nonlinearcircuits

TIN TEARDROP VCF build & BOM

This VCF uses two SSI2144 chips, which are based on ladder filters. It has outputs for each chip and a mixed output. Controls include the usual cutoff and voltage-controlled Q, along with ‘spread’ controls for cutoff and Q. If nothing is patched into the spread controls, the spread pots work as manual controls. So keep them on or close to zero if you don’t want any or much spread.

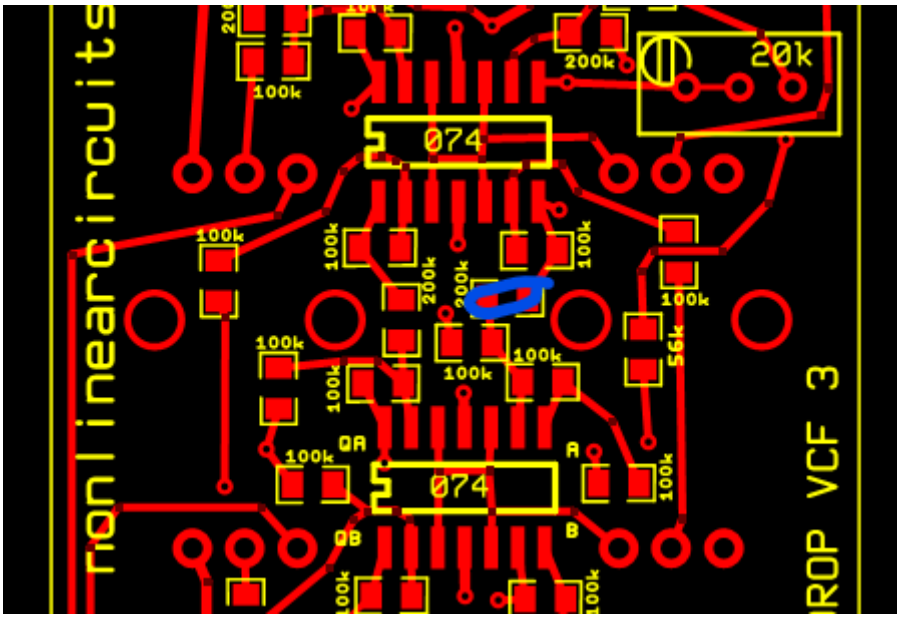
The spread controls work best with a bipolar CV (as in ranging from -5V to +5V), an inverted version of the spread CV is sent to filter core 2, so it changes in the opposite direction to core 1. The spread controls are meant to be a bit less influential than the main 1V/oct CV inputs, in tech terms it is approx. 1V per 2 octaves.

So, I guess it is a stereo filter in some respects, tho it was never really the intent.

The SSI chips are a bit tight to solder, have your bottle of flux ready, otherwise it is a pretty easy build.

There are a couple of options when you build this, probably best to just install everything, but see Notes # 4 & 5 for details.

There is an error on the version 3 PCB, the indicated resistor is labelled 200k, but it should be 100k, be sure to change it otherwise the spread control will not work properly –



DON’T FORGET TO INSTALL THE TWO 1k TEMPCOS AT THE END.

THEY SIT ON TOP OF THE SSI2144 CHIPS

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

VALUE	QUANTITY	DETAILS
15pF	2	0805
560pF	2	0805 use C0G/NP0
3n3	2	0805 optional – see notes #5
6n8	6	0805 use C0G/NP0
10n	2	0805
100n	6	0805
10uF	2	0805 25V or higher voltage rating Mouser:963-TMK212BBJ106MG-T or similar
220R	4	0805
470R	2	0805
1k	3	0805
1k tempco	2	thru-hole If you don't care too much about 1V/oct tuning, regular 1k resistors will work fine
13k	2	0805
22k	1	0805
47k	5	0805
56k	2	0805
68k	2	0805
91k	1	0805
100k	18	0805
200k	4	0805
220k	1	0805
1M	2	0805 see notes #4
LL4148 diode	2	sod80 Tayda: A-1213 see notes #4
BCM847DS	2	Mouser Part No: 771-BCM847DS115 see notes #4
TL072 or TL082	2	Soic Tayda: A-1139
TL074 or TL084	2	soic Tayda: A-1140
SSI2144	2	check NLC webstore for stock or Synthcube
Eurorack 10 pin power connector	1	Tayda: A-198 cut to size
S1JL, Schottky, power rectifier or 10R (worst option)	2	SMD SEE NOTES #1. **dot on PCB indicates CATHODE (stripe on component).**
3.5MM SOCKET Kobiconn style	8	Tayda: A-2563 or Thonkiconn Jacks (PJ301M-12) from Thonk, Synthcube or Modular Addict
100k pot	6	Tayda: A-5623 or A-4729 or similar
20k trimpot	1	Tayda: A-592

