimensions:** 1U, Full-rack measured with knobs and switches:  
19" w, 9" d, 1.75" h (48.25 cm x 23.85 cm x 4.55 cm)  
**Weight:** 4lb 6oz (~2 kg)

In compliance with the following requirements: RoHS2  
Directive: 2011/65/EU





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