

# Hum Eliminator™ General Instructions

## WHAT WILL THE HUM ELIMINATOR™ SOLVE?

The Hum Eliminator™ is a unity gain signal and ground path isolator designed to break ground loops. Hum and noise caused by the presence of a ground loop can be stopped by inserting the Hum Eliminator™ in the line level signal path (+4dBu or -10dBV). This eliminates the ground loop without degrading your signal. The Hum Eliminator™ will not reduce hum or noise normally generated by a piece of equipment. In other words, for noisy preamps, noisy single coil pickups or noise caused by faulty tubes, other corrective action would apply.

## USING THE HUM ELIMINATOR™

Identify the ground loop causing the trouble; not all ground loops cause noise or hum. For complex systems you may need to repeat these steps starting with a different piece of equipment in various combinations to locate the problem:

- 1) Strip the system down to one piece, such as the mixer, by disconnecting all interconnects and AC cords except for the mixer.
- 2) Add one piece of equipment at a time: hook up AC and interconnects (making sure all grounds are connected and in good condition) then listen for hum or noise.
- 3) Turn on and off the power each time you switch equipment to avoid pops/shorted outputs.
- 4) Proceed until you find the offending piece(s) causing the problem.
- 5) Plug the Hum Eliminator™ in all lines between the offending equipment and the rest of the system. For example, insert the line outs of the keyboard into the inputs of the Hum Eliminator™, then insert the line outs of the Hum Eliminator™ into the inputs of the mixer.

**IMPORTANT: Never use the Hum Eliminator™ between an amplifier and speaker or the equipment may become damaged. Use only on non-powered line level signals.**

With a rack of amplifiers, we recommend putting an 8 channel single rack space Hum Eliminator™ in front of your amps' inputs so you do not have to solve ground loop problems during sound checks.

A common path for ground loops is through a chassis into the rack and then into another chassis. Test this by removing the chassis from the rack. The Hum Eliminator™ will help but you should also try isolating the chassis from the rack with electrical tape and insulating the rack screws with nylon washers.

Most ground loop problems can be solved using the Hum Eliminator™. Patience is a necessity when attempting to solve ground loops! Many popular mixers with TRS balanced line inputs do not have common mode rejection. They drop the inverted signal, creating unbalanced inputs! To get the benefits of balanced inputs, run your balanced line into the Hum Eliminator™ and run a mono 1/4" line from the Hum Eliminator outputs to the mixer's TRS inputs. This way you are running a balanced line all the way up to the Hum Eliminator™ and you will not lose common mode rejection.

# Hum Eliminator™ Applications

The Hum Eliminator™ does more than just prevent AC hum from being picked up by your sound systems. It also can be used as one of the most cost-effective ways to convert unbalanced signals to true balanced signals.

**GROUND LOOPS** - The Hum Eliminator™ prevents ground loop antennae from forming and picking up AC hum. AC hum & noise is almost always caused by a loop antenna effect across signal lines between two or more pieces of gear, or by long unbalanced cables picking up noise. Loop antennae are basically a type of radio antenna, which tend to pick up the 60Hz and harmonics (50Hz in other parts of the world) AC signal being broadcast by a building's electrical current. These loop antennae are closed circuits usually along the ground wires and hence are commonly called ground loops.

**BALANCED / UNBALANCED** - Unbalanced signals are more susceptible to picking up electrical noise & RF interference than balanced signals are. The longer the unbalanced cable, the greater the chance of a problem. The Hum Eliminator™ is one of the most cost-effective ways to convert between unbalanced signals and true balanced signals.

**MIXERS/RECORDING** - Many mixers have either unbalanced or "impedance balanced" monitor outs / aux sends. Use a Hum Eliminator™ to get true balanced monitor outs for noise-free performance. When using more than one mixer (or submixing), there's a huge chance of getting ground loops (and that buzz!). Use Hum Eliminator™ to prevent these ground loops. Eliminating hum is one of the biggest challenges facing studios. Many studios will run all of their line level gear through Hum Eliminators™ to help ensure noise-free recording.

**KEYBOARDS / SAMPLERS / SYNTHS** - Most keyboards, samplers, and synthesizers have unbalanced -10dBV outputs. Use a Hum Eliminator™ to balance the signals if using with other -10dBV equipment. To use a -10dBV unbalanced device with a +4dBu balanced device, use an EBTECH® Line Level Shifter™.

**LIVE SOUND / DJ MIXERS** - A common problem with live performance is long unbalanced cables picking up hum along the way. Balanced signals are more immune to picking up noise. Use the Hum Eliminator™ to balance long unbalanced signals. Mobile DJs or bands never know when setting up their system if they're going to get a hum or not. The electrical wiring changes from one building to another. What works fine at one gig might not work at the next. It's worth the low cost to keep a Hum Eliminator™ available, nobody can afford to lose a gig because of hum problems. Some DJs run everything in their rig through Hum Eliminators to play it safe. The main outs on most DJ mixers are -10dBV unbalanced RCA. When using with a +4dBu power amp, over 2/3rd's of the amp's volume can be lost. Use an EBTECH® Line Level Shifter™.

**POWER AMPLIFIERS** - Running multiple amplifiers can create ground loops between the amplifiers, which will pick up the dreaded hum and buzz. Run each amplifier's input line through a Hum Eliminator™ to prevent this problem.

**GUITAR OR BASS** - Whenever possible, we recommend you use our Hum X product for GROUND RELATED hum issues on a guitar or bass rig setup. If you are in apart of the world where the Hum X cannot be used, the Hum Eliminator is the next best solution. If any of your FX pedals have a 3 prong ground power plug, you will need to put the Hum Eliminator on the audio feed to the amp. When using two or more guitar amplifiers (with stereo FX or ABY splitters), ground loops can form between the amplifiers. Bass amps can get ground loop from the DI connection to the PA; simply run that DI feed through the Hum Eliminator.

**COMPUTER SOUND CARDS** - Most sound cards have unbalanced inputs and outputs. Balance these with the Hum Eliminator™. Even balanced sound cards have tremendous susceptibility to ground loops because of the computer's power supply. If you hear a buzz, use a Hum Eliminator™.

**BROADCASTING / VIDEO** - Press Boxes have many feeds all going to different gear, which can create lots of ground loops and hum. Use a Hum Eliminator™ on these feeds to eliminate the problem. Using a Hum Eliminator™ on the audio feed of a video camera can help prevent video hum (snow).