

KAT-KIT TB PLUSH KIT

Welcome to the KAT-KIT TB PLUSH Build-It-Yourself-Kit.



Firstly, a little info on the TB. For starters, the components provided are the best for the job in-hand. They are the same components used for the builds of many KAT TB's and Fryer Sound TB Touring, Deluxe and Plus Treble Boosters. The circuit board has been specially designed for the kit so that the build can be easy with all components identified on the board. The case is the same powder-coated, silk-screened folded steel unit used for the TB Touring, Deluxe and Plus, so rugged, durable and yet, attractive.

Sound-wise, this TB has been developed to emulate the 1980's era of Brian May's tone, so think Queen from the late 70's through to the end. Think Wembley... Think Live Aid!!

So, what's in the kit?

Well, everything you need to successfully build the TB except for a few hand tools and a battery.

Here are the only tools you will need to build this kit:

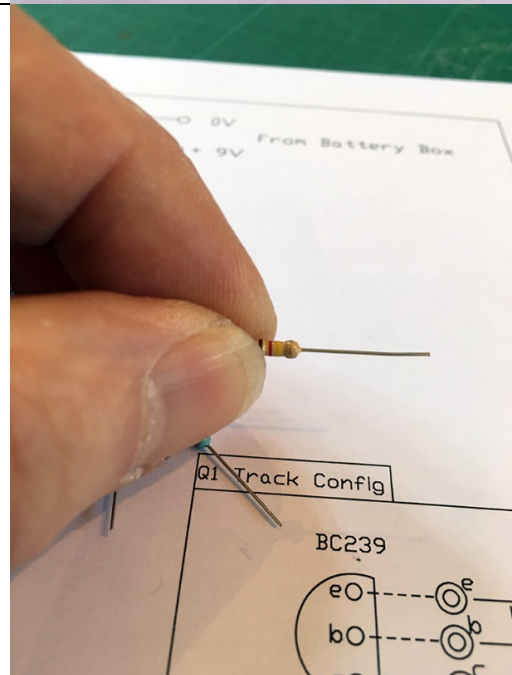
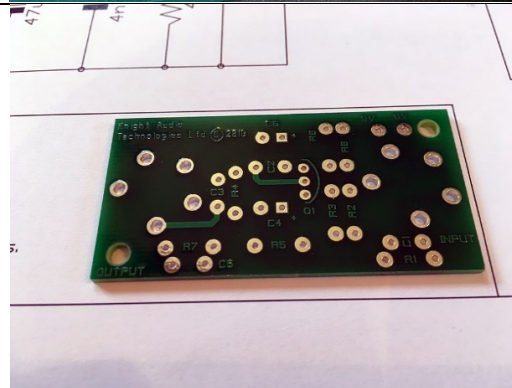
1. Soldering Iron (25 – 40W)
2. Multicore solder
3. Cutters
4. No. 1 Pozidriv screwdriver
5. Large pair of pliers



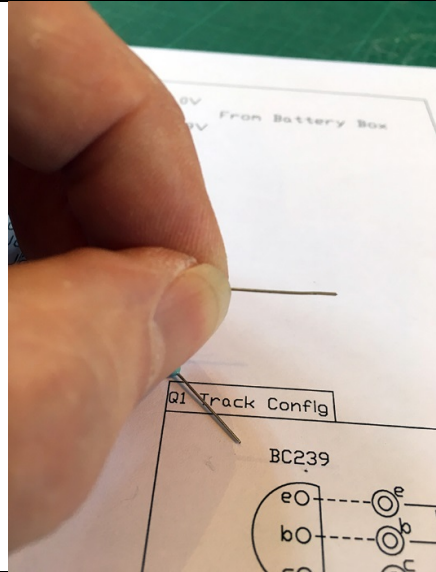
We would suggest that you set up on a large piece of cardboard or cutting board along these lines.



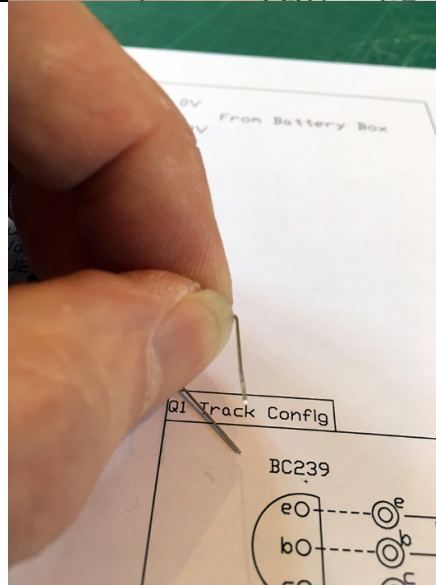
So, Let's start with the circuit board. It is double-sided with plated tracks and solder resist to stop solder going where it's not wanted. The top of the board has component idents and orientation marks to assist the build.



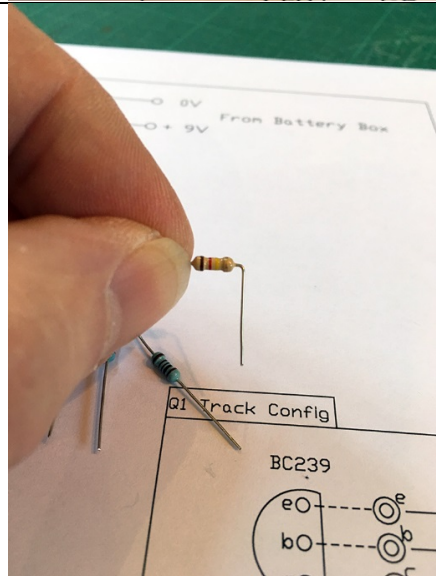
The first thing we need to do is pre-form (bend) the legs ready to insert the device in the board. To do this, hold the resistor in your hand with your thumb nail resting on the end of the resistor body:



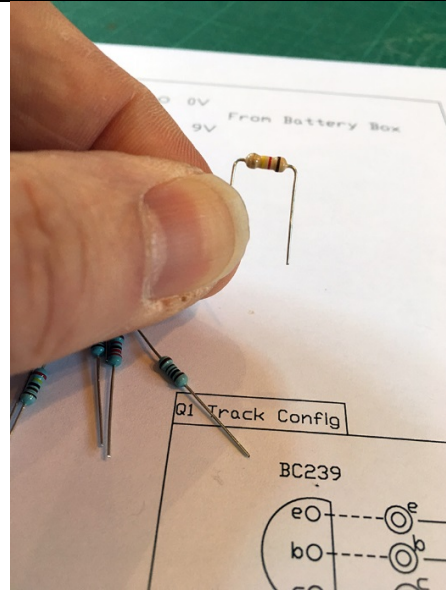
With your finger, bend the leg towards you at 90 degrees so that the lead is formed around your thumb nail.



