

nonlinearcircuits

Encephalo Adjuster build & BOM

This module is a 24 stage phase shifter using LDRs in a black box. It is a little more complex to build than usual but most of the build is repetitious and not so difficult. I have added plenty of pics in this guide to help with the build.

Probably the unusual feature is the positive and negative feedback path. Feedback is 0 when the Regen pot is in the middle, turn it to the left for negative feedback, to the right for positive, or use CV to do the job for you. It will self-oscillate at the extremes.

It is probably obvious at this point that I have a thing for phasers. 24 stages are somewhat ridiculous but I wanted to try it and the result is a very nice smooth phaser with some angry bits when you push it. The name comes from a mind control device that appears in a few AE Van Vogt novels, I have been itching to use it for years.

The trimpot on the top PCB sets the operating range for the Phase pot. Set it to remove any dead zones at the extremes.



BOM – The Tayda & Mouser part numbers are given as examples

VALUE	QUANTITY	DETAILS
100pF	3	0805 Tayda: A-3503
10nF	24	0805 Tayda: A-3507
100nF	5	0805 Tayda: A-3511
10uF	3	0805 25V or higher voltage rating Mouser:963-TMK212BBJ106MG-T or similar
470R	4	0805
1k	5	0805
1k8	1	0805
10k	49	0805
12k	2	0805
20k	5	0805
33k	1	0805
47k	7	0805
100k	12	0805
220k	24	0805 OPTIONAL – SEE NOTES
300k	2	0805 * = sets feedback gain
470k	1	0805
TL074 / TL084 / LF347	8	soic Tayda: A-1140
LM13700M	1	soic Mouser Part No: 926-LM13700MX/NOPB
BC847	1	NPN sit23 Tayda: A-1339
BC857	3	PNP sot23 Tayda: A-1345
100k trimpot	1	Tayda: A-2506
LDR	24	GL5506 or GL5516 or whatever
3mm LEDs	3	red/yellow/green very bright ones
Eurorack 10 pin power connector	1	Tayda: A-198 cut to size
Schottky diodes	2	I use MBR0540 in a sod-123 package. Any with 30V+ and 0.25A+ ratings will do. dot on PCB indicates CATHODE (stripe on component).
3.5MM SOCKET Kobiconn style	8	Tayda: A-865 or Thonkiconn Jacks (PJ301M-12) from Thonk, Synthcube or Modular Addict
100k pots	6	Probably best to use T18 (or similar) splined/knurled shaft pots as the spacing is tight. Otherwise : Tayda:A-1848 or A-5513 or A-4729
20 Pin 2.54mm Single Row Female Pin Header	4	Tayda: A-1310
15 Pin 2.54mm Single Row Female Pin Header	2	Tayda: A-1669
40 Pin 2.54mm Single Row Pin Header Strip	3	Tayda: A-197 snap into 15 and 20 pin sections, get spares

Additional notes:

1. The chips, resistors, caps are cheapest from Tayda. Schottky diodes, CMOS & 1uF, 10uF 25V 0805 caps from Mouser/E14/Farnell/etc.

2. Join the Nonlinearcircuits Builders Guild on FB: <https://www.facebook.com/groups/174583056349286/> and ask questions there if you have any. If you prefer not to FB then email is fine.

3. For some reason pots are somewhat scarce these days. It makes no sense to me, I order 1500 at a time from my regular supplier and get them in 3 weeks. If you want to order a minimum 500 pots @ \$0.30 each contact Rita at sales1hongyuan@163.com. Shipping is a bit pricey, but should still work out cheaper than buying from Tayda or elsewhere.

