FuzzPups

Lovely little boxes of joy with a totally standardised build pattern

What's a FuzzPup?

It's our new system for building 1590A pedals with a standardised format for all the non-PCB components, and a connection system common across every single circuit.

What's this document?

A general guide for building these beauties that applies to each and every one. That way we don't have to include this information in every single document for every single circuit. "Why? It's a PDF - it doesn't cost anything." If we decide to change any aspect of this standard in future we only need to change this single document. Probably.

Before you start

Due to the nature of these builds, i.e. there's a lot going on in a very confined space, they are fiddly to complete. You should only attempt these builds if you have patience, a light touch and are comfortable with tight spaces.

Still before you start

Read the full document that applies to the circuit you're building as well as this one. There may be some specific requirement of that particular build which isn't covered by the information contained within this PDF.

General, but very important tips

Get your components as close to the PCB as possible. There isn't much height clearance when boxing up, so any film caps that are sitting even a couple of mm off the board could mean the difference between a successful build and a disappointing failure. If you're confident enough to solder ICs rather than use sockets, do.

Keep your soldering neat, and ensure you cut your component legs as tight to the solder joints as possible. Anything sticking too far out of the bottom of the PCB will stop it getting right down onto the body of the jacks, and your lid won't fit on the box.

Electrolytic capacitors - long lead (+) to square pad.

Diodes - lead nearest to the stripe (-) to square pad.

LEDs - short leg (-) to square pad.

You've read the circuit-specific instruction document, right? Built the circuit, now it's time to test it.

You may have noticed you maybe don't have flying leads coming off your main circuit board connections - you've got a neat row of 6 header pins instead. How do you test the board?

We have a few options...

The easiest way is to add some flying leads. If you're going to wire up your circuit with a top-mounted DC socket and using the jack connections from the main circuit board, you will have wires attached to the PCB you can use. You're good to go. Connect them up to your test contraption of choice (we highly recommend having a tester circuit - they're not going to break the bank). If you don't have a test unit you'll have to wire up your jacks and DC socket. If you give it some thought and make the wires the right length for your final assembly (read further on in this doc) then you won't have to undo the jack connections later.

If you intend to do your final circuit wiring using the daughterboard connections, you can still test the circuit as above. Add the jack and DC wires to your main circuit and test. Once you're happy its working OK you can simply desolder or just snip them off.

Finally, if you want to keep it really modular and neat you can make yourself a connector so you can simply plug your circuit in using the header pins. Unfortunately those pins are too big to fit the SIL sockets we supply with our test units. A little outside-the-box thinking later and we have a solution. We ~~butchered~~ modified a 14-pin DIL socket - the kind you use to mount ICs - wiring it up to a 6-way ribbon cable and a row of SIL sockets at the other end. Presto! A lead that'll plug into our test unit and will accept the bigger pins needed. You could just solder flying leads from the DIL pins of course.

Testing... Testing... One... No, just one.

If you're using one of our tester units just plug in and go. Make sure you get the connectors the right way around - you don't want to reverse your power polarity and blow up your neatly soldered ICs and transistors now.

If you're going the long way around (nothing wrong with that) here's how you go about it.

