nonlinearcircuits

I WAS SITTING IN A ROOM

Build & BOM – PLEASE READ CAREFULLY

Working on the CellF project brought two members of our group into contact with Alvin Lucier. Originally, we planned to take CellF to NYC and hook the neurons directly to Alvin. Then covid happened, then Alvin passed away in Dec 2021. Prior to his passing, he supplied Guy and Nathan with a vial of his blood which was used to grow neurons. We used these for a performance with Darren Moore at the 2023 Venice Biennale (Music for Surrogate Performer).

Anyway, when in Venice, all the discussion about Alvin Lucier got me thinking about a module to (sort of) recreate one of his best known works; I'm Sitting in a Room

This module has nine PT2399 chips in series. The 1st has voltage controlled delay time, the following 8 have fixed delays. It is noisy, but that is the whole point. At certain settingS, you can get some interesting effects such as an illusion of reverse delay.

By default, out6 is fed to the feedback input, but feel free to try different outs. The effect is usually quite different using odd or even numbered outs as feedback. Even better, take one of the outs and process it thru a VCF or Phase shifter and then feed it back.

There are outputs for stages 1-8, 9 misses out but is summed into the ALL output with everything else.

This module can also be used for pseuedo stereo, multi-phonic or spatialization effects.

There are a couple of options when building this module.

1. The PT2399 delay time is set by a resistor, usually the maximum value for this resistor is approx 50k. On the PCB is a resistor marked 220k* which is used to set the delay time of the 1st stage. If you use a resistor well above 50k (like 220k), then you get into glitch and noise territory. So, if you want to keep things reasonable civilised, install a much lower valued resistor on the pads marked 220k*, say 51k-68k. I like 220k.
2. The resistors marked Rd set the fixed delay time stages 2-9. On the proto-types, I used mainly 47k, tho tried some with 22k and 10k. **Most recently, I tried 4k7 for Rd and like it a lot**. You could even go lower, tho prob not much less than 2k. Going by the datasheet, a resistor of 4k7 for Rd implies a room of 27 metres in length, which is probably a bit unrealistic. Going down to 1k5 gets a 16m room. Pt2399 chips get funny if the delay resistor is too small, you might get away with 1k (13m). In the demo video, the white panel version uses 4k7 for Rd, the black panel has 47k.
3. If using 47k (as suggested in the corner on the top PCB), the room would be approx 180m long! The module is pretty noisy but is **a lot** noisier using larger valued resistor such as 47k for Rd. Still fun tho.

   Another point to mention is this module sucks a lot of current. If you use 4k7 for Rd, it will require 260mA on the +12V rail. If using 47k for Rd, then 220mA.

   The negative rail uses 18mA.

Furthermore the PCBs do get warm. The proto-type builds used a 1.5A regulator to get 5V for the delay chips. The heatsink of this regulator usually sat at 65C, not dangerously hot but I didn't like it. So the production version uses nine LM78L05 smd regulators, these still warm up but rarely over 50C.

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

Synthcube will stock full part kits, or you can order partial kits.

VALUE	QUANTITY	DETAILS
100pF	10	0805 optional see notes #6
1n	9	
10n	9	
47n	18	
100n	29	0805
10uF	34	0805 25V or higher voltage rating Mouser Part No: 187-CL21A106KAYNNNE or similar
470R	5	0805
1k	16	0805
2k2	1	0805
10k	22	0805
15k	2	0805
22k	2	0805
27k	1	0805
33k	3	0805
47k	1	0805
68k	2	0805
100k	17	0805
220k*	1	0805 See notes pg1
RL	1	resistor for vactrol LED, see notes #4
Rd	8	resistors to set delay time, see notes pg1
TL072 or TL082	5	Soic Tayda: A-1139
PT2399 or CD2399	9	soic Tayda: A-5781
LM78L05 smd 8 pin regulator	9	soic Tayda: A-629 marked with white rectangles on PCB
LL4148	1	sod-80 Tayda: A-1213
BC857	1	SOT23-3 Tayda: A-1345
Eurorack 10 pin power connector	1	Tayda: A-198 cut to size
Schottky or power rectifier with at least 1A rating	2	SMD SEE NOTES #1. **dot on PCB indicates CATHODE (stripe on component).**
3.5MM SOCKET	12	Tayda: A-2563 or Thonkiconn Jacks (PJ301M-12) from Thonk, Synthcube or Modular Addict
5V1 Zener	18	SOD80 optional, Tayda: A-6014 (5V6 but will do) see notes #5
10 pin header	3	get one 40 pin strip and cut off as needed Tayda: A-197
10 Pin 2.54mm Single Row Female Pin Header	3	Tayda: A-1306
100k pot	3	Tayda: A-5623 or A-4729. Maybe use knurled shaft to suit smaller knobs.
vactrol	1	DIY or factory, say Macron NSL-32