For knurled shaft you want

H09312NA B100K L15KQ-006

9mm single gang knurled shaft B100K rotary potentiometer ,no tab. hardware (nuts+washer) .shaft dia 6.0mm

For regular shaft (note these are 6mm, ask if you want 6.5mm), you want

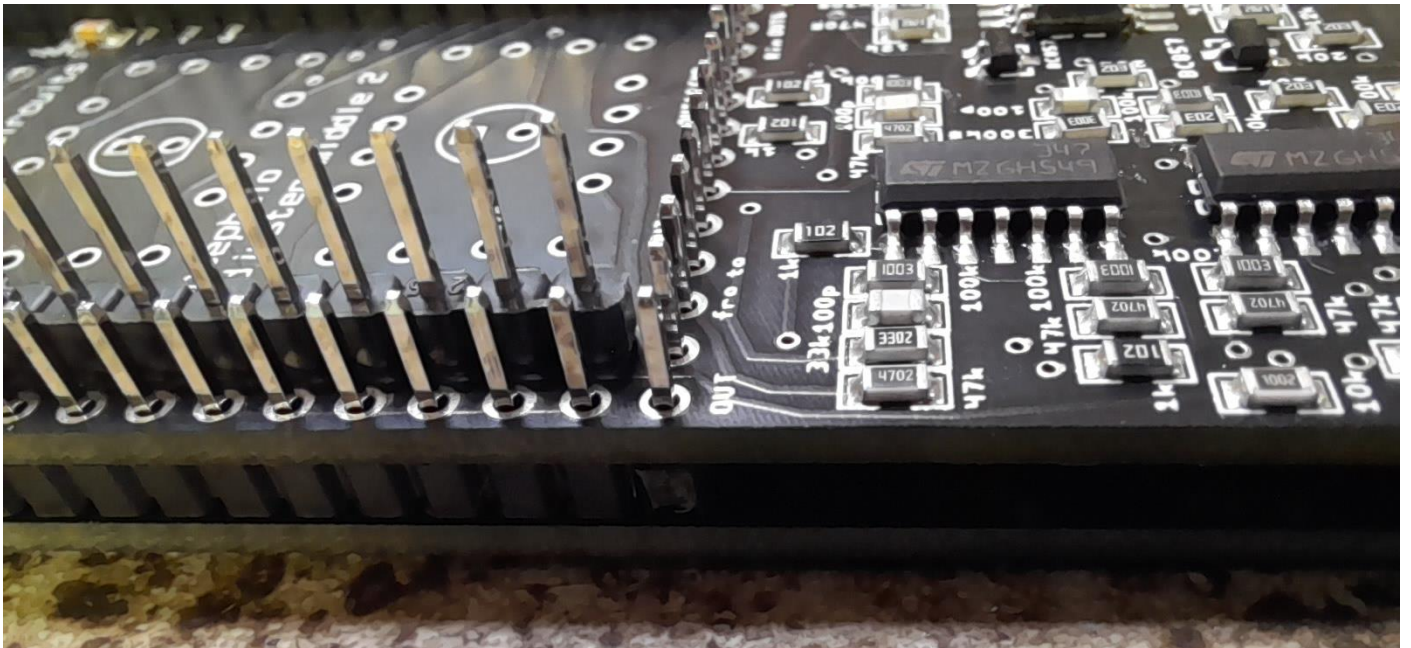
RV9312NO-SB15A1.5-B104-060 no tab

9mm single gang B100K rotary potentiometer,no tab. hardware (nuts+washer) .shaft dia 6.0mm.

