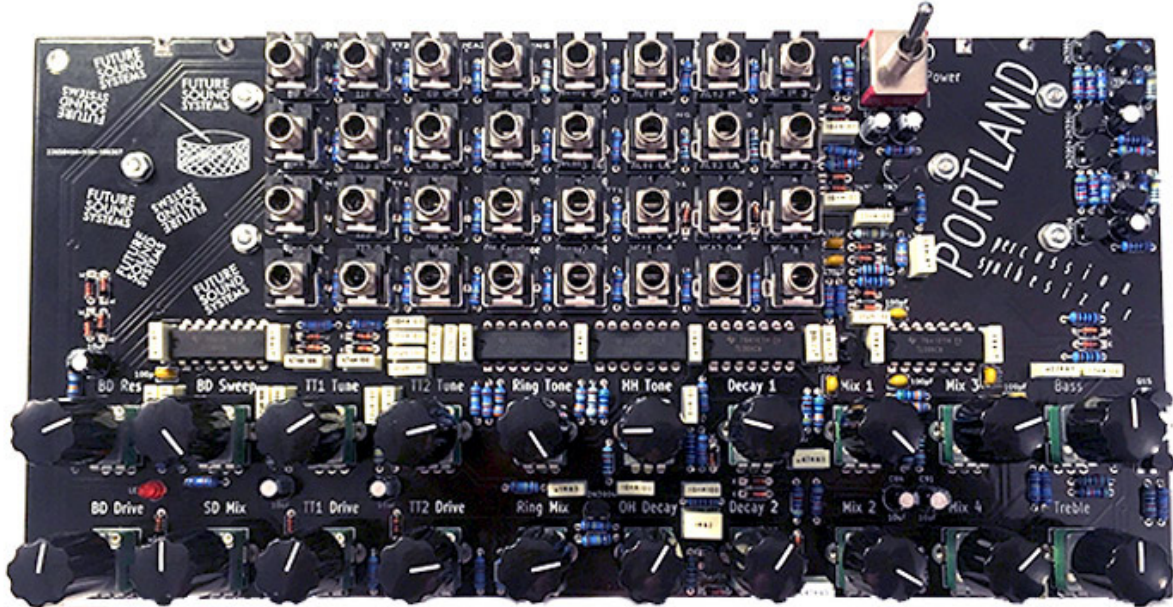
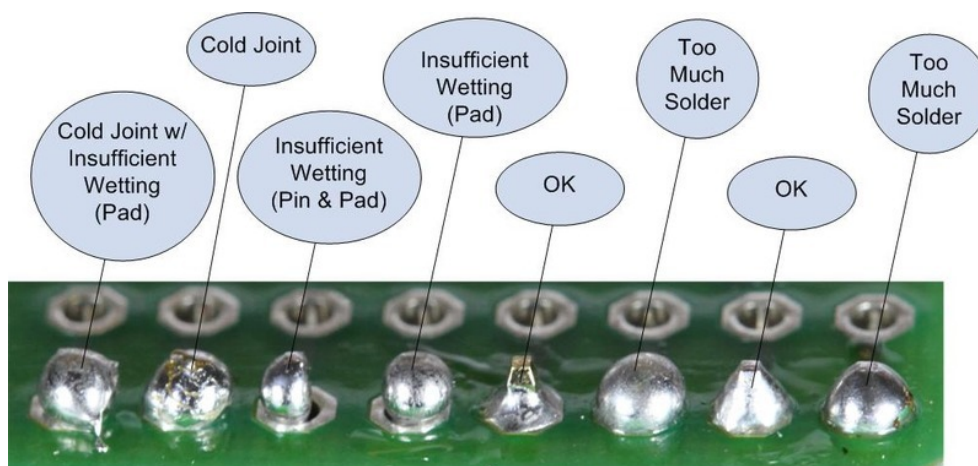


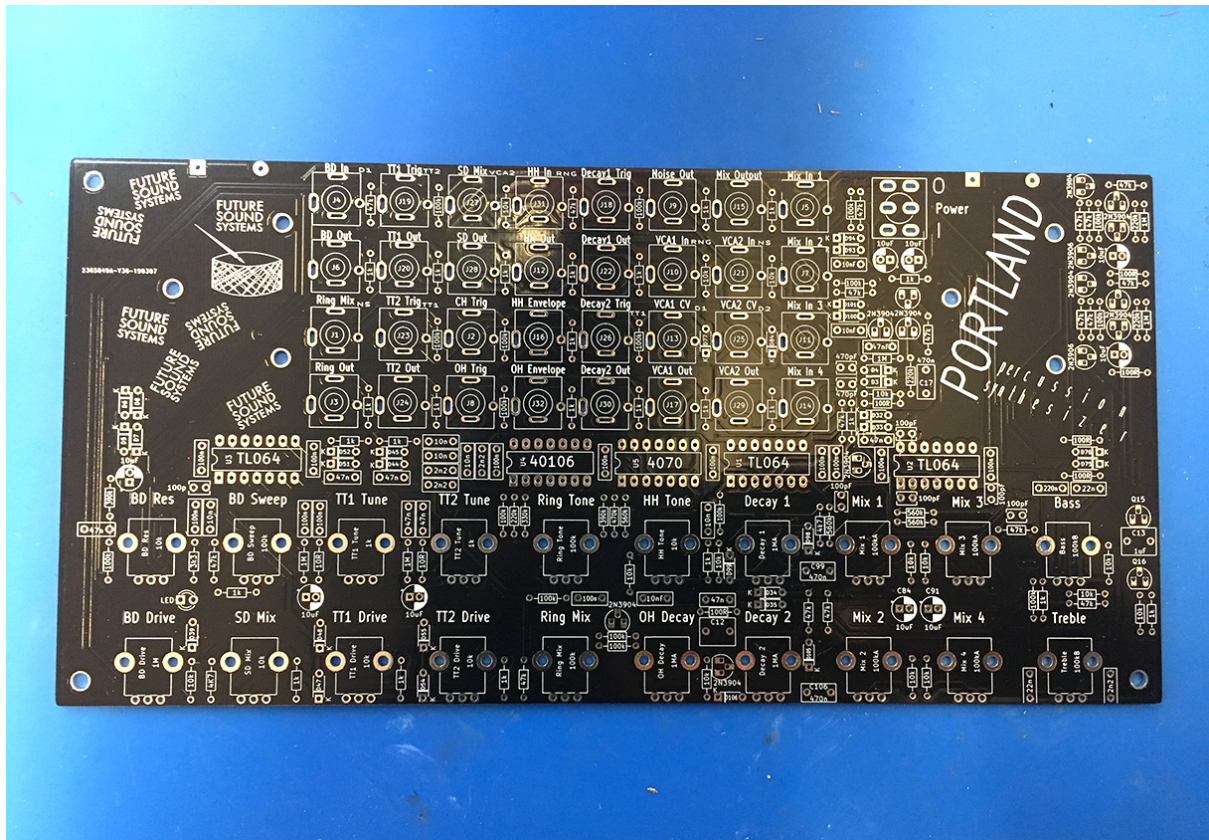
The latest revision of this document can be found here:
<https://www.thonk.co.uk/Documents/portland>



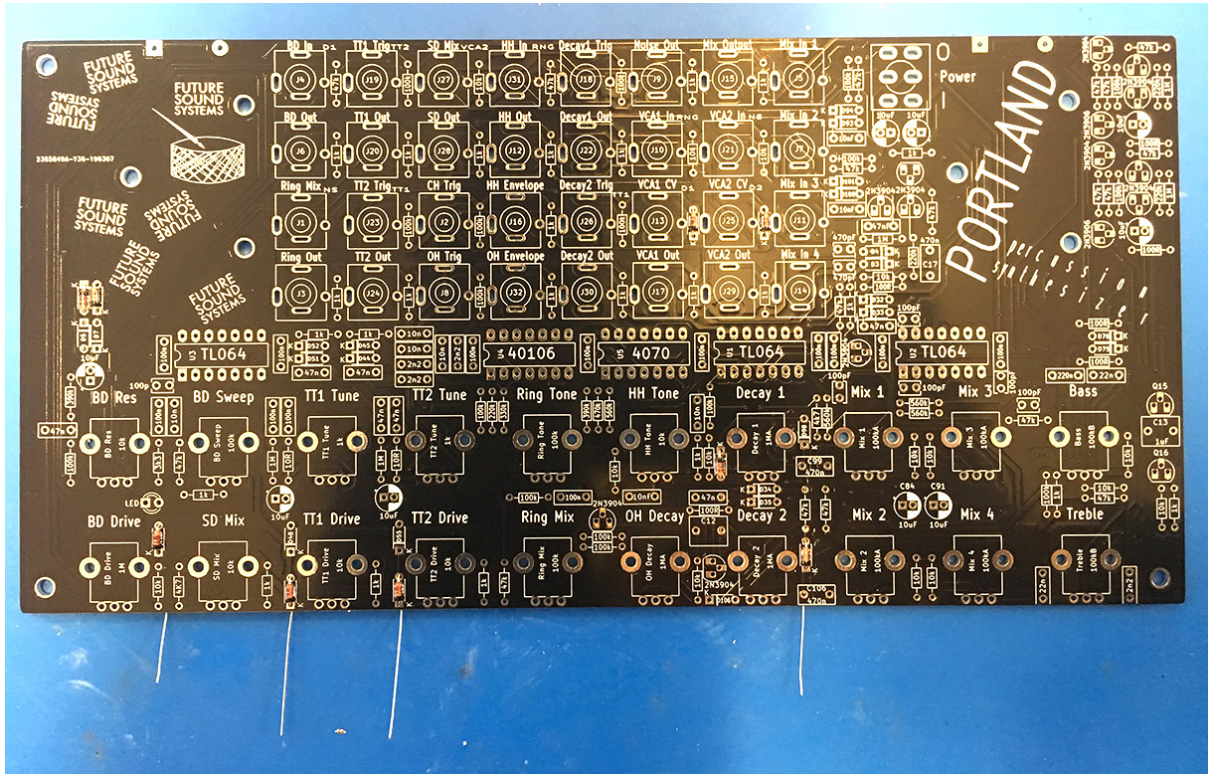
Your solder joints should look like those shown as 'OK' below, they should have that neat conical shape on BOTH sides of the PCB. If they don't look the same on both sides then stop! Work out why from the soldering guides linked and don't continue until you are getting those results. This isn't about perfectionism, you are very likely to end up with a destroyed, damaged or defective unit if you're not hitting that standard.



This photo is from the Adafruit guide to excellent soldering - <http://bit.ly/1I77tF4> and is reproduced under an Attribution-Sharealike creative commons license - <http://creativecommons.org/licenses/by-sa/3.0/>

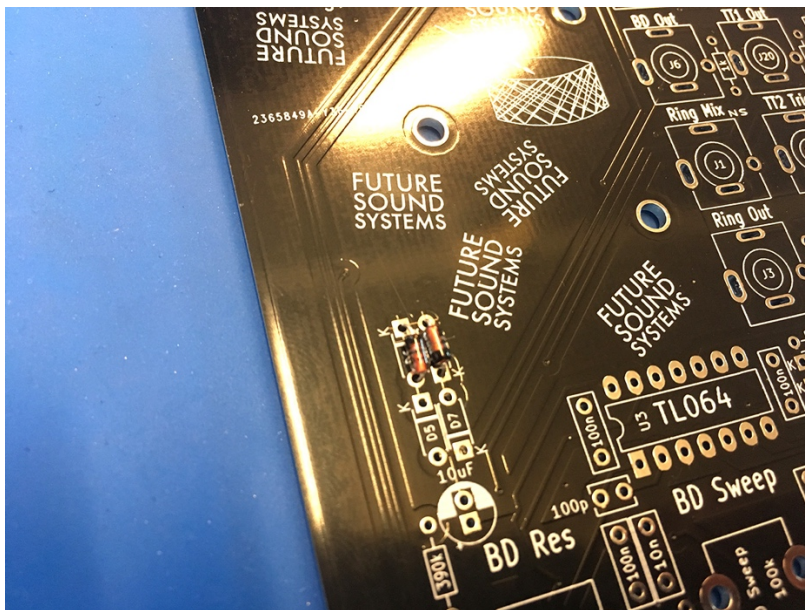


01 - This is the bare PCB for the FSS Portland drum synthesizer – familiarise yourself with the layout

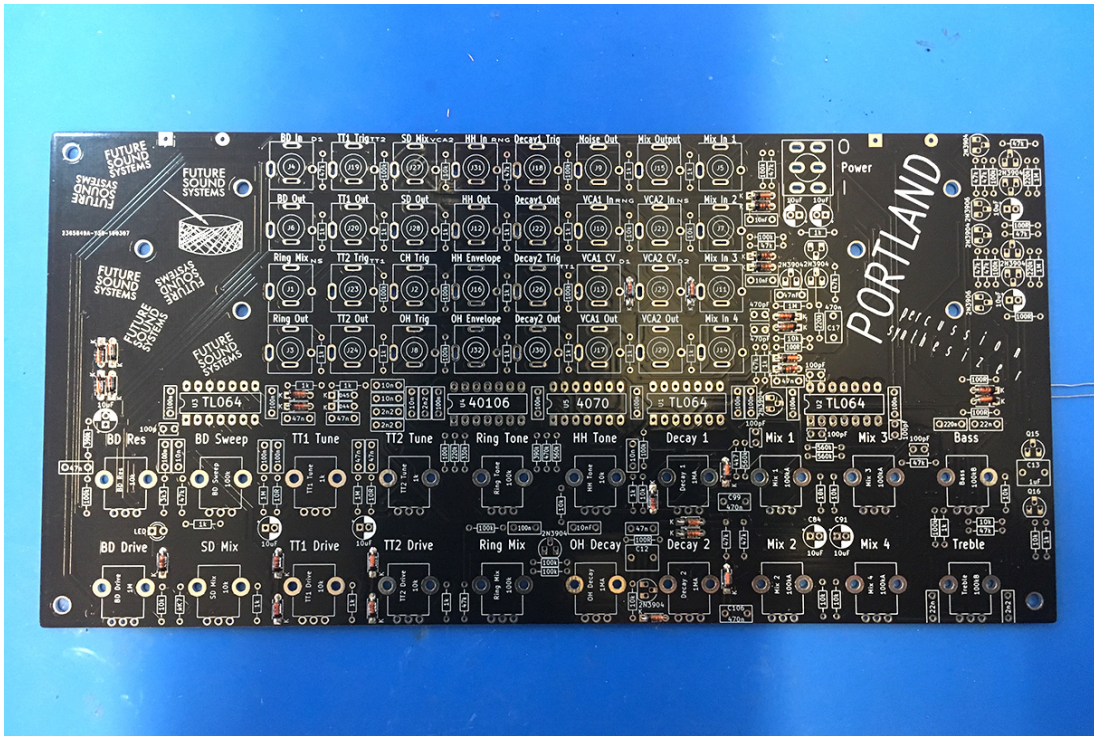


02 - Begin with the thirty-one 1N4148 diodes - **Note: Orientation is vital!** The black stripe (cathode) of the 1N4148 is marked on the PCB with a K

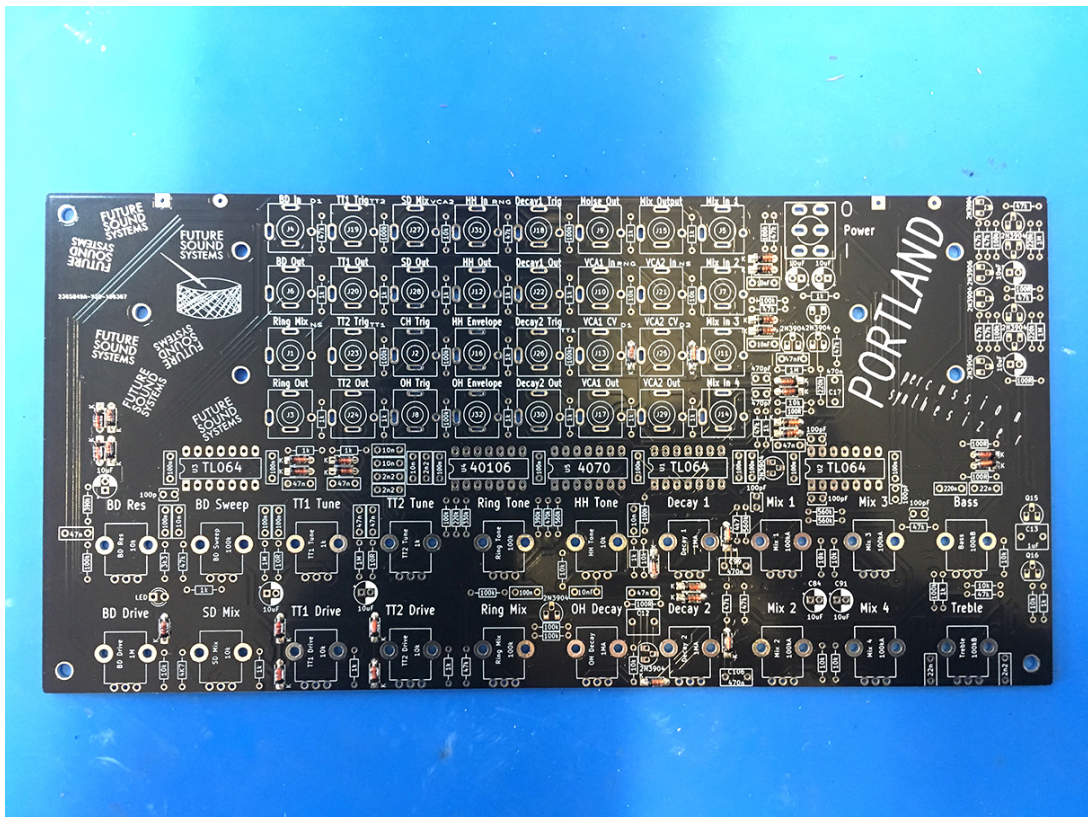
(D105, D3, D4, D5, D6, D7, D8, D32, D33, D34, D35, D39, D44, D45, D47, D48, D51, D52, D54, D55, D75, D76, D77, D84, D93, D94, D98, D99, D100, D101, D106)



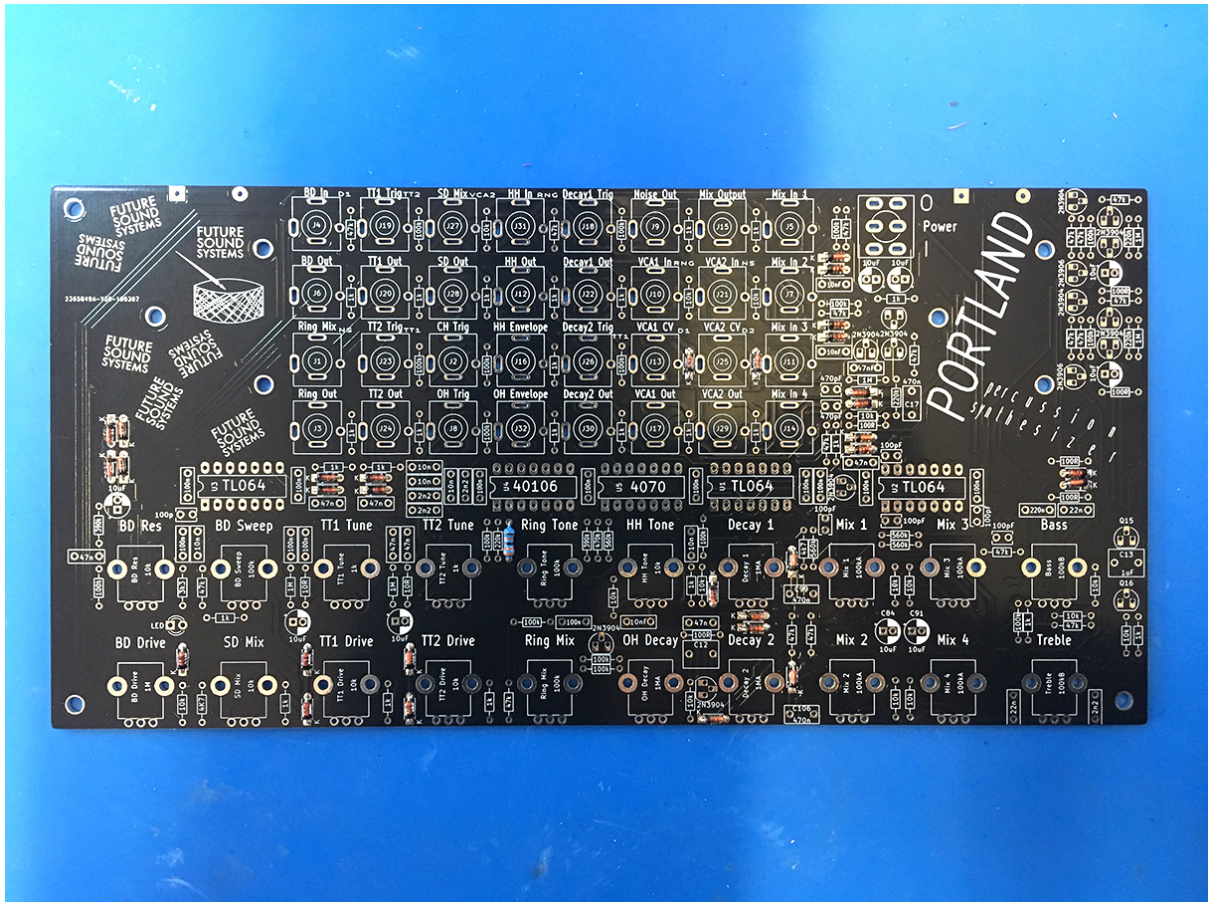
Because there are so many of these diodes, it is much easier to solder them in stages - this will reduce the nest of leads on the back of the board



Each block of 1N4148s can be placed, leads bent, soldered, then leads cut to size

