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Quality Kits For The DIYer

How to apply shielded wire to your OLCircuits kit

Let's begin with a simple explanation of how shielded wire works with your OLC kit:

Symptom:

Your pedal squeals and shrieks (in a *bad* way, lol).

Why:

High-gain pedals, such as the Slow Century, Dr. Watt, Orange Peel (and others), have so much small-signal amplification that they will greatly amplify more than just the direct signal (referring to signal [guitar, pedal board] coming in via the ¼" input jack) being fed to them. Aside from amplifying hum, hiss, and musical notes from your guitar and the environment around it, they will re-amplify the signal radiating from the wires and components inside the pedal itself. The hotter ("louder") signal radiating from wires and components further into the circuit (pots, output wire, PBC traces, etc) is picked up again and fed back through the earlier stages of circuit, over and over. This is called *oscillation* or *feedback* and is very unpleasant.

How to smack it down a notch or two:

We'll focus on using *shielded wire* between the 3PDT and the PCB input because it's relatively easy to apply and lays a heavy smack-down on oscillation. By grounding the *braided shield*, we prevent (or reduce significantly) the amount of undesired signal reaching the conductor. The shielded wire OLC uses is called RG-174 (aka "mini-coax"). It has four layers: jacket, braided shield, dielectric insulator, and conductor. It's just like your guitar cable, except the total outer diameter is 0.1" (2.54mm)… much thinner!

You'll need:
RG-174 coax wire (a 12" [305mm] piece is plenty and leaves you some extra if you mess up)
Wire stripper (you can also use the same cutters you used to snip the leads from the underside of your PCB, but it requires a different "touch")
Soldering Iron
Solder

NOTE: The specific wiring in this guide is based on OLCircuits' 3PDT wiring. If you have wired your switch in another fashion, you'll need to do some figuring.

Let's do it:

The exact amount of wire you need will vary by pedal layout. You're going from pin 5 of the 3PDT to the input on the PCB. You should allow for mistakes (the kind that mean you have to cut part of the wire off completely), so don't cut it to the exact length. You must also allow for some bending room, as this wire won't be a straight line. I suggest not cutting the wire at all, yet, and work on one end of it at a time.

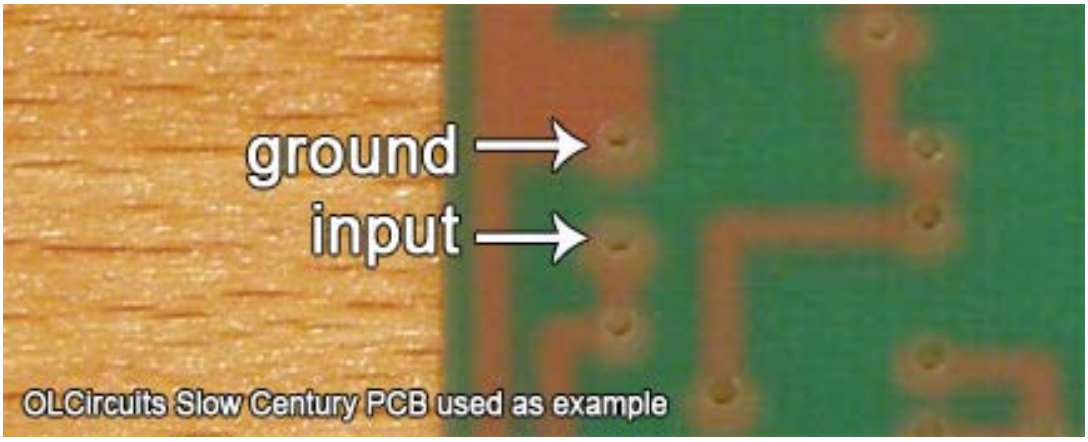
Begin with one end of the wire. Strip about ¼" of the *jacket* off of the end:

Peel the *braided shield* back a bit. Now separate the strands into two groups. Make one side a little less dense/thick than the other (it needs to fit through a hole on the PCB). Now twist them. Look for any stray strands as we don't want to touch anything else with the braid (more on this later). It should look like this, where my less-dense/thinner group is the lower one:

Cut the thicker group off. Strip enough of the *dielectric insulator* off to allow the *conductor* to fit through a hole on the PCB. Now, “tin” (apply solder to) the thinner group. “Tin” (apply solder to) the conductor:

If there are any loose strands of braid, cut them off.

