Cleveland MUSIC CO.

# DIY Pedal Enclosure Kit With Top-Mounted Jacks

This kit includes everything you need to build a professional quality, space-saving pedal enclosure and includes custom PCBs and premium hardware for all the I/O and switching components. And since everything in the kit is PCB mounted, most of the off-board wiring of a typical pedal build is eliminated. You just add your own effect board, drill holes for your controls, and solder just FOUR wires. It really is that simple.

## Who And What Is This Kit Designed For?

***First and foremost, this kit assumes you already have a pedal circuit built and tested, with the controls wired (or PCB-mounted), just waiting to be "boxed". This kit does not include an effect circuit!***

The circuit you add to the kit can be built on a DIY or third-party PCB, on stripboard, vero board, perf board, or even on tag or turret board if that is what you fancy! Just ensure that the total space required for your circuit in the enclosure does not exceed 58mm wide by 72mm deep and 30mm high ("high" referring to the cross-section view of your physical circuit.) That's about 2.25" wide x 2.85" deep x 1.2" high.

Typically, PCB suppliers for DIYers will clearly state what size enclosure a PCB was designed for: this kit provides a "125B" enclosure, but PCBs designed for "1590B" enclosures will work as well (since a 1590B is smaller than a 125B.)

Secondly, this kit is designed for pedal makers with at least some DIY soldering, wiring, and pedal assembly experience. That is, you do not need instructions for how to use your soldering iron, how to drill holes in an aluminum enclosure, etc. If you have never built a pedal before or don't feel confident in your knowledge of basic audio electronics topology, or you doubt your soldering or metal drilling skills, this kit may not be the best thing to start with. We cannot provide beginners the support they need, but the kind folks at https://www.reddit.com/r/diypedals/ and other online communities can probably help you get started.

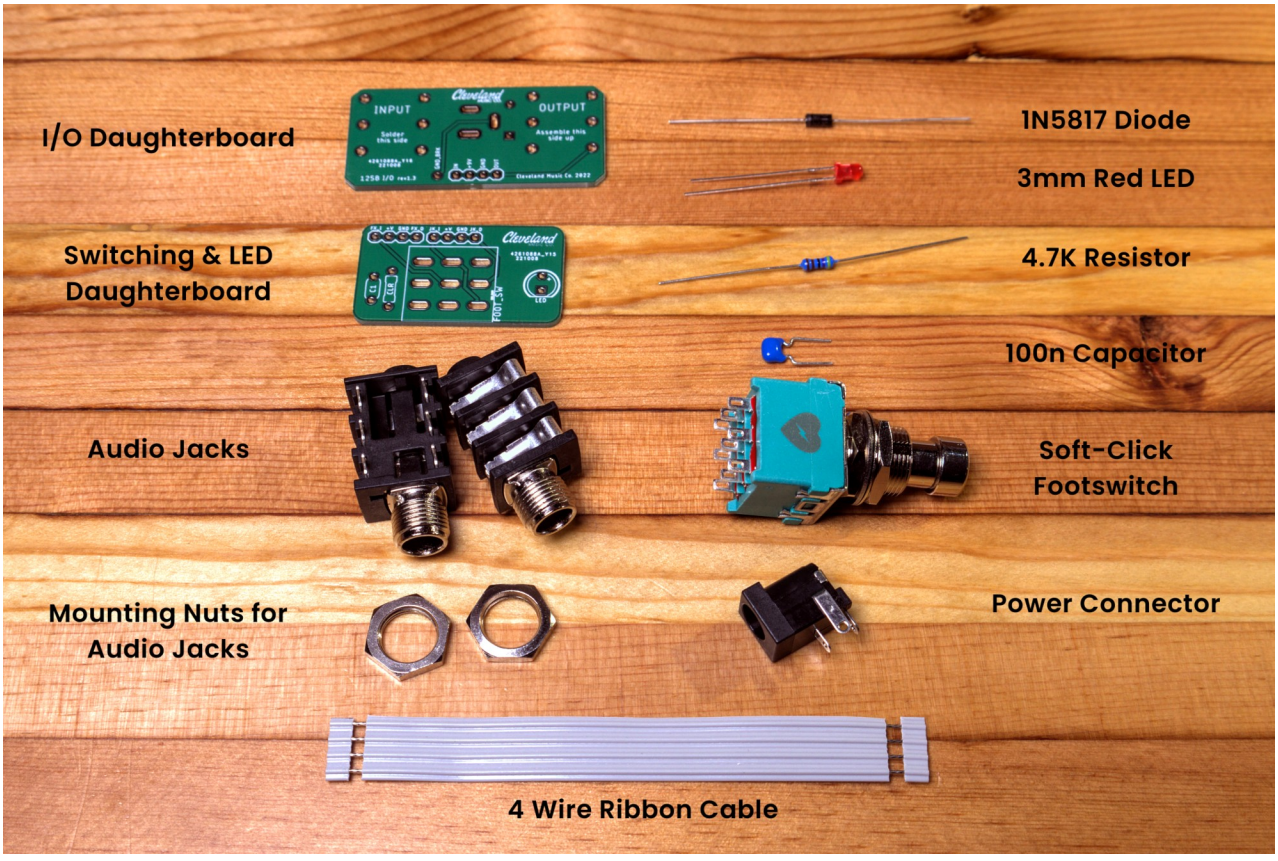
Lastly, we mentioned your circuit should be "tested". Just trust us: it is far easier to troubleshoot a wonky circuit *outside* the enclosure than it is after everything has been wired and stuffed into a cramped box. Here is an example of a popular test rig in the DIY community: https://tagboardeffects.blogspot.com/2014/09/test-box-20.html. Use your Internet machine to find more.

