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PZ-Pre

Acoustic Instrument Preamp

User Guide

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Radial PZ-Pre
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Congratulations on your purchase of the Radial PZ-Pre, without a doubt the most challenging pedal we have ever produced! Why? Simply put, it is so jammed with features that it took us over two years to get it right! And with all of these features, we absolutely recommend that you take a few minutes to read through this manual to familiarize yourself with all of the PZ-Pre functions before you get started.

Like all Radial products, the PZ-Pre is built to the very highest standards with the very best components and provides the type of durability you would expect for concert stage use. If after reading this manual you have a question, please visit the FAQ in the PZ-Pre section of our web site. This is where we post the latest notes. If you have a question that is not covered, please send your email to info@radialeng.com and we will do our very best to get back to you promptly.

Now get ready to pluck, pick, bow, twang and strum till dawn!

INTRODUCTION

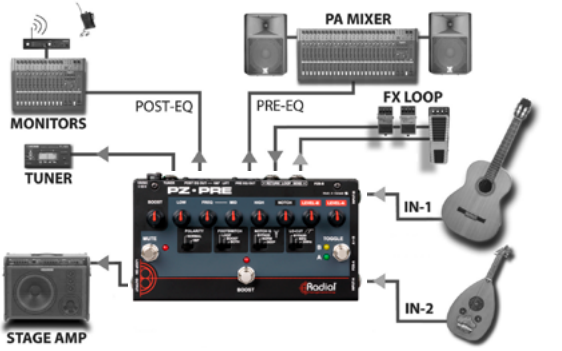
The Radial PZ-Pre is a very unique pedal. Although the PZ-Pre is likely to be the best sounding acoustic guitar preamp you have ever experienced, it is not dedicated to just guitars. We designed the PZ-Pre from the ground up to work with all types of instruments including violin, cello, contrabass, mandolin, Dobro, bouzouki, harp, sitar and banjo! This is because the two inputs have been designed to accept all types of pickups and the on-board equalizer is both very powerful and musical. You can even combine the two inputs should you wish to use two pickups at the same time!

Our quest for flexibility did not stop there; we also equipped the PZ-Pre with four outputs so that it could drive four separate signal paths at the same time! And each output is managed differently to address different needs.

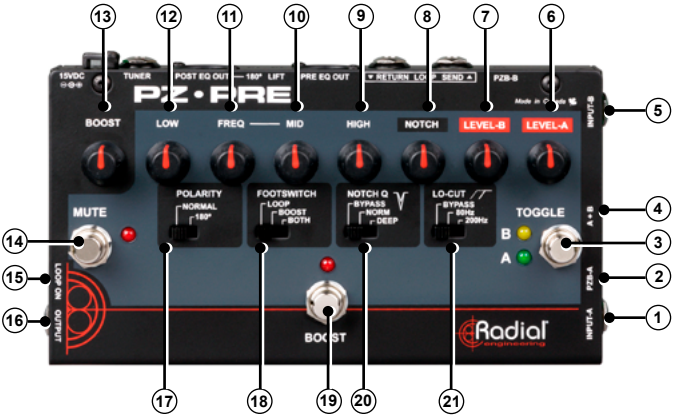
The instrument amplifier output is designed for the on-stage musician. An electric fiddle player may have numerous effects pedals and an over-driven guitar amp on stage to create various sonic textures while a bouzouki player may have his vintage Fender® Twin™. Their is an output for your electronic tuner and the mute footswitch lets you tune in silent or change instruments.

There are also two built-in Radial direct boxes with balanced XLR outputs to connect you to the PA or recording system. Output-1 is a pre-EQ, pre-effects output designed to send a clean signal to the PA system while output-2 is post-EQ and post effects to feed stage monitors and in-ear systems with a completely different mix. For instance, when playing in a typical arena, there is so much echo that the last thing you would want would be to send a 'wet instrument' (sound with lots of echo and reverb) into the PA system. On the other hand, adding reverb to your in-ear monitor system will often give you a better sense of space and a more natural feel to the performance.

The built-in flexibility is further expanded with an effects loop, power booster and probably the best sounding preamp you have ever encountered for your instrument. Best of all, it is all housed in a super compact pedal that can fit in any gig bag and travel with you wherever you go.

