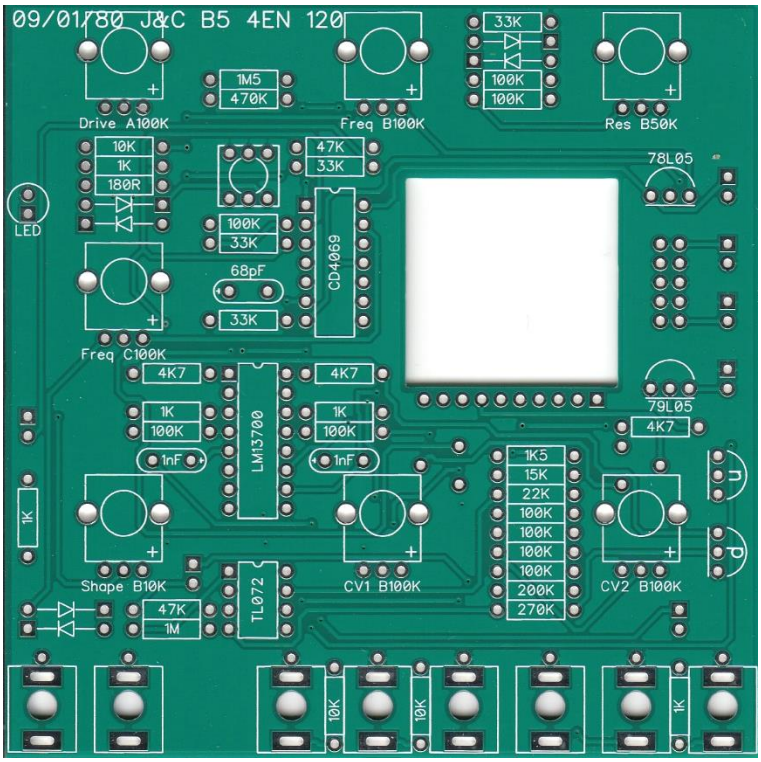
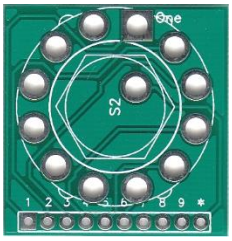
FREQUENCY CENTRAL

Build documentation for:

GNATOPHILIDAE OXFORDII

Based on the 12db/oct VCF found within the EDP Gnat synthesiser. Bonus LFO also onboard!





In September 2023 I was lucky enough to acquire an EDP Gnat synthesiser after questing for one for many years. I'm already the owner of an EDP Wasp, and had always wondered about the Gnat, which is a smaller version of the Wasp in many ways, but with a character all of it's own. After decades lying unloved in an attic for decades, my Gnat required a little love to get it in full working order, so I set to work on it, after looking up the schematic. The Gnat came to life, and we fell deeply in love with each other.

There have been a few remakes of the Wasp VCF, but never one of the Gnat to my knowledge, so with an original on hand I set out to remedy this sorry situation. The original is strictly lowpass, but it's easy enough to add bandpass, highpass and notch reject – so that's what I did.

The Gnat VCF uses 3 gates from a CD4049, leaving 3 unused gates, so I used them to create an LFO based on the enhance LFO of the Gnat, which is used exclusively for a fixed rate PWM of the DCO. The LFO is expanded to offer multiple waveforms. It hasn't got a massively wide range, but you can tailor it to taste using either 10uF (faster range) or 47uF (slower range) where indicated.

Gnatophildae Oxfordii is big and garish, a little whacky and a little leftfield. That's it's joy.