**Before you dive right in, it is recommended you read this entire document first; especially before you take a drill to the enclosure!**

## Let's Build It

Before you begin, ensure the following:

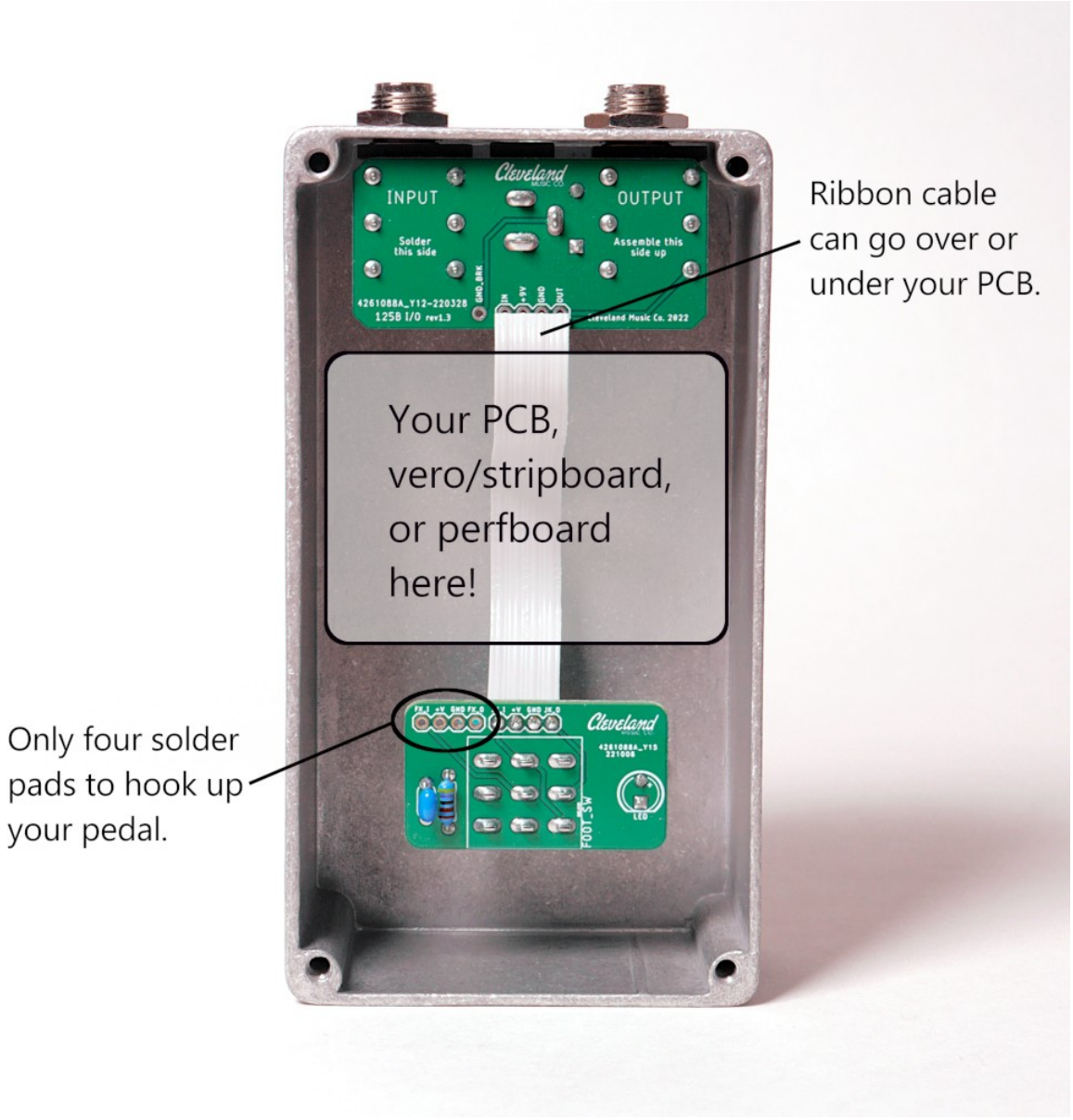
1. You have a soldering iron, your solder of choice, and, ideally, a small "chisel tip" for the iron. (Look it up if you're not familiar. It's not crucial, but it is nice to have the extra mass over a small cone tip for some of the kit components.)
2. You have access to a drill press or hand drill with appropriate metal drill bits for your necessary enclosure holes. A "step bit" is ideal. (Again, look it up. Not crucial; just nice.)
3. You have a fully-built, fully-tested pedal circuit ready to be boxed up!
4. **From the kit:** You have the pre-drilled enclosure, the backplate, and the 4 screws for the backplate.
5. **From the kit:** You've inventoried the small part kit contents and verified you have everything in the picture below.



