

# USB-PRO™

## USB Direct Box



# User Guide

# Radial<sup>®</sup> USB-PRO<sup>™</sup>

## USB to Audio Direct Box

Table of Contents	Page
Overview .....	1
What is a direct box anyway .....	1
Features.....	2
Getting started with USB and audio connections .....	3
Testing and Using .....	4
Eliminating hum and buzz.....	4
Using the headphone output.....	5
Specifications .....	5
Radial Limited Warranty.....	Back Cover

### INTRODUCTION

Congratulations on your purchase of the Radial USB-Pro! The Radial USB-Pro is a high-resolution stereo direct box designed to convert sound files from a laptop computer and seamlessly transfer them to a pair of balanced audio outputs to feed a PA, recording or broadcast mixing console.

Plug and play easy to use, the USB-Pro can be up and running in no time. That said, as with any new product, we recommend that you take a little time to read through the manual in order to familiarize yourself with the USB-Pro features so you can get the most out of it.

If you have any questions that are not covered in this manual, please consult the FAQ section on the web site as this is where we post the latest updates and questions from other users. If you still can't find what you are looking for, feel free to send us a note at [info@radialeng.com](mailto:info@radialeng.com) and we will do our very best to reply in short order.

Now get ready to sing along at 96kHz!

## OVERVIEW

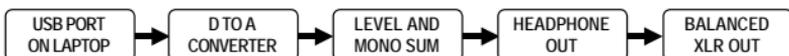
The Radial USB-Pro is a fully USB 2.0 compliant, 24bit/96kHz digital to analog audio converter and professional direct box in a compact and road rugged package.

A typical direct box is a device that lets you interface a high impedance (hi-Z) audio output with professional low impedance (low-Z) PA and recording systems. In the case of the USB-Pro, the digital audio signal is converted to analog and feeds directly into the direct box circuit to produce low-Z balanced left and right stereo signals. These outputs connect to a mixing console which in turn feeds the PA system. Direct boxes like the one built into the USB-Pro ensure the signal is delivered to the PA as faithfully as possible.



The USB-Pro is very easy to setup and use because it derives power from the USB connection and automatically configures the sampling rate and bit depth without the need for special drivers. The USB-Pro can be used for audio playback, system testing and for transferring digital audio files to analog for processing.

Following the block diagram below, a computer's USB digital audio output is converted to separate left and right stereo channels. A level control allows you to make fine adjustments and a mono sum switch can be activated to test for phase issues or send mono signals to two separate audio systems. The 3.5mm mini headphone output can be used to monitor the stereo signal. Before the XLR, output isolation transformers may be switched into the circuit to eliminate noise caused by ground loops. The signal is then balanced to drive long cables back to the mixing console.



## FEATURE SET



1. **LEVEL:** Used to set the XLR and headphone output level.
2. **MONO:** Sums the stereo signal to mono. When active, the LED indicator illuminates. Mono mode reduces the channel count on the PA or lets you send the signal to two separate audio systems simultaneously.
3. **HEADPHONE:** Mini 3.5mm (1/8") TRS headphone output is used to check the output from the digital source for trouble shooting. Works with ear-buds and standard headphones.
4. **USB PORT:** Connects from the PC or Mac using a TYPE B cable. This port delivers the digital audio signal and power to the USB-Pro which automatically recognizes the sample rate and bit depth.
5. **POWER LED:** This indicator will illuminate when the power is received from the USB connection.
6. **LEFT XLR OUT:** Standard XLR male output follows the AES format with pin-1 ground, pin-2 hot, pin-3 cold.
7. **GROUND LIFT:** Used to help eliminate hum and buzz caused by ground loops. Lifts pin-1 on both XLR outputs.
8. **RIGHT XLR OUT:** Standard XLR male output follows the AES format with pin-1 ground, pin-2 hot, pin-3 cold.
9. **ISOLATION:** Switches on side panel for each channel lets you insert transformers isolation when needed. Use to eliminate hum and buzz caused by ground loops.

