# nonlinearcircuits

## 8bit Cipher build & BOM vers.1

**For build pictures go to http://nonlinearcircuits.blogspot.com.au/2016/10/8bit-cipher-panel.html**

This module is based on the one part of the Buchla Source of Uncertainty/Random Voltage source, although it has been modded somewhat to obtain 4 CV and 9 gate outputs. It requires a clock signal and a signal on at least one of the data inputs to operate.

The sync input makes it a bit like an 8 bit sample and hold. If nothing is inserted into the sync jack the module carries on as normal. When a signal is introduced to sync, the data obtained from the data jack is only loaded onto the outputs when the sync signal is high.

Like virtually everything else in the NLC synth, any signal crossing 1V can be used as a clock or data signal. The best way to see what it does is feed it two signals from different sources, say two LFOs. Leave the clock signal steady and vary the frequency of the signal to the data input. Also try different wave-shapes such as square, sawtooth or triangle. You will see how the data is shifted down thru the stages.

It takes a little bit of tweaking to get the data moving thru in patterns you like, but should be very easy to see what is happening by watching the LEDs.

Once you have it running nicely, connect one of the CV outputs to a VCO and have a listen to the patterns. Tweak the signal on the data input to see how this changes. The first & final stages are fed back to Data input2 via a crude XOR circuit. If nothing is patched into this input, the feedback signal will ensure a nice level of complexity to the output patterns.
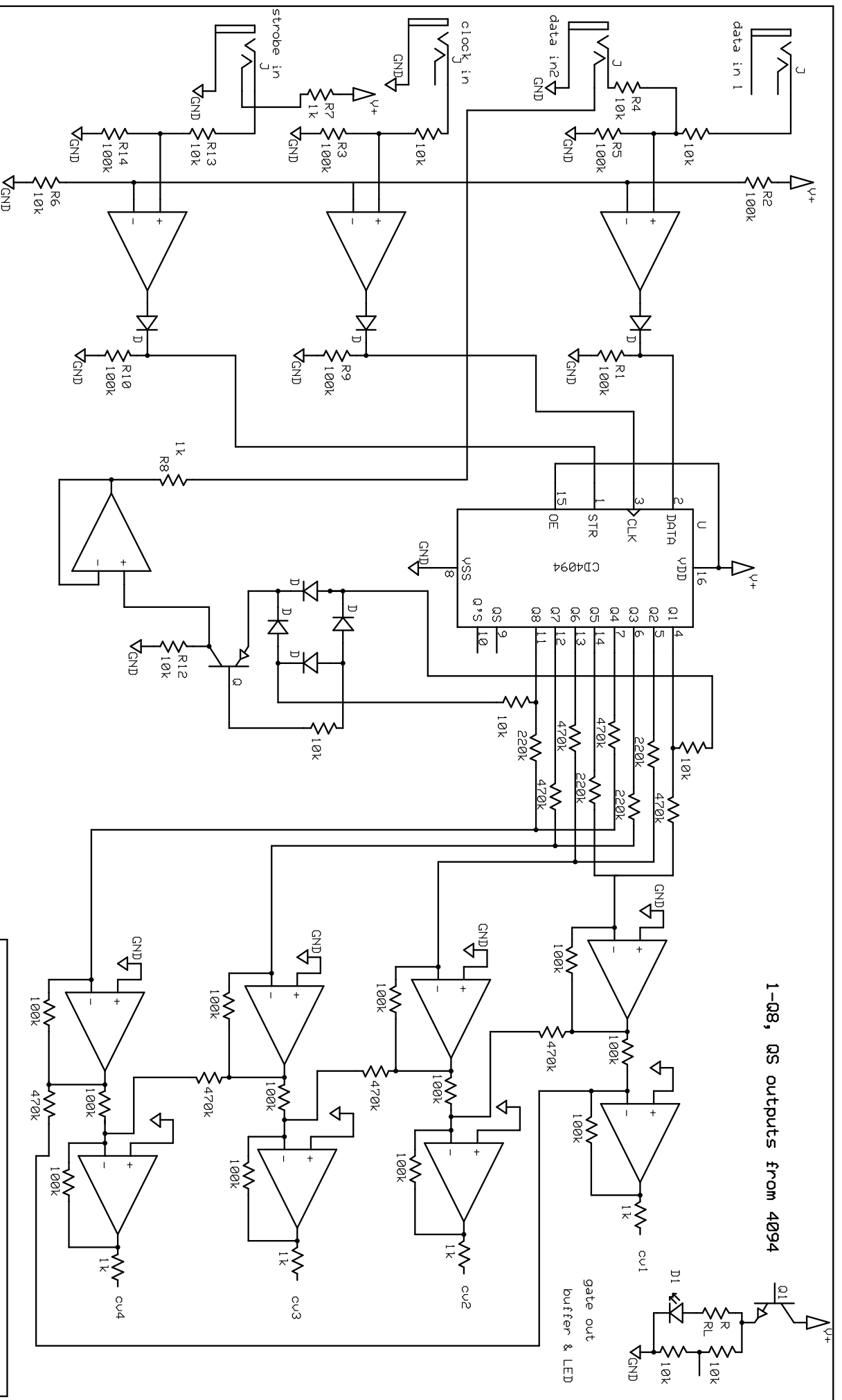
The CV outputs are all related to each other but are all different; part of CV1 is fed to CV2, part of CV2 is fed to CV3 etc.

