“It’s 555…” resonator

build info

nonlinearcircuits

BOM

BC547	10	npn – marked “**n**” on PCB see notes
BC557	10	pnp- marked “**p**” on PCB see notes
555 IC	5	
TL072	2	
TL074	1	
power connector 0.156 Molex 3 pin	1	
100k pots	15	see notes
10uF electro caps	7	value not marked on PCB, 2mm spacing
decoupling caps 47nF-100nF	15	value not marked on PCB 2.5mm spacing
1nF caps	10	4.5mm spacing
10nF caps	5	2.5mm spacing
cp caps (10nF?)	5	see notes 4.5mm spacing
100nF cap	1	4.5mm spacing
10R	2	
1k	2	
1k8	5	
2k2	5	
100k	24	
120k	10	
220k	5	
330k	5	
1M	1	
1N4004 diodes	2	optional, for reverse voltage protection

notes:

matching trannies and ‘cp’ caps.

You do not have to match the transistors into pairs but do it if you can. You may still have to select different values for one or two of the cp capacitors.

‘cp’ caps refers to the capacitors marked ‘cp’ on the PCB.

The cp capacitors and the transistors (which form a VC resistor) control the pulse width of the signal from each 555. You may have to experiment here. I find unmatched transistors and cp capacitors of 10nF give a good pulse width range, but on stage two I had to install a 1uF cap to get a decent pulse width. I have built three of these and usually have to change a few capacitors to get a good pulse width on each stage. The original design used 500pF caps but I find these to give a very narrow pulse and make the resonator sound weedy, maybe some people like this?

I suggest install 10nF caps for the spaces marked "cp" on the PCB, but when testing the circuit be prepared to change out one or two of them to a larger value. So have a few different values on hand up to 1uF.

pots

These are a common footprint, if you have built any of my boards before you know what to get. I use 100k pots from Song Huei - R0903N-B100k, L-25KC (the 25 is the length L).

It seems a pretty common footprint. Another pot that fits is this Alpha from Altronics - http://www.altronics.com.au/index.asp?area=item&id=R1948

You should find similar types from Mouser, Rapid, etc.

Some pots have metal tabs that may sit on top of a track, I usually bend these tabs inwards on the pots where this happens. Most of them are fine; probably no need to do this but an ounce of prevention etc.

decoupling caps

There is a 10uF and 100nF decoupling cap for each 555 IC, plus a load of others around the board. This is maybe overkill but 555s are famous for being gluttonous & noisy chips so best to try and keep the power rails clean and decouple away!

BUILDING

It is very important to install all of the IC sockets first, many of the resistors sit very close to the ICs and it will be very difficult to install the sockets after the resistors.

The second job would be to fix the error, if you can be bothered; it still works if you don't……see next section. Again the board is so packed it will be very hard to fix the error after installing everything else.

After this, just go the usual route; resistors, trannies, caps.