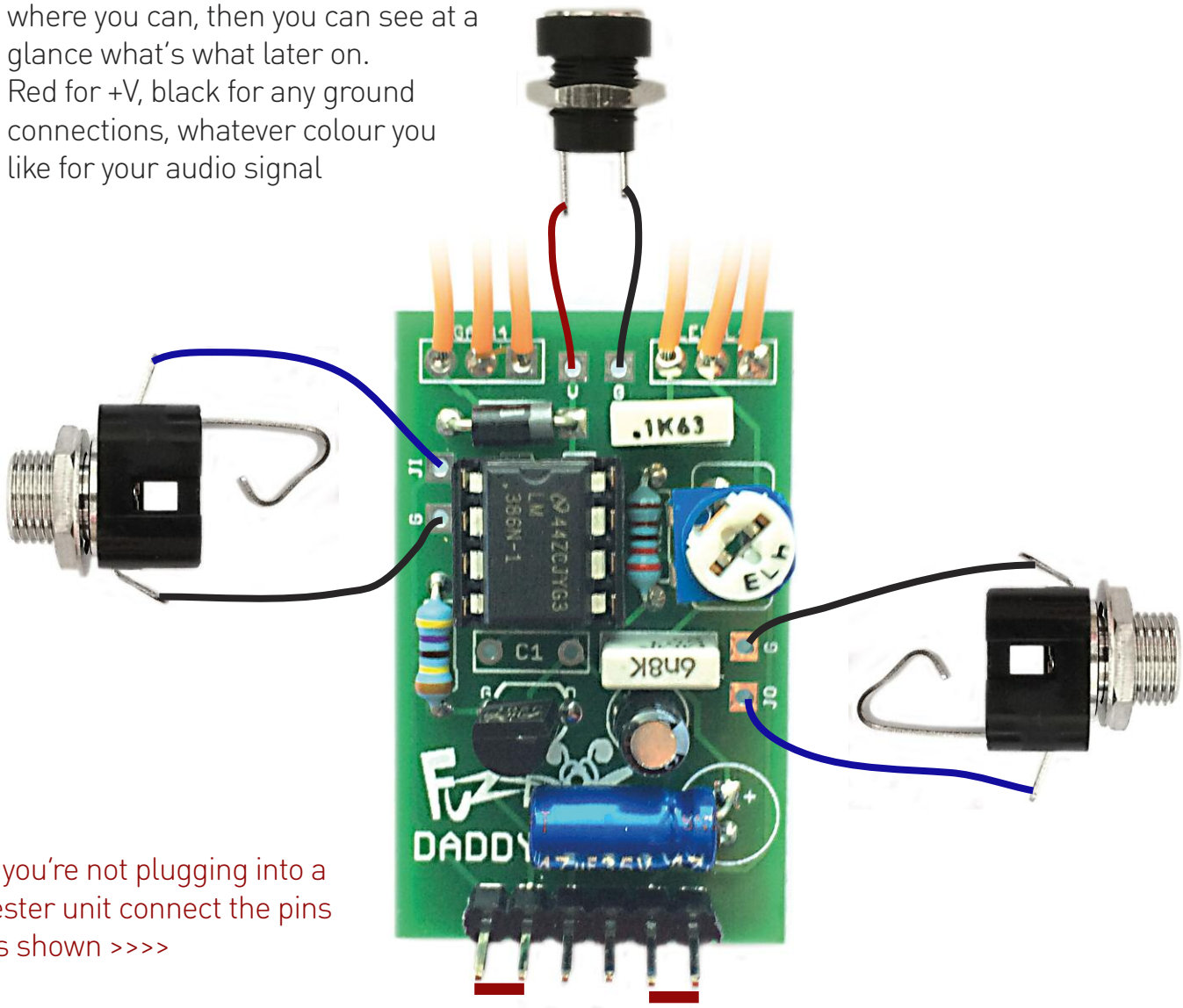
Ensure you have the circuit complete before you test, including the pots. Just imagine them there on the end of those orange wires below.

You can attach a battery snap to the V and G connections for testing if you prefer that to a DC connection.

No, the colour of the wires doesn't matter, but it's always good to follow convention where you can, then you can see at a glance what's what later on.
Red for +V, black for any ground connections, whatever colour you like for your audio signal

If you aren't using one of our tester units you have to connect the header pins for JI/CI and JO/CO. That's the two outer sets of pins (see below). If you have header jumpers that's handy, but who has those lying around? Either tack a wire between each pair with solder (which will mean cleaning it off after testing), or simply clamp something across them like a couple of crocodile clips.

Hopefully you'll plug into this and have sweet tone coming through. If not, aw man... something's up with the circuit. Double check your test wiring first. If that's ok it's time to hit the web and learn how to troubleshoot. You have a multimeter, right?



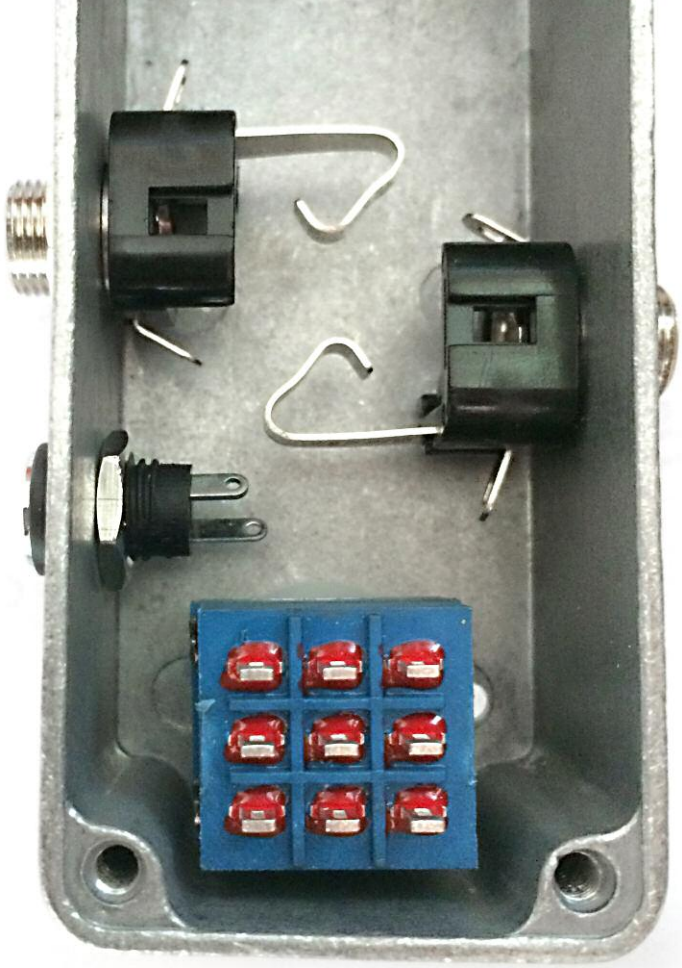
If you're not plugging into a tester unit connect the pins as shown >>>>

