JDV-Pre™ 500

Instrument Preamp and DI

500 Series Module

User Guide

True to the Music

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Made in Canada

Radial® JDV-Pre™ 500 User Guide

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Congratulations… you've done it! You have invested in what we believe is one of the most musical sounding instrument preamps ever made. The JDV-Pre went through many design revisions before we finally decided to release it to market. Why so long? Each time we plugged it in, we found ourselves asking for extra bits that could make the JDV that much better.

What this really means is that behind what appears to be a simple control panel are lots of extra cool features that have been carefully incorporated into the design. And the only way to take full advantage of them is to actually read this manual. Once you have done so, there may be questions that have not been answered. For these, we kindly ask that you visit the JDV-Pre FAQ page. This is where we answer questions from users, like yourself, with the latest information that can be helpful when using the JDV-Pre live on-stage or in the studio. If of course you cannot find what you are looking for, either post a question on the FAQ or feel free to send us an email at info@radialeng.com and we will do our very best to get back to you in short order.

Now close your eyes and listen. You are about to hear your vintage Fender Jazz bass for the very first time.

WARNING NOTICE TO USER!

The Radial JDX 500 is not a load box. This means that if you are using it with a guitar amplifier it must be connected to a speaker cabinet or some type of load box. Failure to do so could result in damaging the JDX and your amplifier which of course would not be covered under warranty. Always ensure you have proper cables and connections have been checked. We recommend using high quality 12 gauge speaker cables.

Because the JDX 500 can also be used as a direct input from a guitar, we have instituted a slow flashing LED to let you know when you are in this mode. This safety measure reminds you that you should not connect a guitar amplifier output to the JDX when in guitar mode as this may damage the JDX.

Although preventative safety measures have been designed into Radial 500 series products **we strictly advise against hot-swapping modules** or plugging and unplugging them when the Workhorse or other 500 series rack is powered on. Hot swapping can cause connection sparks at the card-edge connector that could send damaging transients to other equipment. This also greatly reduces the life span of the contacts. Damage due to hot swapping is not covered under warranty. There are no user serviceable parts inside.

FEATURE SET

1. GAIN: AccuState level control simultaneously adjusts the gain and input sensitivity to ensure lowest noise at all gain settings.

2. INVERT: Reverses the polarity on the JDV output. Ideally suited for reducing feedback on stage or can be used in the studio to better phase align two signals for improved stereo imaging.

3. HP FILTER: High-pass filter reduces low frequency resonance, helps clean up the sound of acoustic instruments and eliminates run-away feedback. Great for layering tracks when recording.

4. DRAG: Engages the Drag control. This shifts the impedance of the front panel ¼" input from a fixed 3.9meg-Ohms for passive piezo pickups to a variable load for magnetic pickups.

5. LOAD ADJUST: Varies the load from 22k-Ohms (fully counter-clockwise) to 500k-Ohms (fully clockwise). Replicates the load of a tube amplifier on a magnetic pickups for a smoother, more natural tone. Great for bass and guitar!

6. LED INDICATORS: For power, signal present, peak-overload, and phantom power provide visual feedback of the JDV-Pre operating status.

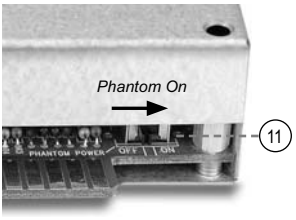
7. INPUT: Used to connect high impedance instruments to the JDV-Pre. This front switching jack has priority over the XLR mic input on rear panel of 500 series rack.

8. AUX OUT: Buffered output used to feed a guitar amplifier. Transformer isolated to eliminate buzz and hum caused by ground loops.

9. OMNIPORT: Balanced, low impedance direct box output (mic-level) designed to feed a snake system and mixing console in a live touring environment. Available when used with the Workhorse rack.

10. XLR INPUT (rear panel of rack): Microphone input with phantom power. Enables the JDV-Pre to be used with instrument condenser mics. Transformer coupled for optimal signal flow. This input is disabled when a plug is inserted into the front panel ¼" input.