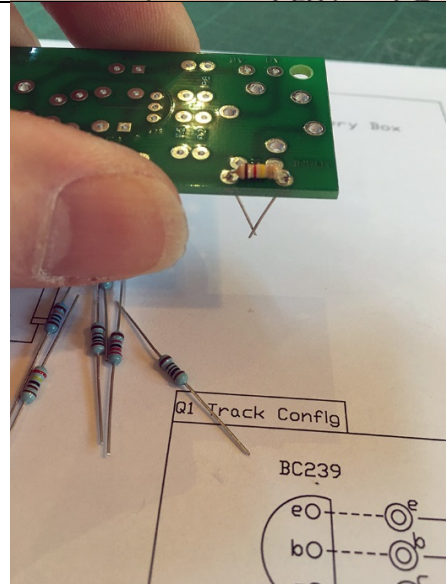
So, it looks like this. Then do the same to the other leg so both are now bent in the same direction:



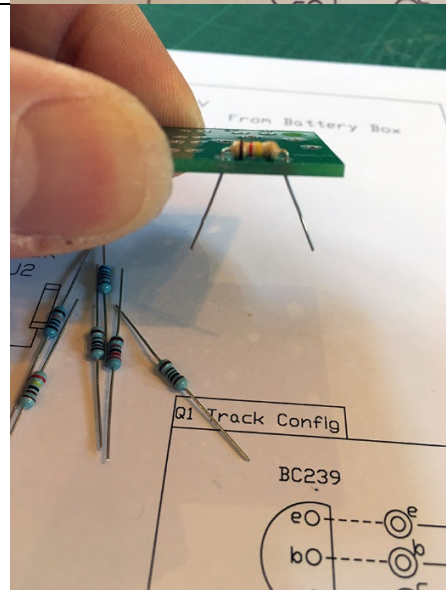
Your formed legs now looking like this and ready to be dropped into the board.



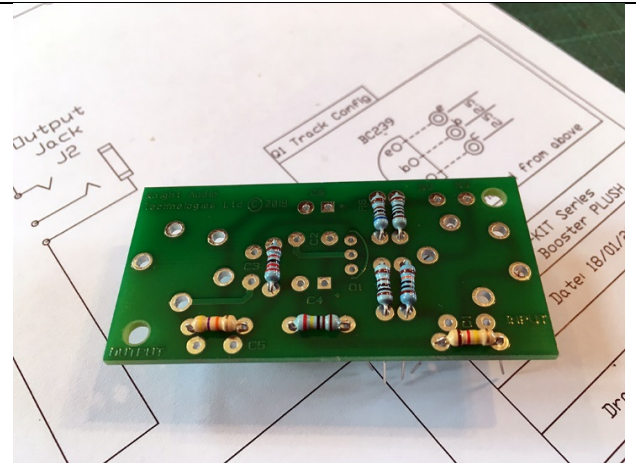
Find the location of 'R1' on the board and drop the resistor into the holes from above. It is good practice (but not necessary) to orientate the resistors so that the colour codes either read from left to right, or from bottom to top. This just makes repairs and fault-finding further down the line a little easier...



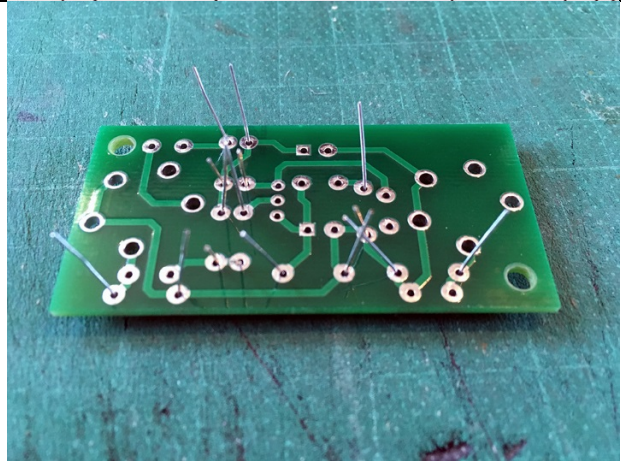
With the resistor dropped in, make sure it is seated all the way down and touching the top of the board at both ends. Now gently bend the legs open underneath so as to temporarily hold the component in-place whilst you load the rest.



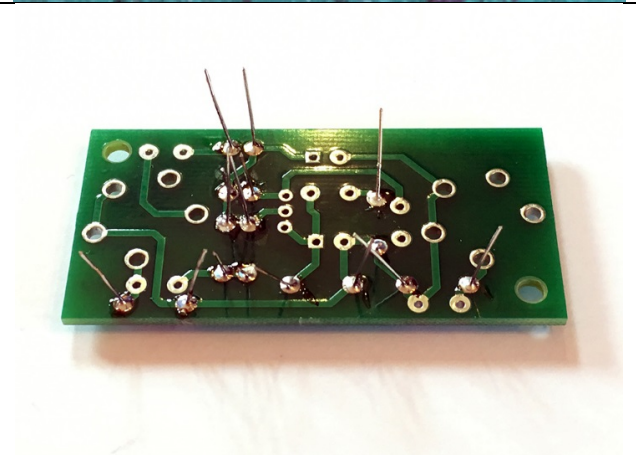
You should now have a board populated with 8 resistors. There is a 'check picture' further along in these instructions if you want to check you have the correct components in the correct place before you solder. If you are colour-blind in any way, or have sight impairment, you can check values with a multi-meter touched across the ends of each resistor in turn.



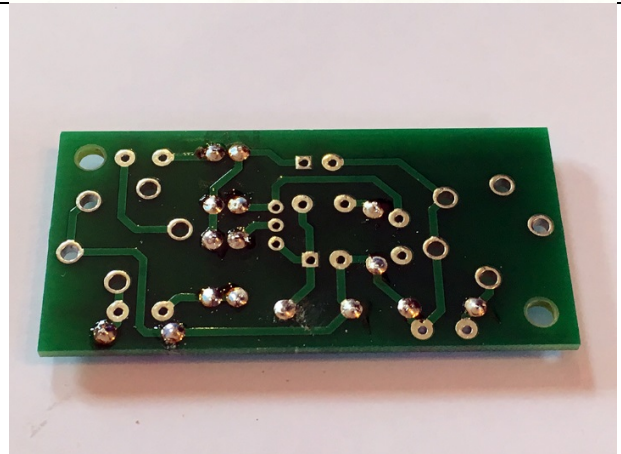
Now carefully turn the board over so that all the resistors are flat against the work surface. If you apply gentle pressure to the board as you solder, you will find that all the components are perfectly seated once soldered.