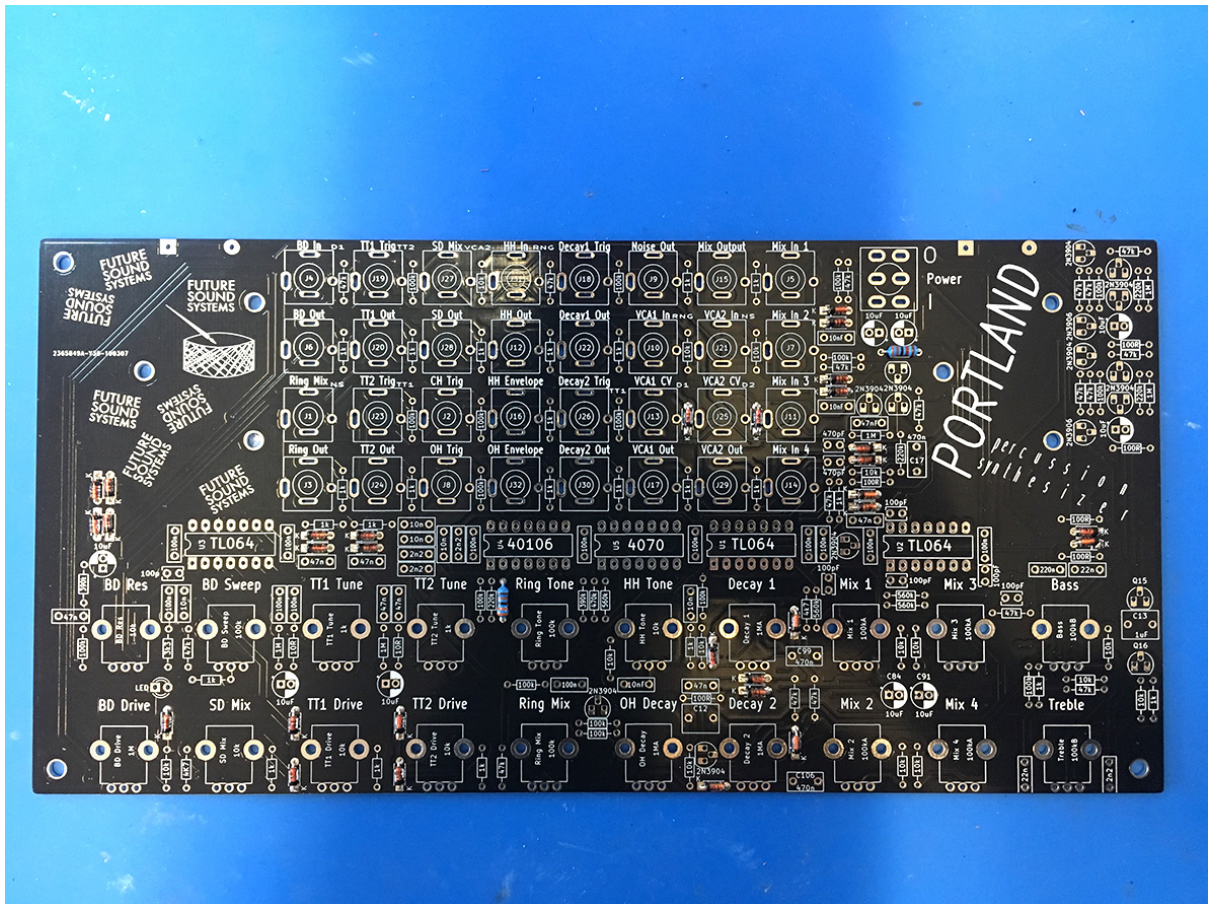


Once all of the 1N4148s have been soldered in, the PCB should look like the photo above

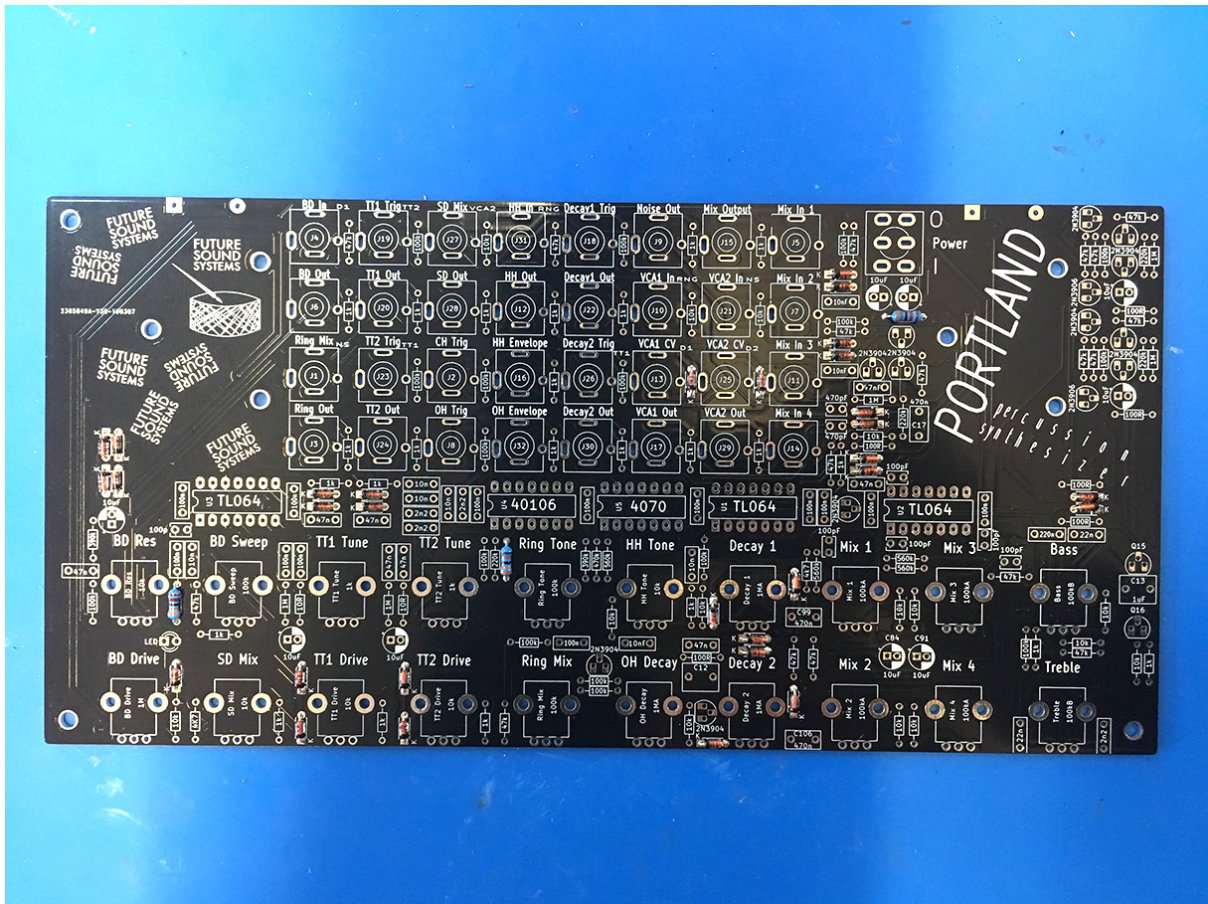


03 - Next place and solder the one 330k resistor

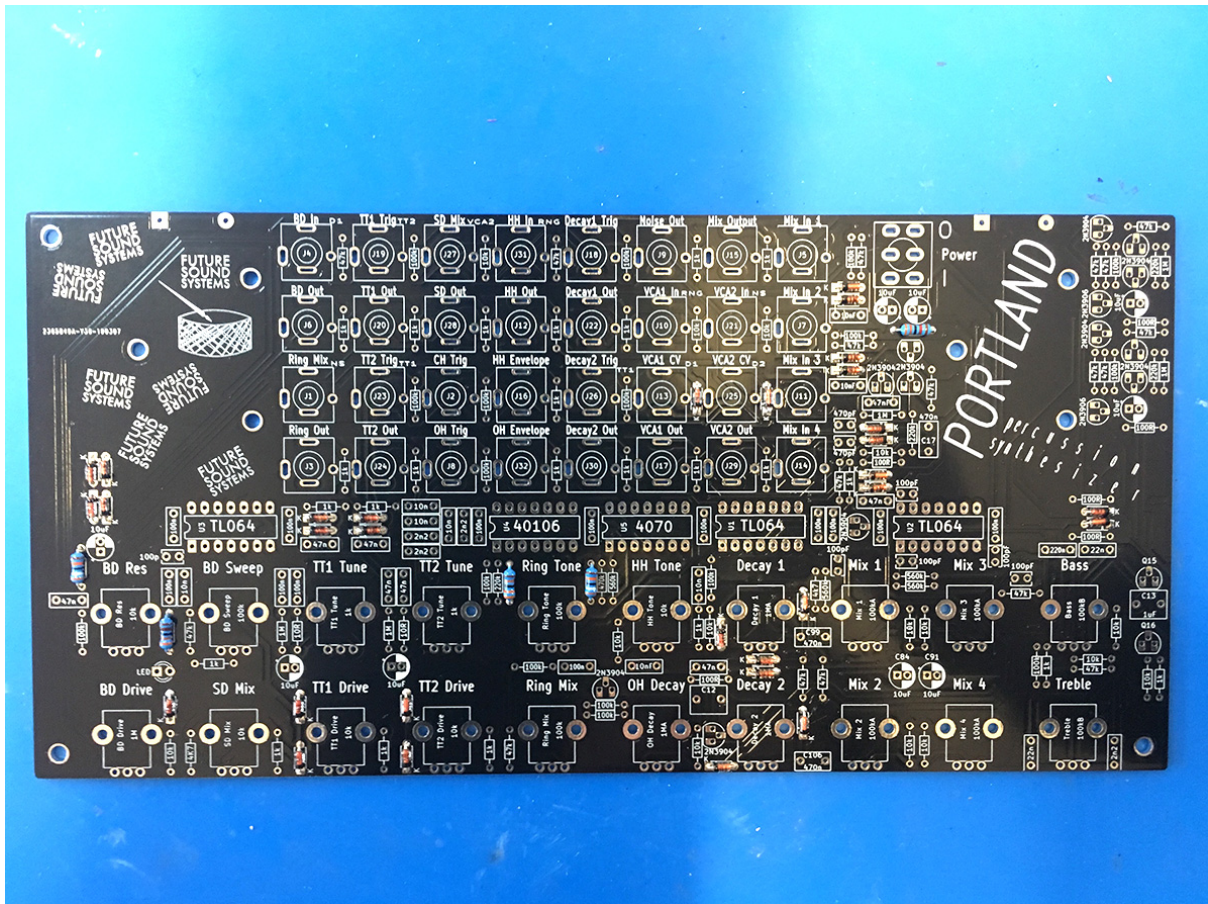
NOTE: Do not confuse with the 33k or 3.3K resistors



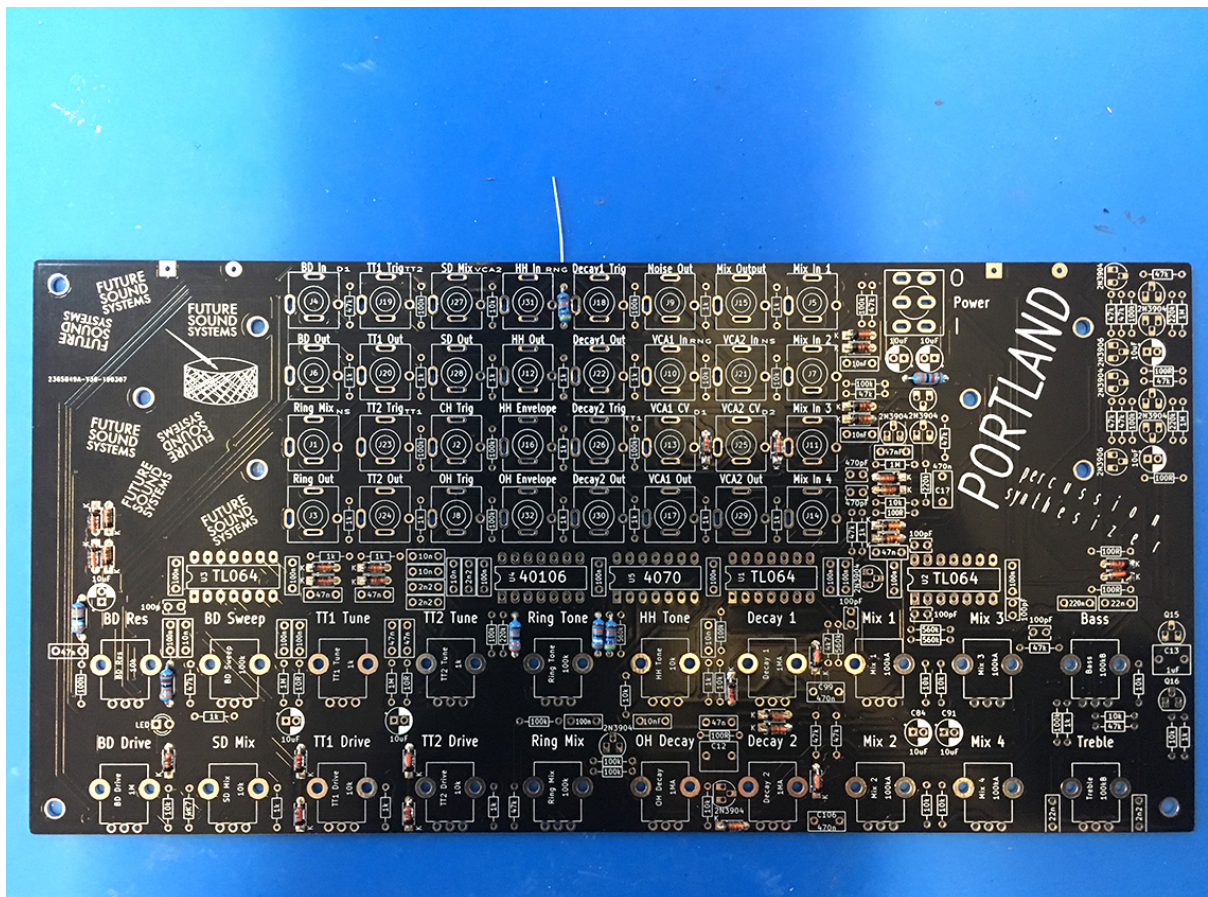
04 - Then place and solder one 33k resistor



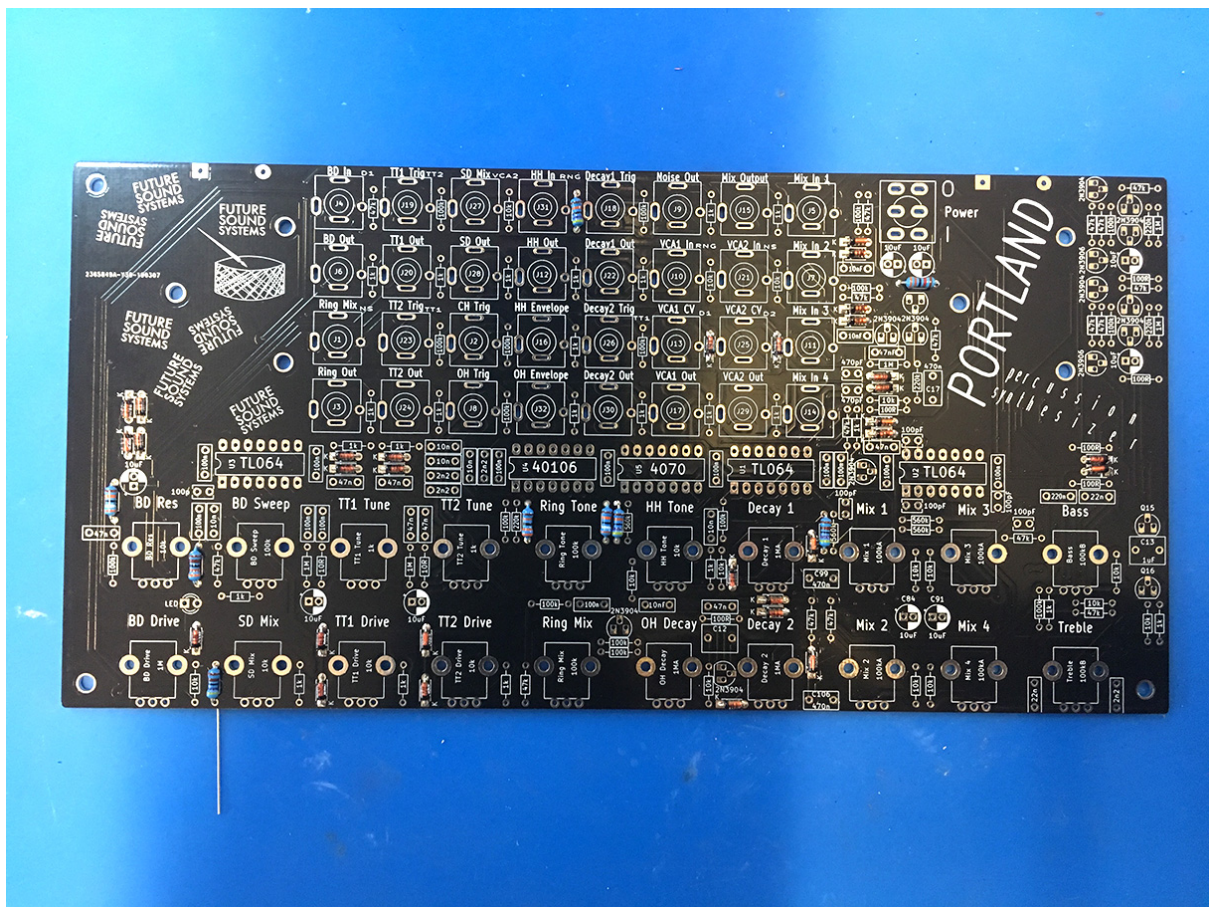
05 - Then place and solder one 3k3 resistor



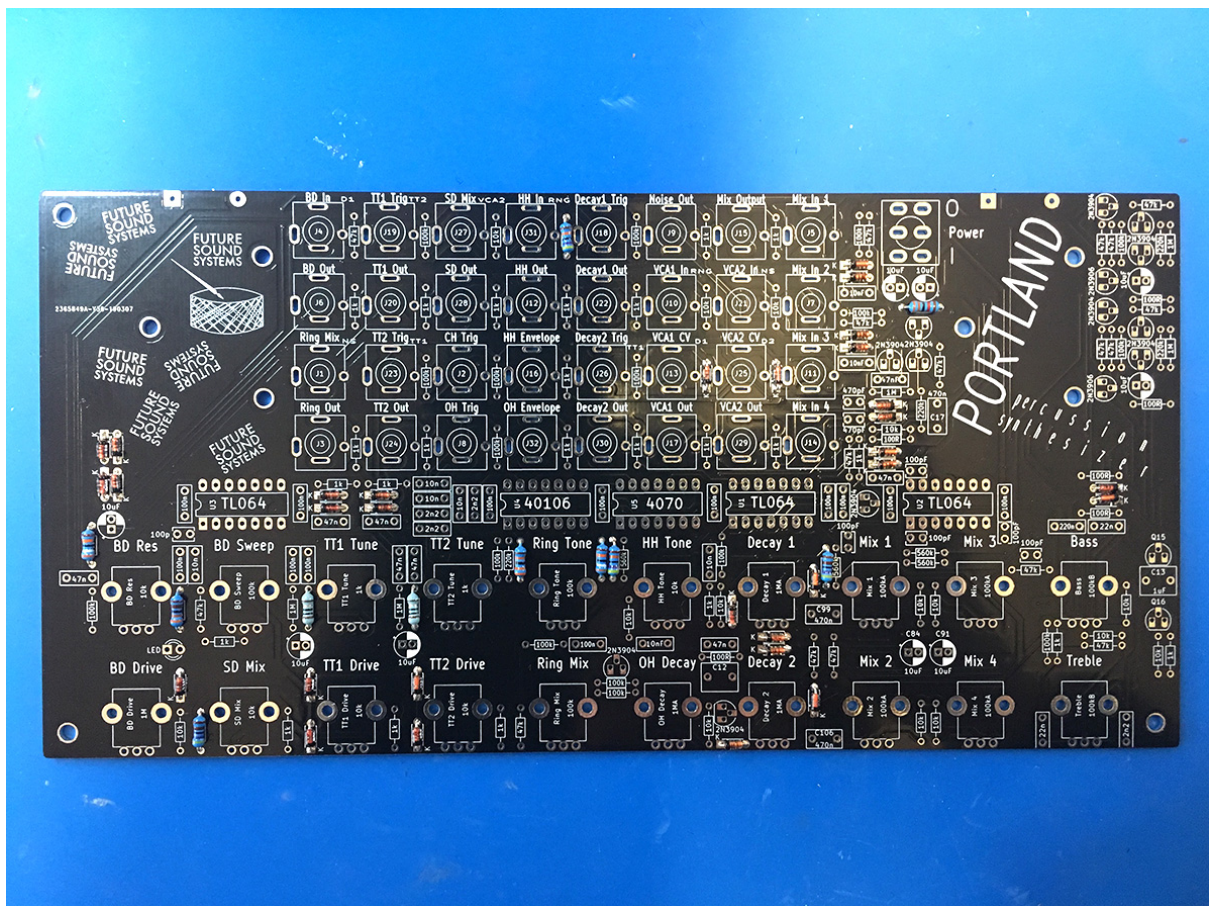
06 – Next solder the two 390k resistors



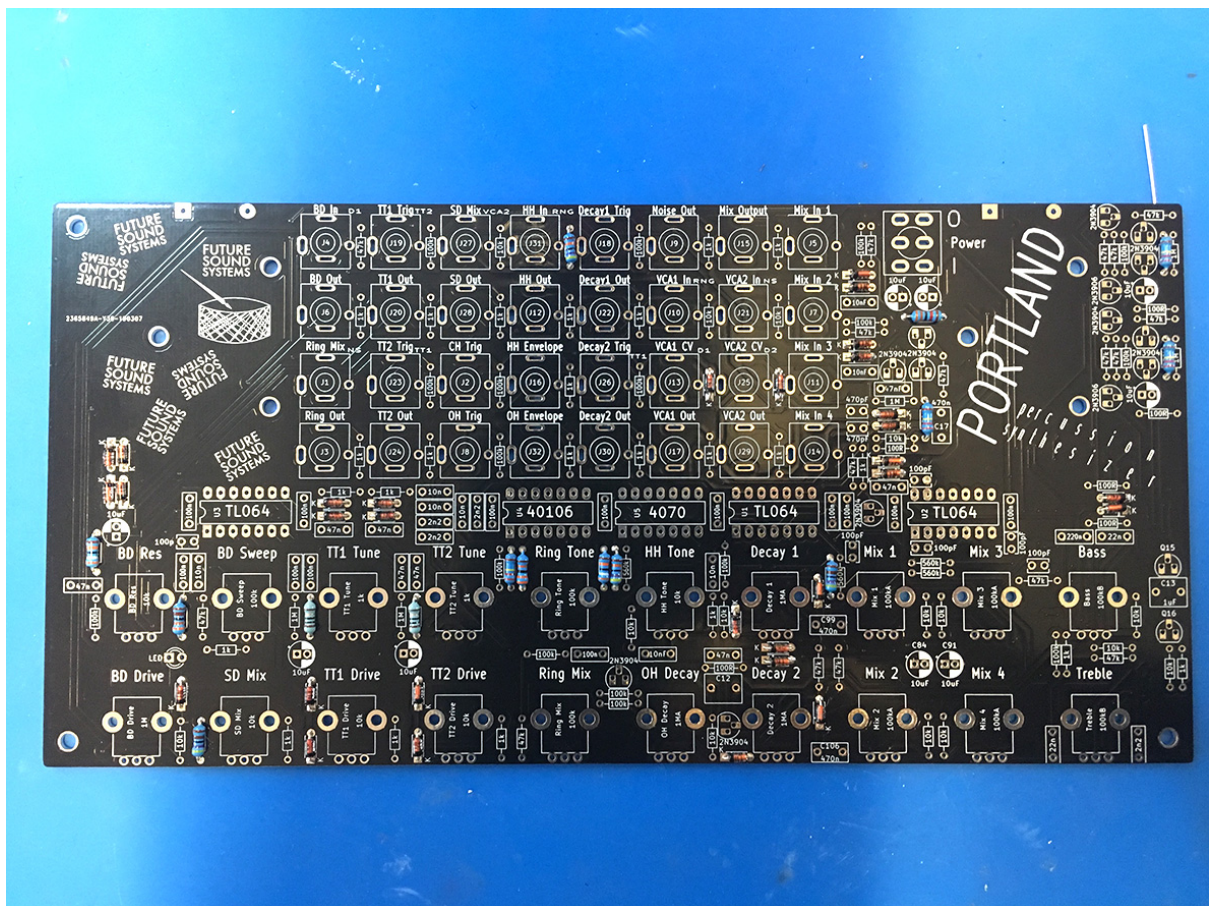
07 – now solder the two 470k resistors – the photo above shows them placed before soldering



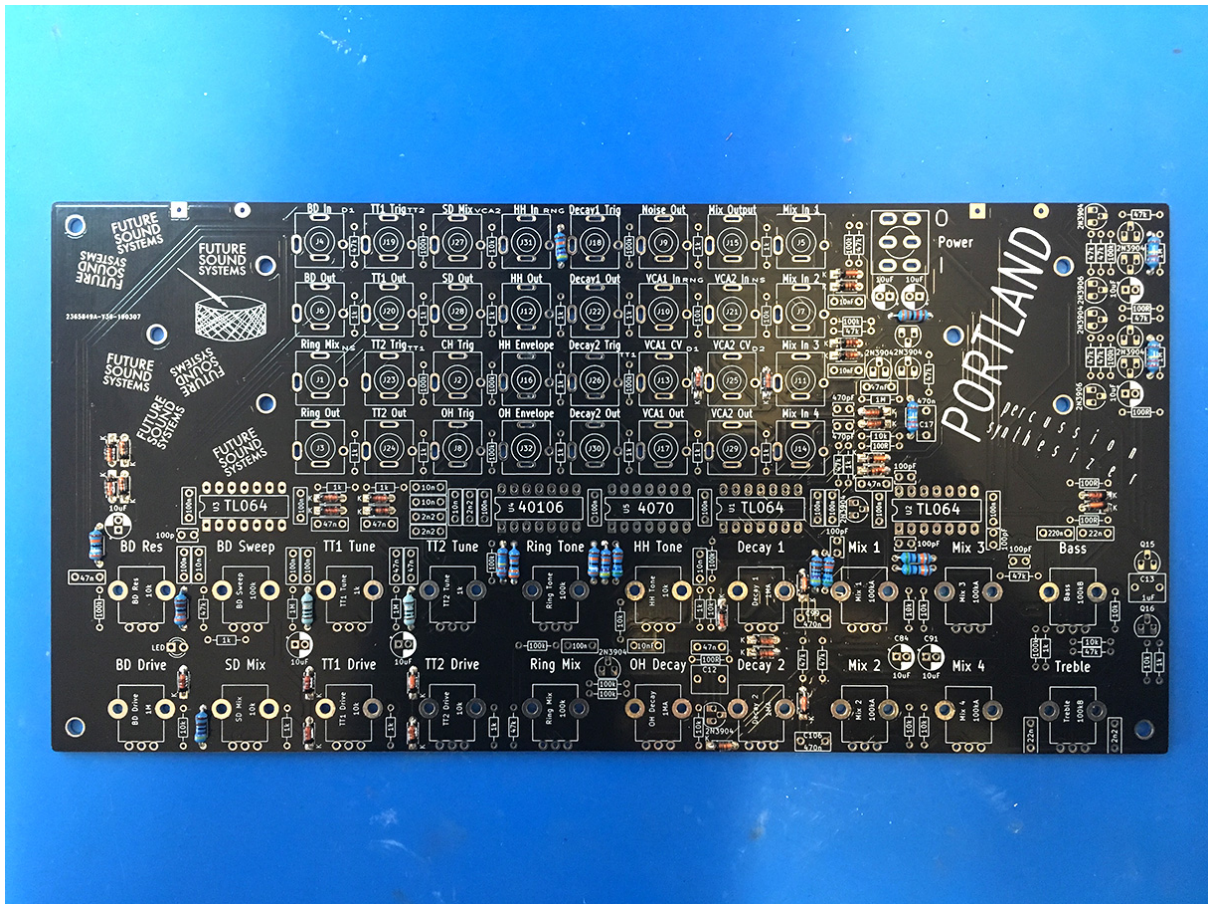
08 – Next solder the two 4K7 resistors - here they are placed before soldering



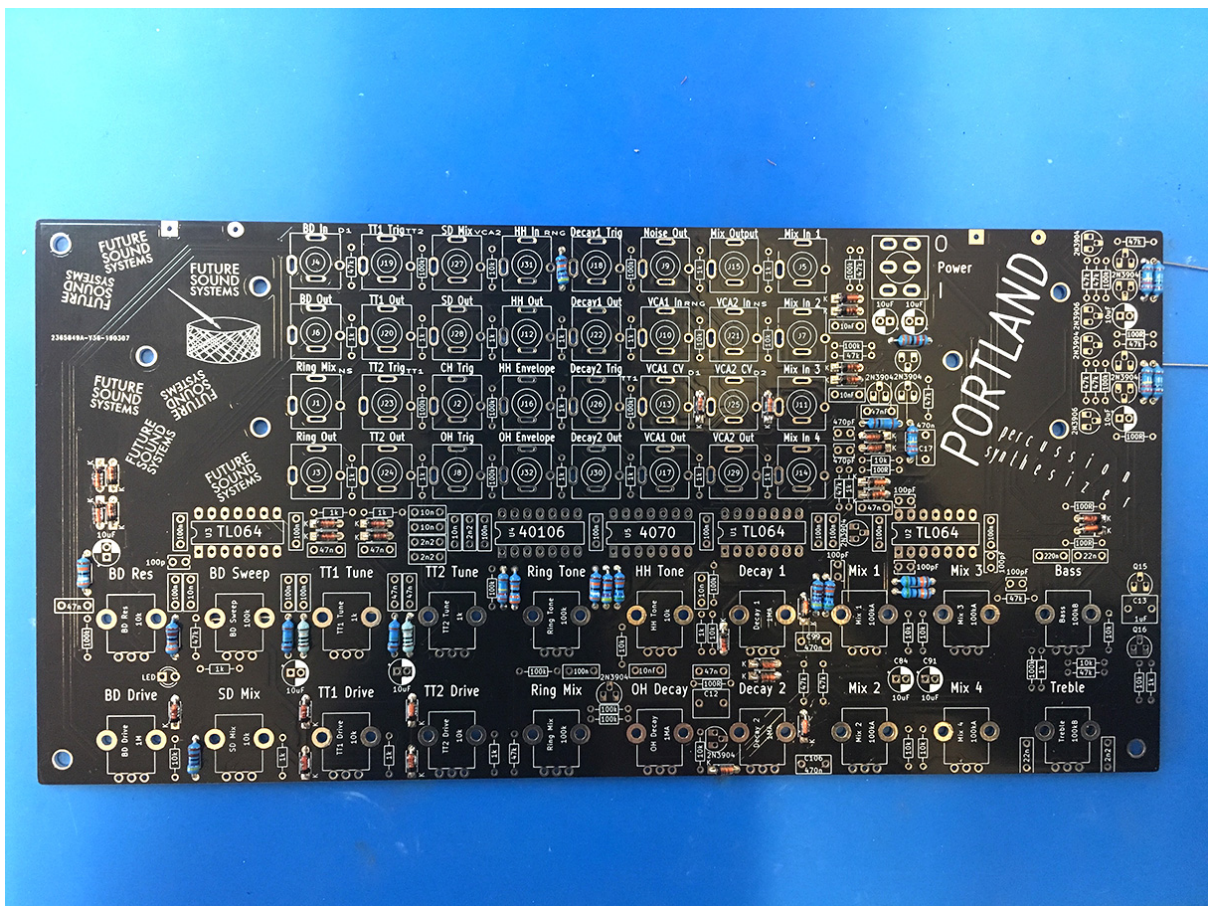
09 – The two 10 ohm (labelled 10R) resistors can then be placed and soldered



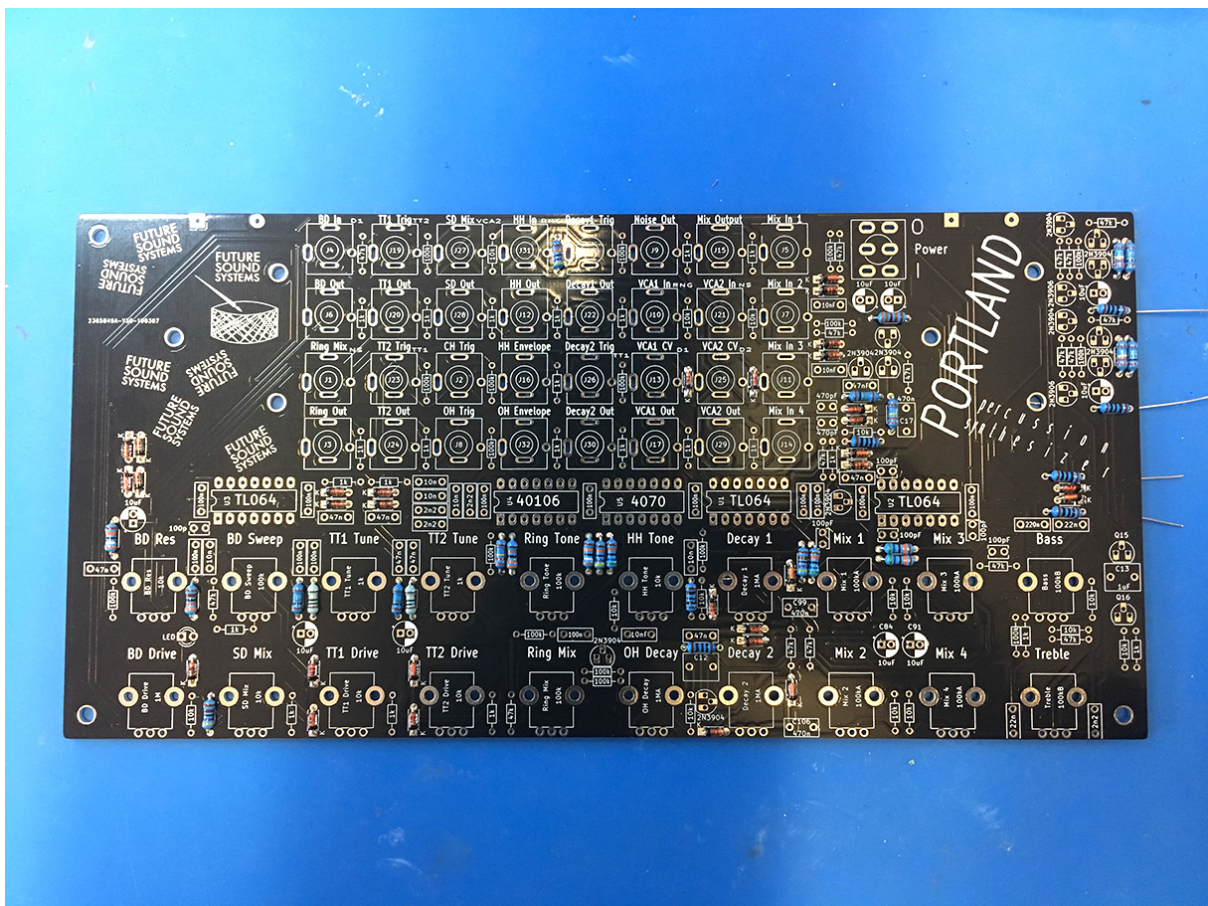
10 – next solder the four 220k resistors



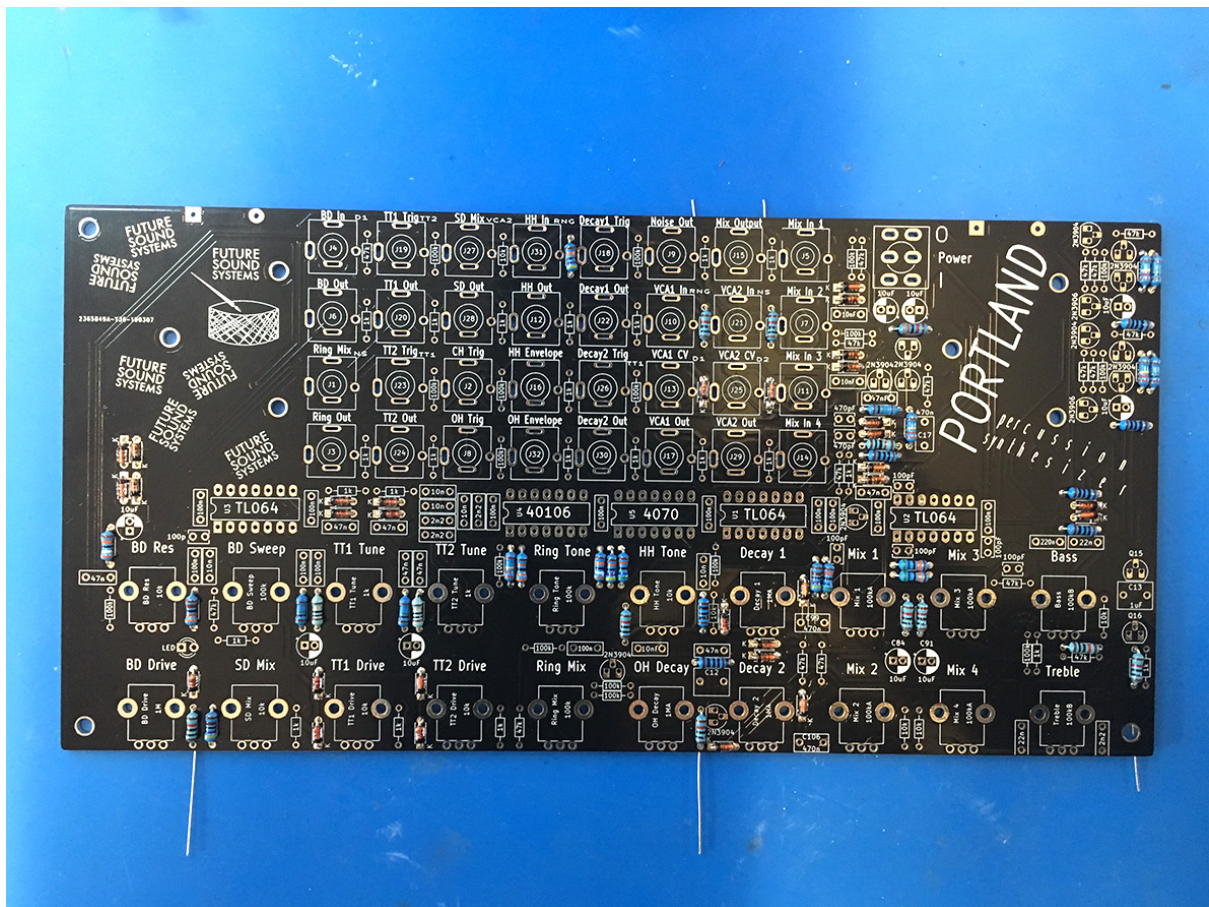
11 - next solder the four 560k resistors



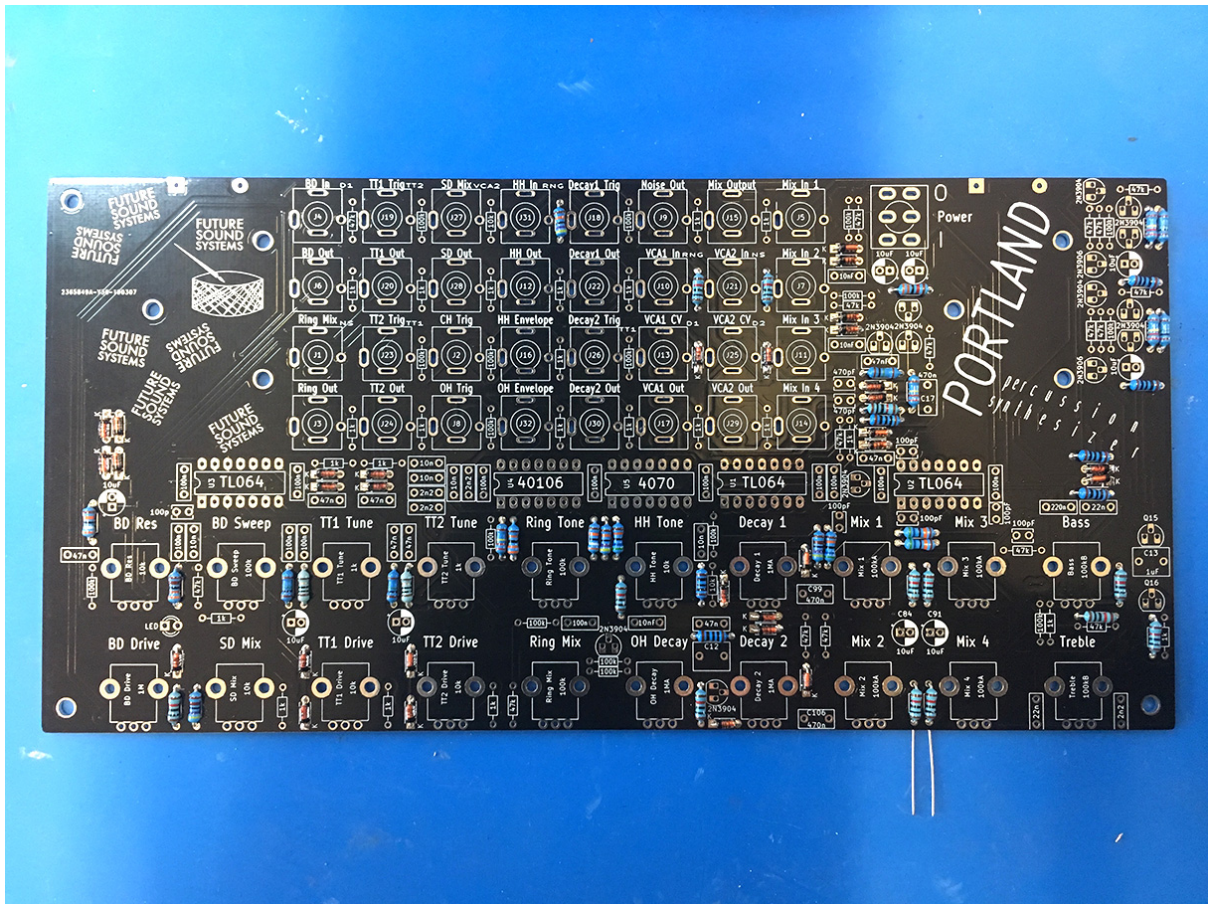
12 – Then place and solder the five 1M resistors



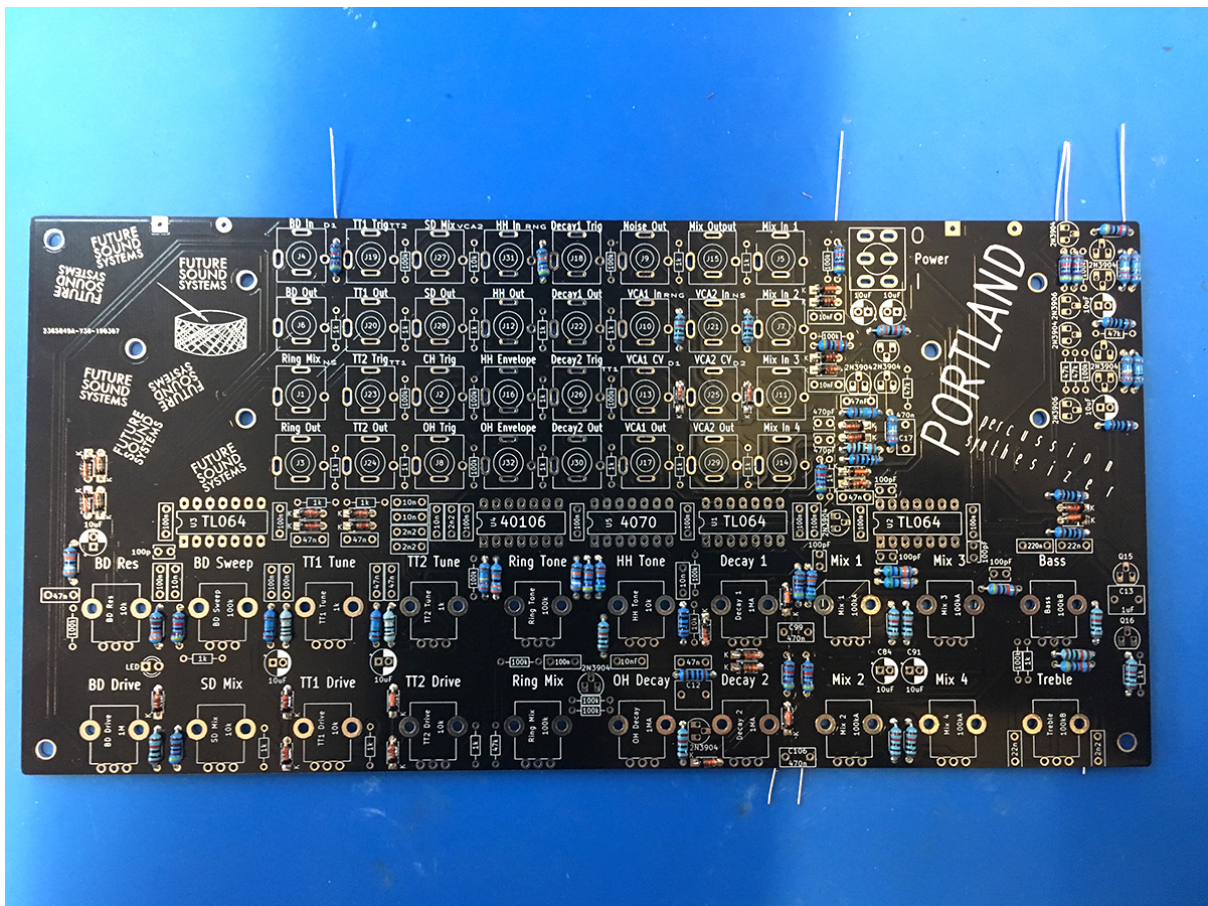
13 - Now place and solder the seven 100 ohm (labelled 100R) resistors



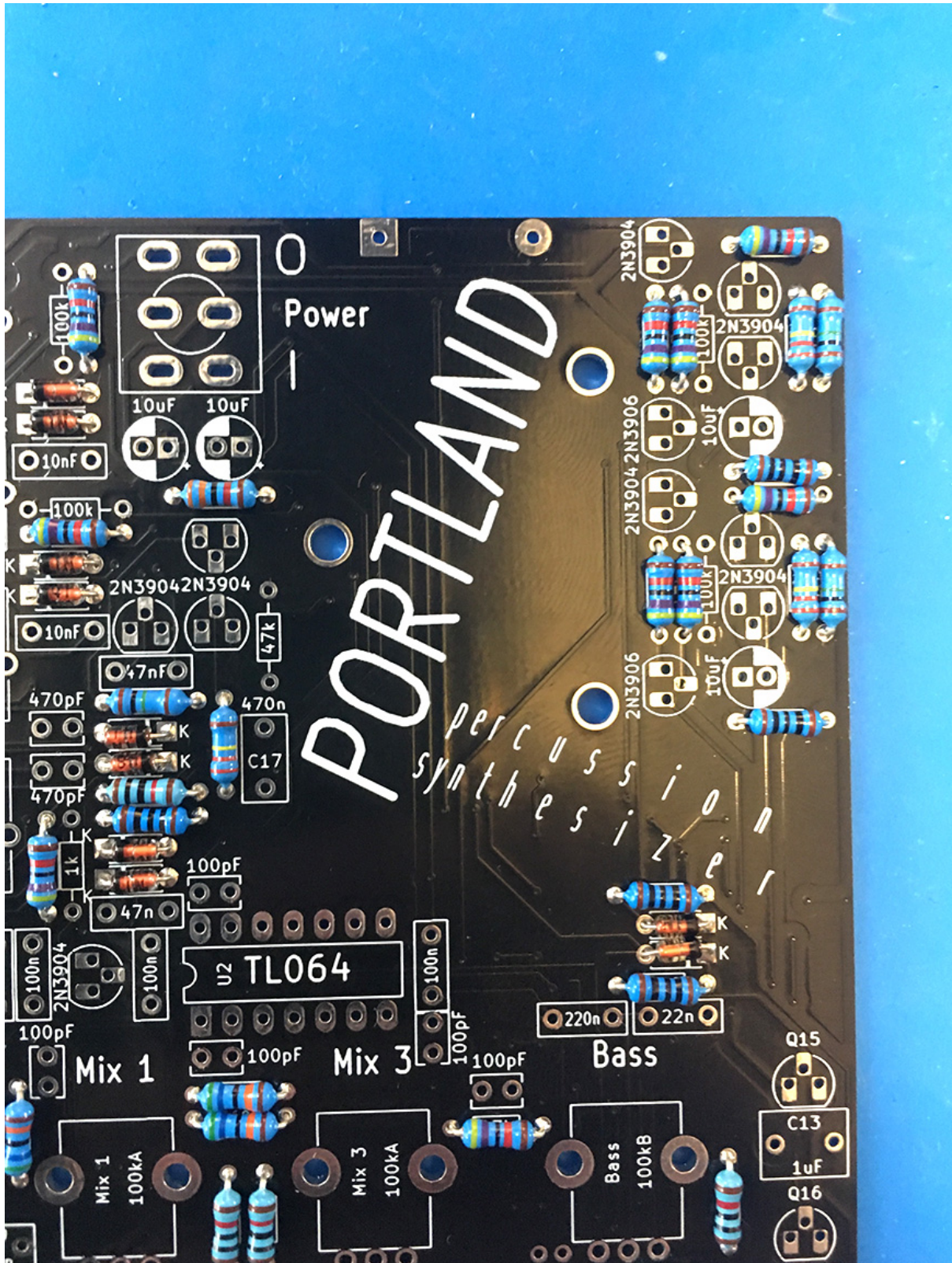
14 - Next move on to the thirteen 10K resistors – these can be split into two rounds of soldering. This photo shows the first 9 resistors in place



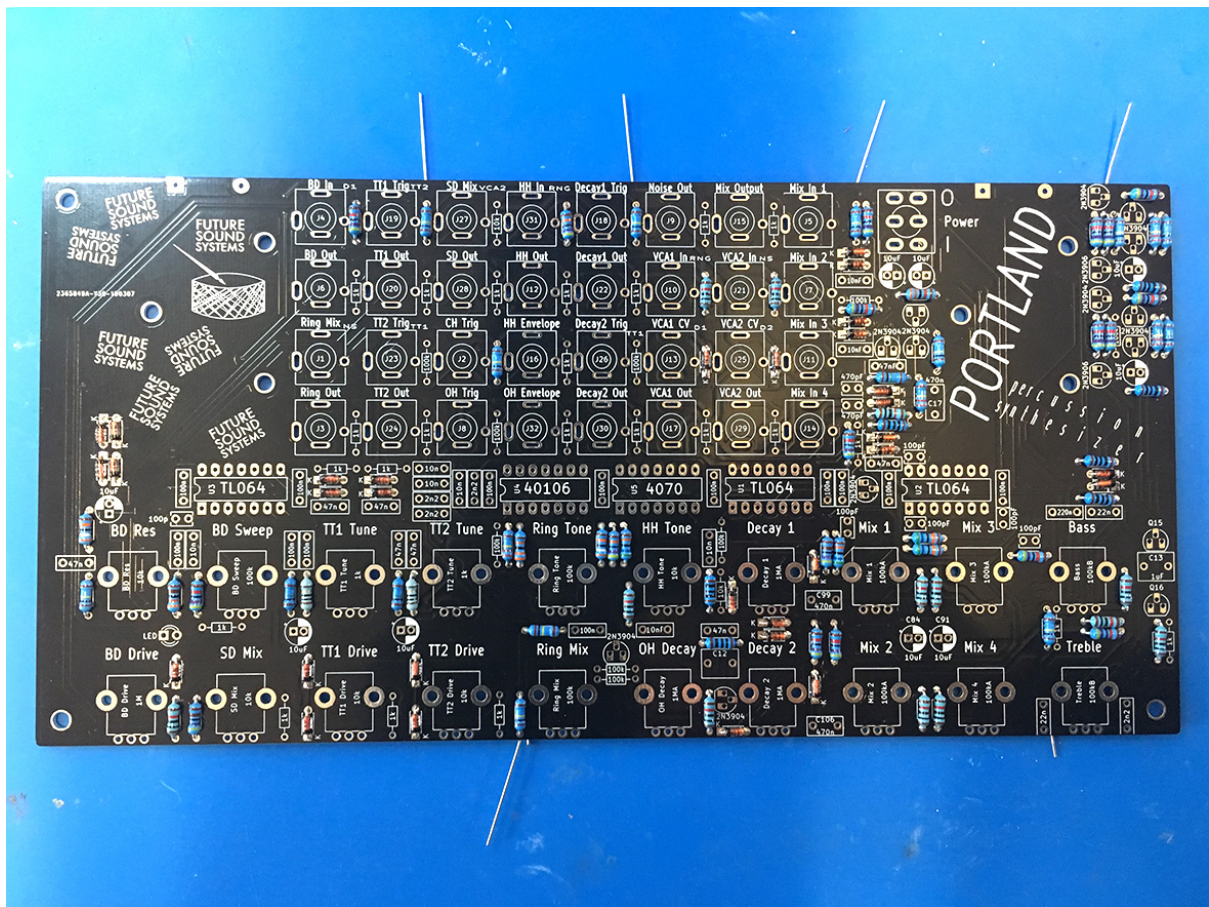
15 - Then fit and solder the final four 10k resistors



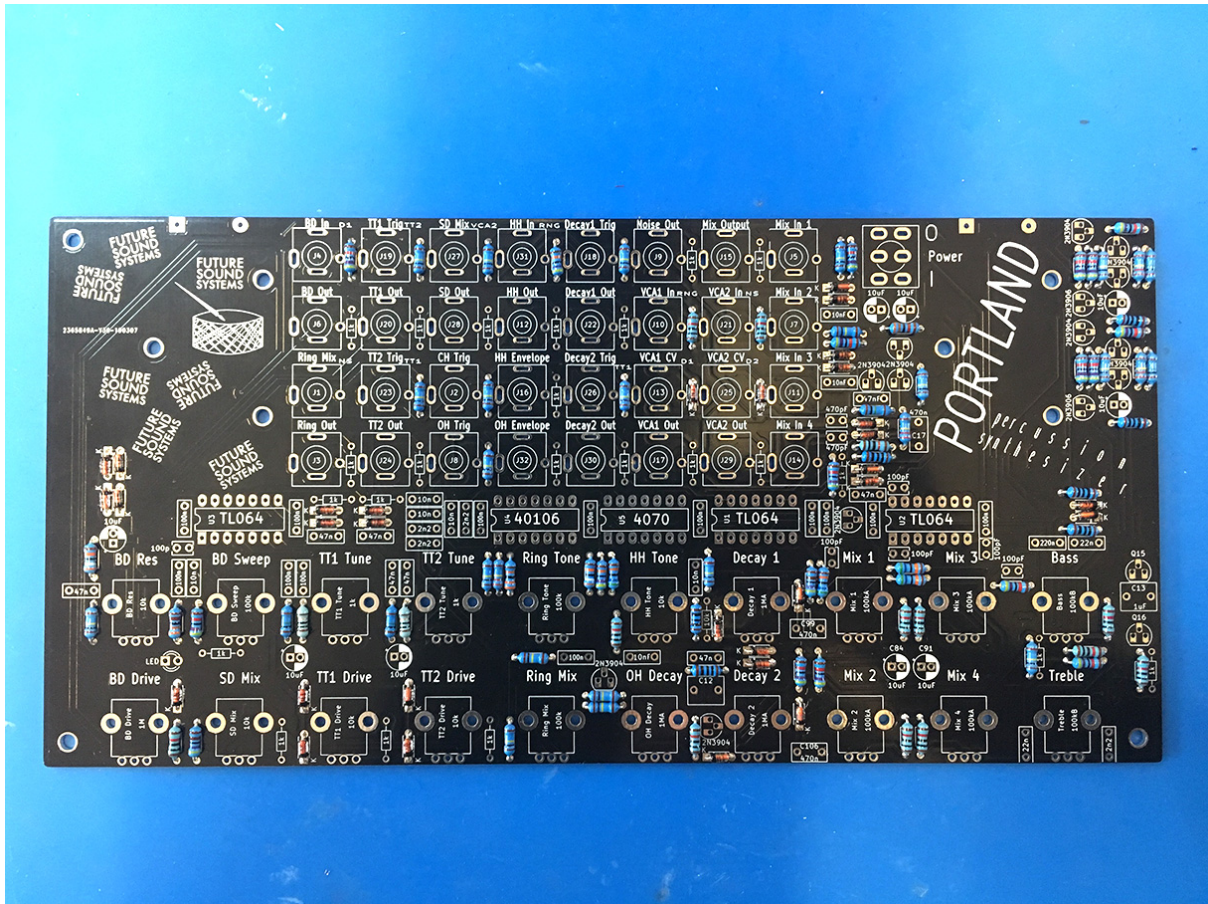
16 - The 47k resistors can also be split into rounds – this photo shows the first 12 resistors in place



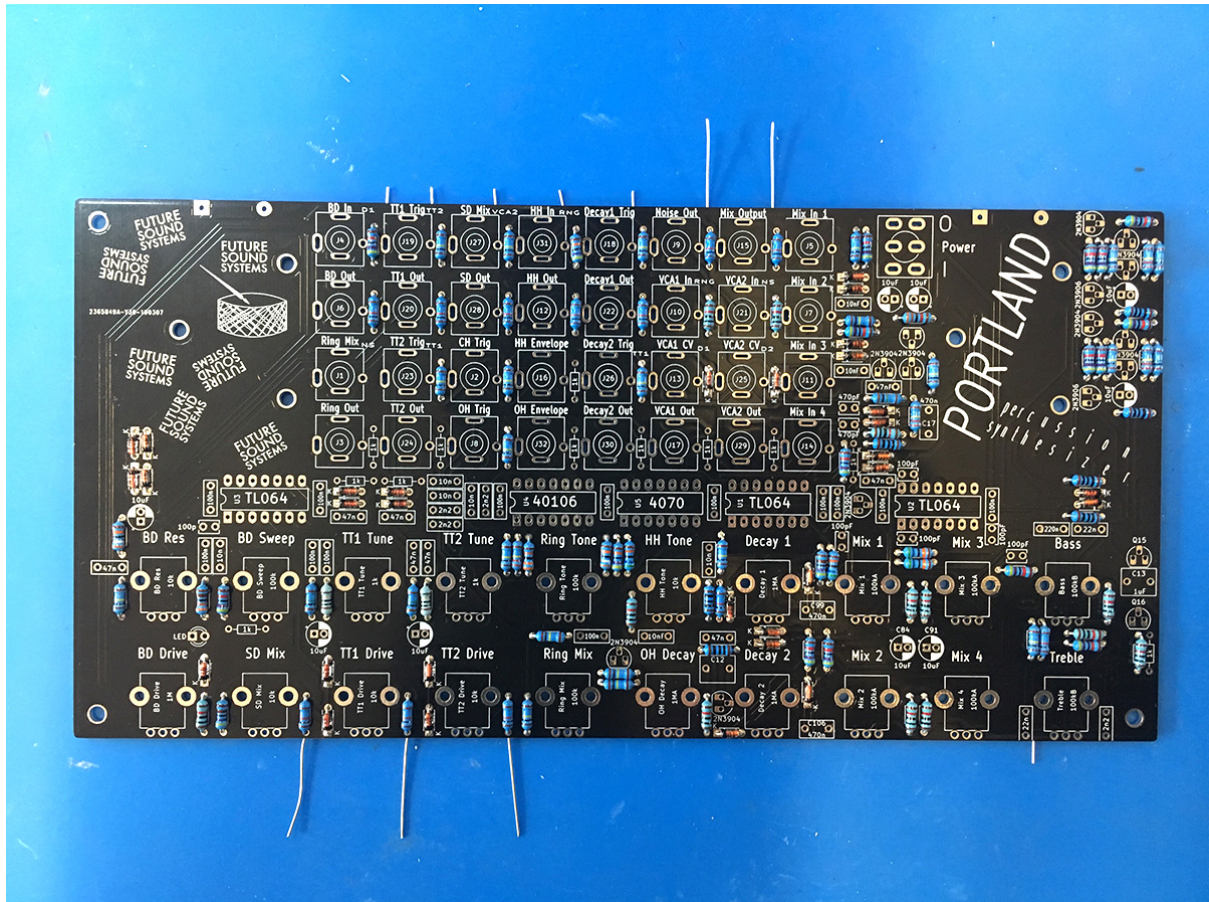
17 - Now place and solder the final three 47K resistors belonging to the VCAs and Decay envelopes



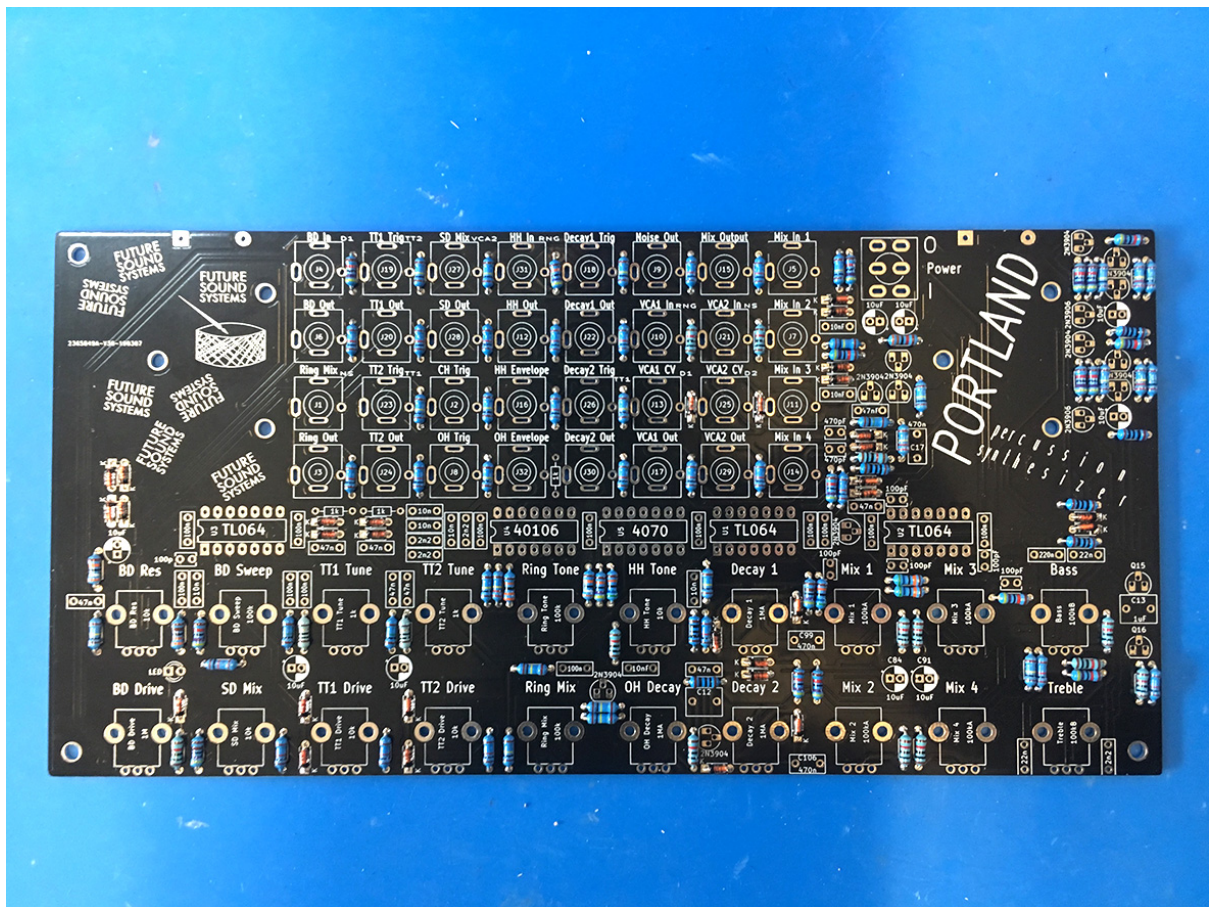
18 - Split the 100K resistors into rounds as well – this photo shows the first set in place



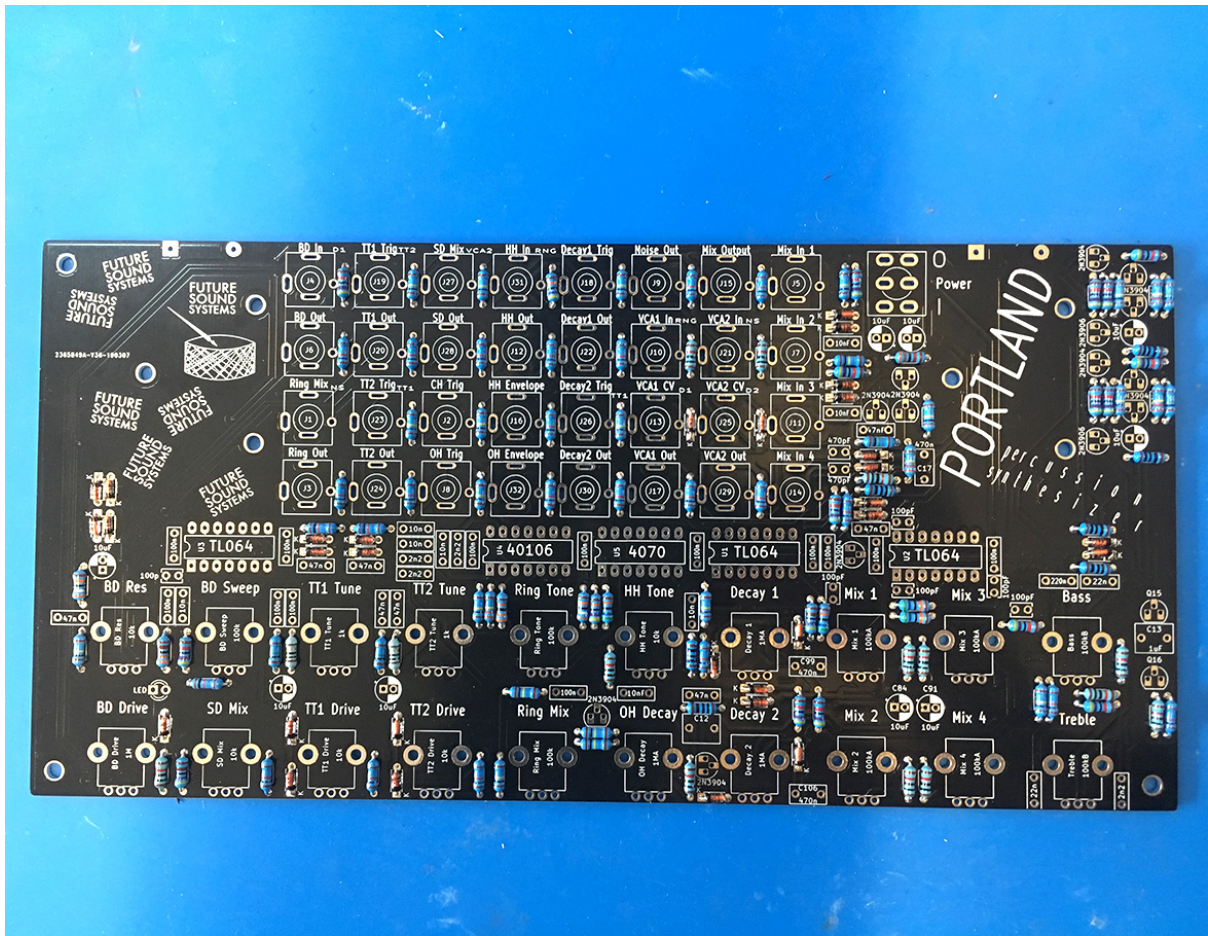
19 - Now solder the remaining 100k resistors as shown



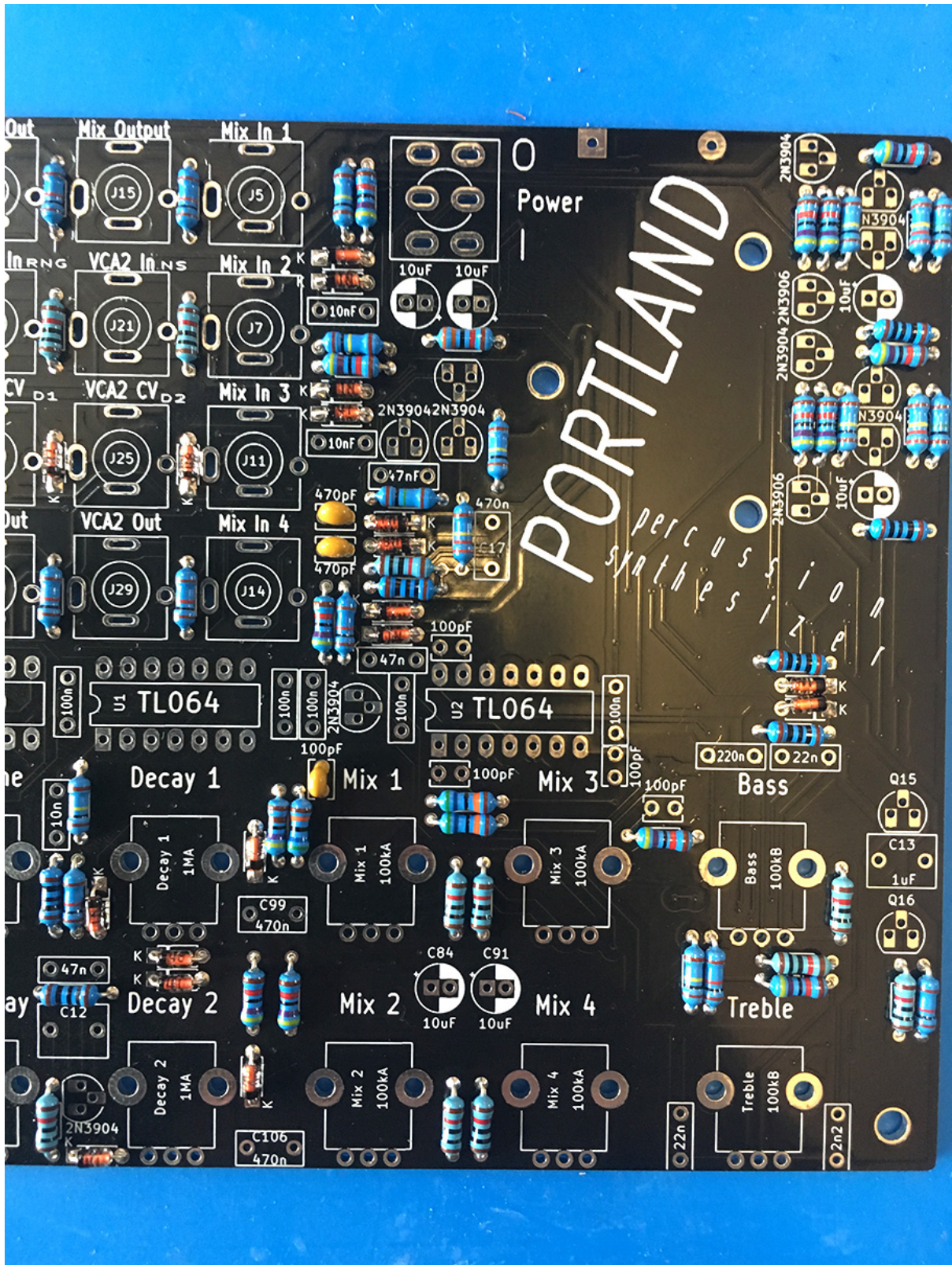
20 - Again the 1K resistors should be split into rounds - here are the first twelve 1K resistors in place