Fitting your offboard connectors

You'll have a pair of mono 1/4" jack sockets (Lumberg KLBM3), a mini 8mm DC socket and a 3PDT footswitch. There are only two different drilling patterns for these components if you're using an enclosure supplied by us. The only difference between them is the position of the DC socket - either at the bottom next to the footswitch, or right at the top of the enclosure.

The holes for the DC and jacks are drilled close to the top surface of the enclosure to allow plenty of space for the circuit to fit. It's tight, but it works. As the bodies of the jacks are plastic you don't need to worry about shorting out anything on the underside of your PCB if they touch them.

Position everything as shown above. Note the orientation of the jacks - this is important.



The DC socket should be rotated at around 45° as shown below to give extra clearance between it and the jack socket. It looks like a lot of space, but when a jack is inserted the socket will bend out towards the footswitch.

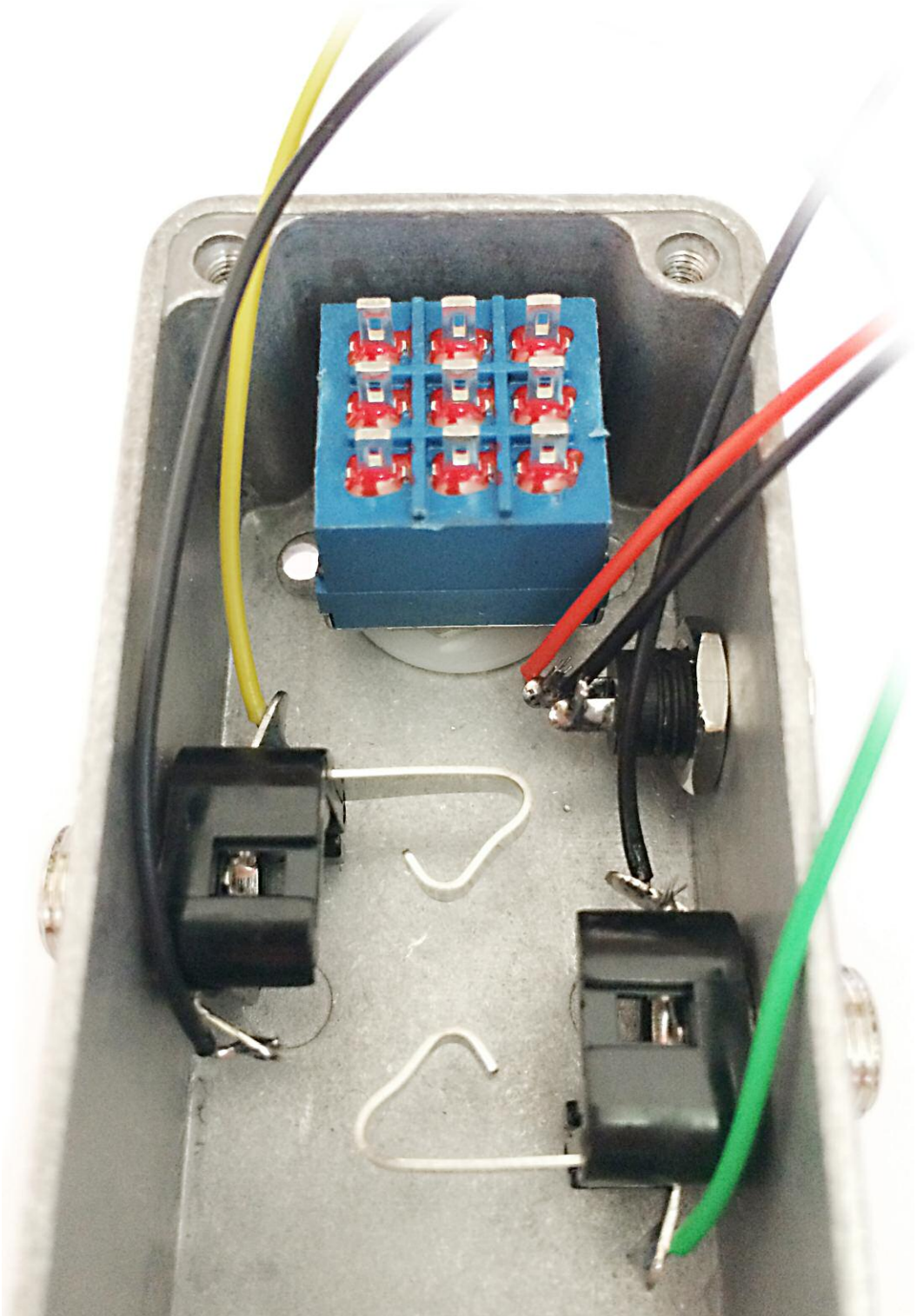
When mounting the footswitch you should give the bottom nut a turn or two so the switch body sits away from the top surface of the box. The tips of the 9 footswitch lugs should sit just below the edge of the enclosure. Any higher and they may short out against the box lid. Any lower and you may not have room to fit your circuit in the box.