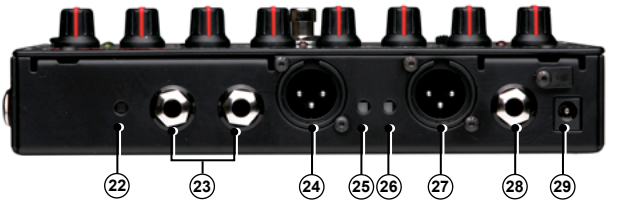


FEATURES AND FUNCTIONS - TOP PANEL



1. **INPUT-1:** ¼" connection for first instrument.
2. **PZB-1:** Recessed switch activates piezo buffer for input-1.
3. **TOGGLE:** Footswitch selects between input-1 and input-2.
4. **BLEND-MIX:** Recessed switch selects between toggle mode and mix/blend mode.
5. **INPUT-2:** ¼" connection for second instrument.
6. **LEVEL-1:** Gain control for input-1.
7. **LEVEL-2:** Gain control for input 2.
8. **NOTCH:** Used to sweep the frequency of the notch filter.
9. **HIGH:** High frequency shelving EQ, boosts or cuts treble.
10. **MID:** Amplitude control for semi-parametric mid EQ.
11. **FREQ:** Frequency control for semi-parametric mid EQ.
12. **LOW:** Low frequency shelving EQ, boosts or cuts bass.
13. **BOOST:** Variable level control for the power booster.
14. **MUTE:** Footswitch mutes all outputs except tuner out.
15. **LOOP ON:** Forces the effects loop to remain on.
16. **OUTPUT:** ¼" out for instrument amplifier.
17. **PHASE:** Inverts the signal polarity at the ¼" instrument output.
18. **FOOTSWITCH ASSIGN:** Sets function of boost footswitch between power boost, effects loop or both.
19. **BOOST:** Footswitch activates power booster and/or effects loop depending on setting of footswitch assign switch.
20. **NOTCH Q:** Sets the depth of the notch filter. Select between normal, deep and bypass.
21. **LO-CUT:** High-pass filter removes low frequencies to eliminate resonant feedback. Select between bypass and two low-cut settings.

FEATURES AND FUNCTIONS - REAR PANEL



22. PZB-2: Recessed switch activates piezo buffer for input-2.

23. LOOP SEND & RETURN: The built-in effects loop uses ¼" jacks to connect effect pedals.

24. PRE-EQ: balanced XLR direct box out captures the dry signal before the filter, EQ, effects loop and boost sections. Outputs an un-processed signal for the house PA or recording console.

25. LIFT: recessed ground lift switch disconnects pin-1 on both XLR outputs to reduce hum and buzz caused by ground loops.

26. 180°: recessed switch reverses the polarity at the post-EQ XLR output.

27. POST-EQ: balanced XLR direct box output sends a wet signal for the monitor system so the player can control their on-stage tone with the PZ-Pre.

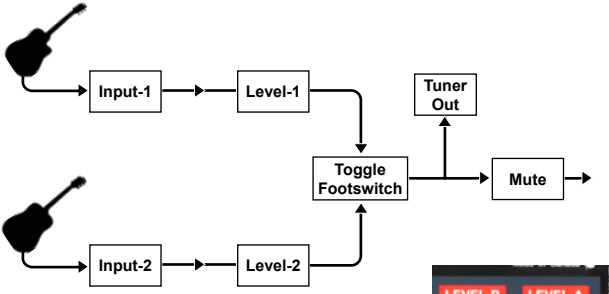
28. TUNER: buffered ¼" output to feed an electronic tuner.

29. 15VDC-400mA: power supply connection 15 volts DC, center pin positive.

INPUT SECTION

Input-1 and 2

The PZ-Pre features two ¼" inputs located on the right side panel. The flexible dual input design lets a player connect and switch between instruments simply by stomping on the TOGGLE footswitch. Most performers, whether they play acoustic guitar or mandolin, tend to have two instruments on stage. The second instrument is often for backup should a string break; in some cases, it may be tuned differently, or it may even be a completely different instrument! The PZ-Pre is equipped to be a control center for two instruments.



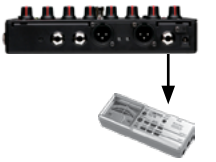
LEVEL-1 and 2

Both inputs are equipped with LEVEL controls that let you adjust the volume of each instrument. These controls are used to compensate for the differences in output level some pickups produce. Once adjusted, you can seamlessly switch between instruments.

PZB-1 and 2 Piezo Pickup Buffers

Each PZ-Pre input features a special piezoelectric pickup (piezo) buffer called the PZB that can be switched into the signal path when needed. The PZB allows a passive piezo pickup to be connected directly to the PZ-Pre without the use of a separate preamp. The PZB increases the gain while elevating the input impedance to 10meg Ohms. This ensures that the piezo pickup 'sees' the optimum input impedance for signal transfer which will result in better tone. To activate the PZB, use a small screwdriver to push in the recessed switch. There is a separate PZB switch for each input channel.