Key to PCB screen print:
n: This signifies NPN BC547 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 BC547/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			
180R x 1 1K x 5 1K5 x 1 4K7 x 3 10K x 3 15K x 1 22K x 1 33K x 4 47K x 2 100K x 9 200K x 1 270K x 1 470K x 1 1M x 1 1M5 x 1 All resistors ¼ watt metal film.	68pF x 1 1nF x 2 10uF electrolytic x 5 47uF electrolytic x 3	TL072 x 1 LM13700x 1 CD4069 x 1 BC547 x 1 BC557 x 1 1N4148 x 6 3mm red LED x 1 78L05 x 1 79L05 x 1 8 pin socket x 1 14 pin socket x 1 16 pin socket x 1	A100K x 1 B10K x 1 B50K x 1 B100K x 3 C100K x 1 Rotary switch 1P12T x 1 DPDT push switch x 1 Cap for above x 1 10K trimmer x 2 3.5mm socket x 8 Male 40 pin header 10 pin box header Big knobs x 7

Main PCB assembly (front)

1. Solder all 6 diodes and all resistors.

2. Solder all IC sockets.

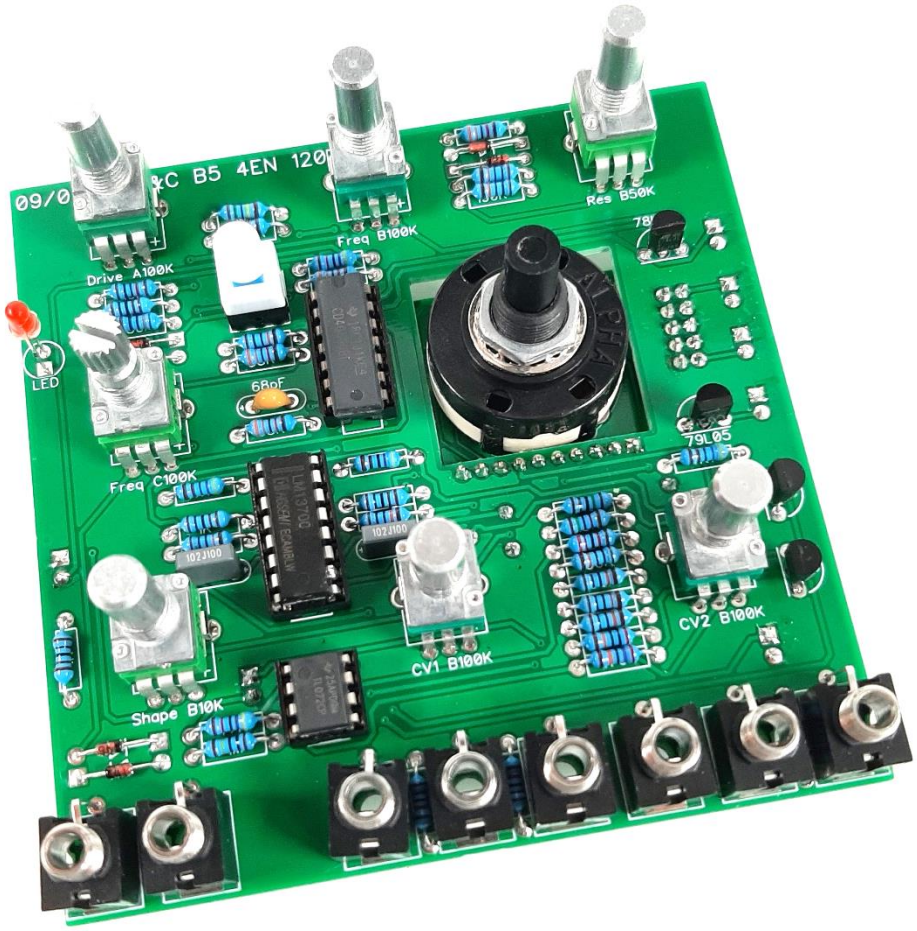
3. Solder all non-electrolytic capacitors.

4. Solder transistors and voltage regulators.

5. Solder the DPDT switch into place, put it's little hat on.

6. 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.