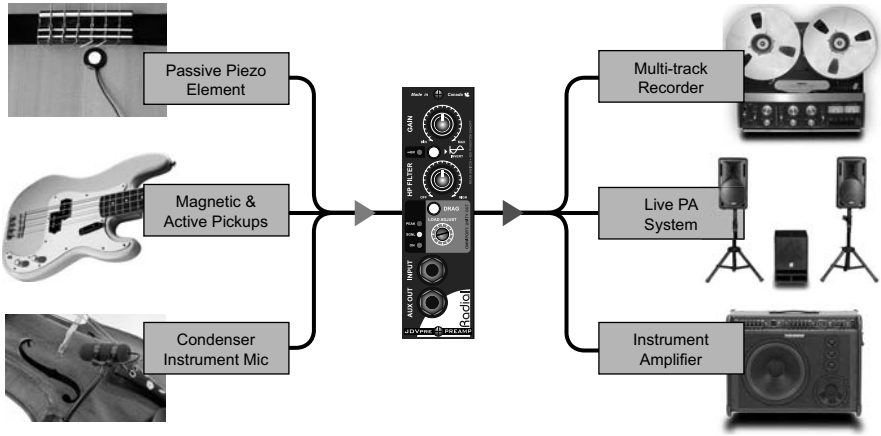
11. PHANTOM POWER - Turns on/off the +48V power supplied through the rear panel XLR microphone input. When engaged the front panel LED indicator will illuminate. Used to power condenser microphones connected to the XLR mic input.



JDV-PRE OVERVIEW

The JDV-Pre is a preamp dedicated to instruments. In other words, when we designed the JDV-Pre, our goal was to deliver a device that would be equally effective at amplifying a guitar, violin, mandolin or a contra-bass. So we started by optimizing the front end for the most natural tone and widest possible bandwidth. We then added a variable low-cut filter that would enable the engineer to 'size' the preamp so that it would translate the instrument's true character while eliminating problem resonance.

As we developed the design, it became abundantly clear that instruments are amplified in many different ways depending on the transducer. In our audio world, a transducer captures vibrations and converts them into an electrical impulse. This can be in the form of a magnetic pickup that captures the vibrations of a string, a piezo element that captures the vibrations at the bridge or even a microphone capturing the vibrations of sound as it travels through the air.



Each transducer reacts differently to an electrical circuit. For instance a magnetic pickup sounds warmest when the impedance is set around the 200k-Ohm mark. A piezo really works best when the impedance approaches 4meg-ohms. And with condenser and dynamic microphones, one has to consider 48V phantom power, the input impedance and of course how much gain you introduce. The more gain, the more opportunity for noise. The more noise filtering you employ, the more you can affect the instrument's natural harmonics. Great care is needed all the way along.

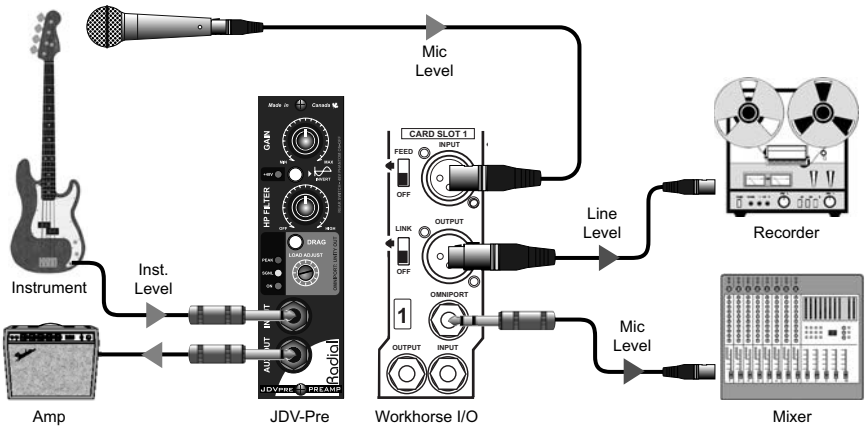
Once you captured the source, the next goal is to send it along to one or more destinations. For instance when recording, the JDV-Pre must produce a +4dB balanced line output to feed digital audio workstation and a thru-put for the musician's amplifier. On a live stage, the JDV-Pre must also be able to feed the artist's instrument amp and produce a mic-level output like a direct box so that it can feed a snake system.