All mounted and tightened up? Good. Next...

Preliminary wiring

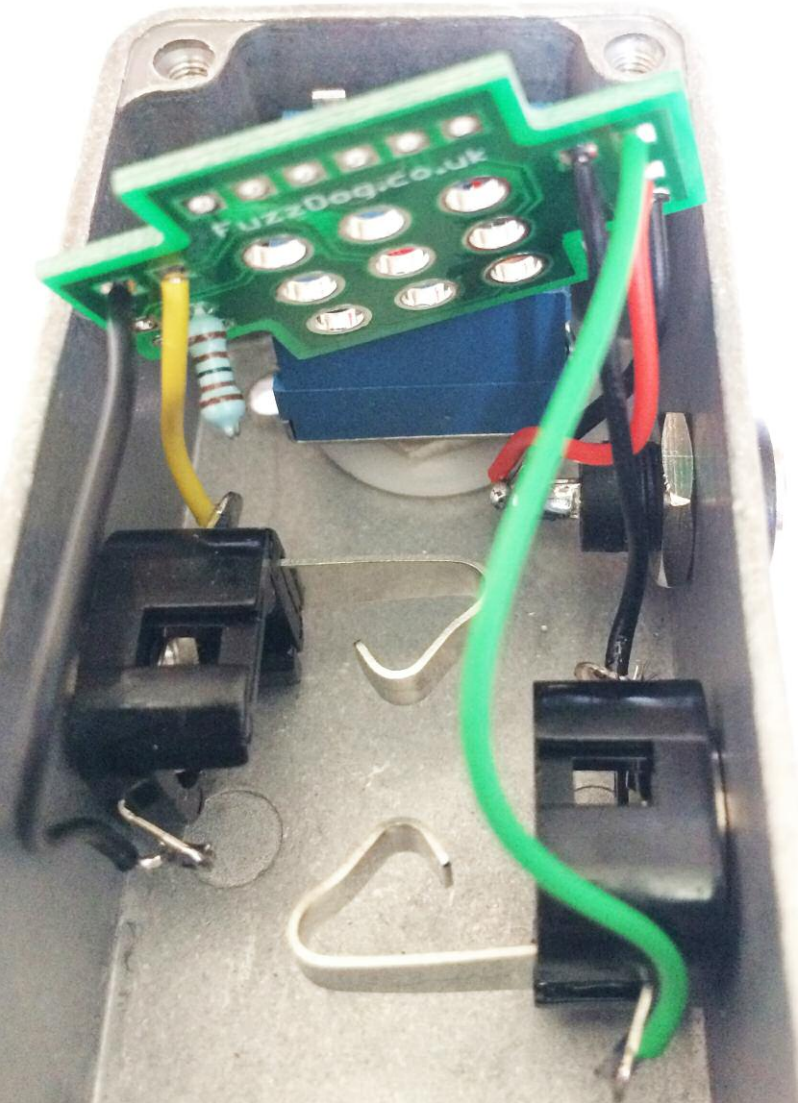
It's easiest to do your wiring before you bring your circuit anywhere near the enclosure. We've kept the FuzzPup boards much narrower than they could be so you have plenty of wiggle room for wires around them, but it'll still be difficult to get a soldering iron underneath once the main circuit is mounted.

Wire up the jacks and DC as shown below, giving yourself plenty of length at this stage. If you have a top-mounted DC socket don't worry about this for now. You'll always have access to that, so it can be left until last. It will connect to your main circuit board rather than the switch daughterboard.



