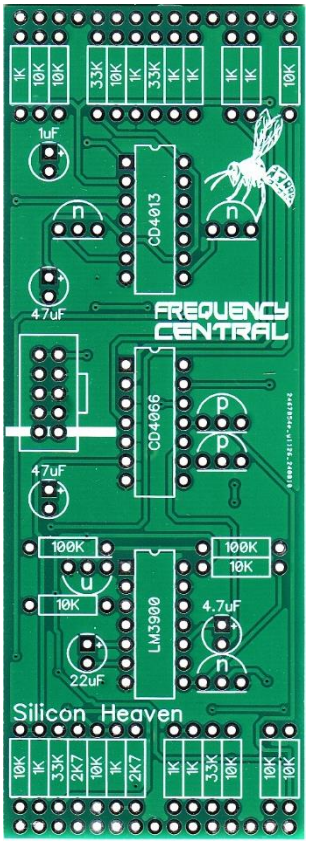
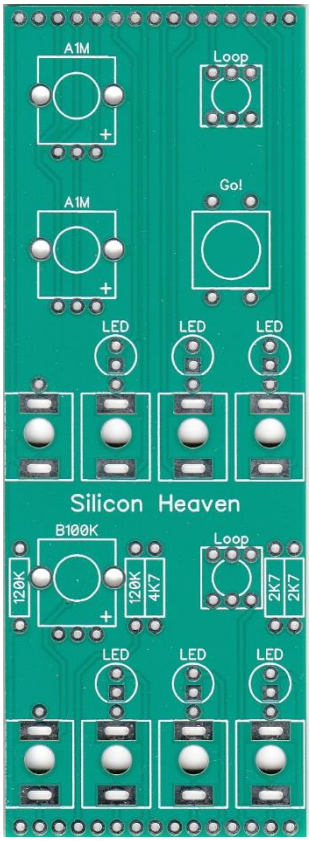
FREQUENCY CENTRAL

Build documentation for:

SILICON HEAVEN

2 x one-shot/cyclic event generators based on CMOS envelopes used in EDP Wasp and Gnat





Chris Huggett, chief designer at EDP came up with a novel little circuit for the filter envelope of the Wasp, based around half a CD4013, half a CD4066 and half a LM3900. It was an A/R generator with looping option which would proceed through its whole cycle from only a trigger input. He further developed the circuit for the filter envelope in the Gnat to use just one knob to provide a range of attack envelopes when anti-clockwise (from 12 o'clock), and a range of release envelopes when clockwise (from 12 o'clock). As you can build two of these with a CD4013, CD4066 and LM3900, we've provide both a two knob version and a one knob version, each has it's own place.

We have re-engineered these ideas for Eurorack, and added a couple of useful features:

- As both circuits are based around flip-flop, we've provided **Q** outputs and **not-Q** binary outputs (ie. either low or high). **Q** describes the attack cycle, whereas **not-Q** describes the release cycle on both envelopes. There are numerous applications for these outputs.
- The Gnat A/R did not have a looping function – we've added that as it's a useful extra.
- We've included a **Go!** Button, which manually actuates both envelopes.

- The second envelope's gate input is normalised from the first envelope's gate input. This can be broken by patching a jack to the second envelope's gate input.
- Both envelope outputs are 0V to 5V.
- All Q and not-Q outputs are 0V to 8V

Key to PCB screen print:
n: This signifies NPN BC549 transistors. Note the correct pinout as shown by the half circles.
p: This signifies PNP BC557 transistors. Note the correct pinout as shown by the half circles.

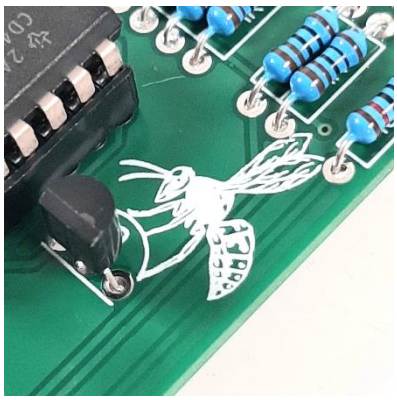
The PCB shows the correct orientation for BC549/BC557. Other transistor types can be used (eg 2N3904/2N3906), but please observe the correct pinout.

Please observe the correct polarity of the electrolytic capacitors.

You will notice that all of the components listed below are also hyperlinks to where I 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.