The JDV-Pre user's guide follows the flow chart above and discusses how each of these functions is addressed. Let's get started!

Making Connections

Before making any connections, start by turning off your audio system and turning all volume levels down. This helps protect equipment from turn-on transients that could damage loudspeakers and other sensitive equipment. We recommend using a power bar with an on-off switch as this makes it easy to turn on and off the 500 series rack, monitors and so on, using a single switch. Carefully plug the JDV-Pre module into your 500 series rack avoiding stress on the card edge connector. Screw the module in to ensure it does not accidentally become dislodged.

The JDV-Pre has two input connections; the front panel ¼" and the XLR as found on the rear panel of 500 series racks. The front panel input connector is typically used for high impedance instrument pickups while the rear XLR is optimized for a low impedance microphone. There are three outputs on the JDV: The front panel aux out which is used as a thru-put to the guitar or bass amplifier when recording; the XLR output on the 500 rack and, if you are using it with a Workhorse, the Omniport which in this case is set up as a balanced low impedance direct box output (mic-level).



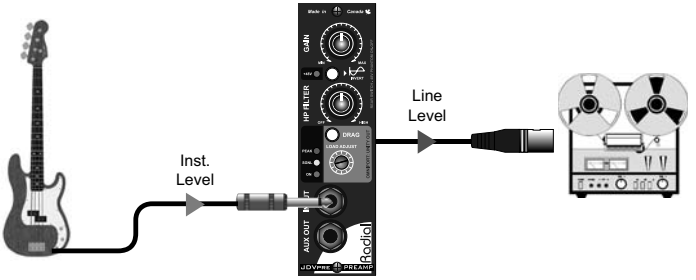
If you are familiar with audio equipment you will find the JDV to be extremely easy to use. You plug in, turn up the input gain, adjust the high-pass filter and play. The variations really come down to the type of pickup or microphone you are using.

Start by setting up the JDV-Pre 500 controls as follows:

1. GAIN: set fully counter-clockwise
2. HP FILTER: set fully counter-clockwise (bypass)
3. INVERT: outward position
4. DRAG: outward position (bypassed)
5. LOAD ADJUST: set to 12 o'clock position (approximately 200K Ohms)
6. If you plan on connecting a condenser mic ensure the phantom power LED is illuminated.

Using magnetic pickups

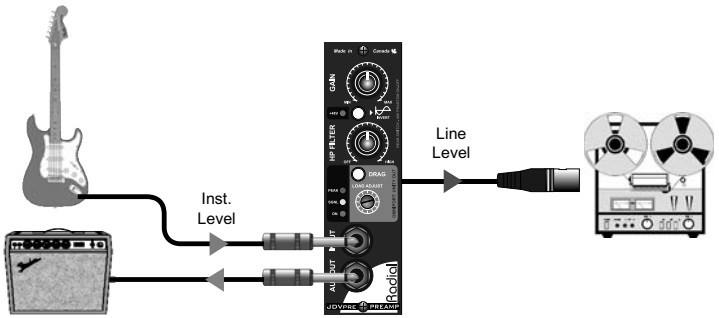
Magnetic pickups such as those found on a typical Fender bass are often recorded direct in the comfort of the control room. The JDV-Pre's front mounted ¼" input connector makes this easy. All you do is plug in, turn up the volume and you are set to go.



Drag control brings the natural tone of the instrument to a whole new level by allowing you to replicate the load on the pickup as if connected to an amplifier. This not only makes the instrument sound more natural, it changes the response of the instrument so that it feels right. To activate, you simply depress the Drag control on switch. This changes the input impedance from 3.9m Ohms (optimized for piezo pickups) to a variable load that ranges from 22k Ohms to 500k Ohms.