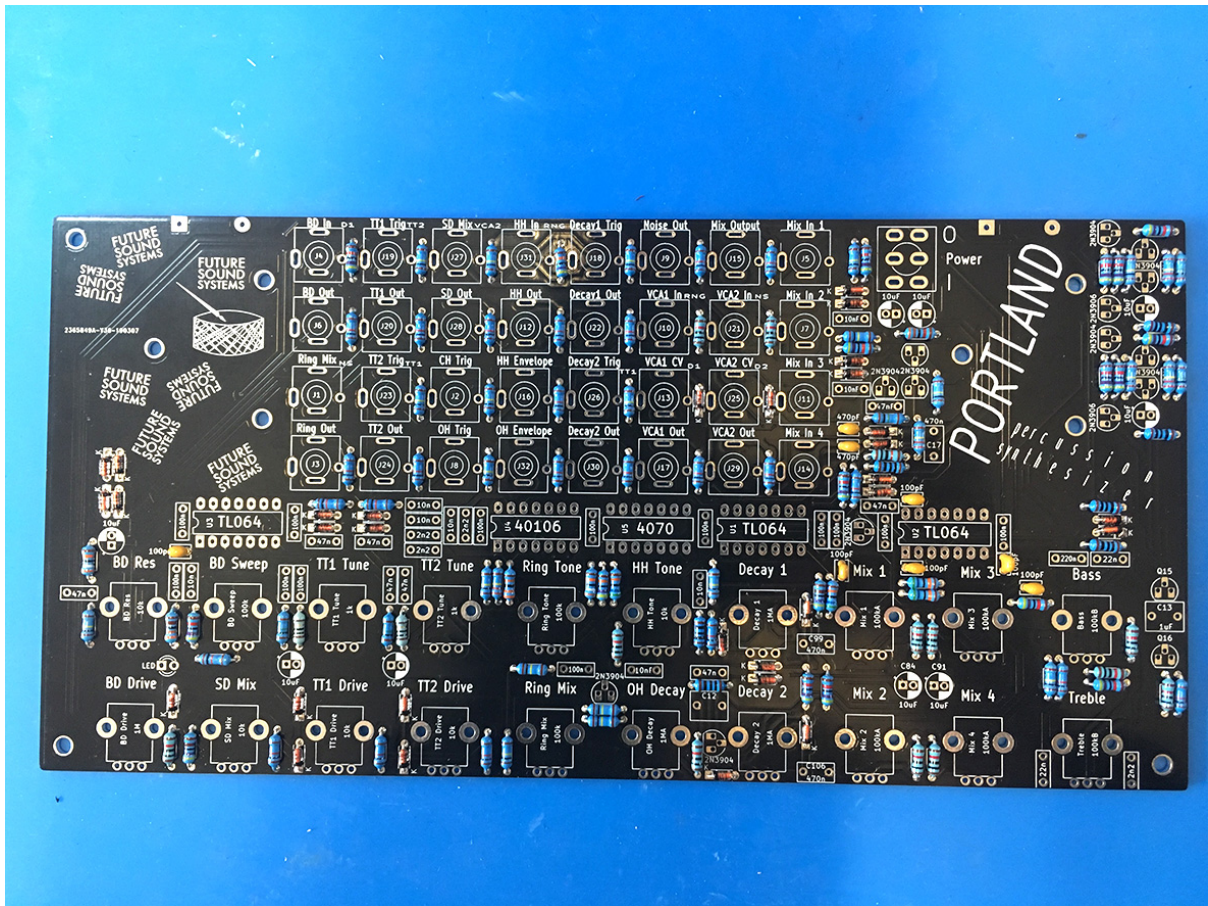
21 - Here are the next nine 1K resistors fitted and soldered



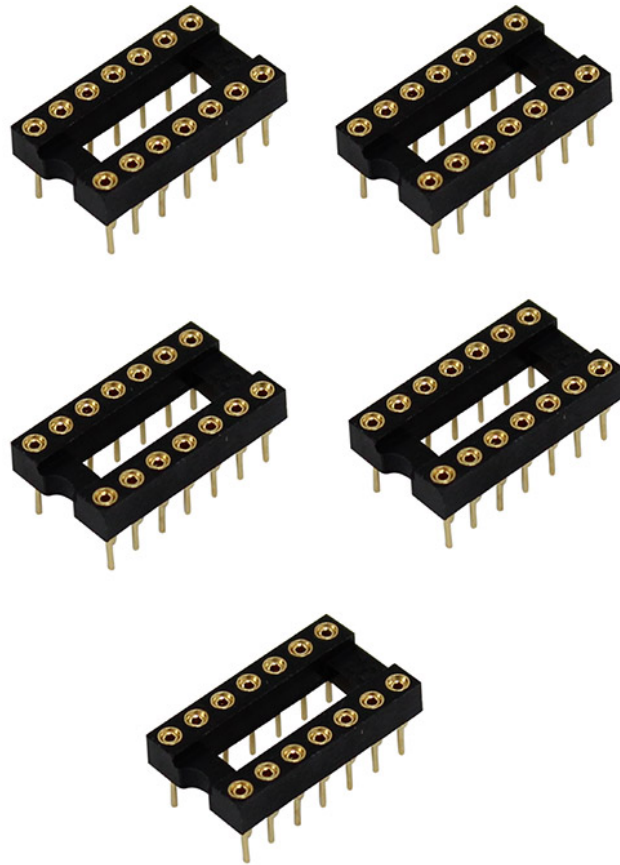
22 - Here are the last three 1K resistors fitted and soldered



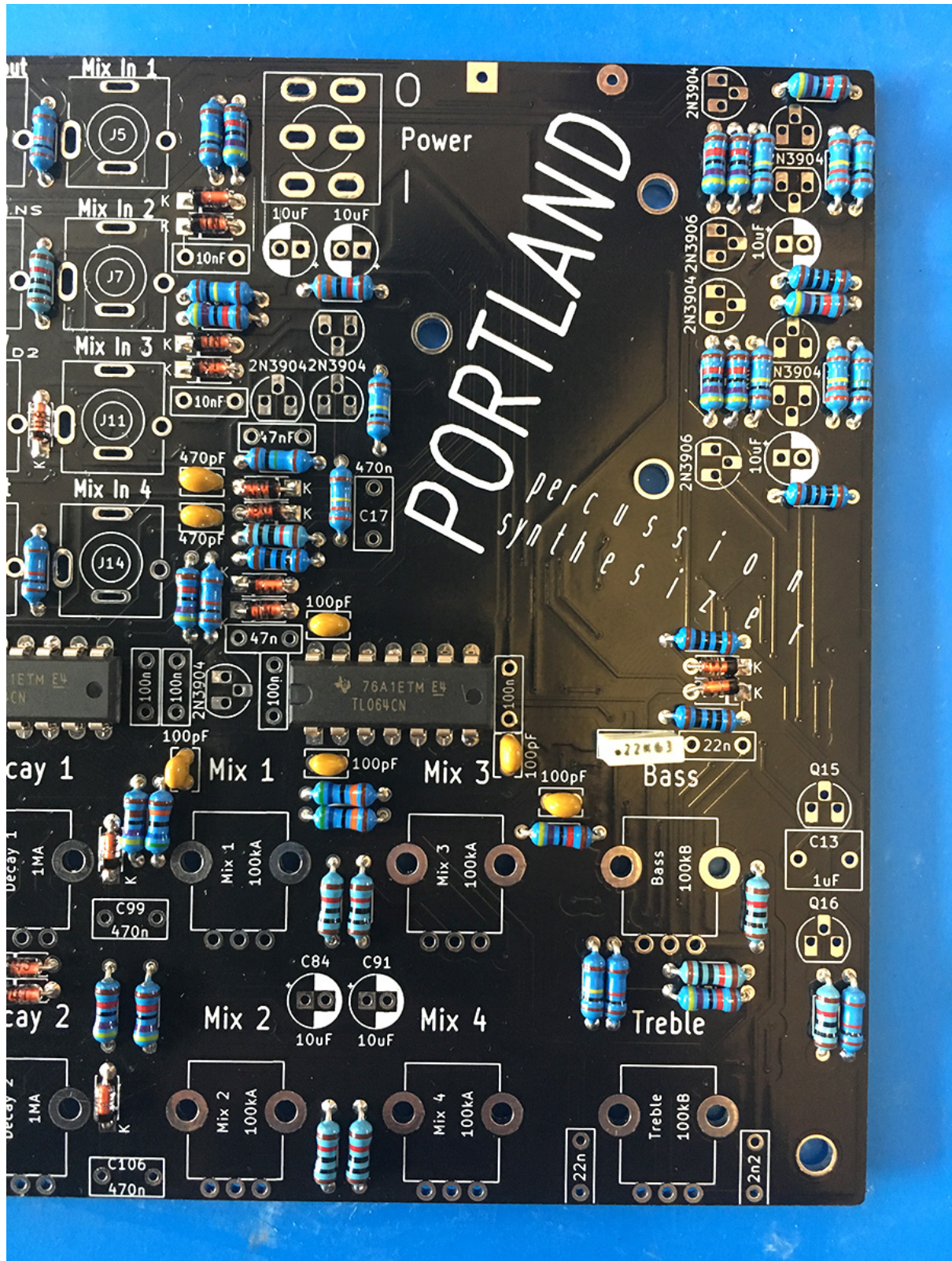
23 - Now fit the three 470pF ceramic capacitors towards the right-hand side of the PCB as shown



24 - Next place and solder the five 100pF ceramic capacitors

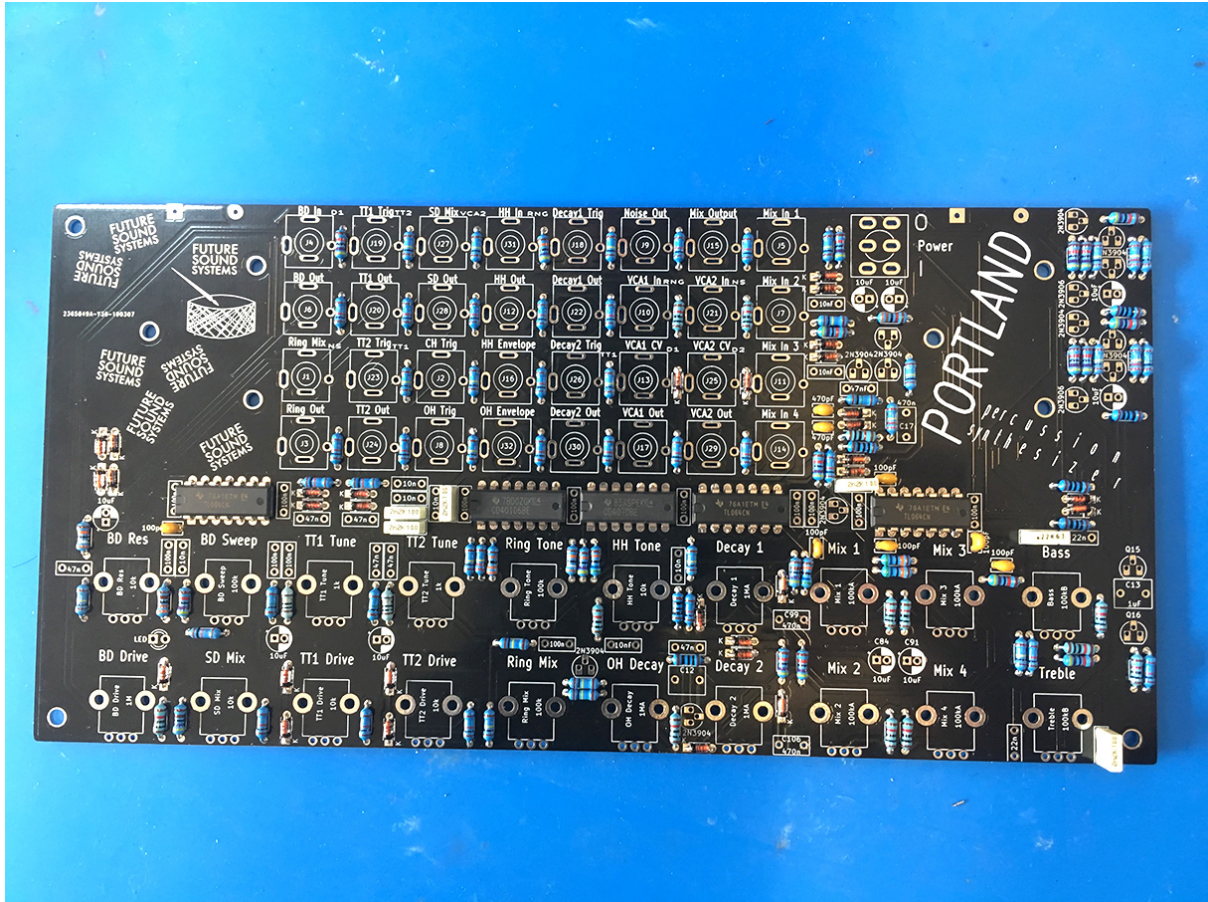


25 - Now take the five IC sockets and solder them in place – Note: be sure to match the curved notch in each of the sockets with notch on the PCB silkscreen.



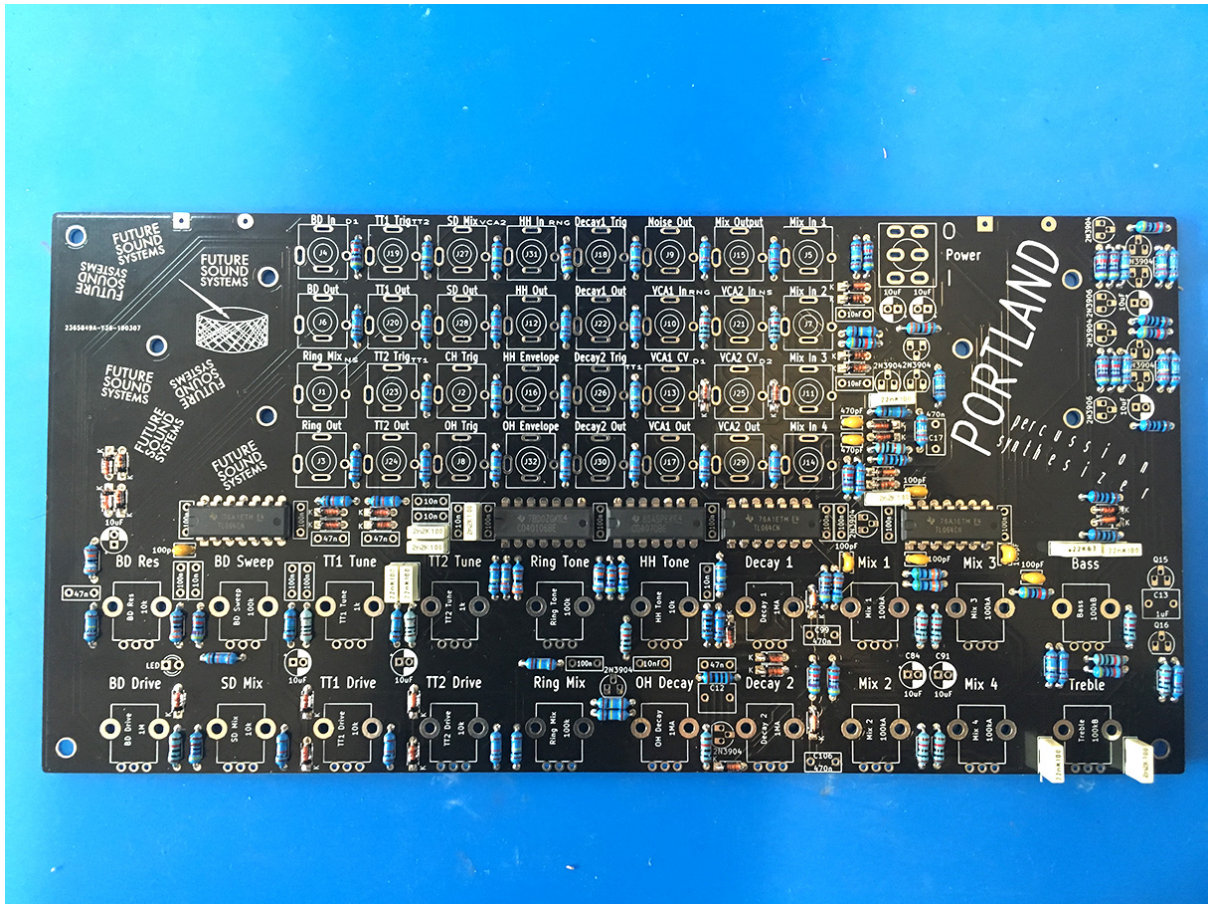
26 – Now fit and solder the one 220nF box capacitor - placed above the mixer Bass control as shown

Note: The text on this capacitor should read exactly: .22k63



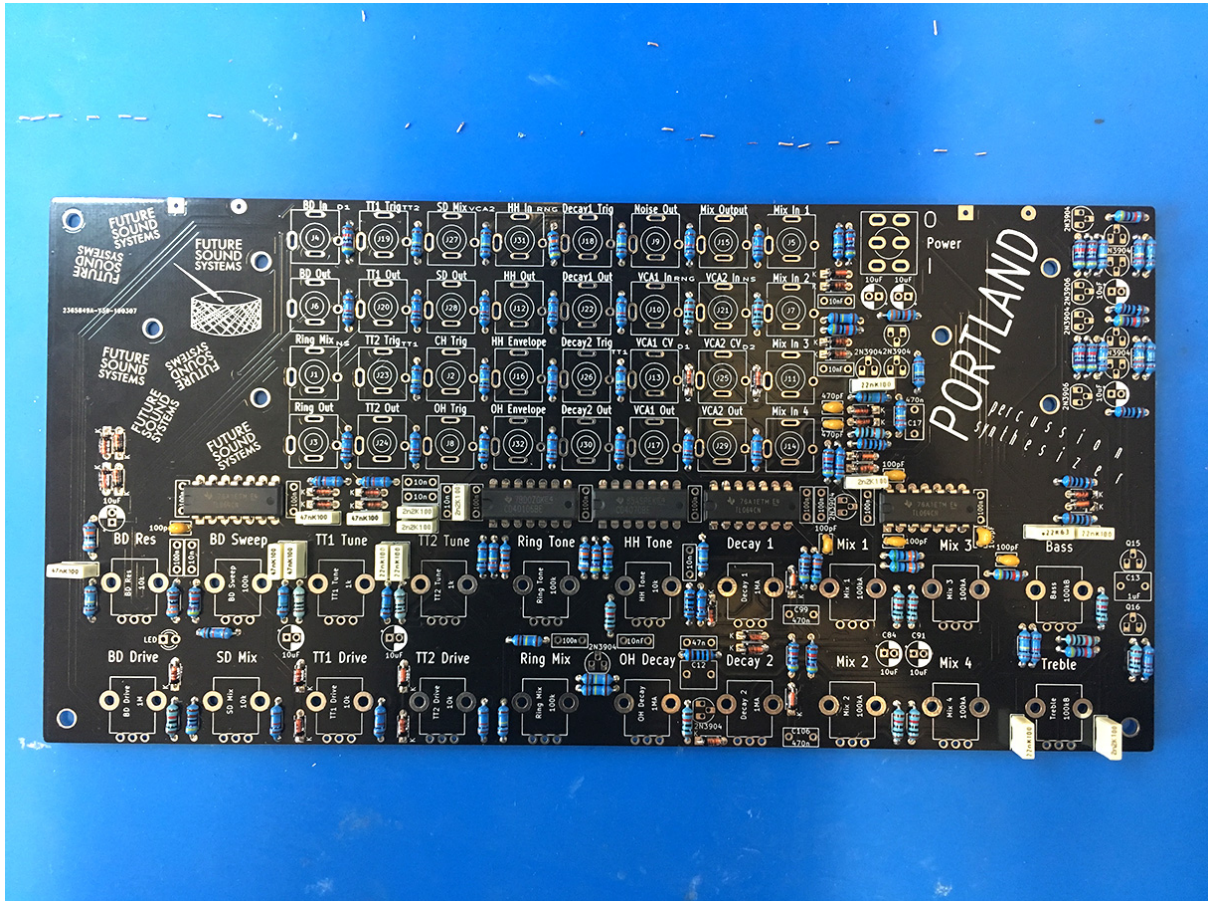
27 – Now fit and solder the five 2n2 box caps across the PCB

Note: The text on these capacitors should read exactly: 2n2k100



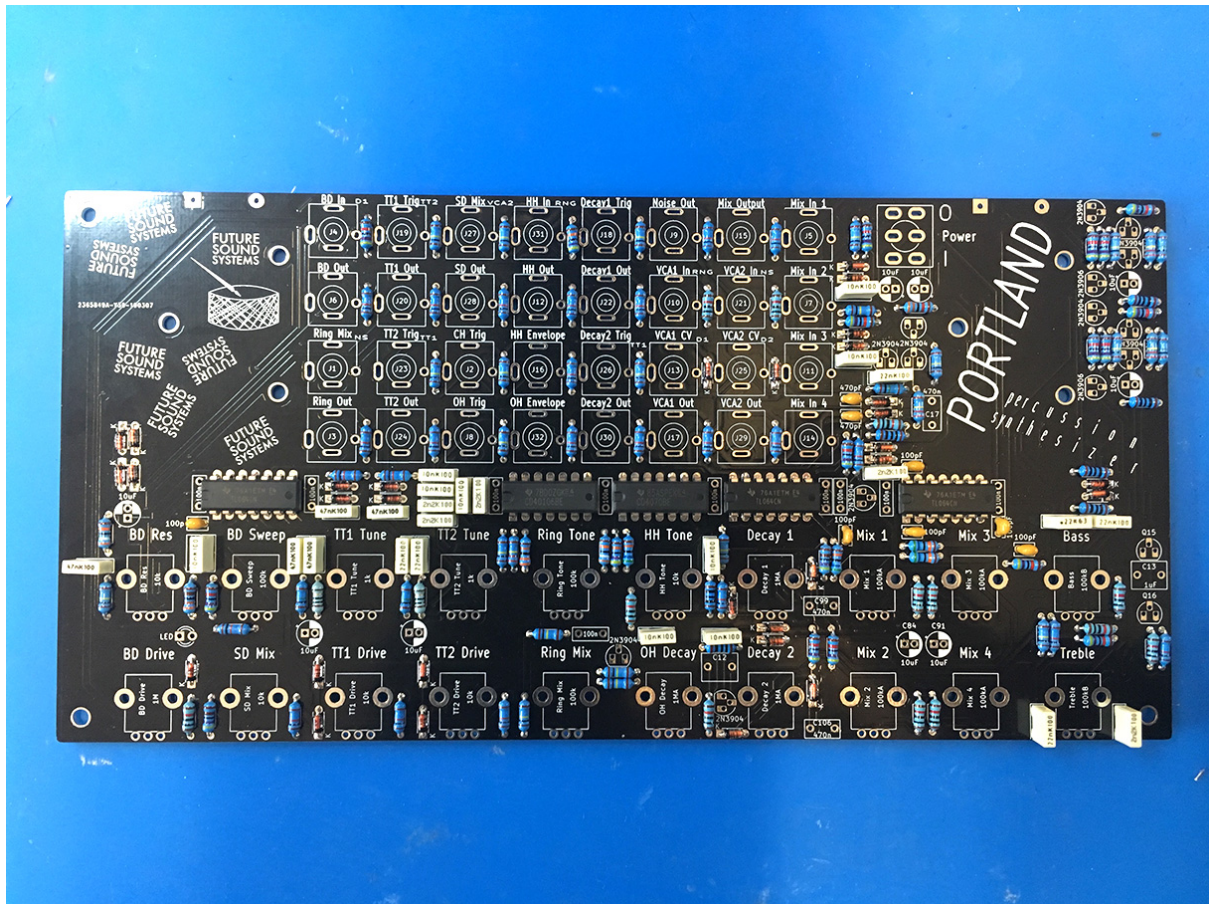
28 – Now fit and solder the five 22nF box caps across the PCB