Additional notes:

1. , Schottky with 1A or more rating (best option) **or** standard power rectifier diode 50-600V 1A or more, **or** use a resettable fuse **or** just a 10R. Examples: Mouser: 771-PMEG3010ER115, 863-NRVB130T1G or 621-B130LAW-F.

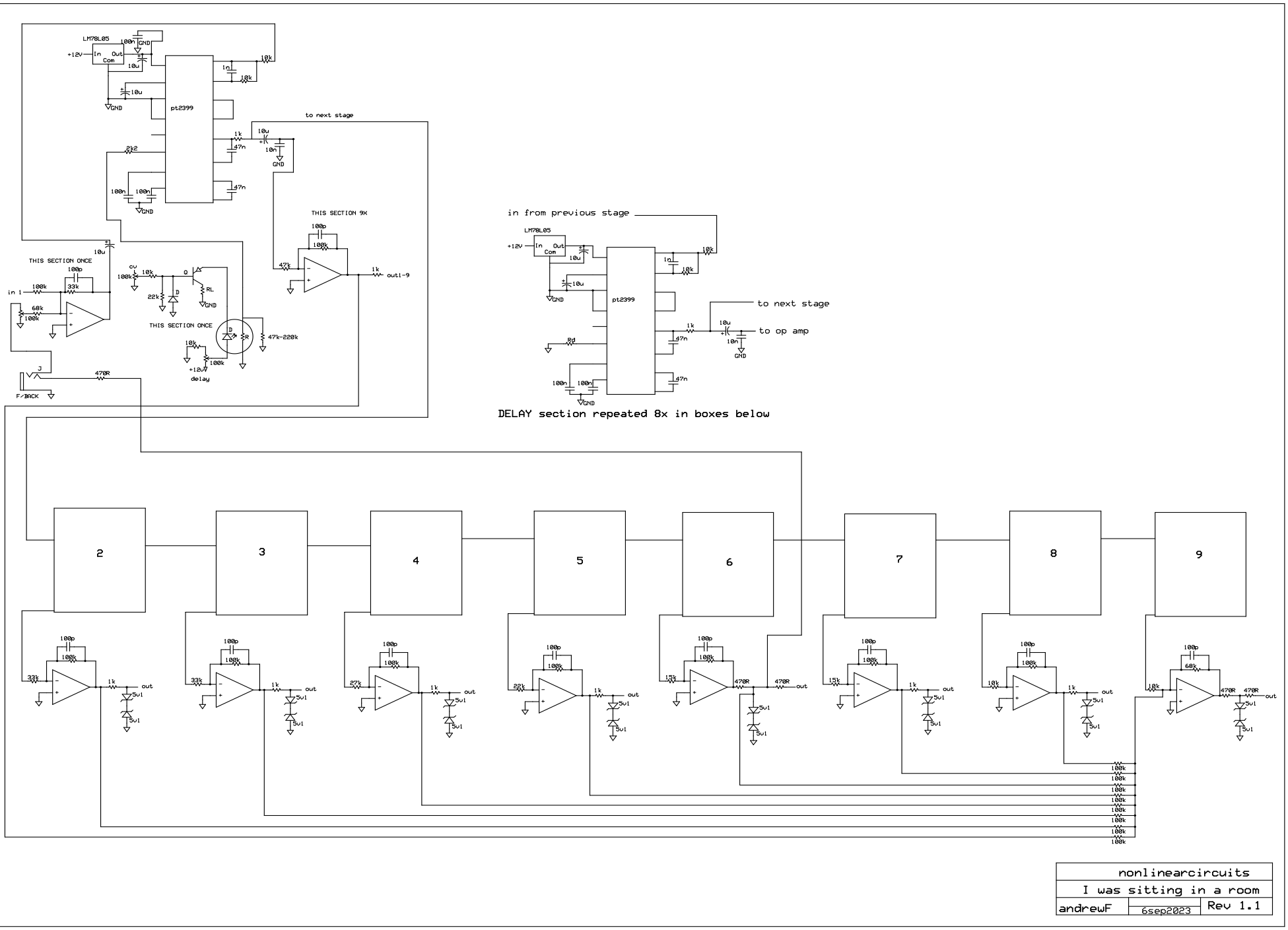
2. The chips, resistors, caps are cheapest from Tayda. Schottky diodes, CMOS & 1uF, 10uF 25V 0805 caps from Mouser/E14/Farnell/etc.