## Step 1: Drill holes in the enclosure for your circuit's controls

There's not a great deal of help we can offer here because you can use this kit to build literally anything with any number of controls, as long as they all fit in the box. But here are a few tips:

- Most PCB suppliers provide a "drill guide" for PCBs designed for board-mounted pots and switches. Follow their instructions and use the supplier's drill guide if this is your situation.
- If you are using a vero board (or similar) layout and the pots and switches have "flying wires" leading to them, you don't have to be as exact, but be sure you have enough clearance in between the various components. Refer to the below photograph to better understand the layout you are dealing with. This will be ***Figure 1*** for the rest of the document.



- In any case, it might be helpful to measure and draw a “cross hair” design in pencil on the enclosure, so 4 equal quadrants and the enclosure center are clearly visible. Use these as a guide when designing your control layout.
- **DRILL PILOT HOLES FIRST, THEN DRILL TO REQUIRED SIZE WITH LARGER BITS!** 1/16” is a popular bit size for pilot holes. We strongly suggest you research “step bits” and consider purchasing at least one that covers the range of hole sizes you might regularly drill.

**NOTE:** Counter-intuitively, the I/O Daughterboard will be mounted fairly “high” up the enclosure wall, leaving space for at least standard 16mm potentiometers beneath it. To get a feel for the space available, “dry fit” the audio jacks into place and observe. Certain circuits can be mounted in this space provided the components in that area of the board are low-profile.

Optionally, at this point, you can paint, buff, powdercoat, dip, or do whatever you can think of to customize the enclosure. Just let your finish properly dry and/or cure according to the manufacturer instructions.

### Step 2: Solder the I/O Daughterboard components

Remember the assumptions for this kit: you already know how to solder, so there is no detailed step-by-step provided. What follows is better described as the suggested order of operations. We’re suggesting this based on many years of experience soldering and doing final assemblies.

**NOTE:** The I/O daughterboard has TWO sides:

- One side (top) is labelled “Solder this side” and “Assemble this side up”. **DO NOT PLACE ANY PARTS ON THIS SIDE!**
- The other side (back) is labelled “Place parts this side” and features printed component footprints. **PLACE ALL PARTS ON THIS SIDE... EVEN THE AUDIO JACKS!**

Refer back to the *Figure 1* photo in the previous section to better understand.

The recommended order of operations:

1. **Solder the 1N5817 diode.** Match the orientation to the printed footprint on the PCB (note the band at one end of the diode.) This diode is for reverse polarity protection. (If you are an advanced builder and want to omit it, be sure to "jumper" the pads.)
2. **Solder the Kobiconn 7620-E power connector.** A set of "helping hands" are useful here. Alternatively, a quick bit of masking tape is also handy to hold the power connector in place while soldering.
3. **Solder the Neutrik NRJ6HM-1 audio jacks.** This is pretty straightforward: put the pins through the holes so the jacks protrude beyond the PCB edge with the *Cleveland Music Co. logo*, and the jacks form a platform that holds the PCB in place while you solder. 6 solder points per jack. Refer to *Figure 1*.
4. Set the I/O Daughterboard aside.