The stage outputs are great for driving drum modules….or anything you like.

| component | quantity | notes | component | quantity | notes |
|---|---|---|---|---|---|
| TL074 | 3 | SOIC Tayda# A-1137 | 10Ω | 2 | thru-hole better to use rectifier diodes, like 1N4002 **Vers.4 PCB – use sod-123 schottky diodes (min rating 30V, 0.25A/250mA)** |
| 4094 | 1 | SOIC CMOS Mouser# 511-HCF4094YM013TR | 1k | 6 | 0805 |
| BC847 | 9 | SOT-23 NPN Tayda# A-1339 | 10k | 27 | 0805 |
| BC857 | 1 | SOT-23 PNP Tayda# A-1345 | 100k | 19 | 0805 |
| LL4148 | 7 | diode SOD-80 | 220k | 4 | 0805 |
| | | | 470k | 8 | 0805 |
| 10uF | 2 | electrolytic 25V or higher rating **Vers.4 PCB – must be 0805 min 25V rating (not electrolytic)** | RL | 9 | select resistor to suit LEDs, for WAMOD this will be 10k |
| 100nF | 3 | 0805 | 3mm LED | 9 | 3mm!!! **not** 5mm |
| 10 pin euro power connector | 1 | (2x5) Tayda# A-198 | 3.5mm thonkiconn type socket | 17 | Tayda# A-2563 (PJ-3001F) |
| 40 pin single | 1 | break into three sections | 10 pin single | 3 | Tayda# A-1306 |

| row header | | of 10<br>Tayda# A-197 | row female<br>header | | |
|---|---|---|---|---|---|