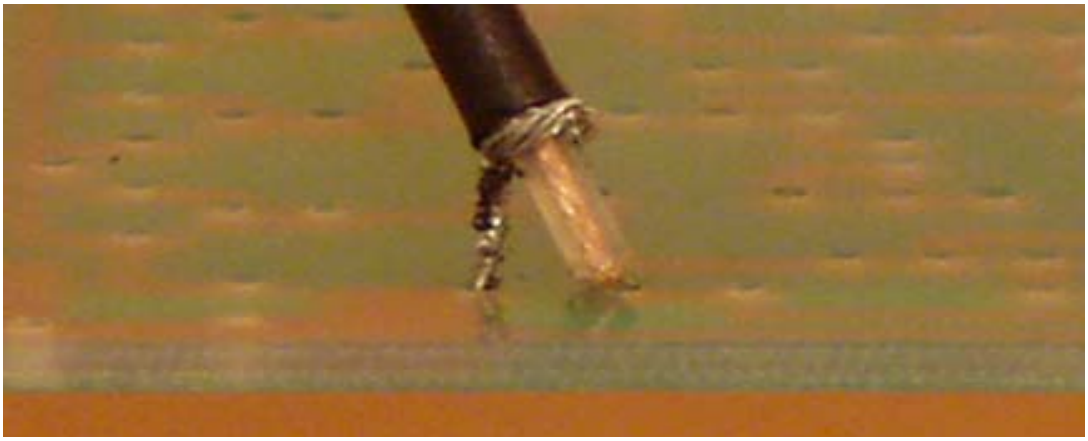
The PCB used to demonstrate is OLCircuits’ Slow Century. The PCB was designed with shielded input wiring in mind… a ground pad/hole is placed next to the input pad/hole. Note that some PCB designs may not have this. If that’s the case, skip down to **page 6**.



I'm using an unpopulated PCB for demonstration purposes, but I recommend doing this after you've populated the PCB and wired everything else.

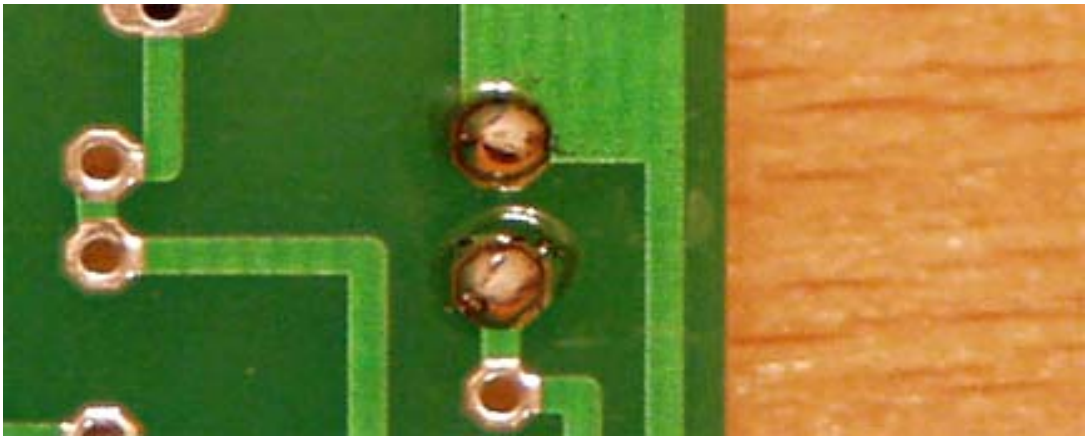
Place the conductor through the input hole and the soldered braid through the ground hole. Solder them in place.

Note: This does not ground the PCB. It grounds the shielded braid only… and only if you've grounded the PCB as per the instructions for your kit. This does not fill the requirement of a ground wire running between the PCB and a ground point elsewhere (input jack ground point is recommended).



Note that there are no braid strands anywhere near the conductor. Since the braid is now grounded (assuming you've wired the rest of the PCB, specifically the ground wire), if any strands were to touch the conductor, it would ground the input (silence it).

Trace side of the PCB:



Now, let's solder to the 3PDT:

On this end of the wire, we want to use the conductor (and its dielectric insulator) only. We're not going to ground the braid on this end. We want to cut it further back so that the braid doesn't touch anything else.

Do this again, but cut off about ½" this time:

Cut all of the braid off. Strip just enough of the dielectric insulator off to allow you to solder to the pin on the 3PDT. Solder it to Pin 5 as shown below. If your "switch pin to PCB input" is somehow different, solder it to that one.

Note that the braided shield is cut back far enough that it's very unlikely to touch anything else.

