



## Line Level Shifter® User Instructions



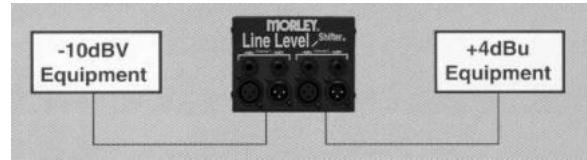
Solve your -10dBV to +4dBu problems, now!

What do you do when you need to connect a low volume -10dBV output (like MP3 player, or CD player) into a high volume, +4dBu input (like the FOH PA Mixer or multi-track digital recorder)? What you need is one of our Line Level Shifter® from Morley®!

The Line Level Shifter® uses the physics of inductance and impedance matching to increase or decrease the signal voltage without the added noise of active electronics. The Line Level Shifter® also converts back and forth between balanced and unbalanced signals automatically. This is great because most -10dBV signals are unbalanced while most +4dBu signals are balanced.

The Line Level Shifter® also contains Morleys Hum Eliminator™ technology to break ground loops that cause AC hum.

- Converts back and forth between -10dBV and +4dBu
- Converts automatically back and forth between balanced and unbalanced lines at either end
- 1/4" TRS "smart" jacks accept TS (mono) or TRS (stereo)
- Custom Engineered Morley 3:1 Isolation Transformers eliminate AC hum / 60Hz buzz and noise
- Automatically translates signal voltages to match differences in ground potentials, avoiding clipping
- Completely passive design with audiophile quality components assures the best possible noise and distortion performance
- Frequency response 10Hz to 40kHz plus or minus 1dB into 10kOhm load
- Distortion less than 0.002% THD @ 1kHz
- Crosstalk better than -97dB
- Maximum source impedance 1kOhm. Minimum load impedance 10kOhm
- Cold Rolled Steel Housing
- One Year warranty



### GETTING STARTED

**MAKING THE CONNECTION:** The Line Level Shifter® is designed to allow you to use equipment with different line level requirements at their correct gain settings. This will reduce noise and enable you to use mismatched pieces of equipment.

Balanced or unbalanced lines may be used at either level. However, normally the only balanced signals will be on the +4dBu side. Balanced signals will give you the advantage of common mode rejection (CMR), canceling out any noise picked up by balanced lines as they run near AC power.

**USING THE LINE LEVEL SHIFTER®:** The TRS smart jacks do all of the rewiring for you. For unbalanced signals just use standard 1/4" two conductor connectors. For balanced signals use 1/4" three conductor (TRS) connectors. You also have the choice of XLR connectors too!

TRS connectors are sometimes called stereo plugs but remember to never use stereo or multiple channels in one connector with the Line Level Shifter®. Stereo requires two separate channels. Use a "Y" cable with one stereo plug and two mono plugs (one for each channel of the Line Level Shifter®).

**TIP** = + or - (just be consistent between +4dBu & -10dBV)

**RING** = + or - (just be consistent between +4dBu & -10dBV)

**SLEEVE** = Ground

### THE INS AND OUTS OF IMPEDANCE:

Quality products are designed to have low impedance (<100 ohms) at the line level output jacks and high impedance (>10K ohms) at the line level input jacks. The Line Level Shifter® operates best under these conditions, giving the full 11db gain desired. However, the Line Level Shifter® has been designed to work in less ideal situations with only a modest reduction of gain in the -10dBV to +4dBu direction. There is no effect when going from +4dBu to -10dBV.

R <sub>load</sub>				
	1Meg	100k	50k	10k
0	.007	.078	.155	.748
10	.008	.091	.180	.853
50	.013	.142	.279	1.260
100	.020	.205	.401	1.743
300	.046	.453	.873	3.445
600	.085	.812	1.536	5.500
1000	.136	1.269	2.348	7.650

R source = Output impedance of equipment (-10dBV) in ohms

R load = Input impedance of equipment (+4dBu) in ohms

## ABOUT THE LINE LEVEL SHIFTER AND COMMON USES

What's converting between -10dBV and +4dBu all about? Most consumer music gear has -10dBV inputs/outputs, while most pro gear has +4dBu inputs/outputs (which is 11dB greater or 3.5 times louder). Additionally, the -10dBV signal lines are unbalanced and are susceptible to picking up noise, whereas the pro gear lines are generally balanced and more immune to picking up noise.