Begin by setting the Drag Control to 12 o'clock. Then turn it clockwise. The sound will become brighter with greater clarity. As you turn it counter-clockwise the tone will warm up and sound smoother. Setting the Drag is particularly important if you intend to Reamp the signal down the way (read more about Reamping later in this manual). By adjusting the load with the Drag control, guitars, pedals and amps will sound more realistic.

The JDV-pre is equipped with a ¼" Aux output on the front panel. This is used to send the instrument signal to a guitar amp while recording. This enables the guitarist to hear himself play through a distorted amp while you capture the dry clean track on your recorder. The Aux out is transformer isolated to help eliminate hum and buzz caused by ground loops. Ground loops are a common problem when interfacing some guitar amps to pro-audio equipment.



Using an active bass or guitar

Active pickups have been around for years. They have become more popular since the advent of 5 and 6 string basses. And although these can sound absolutely amazing, more often than not these instruments are so loud, they overload the instrument input on most devices. This is because traditional passive basses generally produce around 1 Volt of signal while their active counterparts (powered with 9 Volt batteries) can deliver well over 6 Volts when played hard! Unless your interface has enough headroom, you will get distortion. The JDV-Pre addresses the problem by providing 30 Volts of headroom for active electronics. Connection is the same as using a passive bass. However, Drag control will have little or no effect on active pickups as the signal is already buffered by the bass's internal electronics.

Using piezo pickups

Musicians usually complain that piezo equipped instruments sound squawky and harsh. This is not so much the fault of the piezo element as it is the built-in preamp that normally accompanies it. Piezo pickups sound best when they 'see' a very high input impedance. But when you increase the input impedance, you also elevate susceptibility to background noise and hiss. Therefore most manufacturers compromise by using a 1meg-ohm input. This results in an acceptable sound that is functional on a live stage.

But what few realise is that if you couple the output of a piezo transducer directly to a really good high-impedance preamp, you can produce sounds that are as good as a condenser microphone. The JDV-Pre has been carefully crafted with a very high input impedance and ultra low noise circuitry to get the best possible bandwidth and transient response from piezo elements.

By disengaging the Drag Control, the JDV-Pre's input impedance elevates to 3.9 meg-ohms, or about four times higher than the typical input impedance found at the input of most guitar and bass amplifiers. Careful attention is paid to reducing noise while the class-A feed-forward circuit assures the most natural tone. For best results, try to bypass the internal preamp in your instrument and connect the piezo directly to the JDV-Pre's ¼" input on the front panel. You will immediately notice a much warmer, natural sounding tone. This is not only effective on acoustic guitars, but equally so on difficult to amplify instruments such as violin, mandolin, banjo, and contrabass. In the studio and live on-stage, piezo pickups offer consistent results as opposed to microphones where placement can vary the sound from session to session.

Piezo element wired directly to output jack.

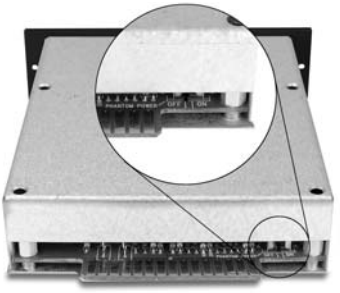
Piezo element wired to battery powered preamp.

Using an active acoustic guitar
As described above, most acoustic guitars for stage use are outfitted with some form of transducer and a built-in battery powered preamp. These are designed to be plug and play easy to use, and although they do not necessarily sound the best for studio recording, they are extremely functional for live performance. In the studio they are great for tracking song ideas or recording demos. Those that simply want to use their guitar's built-in preamp with the JDV-Pre will benefit from the huge internal rail voltage the 500 series provides with greater dynamics, headroom and lower distortion.

Using a microphone
There is no denying… capturing the sound of the instrument with a high quality condenser microphone is just about as good as it gets. The real magic lies, not merely with the choice of mic, but the marriage with the preamp you use. The JDV-Pre's zero-feedback front end Class-A circuit sounds nothing short of remarkable. In fact it sounds so good; don't be surprised if you end up using the JDV-Pre as your go-to mic preamp for vocal tracks too! It sounds fantastically warm and natural and will surely captivate your senses as you start using it.

