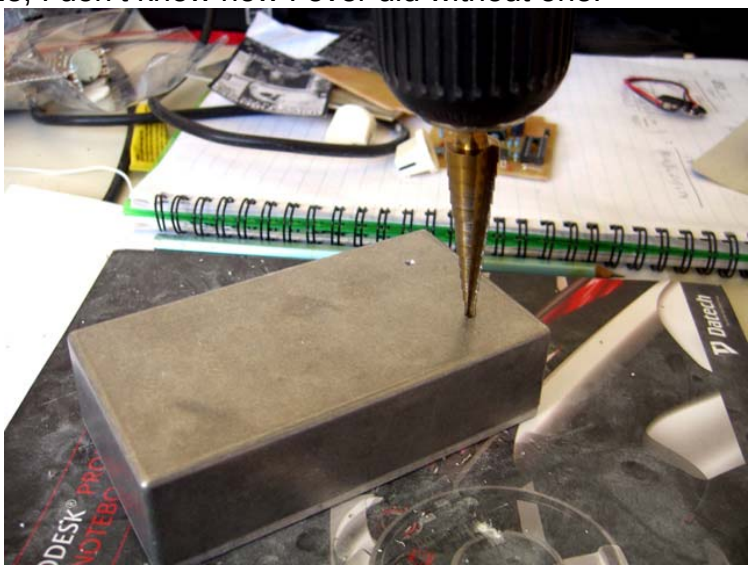
An Approach to Building Effects Pedals

By The ValveWizard

Over the years I have developed a system for making effects pedals. I like the interior of my pedals to look as professional as possible, which means mounting as much as possible on the PCB. (For me the days of building the circuit on strip board and then trying to mash a rats' nest of off-board wiring into the enclosure –usually with some random bits of cardboard for insulation– are long gone!)

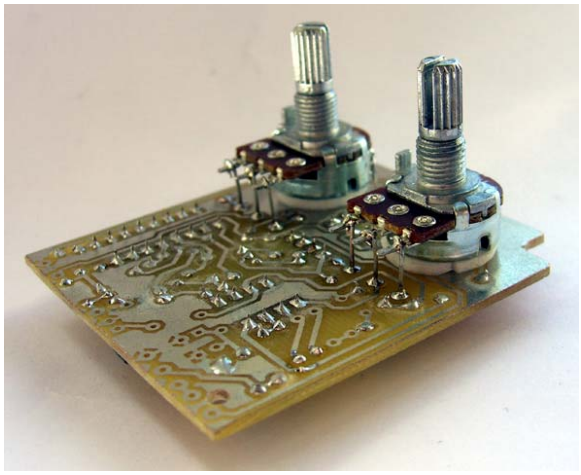
By mounting all but the audio jacks and footswitch on the board, the whole thing can be lifted out of the enclosure as a complete working device without any de-soldering needed. This makes testing, modding and repairs extremely easy!

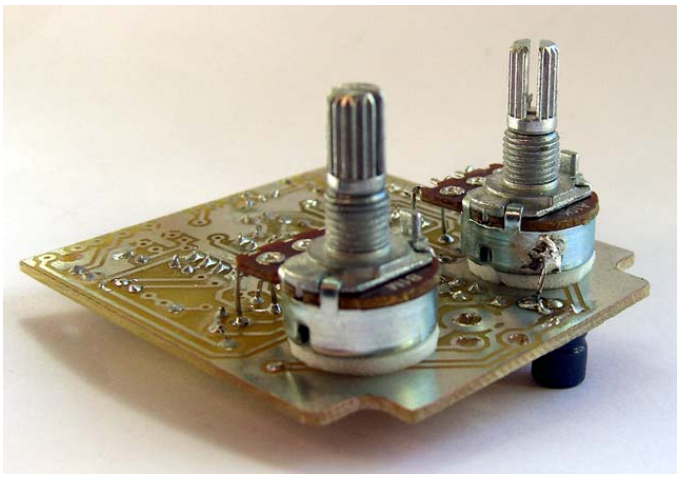
First I drill the holes for the pots. Sometimes I print out the PCB layout pattern and use it as a guide, but because I am usually building brand new designs I can't always be sure of the exact position of parts, so sometimes I mount the hardware on the PCB first and then judge the hole positions by eye and correct any errors with a file as I go. A step drill makes large holes a breeze; I don't know how I ever did without one!



