AEA RPQ2

OWNER'S MANUAL

2-CHANNEL RIBBON PREAMP WITH EQ

WELCOME

Congratulations on your purchase of the RPQ2 preamp and welcome to the AEA family. We at AEA take sonic integrity seriously and have created preamps that have been specially designed to meet the particular challenges of ribbon mics and to bring out their full potential. Building on the obstacles identified when designing preamps in the 50's, we now use tools like quiet JFETS and transformerless designs to construct clean, high gain, high impedance preamps. A passive ribbon mic is only as good as the preamp you match it with. Whether you are using an AEA ribbon or any other passive ribbbon mic, we understand how much you can enhance the sound of your ribbons with the right preamp. The RPQ2 is the perfect companion for any and all ribbons, condensers, and moving-coil microphones – whenever a true and pristine signal path is desired.

Your RPQ2 is 100% handcrafted in Pasadena, CA. AEA is a family owned company with a small crew of skilled technicians – most of them being musicians themselves. Proudly independent, we still manufacture all our ribbon microphones and preamps by hand from locally sourced parts.

We hope that the RPQ2 will help you capture many magical performances that touch the heart. Please read this manual thoroughly to make sure that 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 RPQ2 via e-mail, phone or our social media channels.

Wes Dooley
President of AEA

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INTRODUCTION

Specifically designed for ribbon microphones, the RPQ2 excels at drawing out the warmth and lush sound ribbons are uniquely known for. With 81dB of sweet JFET gain, the RPQ2 delivers the quietness, and headroom needed for today's high-resolution recordings. With phantom power disengaged, the NoLoad™ input impedance at 63K Ohms means the RPQ2 won't load down a mic and change its sound. The RPQ2's CurveShaper™ EQ gives you the tools to control your ribbons right at the start of the signal path. Switchable and tunable low and high-frequency controls allow you to tame proximity and provide HF extension. The RPQ2 also includes front panel Direct Inputs, Mic/Line switches for balanced line inputs and outputs, as well as inserts for patching compressors or other effects between the preamp and CurveShaper™ EQ section. This feature is particularly useful for bypassing the preamp section when you want to use the unit in Line Input mode for post-EQ processing. Engineers have discovered that the RPQ2 also complements their moving coil and condenser microphones. Like our Big Ribbons, we designed the RPQ2 to have a natural and musical tonality.

WARRANTY

Your RPQ2 comes with a one-year limited warranty on parts and labor, shipping not included. **Registering your preamp with AEA will extend the warranty to a full three years.**

Please register your RPQ2 preamp at **AEAribbonmics.com**

SUPPORT

If you should encounter any problems with your preamp or have questions regarding using the RPQ2 in specific application, please contact our customer support team at **support@ribbonmics.com**.

To talk to a live human being, call +1 (800) 798-9127, between 9:00 A.M.- 5:00 P.M. PT Monday through Friday.

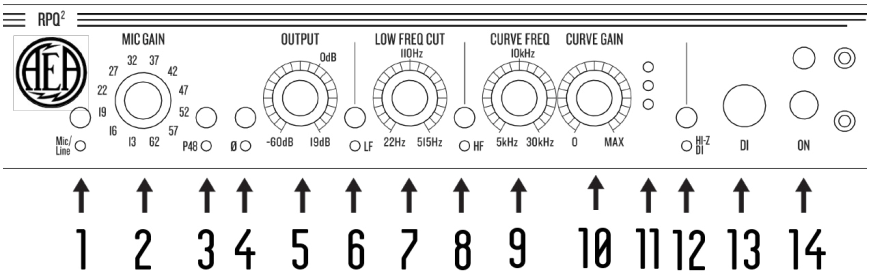
GENERAL GUIDELINES

To maintain the best performance from your new AEA RPQ2 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 Mic 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.

FRONT PANEL GUIDE



1 - Mic/Line switch:
OUT is Mic Input mode; IN is Line Input mode which bypasses the mic preamp stage to accomodate line-level signals. The LED below the switch will indicate when the Line Input mode is engaged.

2 - Mic Gain rotary switch:
This twelve-position switch selects from +13dB to +62dB of preamplifier gain, as measured between the XLR input and the 1/4" preamp output.

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 +19dB additional output gain following the optional CurveShaper™ EQ circuitry. 0dB marker on dial indicates unity.

6 - Low Frequency (LF) In switch:
OUT is bypass; IN inserts the -20dB low-cut shelving filter. The green LED below switch will indicate when LF cut is engaged.

7 - Low Frequency Filter control:
This continuously variable control adjusts the -3dB break-frequency of the filter from 22 Hz to 515 Hz; maximum LF reduction is -20dB.

8 - High Frequency (HF) In switch:
OUT is true bypass; IN inserts the CurveShaper™ circuitry. The green LED below switch will indicate when HF boost is engaged.

9 - Curve Frequency control:
This continuously variable control adjusts the +3dB break-frequency from 2.5 kHz to 30 kHz.

10 - Curve Gain control:
This continuously variable control adjusts the HF gain from flat (+0dB) to maximum (approx. +20dB); the slope of the CurveShaper™ EQ varies as Curve Frequency and Curve Gain settings interact.

11 - Audio Signal Level indicators:
The green LED snaps on at -20 dBu to indicate the presence of sig- nal; the yellow LED snaps on at 0 dBu; the red LED snaps on at +24 dBu to warn of approaching signal overload.

12 - Hi-Z Direct Input switch:
OUT is bypass; IN engages signal to pass through Hi-Z direct input. The green LED below the switch will indicate when the Hi-Z DI mode is engaged. HI-Z mode will override all signals going to the XLR output. quency of the filter from 22 Hz to 515 Hz; maximum LF reduction is -20dB.

13 - Low Frequency Filter control:
This continuously variable control adjusts the -3dB break-frequency of the filter from 22 Hz to 515 Hz; maximum LF reduction is -20dB.

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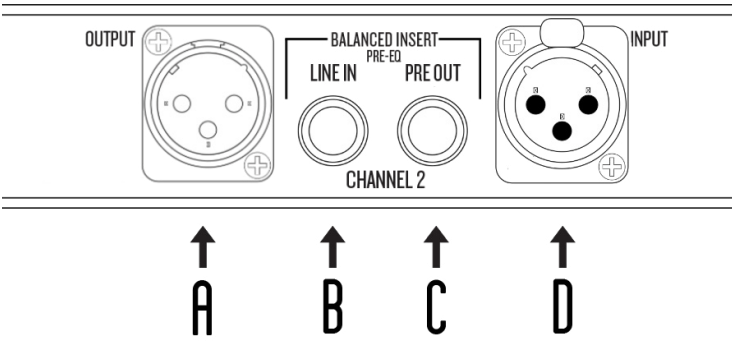
REAR PANEL CONNECTIONS



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" Line In Input:
Line Input mode connector. Bypasses the mic preamp gain stage to accommodate line-level signals. Depress the Mic/Line switch (ref. #1) to utilize this Line Mode input.

C - Balanced 1/4" Preamp Output:
Direct output of preamp gain stage before EQ and Output Level control.

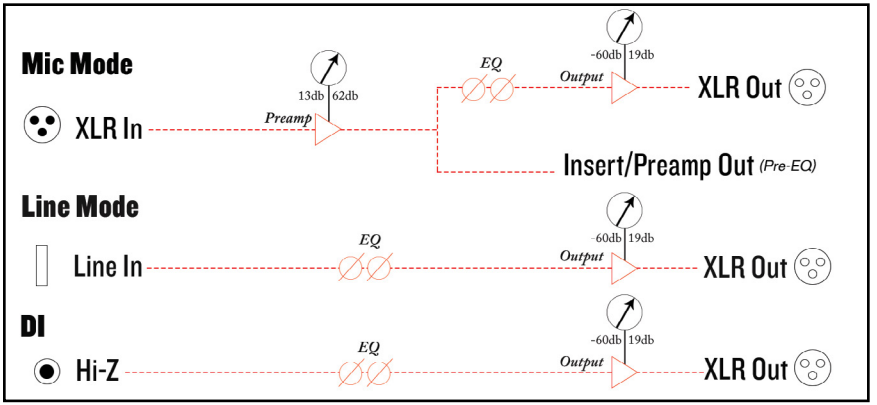
D - Balanced Input - XLR:
Mic Input mode connector. Male three-pin XLR: pin-1 is ground, pin-2 is high (+), and pin-3 is low (-).

INPUT & OUTPUT CONNECTIONS

The RPQ2 was designed to be used in three main ways:

1) Mic preamp routed into optional EQ.

2) Line level stand-alone EQ.
3) DI routed into optional EQ.



AEA RPQ2 Routing Diagram

Each RPQ2 channel provides an XLR input (Mic Input mode), a 1/4" front panel unbalanced DI, and a back panel Line In 1/4" connector (Line Input mode).

