Build notes for the Portabellabz SQ-1 Card

BOM

1 x Korg SQ-1 sequencer
1 x on-off-on subminiature switch
2 x 500k 3006P multiturn trimmers (marked 100k on the PCB)
2 x 100k resistors (marked 330k on the PCB)
1 x 10 ohms resistor
1 x LM7805
2 x 22µF electrolytic caps
2 x 100nF ceramic caps
2 x 1N4148 diodes
1 x male 8 pins Jones plug
4 x 24mm M3 female/female standoffs (or imperial equivalent)
9 x 8mm M3 screws (or imperial equivalent)
1 x M3 nut (or imperial equivalent)

Build

1. Unscrew all screws to open the metal case and pull out the knob.
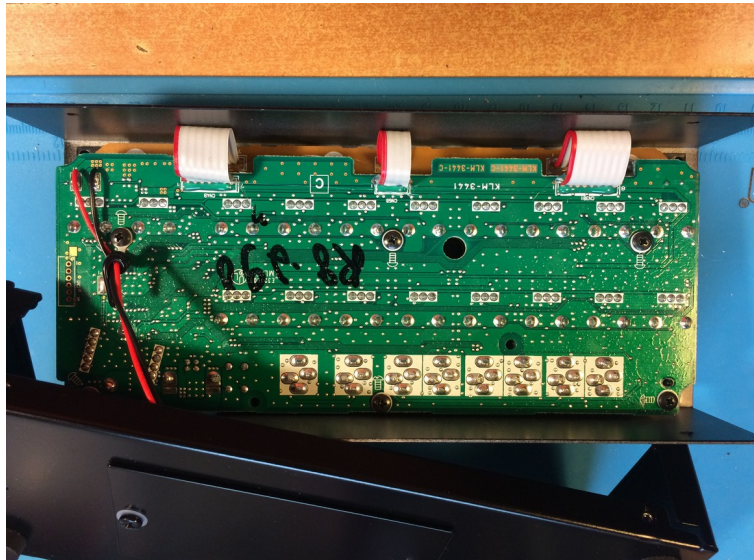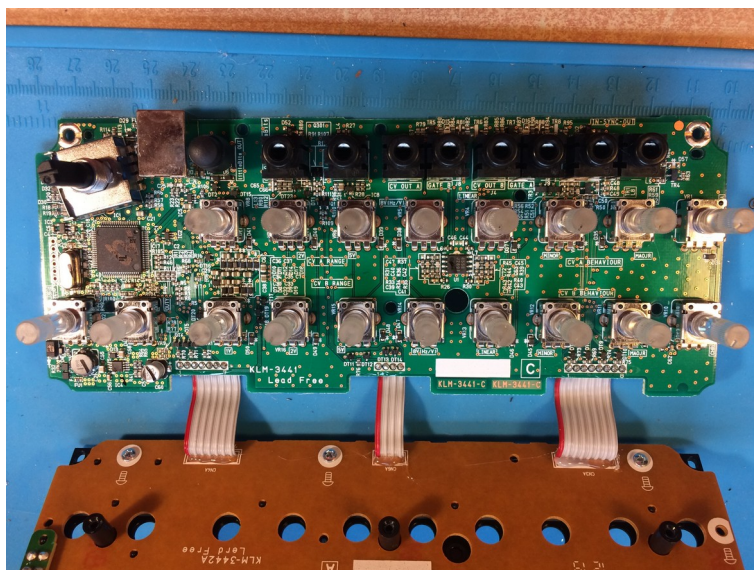

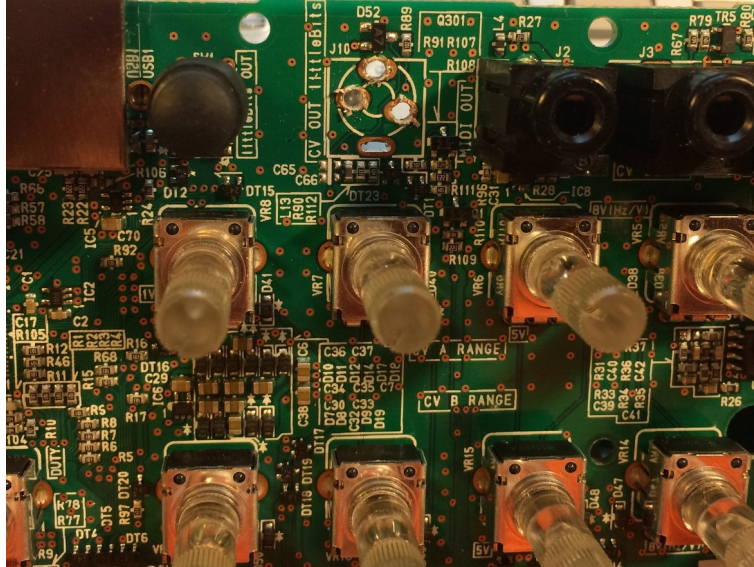2. Desolder the batteries cables.
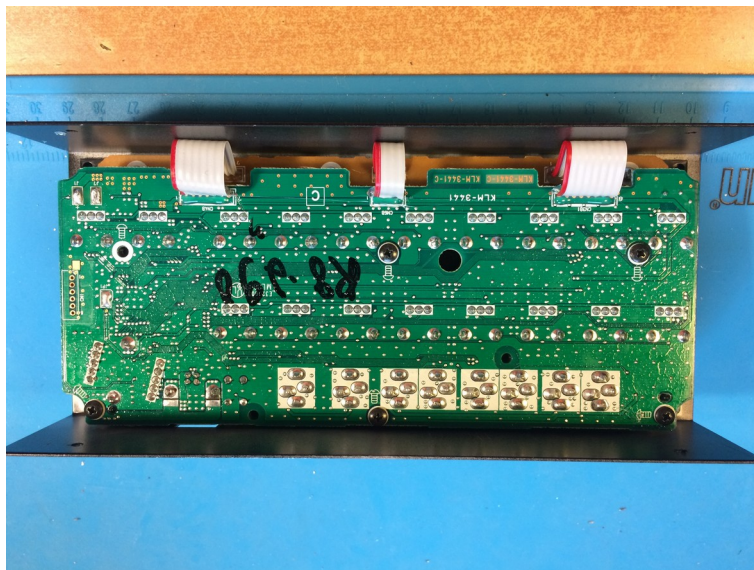
3. Unstick the circuit from the panel using a flat screwdriver, it's sticked with double sided tape and should come easily.
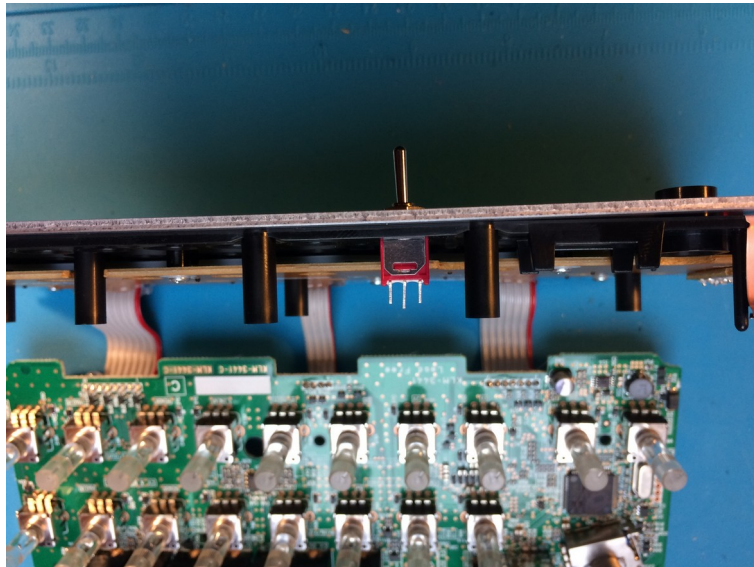

4. Unscrew the 6 PCB black screws and open the sequencer

5. Unsolder the first jack socket (littleBits OUT) located to the right of the power pushbutton and enlarge the mounting holes with a hand drill.
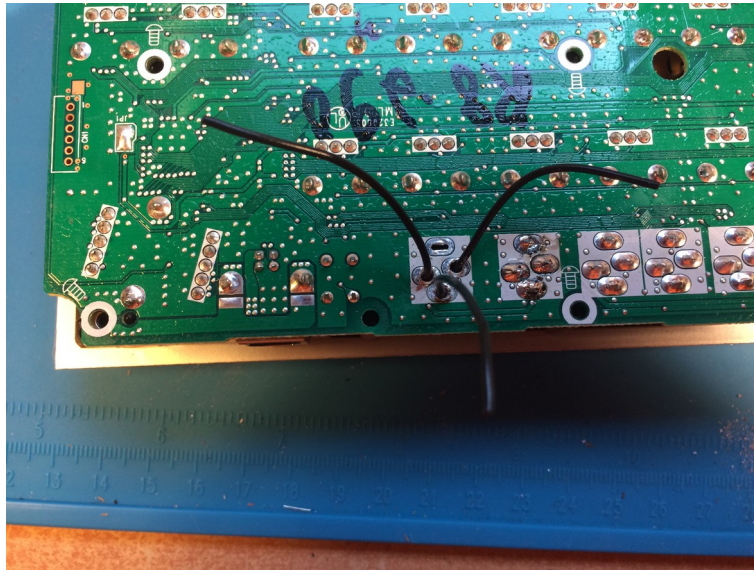

6. Remove the protective film from the aluminium panel's both sides and place it onto the sequencer circuit with the subminiature switch.
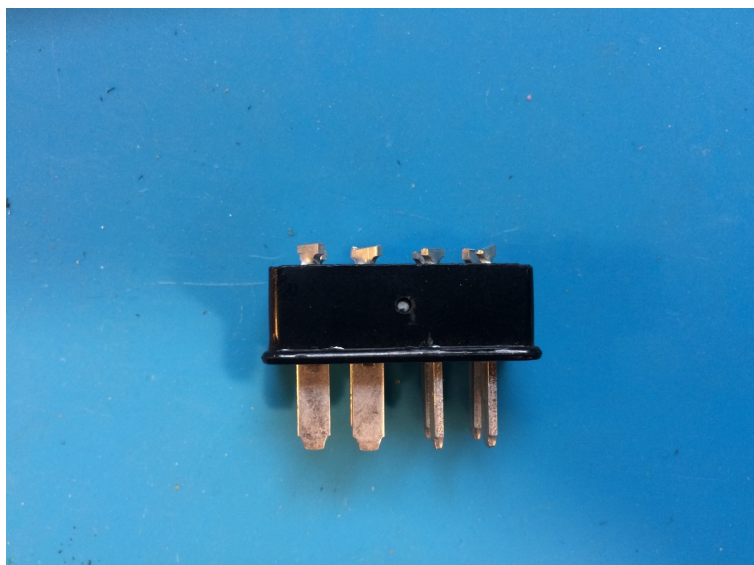

7. Solder 3 cables to the subminiature switch.
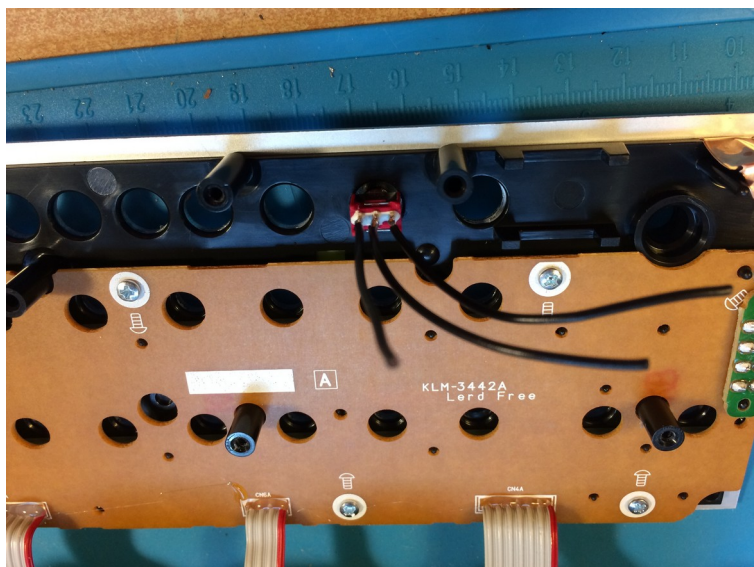
8. Run the cables through the holes of the removed jack socket emplacement, put the sequencer PCB back in place and rescrew it. Screw the standoffs in the panel corner holes.
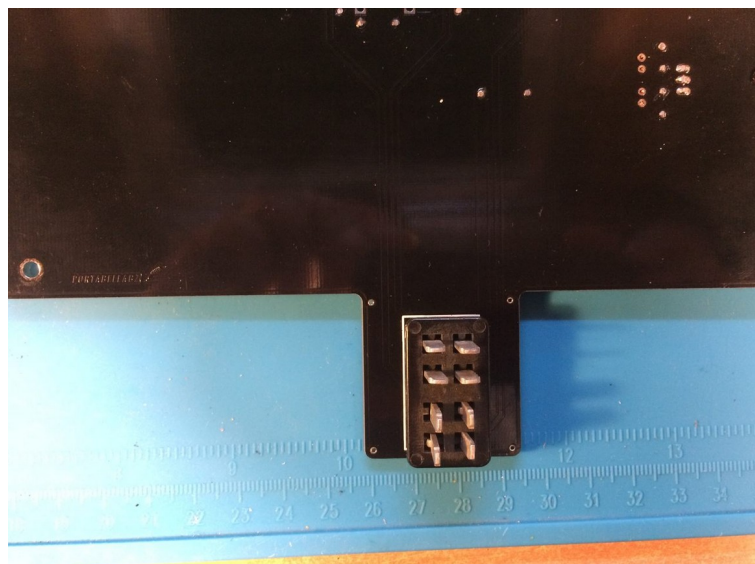

9. Populate the SQ-1 Card PCB

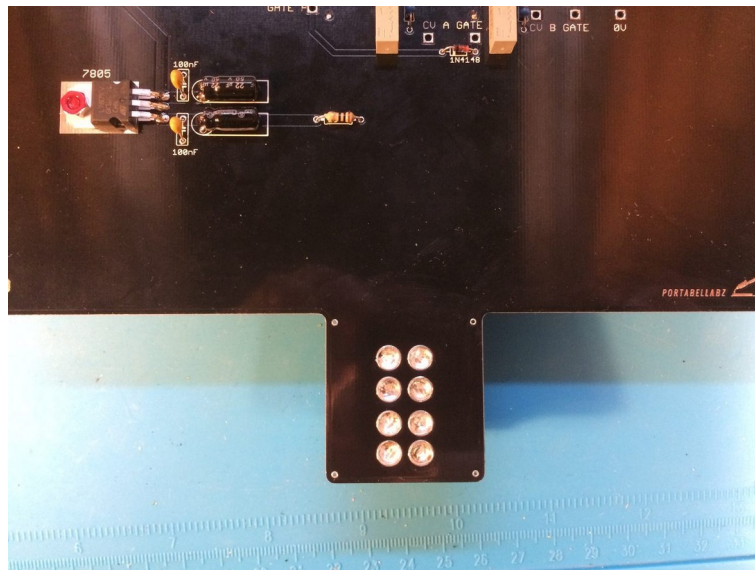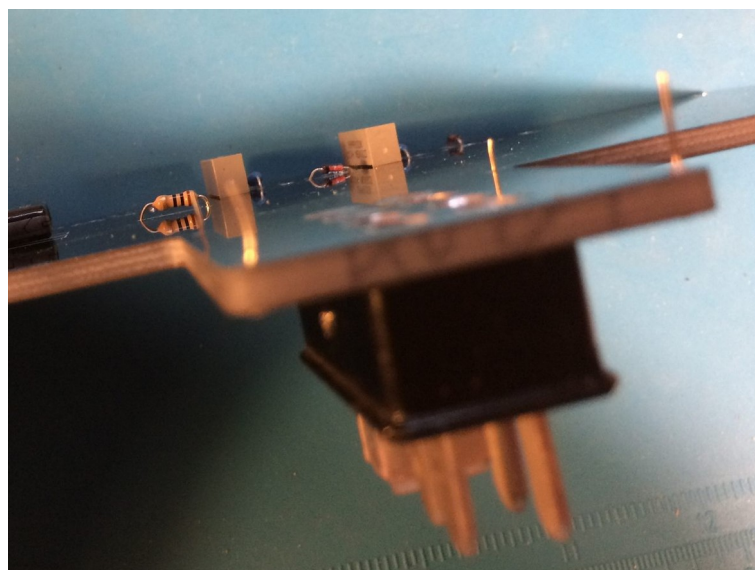10. Snip the Jones plug's solder lugs to make them shorter than 3mm.

