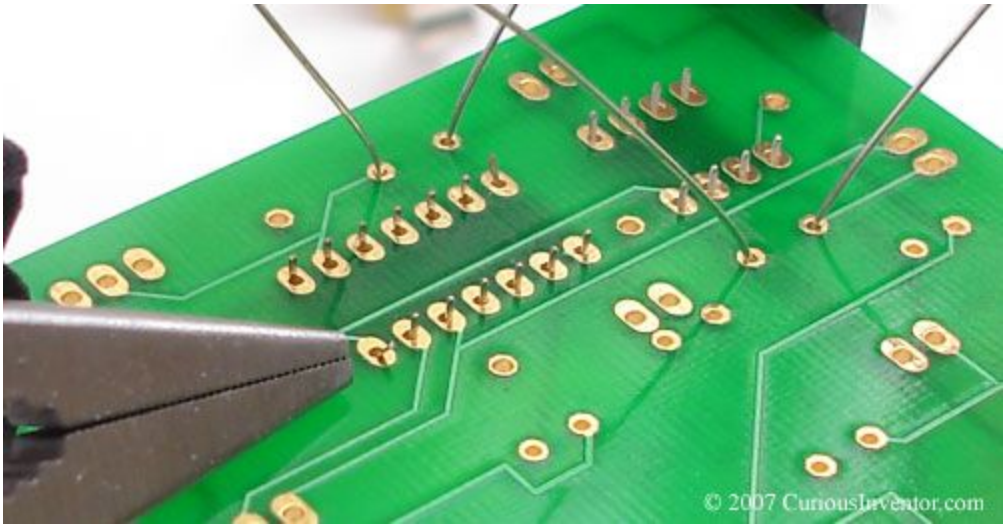
Introduction:

This guide will walk through the assembly of the "Everything" version of the kit.

1. Recommend Tools and Supplies:

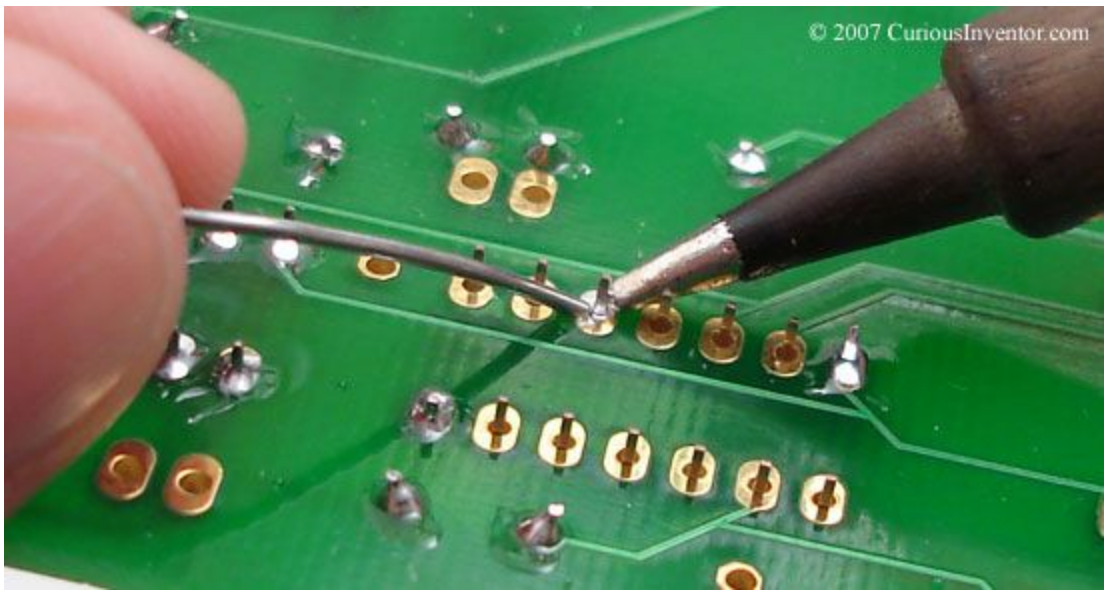
- **Soldering Iron and Solder:** A 15 Watt iron will may get the job done, but it'll be easier with a 25 or 35 Watt iron. The larger pot and switch connections can draw a lot of heat. Don't lose sleep purchasing your first iron; any cheap RadioShack one will do. We like small chisel or screw driver shaped tips (say 1/16th of an inch wide), but personal preference plays a big role. The goal is to use a tip that's about the same size as the pad you're soldering. This way you get you get as much surface area contact as possible (better for heat transfer) but are still small enough to avoid touching neighboring pads.
  For solder, we recommend .02 or .031" diameter, rosin cored flux, tin-lead solder, either 63/37 or 60/40, whatever's cheaper. See our soldering guide for explanations. Lead-free solder is a little bit harder to use since it "wets" metal somewhat slower and has a slighty higher melting point. If your kit has sat on the shelf for a while (a year), some steel wool or a pink eraser is useful to remove oxidation from the components and board before starting.
- **Needle Nose Pliers:** Used to clinch or bend component leads, help remove components, and in this kit, remove metals stubs from the pots and also tighten nuts.
- **Helping Hands:** Two aligator clips on a heavy base that are useful for holding wires while you solder them.
- **Flush Cutters:** Used to trim leads close ("flush") to the board.
- **Solder Sucker or Solder Wick:** Used to remove solder.
- **Clamp:** A table top will be fine for most of the job, but a clamp can be handy, especially when removing components.
- **Multimeter:** To check your work.
- **22 Guage stranded wire:** The big component we don't supply is wire to connect the circuit board connections to the pots and switched. We recommend 22 guage stranded wire, since solid wire is more likely to break while being bent back and forth during installation. The more colors, the easier to keep track of things.
- **Wire Strippers:**
- **Screwdriver:** Either phillips or regular will do for putting together the case.