With ribbon, moving-coil dynamic, tube, and any other microphones that do not use phantom power, it is recommended that the P48 switch (ref. #7) is in the OUT position before and while they are connected, to prevent possible damage to the microphones. The red LED below the phantom power switch lights up when P48 is engaged.

To prevent damaging the equipment in your system, it is a good idea to test your microphone cables regularly to determine whether they have any open, shorted, reversed, or intermittent connections.

LINE INPUT MODE

Line Input mode bypasses the mic preamp stage to accommodate line-level signals. Depressing the Mic/Line 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. #11). The illuminated green LED below the Line/Mic switch indicates when Line Input mode is active. Plug line level signal sources into the Line In connector (ref. B) located on the back panel.

Line Input mode allows you to insert compressors or other effects between the preamp and CurveShaper™ EQ section. While the Mic/Line switch is depressed, the preamp section of the RPQ2 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 Preamp 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.

While in Line Mode, connecting the Line In (ref. C) directly to the Preamp Out (ref. B) with a 1/4" TRS cable is the same routing that Mic Mode does internally.

DIRECT INPUT MODE

Engage the Hi-Z DI switch (ref. #12) to plug and play directly into the RPQ2's high impedance circuit and optional CurveShaper™ EQ section. Each DI connector is 1/4" mono unbalanced and has a high input impedance of >5M Ohms which will not load down typical DI sources such as bass guitars, keyboards, etc.

Depressing the Hi-Z switch (ref. #12) bypasses the first gain stage and routes the signal from the Direct Input connector straight to the optional CurveShaper™ circuitry and the Output Level control (ref. #5). The illuminated green LED below the Hi-Z/DI switch indicates when Direct Input Mode is active. There is no 48V phantom available on this input. The DI switch will override all sources going to the XLR output.

OUTPUT CONNECTIONS

In Mic Mode, 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" Preamp Out (ref. C) simultaneously as an auxiliary output of the preamp gain stage. Signals running through the XLR input (ref. D) in Line or DI Mode will pass through the preamp gain (ref. #2) stage and 1/4" Preamp Out.
In Line 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.

When the DI switch is engaged, sources plugged into the DI connector will bypass the preamp gain stage and route through the optional CurveShaper™ EQ and Output Level control to the XLR Output. Note: the DI switch will override all sources going to the XLR Output. If you do not hear output from the XLR and are not using the direct input, check if the DI switch is engaged.

The output of the RPQ2 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 +28 dBu; when unbalanced, the maximum level is +22 dBu. (These are as measured into a 600 Ohm load; the recommended load is > 10K Ohms; 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 RPQ2. We recommend testing your cables regularly to be sure that they are in proper working order.

INPUT IMPEDANCE

The average preamp has an input impedance sitting around 1200 Ohms. 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.

Unleash the full potential of your mics with the RPQ2's high impedance circuit. The RPQ2's default input impedance is 63K Ohms. With phantom-power engaged, the RPQ2's Mic Mode input impedance switches to 10K Ohms. The RPQ2's NoLoad™ high-input impedance guarantees the highest sensitivity, bandwidth, transient response, and clarity from your microphones.

We actively encourage users to visit **AEAribbonmics.com** to access our comprehensive collection of in-depth articles and tutorials featuring AEA preamps, along with a library of audio and video demonstrations of the preamps in action.

SETTING THE GAIN

The RPQ2's JFET circuit design generates up to 81dB of clean and quiet gain, with extended bandwidth from below 1 Hz to beyond 200 kHz, for dynamic range and transient response that complements all microphones.

As with any piece of audio equipment, setting and maintaining proper signal levels are critical to obtaining optimum performance: if the level is too low, you sacrifice noise performance; if too high, you risk overload distortion. The AEA RPQ2 provides an easy method for setting and monitoring the system gain.

MICROPHONE INPUT MODE

The Mic Gain control (ref. #10) provides from about +13dB to +62dB of gain for the preamp input stage. The Output Level control (ref. #11) adds another +19dB of output gain, following the CurveShaper™ circuitry, for a total of +81dB of gain.

Start with the Output Level control (ref. #11) pointing at the 0dB indicator and the Mic Gain control (ref. #10) fully counterclockwise. Then, with the microphone in position increase the Mic Gain control until you are happy with the input level in your DAW, console, or tape machine. On the RPQ2, if the red LED is illuminated too often or too long, reduce the Mic Gain control one step at a time until it illuminates only briefly at the loudest peaks. The red LED is only triggered when the input level is 4dB or less away from clipping the preamp's output. If the red LED occasionally flashes while recording, it does not necessarily mean that the preamp is clipping.