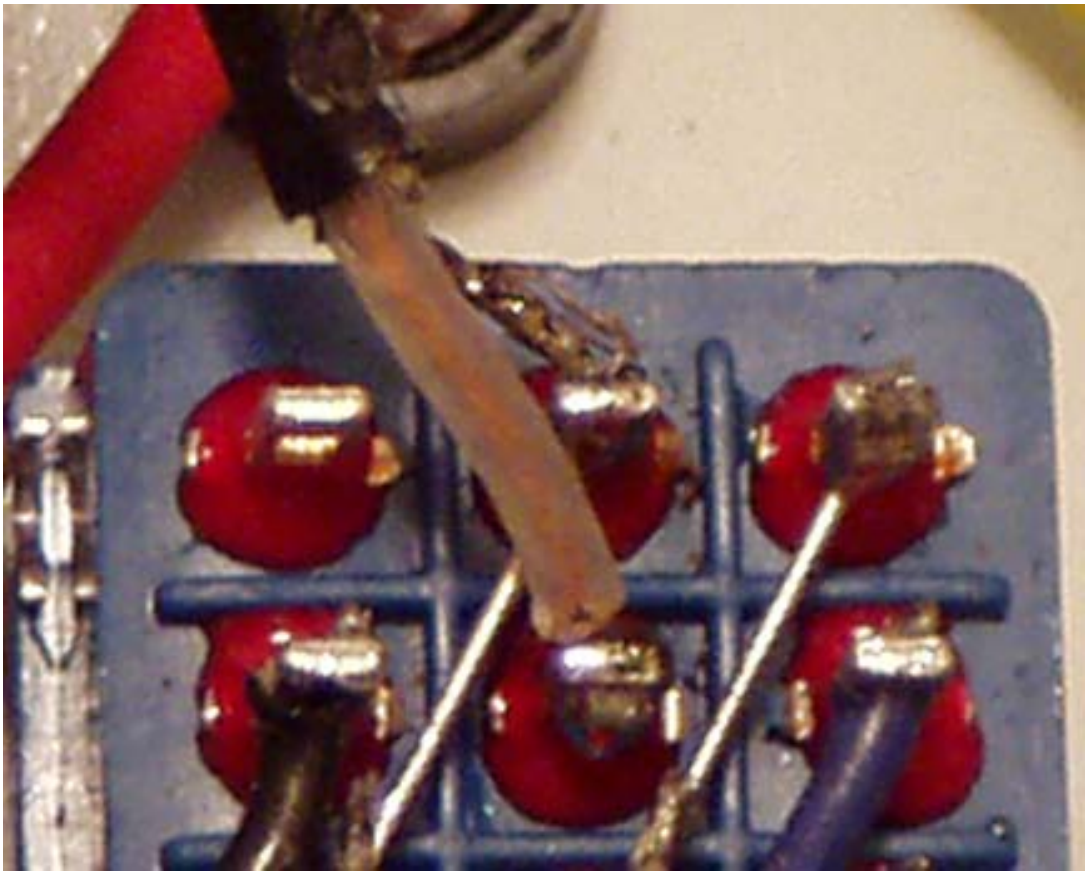
You're done.

If your PCB does not have a ground pad near the input, you can still ground the shield. Begin on the next page to do this.

If your PCB does not have a ground pad near the input, we can ground the braid another way.

Beginning with this:

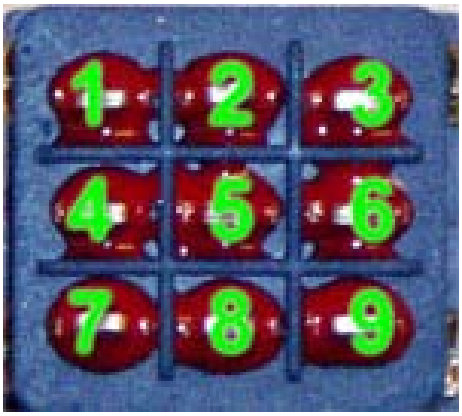
We're going to solder the braid and the conductor to the switch itself. Solder the conductor to Pin 5 (the pin that should go to the PCB input). Solder the braid to any grounded pin (pin 2 is convenient, if you are using the OLCircuits 3PDT wiring method):



Another view:

On the PCB side of the wire, cut back enough of the braid to prevent it from touching anything else on the PCB. Strip enough of the dielectric insulator off of the conductor to fit through the input hole. Solder. Done.

3PDT pin layout:



OLCircuits' 3PDT Wiring: