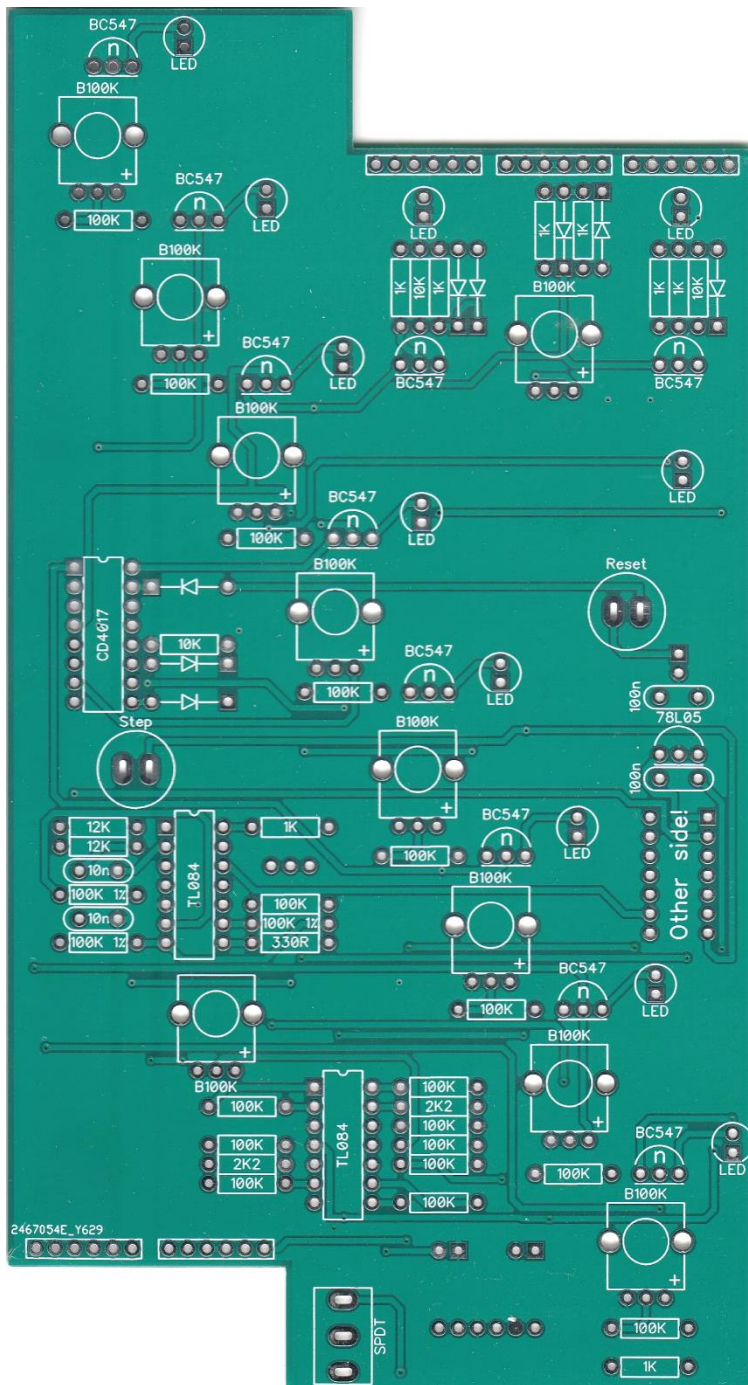# FREQUENCY CENTRAL

Build documentation for:

BERLIN SCHOOL

A flexible 8 step analogue sequencer under digital control

Berlin School features a main PCB and 5 socket chicklets (one group of 3, one group of 2):

Main PCB

Socket chicklets

Berlin School is based around the classic CD4017 Johnson counter chip, under the control of a 16F1765 PIC which provides a few novel features:

- Onboard clock division: /1, /2, /3, /4, /5, /6, /7, /8
- External voltage control of clock division
- Quantised output (chromatic)
- Quantised manual transpose (chromatic)
- Quantised voltage controlled transpose (chromatic)
- 4 step / 6 step / 8 step options