Switch wiring

There are a few different ways to connect up your wires. By far the easiest is as shown below. All your offboard connections are made to the footswitch daughterboard. To do this you should lay the daughterboard in position on the footswitch and check how much wire you'll need for each connection. Too much and you'll end up having trouble cramming all the extra beneath the PCBs when you do your final assembly. Too little and you won't be able to manoeuvre your PCBs into position. Around a half inch of slack in each case is good.



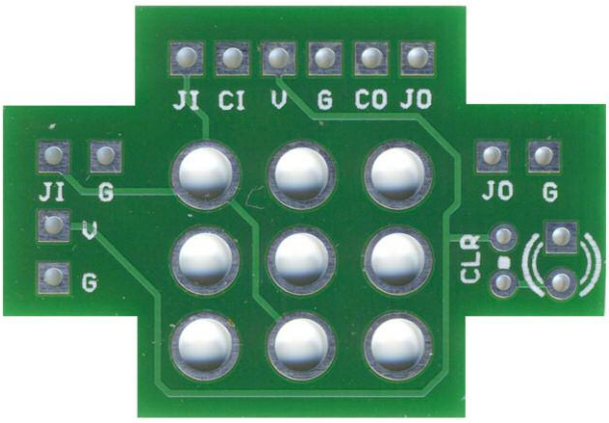
You should use the JI (jack in) and JO (jack out) connections on the outer edges of the daughterboard as shown below, rather than the ones on the front edge. You need that space free to connect your main circuit board.

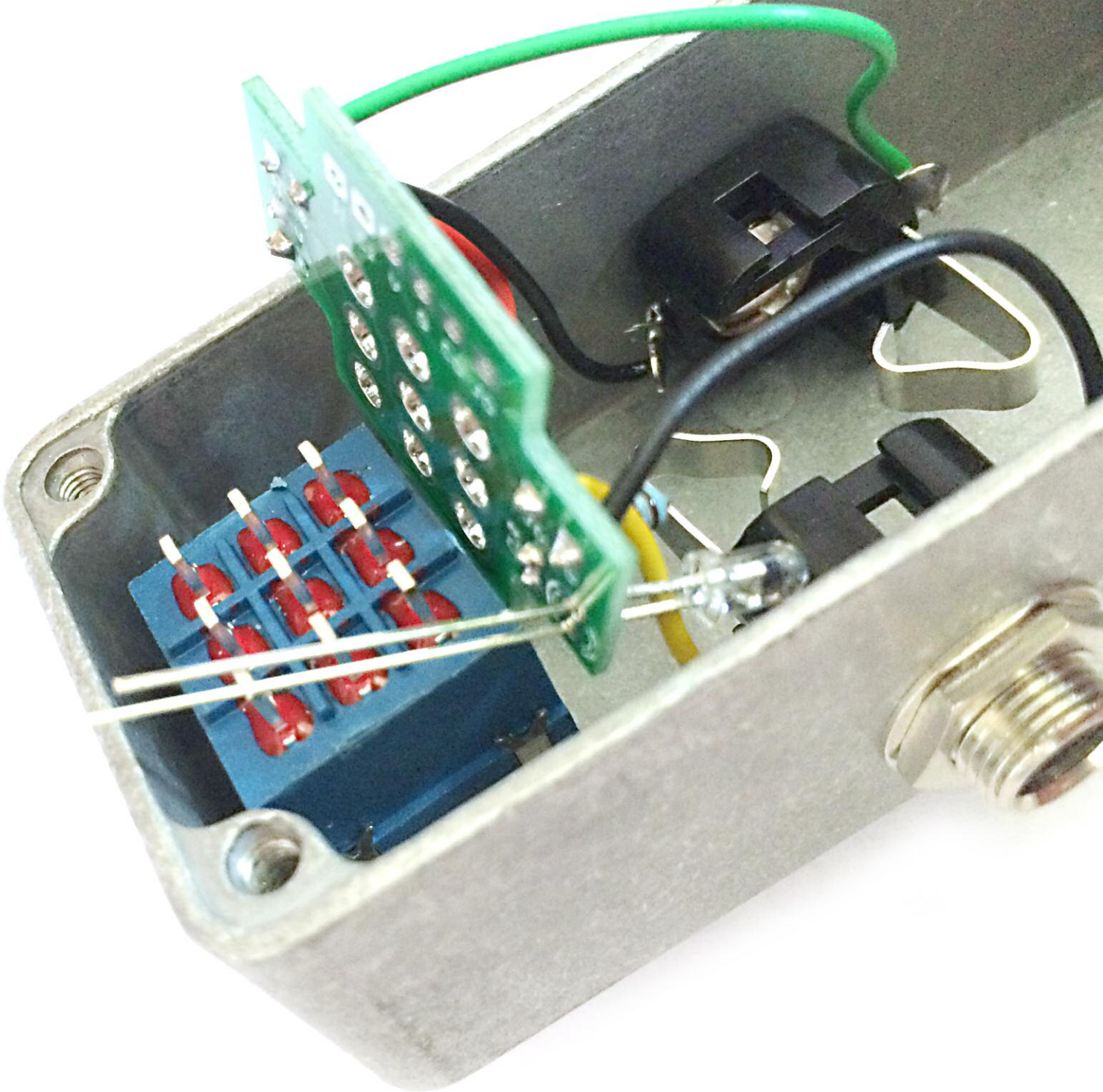
The shorter pin of the DC socket is your GND, the longer is your +V.