Note: The text on these capacitors should read exactly: 22nk100



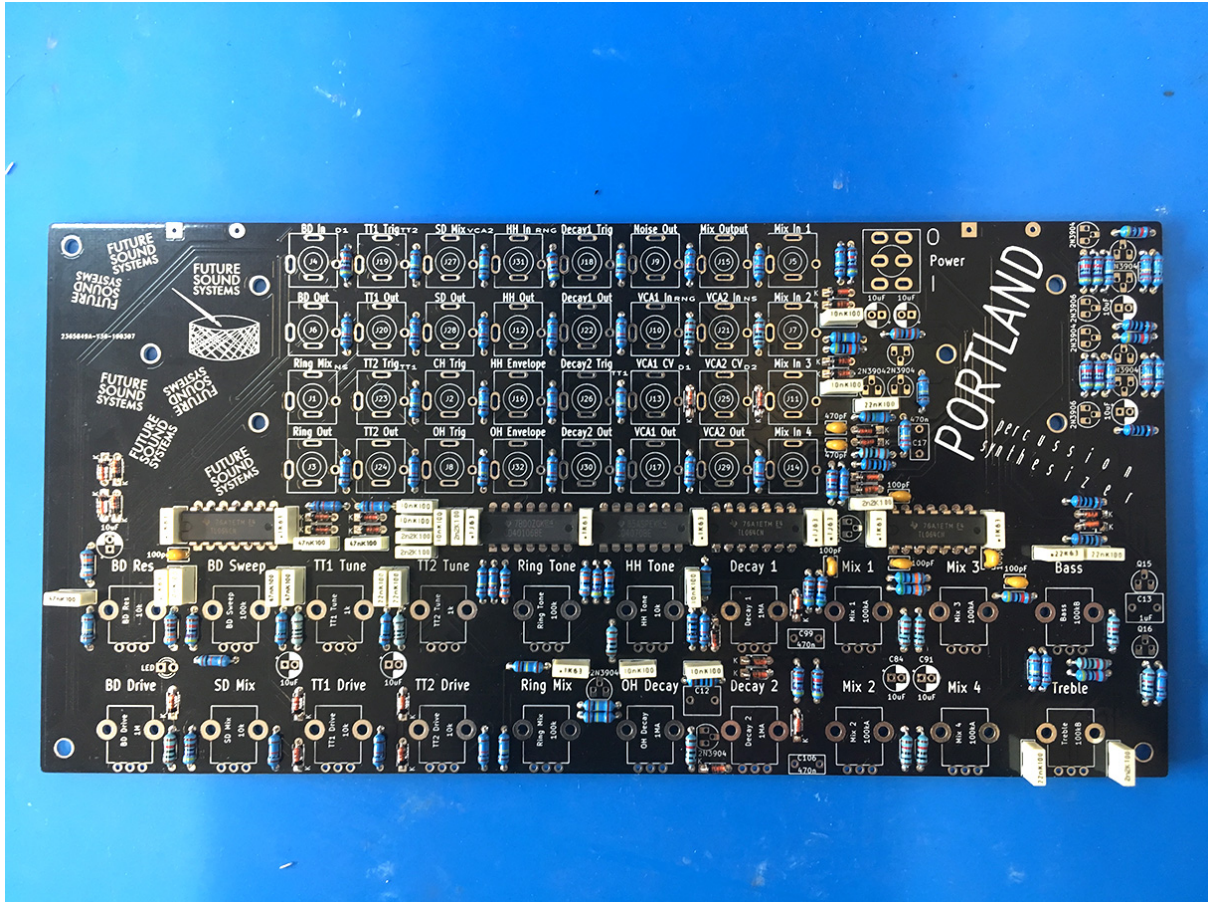
29 – Now fit and solder the five 47nF box caps across the PCB

Note: The text on these capacitors should read exactly: **47nk100**



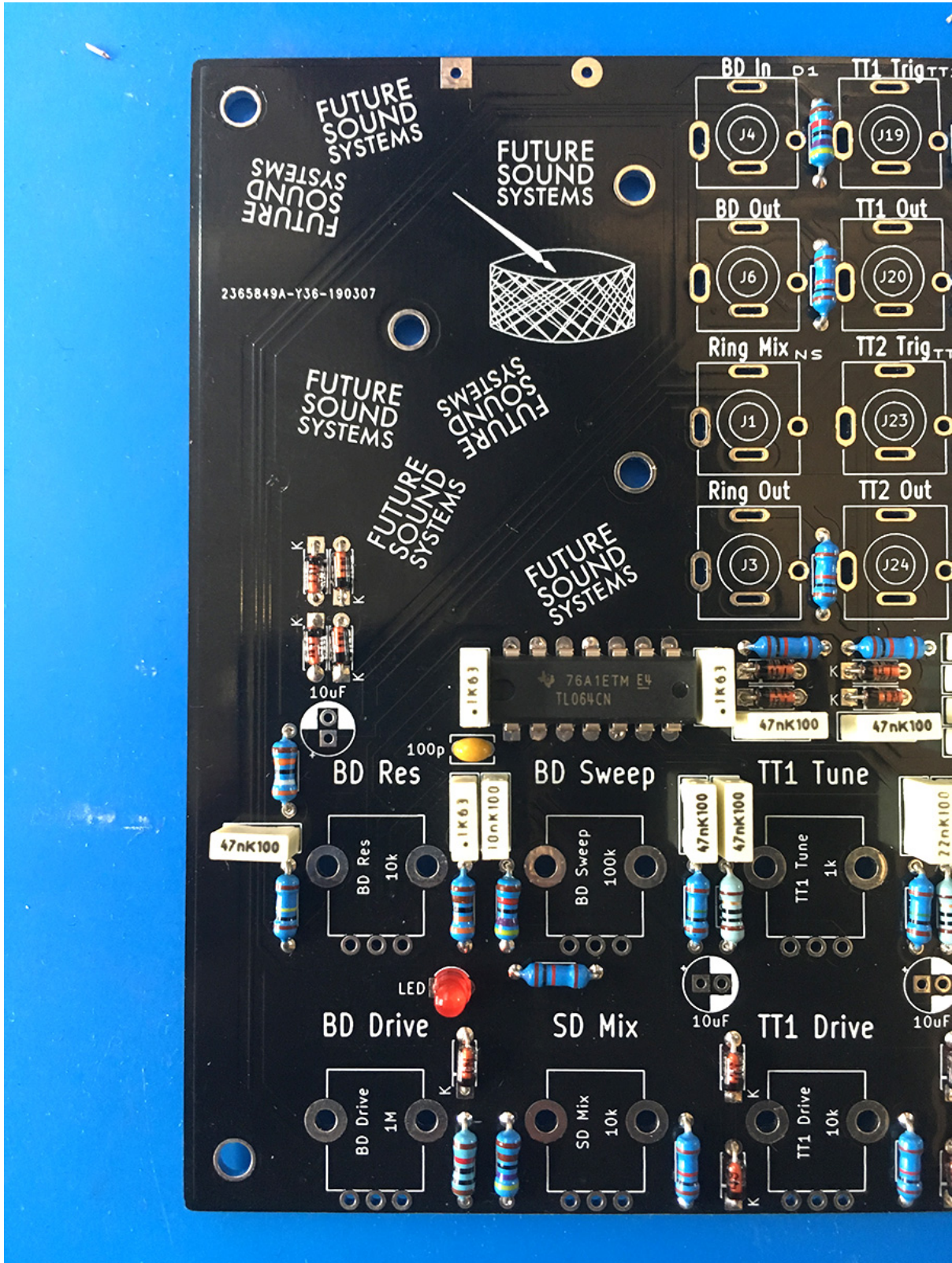
30 – Next fit and solder the nine 10nF box caps across the PCB

Note: The text on these capacitors should read exactly: **10nk100**



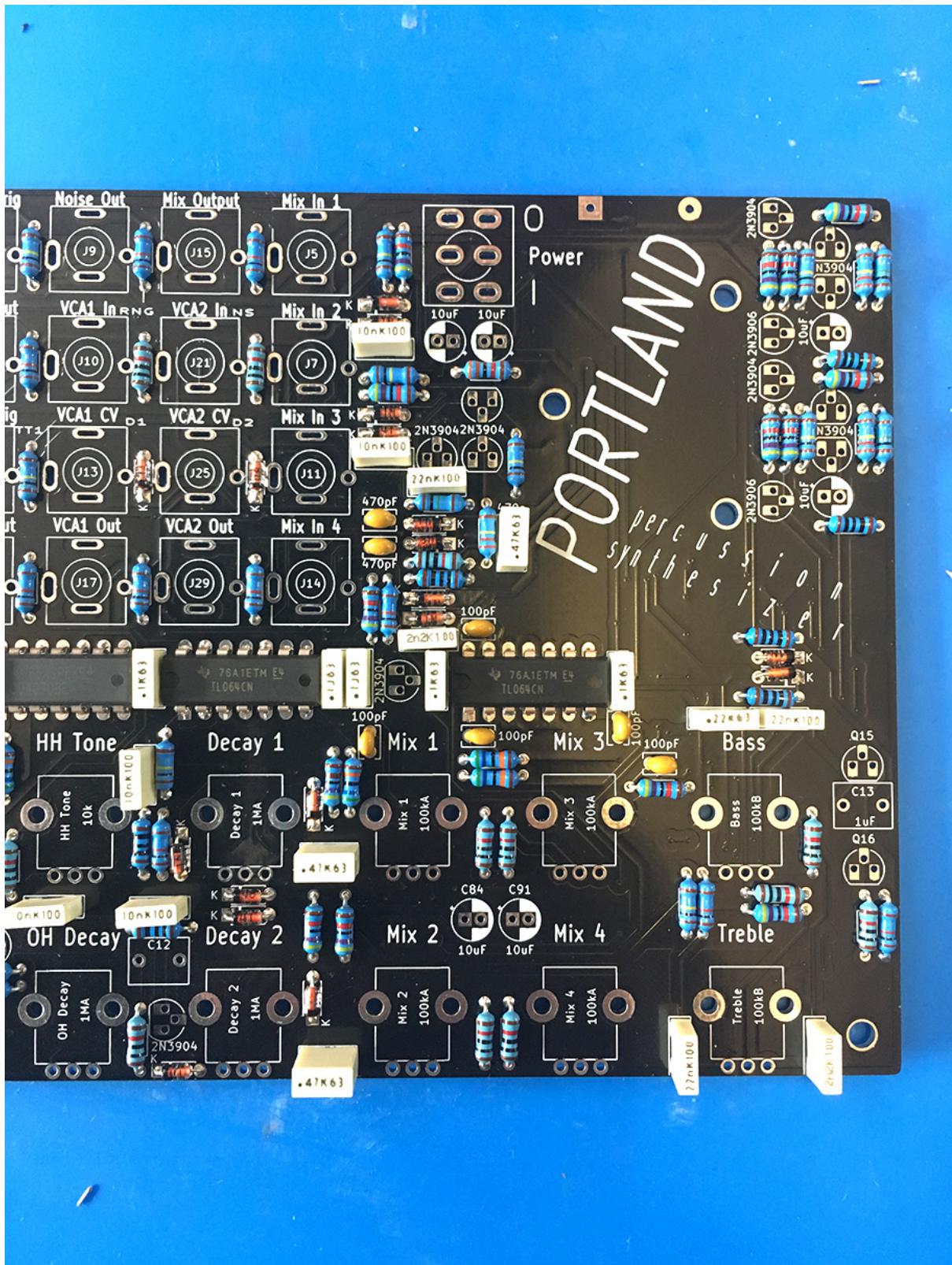
31 – Next fit and solder the eleven 100nF box caps across the PCB – they are mostly near the IC sockets

Note: The text on these capacitors should read exactly: **.1k63**



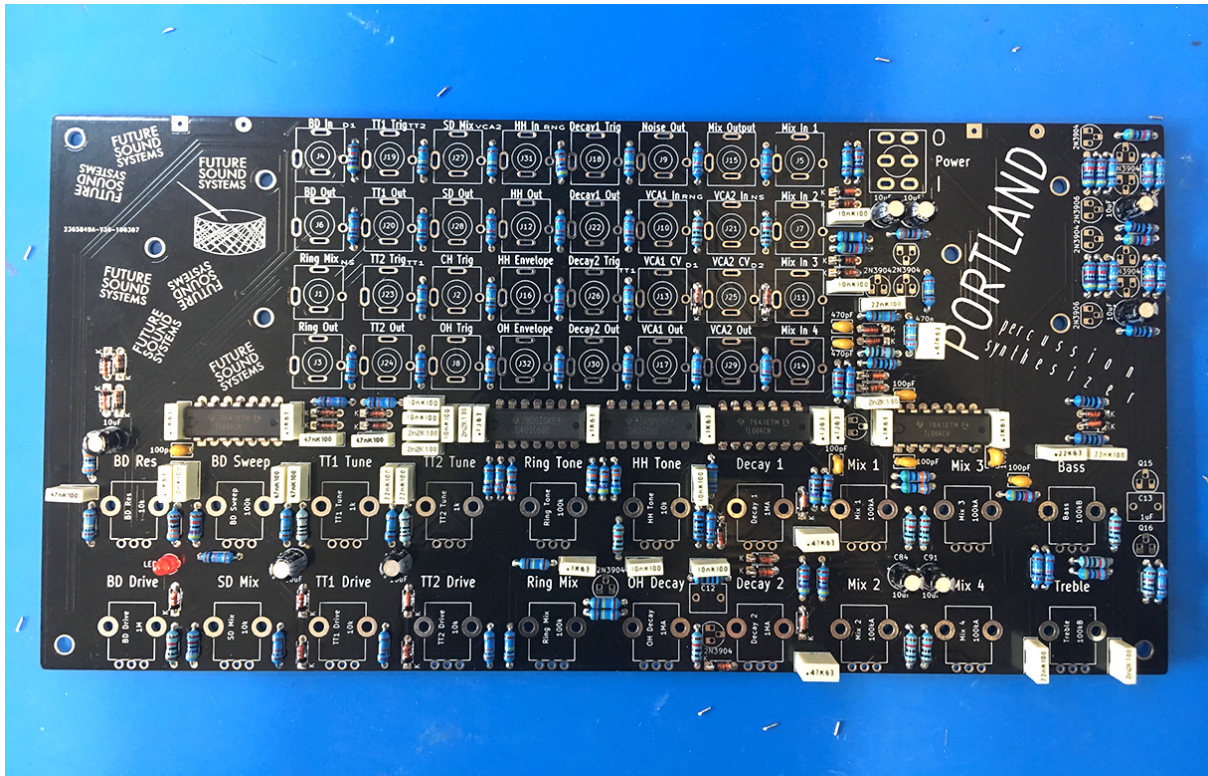
32 – Now fit and solder the bass drum resonator LED - **Note:** orientation is vital!

The short leg must go to the square pad marked with a minus sign



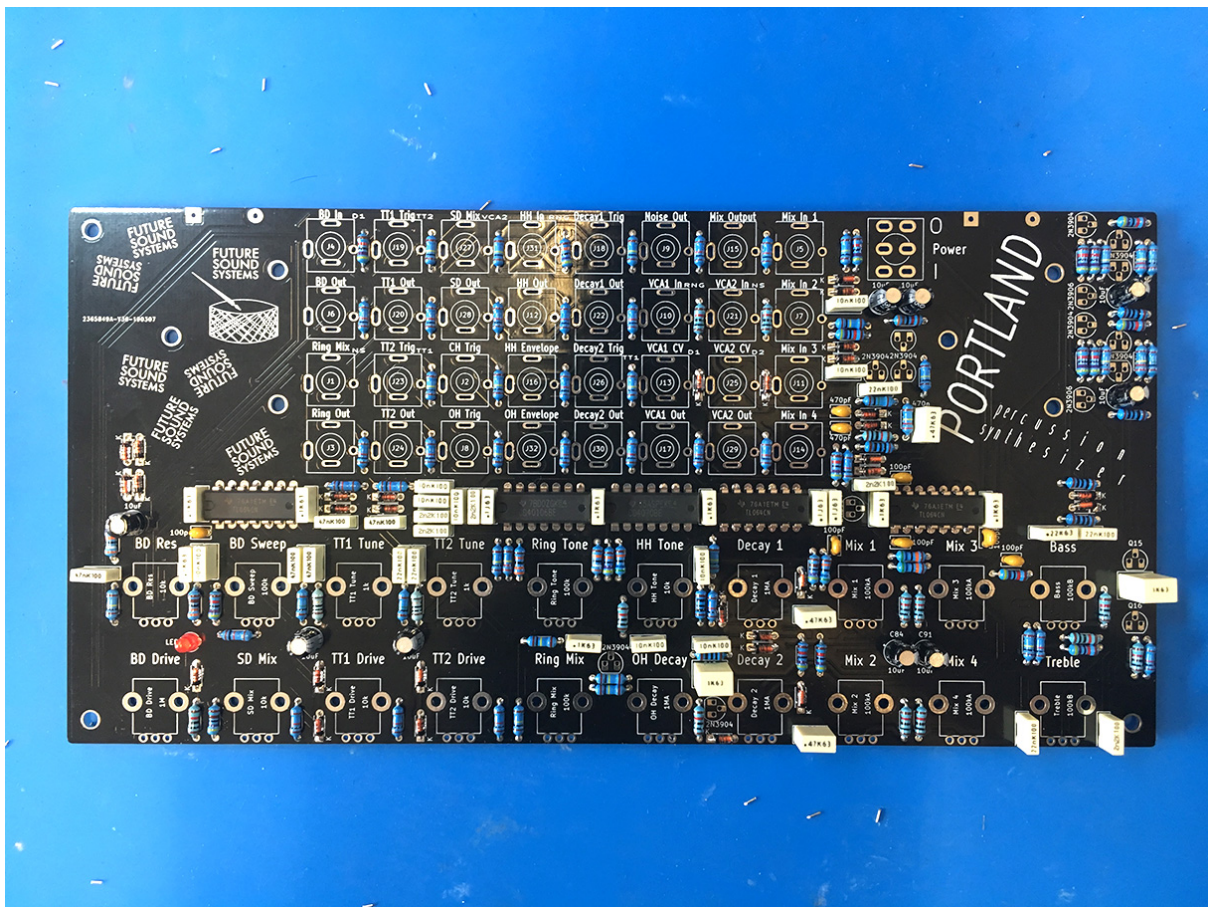
33 – Now fit and solder the three 470nF box caps toward the right hand side of the PCB

Note: The text on these capacitors should read exactly: **.47J630**



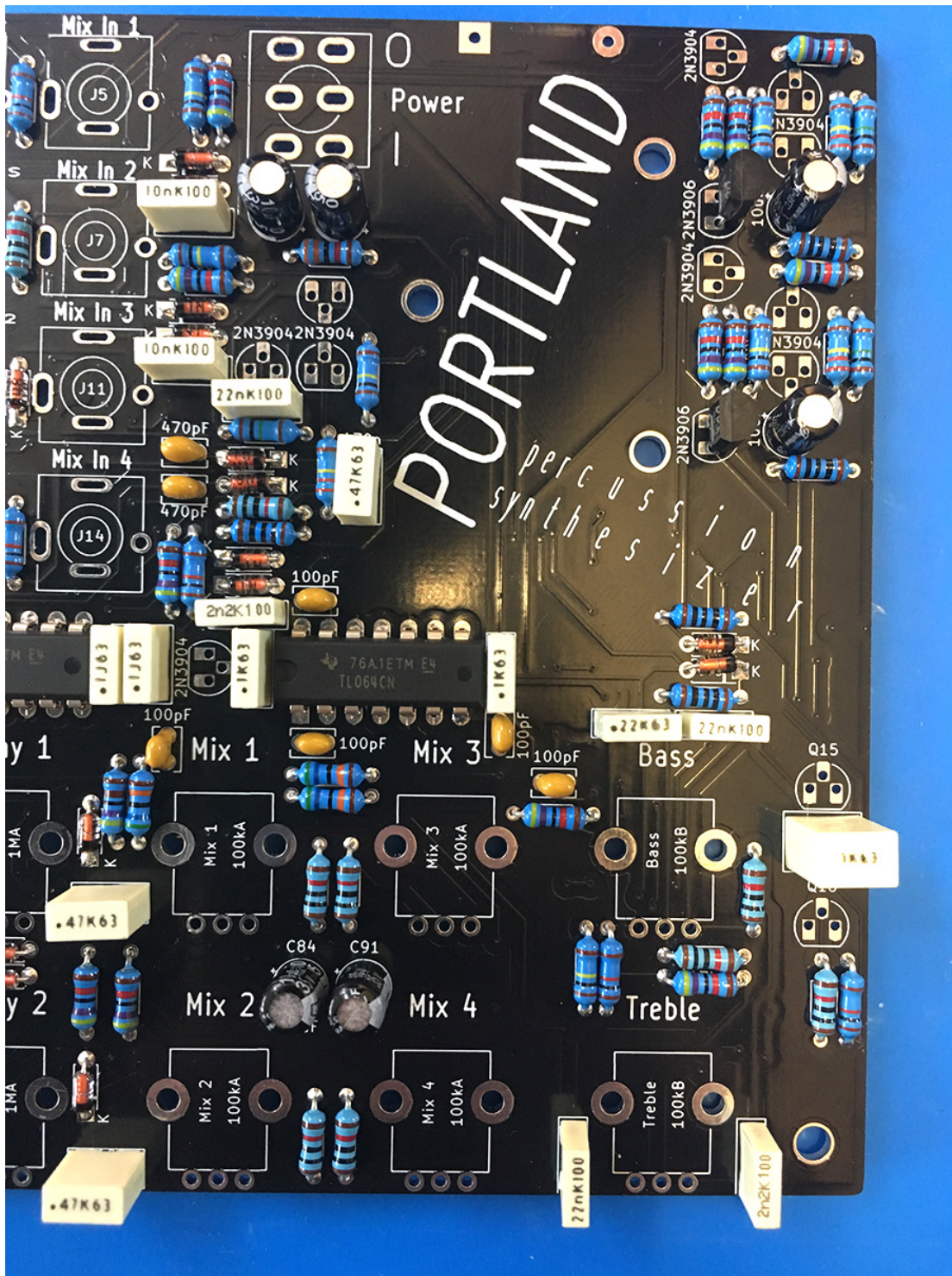
34 – Next fit and solder the nine 10uF electrolytic caps across the PCB - **Note: orientation is vital!**