So, here's the board with the resistors just soldered in and ready for the leads to be trimmed. Each solder joint should have a concave shape (slightly sunken), rather than convex (pudding shaped). If your joints are convex, you are applying too much solder. Your solder-time per joint should not exceed 3 seconds. If in doubt, count 1 (apply soldering iron to joint), 2 (feed in solder), 3 (remove iron).

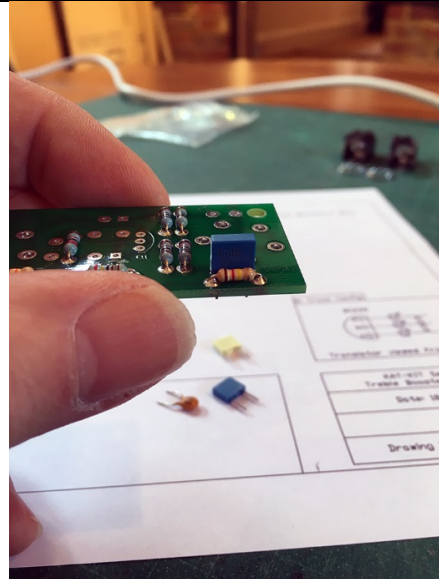


Once you have soldered the leads and checked the solder joints for quality, you can then trim off the leads with your cutters. Bad solder joints will have a dull grey look to them, good joints will be shiny. Make sure there are no gaps in the solder around the lead at the pad. The solder pad hole should be full with solder.

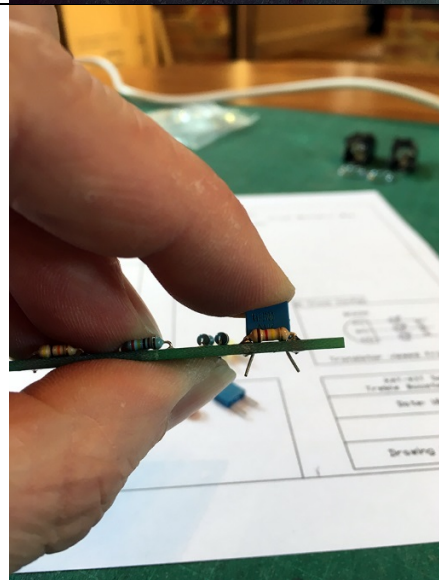


Now it's time to move on to the small polyester and ceramic capacitors. The value of which is either written on the front or the top of each device. Again, further help can be found at the back of this piece.

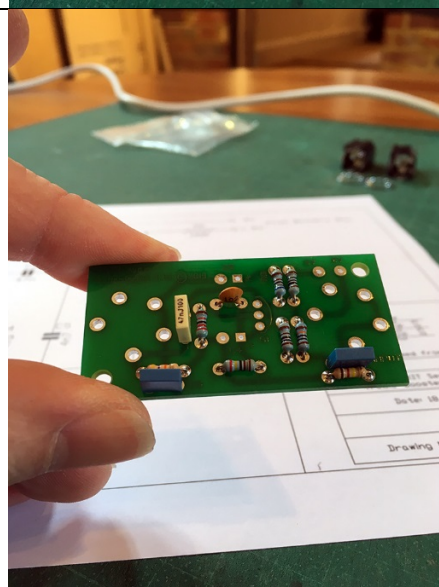
As per the resistors, you can drop the four capacitors into their respective holes as detailed.



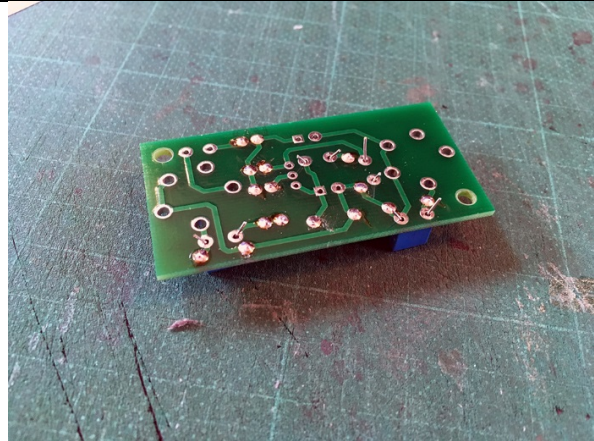
Once again, bending the legs below the board to temporarily hold them in place before soldering:



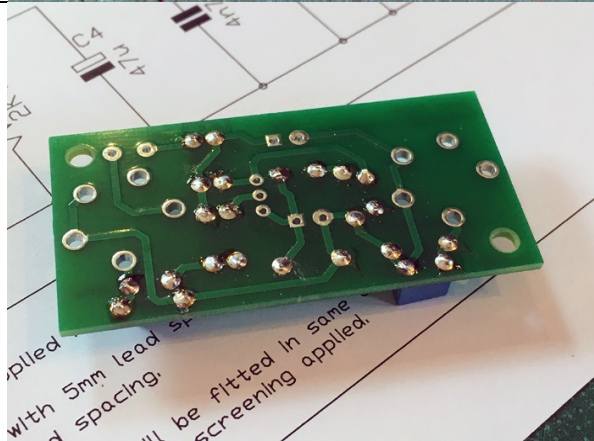
The small capacitors are now in and ready for soldering. Time to flip the board and rest it on the top of the new capacitors.



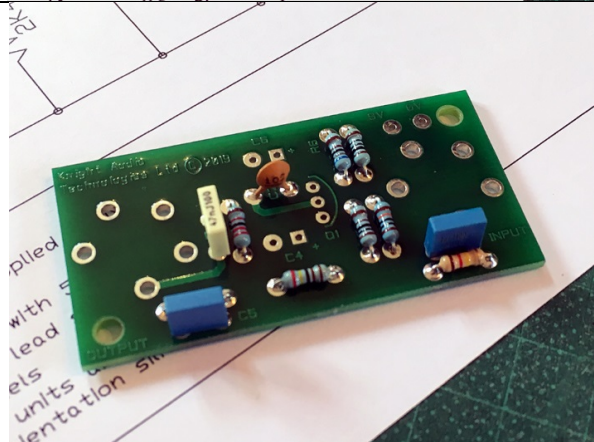
Board inverted ready for soldering.