The jack socket grounds are the ones with black wires connected to them in the picture.

You should solder in your LED Current Limiting Resistor (CLR) before you connect the wires. Easier, honestly.

With this wiring configuration you only need to connect the daughterboard and main circuit board with the four main pads - IN, V, G and OUT. The leading edge JI and JO pads are now redundant. However, we recommend still using all six connections to make a stronger join between the two boards.





Don’t forget the LED

Really - don’t! Once you’ve soldered the daughterboard in place on the footswitch it’ll be difficult to get the LED in there.

Pull it through the daughterboard from the bottom. Long (+) leg goes into the round pad.

Once its pulled all the way through you can bend the legs out slightly to stop it falling back out, or just be careful not to let it. Don’t worry about how far the LED is from the PCB right now. That’ll fall into position soon.

Time to marry your PCBs

You've already built and tested your main circuit so we know we're good to go with that. Get your daughterboard into position just above the footswitch. Yes, we know the one in the image has no wires attached - we forgot to take pictures before soldering up the one we'd been building. Position your main circuit's header pins into the daughterboard as shown. Now drop the daughterboard into position on the footswitch.

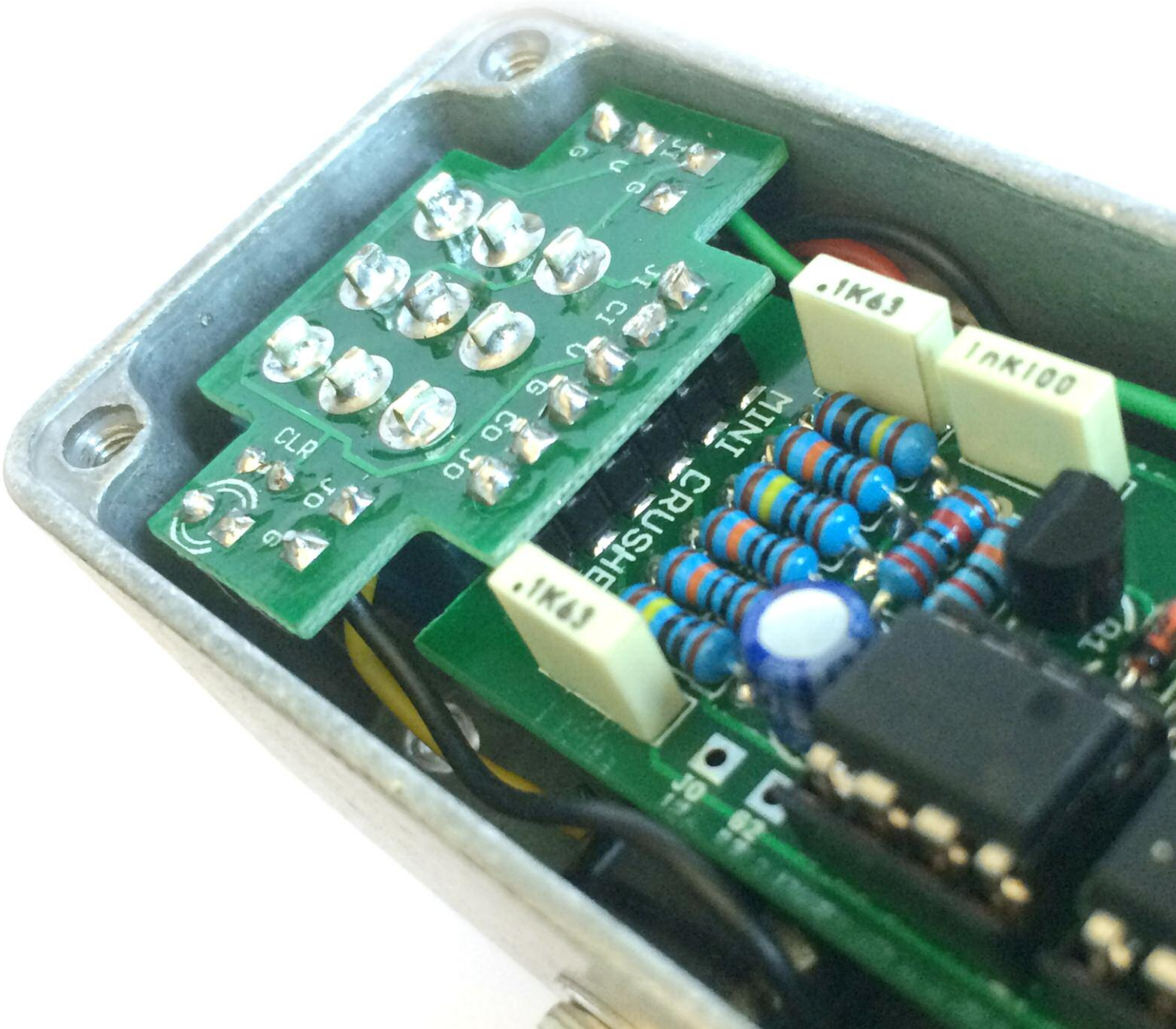
You may find the main circuit board catches on the edge of the footswitch. Don't worry, it's time to wiggle. There's lots of play in the pads of the daughterboard, so pull it slightly forward on the footswitch. You should have plenty of space and the main circuit will drop down nicely onto the top of the jack sockets, even if you didn't mount the header pins at an angle.