Additional notes:

1. , Schottky (best option) **or** standard power rectifier diode 50-600V 1A or more, **or** use a resettable fuse **or** just a 10R. Examples: BAT54GWX, PMEG2005EGWX, AEC-Q101, 20V, SOD-123, PMEG2005EH DIODE, SCHOTTKY, 0.5A, 20V, 1N400x or S1JL or similar.

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

3. 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.

4. The BCM847, diodes and 1M resistors are a mod suggested in the SSI2144 datasheet to "enable sub-audio cutoffs", see pages 5/6 in the datasheet. You can leave these off but it is best to install them.

5. The 3n3 capacitors are suggested as optional on Figure 1, page 3 of the datasheet. Installing them "improves Q stability and amplitude over frequency sweep". I have tried with them on and with them off and don't notice much difference with my long-suffering ears. If you have some, install them.

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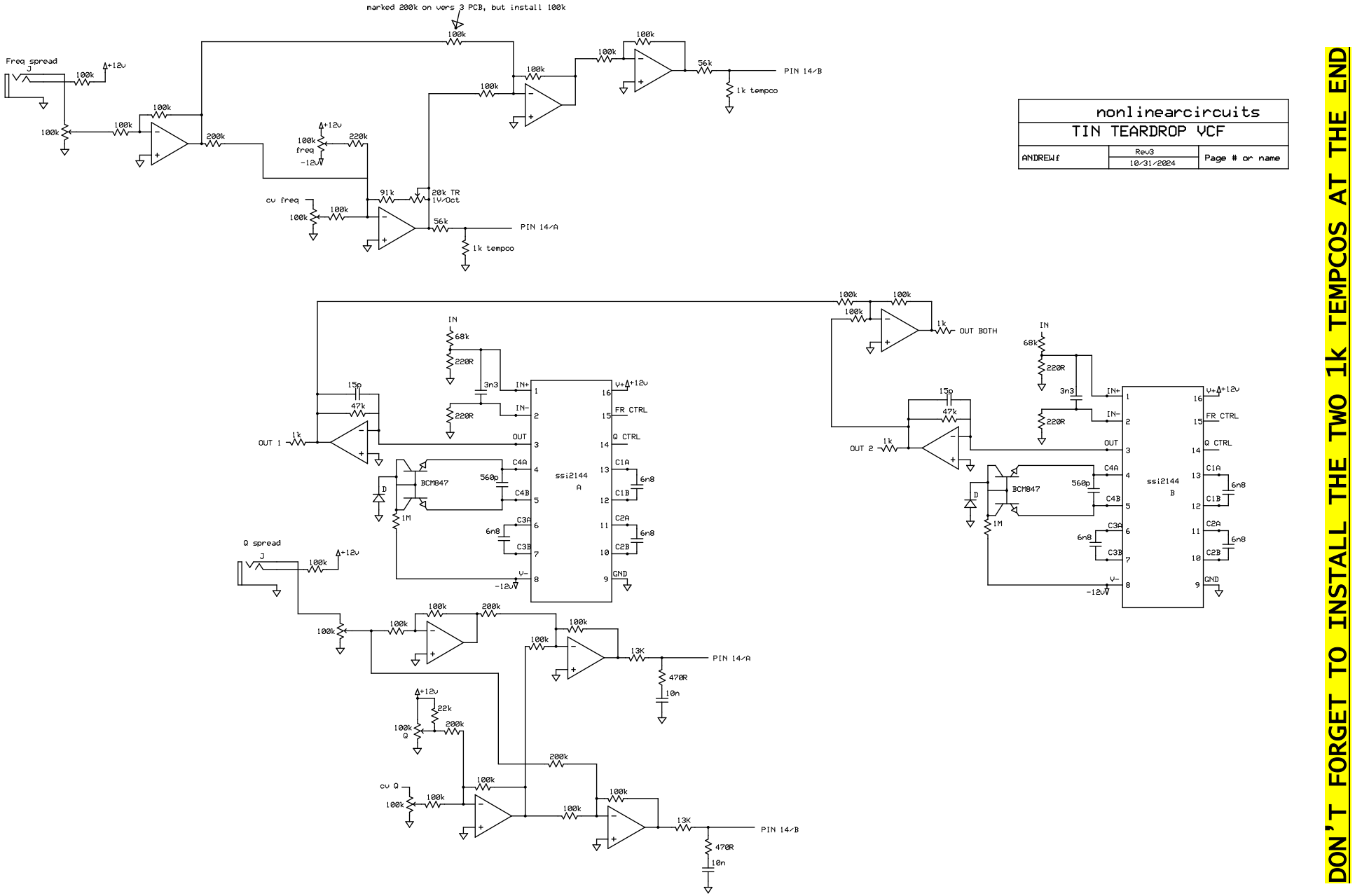
marked 200k on vers 3 PCB, but install 100k
Freq spread
J
+12v
100k
200k
220k
freq
-12v
cv freq
91k
20k TR
1V/Oct
56k
PIN 14/A
1k tempco
PIN 14/B
nonlinearcircuits
TIN TEARDROP VCF
ANDREWf
Rev3
10/31/2024
Page # or name
IN
68k
220R
3n3
15p
47k
1k
OUT 1
OUT 2
OUT BOTH
BCM847
560p
1M
6n8
ssi2144
A
B
IN+
IN-
OUT
V+
V-
FR CTRL
Q CTRL
C1A
C1B
C2A
C2B
C3A
C3B
C4A
C4B
GND
Q spread
22k
100k Q
cv Q
13K
470R
10n
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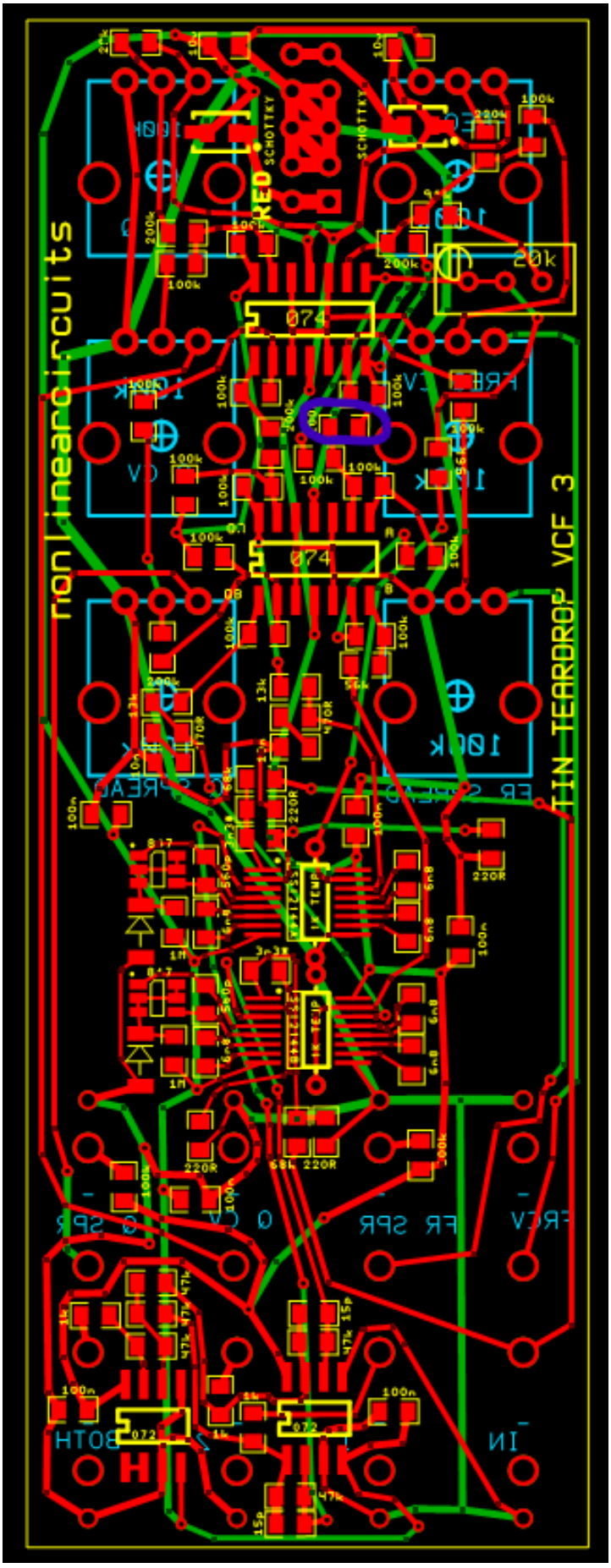