Note, however, that if you subsequently apply the CurveShaper's™ HF boost, you may need to reduce the Mic Gain control correspondingly to avoid system overload.

The Output Level control can apply up to +19dB of gain in the full clockwise position, or it can attenuate the signal as much as -60dB just like a fader on a console. Though the optimum position of the Output Level control is unity at 0dB, the Output Level control may be used to fine tune the overall output level.

LINE AND DIRECT INPUT MODE

When using Line or Direct Input mode, the Mic Gain control (ref. #10) is bypassed. The Output Level control (ref. #11) allows you to control the overall level of the Line and DI sources. The Output Level control can apply up to +19dB of gain in the full clockwise position or can attenuate the signal as much as -60dB just like a fader on a console.

If you subsequently apply HF boost, you may need to reduce the Output Level control correspondingly to avoid system overload.

THE EQ SYSTEM

USING THE CURVESHAPER HIGH FREQUENCY EQ

The RPQ2 features a unique CurveShaper™ circuit that enables you to add a little extra "presence" or "air" to compensate for high-frequency losses that are inherent to most ribbon microphones, the result of distant mic placement, or to restore presence in a "dry" acoustical environment.

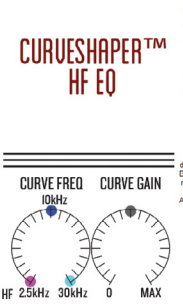
The circuit functions similarly to a conventional parametric shelving boost but with a significant difference: the slope and bandwidth varies as both the Curve Frequency and Curve Gain controls are adjusted.

From a technical standpoint, it is evident the EQ shape of the CurveShaper™ is a bell. At its lowest setting, the peak frequency of the CurveShaper™ is 30k while at its highest setting, the peak frequency is 120k. In many instances, a bell with a peak at 120k is not very practical since it is above the human frequency threshold of hearing. But the CurveShaper™ has a very wide bandwidth that allows the left side of the bell to essentially act as a high-frequency shelf.

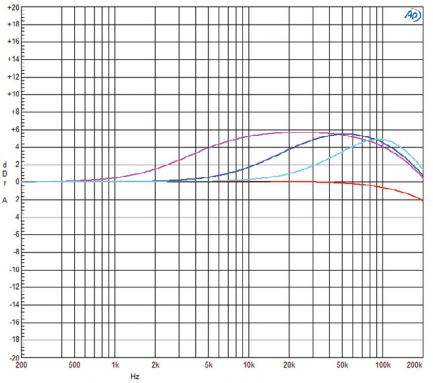
The Curve Frequency knob, at its lowest setting, will yield a gentler slope and wider bandwidth. As the frequency is raised, the slope becomes steeper while the bandwidth narrows.

To activate the CurveShaper™ EQ section, depress the High Frequency switch (ref. #3). Start by adjusting the continuously variable

Curve Frequency control (ref. #4). The frequency markings on the Curve Frequency dial indicate the +3dB break-frequency when the Curve Gain is at max. Select the desired frequency with the Curve Frequency knob, and then dial-in the amount of boost you desire with the Curve Gain control (ref. #2). The two controls are interactive. Use your ears to determine what frequency and gain setting sounds best.



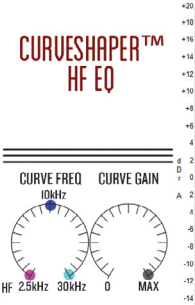
High-Frequency Gain Centered (Noon)



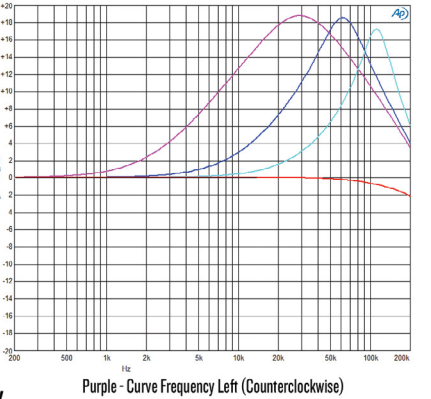
Purple - Curve Frequency Left (Counterclockwise)
Blue - Curve Frequency Centered (Noon)
Cyan - Curve Frequency Right (Clockwise)

In Line Input Mode, the CurveShaper™ becomes a versatile EQ to add presence or air to any line level signal on a mix or even in mastering.