11. Solder the Jones plug. Fill in the holes with solder.

12. Solder a component leg in each of the 4 holes in the corners.

13. Slot the cover along the 4 component legs, snip the exceeding leg and solder the cover.
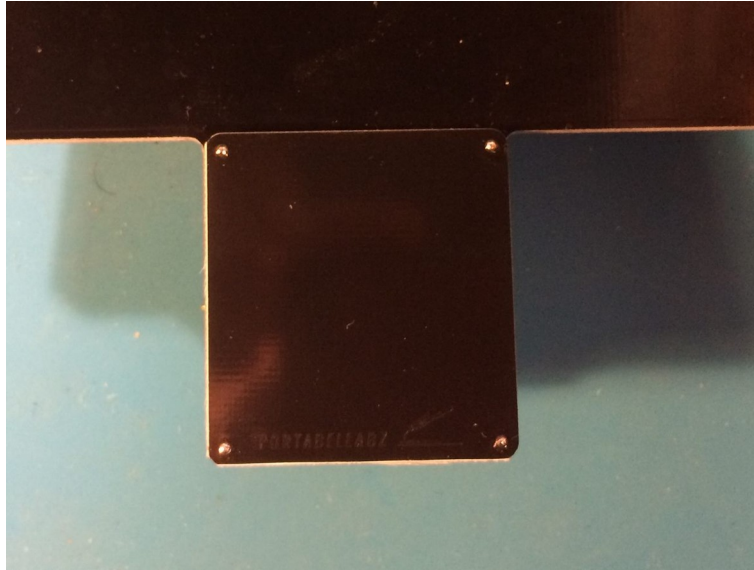
14. Proceed the same way to install the small plates of the handle support to the back of the SQ-1 Card.
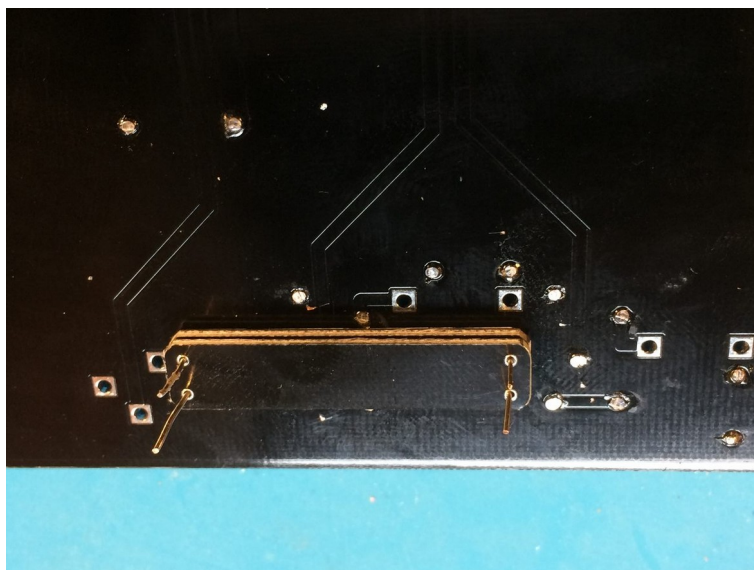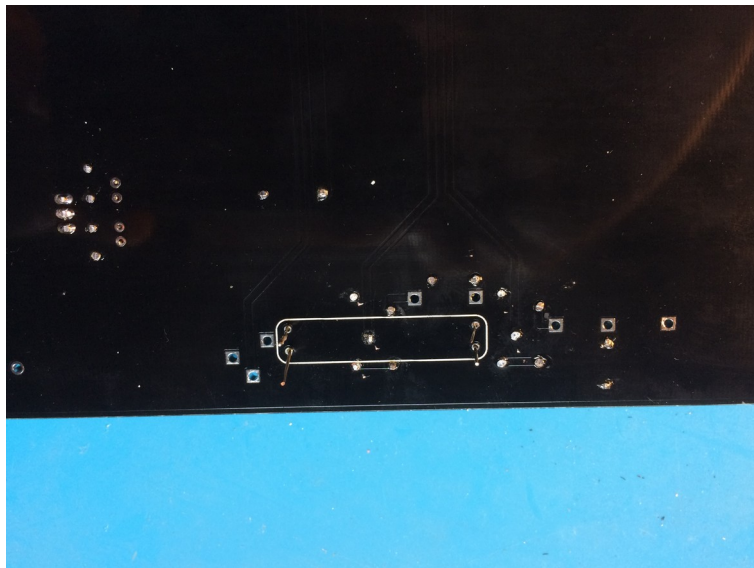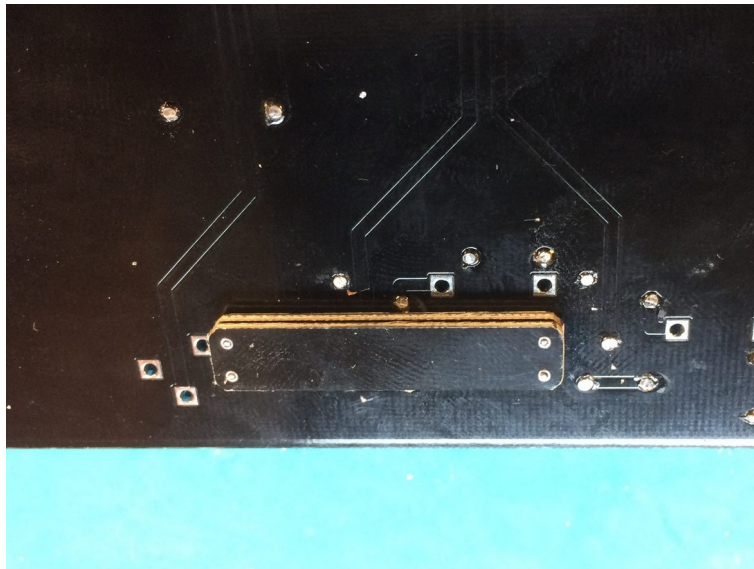
15. Connect the sequencer circuit to the SQ-1 Card.
The CV and gate cables to the corresponding jack tips.
The 0V cable goes to the closest jack sleeve.
The +5V cable to the solder joint shown on the close-up pic.
The switch cables to the pads in front of their holes.

16. Close the card and screw the standoffs to the back of the card.
It's done.

1V/oct calibration

Use the same pins whose value is matched 1% for calibration and performance to have always the same CV. It's good to measure and select a few pins that will be the same color or marked to use with the SQ-1 Card.