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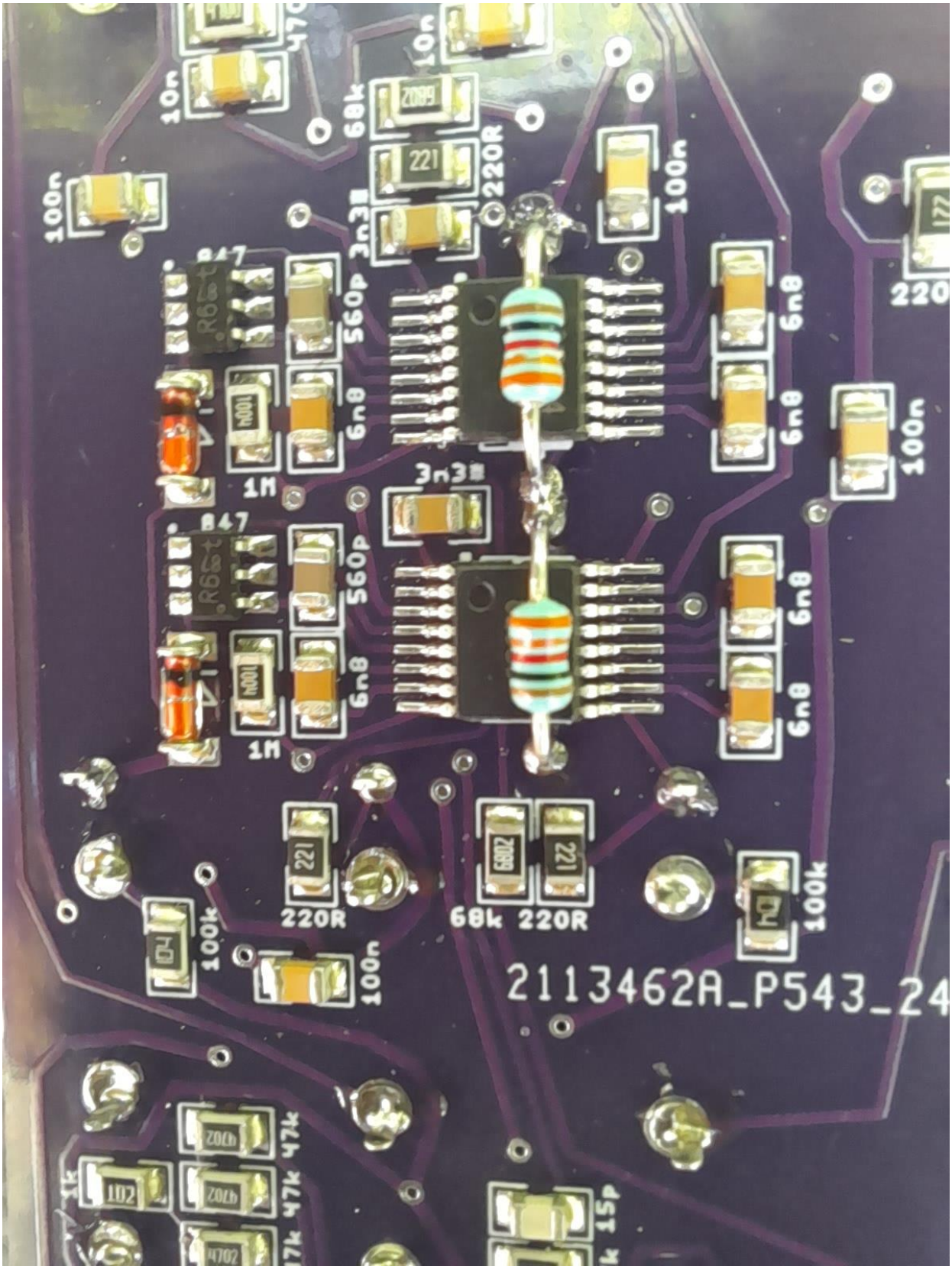

LOOK AT THOSE LOVELY 1k TEMPCOS

You could even baste them with heatsink paste, once everything is tested and working!