2. Add components to the PCB (Printed Circuit Board):



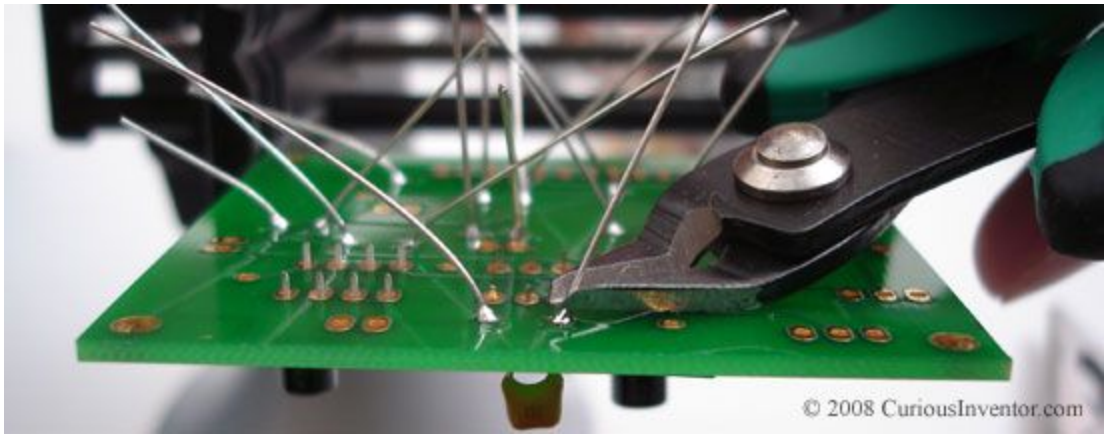
To keep components in place while you solder them, clinch (bend / splay) the leads outwards. On the IC, do this for two opposite corners. This is actually what automated machines do to keep chips in place while the boards are run over fountains of liquid solder (wave soldering).