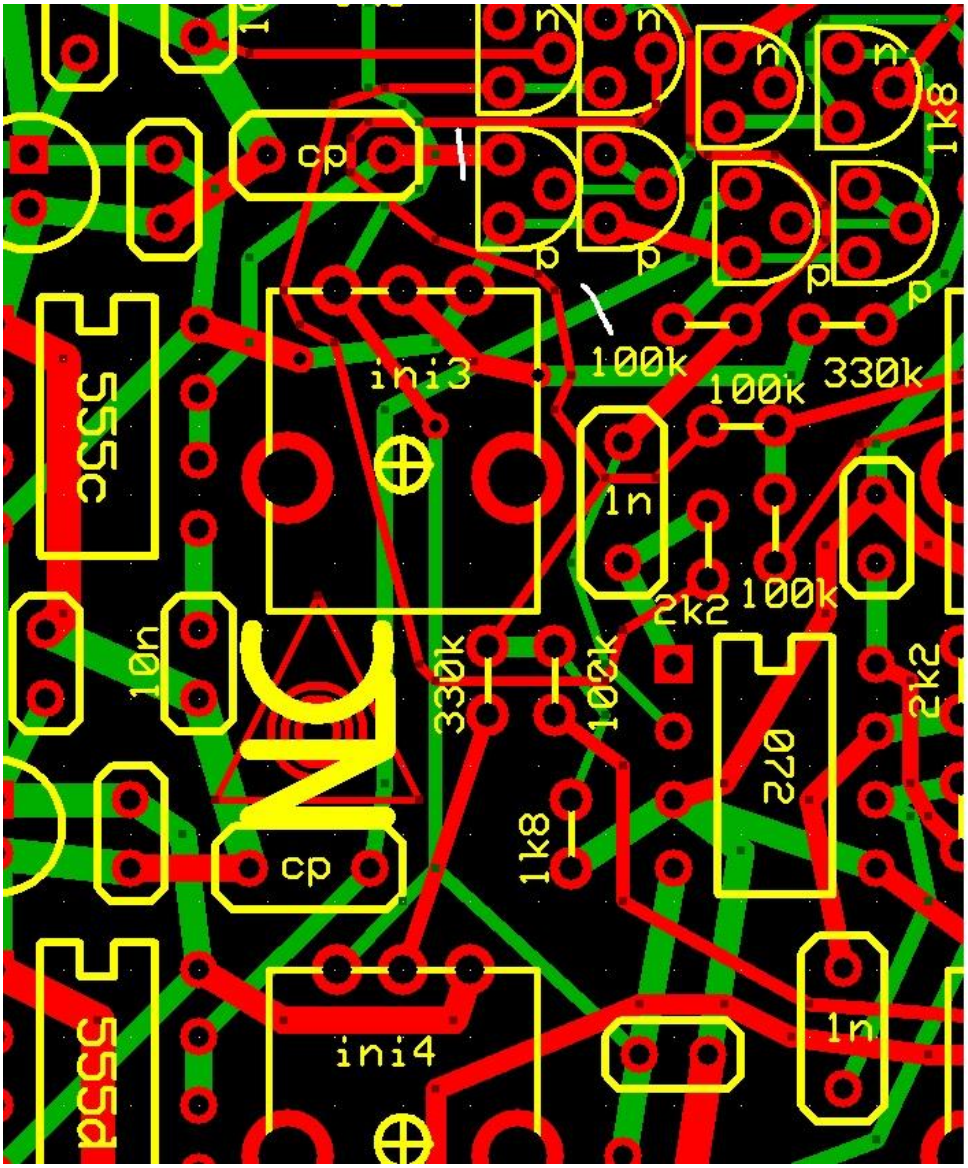
When installing the pots, I put them on the board but do not solder them. I then attach the board to the panel and make sure all of the pots are straight and level. Once this is done, I solder on the pots **and** their side tabs.

ERROR!

There is an error on the PCB, if you do not fix it, everything will still work except that the Initial and Env pots for stage three will control the pulse width of stage four and the pots for stage four will control the pulse width of stage three.