## GETTING STARTED

Before making any connections, always ensure your audio system is either turned down or turned off in order to protect more sensitive components from damage due to loud turn-on or plug-in transients.

## USB CONNECTION

The Radial USB-Pro is powered by your computer's USB port. As soon as you plug it in, the USB-Pro will power up and automatically configure itself based on your computer's audio settings. The POWER LED indicator will illuminate to let you know the USB-Pro is up and running.



LED Power Indicator

As the USB-Pro uses a TYPE B USB connector, you will need a USB 2.0 cable that fits the USB port on your computer or laptop. This will most likely be a common 'TYPE A to TYPE B' USB cable that is compatible with the majority of personal computers and laptops.



**TYPE A USB**

*Fits most laptops and computers*

Many other USB adapters and cables are available to connect tablets, USB hubs and other USB devices to the USB-Pro. Check with the manufacture of your device to determine the correct USB cable that is needed to fit your device.

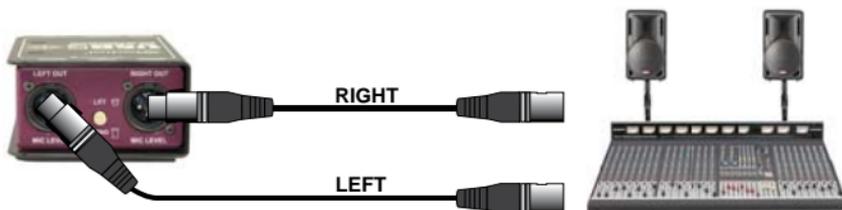


**TYPE B USB**

*Used to connect to the USB-Pro*

## AUDIO CONNECTIONS

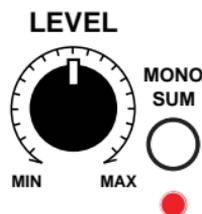
Connect two standard low-impedance XLR cables from the LEFT and RIGHT outputs to the mic inputs of your PA or recording system. These XLR outputs conform to the AES standard and are balanced to drive long cable runs up to 100 meters (300') without noise and are suitable to connect the USB-Pro to professional mixing consoles and preamps.



*Audio connections for PA system and recording systems use balanced XLR cables up to 100 meters (300').*

## TESTING AND USING

First, set the USB-Pro's LEVEL control to the 12 o'clock position. This will allow you to adjust the output level on the fly. Next, check the status of the MONO SUM switch and LED indicator. For stereo, set the switch to the outward position (LED off). For dual mono outputs, set the switch to the inward position (LED on).



It's a good idea to start testing your computer's audio with a sound file, MP3 or video you are familiar with. Set your computer's output level and the level of the media playback software to approximately 80%. Keep in mind that various media files will playback at different volume levels depending on your software and how the sound file was recorded.

Slowly raise the level of the PA or recording system. It is good practice to always test at a low volume to ensure proper connections have been made and all devices in the signal chain are set up correctly and working. This way, should a device not be turned on or a connection not fully made, it will not create a loud transient 'pop' in the PA which could damage a tweeter or annoy your audience. When satisfied, slowly increase the input gain on your mixing console until you reach an appropriate level.

In some cases, like when a second audio interface is also connected to your computer alongside the USB-Pro, your computer may not automatically switch to the USB-Pro as the main audio output. In such cases you will need to enter your computer system's control panel and select the USB-Pro as the audio output device from a list of available devices.

## ELIMINATING HUM AND BUZZ

The USB-Pro has been designed to minimize hum and buzz caused by ground loops by incorporating dual isolation transformers for the XLR outputs. The isolation transformers are normally bypassed but may be introduced into the signal path using the side access ISO switches. If you hear noise after connecting the USB-Pro to your audio system, try engaging the isolation transformers by sliding the switch in the direction of the arrow.