1. Install the SQ-1 Card to the Synthi's keyboard socket and power it on.
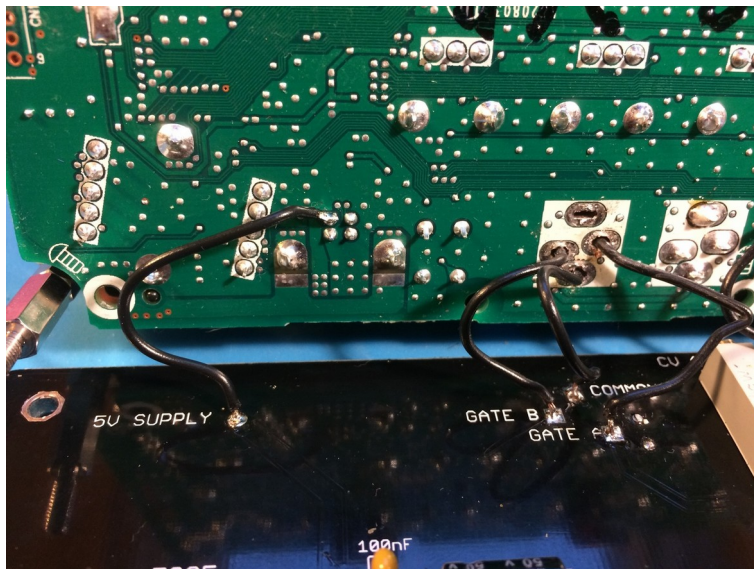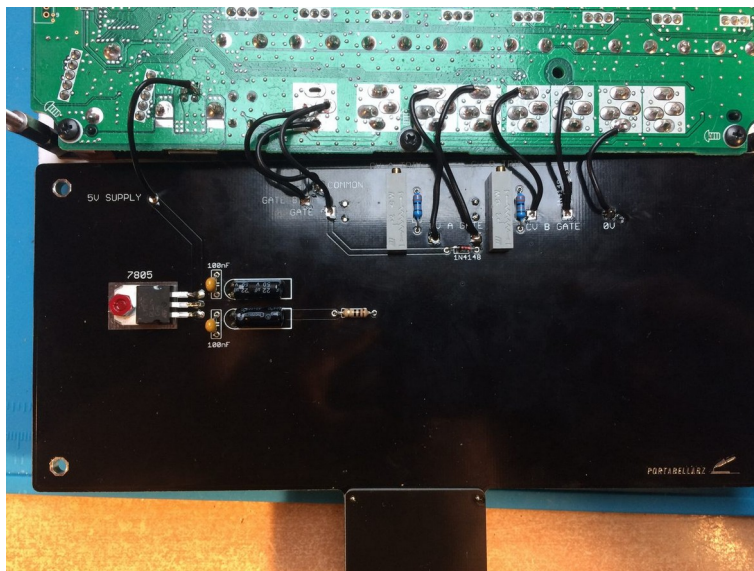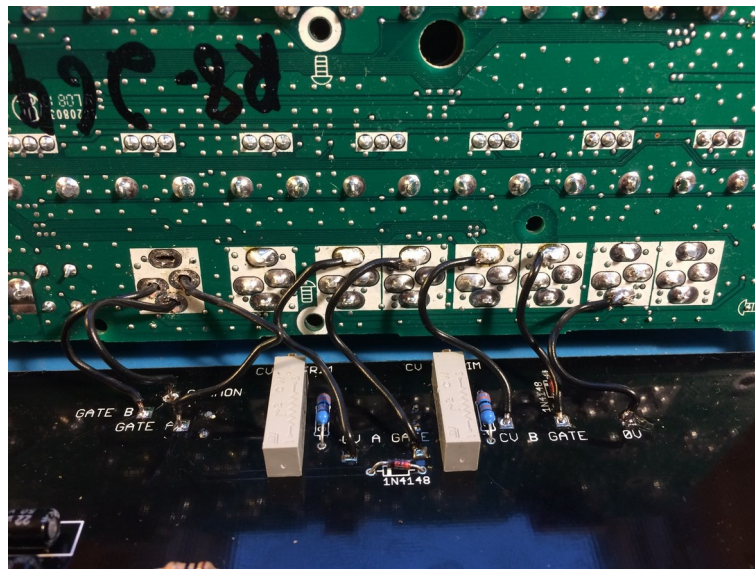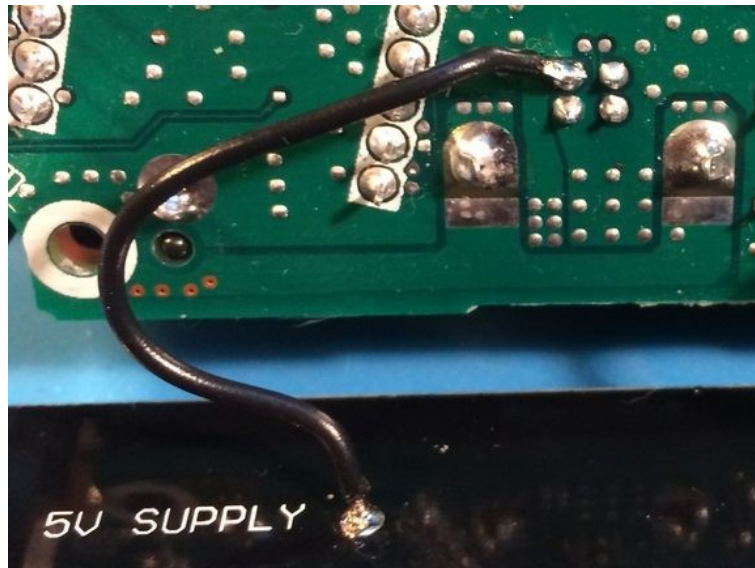2. Plug a minijack cable into the cv. A out mini jack socket and connect it's other end to a multimeter with crocodile clip cables (red probe to tip, black probe to sleeve).
3. Set the sequencer A row to 5V range and chroma behaviour.
4. Adjust the pots to have step 1 : 0V, step 2 : 1V, step 3 : 2V, step 4 : 3V, step 5 : 4V, step 6 : 5V.
5. Set the Synthi input level ch1 pot fully CW to 10.
6. Patch an oscillator to the output.
7. Patch a selected pin into row 8 to control this oscillator's frequency.
8. Set the oscillator's frequency vernier dial to around 4.5 to get an accurate note with step 1 (0V).
9. Move the sequencer to the step 2 (1V) and adjust the SQ1 Card's CV A trim to get a note 1 octave higher than the step 1 using your ear or a tuner.
10. Move the sequencer to the step 3 and readjust the SQ1 Card's CV A trim to be 2 octaves higher than step 1.
11. Proceed the same until step 6, with a good working Synthi you'd be able to get proper tracking over 5 octaves with minimal drift.