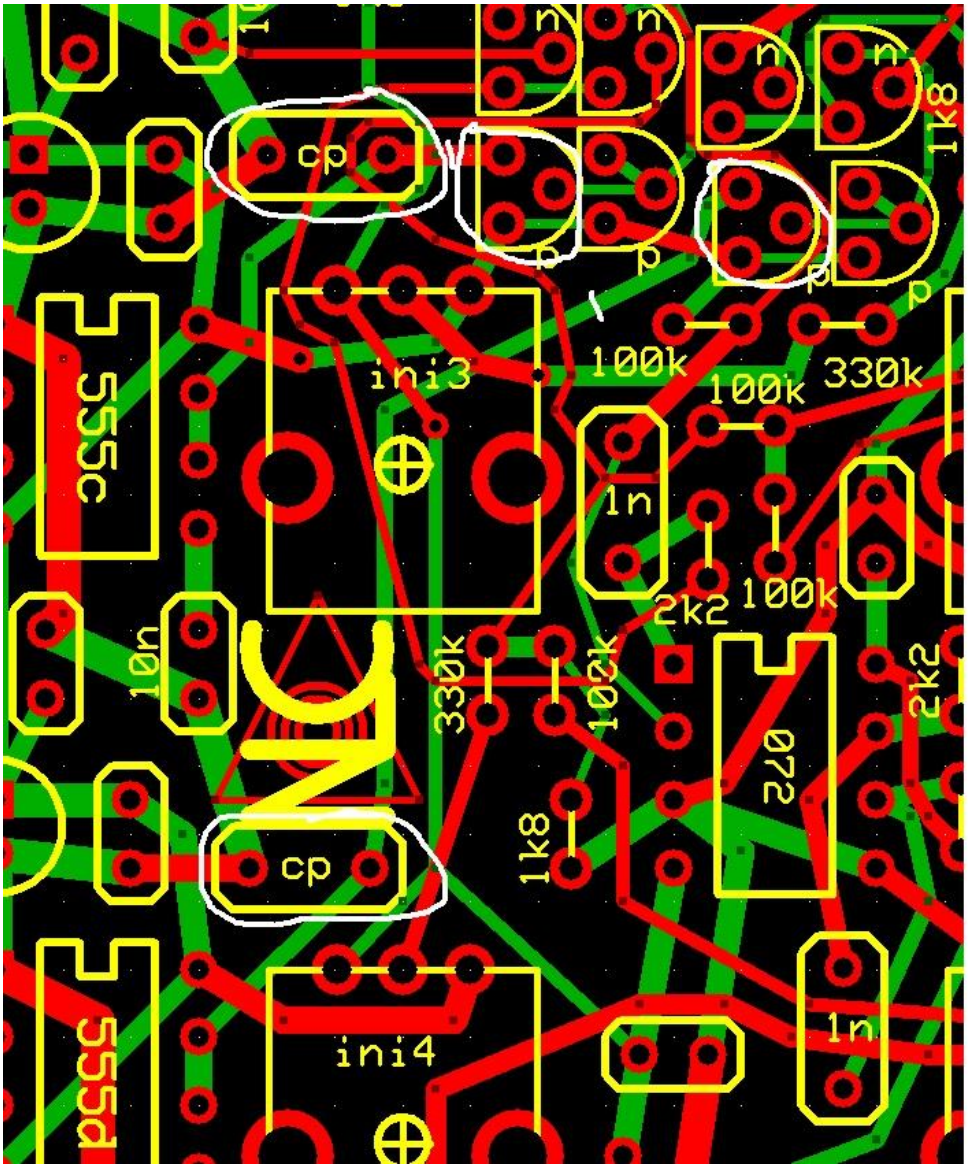
If you want to fix this, you need to cut two tracks and install two jumper wires, do this early in the build. The board gets very full and it will be hard to cut tracks and add wires with lots of components on the board.

See pics below for a guide:



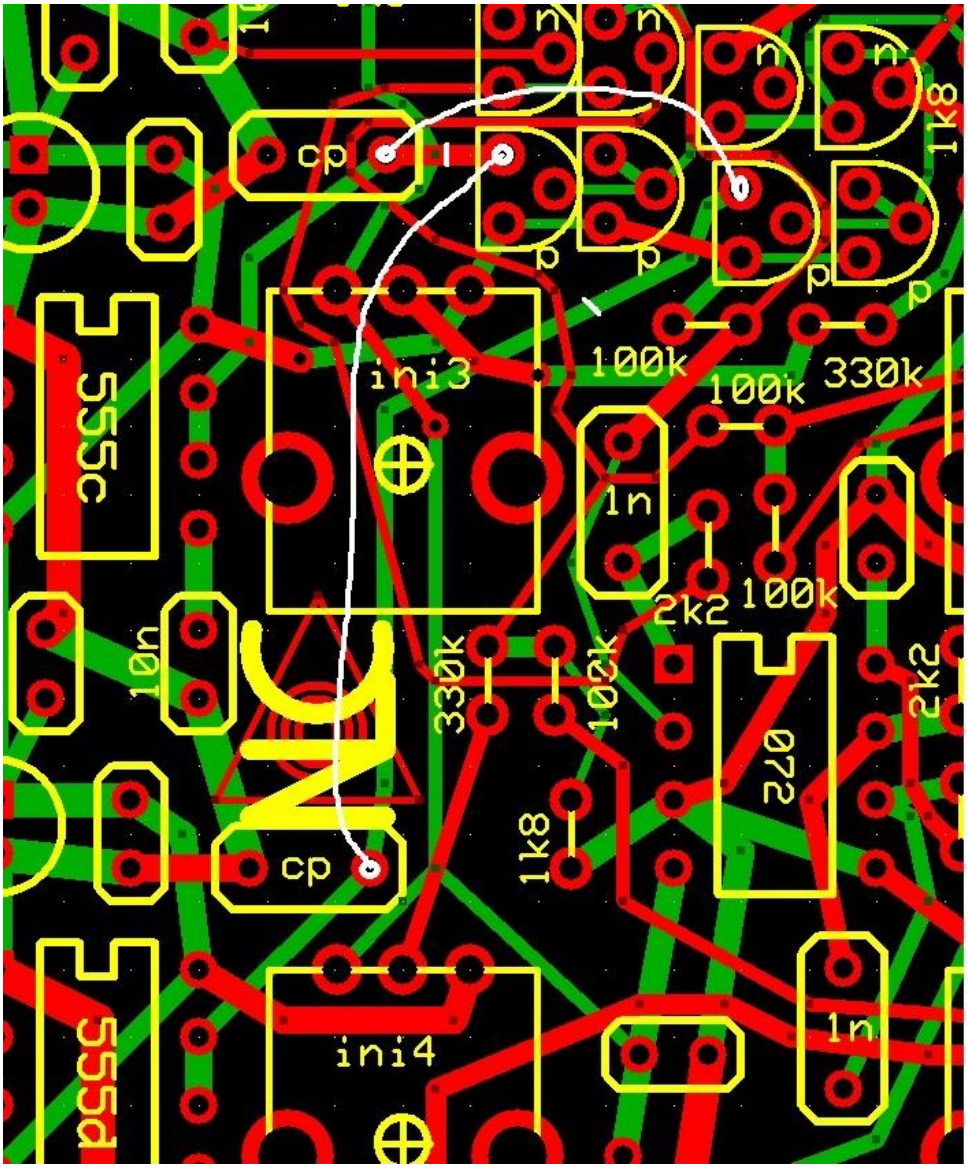
Step 1

Cut the two tracks marked in white.
Red is the top of the PCB.
Green is the solder side.



Step 2

Install the two "cp"capacitors (10nF) and the two BC557 trannies



Step 3