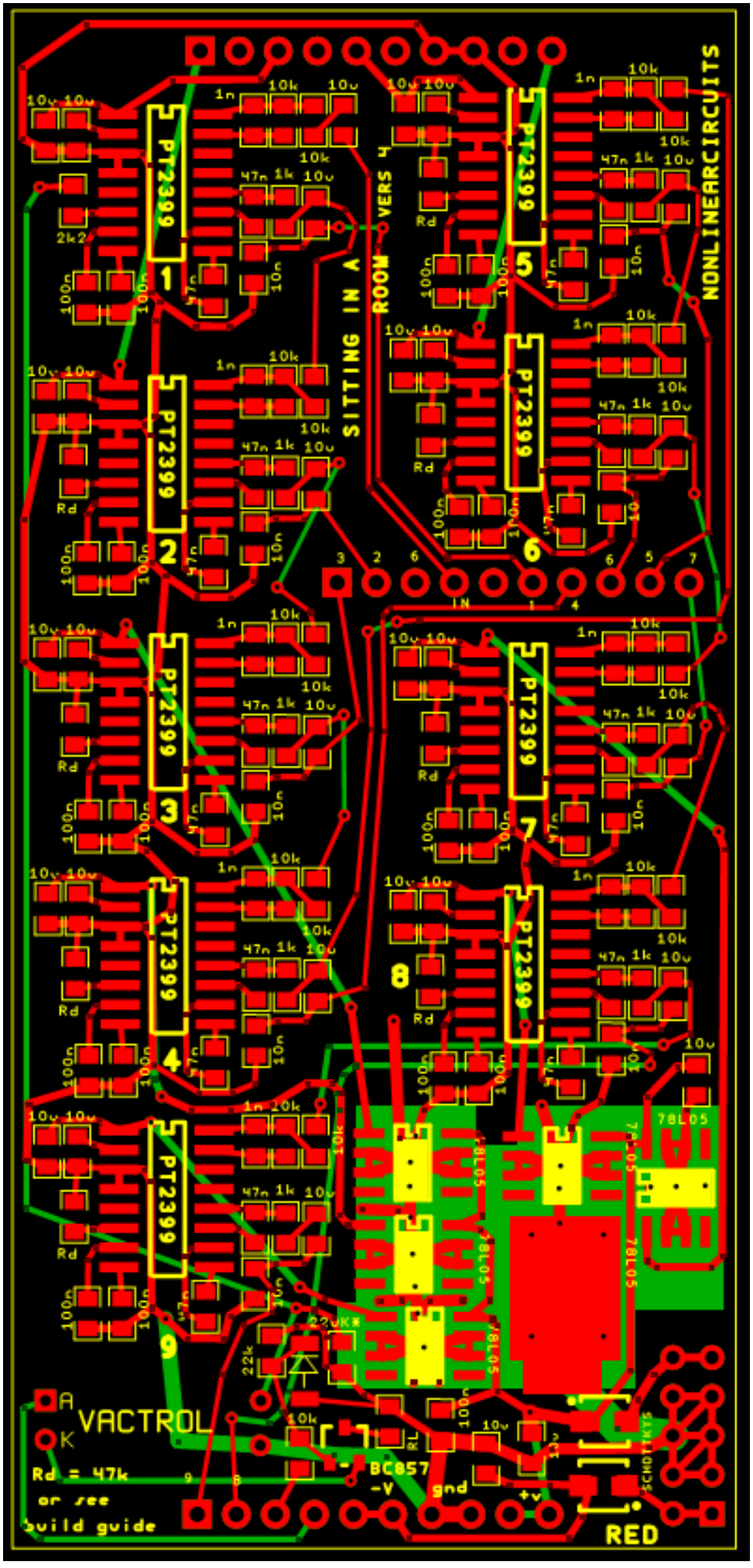
3. Join the Nonlinearcircuits Builders Guild on FB: https://www.facebook.com/groups/174583056349286/ and ask questions there if you have any. If you prefer not to FB then email is fine.