data in 1
J

data in2
GND
J

clock in
GND
J

strobe in
GND
J

R4 10k
R5 100k
GND
10k
R2 100k
V+

R3 100k
GND
R7 1k
V+
10k

R13 10k
R14 100k
GND
R6 10k
GND

R1 100k
GND
D

R9 100k
GND
D

R10 100k
GND
D

R8 1k

R12 10k
GND
Q
D
D
D
D
10k

U
CD4094
16 VDD
2 DATA
3 CLK
1 STR
15 OE
8 VSS
GND

Q1 4
Q2 5
Q3 6
Q4 7
Q5 14
Q6 13
Q7 12
Q8 11
QS 9
Q'S 10

V+

220k
470k
470k
220k
470k
470k
220k
220k
470k
470k
10k
10k

1-Q8, QS outputs from 4094

100k
GND
100k
100k
470k
100k
cv1
1k

100k
GND
100k
470k
100k
100k
cv2
1k

100k
GND
100k
470k
100k
100k
cv3
1k

100k
GND
100k
470k
100k
100k
cv4
1k

gate out
buffer & LED

Q1
D1
RL
R
V+
10k
GND
10k

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8bit
cipher
BTM
vers2

serial

j=jack
L=LED

serial
serial

L
j
L
j
L
j
L
j
L
j

4

3

X

4

X

3

7

8

8

7

L
j
L
j
L
j
L
j
L

1

2

5

6

j
gnd

2

X

1

X

X

5

strSw

cv4    cv2        str  dSW  data  ck

xor    cv3    cv1
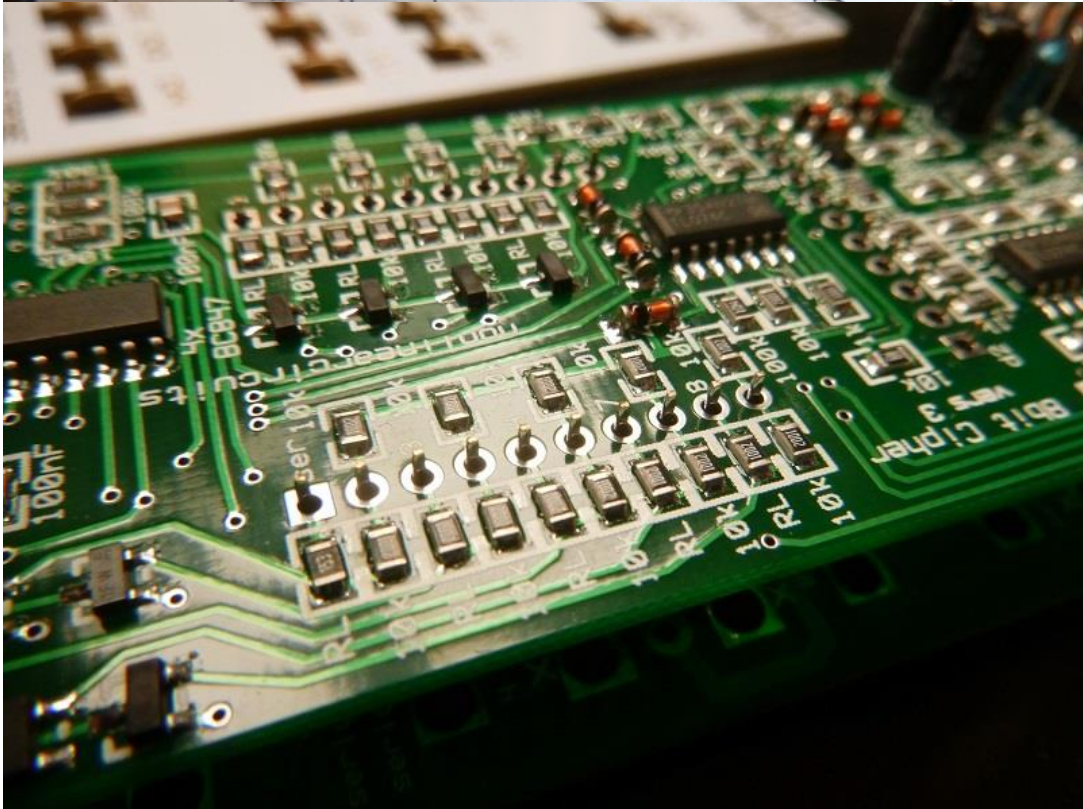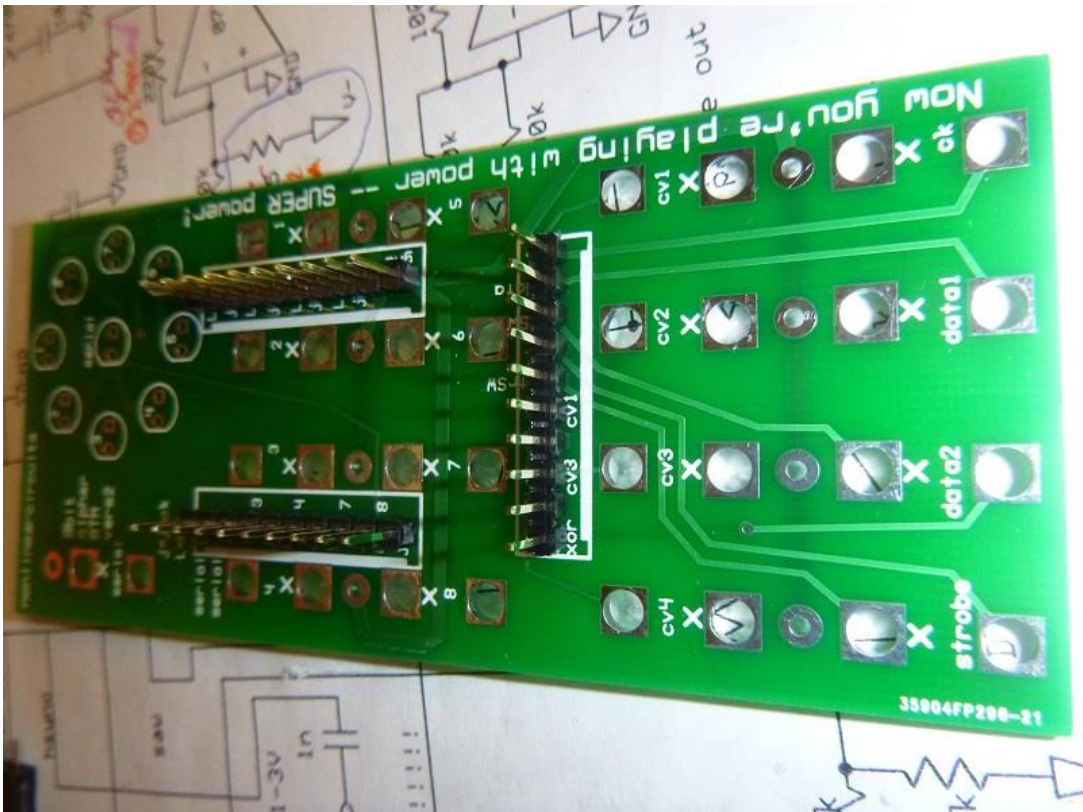
cv4