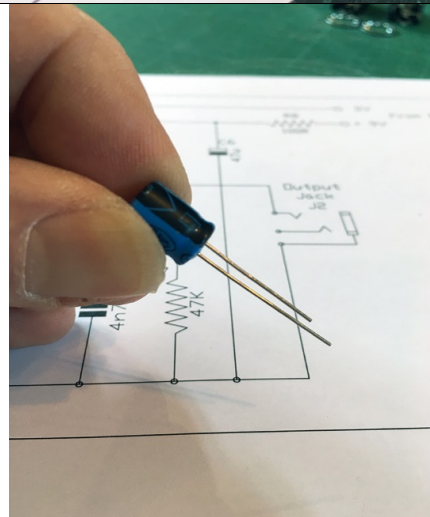
Small capacitors now soldered in, you can cut the excess leads off with your cutters.



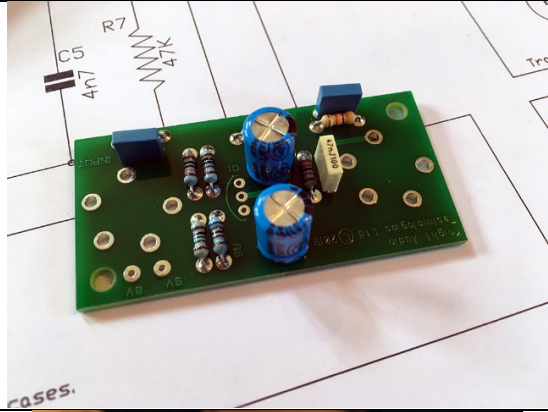
Your board should now look like this!..



Now for the larger Electrolytic capacitors. There are two in this circuit and both are the same value, so you don't need to worry about fitting the wrong one. There are two types of Electrolytic capacitor used in these kits: the blue one (shown) and a silver one. Electrolytic capacitors are polarised and have to be inserted the correct way around. They have a plus leg and a minus leg. The plus leg is the longest and the minus leg the shortest. The minus side of the cap also has a black (-) band down the side.

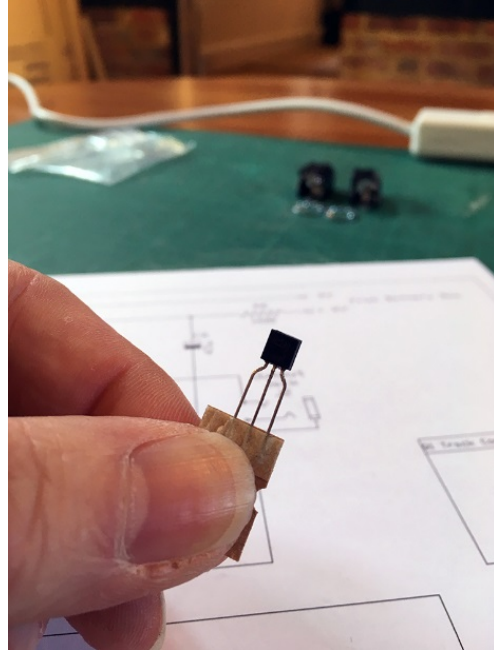


Capacitors and resistors now installed.
Your board should look like this!...

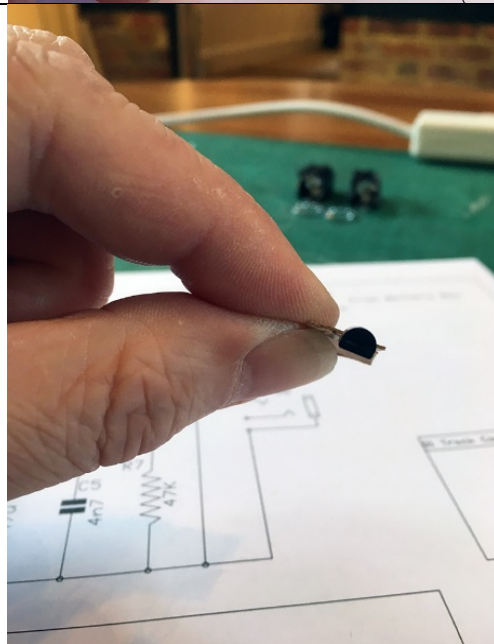


Transistor-Time!...

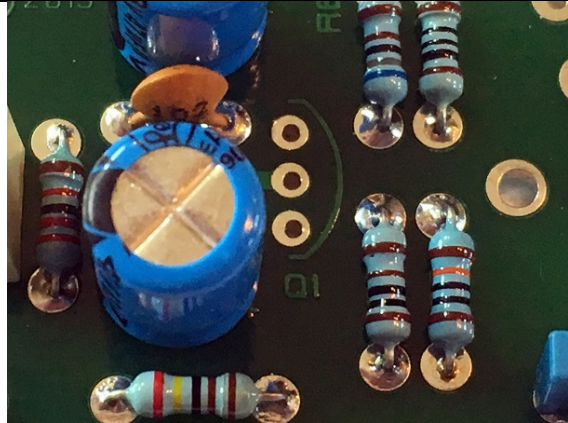
The transistor is the 'engine-room' of the Treble Booster. They are all different, have different responses and gains and can be right diva's if not handled with care. Firstly, they HAVE to be oriented the correct way around FIRST TIME, otherwise they will self-destruct on power-up! Some can be a little sensitive to static, so try not to handle the leads too much (especially if you've been walking across a nylon carpet)!!



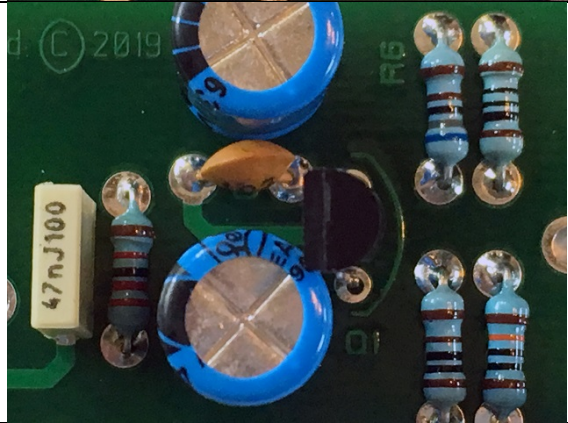
They are also heat sensitive, so we have to be careful when soldering them in!
But first, let's get your transistor in to the board the correct way around. If you look at the transistor, you'll note that it has a round body with a flat on one side.