Add two jumper wires as shown, from the collectors of the two trannies to the right side holes of the cp caps

Wiring

There are 9 sockets to connect

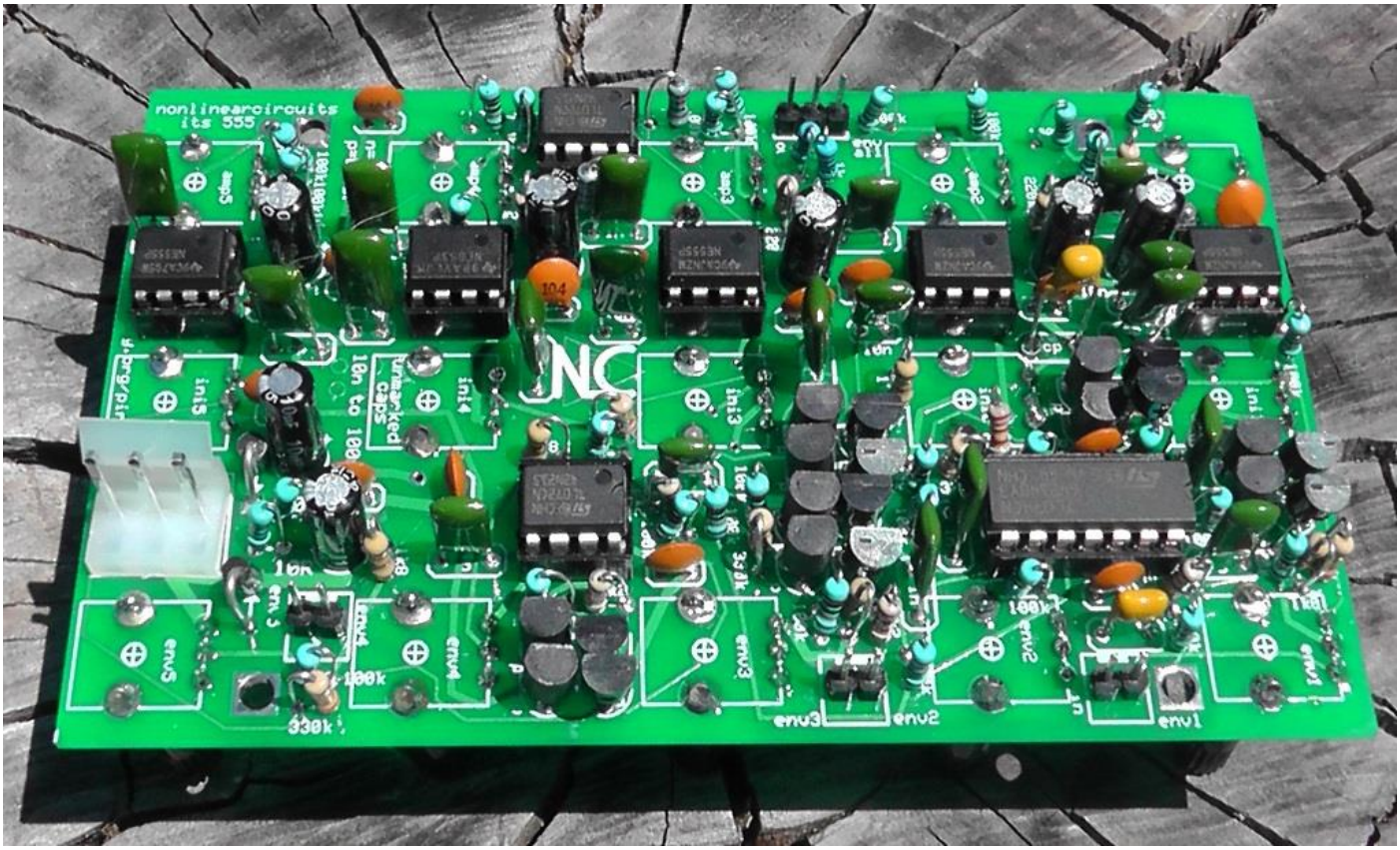
Env 1-5 are CV inputs for each stage.