Bill of Materials

330R x 1 1K x 8 2K2 x 2 10K x 3 12K x 2 100K x 17 100K, 0.1% x 3* All resistors ¼ watt metal film.	10nF x 2 100nF x 1 10uF electrolytic x 1 47uF electrolytic x 2	BERLIN SCHOOL PIC CD4017 TL084 x 2 BC547 x 10 78L05 x 1 1N4148 x 8 5mm red LED x 11 14 pin socket x 3 16 pin socket x 1	B100K x 10 10K trimmer SPDT toggle x 1 (on/off/on) Push Button x 2 6.3mm socket x 5 Male 40 pin header x 1 Female 40 pin header x 1 DOTCOM 6 pin header
*100K 0.1% x 3 These are the three matched resistors for the output stage. They don't have to be 100K exactly, they just have to be matched to each other, so for example if they are all 99.9K that's fine. Grab a bunch of 100K resistors, measure each one, make little piles of 100.1K, 100K, 99.9K etc. Before long one of the piles will have three resistors in it, that's your matched set! Should only take 5 minutes – like this!			

Please observe correct polarity of the electrolytic caps, voltage regulators, transistor, ICs etc!

Main PCB:

Populate the Main PCB front first, as shown on the silkscreen, starting with the lowest profile components, so:

- Resistors, diodes
- IC sockets
- Non-electrolytic capacitors, transistors and voltage regulators
- Panel mount components (pots, switches, LED) – it can be useful to use the panel to make sure of nice fit.
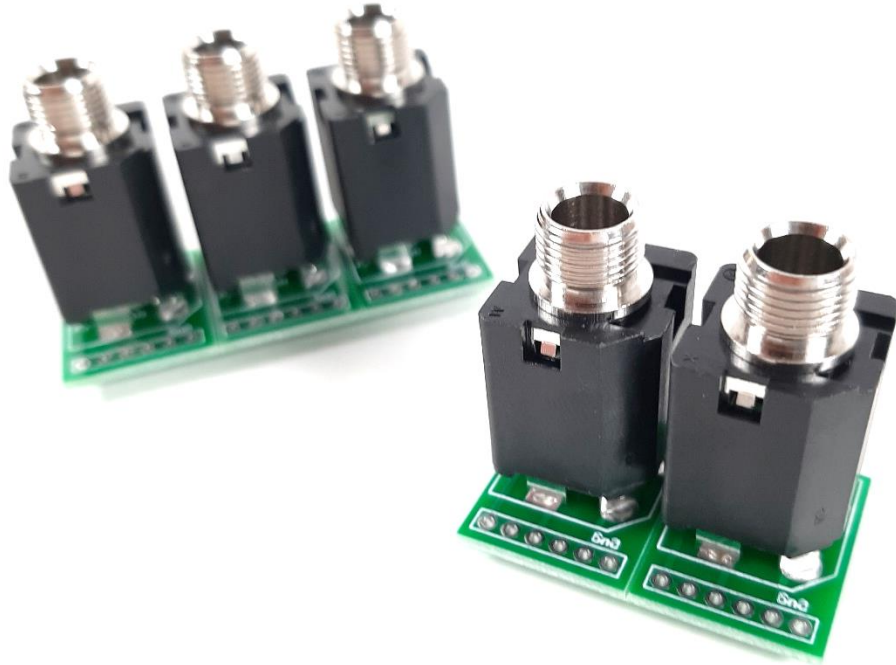
Now populate the rear of the Main PCB:

- Trimmer
- Headers for sockets chicklets
- Power header
- Electrolytic capacitors
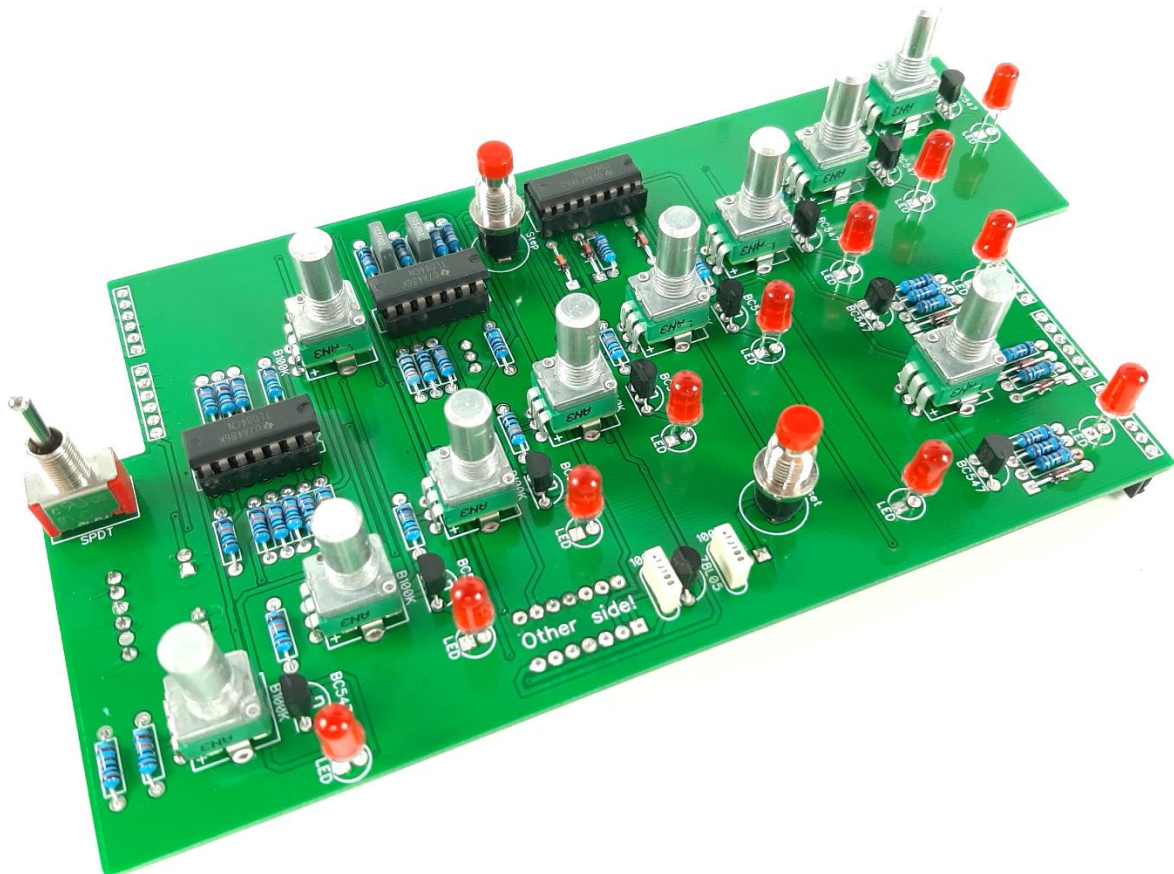
Sockets PCB

- DO NOT split the 3 x socket chicklets and the 2 x socket chicklets
- Solder the sockets to the socket chicklets, each socket sits on it's silkscreen footprint

Final Assembly

1. Present the pcb to the panel, and bolt the two together using the washers and nuts for the pots and switch
2. Cut 5 pieces of male header to be 6 pins wide. Place the long end of each into the 5 female headers.
3. Present each socket set pcb assembly to the main pcb, bolt into place, making sure that the male headers line up with their places on the socket pcbs. Solder the male headers to the sockets pcbs.
4. Bolt the sockets into place.

Calibration

1. Set all 8 step knobs fully clockwise
2. Plug a patch cable into Berlin School's CV Out
3. Using the STEP button, advance Berlin School to any step
4. Using a digital multimeter (DMM), connect the black probe to the sleeve of the patch cable (ie ground), connect the red probe to the tip of the patch cable (I find a couple of crocodiles can help here)
5. Set the DMM to read DC voltage
6. Adjust the trimmer on the back of Berlin School until the DMM reads 5.00V

Berlin School is a genre of electronic music which originated in West Berlin in the 1970s. The sound consists of ambient elements combined with short, repeating sequences.

https://www.frequencycentral.co.uk/