What truly makes it a marvel is the circuit design and the addition of an old school Hammond broadcast transformer. Transformers naturally compress the sound. This is because transformers do not so much distort, they saturate. In other words, as they reach their maximum signal handling capacity, instead of going from say 1% to 100% distortion like an active circuit, the distortion increases gradually. They naturally compress to create a sonic effect that folks refer to as "vintage". When used on acoustic instruments that are typified with fast transient peaks such as a banjo, acoustic guitar or mandolin, the transformer gently smoothes out the tone.

Connection is made using the rear panel XLR input on your 500 series rack or Workhorse. The JDV-Pre is well suited to accommodate dynamic, ribbon and condenser microphones. To active 48V phantom power, you merely set the phantom switch adjacent to the card edge connector to ON before you plug it into your rack. Although phantom power will not harm dynamic microphones, most engineers tend to turn it off when not in use. This helps reduce the pops that are associated when plugging in equipment.



Note that if the Drag Control is turned on, it will affect the load on the microphone. For fun, try increasing or decreasing the load as you test various microphones. You may find that the effect can be very pleasing on some instruments.

Using the 180º invert switch
A wonderful feature built into the JDV-Pre is the invert switch. This reverses the electrical polarity of the signal by 180º, essentially putting it out of phase. The most common application for this function when recording is combining two mics to create a stereo field. Sometimes, flipping the polarity can bring certain frequencies in phase resulting in better tone.

Another less known application has to do with using the 180º invert switch to eliminate room resonance. This is primarily applied in live performance environments where the sound from the PA system may be interfering with echo in the room. This can create a hot spot (room

mode) which can amplify certain frequencies causing resonant feedback. By inverting the phase, you basically move the hot spot thus solving the problem.

Using the high-pass filter
The JDV-Pre is equipped with a high-pass (low cut) filter that is designed to reduce resonance and excessive low frequency build up from instruments. In fact, it is always on. You just can't hear it. This is because it begins to take effect at 5Hz which of course is well below the human hearing threshold. As you turn it up (clockwise) it slowly rises to gently remove unwanted low frequencies.

Using the high-pass filter with acoustic instruments will change your world for the better. Acoustic instruments are resonating devices with all kinds of harmonics emanating from the body, top, sound hole and neck. When recording, these resonances many not even be immediately audible but depending on the playback system, they can turn what could be a wonderful mix into a low frequency mud fest. The 'Nashville Trick' is eliminating the problem before it hits the recording system. All you do is dial in the high-pass filter until the bottom end cleans up. Once you have found what you think is the cut-off frequency, take the time to play a little longer so that you get use to the effect, and then add some bass back in by dialling backwards. You will be amazed at how well this can work! Not just on acoustics, but also on voice and just about any other musical source.

Using The JDV-Pre in the studio
Most of the applications detailed above apply to using the JDV-Pre in the studio and on a live stage. But for those that are new at recording, we felt it would be good to discuss a standard recording setup. Generally speaking, if you are recording an acoustic instrument, the instrument is connected to the JDV-Pre and the output will be sent directly to the recording system. Playback for monitoring is normally done via headphones.