Tuner Output



This buffered ¼" output is dedicated for an electronic tuner. Since it is buffered, connecting a tuner won't load down your pickup's tone. The TUNER output is always on and can be used in conjunction with the MUTE footswitch to allow silent tuning.

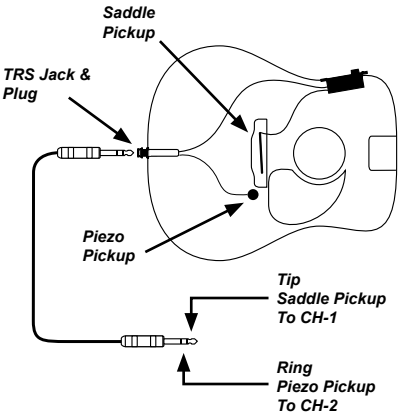
Mute Footswitch with LED

Depressing this footswitch will mute all outputs except the TUNER out. The LED illuminates to indicate the PZ-Pre is in mute mode. The MUTE footswitch allows silent tuning on stage through the TUNER output. The function may also be used to mute your rig for instrument change-over.

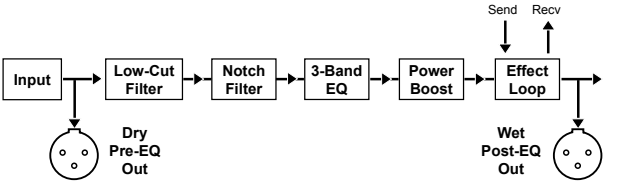
Blend-Mix

The BLEND-MIX function is typically used with instruments that have two pickup elements or two different pickup systems. It allows you to blend the two input channels using the LEVEL controls to set up a mix. For instance, you can use the MIX mode to blend an active on-board pickup with a passive piezo to create a more natural acoustic sound. Alternatively, you can use the MIX mode to connect two guitars to one amp for jamming with another player. The MIX mode is activated by depressing the recessed BLEND-MIX switch using a small screwdriver. The TOGGLE footswitch will not work when the MIX mode is active.

Input-1 is specially equipped to allow a ¼" stereo TRS cable (Tip, Ring, and Sleeve) to access both PZ-Pre channels. This feature is designed for instruments that combine two pickup systems through a stereo TRS jack. A stereo TRS cable will allow you to connect both pickups to separate PZ-Pre inputs with a single cable. From there you can toggle between the two pickup systems or blend them together.

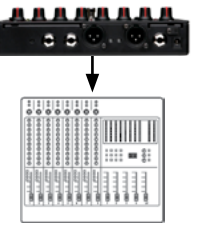


PRE-EQ OUT, FILTER and EQ SECTIONS



Pre-EQ DI Output

This balanced XLR output is essentially an active direct box. It produces a 600 Ohm, mic-level signal suitable for multi-channel concert snake and mixing console. It captures the dry signal before the filters and equalizer section and is not affected by the PHASE, BOOST and LOOP functions. It is intended to feed a PA or recording system with a clean, unprocessed signal.



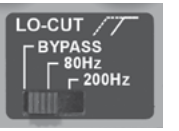
Mixing Console

Ground Lift for Balanced XLR Outputs

The balanced XLR outputs are equipped with a recessed set-and-forget ground LIFT switch on the rear panel to reduce hum and buzz caused by ground loops. If you hear any noise, push in the switch to help eliminate the problem.

Low-Cut Filter

The three position low-cut filter (also known as a hi-pass filter) is designed to eliminate low frequency resonant feedback. Selecting either the 80Hz or 200Hz positions will roll-off low frequencies preventing uncontrolled, run-away resonant feedback. The LO-CUT filter can be removed from the signal path by setting it to BYPASS.



Notch Filter

To help control feedback, a sweepable notch filter allows you to focus on a very narrow frequency and surgically remove it without affecting the over-all tone of the instrument. The notch filter on the PZ-Pre has two controls: NOTCH sweeps the frequency spectrum of the filter from 56Hz to 330Hz while the NOTCH Q switch controls the width and attenuation of the filter. The NORMAL setting introduces a -8dB notch and the DEEP setting introduces a -15dB notch. The notch filter can be removed from the signal path by setting it to BYPASS.