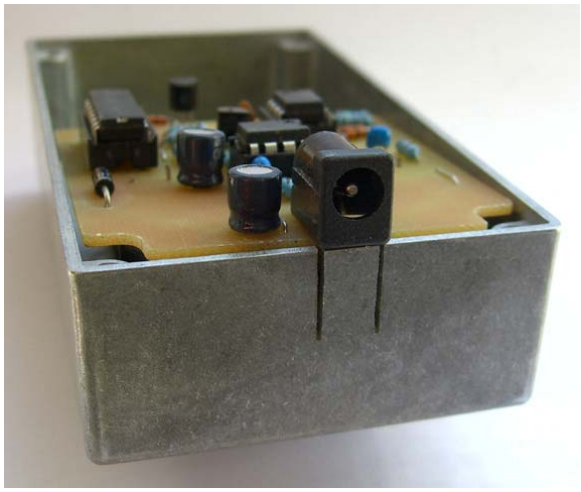
I mount the pots to the PCB using double-sided sticky pads (unless I'm using proper PCB-mount pots, which I usually don't). If I have drilled the holes first I mount the pots in the holes (with sticky pads already applied) and then lower the PCB onto the back of them.

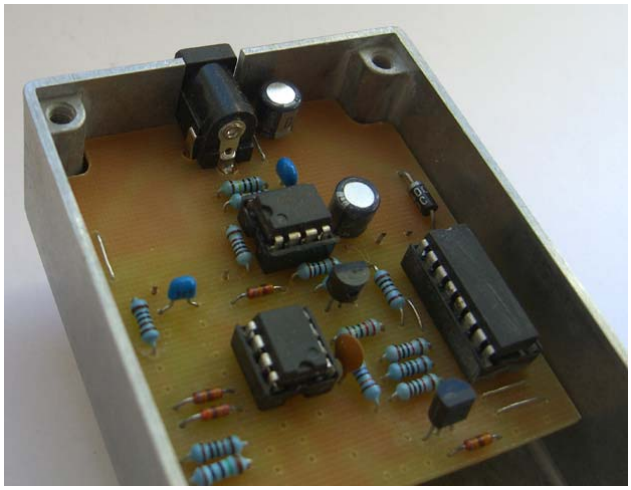
Then I wire the pots to the PCB. Also, if I need to ground the enclosure I usually do it by soldering a wire from the ground plane to one of the pots, as shown in the right-hand photo (it helps to put some solder onto the body of the pot *before* sticking the pot to the PCB!).



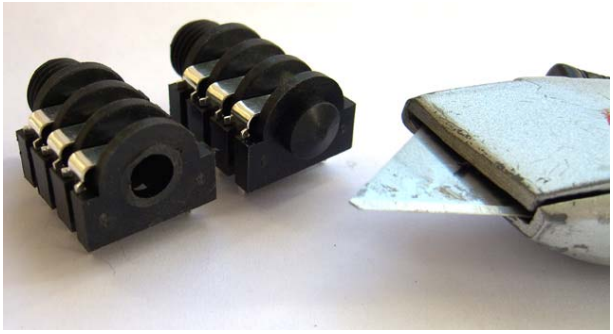


Next, I solder the DC jack to the PCB. I then judge its position and saw two cuts in the enclosure as shown below. Grip the metal tab with some pliers and it will snap off easily. Then I neaten up the hole with a file until the PCB sits nicely, as shown in the right-hand image. Sometimes the flange around the lid of the enclosure fouls with the DC jack, in while case a file a bit out of it, but I don't get this problem with Hammond enclosures.





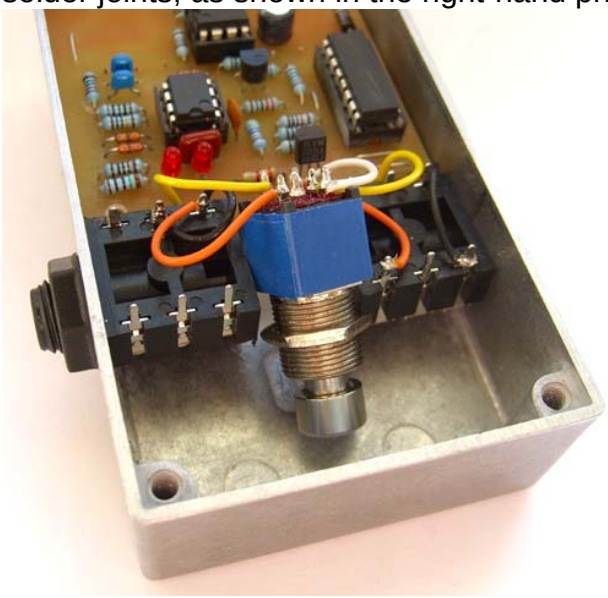
I then drill the holes for the audio jacks. I nearly always use plastic jacks- they're neater and more sturdy than the open type, and they don't force you to use any particular ground scheme. I usually position them right up against the PCB so when you plug in the DC power plug, any excessive force is put on the jack sockets and not on the sticky pads used to affix the pots. In order to fit the footswitch in between, I cut the bump off the end ends of the jacks, as shown below.