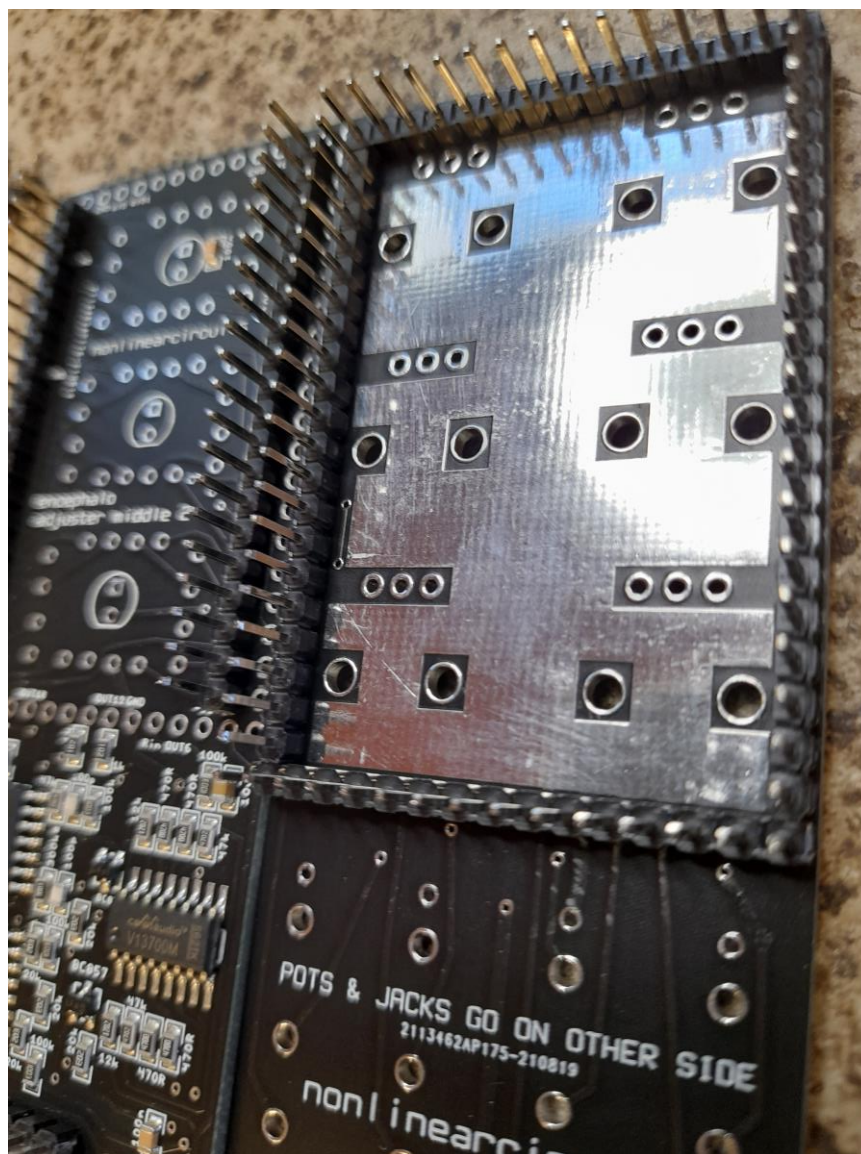
4. The 24 220k resistors can be left off if using GL5506 or GL5516 LDRs. The trimpot can be used to preset the phase shift. I suggest leaving them off no matter what LDRs you use and then just use the trimpot to get a good operating range from the Phase pot. If you cannot get a good range, then add the 220k.

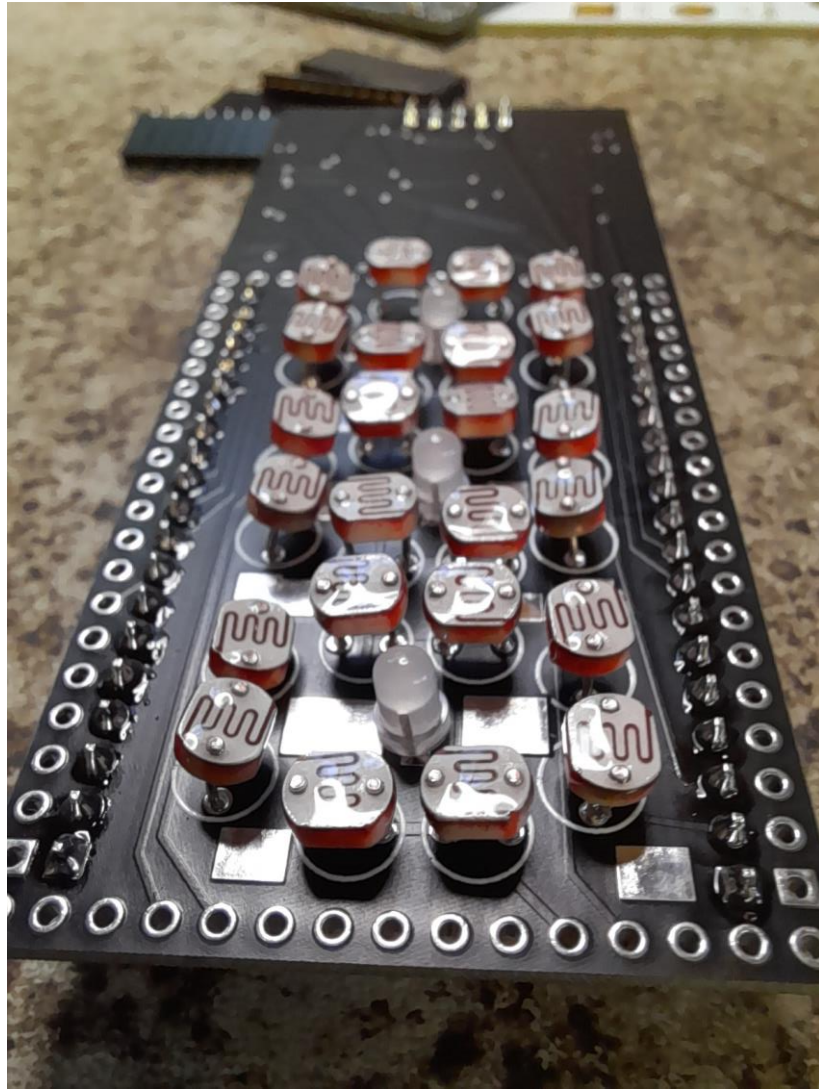
5. The 300k* sets the gain of the feedback VCAs, a higher value here gives more gain. I set it so the module will self-oscillate when the Regen pot is at max. If you do not want that, reduce it, try 270k or 220k.

