

## Grounded!

Most of us are familiar with grounded AC plugs because we see and use them all the time. 3-prong plugs, right? But what is *grounding*?

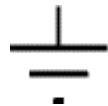
Here's a familiar situation. It's the middle of winter, and you're walking across a carpeted room to open a door, and when you touch the doorknob, ZAP, you get a shock of static electricity! That's because the electrical *potential* between you and the doorknob is greater than zero. You've picked up and stored a whole bunch of loose electrons from the carpeting, and they desperately want to go somewhere. Your body has a negative charge. The doorknob is a good place for the extra charge to go!

You can prevent this horrible thing from happening. You attach the bare end of a length of wire to the doorknob, and you hold on to the other end of the wire as you walk across the carpet. Now, instead of building up in your body, the electrons escape through the wire to the doorknob. You never build up a negative charge. So when you reach out to touch the doorknob, you don't get a shock.

You remained 'grounded' during your walk across the carpet. In other words, you maintained *zero electrical potential* with the doorknob the whole time!

AC Grounding is similar, though not exactly the same. AC grounding uses the ground that we walk on instead of the wire we connected to the doorknob. Its purpose is to protect you by giving sudden extremes of current a place to go besides your body! The Earth, the world we live on, is a giant place, with lots of room for excess electrons. The charge would rather go right into the ground, if it had a route to get there, than go through your body.

The symbol for grounding looks like this. Some of your gear might have diagrams printed on it, and you might see this symbol somewhere in there.

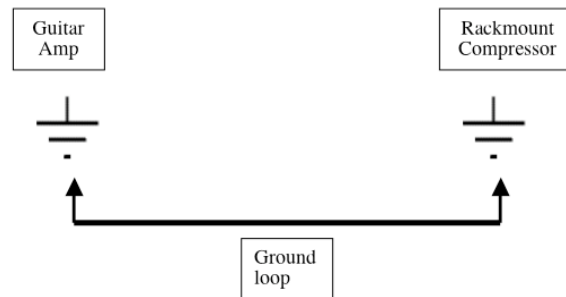


Grounding is a way of wiring that connects a part of the AC circuit to the Earth, usually through a third prong on the plug. Grounding can prevent overloads that come from *short circuits*, from *voltage spikes*, and from *overworking*.

You'll notice that most large appliances, like air conditioners and refrigerators and guitar amps are grounded (three-prong plugs). It's because they use a lot of current when they're working.

## Ground Loops

When you have two electrical devices in a studio that are grounded, you have to remember that they are 'connected' to each other through the ground. Even if you don't have two devices wired together, they might be able to 'sense' each other through the ground. When there are small imbalances in the way the two devices cope with their electricity, the 'difference' between them can create hum, sometimes called 60-cycle hum. This problem is called a *ground loop*.



### How to Prevent Ground Loops:

One way to prevent a ground loop is to lift the ground of one of the offending devices. Some devices, like guitar amps, offer a switch to do this. You can get Line conditioners and Audio isolators that will isolate two grounded devices from each other. You may also use Direct Boxes that have Ground Lift switches.

### How NOT to Prevent Ground Loops:

You can cut off the ground pin from one of the AC plugs on your devices, but this is very dangerous. DON'T DO IT. You may damage your equipment, or electrocute yourself.

There is also a little adapter called a 'cheater' that can prevent the ground pin on the plug from going into the wall outlet. It's the same as cutting off the ground pin, just non-destructive. So the danger is the same. DON'T DO IT.