Make sure your wires aren't stuck between the PCB and jacks. We made that PCB narrower than the enclosure for a reason.

Mission, hopefully, accomplished

With your main circuit nicely lying on the jacks, check your daughterboard positioning. You should be able to have it pressed all the way down onto the body of the footswitch, bu it doesn't matter if the best fit is slightly above. Nor does it matter if the header pins aren't pushed right up so the plastic casing on them is pressed against the daughterboard. This is a bit of a zen procedure, finding the happiest place for both boards to find their forever home.

Once you're happy, solder in the footswitch lugs. Do one first and recheck the fit. It's very easy to reposition the daughterboard if you only have one connection, very difficult once you have two or more. Once all nine are soldered, do your header pin joints. Lastly, push your LED down through the daughterboard into the hole in the enclosure and *carefully* solder it. Take your time with that and use a heatsink. If you burn it out you'll have a nightmare replacing it.



More than one way to skin your tofu

As we said earlier, there's more than one way to wire these up.

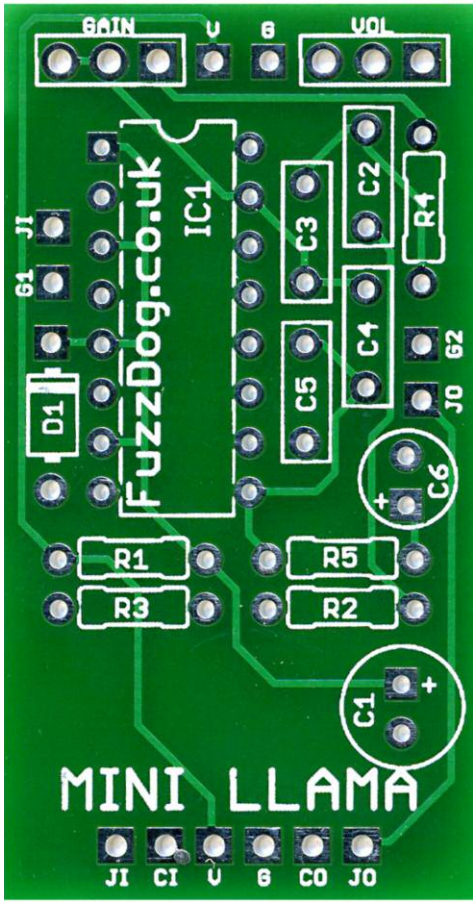
Take a look at the boards opposite - the universal footswitch daughterboard and the Mini Llama.

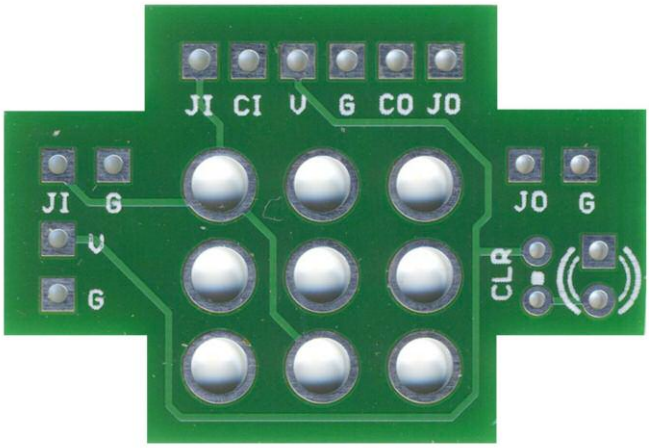
The main connection strip on both is identical.