Incorrectly matching the signal levels between pieces of gear can result in volumes that are too low, having to turn up the gain and increase the noise floor. It also limits the range of volume control between all inputs, which makes it difficult to get a good mix and can potentially overload the -10dBV inputs. The Line Level Shifter® converts between unbalanced and balanced lines as needed and efficiently converts back and forth between -10dBV and +4dBu.

The Line Level Shifter® also eliminates hum, just like the Morley® Hum Eliminator™. The difference is that the Line Level Shifter® always steps up or down your signal. Below are more specific applications for the Line Level Shifter®.

**AUDIO / VIDEO** - The audio inputs on most video camcorders are unbalanced -10dBV. When running a sound mix from a +4dBu output to the camera, use a Line Level Shifter® to ensure its input is not overloaded and the signal is not distorted. Use a Line Level Shifter® when running the audio feed from a -10dBV (VCR / DVD / CD / MP3 Player) to a +4dBu sound system to get the best possible signal quality.

**BROADCASTING** - Broadcasters frequently need to hook up a consumer -10dBV output MP# Player or CD player, etc... to a balanced +4dBu input. The Line Level Shifter® allows this to be done without losing volume and eliminates hum at the same time.

**COMPUTER SOUND CARDS** - Most sound cards have unbalanced -10dBV inputs/outputs. A Line Level Shifter® allows the sound card to work with a +4dBu device and eliminates hum at the same time. Even balanced sound cards have tremendous susceptibility to ground loops because of the computer's power supply. If you are experiencing noise issues but do not require a change in signal voltage, use a Hum Eliminator™.

## ABOUT THE LINE LEVEL SHIFTER AND COMMON USES (continued)

**DJ MIXERS** - Most DJ mixer main outs are unbalanced -10dBV RCA and most power amps have balanced +4dBu inputs. When going from a -10dBV DJ mixer to a +4dBu power amp, over 2/3rd's of the amp's volume is lost. That turns a 600-watt amp down to 175 watts. Many DJs prefer the feature set of a particular -10dBV unit and the few DJ mixers that have +4dBu outputs can cost much more than a -10dBV DJ mixer. Use a Line Level Shifter® to get all of the lost power back and get rid of any hum problems at the same time!

**GUITAR AMP FX LOOPS** – The signal levels in most guitar amp effects loops are all over the place. Some may be too strong signal for floor effects, other may be too weak. Unless your amp has adjustable levels on the send and return you're stuck with what you got; unless you have a Line Level Shifter®! Use the Line Level Shifter® to increase or decrease the Send and Return as needed for your particular situation. A more efficient matched signal level means better tone and in the world of guitar, tone is **EVERYTHING!**

**KEYBOARDS / SAMPLERS / SYNTHS** - Most keyboards, samplers, and synthesizers have 1/4" unbalanced -10dBV outputs. The Line Level Shifter® converts these outputs to +4dBu for use with a +4dBu mixer or other +4dBu device without losing volume. Balancing the outputs can help make long signal runs hum and noise free.

**MIXERS / RECORDING** - Almost everyone hooks up a -10dBV, unbalanced output from a consumer MP3 Player or CD player, etc... to an otherwise high performance system. You will get a better signal-to-noise ratio (SNR) using the Line Level Shifter® rather than by turning up the mixer's input gain. You can also balance the lines at the same time. Getting the best noise floor means adding the least amount of active gain. Recording with unbalanced -10dBV outputs (keyboards, effects units, drum machines, computers, etc.) often requires a lot of active gain. Use the Line Level Shifter® to run these units up to balanced +4dBu and provide the best mix you can get. Some high-end mixers only have +4dBu inputs; when -10dBV equipment is hooked up to these inputs, use a Line Level Shifter® to get a better signal level. Tape return levels are often mismatched with the mixer. They either overload the mixer's input or don't drive it loud enough. The Line Level Shifter® works both ways, either stepping the signal up or down.