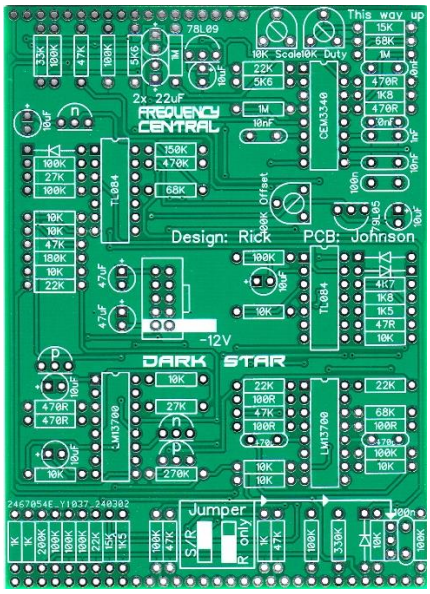
FREQUENCY CENTRAL

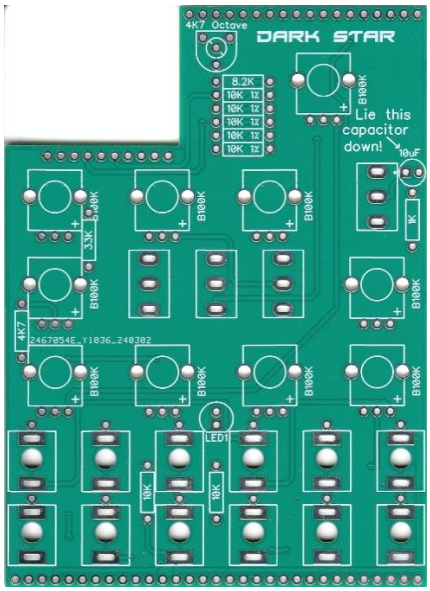
Build documentation for:

DARK STAR

Main PCB **Control PCB**

Super compact full modular synthesiser voice bursting with character and features!





<u>Key to PCB screen print:</u>

n: This signifies NPN BC547 (or BC549) transistors. Note the correct pinout as shown by the half circles.

p: This signifies NPN BC557 transistors. Note the correct pinout as shown by the half circles.

Please observe the correct polarity for all ICs, voltage regulators, diodes and electrolytic capacitors.

Bill of Materials

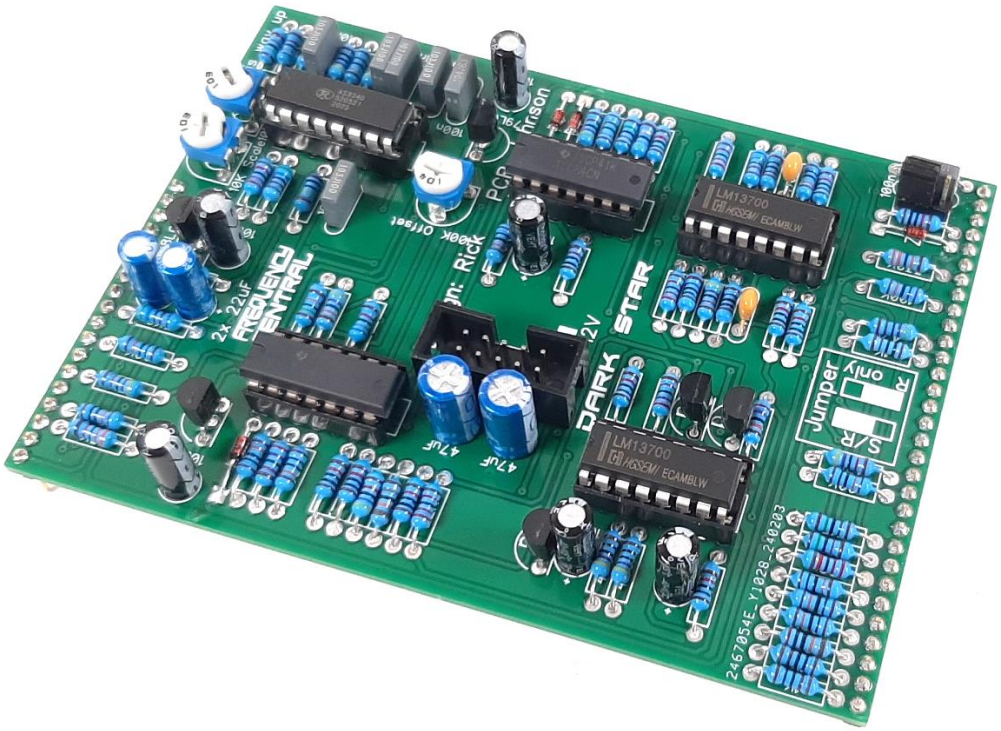
47R x 1 100R x 3 470R x 4 1K x 4 1K5 x 2 1K8 x 2 4K7 x 2 5K6 x 2 8K2 x 1 10K x 13 15K x 2 22K x 5 27K x 2 33K x 2 47K x 5 68K x 3 100K x 12 150K x 1 180K x 1 200K x 1 270K x 1 330K x 1 470K x 1 1M x 3 10K 1% x 5* All resistors ¼ watt metal film.	470pF x 2 1nF x 1 10nF x 4 100nF x 2 10uF x 7 47uF x 2	AS3340 x 1 LM13700 x 2 TL084 x 2 BC547 or BC549 x 2 BC557 x 2 1N4148 x 4 78L09 x 1 79L05 x 1 3mm red LED x 1 16 pin IC socket x 3 14 pin IC socket x 2	B100K x 1 metal shaft B100K x 9 (or these)** 4K7 trimmer x 1 10K trimmer x 2 100K trimmer x 1 3.5mm socket x 12 SPDT toggle x 4 (on/on) Rotary switch x 1 Male header x 2 (cut to size) Female header x 2 (cut to size) Power header x 1 Jumper x 1 for Release Big knob x 2