3-Band Semi-Parametric EQ

This three-band semi-parametric EQ is shared between the two inputs. HIGH and LOW are shelving type EQ and adjust the treble and bass response. The sweepable midrange EQ uses two controls: MID controls the amount of boost or cut, while FREQ sweeps the frequency spectrum.

Phase Reverse (¼" Stage Amp Output)

Technically speaking, this is actually a polarity reverse switch that lets you toggle the polarity of the signal at the ¼" instrument OUTPUT. This switch is used to help reduce feedback when the monitors or PA system coincide with the instrument amp to cause a feedback hot-spot where the performer is situated on stage.

Boost and Effects Loop

The PZ-Pre is equipped with a power booster and effects loop that can be kicked in to create dynamic solos or avant-garde textures. The power boost and effects loop may be activated together or separately, depending on the position of the FOOTSWITCH ASSIGN switch.

Boost

When the FOOTSWITCH ASSIGN is set to BOOST, depressing the BOOST footswitch will only turn on and off the variable power booster (effects loop is bypassed). The BOOST knob sets the level of the power booster with a maximum of +12dB of clean boost. When set to BOTH, depressing the footswitch will turn both the effects loop and power booster on or off. An LED illuminates when the loop, booster, or both, are active.

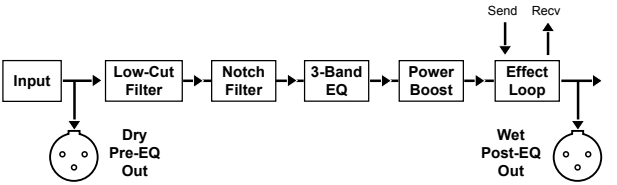
Effects Loop

The ¼" effects loop SEND and RETURN jacks are used to interface with standard guitar effects pedals such as reverb, chorus and delay. When the FOOTSWITCH ASSIGN is set to LOOP, depressing the BOOST footswitch will only turn on and off the effects loop (power booster is bypassed). The effect loop can be set to stay on all the time by using the LOOP ON switch next to the stage amp output.

OUTPUT SECTION

¼" Instrument Amp Output

The ¼" OUTPUT jack connects to the musician's on-stage amplifier. This output is at the end of the PZ-Pre signal path and is affected by all the controls.

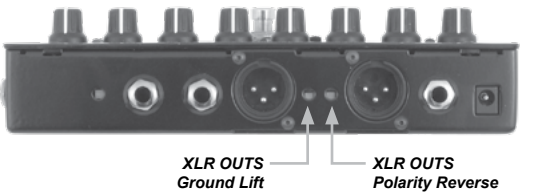


Post-EQ DI Output

This balanced XLR output is another active direct box. It produces a 600 Ohm, mic-level signal suitable for connecting to mixing consoles. The POST-EQ XLR OUT comes at the end of the PZ-Pre signal path after the filters, equalizer, PHASE, BOOST and LOOP functions. It is intended to feed a stage monitoring system or in-ear monitors allowing the player to control their on-stage tone through the PZ-Pre controls.

180° Polarity Reverse

The POST-EQ XLR balanced output features a polarity reverse for absolute phase alignment. This recessed switch will invert the signal polarity of the POST-EQ XLR output by reversing pins-2 and 3 at the XLR connector. The default position for the switch is pushed out where pin-2 is positive. This is the AES standard for XLR connectors and is sometimes called 'pin-2 hot'.



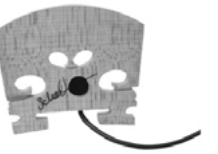
INSTRUMENT CONNECTIONS

Because the PZ-Pre can accept different kinds of pickups it's important to identify which type of pickup your instrument is equipped with. Typical pickup systems include:

1. Magnetic (passive)
2. Piezo transducers (passive)
3. Magnetic or piezo with on-board preamp (active)
4. Combination magnetic and/or piezo with split output

Magnetic Pickups (Passive)
These types of pickups are sometimes mounted in the sound hole of an acoustic guitar. They are referred to as passive pickups because there are no electronics between the pickup and instrument output jack. Magnetic pickups connect directly to the PZ-Pre with an instrument cable. (PZB not required)

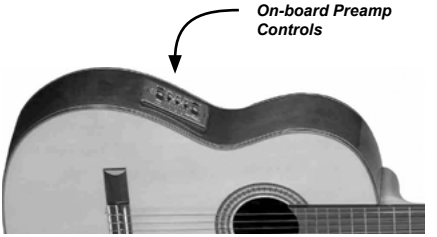
Piezo Transducers (Passive)
Piezo transducer pickups can be permanently mounted inside an instrument, embedded in the bridge or attached to the sound board with double sided tape. A piezo is considered passive when there are no active electronics between the transducer and the instrument output jack. The piezo transducer pickup converts vibration into a very small electrical current. The current a piezo produces is so small that it needs a specially designed amplifier or buffer to increase the signal to a workable level.



