DI'S – Direct Boxes – Basic Notes

What is a DI? And why do you need a DI? (Commonly referred to as a Direct Box). It's simple, DIs help eliminate "impedance mismatches" with unbalanced and balanced audio equipment. With that being said, the primary function of a Direct Box is to accept an "Unbalanced / High Impedance" signal (such as an acoustic guitar) and convert it to a "Balanced / Low Impedance" signal. This also allows you to send these signals over longer cable runs. Most technicians are not familiar with with what the "DI" stands for. It's short for "Direct Injection."

Direct Boxes come in all different types and sizes, and there are many to choose from. The two main categories of Direct Boxes are "Active and Passive." Both have their advantages and disadvantages, and of course will differ in price. Let's start with Passive types.

Video Clip!

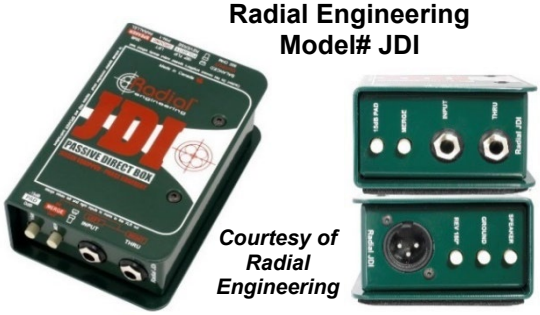
Whirlwind IMP2

The Whirlwind IMP2 is a very popular "Passive" Direct Box used with PA System set-ups.

Passive DI's

Passive DI's do not require power to operate. They use some type of transformer to convert High Impedance signals to Low Impedance signals.

Radial Engineering Model# JDI

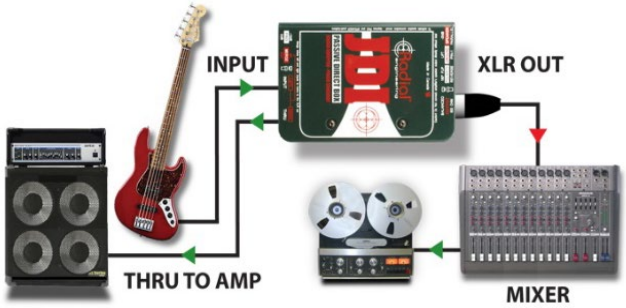


Courtesy of Radial Engineering

Radial Engineering JDI Passive Direct Box

This passive direct box is designed to handle extreme signal levels without distortion (which is critical to the sound quality of the performance). With its "no-power" passive design, the JDI performs high-to-low impedance conversion and signal balancing over a magnetic bridge that passes the signal while rejecting stray DC voltage. This makes the JDI particularly adept at eliminating hum and buzz caused by ground loops.

Courtesy of Radial Engineering



Ex: The Bass Guitar is plugged into the input and has a "Thru" and balanced output.

Active DI's

Active DIs require power to operate and will likely include a Pre-Amplifier. Active DIs also have more features than Passive DIs, including (but not limited to) ground lifts, dual channels, a Pad, a polarity switch, and a "Thru" output. Of course, Active DIs will usually be more expensive than Passive DI types.

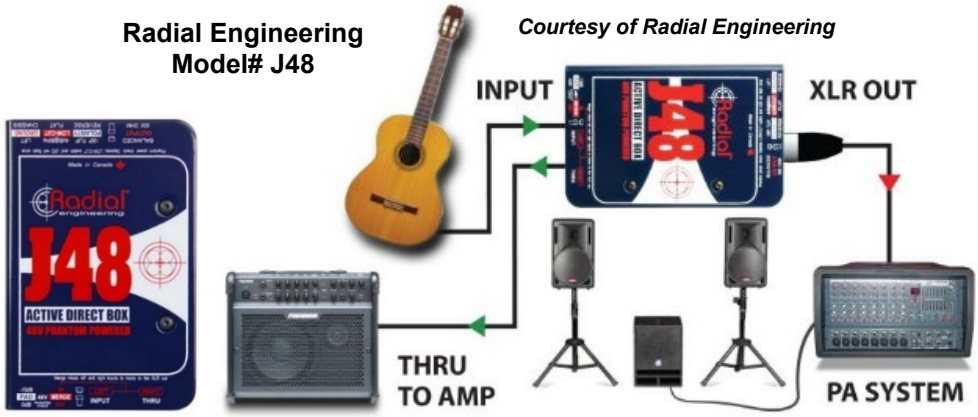
Radial J48 Active Direct Box

Most battery-powered guitars and basses (with active pickups) can produce as much as 7-Volts when played at max volume. Typical DIs are only able to handle about 3 volts. This can create distortion, the bass sounding thin and lacking punch, guitars sounding scratchy with sporadic peaks, and lose their natural body resonance. The J48 has more 'horse-power" (current) and is able to handle these transients. The extra headroom significantly reduces harmonic, phase, and inter-modulation distortion. And this leads to great sound!

Courtesy of Radial Engineering

Radial Engineering Model# J48

Courtesy of Radial Engineering



Tech Notes – Direct Boxes

a) **The Ground Lift switch disconnects Pin 1 of the XLR (use only as needed)**
b) **Not all Direct Boxes function the same (read the owner's manual)**
c) **Not all Direct Boxes sound the same as well – you'll be surprised at the difference in sound quality that different DI's can produce.**