This is supplemented with a ground LIFT switch located next to the XLR outputs. When set to the inward position, this switch disconnects pin-1 from the two XLR's.



Left & right transformer isolation switches



Ground Lift

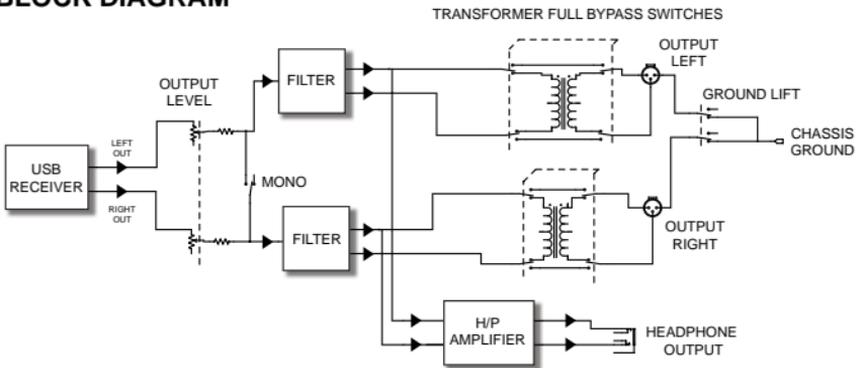
## USING THE HEADPHONE OUTPUT

The USB-Pro is also equipped with a stereo headphone output. The headphone amplifier taps the signal directly from the digital audio converter and can be used at the same time as the balanced XLR outputs. The 3.5mm (1/8") output is designed for both ear buds and standard TRS stereo headphones where tip-left, ring-right and the sleeve is ground.



**Be Careful**, the USB-Pro is designed for professional use as the headphone amp is very powerful and is capable of high sound levels when driven to maximum. Always ensure the output level of your computer, laptop or tablet is set at an appropriate level before auditioning music through headphones. This will not only save your ears, but save the ears of your client! \*See caution note on the back page.

## BLOCK DIAGRAM



## SPECIFICATIONS\*

Audio circuit type: .....DAC with balanced outputs  
 Compatible with: ..... Windows XP/Vista/Win7 and Mac OS  
 Supports: ..... WDM, MME, ASIO, CoreAudio and DirectSound  
 Sampling rates: .....Set by computer OS 44.1/48/96kHz; 16/24bits  
 Frequency response: ..... 20Hz ~ 20kHz  
 Total harmonic distortion: .....<0.01%  
 Dynamic range: .....90dB  
 XLR output impedance: ..... 250 Ohms  
 Stereo channel separation:.....75dB  
 XLR configuration:..... Pin 1 ground, Pin 2 (+), Pin 3 (-)  
 USB bus power:..... 525mA maximum  
 USB connector: ..... Type-B USB input  
 Construction: ..... 14 gauge steel chassis and outer shell  
 Finish: ..... Baked enamel  
 Warranty: ..... Radial 3-year, transferable

*\*Specifications are 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](mailto: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 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.



### Headphone Safety Warning Caution: Very Loud Amplifier

As with all products capable of producing high Sound Pressure Levels (SPL) users must be very careful to avoid the hearing damage that may occur from prolonged exposure. This is particularly important as it applies to headphones. Prolonged listening at high SPLs will eventually cause tinnitus and can lead to partial or complete loss of hearing. Please be aware of the recommended exposure limits within your legal jurisdiction and follow them very closely. The user agrees that Radial Engineering Ltd. remains harmless from any health effects resulting from the use of this product and the user clearly understands that he or she is entirely responsible for the safe and proper use of this product. Please consult the Radial Limited Warranty for further details.



[www.radialeng.com](http://www.radialeng.com)

Radial Engineering Ltd.  
1588 Kebet Way, Port Coquitlam BC V3C 5M5  
tel: 604-942-1001 • fax: 604-942-1010  
[info@radialeng.com](mailto:info@radialeng.com) • [www.radialeng.com](http://www.radialeng.com)