TIN TEARDROP VCF
FREQ
Q
FR CV
Q CV
FR SPREAD
Q SPREAD
FR CV
FR SPR
Q CV
Q SPR
IN
1
2
BOTH
NLC

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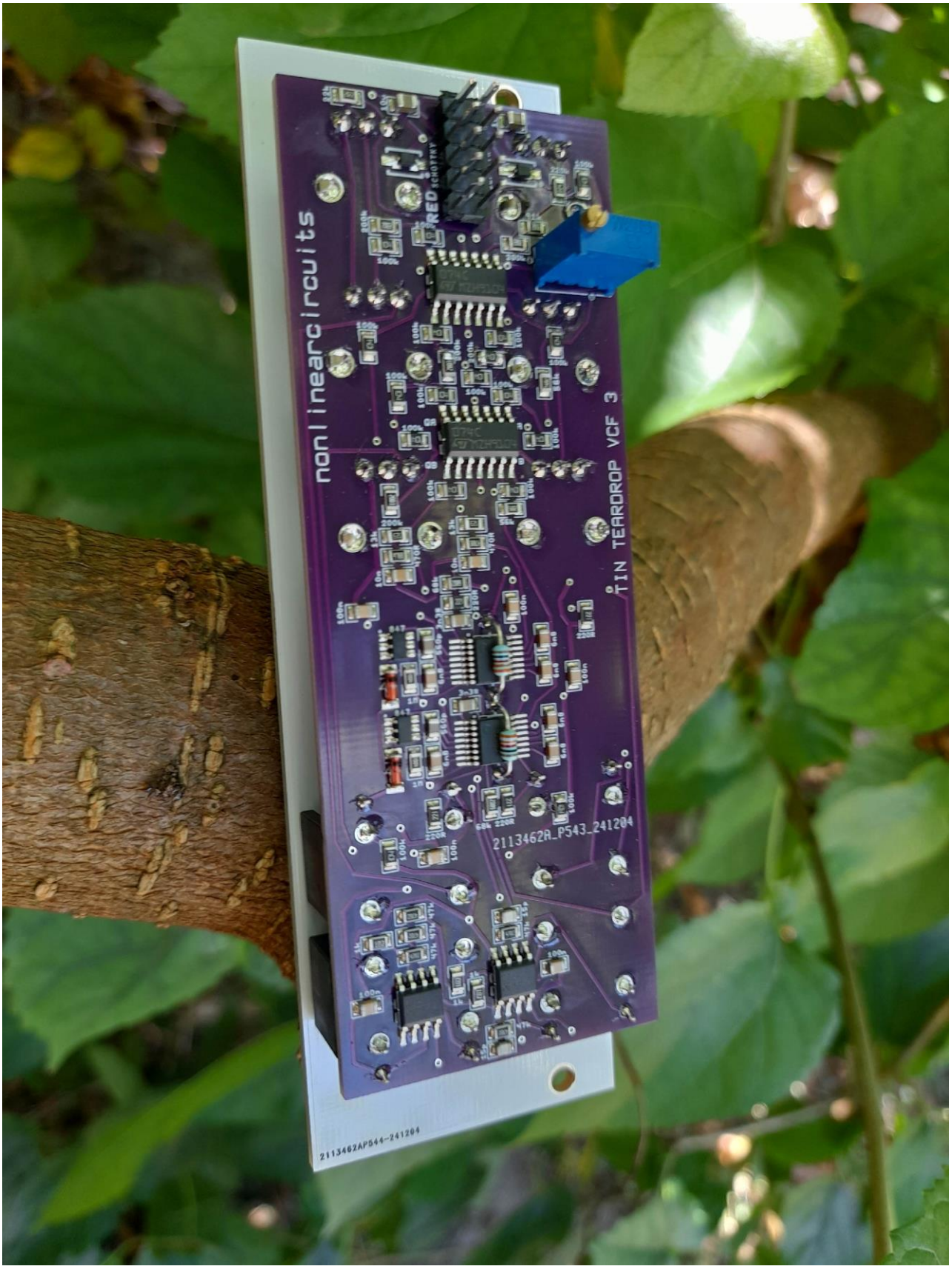
TIN TEARDROP VCF 3
2113462A_P543_241204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TIN TEARDROP VCF 3
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