cv3

cv2

cv1

X

X

X

X

strobe    data2    data1    ck

serial
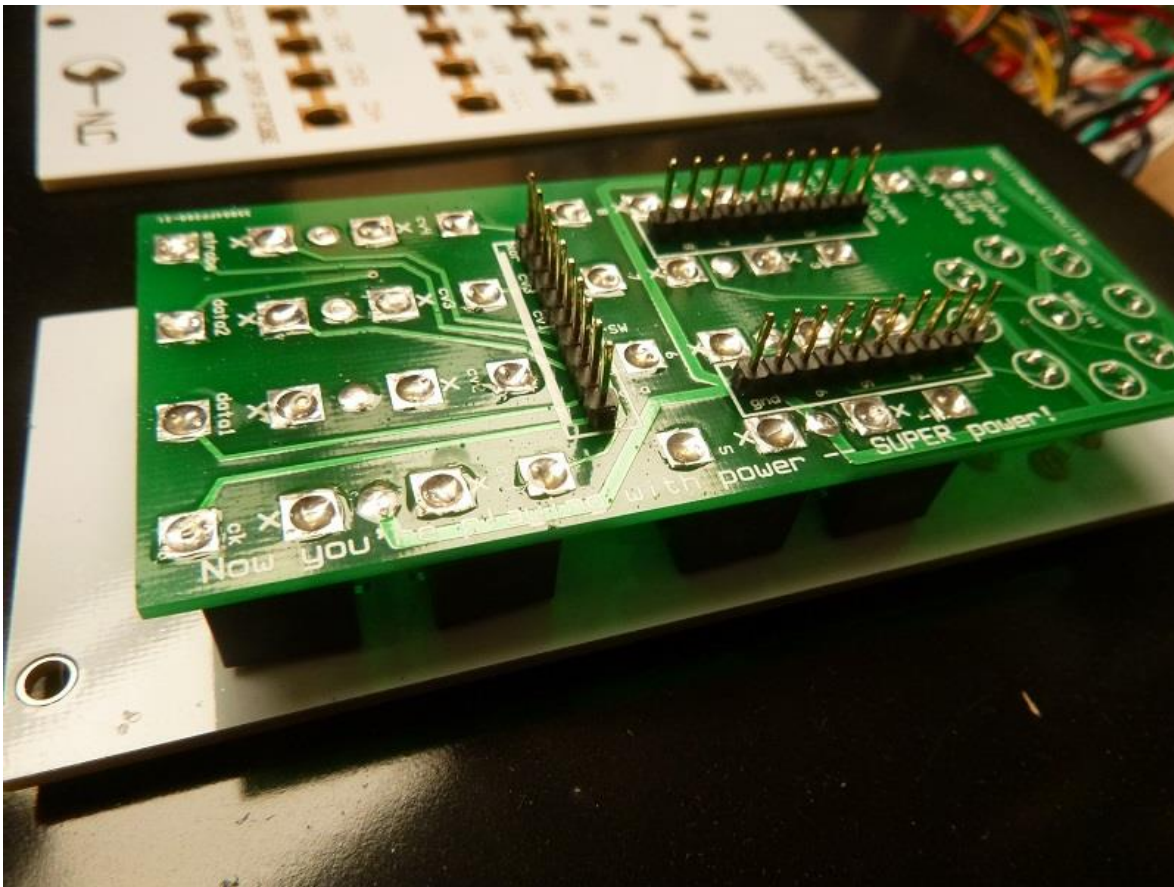
Now you're playing with power - SUPER power!
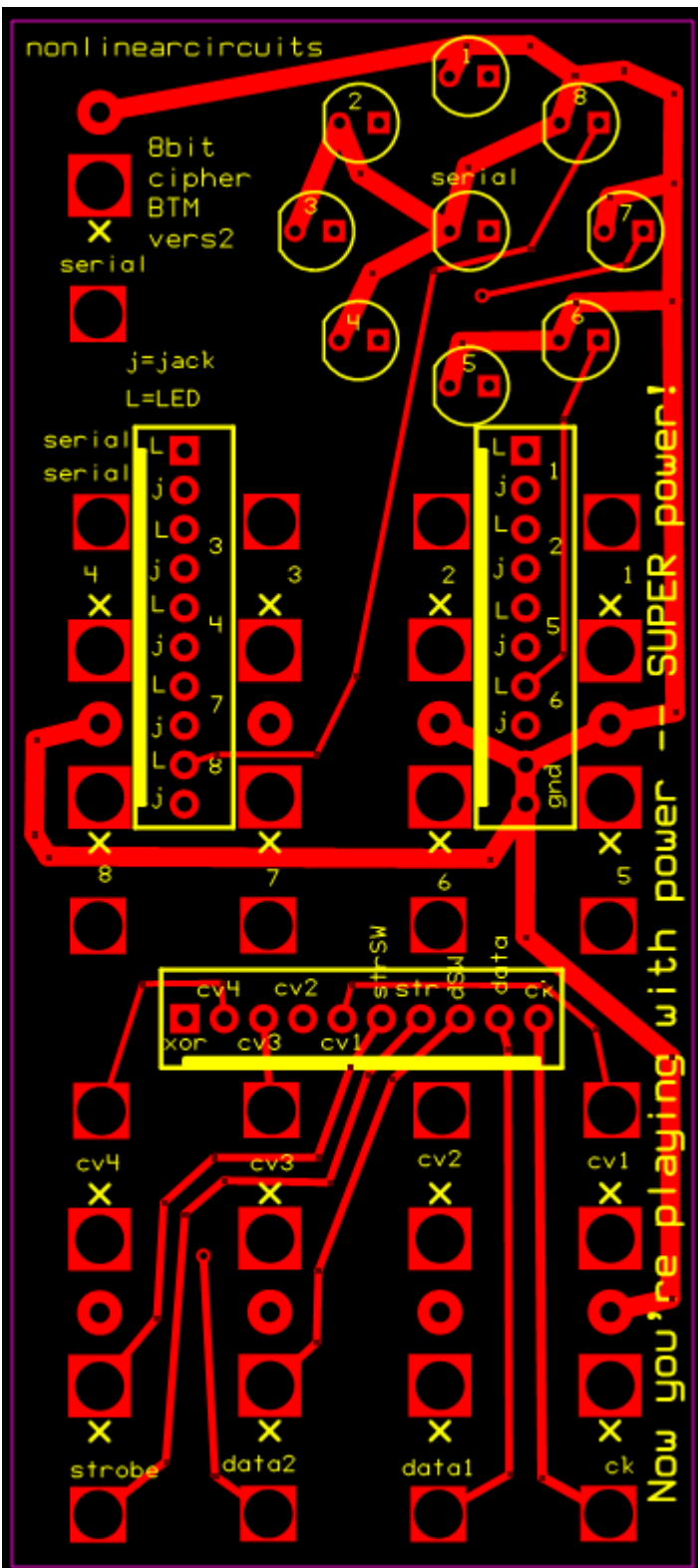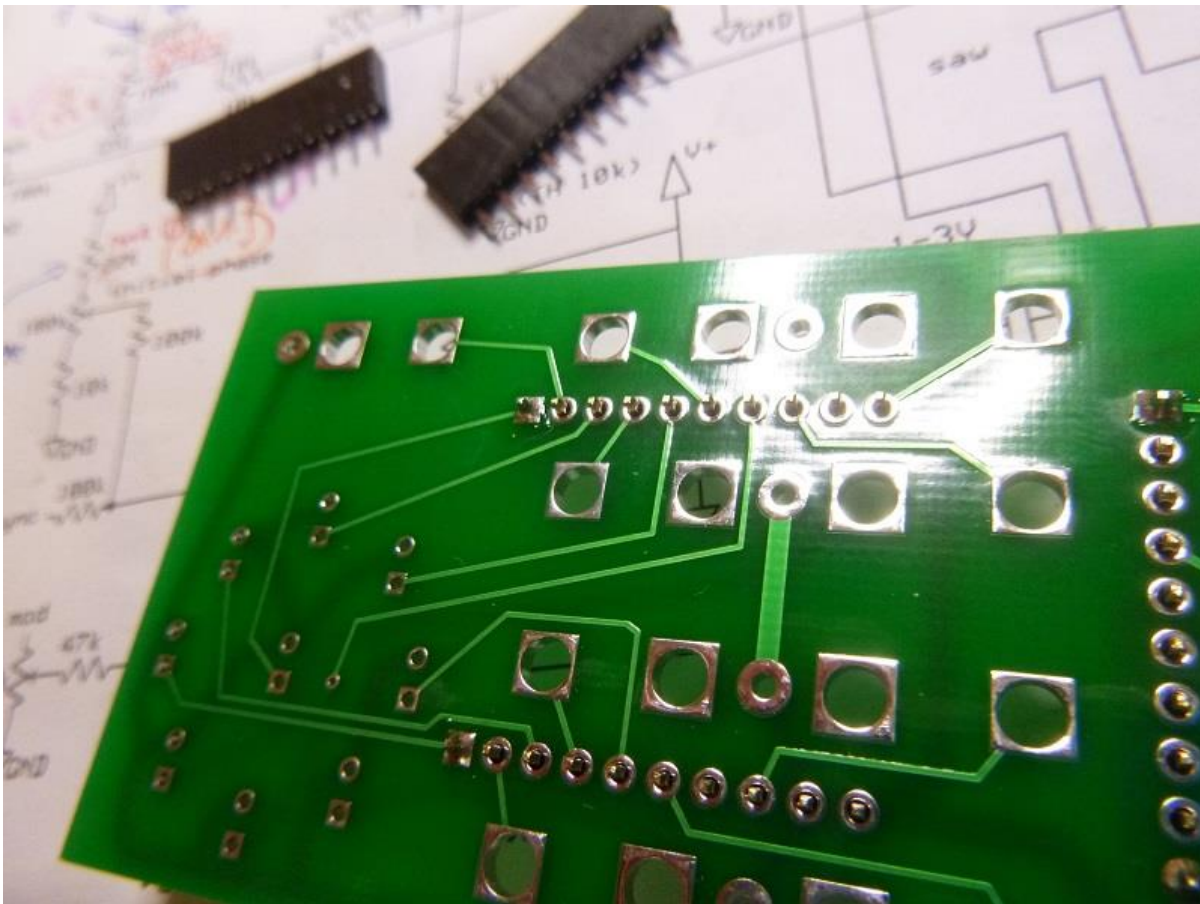