The longest leg must go to the square pad marked plus. The white stripe on the body should match the white shading on the PCB silkscreen



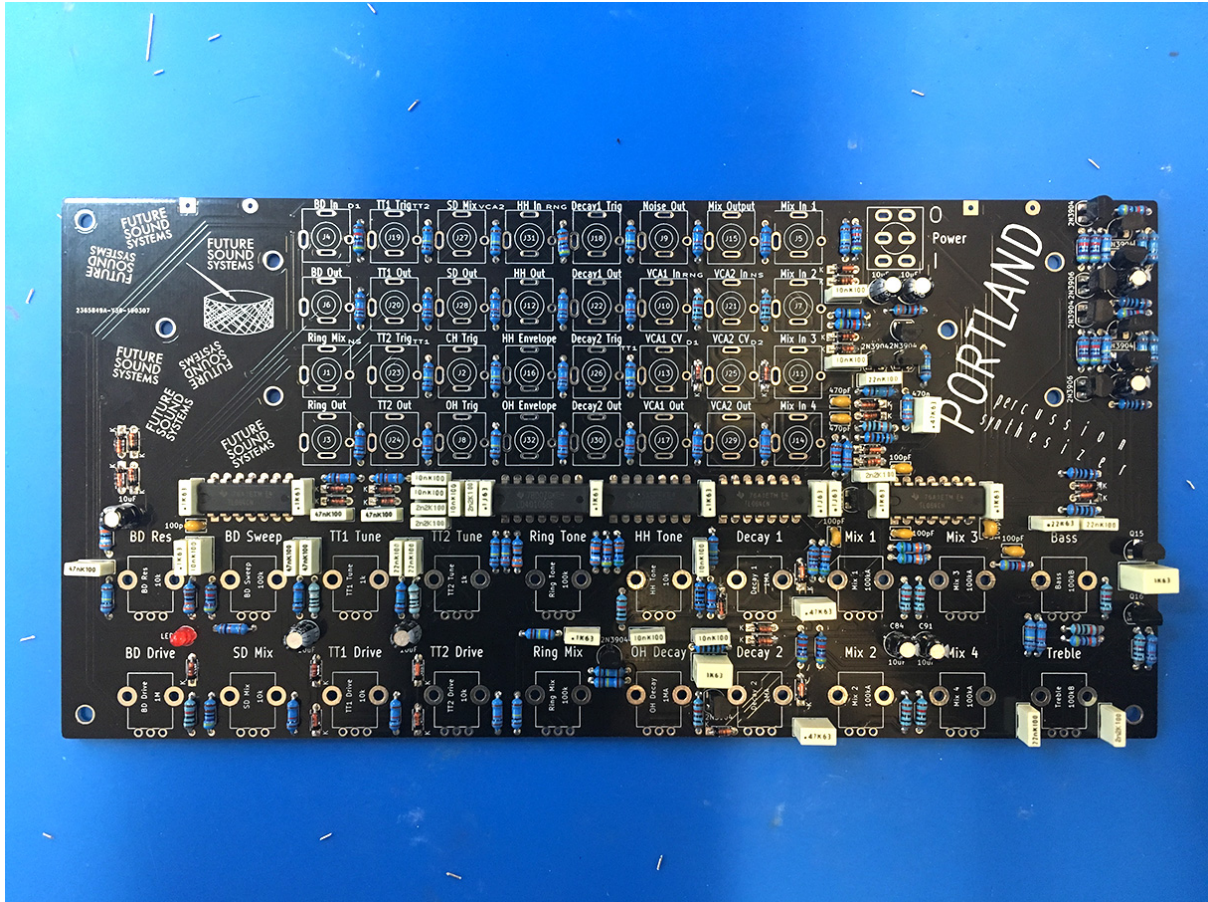
35 – Now fit and solder the two 1uF box caps at C12 and C13

Note: The text on these capacitors should read exactly: **1K63**



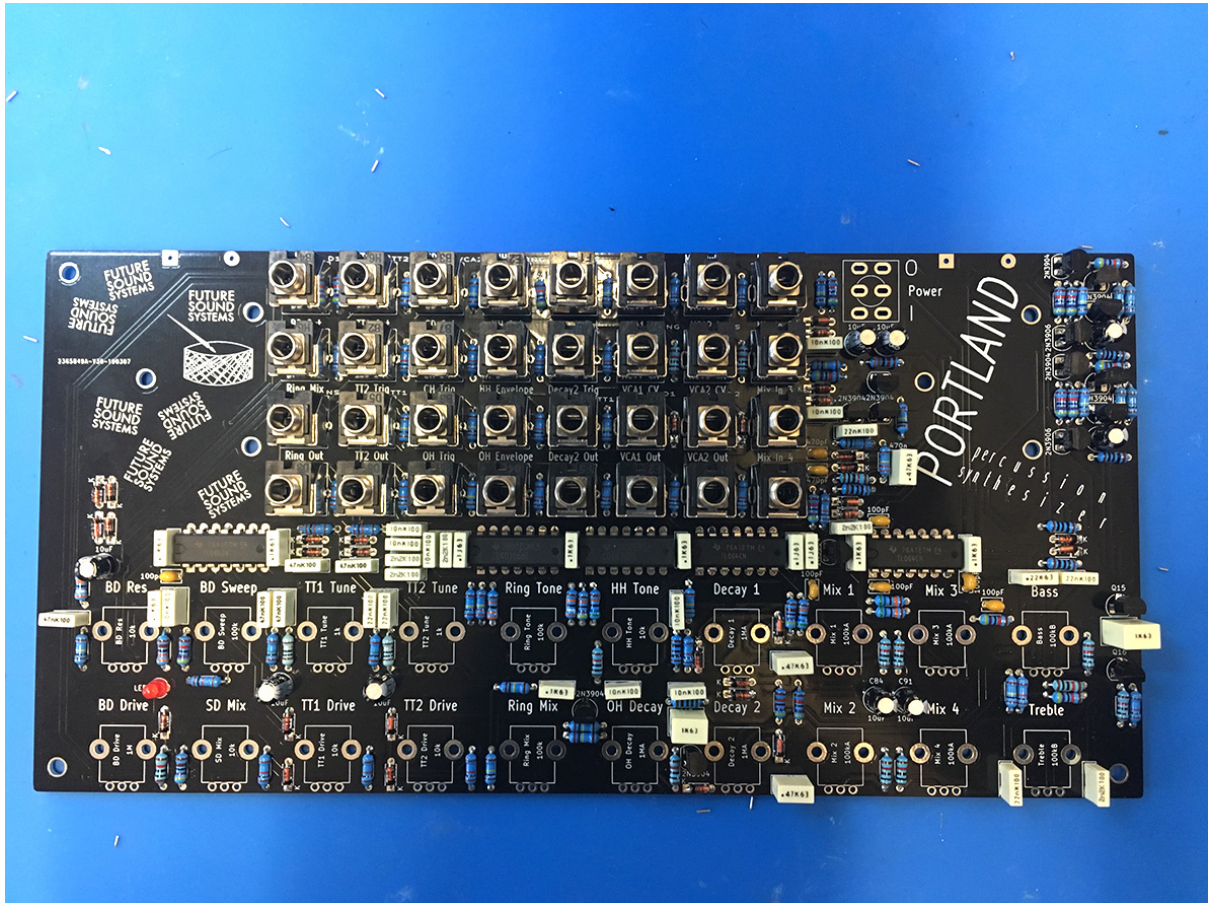
36 – Next fit and solder the two 2N3906 transistors belonging to the Decay envelopes.

Note: orientation is vital! Be sure to match the curve of the transistor body with the PCB silkscreen.



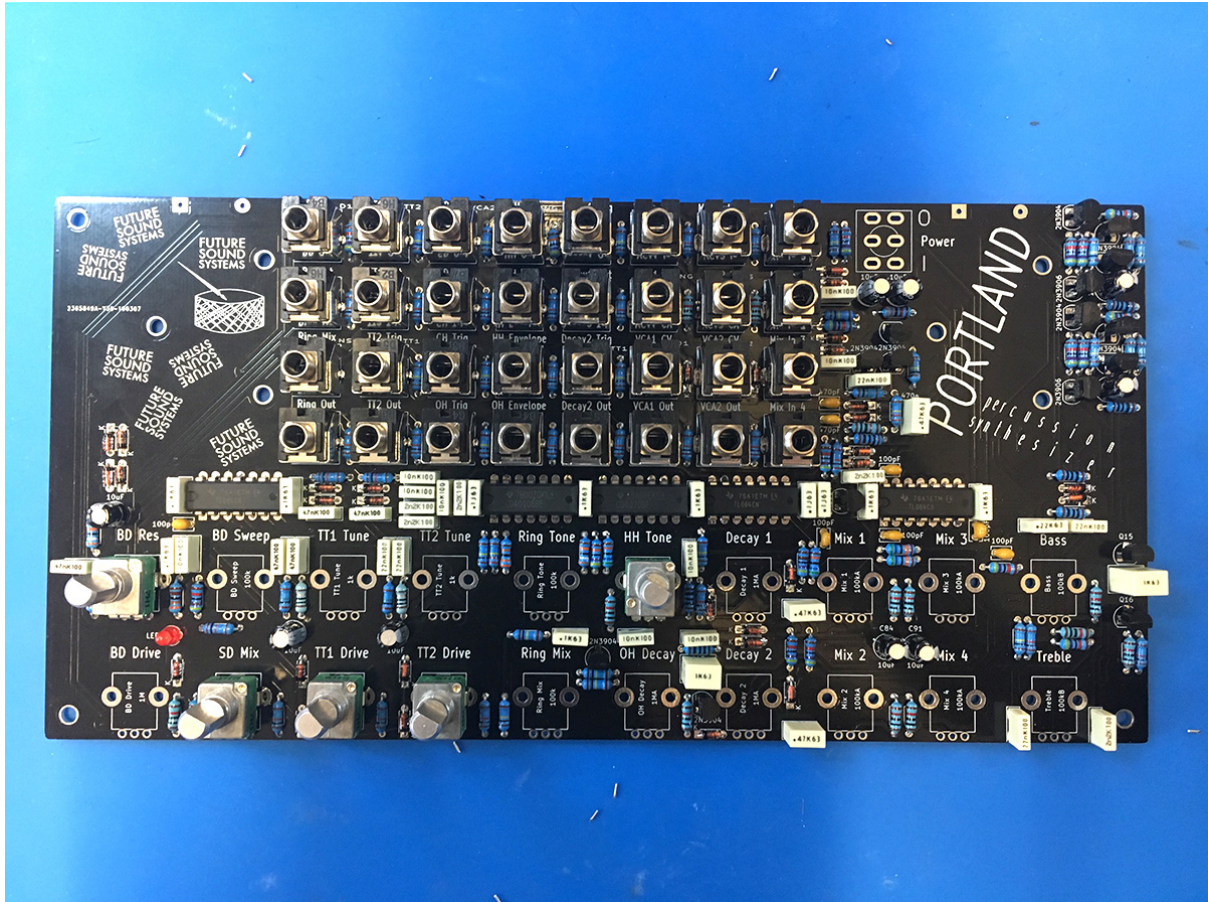
37 – Next fit and solder the fourteen 2N3904 transistors across the PCB

Note: orientation is vital! Be sure to match the curve of the transistor body with the PCB silkscreen.

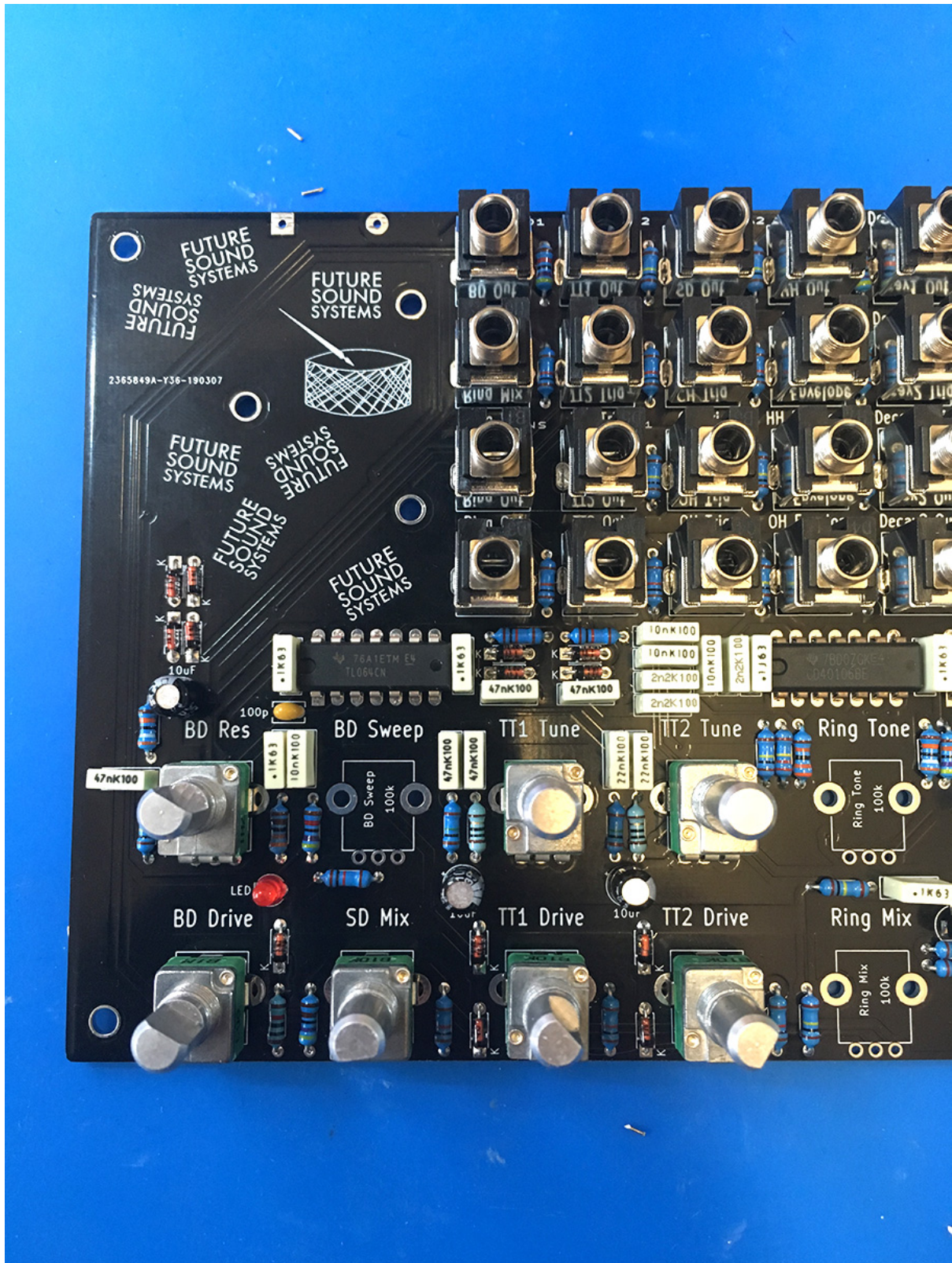


38 – Now fit the thirty-two jack sockets in place - be sure to mount them flush to the PCB surface!

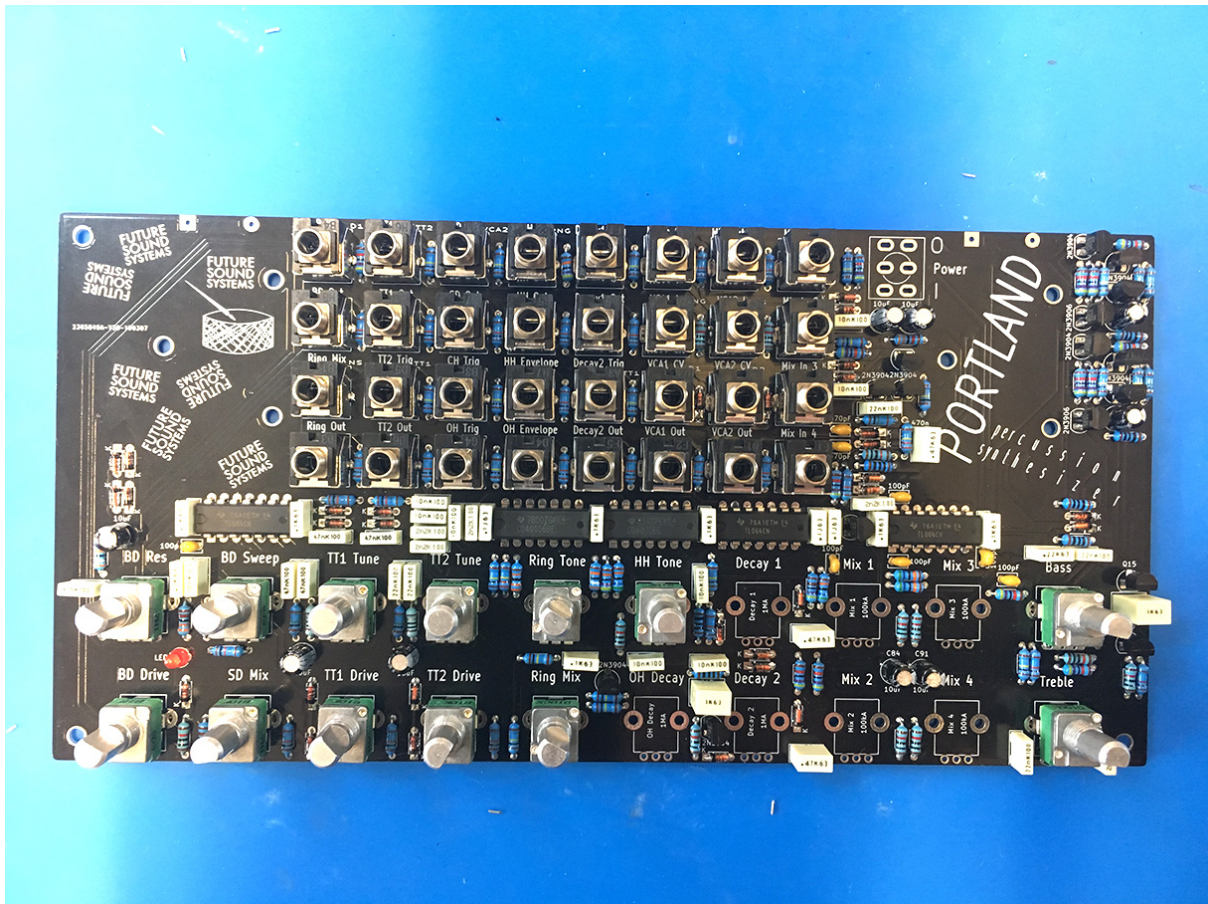
You should be able to rest the PCB upside down against a flat surface to hold the sockets flush against the PCB when soldering them in place.



39 – Next fit the five B10k pots - you can leave soldering the ground terminals until the end of the build if you want to - just in case something goes wrong



40 - Now solder the two B5k and one B1M pots on the left-hand side of the PCB



41 - Then fit and solder the five B100k pots



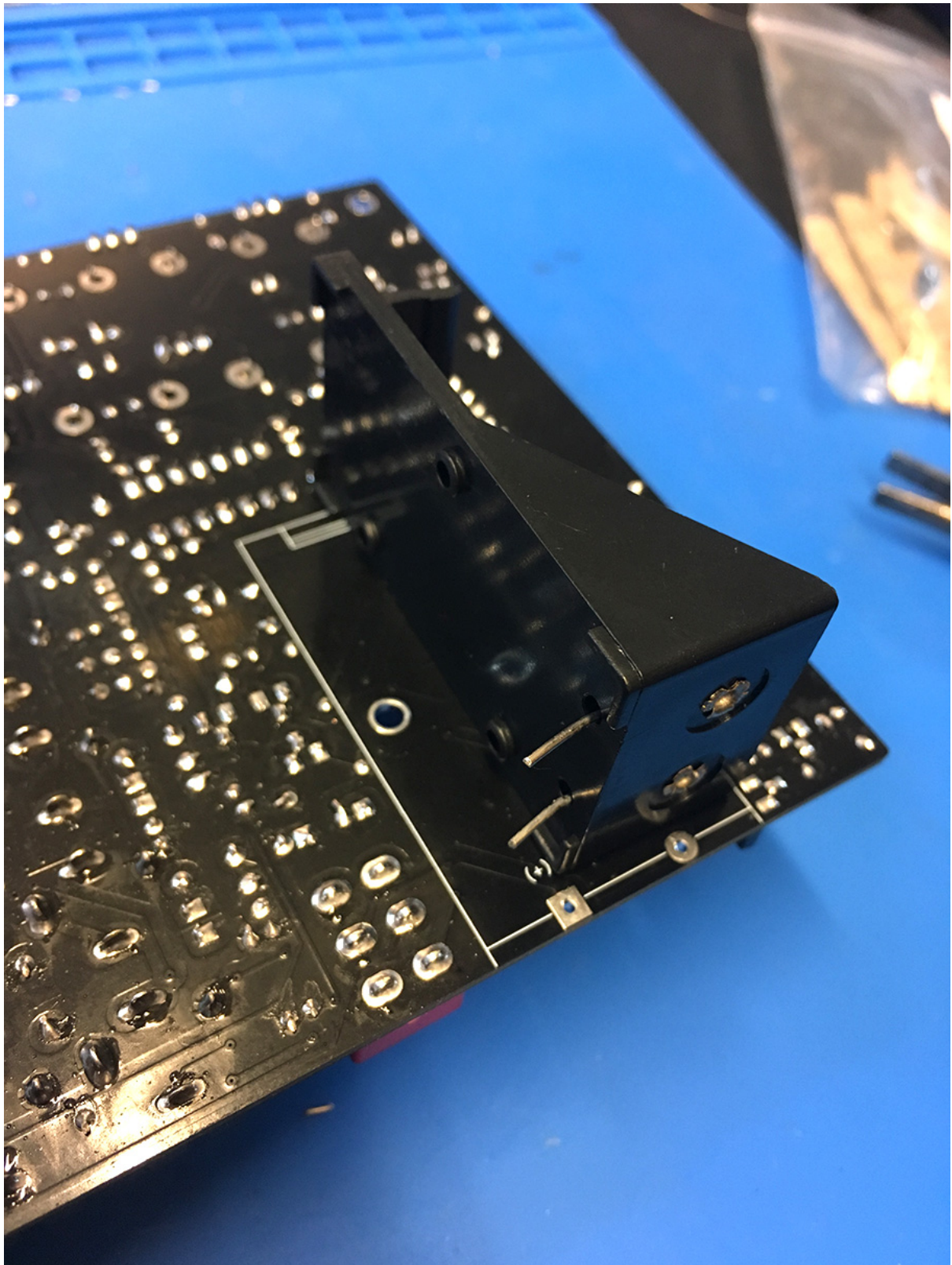
42 – Now fit and solder the three A1M pots for all three Decay controls