* **10K 1% x 5** These are the five matched resistors for the octave switch voltage divider ladder. They don't have to be 10K exactly, they just have to be matched to each other, so for example if they are all 9.98K that's fine. Grab a bunch of 10K resistors, measure each one, make little piles of 10k, 9.99K, 9.98K etc. Before long one of the piles will have five resistors in it, that's your matched set! Should only take 5 minutes.

** I prefer the Song Huei tall trimmers because they have a longer shaft and a white notch. And now Thonk do these toppers in a range of colours: Thonk tall trimmer toppers

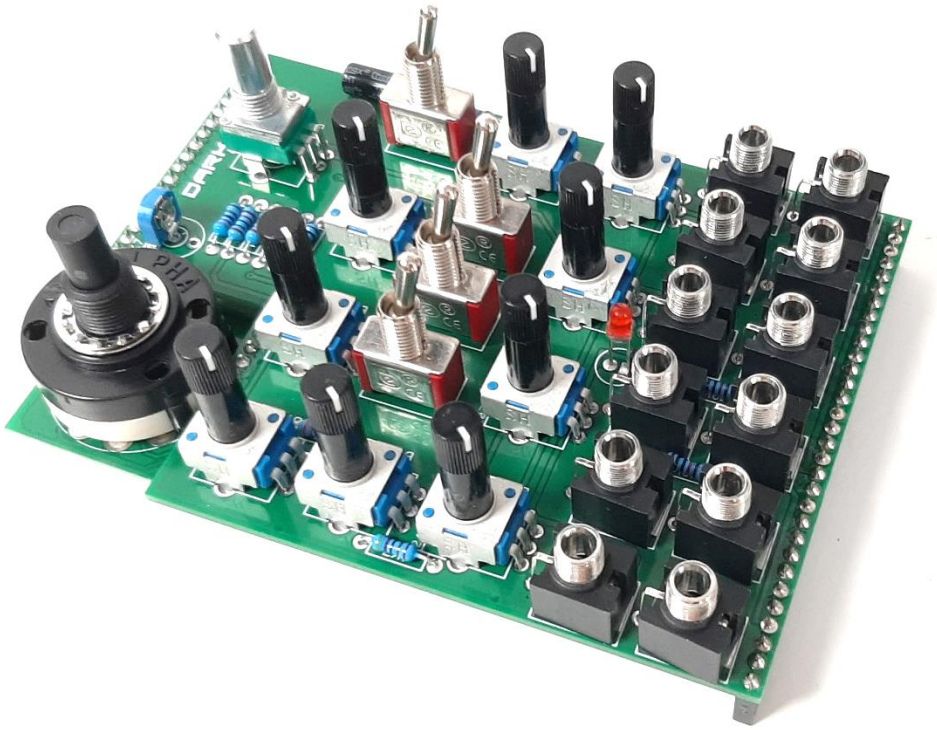
Main PCB assembly

1. Solder the diode and all resistors
2. Solder all 5 IC sockets
3. Solder the non elecrolytic capacitors
4. Solder the 78L09, 79L05 and NPN/PNP transistors– watch the polarities!
5. Solder the 3 x trimmers and the 3 pin header for the jumper (cut from male header)
6. Solder the box power header. Make sure the notch lines up with the screenprint legend. If in doubt, have a look at a power cable, and make sure when inserted into the header the red stripe lines up with the -12V screenprint.
7. Solder all electrolytic capacitors
8. Cut male headers to size and solder them into place. Make sure that they stick out of the bottom of the PCB.