Place the connectors on the bottom PCB, solder the 2 end pins 1st and check they are standing perpendicular to the PCB. Correct if necessary and then solder the rest.
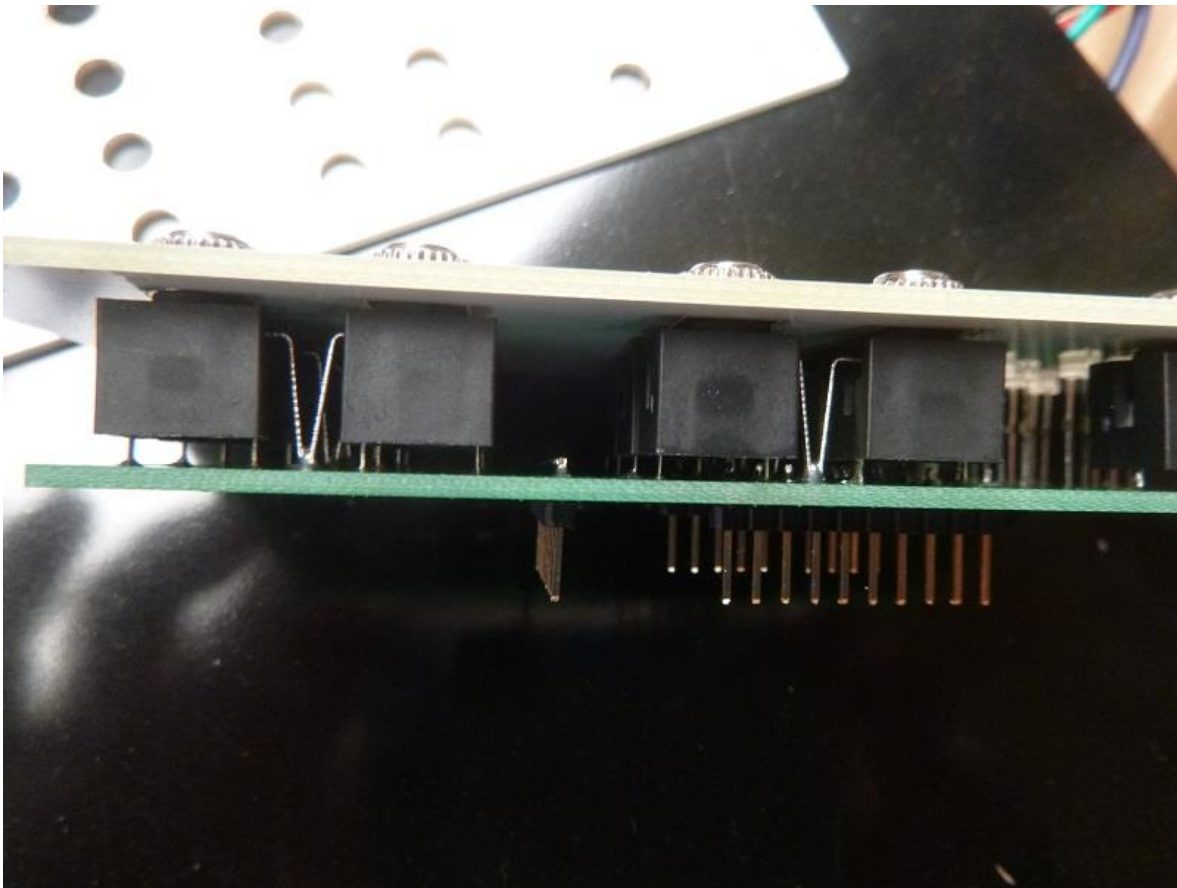
Place the other connectors onto the engine PCB, do not solder them yet
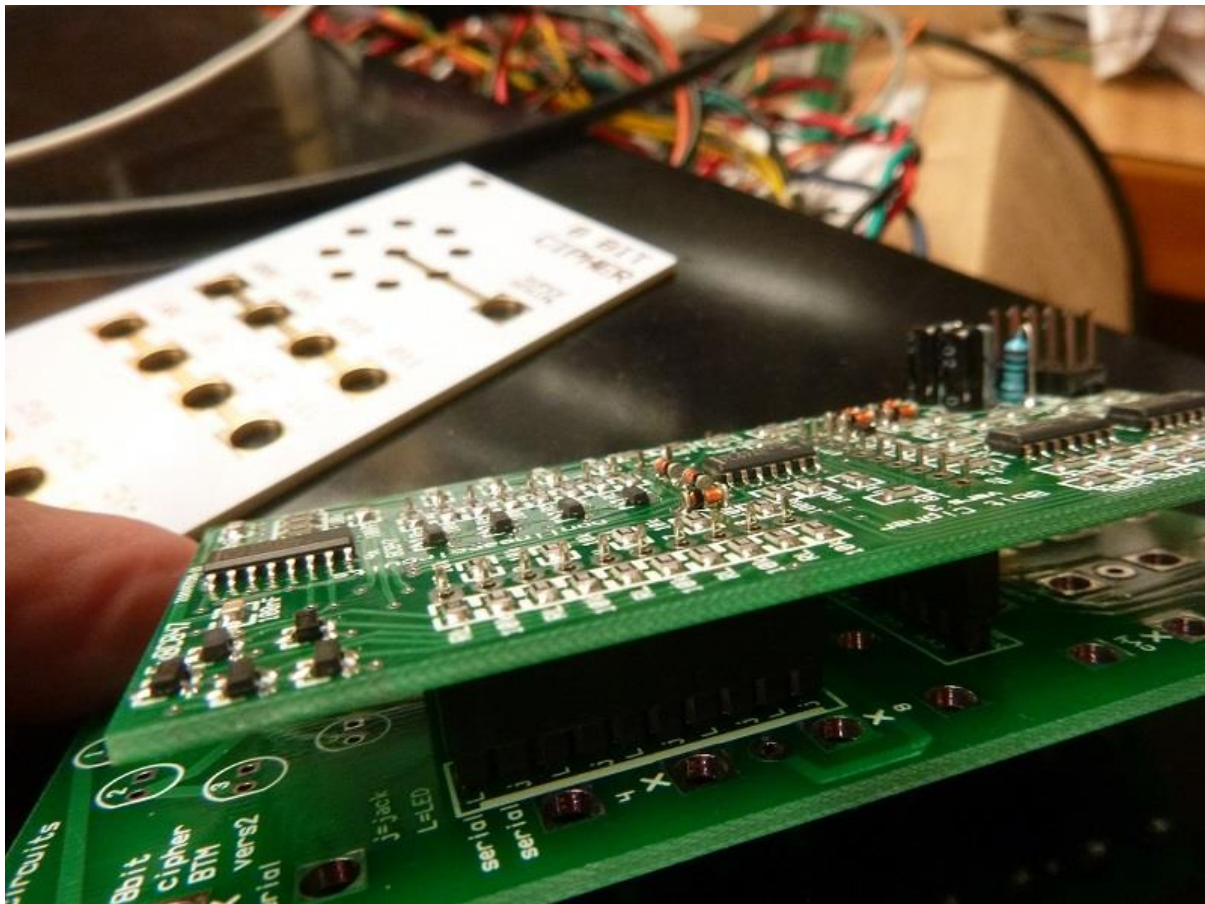
Connect the PCBs and when nice and snug, solder the connectors to the engine PCB



 Remove the upper PCB and install the sockets & LEDs. It might be nice to install a different coloured LED for the centre (serial) position. I found it easiest to place the sockets on the PCB (unsoldered) then place the panel over them. It takes a little bit of jiggling, then hold the two together with one hand and screw the nuts on. Finally solder it all up.

Note: rows of jacks share ground tabs

Now you're playing with power -- SUPER P