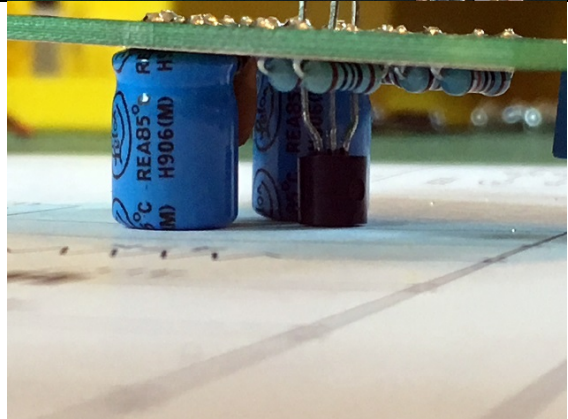
If you now look at the board, you'll notice that we have put a curved indent on the board to one side of the holes. This curved indent signifies the round side of the transistor.



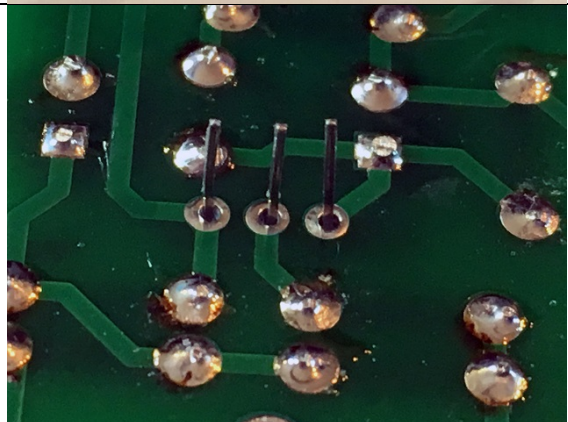
Here is the board with the transistor dropped in.



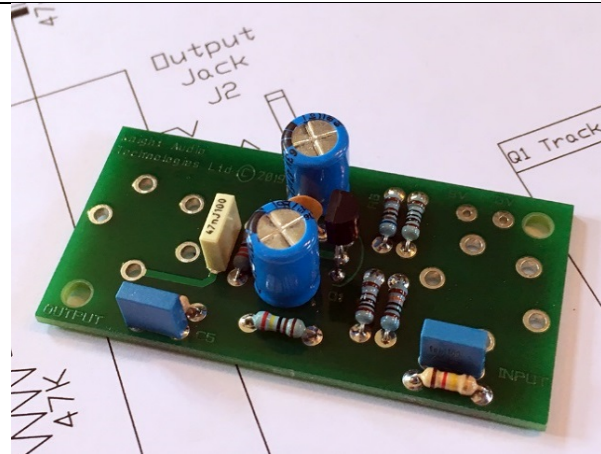
In order to set the correct length of the transistor leads, turn the board over and rest it on the tops of the large Electrolytic capacitors. Then lower the transistor back through the holes so that its body also rests on the worksurface. In other words, the top of the transistor is set to the same height as the tops of the large capacitors.



The transistor leads are now straight and ready for soldering. My general rule is this: Solder the middle lead first. Let it cool for 10 seconds. Then solder the left-hand lead. Let that cool for ten seconds. Then solder the final lead. This process stops heat build-up in the core (junction) of the transistor. If you stick to the 3 second rule detailed earlier and set the height as mentioned, you shouldn't need any heatsinks on the leads.

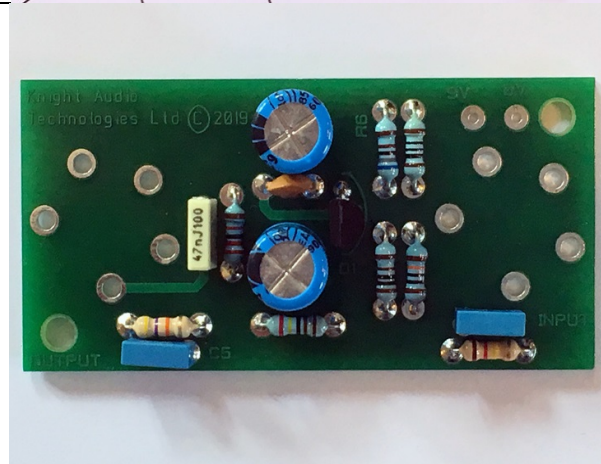


This is how your board should now look!



Check-Board Picture.

Use this to make sure everything is installed and in the right place.



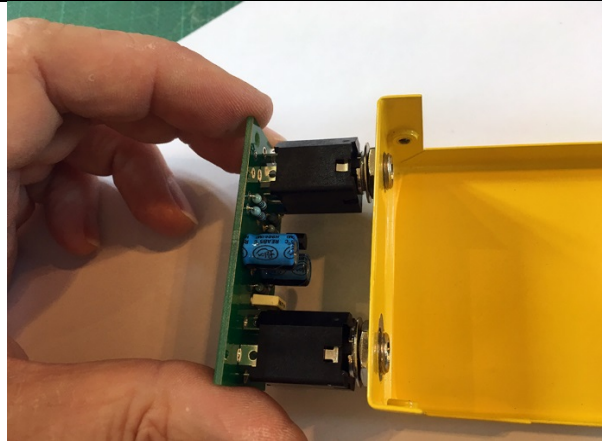
Time to install the jack sockets. These are both 3 pole units so can be fitted in either position. They are a very tight mechanical fit, so do take a little persuasion to get into the holes, so make sure you are pushing them in straight, otherwise you might accidentally bend the lugs.



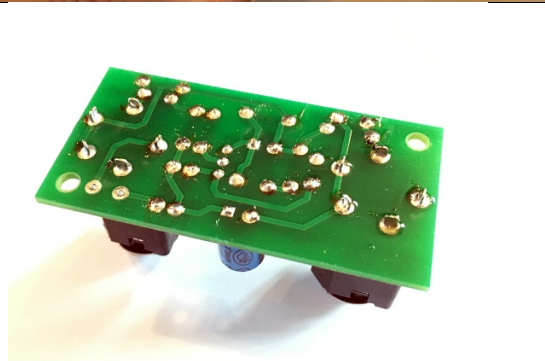
The jacks should go all the way into the board and sit with the wider parts of the lugs resting on the top of the board.