In is the audio input

Env all is a CV input that will modulate all 5 stages

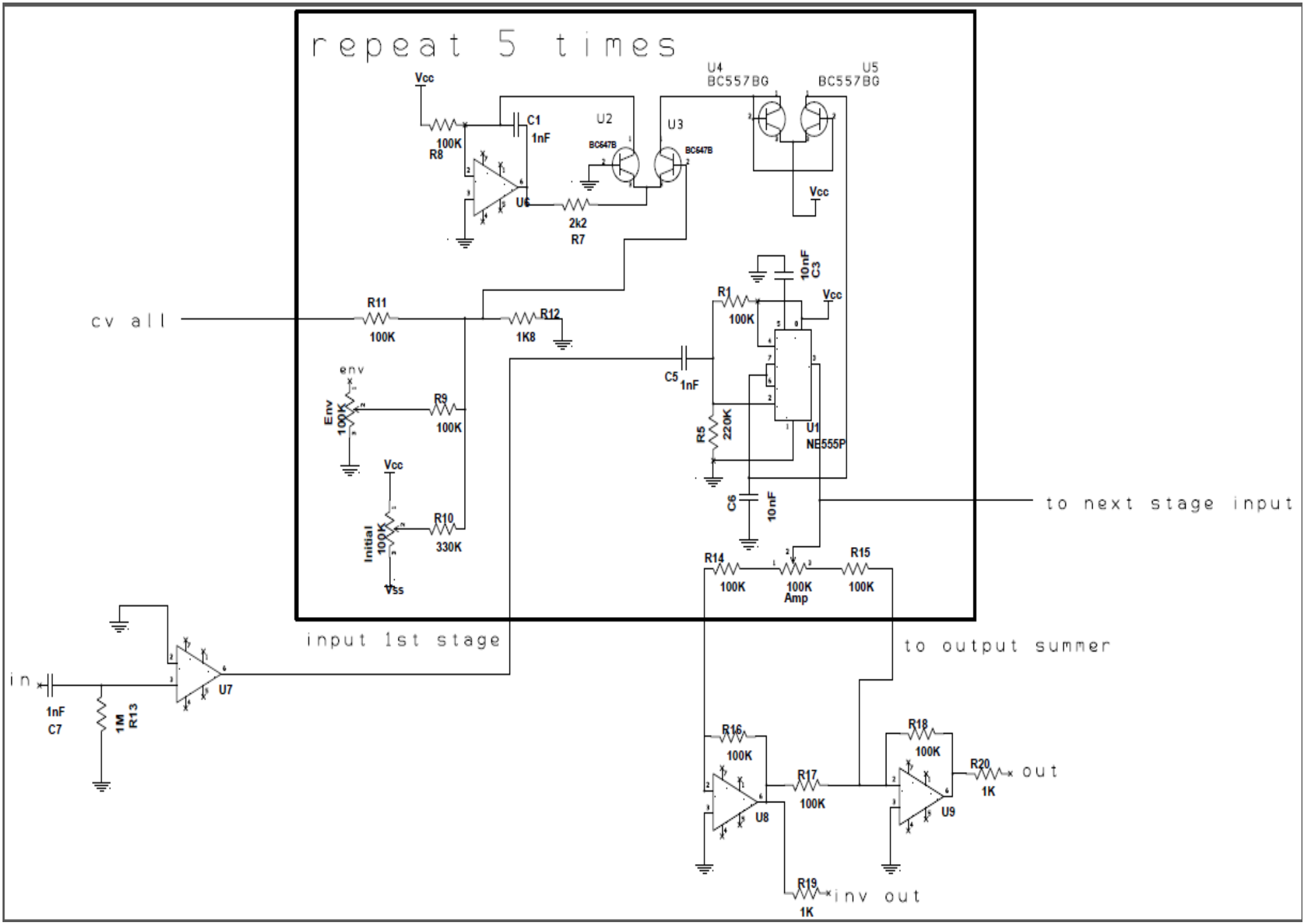
Out is the main output

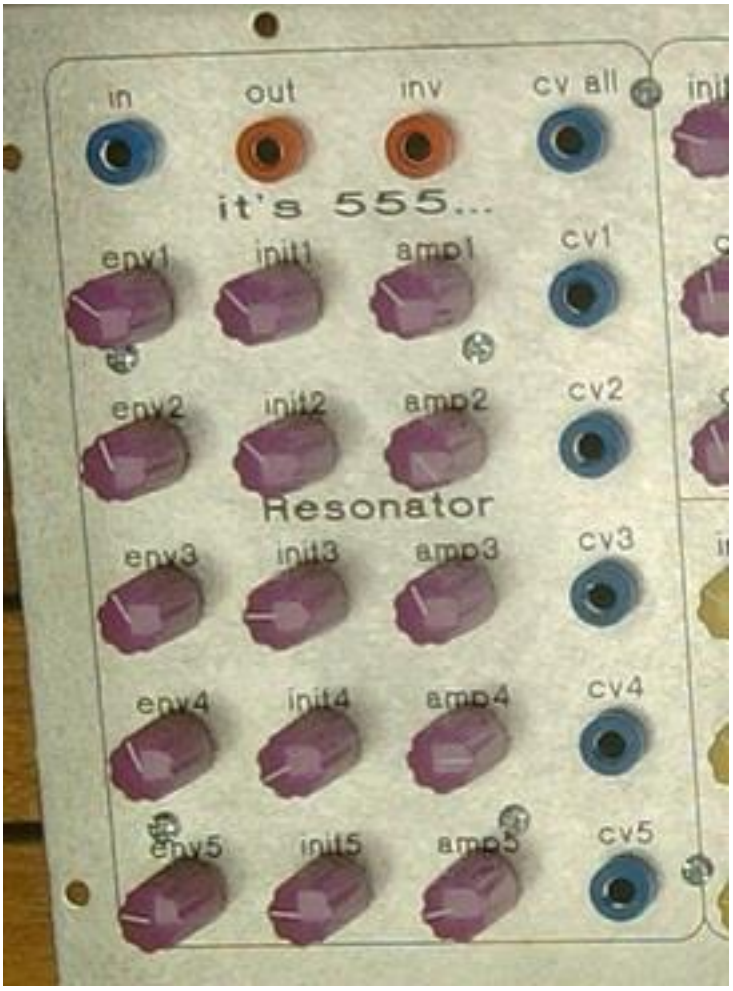
Inv is the inverted positive components of the main output signal 👁.



Sorry, not the greatest schematic, am using new software and yet to figure out how to export it nicely.

Everything in the box appears 5 times, everything outside of the box appears once!


repeat 5 times
Vcc
100K
R8
C1
1nF
U2
U3
BC647B
BC647B
U6
2k2
R7
U4
BC557BG
U5
BC557BG
Vcc
cv all
R11
100K
R12
1K8
env
Env
100K
R9
100K
Vcc
Initial
100K
R10
330K
Vss
C5
1nF
C3
10nF
R1
100K
Vcc
R5
220K
U1
NE555P
C6
10nF
to next stage input
R14
100K
R15
100K
100K
Amp
input 1st stage
to output summer
in
1nF
C7
1M
R13
U7
R16
100K
U8
R17
100K
R18
100K
U9
R20
1K
out
R19
1K
inv out


in
out
inv
cv all
it's 555...
env1
init1
amp1
cv1
env2
init2
amp2
cv2
Resonator
env3
init3
amp3
cv3
env4
init4
amp4
cv4
env5
init5
amp5
cv5