

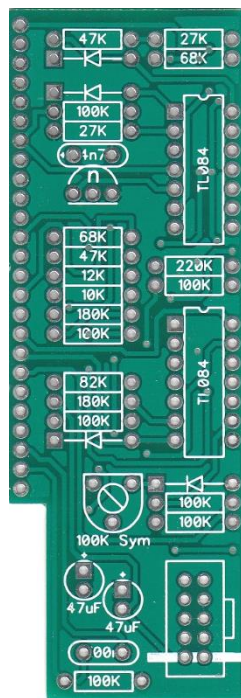
FREQUENCY CENTRAL

Build documentation for:

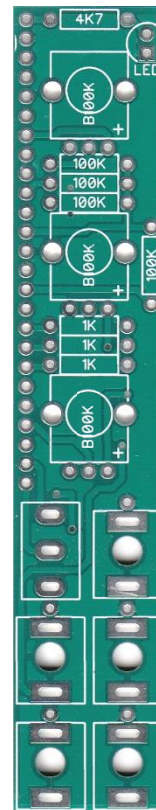
SHAPES

Wide ranging oscillator with multiple shaping options and one-shot mode.

Main PCB



Control PCB



Shapes is a 4HP wide ranging oscillator which operates in both low frequency and audio domains.

Tricks to try:

Key to PCB screen print:

p: This signifies NPN BC547 transistors. Note the correct pinout as shown by the half circles.

The PCB shows the correct orientation for BC547. Other similar transistor types can be used, but please observe the correct pinout.

Please observe the correct polarity of the electrolytic capacitors and diodes.

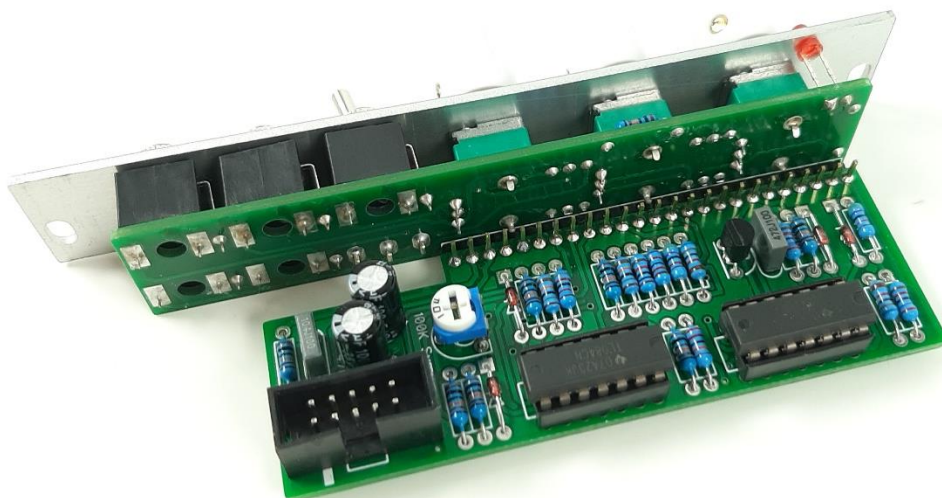
You will notice that all of the components listed below are also hyperlinks to where you can buy each specific part from. You can also use the hyperlinks to find out more about what each component looks like. If you want to know even more, [Google](#) is your friend.

Bill of Materials

1K x 3 4K7 x 1 10K x 1 12K x 1 27K x 1 47K x 2 68K x 1 82K x 1 100K x 11 180K x 2 220K x 1 <u>All resistors ¼ watt metal film.</u>	<u>4n7 x 1</u> <u>100nF x 1</u> <u>47uF x 2</u>	<u>TL084 x 2</u> <u>BC547 x 1</u> <u>1N4148 x 4</u> <u>3mm red LED</u> <u>14 pin socket x 2</u>	<u>B100K x 3</u> <u>SPDT toggle x 1</u> <u>100K trimmer x 1</u> <u>3.5mm socket x 5</u> <u>Male 90° header x 1</u> <u>Box header x 1</u> <u>Knob x 3</u>
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Main PCB assembly

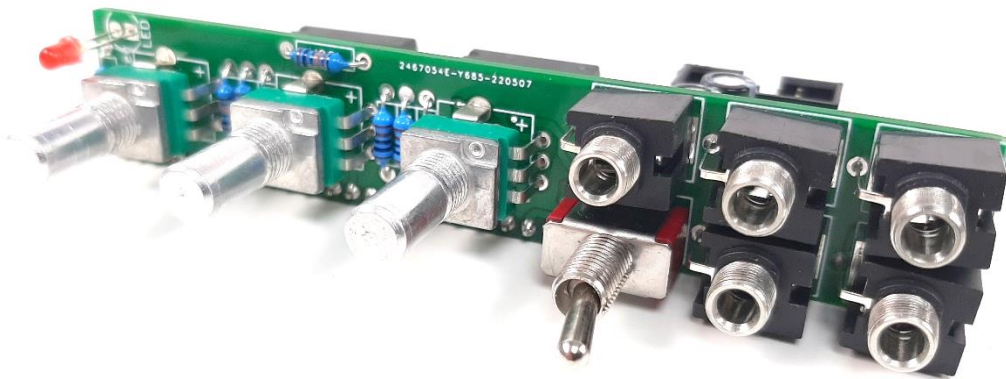
1. Solder all resistors and diodes
2. Solder both IC sockets
3. Solder both non-electrolytic capacitors
4. Solder BC547 - watch the polarity!
5. Solder the 100K trimmer
6. Solder the power header.
7. Solder both electrolytic capacitors
8. Cut male header to size and solder into place (see photo below).



Control PCB assembly

1. Solder the LED (polarity!!), switch, 3 pots, 5 x sockets. Use the panel to ensure these line up nicely.

Note: Not all pots and sockets are equal in height. Providing you use the ones in the links provided, everything will line up perfectly.



Final assembly

1. Slot the header from the assembled Main PCB into the Control PCB. Ensure a nice tight fit and solder into place
2. Bolt the pot and the sockets to the panel using their nuts and washers.

Calibration

The 100K SYM trimmer is there to set the symmetry of the triangle waveform. As this is fundamentally a saw core oscillator (from which the other waveforms are derived) there is naturally a tiny glitch where the triangle 'turns' at the bottom of it's cycle. There are two different ways to perform the trim:

1. **Use a 'scope.** Set Shapes to cycle, patch the triangle waveform into a 'scope. Makes sure Time CV is set to 0 and Shape control is also set to 0. Adjust until the glitch where the triangle turns at the bottom of it's cycle is the smallest that it can be. Chances are it's 50/50 on the trimmer anyhow.
2. **Use your ears.** Set Shapes to cycle, patch the triangle waveform so you can hear it. Make sure Shapes is cycling in the audio domain. A triangle waveform sounds rather dull and hollow – adjust the trimmer until it is at it's dulllest and hollowest. If it's fizzy at all then that's not right! Chances are it's 50/50 on the trimmer anyhow.

RDH 16/03/23

<http://www.frequencycentral.co.uk/>