3. Soldering:



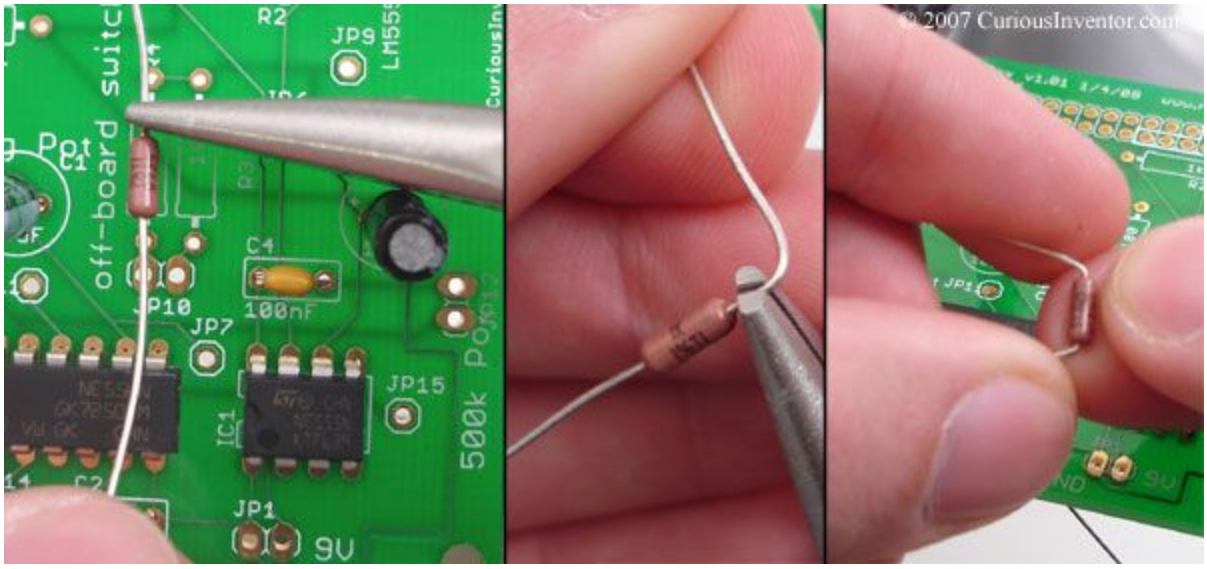
Tin the tip, or in other words, add a bit of solder to the tip, first. This small amount of solder forms a "heat bridge" to help conduct heat from the tip to the pad and component lead. When you first contact the parts with the iron tip, it's helpful to first place some solder in

between the iron and components, then melt solder on the the side opposite from the iron tip. This ensures that the component is hot enough to bond to the solder, and also helps to spread out the solder as it will run towards the heat source.
On ICs, it's a good idea to solder every other pin (and then fill in the gaps) to reduce the risk of overheating the component.



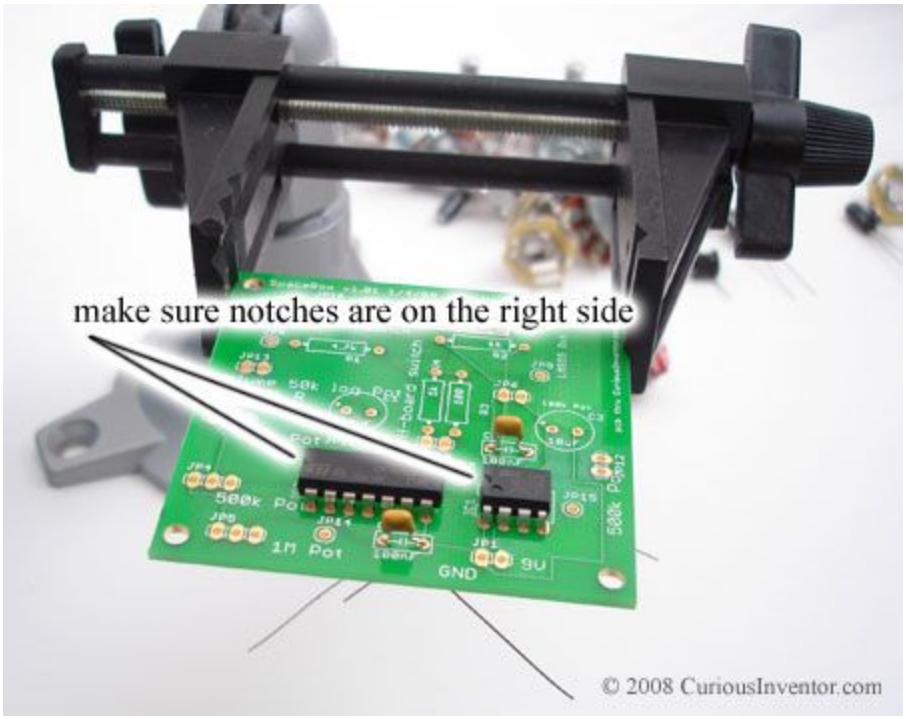
Cut off the leads as you go with flush cutters. Watch out for flying leads; safety glass are actually not over-precatious for this, although we generally just hold the lead with fingers to keep it from flying off.

4. Resistors



Pre-bend the leads before inserting to keep from damaging the board and resistor (not doing this isn't the end of the world). First hold the resistor above it's position, then hold the lead with pliers next to where the bend should go and then fold over the lead. You can also wing it with fingers. Another benefit of using pliers is that you prevent the joint between the resistor body and lead from being stressed. Resistors and most other components should be inserted as far as possible; this means lying flat for resisitor. It's convention to install resistors so their code can be read left to right in the same direction as the silk screen

(tolerance band on the right).