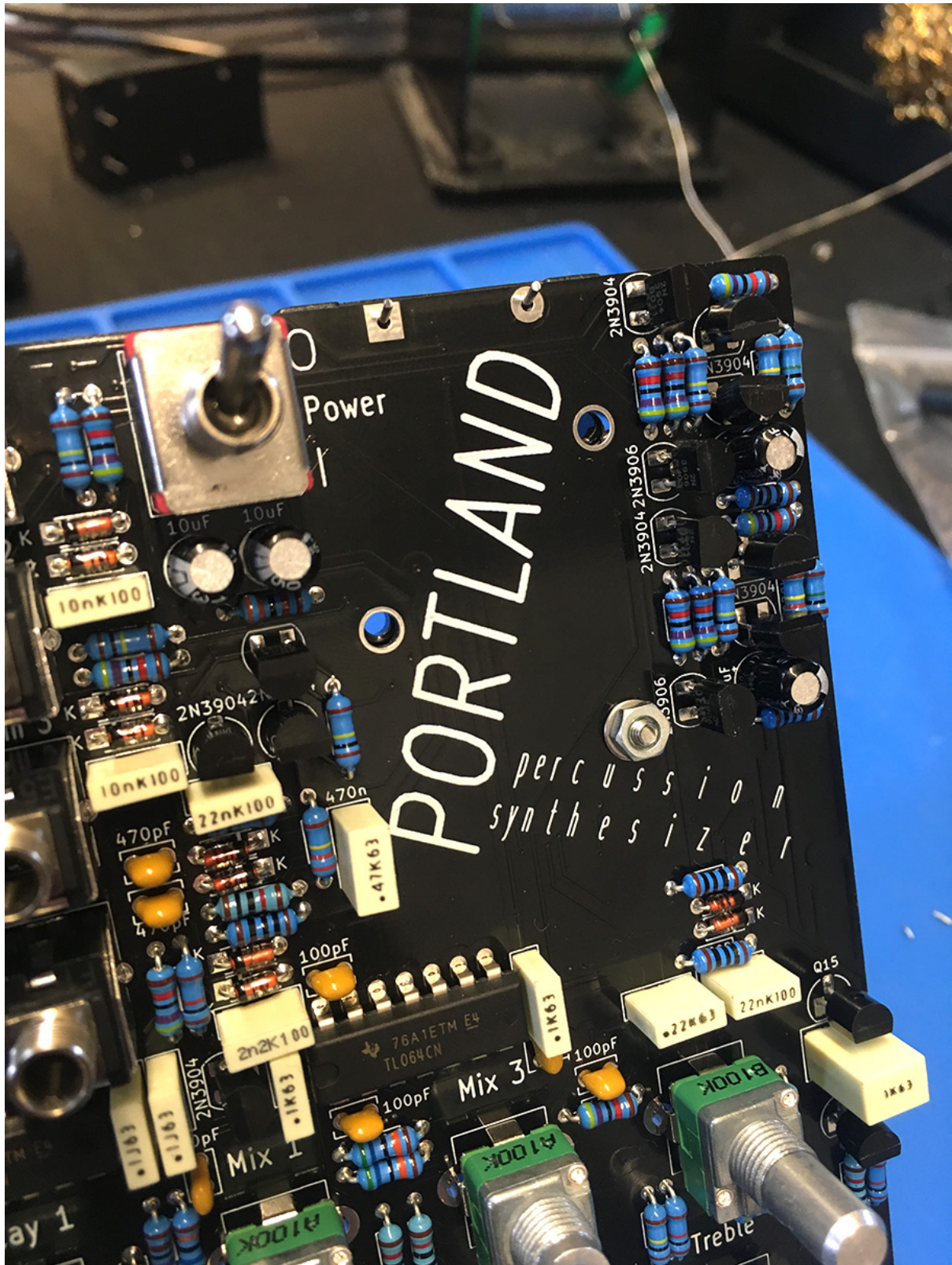
43 - Now fit the four A100k pots for the mixer level controls



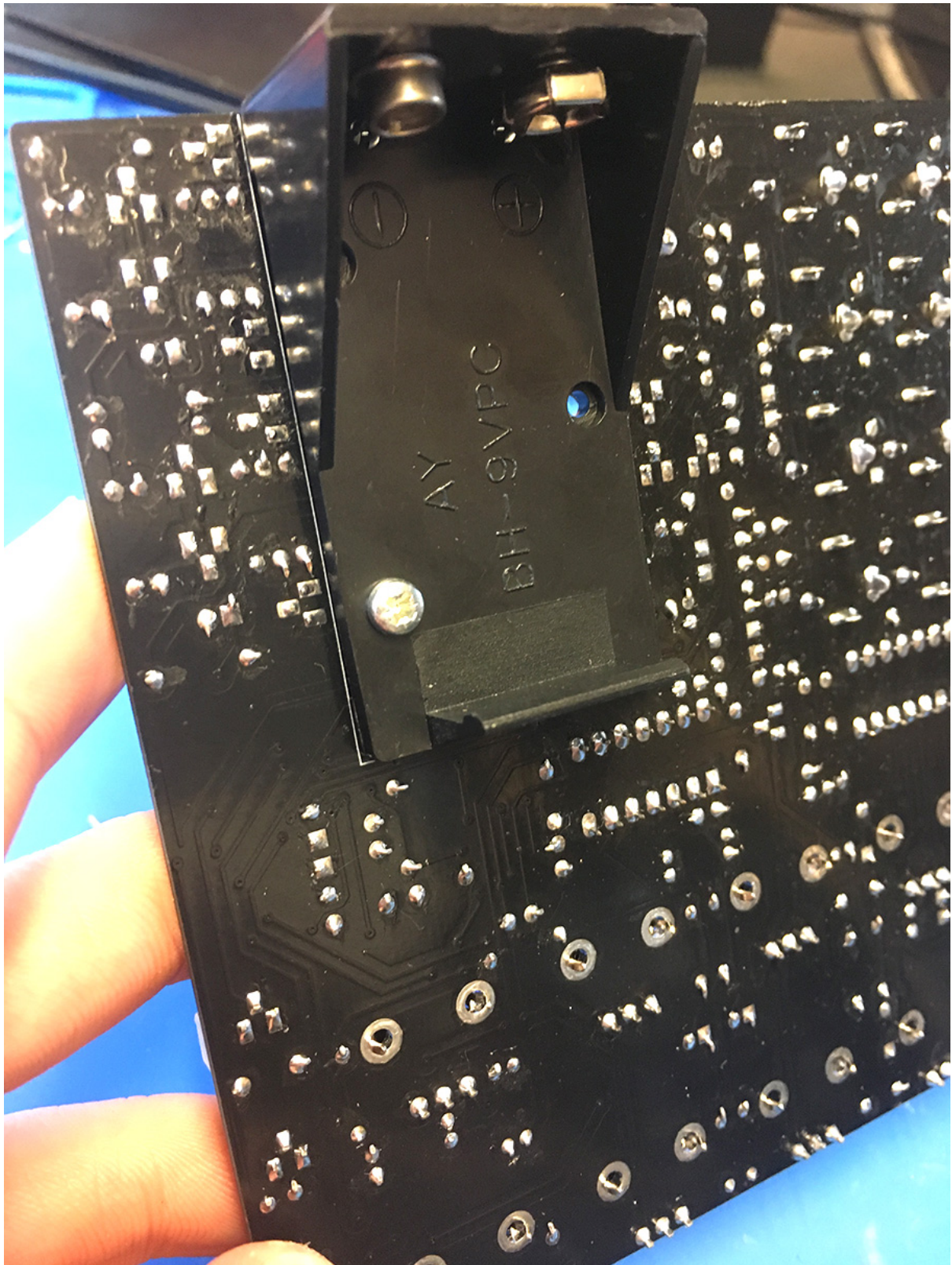
44 - Now it's time to place and solder the power toggle switch – be sure to keep the bottom surface of the switch flat against the PCB surface when soldering



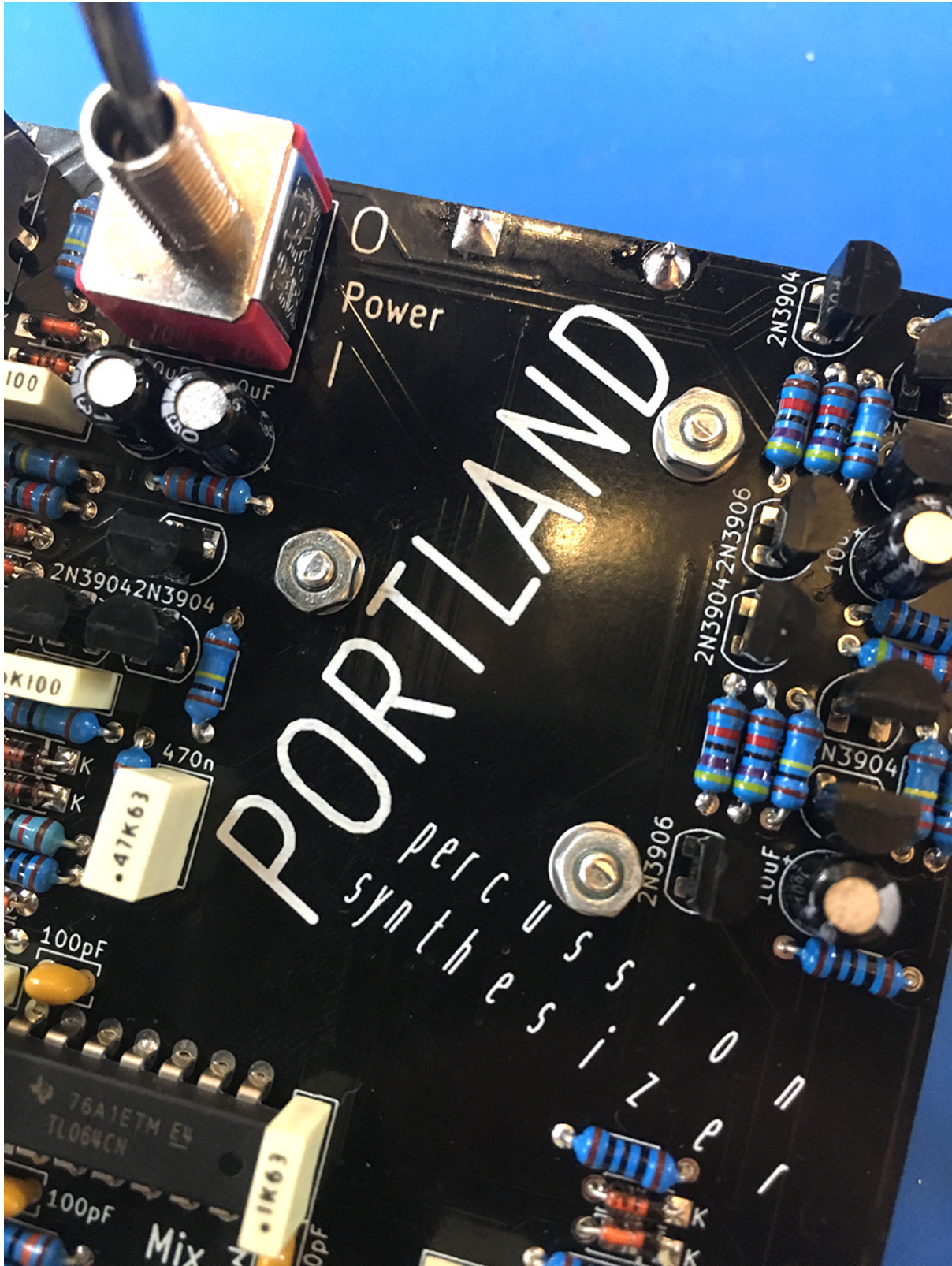
45 - Now take one of the battery snaps and bend the legs slightly back towards the edge of the plastic casing as shown



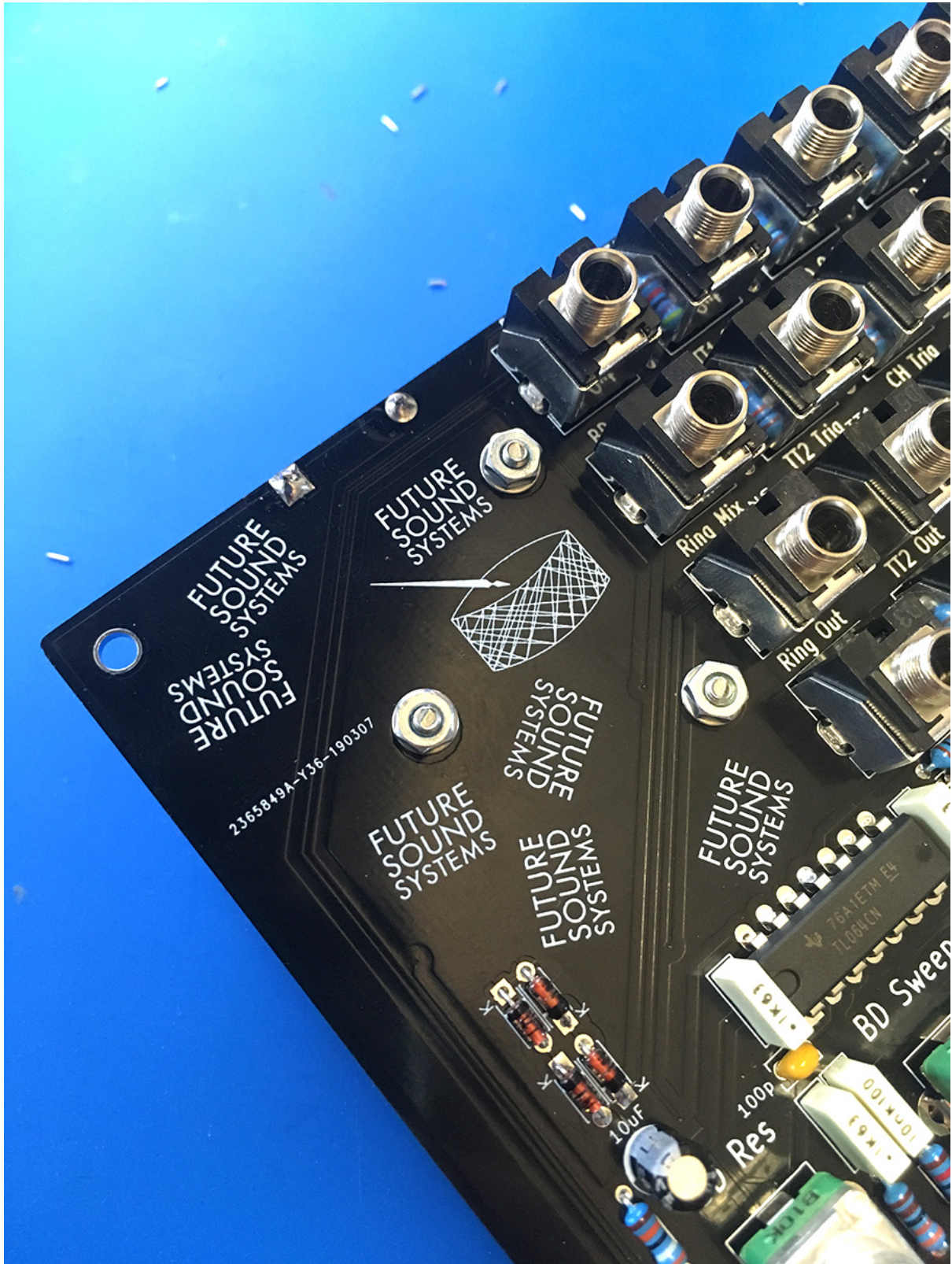
46 - Then fit the battery snap with a screw, washer and nut at the bottom of the snap as shown



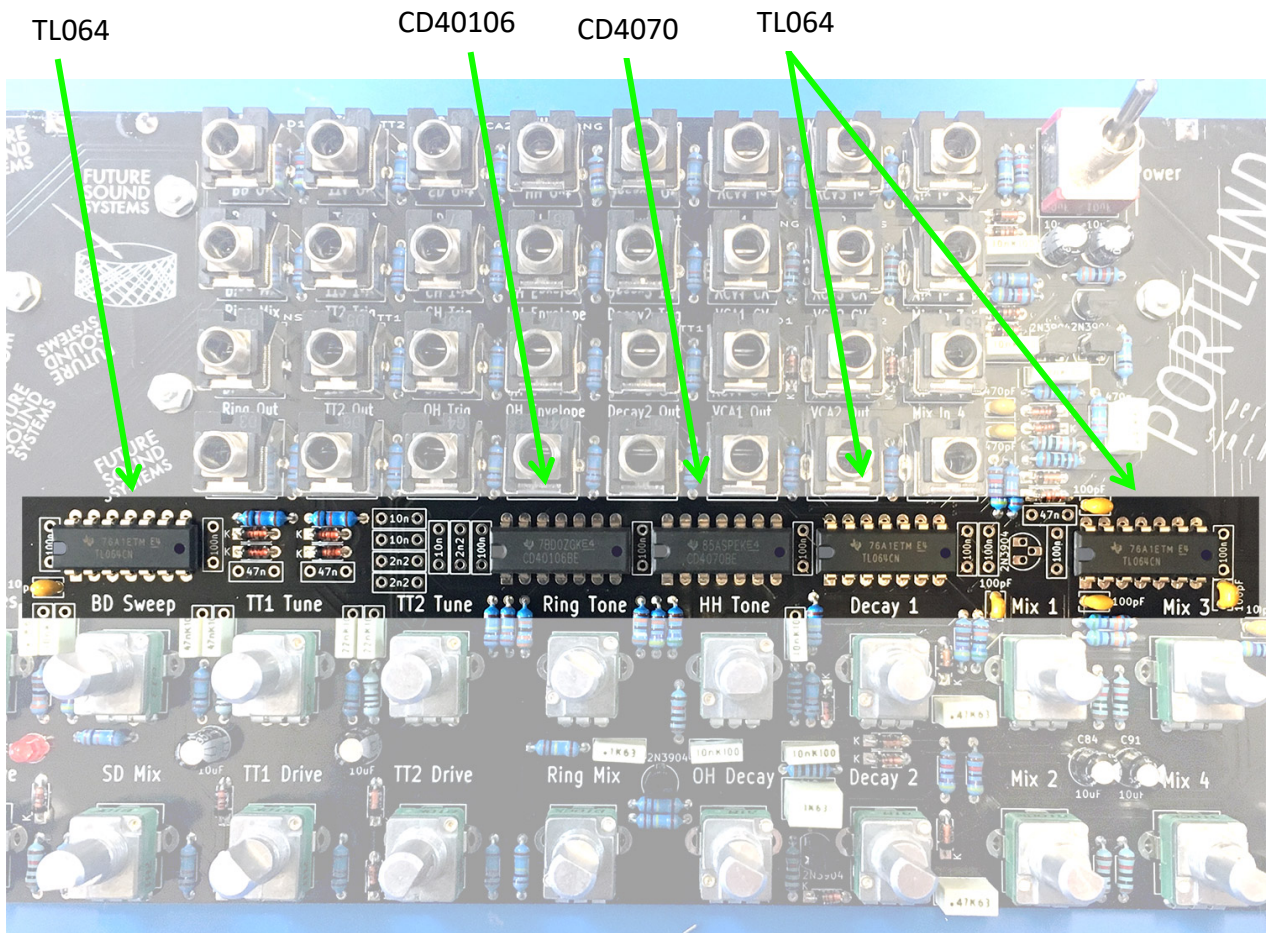
47 - The other two holes of the snap should then then line up with the PCB holes



48 - Now fit the other two sets of screws, nuts and washers and solder the two legs of the battery snap



49 - Next repeat the same sequence of steps for the other battery snap



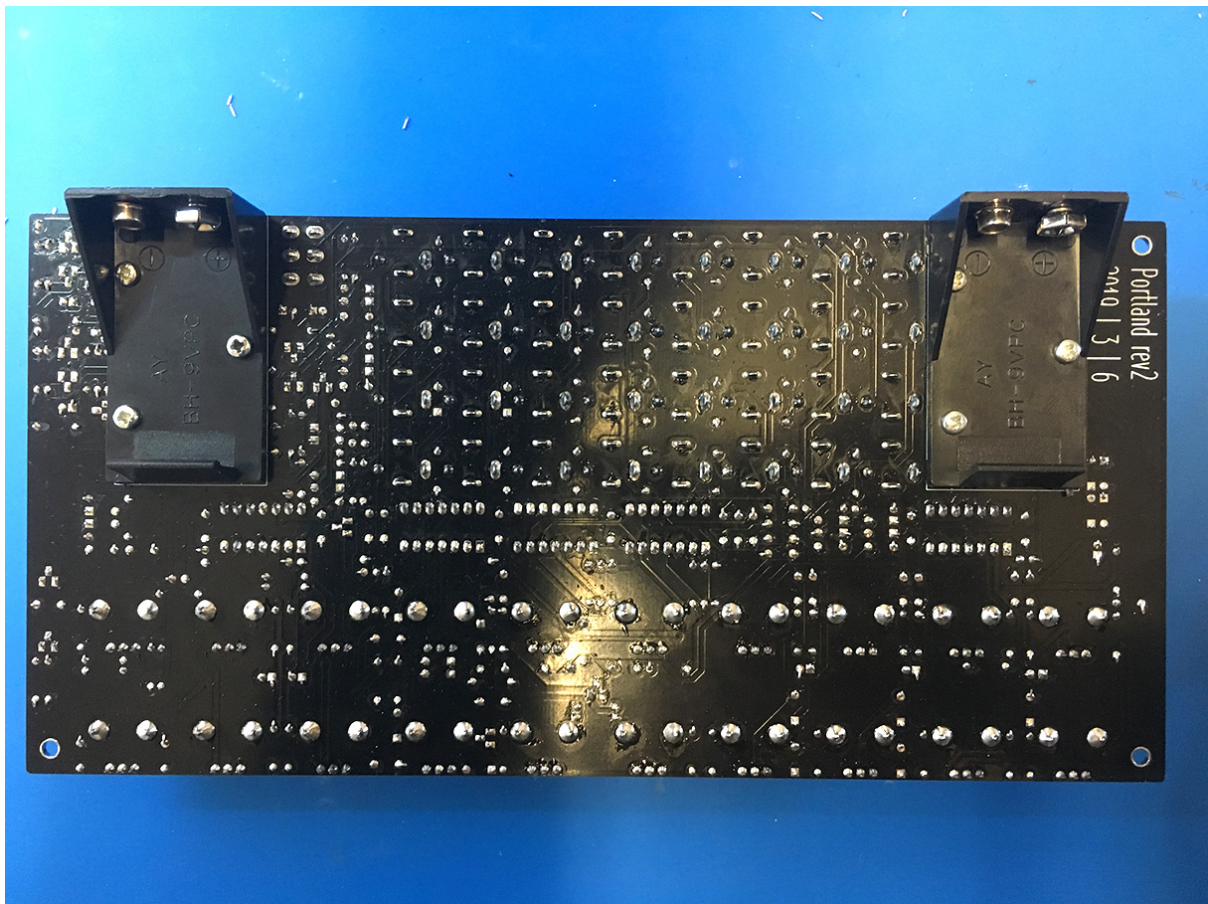
50 - Now paying attention to orientation, fit all the ICs into their sockets as shown.

Note: Orientation is vital for all IC's – be sure to match the notch on the chip with the notch on the IC sockets that were soldered in step 25.



51 - Your Portland build should then look like the photo above, you can now insert batteries and give your build a test.

It is recommended to use a fresh pair of batteries when testing your build.



52 - After a quick test of your Portland, you can solder any remaining joints if you decided not to solder the pot ground joints earlier on.



53 - Finally place the twenty knobs – the build is now finished!