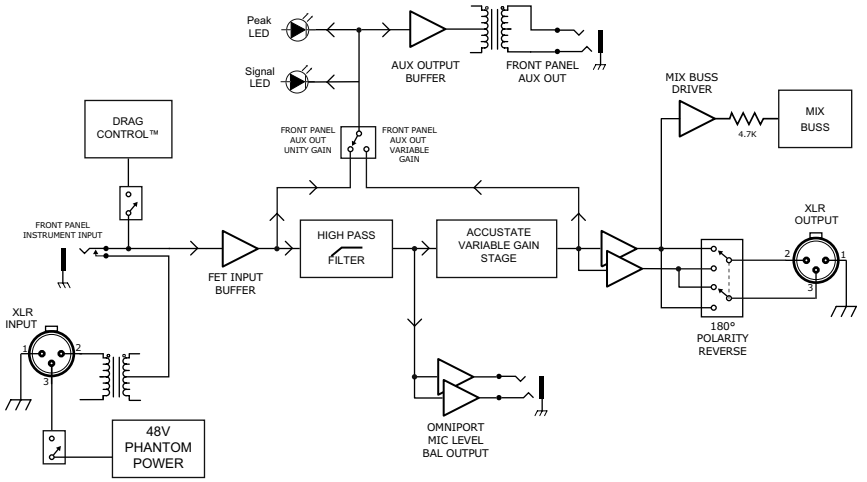
When recording electric instruments like a guitar, the process tends to be a little different as the guitar signal will have to feed the effects pedals and amp before it is mic'd. Today, most top studio engineers will record a 'dry' track at the same time as they record the 'wet' guitar signal. This enables them to Reamp the track later to better fit the final mix.

Reamping in the studio
Once you have recorded a dry track, send the output to a Reamper like the Radial X-Amp. From the X-Amp, you can then drive the signal through various pedals and amplifiers and move the mics around the room to capture the ultimate tone. Best of all, Reamping lets you do the work without the artist having to perform.

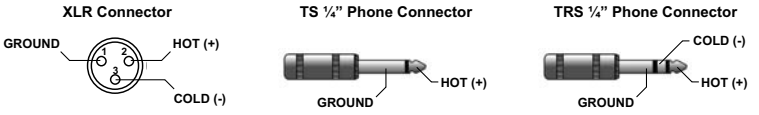
The JDV-Pre on a live stage
The advent of in-ear monitors and line arrays has spawned a demand for better sounding instrument interfaces. In the past, we lived with what we got. Today, artists can truly hear what their instruments sound like and often, they are under-whelmed. The JDV-Pre is perfectly suited for live stages, particularly when coupled with the Radial Workhorse.

Because the JDV-Pre is so clean and void of distortion, it is less susceptible to feedback. This means that instead of having to fight problem frequencies with a radical notch filter, you can quickly dial out the resonance using the high-pass filter and enjoy the natural tone of the instrument. The Radial JDV-Pre is an exceptionally well rounded device that will surprise you with respect to the natural sound it can produce and the efficiency that it brings to your production.

BLOCK DIAGRAM*



CONNECTOR WIRING



JDV-PRE 500 MODULE SPECIFICATIONS*

Specification		
Circuit type	Autopadding discreet component	
Clip Level - Buss output	Buss Output clips at +12dbu	Due to Class A Design
Clip Level - Input - 1/4" Input	>+26dbu	With Gain Control Set to 2
Clip Level - Input - 1/4" Input	-15dbu	With Gain Control Set to 10
Clip Level - Omniport	+5dbu input and +25dbu output	
Clip Level - Output	+10dbu	
Clip Light Threshold	+7db	Monitors XLR Output
Dynamic range	>93db	
Equivalent Input Noise:	-90dbu	Input Gain Control at 5
Frequency Response:	20Hz ~ 20kHz (+/- 2 dB)	
Front Panel Connectors:	Instrument Output, Aux Output	
Gain - Maximum - 1/4" Front:	26db	Input Gain Control at 10
Gain - Maximum - XLR - Rear:	46db	Input Gain Control at 10
Gain - Omniport:	+20db fixed	With relation to 1/4" input
Input - Rear Panel XLR:	Transformer Isolated Microphone Level	With Phantom Power
Input Impedance - 1/4" Input:	3.9M	Drag Off
Input Impedance - 1/4" Input:	22K to 500K	Drag On
Omniport Function:	Unity Gain Microphone Level Output	
Output Headroom:	+10dbu	
Output Impedance - Aux Out:	2.8K Ohms	
Output Impedance - Rear XLR:	321 Ohms, Balanced Output	
Output Level Maximum - Rear XLR:	+10dbu	
Current Draw:	80mA	

** Subject to change without notice.*

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 an 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 centre 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 centre.

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This product is intended for professional use only. The user should be familiar and experienced with the 500 series rack and module format

Radial®

True to the Music

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