JI	Jack In
CI	Circuit In
V	+V Supply
G	Ground
CO	Circuit Out
JO	Jack Out

Where you see other pads across the two boards with the same label, these are all directly connected to each other when the two boards are joined with the 6-pin headers. So, the JI pad on the main strip of the daughterboard connects to JI on the main strip of the Llama, as well as the one on the left hand side of the daughterboard and the one near the top left hand side of the Llama. Therefore you can make your Jack In connection from either the daughterboard or the main board. Same goes for the V connection. Once the two boards are joined you can connect your DC jack to either the V and G pads on the bottom left of the daughterboard OR the ones on the top of the Llama.

Ignore the fact there are numbers after the G pads on either side of the Llama. We are.





Hey, there's an example over on the next page >>>>>>

Alternative wiring example

On the example below we've wired the both the jacks and the DC socket from the main circuit board. The only connections on the daughterboard are the 6-way header pin and the LED and current limiting resistor. It's all good.

So, give your build some thought before you start and plan what you're going to wire from where. If you know where you're heading the end is a lot easier to find. Not sure if that qualifies as zen, but it certainly make sense. Enjoy!

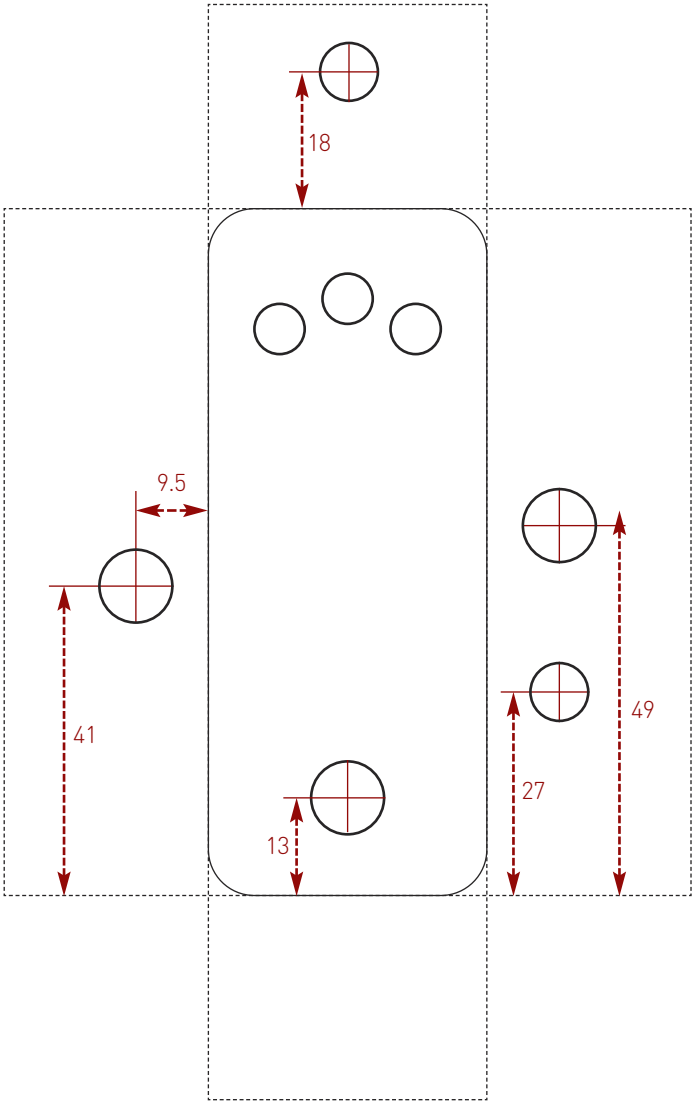
Drilling guide - 1 or 2 pots

This is a guide only. If you're drilling your own enclosure please double check everything before starting.

The holes for the pots are less critical. Simply ensure you have enough clearance for the screw hole pillars in the corners of the enclosure. If you're making a two-pot circuit using 9mm Alpha jacks they should be at least 16mm from the top edge of the enclosure.

Recommended drill sizes:

Jacks	10mm
Footswitch	12mm
DC Socket	8mm
Pots	7mm



Drilling guide - 3 pot daughterboard

This is a guide only. If you're drilling your own enclosure please double check everything before starting.

The holes for the pots are less critical. Simply ensure you have enough clearance for the screw hole pillars in the corners of the enclosure. If you're making a two-pot circuit using 9mm Alpha jacks they should be at least 16mm from the top edge of the enclosure.

Recommended drill sizes:

Jacks	10mm
Footswitch	12mm
DC Socket	8mm
Pots	7mm