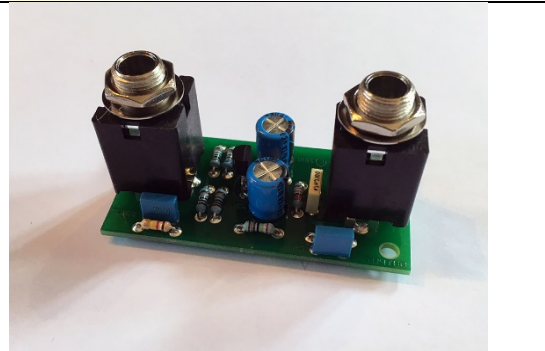
Before soldering-in the jacks, it's worth making sure they align with the holes in the case. If they don't, re-seat the jacks so they do.



You can now invert the board (they won't fall out believe me!) and solder the lugs in place. The jack holes are quite large and will take a lot of solder if you keep feeding it in, but all that will do is run down the lugs into the jack body, so, no need to keep going once the pad is initially full.



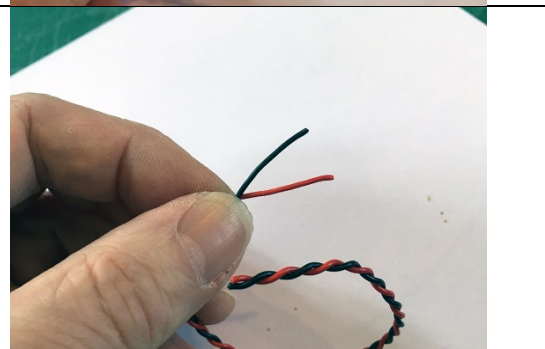
This is how your board should look now!! Yes, it's looking more like a Treble Booster board now!



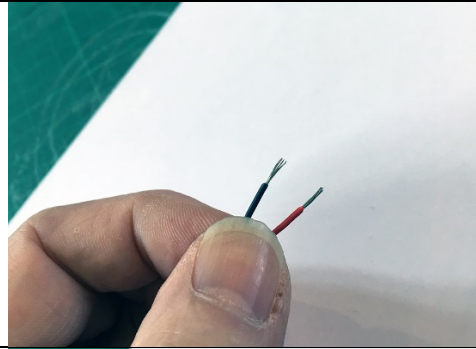
Next to do is connect the battery box to the board. A twisted cable has been provided for this purpose.



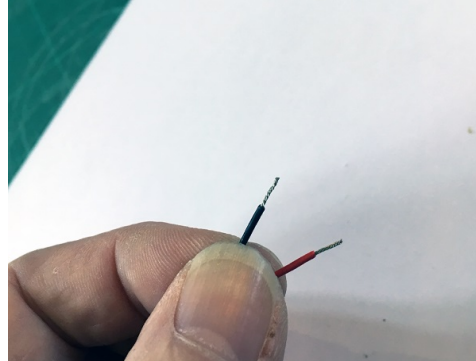
Firstly, grip the twisted cable about 20mm back from the end and untwist it.



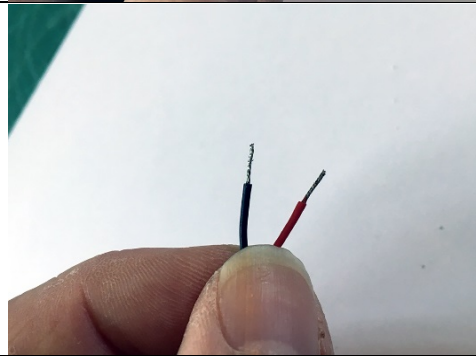
Once un-twisted, use your cutters to strip off the insulation 5mm from the end of each wire. Keep a firm grip on the cable whilst stripping to ensure the two wires remain aligned.



Twist the bare tinned copper strands into tightly smooth ends.



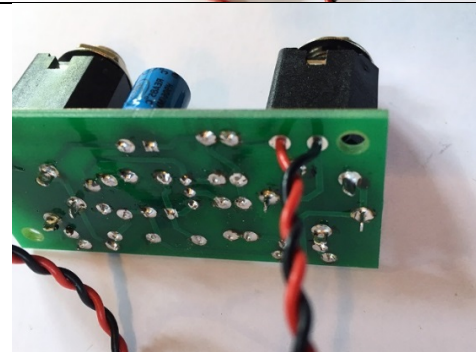
Now tin the ends with your soldering iron. To do this, place the iron under the bare end just add a little solder. You will see the bare twisted wire takes on the solder very quickly. Remove the iron as quickly as you can before the insulation melts. Do not cover them in thick solder as they will not fit in the circuit board holes..



Now do exactly the same at the other end so that your cable looks like this..



Push one end of the cable into the 'Power IN' holes in the board. The cables should enter the board from the back (solder-side).



They are marked on the front with '9V' (Red) and '0V' (Black). Carefully solder the wires this time on the component side! Then trim off the excess wire.



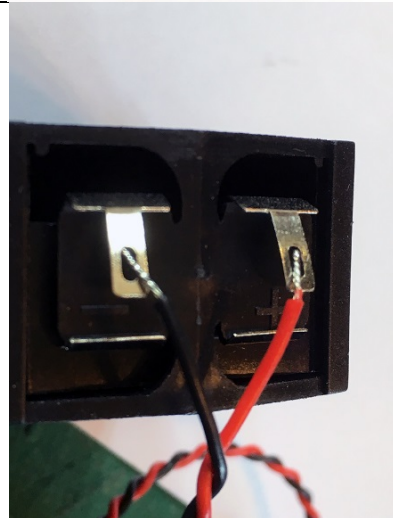
The final part of the electronics assembly is the battery box.



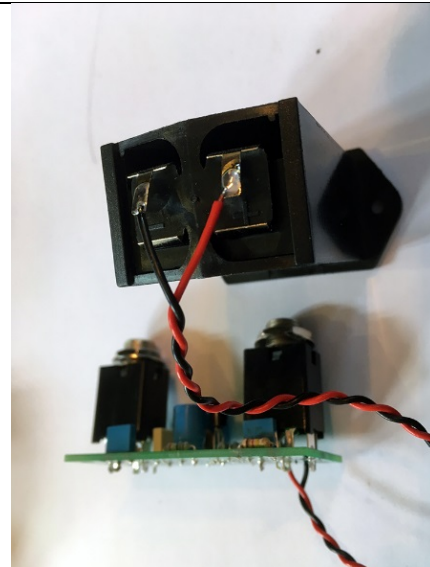
This too is polarised and clearly marked at the terminal end. The Red wire will connect to the + terminal and the Black wire the - terminal.