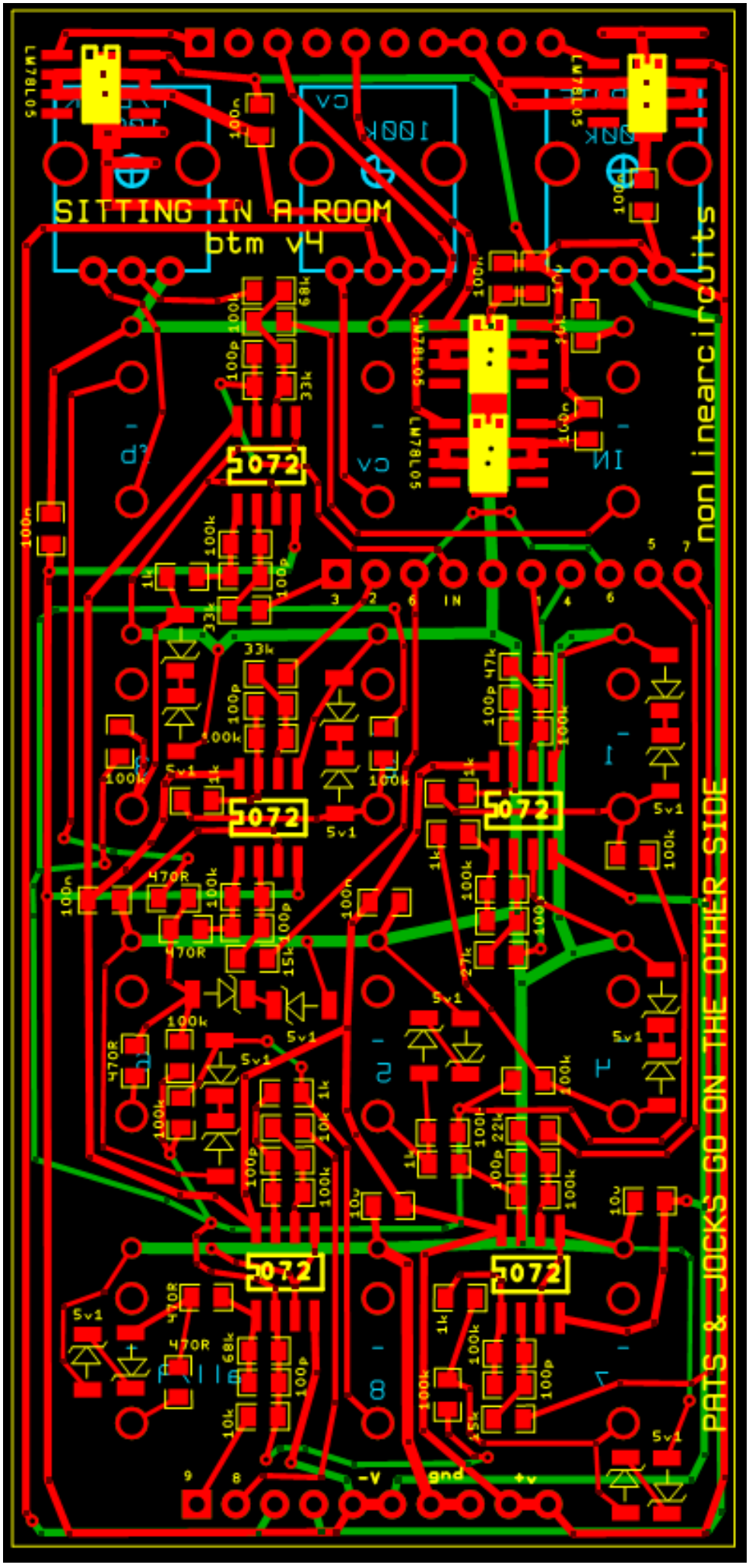
4. RL – select a resistor to suit the LED in the vactrol you are using. If you have a factory made vactrol, then probably 1k will be fine. If making a DIY one, then it depends on your LED, probably 4k7 for a diffused version up to 10k+ for a clear superbright.