12. Proceed the same for the SQ1 Card's CV B via the input ch2 on row 9.

If you don't have a multimeter, you can calibrate the SQ-1 Card with any 1V/oct CV/gate keyboard (or midi to CV converter).

1. Install the SQ-1 Card to the Synthi's keyboard socket and leave it powered off.
2. Plug the 1V/oct controller's CV output into the cv. A out mini jack socket.
3. Set the Synthi input level ch1 pot fully CW to 10.
4. Patch an oscillator to the output.
5. Patch a selected pin into row 8 to control this oscillator's frequency.
6. Set the oscillator's frequency vernier dial to around 4.5 to get an accurate note with the keyboard's lowest note (0V).
7. Play the key 1 octave higher and adjust the SQ1 Card's CV A trim to get a note 1 octave higher using your ear or a tuner.
8. Proceed the same until 5 octaves, with a good working Synthi you'd be able to get proper tracking over 5 octaves with minimal drift.
9. Proceed the same for the SQ1 Card's CV B via the input ch2 on row 9.

From the factory, the Synthi is unbuffered and patching more than 1 pin into rows 8 and 9 will cause CV drop.
Buffering rows 8 and 9 fixes this and can be done with the supplied buffer chicklet, more details on
http://www.portabellabz.be/synthipcbs.html#buf