7. Place all 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. Do the same with the LED.



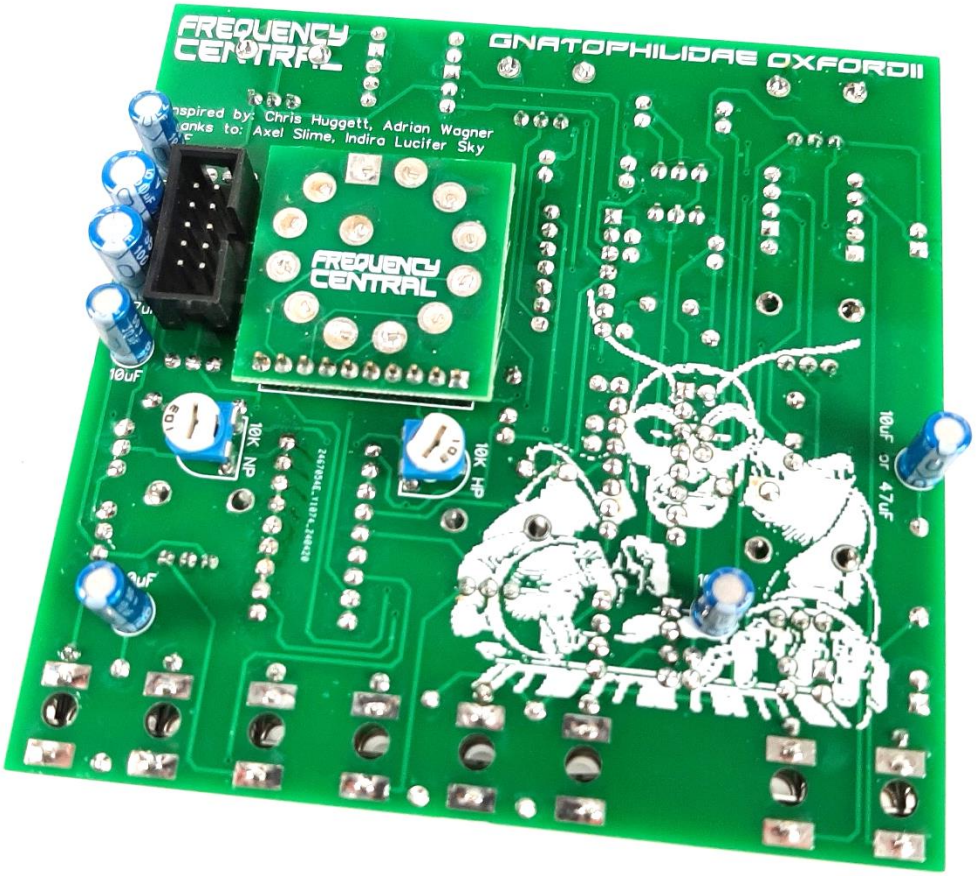
Main PCB assembly (rear)

1. Solder both trimmers

2. Cut male header to size and solder it into place. Make sure that they stick out of the rear of the PCB.

3. Solder the power header – if you're using box type, observe correct polarity

4. Solder all electrolytic capacitors



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

Rotary Switch PCB

1. Solder the 1P12T rotary switch.

Final Assembly

1. Mount the Main PCB onto the panel. Tighten all mounting nuts.

2. So, the 1P12T rotary switch needs to be adjusted to be a 1P4T rotary switch. Remove the mounting nut and the washer, below them you will find another washer with a small flange at 90°, the inner part of the switch has a number of slots, drop the flange into the slot marked 4, then waggle the switch to make sure you're getting 4 positions.

3. Mount 1P12T rotary switch onto the panel, making sure the relevant pads also pass through the male header of the Main PCB. Tighten the nut. Solder the Rotary Switch PCB to the Main PCB via the male header.

Calibration

1. **NP trimmer:** Probably no need to adjust this trimmer away from the mid position. Notch reject is the opposite of bandpass, so sweeping the frequency knob rejects frequencies across the spectrum. As long as it's doing that, you're good.

2. **HP trimmer:** Patch a VCO into an audio input and turn up the drive. Set the switch to Highpass mode and turn the Resonance to a position just before self oscillation. Adjust the null trimmer until you can hear that the filter totally cuts all low end when the Frequency is turned right up.