

Dealing with Audio Ground Loops

What is a Ground Loop?

Ground loops are the result of connecting different pieces of equipment to a common ground but via different paths. These multiple ground paths are effectively acting as an antenna which picks up interference. So, when a ground loop occurs, the ground (often the shield) carries both the intended audio ground plus all the noise caused by the powered devices connected to ground.

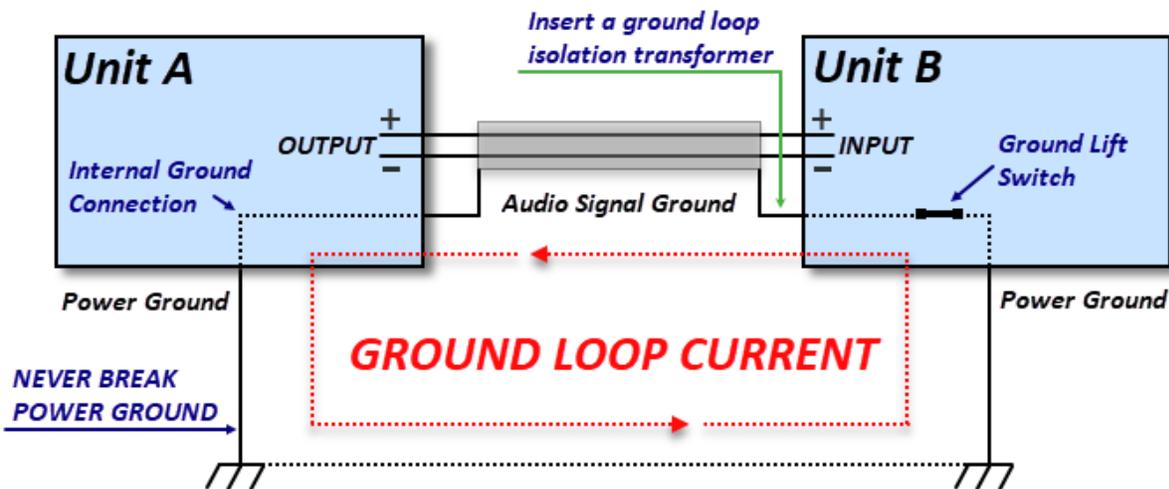
Different combinations of equipment, cabling and environment can create frustrating scenarios in which ground loops may or may not cause interference in audio equipment. A good first step would be to ensure studio power wiring is properly grounded in the first place. In cases where you have the option, connecting all your gear to the same circuit is the most ideal situation, so that any ground potential differences between separate circuits do not cause interference.

Mitigating the Effects of Ground Loops

It may be difficult for temporary setups in an unknown location (such as a hotel or small venue) where you may have no idea how circuits are shared between rooms, or even if the building wiring is correct. While there is an assortment of tools you can use to test outlets, it may be difficult for the travelling audio engineer to have the time and resources to deal with improperly grounded wiring. The next best thing in this scenario would be to try and "break" the ground loop isolate audio signal grounds and power grounds.

The following are some good practices that can help reduce interference from ground loops. Trial and error may be necessary to work towards a cleaner audio signal.

- For smaller setups, try to use the same circuit to supply power to audio equipment.
- Use high quality power and audio cables with low impedance connections whenever possible.
- Use balanced cables and connections whenever you can. Ground loops are especially problematic for unbalanced audio feeds.
- Isolate metal equipment with spacing in the rack. Stacking devices is okay if they have rubber feet to separate them.
- Use a passive inline ground loop isolator transformer connected to audio inputs or outputs. Varying in cost, these can be a very effective solution to break the ground loop between audio equipment.
- Utilize ground lift switches if it is available in audio equipment but be careful to ensure a ground path is still available to equipment in one direction.
- **Never remove the power ground by use of a cheater adapter - this is unsafe!**



TT#22DealingwithAudioGroundLoops-v1.0- 19 April 2021