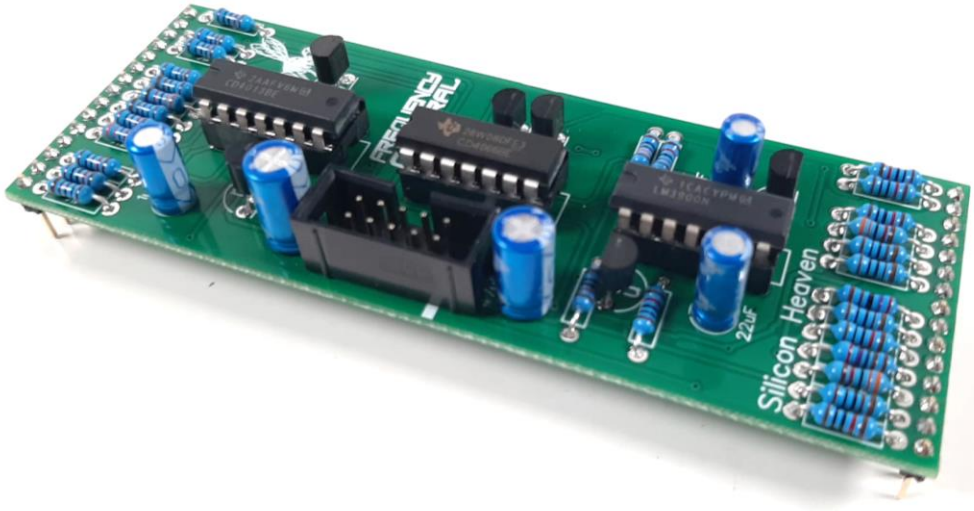
Bill of Materials

1K x 10 2K7 x 4 4K7 x 1 10K x 9 33K x 4 100K x 2 120K x 2 All resistors ¼ watt metal film.	1uF x 1 4.7uF x 1 22uF x 1 47uF x 2	CD4013 x 1 CD4066 x 1 LM3900 x 1* BC549 x 4 BC557 x 2 3mm green LED x 2 3mm red LED x 4 14 pin IC socket x 3	A1M x 2 B100K x 1 Push button x 2 Button caps x 2 Tactile switch x 1 3.5mm socket x 8 Male 40 pin header Female 40 pin header 10 pin box header x 1 Davies 1900 x 3
*No you can't use a regular quad opamp, it must be a LM3900.			



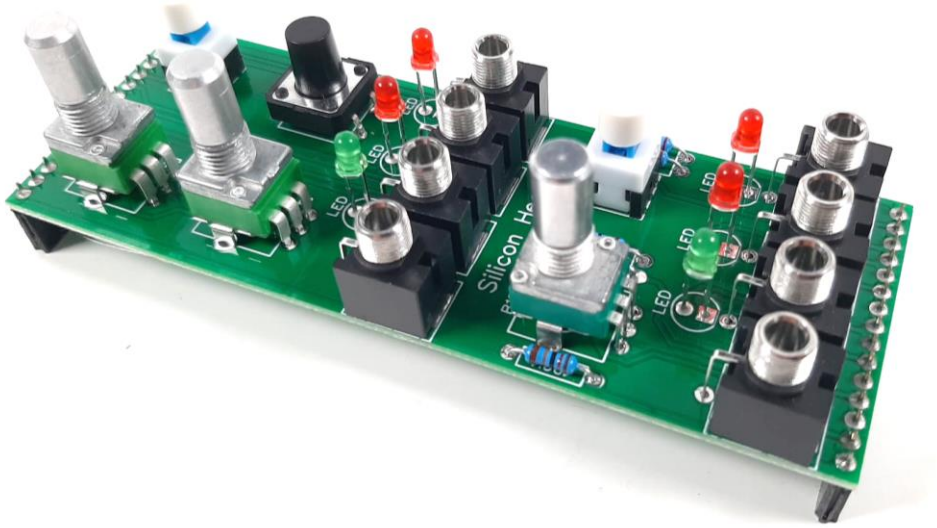
Main PCB assembly

1. Solder all resistors.
2. Solder all IC sockets.
3. Solder all transistors.
4. Solder all electrolytic capacitors.
5. Cut male headers to size and solder them into place. Make sure that they stick out of the bottom of the PCB.



Control PCB assembly

1. Place the PCB on a flat surface. Place the tactile switch into it's solder pad. Do not push it all the way through, it should sit proud of the PCB (see photo), it's legs should not protrude through the other side. Solder them into place from the top of the PCB. **See photo below.**
2. Place both push buttons onto the PCB. Place a piece of card (or similar) over both push buttons. Flip the whole lot over and solder one tab on each switch. Check that they are all seated correctly, then solder the rest of the pads.
3. Solder all resistors.
4. Place the three metal shaft pots on the PCB, then place the panel over them. This will assure that they are correctly positioned. Flip the whole lot over and solder the pots into place.
5. Place all sockets on the PCB, making sure the ground tabs line up with the PCB's ground pads, then place the panel over them. This will assure that the sockets are correctly positioned. Flip the whole lot over and solder the sockets into place.
6. Place all 6 LEDs on the PCB, then place the panel over them. This will assure that they are correctly positioned. Flip the whole lot over and solder the LEDs into place.
7. Cut two female headers to size and solder them into place. Make sure that they stick out of the bottom of the PCB. **See photo below.**



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