6. LEDs should be red, green, yellow or orange.....not blue anyway. Very bright diffused ones are probably best but it is not a big deal

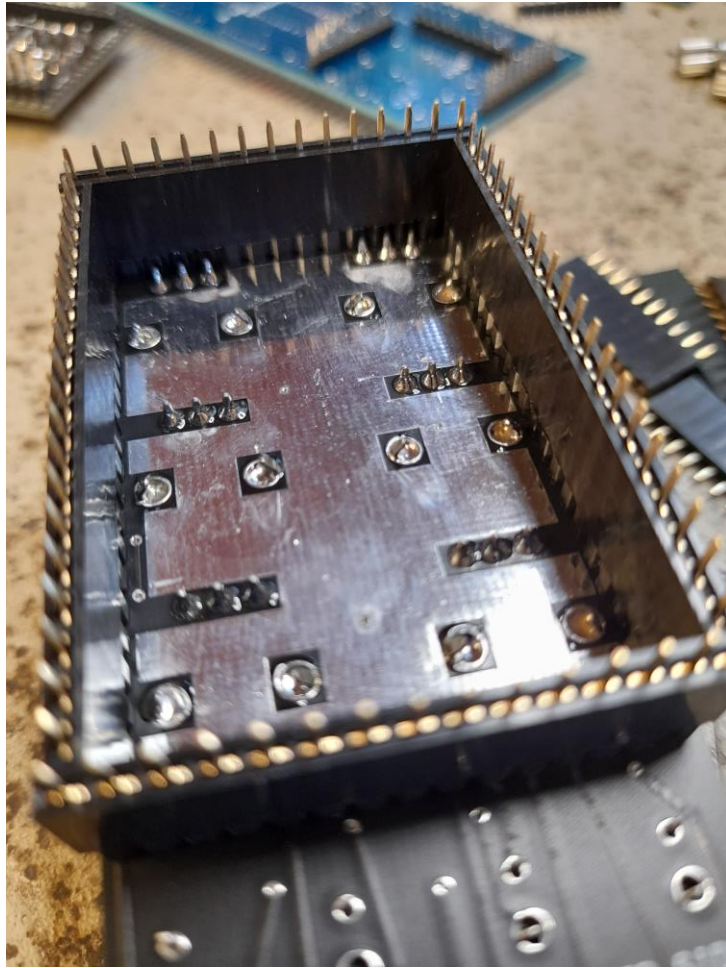


Use PCBs from other layers to hold the pins in place when soldering





Solder the LDRs a little bit off the PCB as the leads are usually poorly plated near the top and are difficult to solder. No need to bend them towards the LEDs.