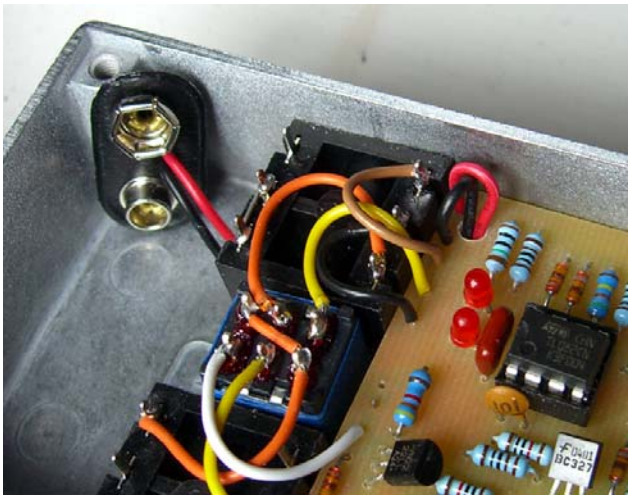


Now I drill the hole for the footswitch. I drill the hole slightly smaller than it needs to be and then file out the rest, leaving a tab or key that fits into the notch on the switch. This might seem like a pain, but it means you can tighten the fixing nut without having to hold the body of the switch at the same time since the key/notch stops the switch from rotating. If you don't do this then there is a good chance you'll break the switch while it is twisting (I've done it).

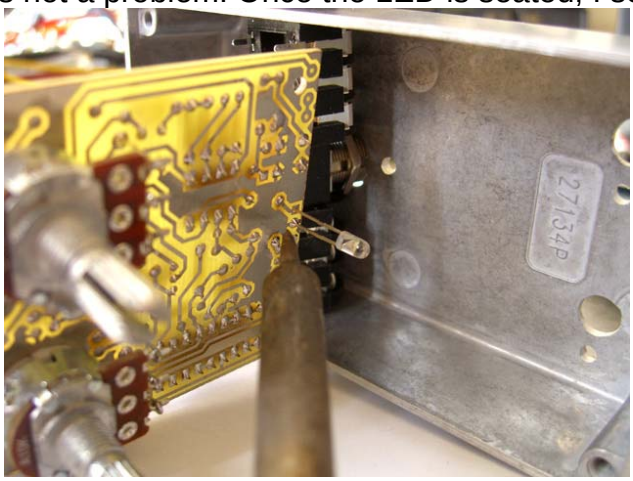
As you can see, the plastic jacks also form a neat compartment for the battery.

Now I do the off board wiring, keeping everything as short as possible. Bare in mind that when installing the whole assembly into the enclosure the footswitch must go in *after* the jacks, so its wiring needs to have some slack.
I pass the battery wires through a hole in the PCB which provides some strain relief for the solder joints, as shown in the right-hand photo.

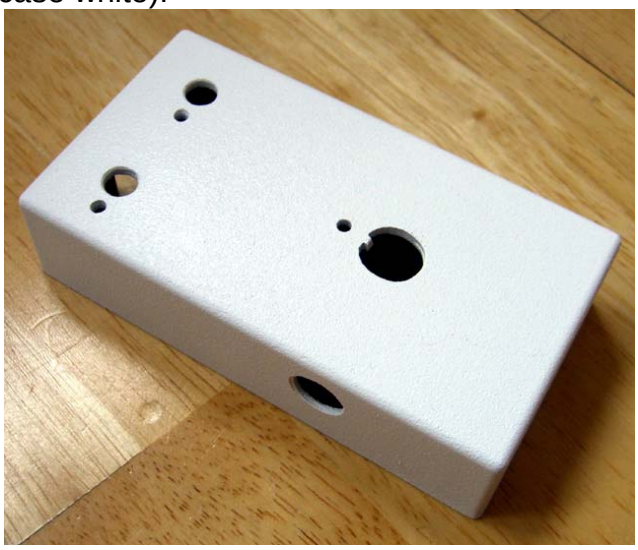




I usually drill the hole for the LED last of all, positioning it by eye; bending the legs a bit to make it slot into place is not a problem. Once the LED is seated, I solder it in place.



Decorating the enclosure is always the most time consuming and expensive part of the job for me. I have tried various methods, including etching, which I still haven't quite got the hang of, so I mostly use paint and dry transfer / decals / stickers etc.
If the enclosure is to be painted then I sprayed it with metal primer and then with a few coats of colour (in this case white).



For this pedal I had a local printer make a high-quality sticker. I applied the sticker to the enclosure and then use a scalpel to cut around the holes. Finally I applied several coats of spray lacquer. Finished!