Be careful when you add Curve Gain because this also affects the overall gain structure of the preamp and could introduce overload distortion. After you make this adjustment, you may need to reduce the Output Level control (ref. #5) to compensate for the CurveShaper's™ signal boost.



High-Frequency Gain Max (Clockwise)

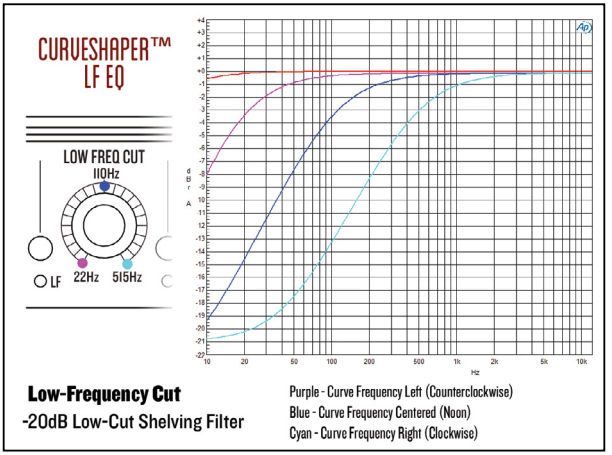


Purple - Curve Frequency Left (Counterclockwise)
Blue - Curve Frequency Centered (Noon)
Cyan - Curve Frequency Right (Clockwise)

Note: When the Curve Gain is fully counter-clockwise (set in the "0" position), no EQ will be introduced into the signal. It essentially the same as having the HF In Switch (ref #8) disengaged.

USING THE LOW FREQUENCY FILTER

The RPQ2 was designed to complement ribbon microphones. AEA Big Ribbon™ mics deliver sub-woofer lows, which the RPQ2 renders faithfully. Such strong low-frequency content can mask high-frequency intelligibility, so the tunable low-frequency (LF) filter was



engineered to reduce low-frequency energy to appropriate levels. Directional microphones when moved closer on-axis to a sound source become more sensitive to low frequencies. This proximity effect, otherwise known as “bass tip-up,” becomes more pronounced the closer the distance. With some large transducer microphones, such as the AEA/RCA R44, proximity effect begins at six feet and is extremely pronounced at a distance of one inch.

LF filters can tame proximity effect and reduce other unwanted low-frequency noise, such as air-conditioning rumble, traffic noise, “P-pops” and breath-noise. The RPQ2 offers a flexible LF filter that can be tailored to satisfy the varying and critical demands of both speech and music.

Pushing in the LF Filter switch (ref. #5) inserts a -20dB (maximum) low-cut shelving filter. The Low Frequency control (ref. #6) adjusts the -3dB break-frequency of the filter.

Setting the filter is easy: push in the LF Filter switch and adjust the tuning control until you like the sound. Then toggle the LF Filter switch quickly to compare the result against the original.

SPECIFICATIONS

Gain at 1kHz:	81dB of gain at 1kHz, balanced-in to balanced-out in Microphone Input mode
Noise figure, rms A-weighted:	<2dB
Noise figure, rms unweighted:	<3dB, 20 kHz LPF bandwidth
EIN:	<-130 dBu A-weighted, 150 Ohm resistive source
Frequency Response:	-3dB <1Hz and >100 kHz
THD:	<0.02% at 1 kHz
Input Impedance:	63K Ohms
Input Impedance (P48 Engaged):	10K Ohms 18K Ohms
Line Input Impedance:	>5M Ohms
Hi-Z Input Impedance:	
Mic Gain Control:	Twelve-position switch provides from +13dB to +62dB of gain for the preamplifier circuit, as measured between the input and the before the output line driver.
Switched LF Shelving filter:	-3dB break-frequency tunable from 22 Hz to 515 Hz; maximum reduction -20dB.
Switched CurveShaper™ EQ:	+3dB break-frequency tunable from 2.5 kHz to 30 kHz; HF gain adjustable from +0dB to +20dB; the slope of the HF filter varies interactively and directly with the CurveShaper™ frequency and gain settings.
XLR output maximum level into 600Ω load:	+28 dBu, balanced; 0 dBu = 0.7746 V rms
XLR connectors polarity:	Pin-1 is ground, pin-2 is high, pin-3 is low
LED 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 +24 dBu to warn of approaching signal overload.
Dimensions:	1U, Full-rack measured with knobs and switches: 19" w, 9" d, 1.75" h (48.5 cm x 23 cm x 4.45 cm)
Weight:	4lb 5oz (~2 kg)

The RPQ2 Single Line diagram is available on our website.

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