solder all the holes so the black box is lightproof

ENCEPHALO
ADJUSTER

IN1



WET/DRY



PHASE



PHASE CV



REGEN



REGEN CV



IN1



REGEN
IN(6)



REGEN
CV



PHASE
CV



OUT6



OUT12



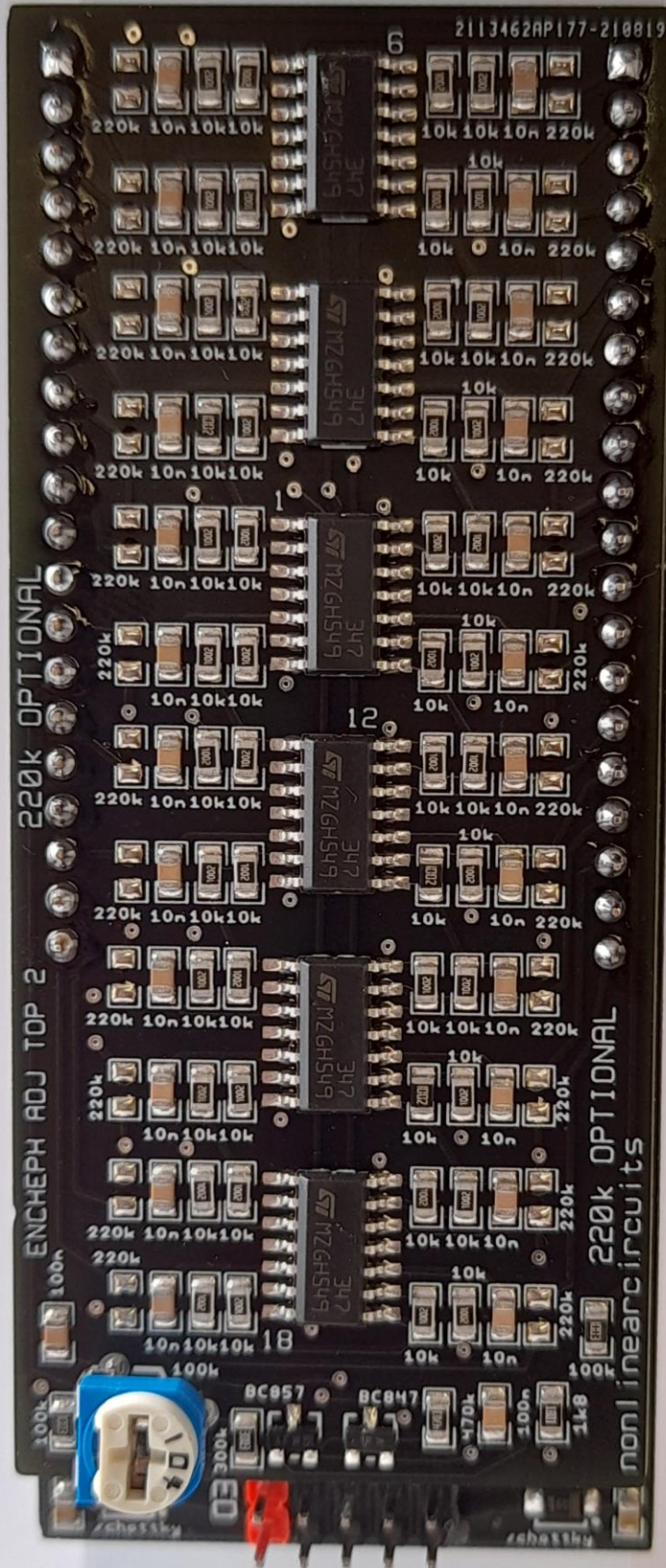
OUT18



OUT



NLC



2113462AP177-210819

220k OPTIONAL

ENCHEPH ADJ TOP 2

220k OPTIONAL

non linear circuits

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12

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6SH9ZM 2S 2HE

6SH9ZM 2S 2HE

6SH9ZM 2S 2HE

6SH9ZM 2S 2HE

6SH9ZM 2S 2HE

6SH9ZM 2S 2HE

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