The PZ-Pre is equipped with a piezo buffer (PZB) on each input to ensure the best possible tone from passive piezo pickups. When connecting a piezo pickup to the PZ-Pre you should engage the PZB for the input you're connecting to. Set the switch to its 'inward' position to engage the PZB.

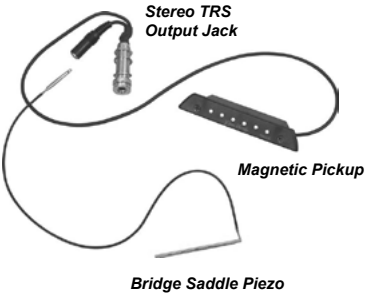
Magnetic or Piezo Pickups with On-board Preamp
Many electrified acoustic instruments feature an on-board preamp that works with internal pickup systems. The pickups may be magnetic, piezo or a combination of both types. These instruments are referred to as 'active' because there is a preamp between the pickups and the instrument output that requires a power source such as a battery. The preamp controls are usually mounted on the side of the instrument.

Active instruments produce a signal that can connect to the PZ-Pre without the need to engage the PZB. The instrument's on-board preamp will buffer the signal and the output can connect directly to the PZ-Pre with an instrument cable.



Combination Pickup Systems
Each type of pickup system has strengths and weaknesses. Some players may use a combination of pickups to create a more natural tone than either pickup system can produce alone.

You can connect both a magnetic and piezo pickup and use the PZ-Pre's unique BLEND-MIX function to blend the outputs together. Alternatively, the PZ-Pre can toggle between the pickups to use the one that best suits the song being played.



OUTPUT CONNECTIONS

The PZ-Pre is equipped with four outputs, each of which is designed for specific tasks to address various needs on stage.

Instrument Amplifier Output

This ¼" guitar level output is designed to feed an on-stage guitar amplifier. Think of this output as your own personal 'world' where you create your sound and get inspired. You may even set up a mic in front of your stage amp so the FOH engineer can mix in your effects with his room mix.

Tuner Output

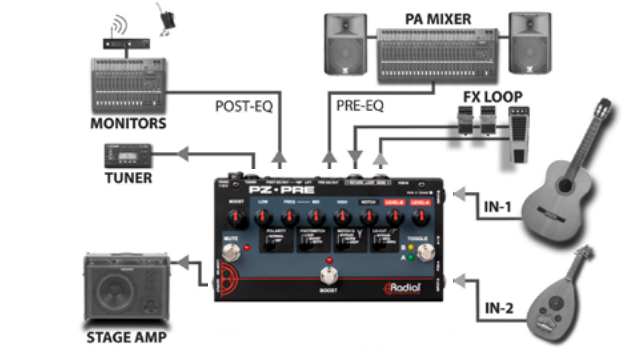
This ¼" output is separately buffered so that connecting an electronic tuner will not have any effect on the instrument tone because of impedance loading. When the MUTE footswitch is depressed, all other outputs are turned off while the tuner output remains active. This lets you quietly tune on stage or change instruments without disrupting the audience.

Pre-EQ and Effects XLR (Dry Direct Box) Output

This balanced mic level XLR output is designed to go into the PA system. It is 'dry' and unprocessed so that the FOH engineer can treat this signal to optimize the sound in the PA. For instance, you may want reverb on stage, but in an arena, this is likely the last thing that is needed. This is also a great place to connect a recorder if you plan to produce a CD afterwards. With a clean, unprocessed track, you can add effects such as reverb or chorus in post-production or even re-amplify the signal using the Radial X-Amp. None of the effects, EQ or notch filter will affect this output.

Post-EQ and Effects XLR (Wet Direct Box) Output

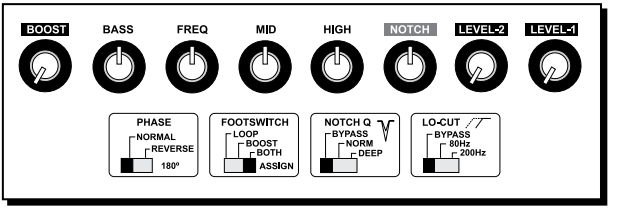
This is primarily designed to feed stage monitors, but is also where you would connect your PZ-Pre to the PA if you do not have a FOH engineer running the PA system. For monitoring, you can have all of your effects on and create the stage mix that sounds best to you without interfering with what the FOH engineer may require. You can also send a wet mix to the house PA and the FOH engineer can combine both feeds!