## Step 3: Solder the Switching Daughterboard components

Suggested order of operations:

1. **Solder the 4.7K resistor to the PCB on the side with the printed footprint (top).** The footprint is labelled "CLR".
2. **Solder the 100n capacitor on the side with the printed footprint (top).** The footprint is labelled "C1".
3. **Dry fit the footswitch in its hole in the enclosure.** One mounting nut goes inside the enclosure along with the locking washer (against the inside of the enclosure). The other mounting nut goes on the outside of the enclosure, after the finishing washer. Simply hand-tighten this assembly in order to hold the switch in place for the next operation. The orientation of the footswitch doesn't matter, as long as the solder lugs are horizontal as in *Figure 1*.
4. **With the enclosure laying on its face, position the Switching Daughterboard on the footswitch solder lugs and ensure it is level.** See *Figure 1* and ensure the PCB matches the orientation in the picture!

5. **Solder one lug in the first column, then one lug in the second column, then one in the third.** Don't hold the iron on any lug for more than 2-3 seconds, and be sure to pause for 20-30 seconds between each lug. Let the footswitch rest for a minute or two before moving on.
6. **Repeat operation 5: solder one lug from each column.** Let the footswitch rest for a minute or two again.
7. **Solder the remaining three lugs.** Let the footswitch rest for a minute or two (yes, again.)

## Step 4: Mount your circuit in the enclosure

1. **Ensure you have hook up wires long enough to reach the pads on the Switching Daughterboard.** Virtually all "negative ground" pedal circuits have the following connection points:
    - Effect IN
    - Effect OUT
    - +V
    - Ground
2. **Put each pot and switch through the holes you drilled in Step 1.** Use mounting washers and nuts to secure them in place.
3. **Loosen the mounting hardware from the Switching Daughterboard assembly.** Set all the mounting hardware (except the nut on the internal side) aside for a moment. This will allow you to more easily perform the next several operations.
4. **Solder your hook up wires to the Switching Daughterboard.** Refer to *Figure 1* before continuing. Hook up your wires to the pads in the upper left corner like this:
    - Effect circuit IN to FX_I
    - +V to +V
    - Ground to GND

- Effect circuit OUT to FX_O

**TIP:** We prefer to use pre-bond wire and feed it from beneath the PCB so the soldering is done on the top of the board.

## Step 5: Wire up and mount the I/O Daughterboard

1. **Solder one end of the 4 Wire Ribbon cable to the 4 pads on the PCB.** Which end is not important. We prefer to feed the wires up from the bottom so the soldering is done on the top of the PCB. (If you refer to *Figure 1* in this case, the wires are going top-down just for illustration purposes.)
2. **Use the provided mounting nuts to secure the I/O Daughterboard in the enclosure as shown in *Figure 1*.** Leave the ribbon cable running over your effect circuit. (Advanced builders could run the cable underneath in certain scenarios, but it's recommended to run it above.)

**TIP:** There is a little bit of wiggle room in this operation. Before tightening the nuts, ensure that the barrel jack of your power supply is not in danger of touching the aluminum enclosure later! See below for reference.

## Step 6: Connect ribbon cable and LED to Switching Daughterboard (Final Assembly!)

This bit is a little finicky. The wires already soldered to the Switching Daughterboard assembly constrict its movements; let gravity do the work: you're going to feed the footswitch and LED through the face of the enclosure at at just about the same time. Be patient and make sure you don't bend the LED leads.

1. **With the Switching Daughterboard assembly still loose, feed the unsoldered end of the ribbon cable through the bottom of the PCB and through the 4 pads in the middle top edge as in *Figure 1*.** Ensure it is straight across all 4 pads. Solder and trim these wires.
2. **Put the locking washer back on the footswitch on the inside of the enclosure.** You may have to hold it so gravity keeps it in place for this next operation.
3. **Feed the LED leads through the BOTTOM of the PCB**. The longer lead goes through the pad labelled "+". To hold it in place, it helps to feed it all the way through the pads until the tension of the legs splaying keeps it there.
4. **Push the footswitch through the hole in the enclosure and secure it in place with the finishing washer and nut.** It may work best to do this while holding the enclosure face up.
5. **Turn the enclosure back over and feed the LED through the 3mm hole in the enclosure**. By design, the hole is big enough for the LED to protrude through the enclosure a little bit, but not big enough that the LED can fall through.
6. **Once the LED is positioned as you like, solder it as seen in *Figure 1* and trim the leads.** If the leads were bent at all, you can straighten them a bit with a small screw driver.

That's it. Put the back of the enclosure on, throw some knobs on the pots, and you are ready to rock.