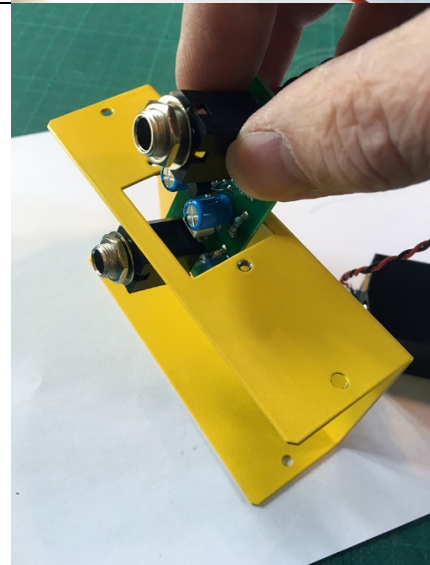
The terminals have 'eye's' to accept the wires, so first insert your wires into the terminals and then apply the iron and some solder to secure the termination.



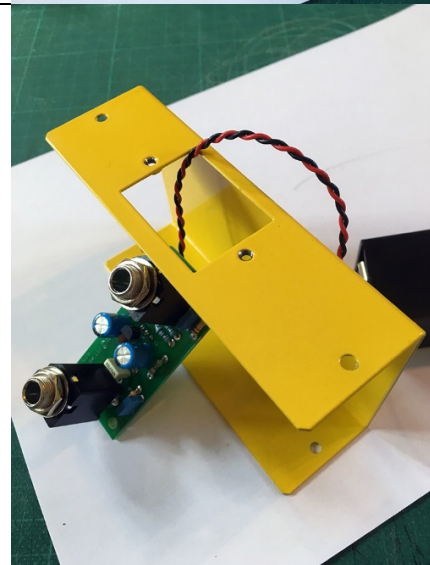
The electronics assembly is now complete and ready to be installed into the case.



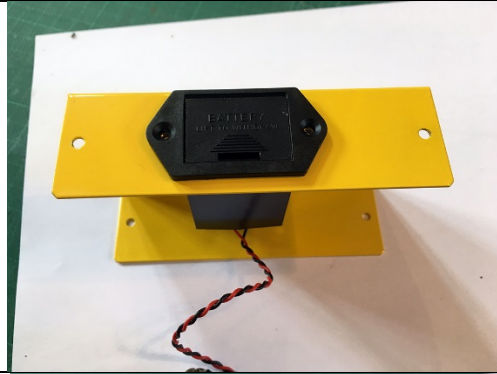
The finished assembly can now be lowered through the battery hole in the case. If you locate the first jack through the hole first, the rest just follows.



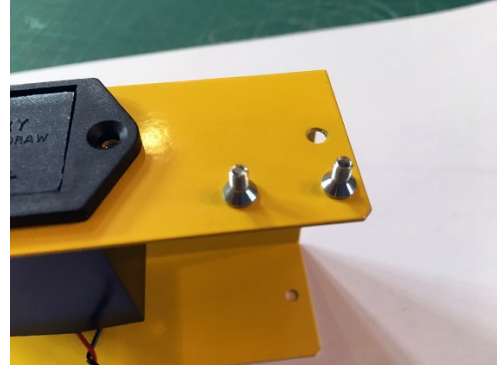
Board assembly now through, you can drop the battery box into place.



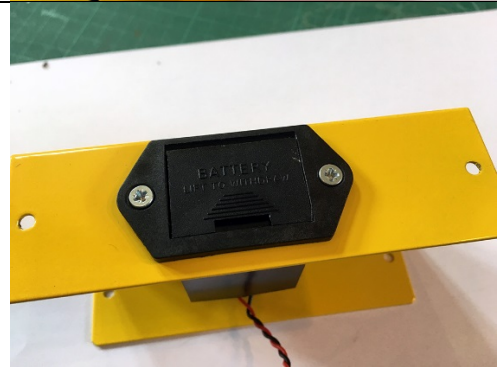
Note orientation of battery box.



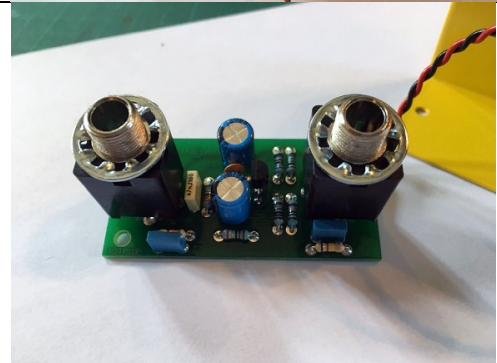
Use the two countersunk screws to secure the battery box. Do not over-tighten otherwise you will crack the box mounting flange.



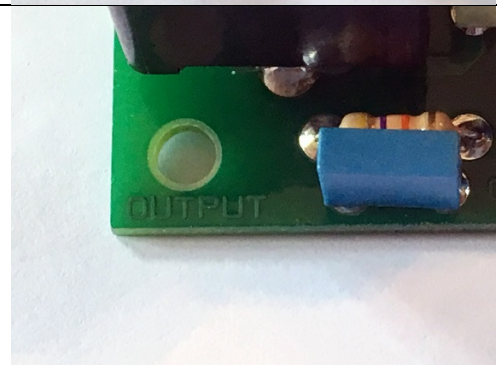
Your Battery box should now look like this..



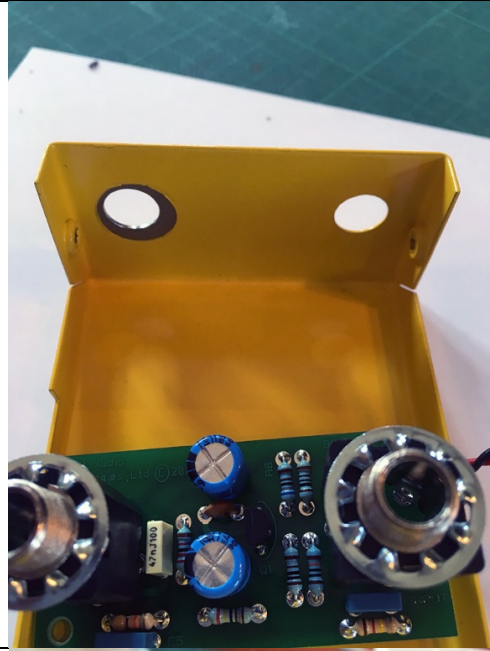
Remove the jack nuts and plain washers and fit the two locking washers provided.