SETTING UP THE PZ-PRE

Always make sure the equipment you are connecting to is either turned off or the volumes are set to zero. This will eliminate any power-up transient pops from harming the loudspeakers. To avoid potential for electric shock, only connect the PZ-Pre to properly grounded audio equipment. If your instrument uses an on-board preamp, ensure the battery is fresh and fully charged.

To start, set the PZ-Pre to a neutral setting as shown below. Connect the power supply and toggle the MUTE and BOOST footswitches to their off positions.



Setting Instrument Levels

1. Start with your primary instrument connected to INPUT-1.
2. Determine the type of pickup you are connecting. If it is a passive piezo pickup, activate the piezo buffer with the PZB-1 switch.
3. Stomp on the TOGGLE footswitch until LED-1 illuminates.
4. Turn on your instrument amplifier or sound system.
5. Slowly turn LEVEL-1 clockwise and set a comfortable listening level.

USING THE PZ-PRE EQ CONTROLS

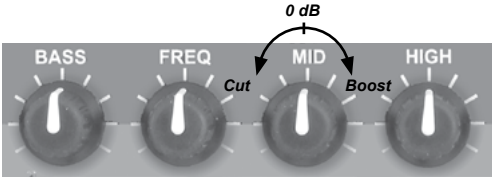
Before you head off to your first gig with the PZ-Pre, it is a good idea to familiarize yourself with the controls in your practice room and investigate the various functions. Do this at a low volume level first so that you do not cause feedback. Listen to the LO-CUT (high-pass filter) and how it affects the tone of your instrument. You will probably find that using it will clean up the bottom end of your sound without affecting the overall tone. In fact, if you are playing with a drummer and bassist, you will likely find that filtering the lower registers of your instrument can really improve the overall mix!

Now listen to the EQ. You will notice that the bass and treble controls are quite powerful! So be careful! Less is always best when it comes to equalization. Creating a big, fat sound with lots of bottom end and a super crisp high end may sound good in your basement, but live, these frequencies tend to muddy up the bottom end and cause the high end to get very harsh, especially if you have mid-range horns in your PA. Furthermore, feedback with acoustic instruments occurs when the sound resonates from the PA back into the instrument pickup system. Feedback increases exponentially when you add lots of bass or treble!

The MID control is very important to getting your sound right. Each instrument tends to work within a given sonic range. For instance, a violin's range is much higher than that of a cello or double bass. However, the character of the instrument is usually in the mid range. This is also where human hearing is most efficient.

The PZ-Pre has a semi-parametric mid-range EQ with one knob that adjusts the center frequency (FREQ) and another that controls the intensity (MID). You can cut or boost any frequency within the controls' range of 82Hz to 5.6kHz. This is also where most folks get into trouble. Because human ears are most sensitive to mid-range, we tend to naturally cut it back. Now if you take out the very essence of the instrument before it gets to the PA, what do you expect the audience to hear? This is why we included a separate Pre-EQ output for the front of house PA system. The Pre-EQ output will give the house engineer a full-range signal to mix with while the PZ-Pre EQ controls can be adjusted to suit you. However, in any case be careful not to over-EQ your tone!

The sweep function of the FREQ control is designed to find the range best suited to your instrument's natural tone. Start by setting the MID control at 2 o'clock and then sweep the FREQ control until you find the spot where your instrument seems to resonate at an unpleasant frequency. Then back-off the MID control to approximately 10 o'clock and listen. Try playing at soft and then louder volumes to see what happens. Then try fine tuning the FREQ control to see where it sounds best. Setting an EQ is more of an art than a science but you can not go wrong if you follow EQ rule number 1: ***Less is Best!***



TIP: The twelve o'clock position is neutral, or zero boost/cut, for the BASS, TREBLE, and MID controls. Turning these controls clockwise will increase, or boost the amplitude while turning counter-clockwise will decrease, or cut.

Set the MID control to a boost or cut position in order to hear the sweep of the FREQ control.

CONTROLLING FEEDBACK

The PZ-Pre gives you low-cut and notch filter tools to suppress feedback and achieve the greatest amount of signal gain. This concept is called gain before feedback. This section of the manual will help you set up the PZ-Pre for maximum gain before feedback.

