Radial® engineering

True to the Music

USB-PRO™
USB Direct Box

User Guide

Radial® USB-PRO™
USB to Audio Direct Box

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 and we will do our very best to reply in short order.

OVERVIEW

The Radial USB-Pro is a fully USB 2.0 compliant, 24bit 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 controverted to analog and feeds directly into the direct box circuit to produce low-Z balanced left and right stereo signals. The built in preamp allows you to adjust the output level from mic-level to line-level and enables the USB-Pro to connect directly to mixing consoles, power amplifiers and self-powered speakers alike. The USB-Pro ensures the digital signal is delivered to the PA as faithfully as possible.

MAC or PC   USB-Pro   PA SYSTEM

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 analog audio. A level control allows you to adjust the output level and a mono sum switch can be activated to send mono signals to two separate audio systems or check for phase issues. 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 without inducing noise.
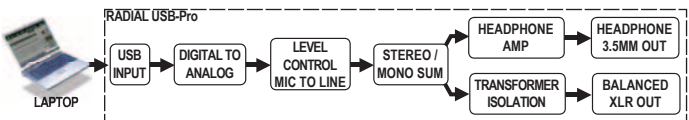
FEATURE SET
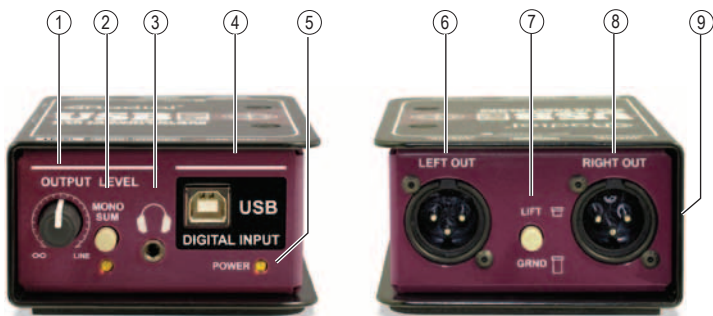
1. LEVEL: Used to set the overall output level.

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 transformer 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

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 is a common 'TYPE A to TYPE B' USB cable that is compatible with the majority of printers, hard drives and audio interfaces.

TYPE A USB
Fits most laptops and computers

TYPE B USB
*Used to connect to the USB-Pro*

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. The POWER LED indicator will illuminate to let you know the USB-Pro is up and running. On most computers the USB-Pro will automatically become the default audio output device after it is plugged in. If this does not happen automatically, go to your system settings/control panel and select the 'Radial USB Pro' from the list of available audio devices.

LED Power Indicator

AUDIO CONNECTIONS

Connect two standard low-impedance XLR cables from the LEFT and RIGHT outputs to the mic or line 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, preamps and power amplifiers.
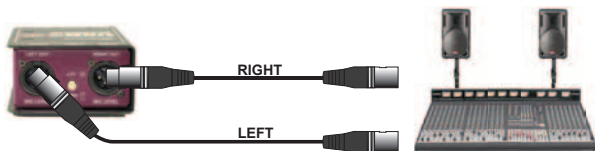

Audio connections for PA system and recording systems use balanced XLR cables up to 100 meters (300').

IMPORTANT NOTICE: The USB-Pro does not require phantom power to operate. For best results ensure the phantom power is switched off when connecting to the microphone input of a mixer. In case of use with a mixer with global phantom power that is activated, the isolation/ bypass switches on the USB-Pro are to be set to the isolation position.

TESTING AND USING
First, set the USB-Pro's LEVEL control to the 7 o'clock (off) 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).

OUTPUT LEVEl

MONO
SUM

∞   LINE
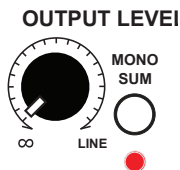
It's a good idea to start testing your computer's audio with a sound file you are familiar with. Set your computers output level and the level of the media playback software (if applicable) to approximately 80%. Keep in mind that various media files will play back at different volume levels depending on your software and how the sound file was recorded.

Slowly raise the output level of the USB-Pro. 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.

Left & right transformer isolation switches

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.

Ground Lift

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USING THE HEADPHONE OUTPUT

The USB-Pro is also equipped with a stereo headphone output. This headphone amplifier is controlled by the master output level control, and is designed to be used to check signal before plugging into a PA system. Adjusting the level control on the USB Pro will affect both the XLR and the headphone output. 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.

GROUND   RIGHT LEFT

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
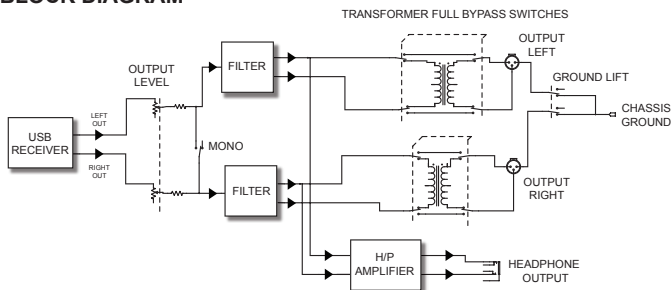
SPECIFICATIONS*

Audio circuit type:	DAC with balanced outputs
Compatible with:	Windows XP/7/8 and Mac OS X
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:	Powder coating
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 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.

⚠ 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.

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.