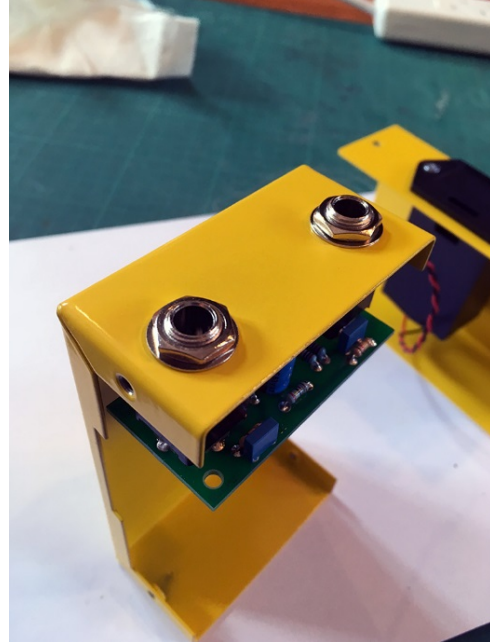
Note which jack is the OUTPUT jack. It is written on the board!..



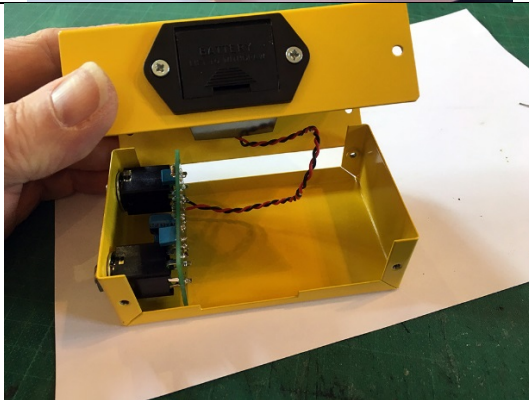
Align the OUTPUT jack with the hole in the case that has bare metal showing. This is to ensure the box is properly connected to the signal ground otherwise the unit will hum!



Insert the board and secure with the plain washers and nuts. Only do the nuts up to finger-tightness for now..



Close the two halves of the box making sure the power cable does not get sandwiched between the sides and base plate.



Fit the first screw to approximately half its depth.



Fit the other three screws, again, to half their depth. The alignment of these holes can sometimes be tight due to the powder coating. If the screws do not align with the threaded inserts, do not force it, but open up the case top holes with a 3.5mm drill bit before re-trying. Once all the screws are in, you can tighten them all down to the case. Again, do not over-tighten.



With the case top secured, you can now tighten the jack nuts. You can either use a large pair of pliers, adjustable spanner or 13mm spanner/socket. Just be careful not to scratch the powder-coating with whichever tool is used.



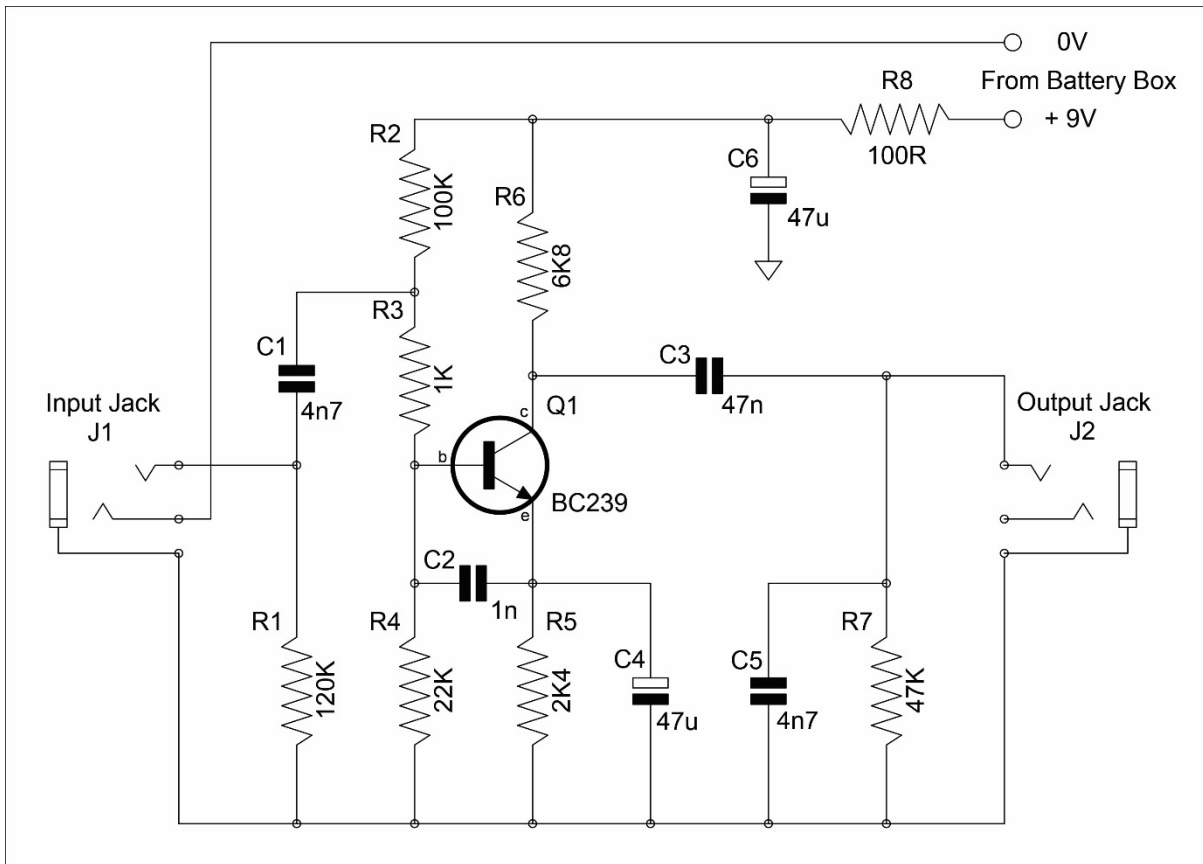
You can now invert the case and add the stick-on rubber feet. One in each corner.





Your finished TB should now look very much like this beauty and sound incredible!

Helpful Bits.



The TB PLUSH Schematic



Resistors and small capacitors guide