To test for feedback you should be positioned in the area on stage where you will be performing. Always test for feedback with your amp, monitors and PA system turned on.

TIP: Feedback can be very unpleasant to listen to. The MUTE footswitch can be used as a panic button in case of uncontrolled run-away feedback. Dampening the strings with one hand while you adjust the PZ-Pre controls is another method to control feedback while testing.

Begin your feedback testing by increasing the LEVEL control to the point where your instrument starts to feedback. Play your instrument, move around on stage and experience the effect.

At this point, you will likely hear two types of feedback: feedback when a specific note sounds and a low frequency run-away resonance. The feedback from a specific note we will deal with later, using the notch filter. For now, we will focus on removing the runaway low resonance with the LO-CUT filter.

LO-CUT Filter
The goal for using the LO-CUT filter is to be able to strum the open strings loud and clear without run-away low frequency resonance feedback. This type of feedback can often be eliminated simply by engaging the LO-CUT filter.

Try this by setting the LO-CUT control to the 80Hz position. Increase the volume and see what happens. If you get more of the same resonance feedback, try the 200Hz position. In this position, you can hear that more bass frequencies have been removed from the signal but your instrument can have more gain before the feedback starts.

Setting the LO-CUT Filter
1. Set the LO-CUT switch to bypass.
2. Perform this test by strumming open strings.
3. Slowly turn up the LEVEL control until low frequency feedback starts to make the open strings resonate.
4. Set the LO-CUT switch to 80Hz.
5. Continue to slowly increase the LEVEL control to the point where low frequency feedback re-occurs.
6. Turn the LEVEL control down a little from this point.
7. If more gain is needed, set the LO-CUT to 200Hz and increase the LEVEL control.

Notch Filter
The notch filter is designed to manage feedback by surgically removing an offending frequency while leaving the rest of the sound intact. To find which note is going to feedback first, play ascending scales starting from your instrument's lowest note.

During your tests, if you hear that a particular note is more prone to feedback than others, set the NOTCH Q to the NORMAL position and slowly rotate the NOTCH control to see if you can dial in the offending frequency. This process is sometimes referred to as 'notching out'.

When you have found the position on the dial that corresponds to the frequency that is feeding back, play and hold a chord or simply let all of the strings resonate. Now, turn the LEVEL control up some more and see what happens. If the same frequency is still on the verge of feedback, try setting NOTCH Q to DEEP.

An important point when using the NOTCH filter is that the problem frequency will likely change each time you play in a different venue or change instruments. So experiment and get familiar with the NOTCH filter functions. This will make sound-check go more quickly and will reduce the occurrence of feedback when you are performing!

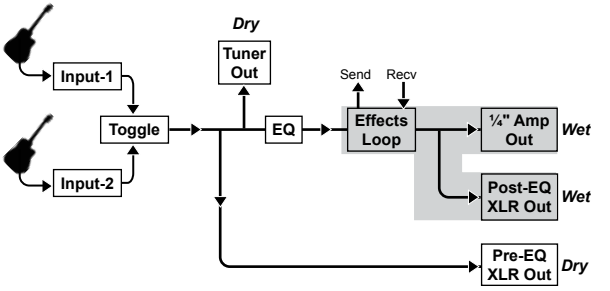
Setting the Notch Filter
1. Set the NOTCH Q switch to bypass.
2. Test by playing ascending notes on the lowest strings.
3. Focus in on the note that tends to feedback before the rest. If necessary, increase the LEVEL control to produce a perpetual feedback ring at this note's frequency.
4. Set the NOTCH Q switch to NORM.
5. While holding the note, turn the NOTCH control until you have tuned the filter to the same frequency. The notch filter is tuned when the note decays naturally without feeding back.
6. Increase the LEVEL control until the same note starts to feedback and then back off the level a little.
7. If more gain is needed, you can switch the NOTCH Q to DEEP and try increasing the LEVEL control some more.

TIP: At some point, turning up the instrument level will cause uncontrollable feedback at many frequencies and is an indication levels should be lowered.

ADDING EFFECTS TO YOUR SOUND

For the most flexibility, the PZ-Pre is equipped with an effects loop that can be linked to the power BOOST footswitch or set to remain on. When linked to the BOOST footswitch, you can turn on and off a string of effects with one footswitch. When the loop is set to remain on you can control your pedals in a traditional way where each pedal is activated or bypassed using its own footswitch.