Control PCB

1. Solder the resistors
2. Solder the 10uF capacitor – lie this one down!
3. Solder the 4K7 trimmer
4. Solder the metal shaft pot, 4 x switches and 12 x sockets . Use the panel to ensure these line up nicely.
5. Solder the 9 x Song Huei tall trimmers. I usually just solder the middle pin first, then ensure that they are all sitting flat on the PCB before soldering the outer pins and lugs.
6. Cut **two female** headers (to connect the Main PCB) to size and solder them into place. Make sure that they stick out of the bottom of the PCB.
7. Cut **one male** header (to connect the Octave PCB) to size and solder it in place. Make sure it sticks out of the bottom of the PCB.



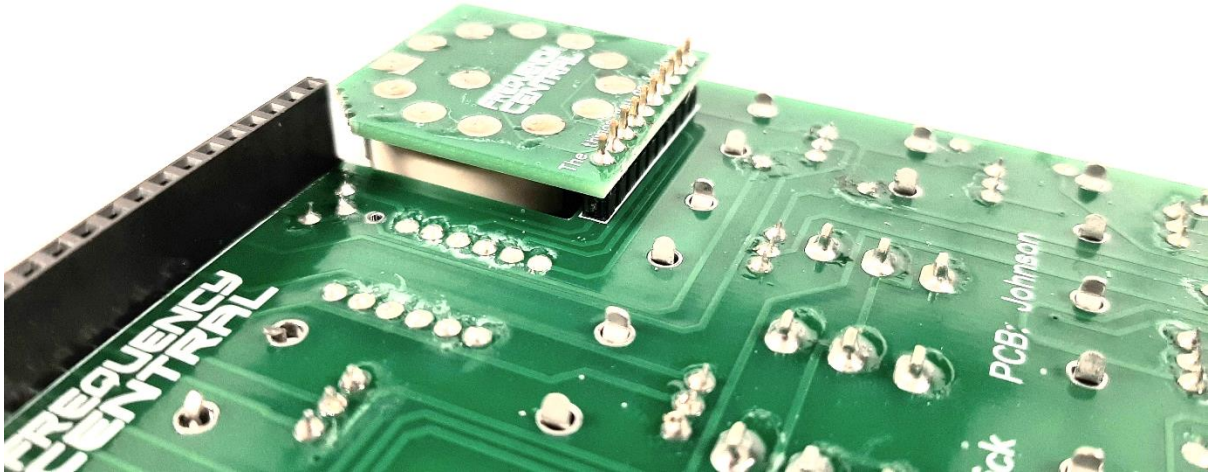
Bolt the metal shaft pots and the sockets to the panel using their nuts and washers. Pop the knobs on the pots and the caps on the sliders. Looks nice huh?

Octave Switch PCB

1. Snap the white corner of the octave PCB
2. Solder the 1P12T rotary switch.
3. Cut the plastic flange off.
4. Once soldered, cut the protruding lugs off the rear of the PCB

Final Assembly

1. Mount the Control PCB onto the panel. Tighten all mounting nuts.
2. So, the 1P12T rotary switch needs to be adjusted to be a 1P6T 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 6, then waggle the switch to make sure you're getting 6 positions.
3. Mount 1P12T rotary switch onto the panel, making sure the relevant pads also pass through the male header of the Control PCB. Tighten the nut. Solder the Octave Switch PCB to the Control PCB via the male header. **See photo.**
4. Plug the Main PCB into the Control PCB



Calibration

- **4K7 Octave (Control PCB):** Set the octave switch to it's highest octave position (2') and adjust trimmer until you get a reading of 7.5V at the **Test** on the octave rotary switch daughter board.
- **10K Scale (VCO):** This trimmer sets the 1V/oct tracking of the VCO, and it's really worth spending some time to get it right. On first power up, the VCO should already be pretty close to 1V/oct with the trimmer in it's mid position, as I carefully chose associated resistor values to make it so. To set it closer, play two notes an octave apart and adjust until it sounds spot on. Then play two notes two octaves apart, and adjust still further until it sounds spot on. If you have a frequency counter, still better!
- **10K Duty (VCO):** This sets the duty cycle of the square wave, should be just about spot on with the trimmer in the mid position, as I carefully chose associated resistor values to make it so. Set the Pulse Width knob to 50 (hard left), and twiddle the trimmer until you hear the easily recognisable hollow sounding square wave.
- **100K Offset (VCO):** Sets up the initial frequency of the VCO. Set Fine Tune to it's centre position, play an A on your keyboard. Adjust the Offset trimmer until you can read a frequency of 110 Hz, 220 Hz, 440 Hz, 880 Hz etc when playing octaves of A.

RDH 12/04/24

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