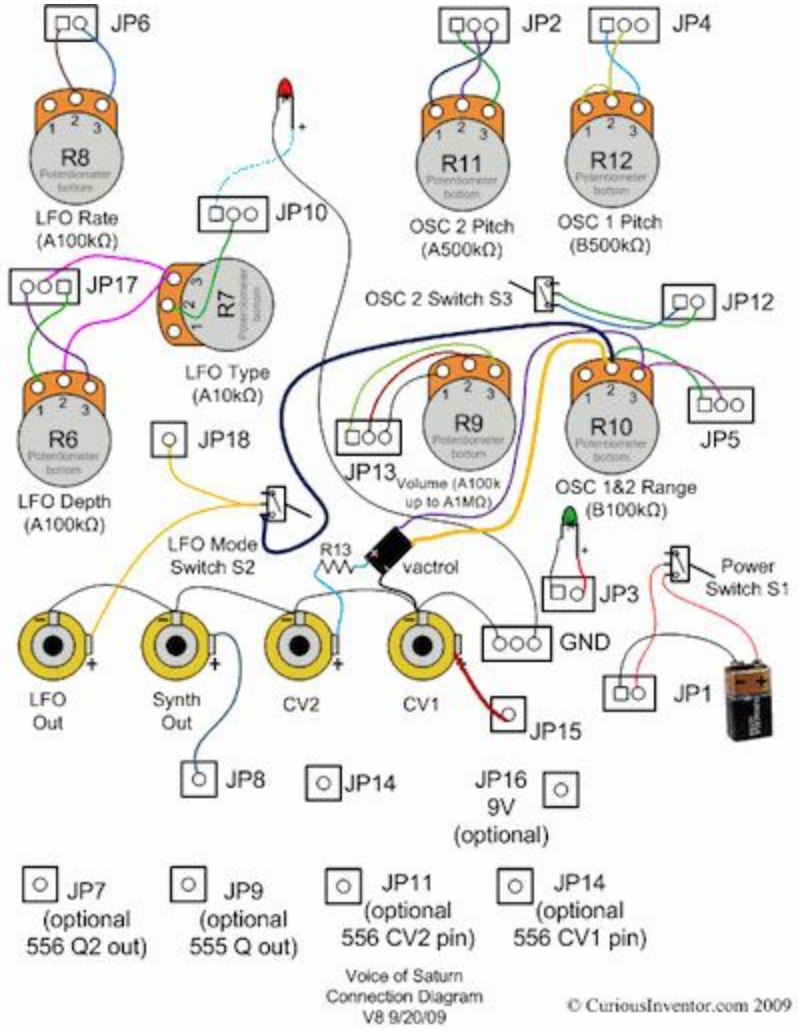


Last, add the ICs making sure to line up the notches on the chips with the markings on the pcb. If available, use IC sockets to further protect the chips from damage.

Finished PCB.

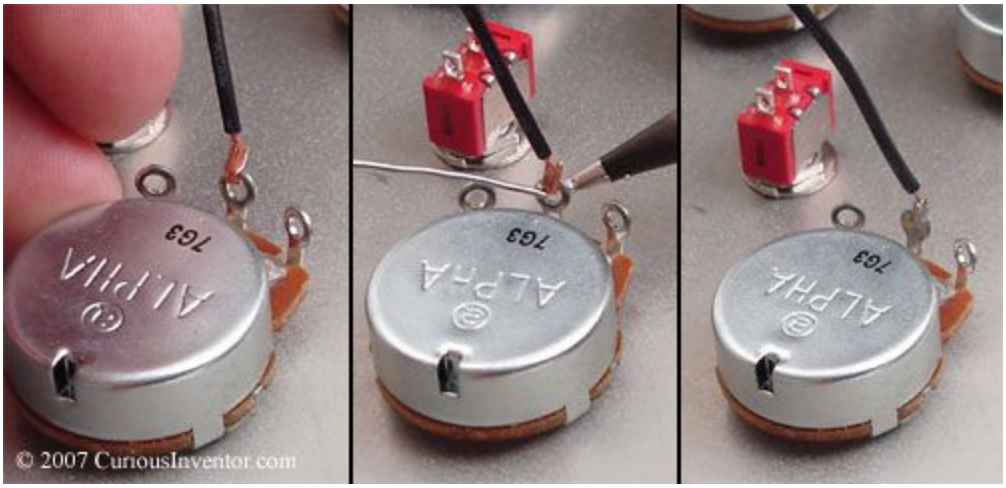
5. Installing Pots, Switches, LEDs and Audio Jacks:

First break off the anti-rotation tab with pliers, then install like the following picture shows:

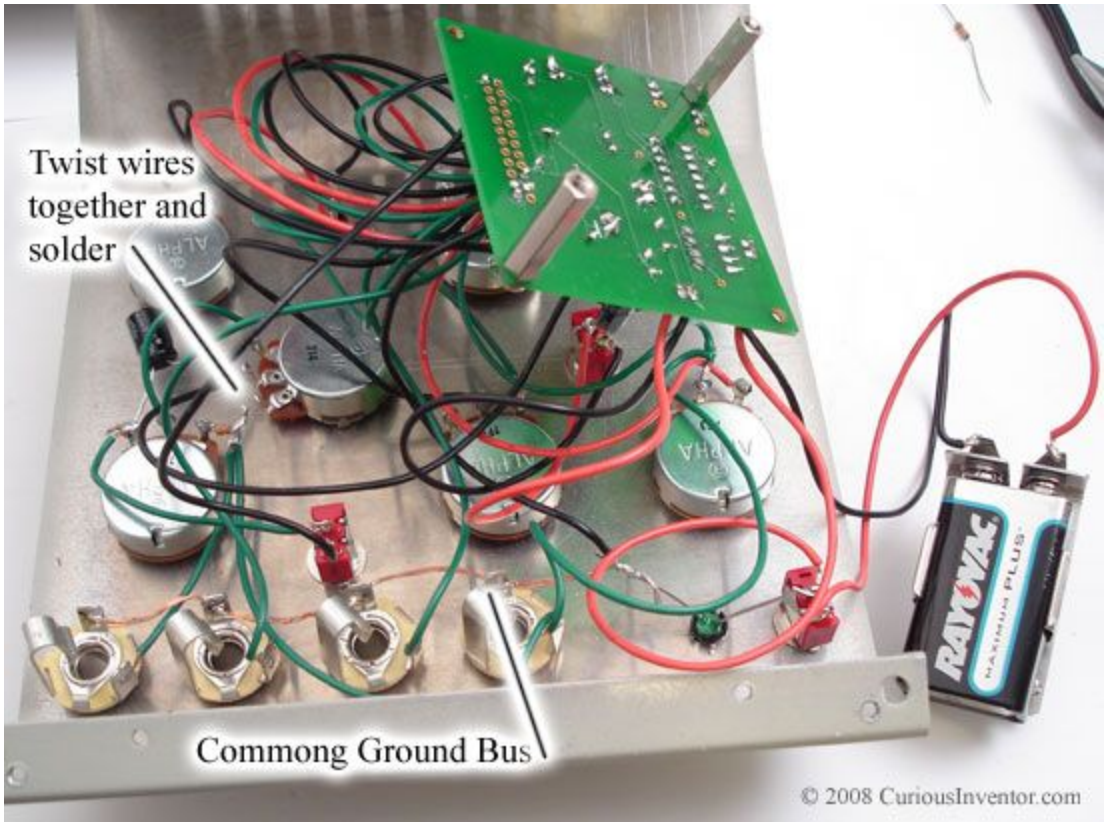


Install the LED holers from the outside, then press the LEDs into them from the inside until they snap in place.

6. Wiring up all the components to the board:



First loop the wire through and bend it to hold it in place, then heat the joint from one side and apply soder to the other. Again, it will help to put a bit of solder between the iron tip and connection to act as a heat bridge.



(this images is from an older version, the resistor attached to R6 is now on the PCB)

Be sure to include the capacitor and resistor as shown in the diagram. Where multiple wires meet (at the resistor for instance), twist the wires together and then add solder. Cover

exposed wires with electrical tape. One tip is to use one continuous strip of wire to connect the grounds of all the audio jacks (as shown).

Install the vactrol and 390ohm resistor directly inside the case. Use electrical tape or heat shrink tubing to protect the wires. Make sure the positive side of the vactrol is attached to the positive Jack terminal. See the connection diagram for more clarification.
Finally solder wires to the battery holder, attach the standoffs to the pcb and screw together the case.

When you first turn it on, the green light should be solid and the red should blink slowly if the LFO Rate is all the way to the left (counter-clockwise). Some knob arrangements don't product any sound at all; set the knobs and switches as shown above to get something.