The effects loop is heard at the ¼" amp output as well as the Post-EQ direct out. However, the effects will not be heard at the tuner out which can help improve tuner response and they will not be heard at the Pre-EQ direct out giving you flexibility to send clean or wet signals to the PA.



The loop is equipped with ¼" send and receive jacks on the rear panel that connect to the effect pedal using standard coaxial cables.

Using the Loop With The Boost Footswitch

The three position FOOTSWITCH ASSIGN switch links the effects loop to the BOOST footswitch. The first setting is BOTH where stomping on the footswitch will turn on the booster and the effects loop. You can use this setting to introduce an effect such as flanging or echo along with a volume boost to enhance a solo. The middle setting, BOOST, allows the footswitch to only control the power boost function while the loop remains off. The last setting, LOOP, does the opposite and allows the footswitch to control just the loop. The power boost function remains off.

Using the Loop On Setting

The LOOP ON switch, located on the left side next to the ¼" output, allows the effects loop to remain on. Using the LOOP ON setting will allow you to control your effects individually using their own footswitches. The switch is recessed so use a small screwdriver to access it. When pushed in, the FOOTSWITCH ASSIGN switch is deactivated and the effects loop remains on all the time. The BOOST footswitch is then dedicated to the power boost function.

Radial PZ-Pre Specifications	
Inputs 1 & 2:	¼" Phone unbalanced
Input impedance:	Normal 6.8k Ohm Piezo 10Meg Ohm
PZB buffers:	+10dB boost
Low-cut filter:	75Hz / 220Hz
Notch filter range:	56Hz - 330Hz
Notch Q:	-8dB / -15dB
Low EQ:	Shelving type +/-12dB (75Hz)
High EQ:	Shelving type +/-12dB (7.5kHz)
Mid EQ:	Semi-parametric +/-12dB (82Hz - 5.6kHz)
Power Boost:	Unity gain to +12dB max.
Effects Loop:	¼" Phone unbalanced Send 1k Ohm / Return 15k Ohm
Switching:	FET Switching
Output (instrument):	¼" Phone unbalanced, 1k Ohm output impedance
Tuner output:	¼" Phone unbalanced, 6.8k Ohm output impedance
Pre-EQ output:	XLR, balanced, 600 Ohm, mic-level
Post EQ output:	XLR, balanced, 600 Ohm, mic-level
XLR pin-out: (AES standard)	pin 1 ground pin 2 hot (+) pin 3 cold (-)
Power supply:	15VDC, 400mA (included), center pin positive
Size (W x D x H):	8"x 4.25"x1.37" (203x108x35mm)
Weight:	2.65 lbs. (1.2 kg)
Warranty:	3 Years, transferable

THREE YEAR TRANSFERABLE LIMITED WARRANTY

RADIAL ENGINEERING LTD. ("Radial") warrants this product to be free from defects in material and workmanship and will remedy any such defects free of charge according to the terms of this warranty. Radial will repair or replace (at its option) any defective component(s) of this product (excluding finish and wear and tear on components under normal use) for a period of three (3) years from the original date of purchase. In the event that a particular product is no longer available, Radial reserves the right to replace the product with a similar product of equal or greater value. In the unlikely event that a defect is uncovered, please call 604-942-1001 or email service@radialeng.com to obtain a RA number (Return Authorization number) before the 3 year warranty period expires. The product must be returned prepaid in the original shipping container (or equivalent) to Radial or to an authorized Radial repair center and you must assume the risk of loss or damage. A copy of the original invoice showing date of purchase and the dealer name must accompany any request for work to be performed under this limited and transferable warranty. This warranty shall not apply if the product has been damaged due to abuse, misuse, misapplication, accident or as a result of service or modification by any other than an authorized Radial repair center.

THERE ARE NO EXPRESSED WARRANTIES OTHER THAN THOSE ON THE FACE HEREOF AND DESCRIBED ABOVE. NO WARRANTIES WHETHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL EXTEND BEYOND THE RESPECTIVE WARRANTY PERIOD DESCRIBED ABOVE OF THREE YEARS. RADIAL SHALL NOT BE RESPONSIBLE OR LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSS ARISING FROM THE USE OF THIS PRODUCT. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH MAY VARY DEPENDING ON WHERE YOU LIVE AND WHERE THE PRODUCT WAS PURCHASED.

To meet the requirements of California Proposition 65, it is our responsibility to inform you of the following:

WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Please take proper care when handling and consult local government regulations before discarding.

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Radial PZ-Pre Users Guide - Part #: R870 1205 10 / 10-2025