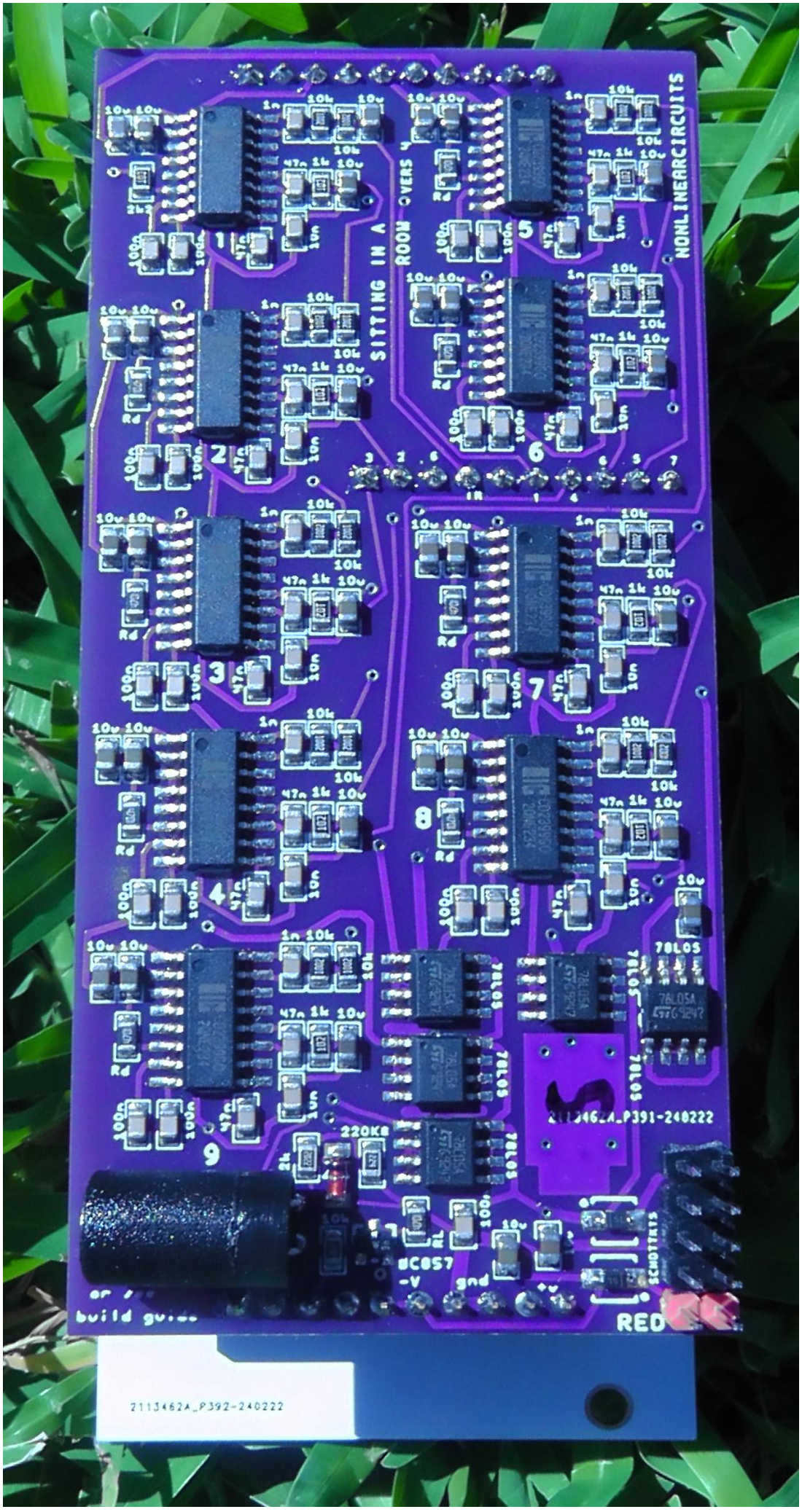
5. 5V1 zeners – these limit the outputs to a 10Vp-p range. PT2399 chips greatly vary their output volume depending on how much of a hard time you give them. The zeners don't anything when the delay is at normal setting but start helping when the feedback is cranked to max and the outputs start clipping. Another benefit is they give a much softer edge than a clipping square wave. If you don't care about such niceties, leave them off. Tayda have a 5V6 zener, which will be fine to use instead.

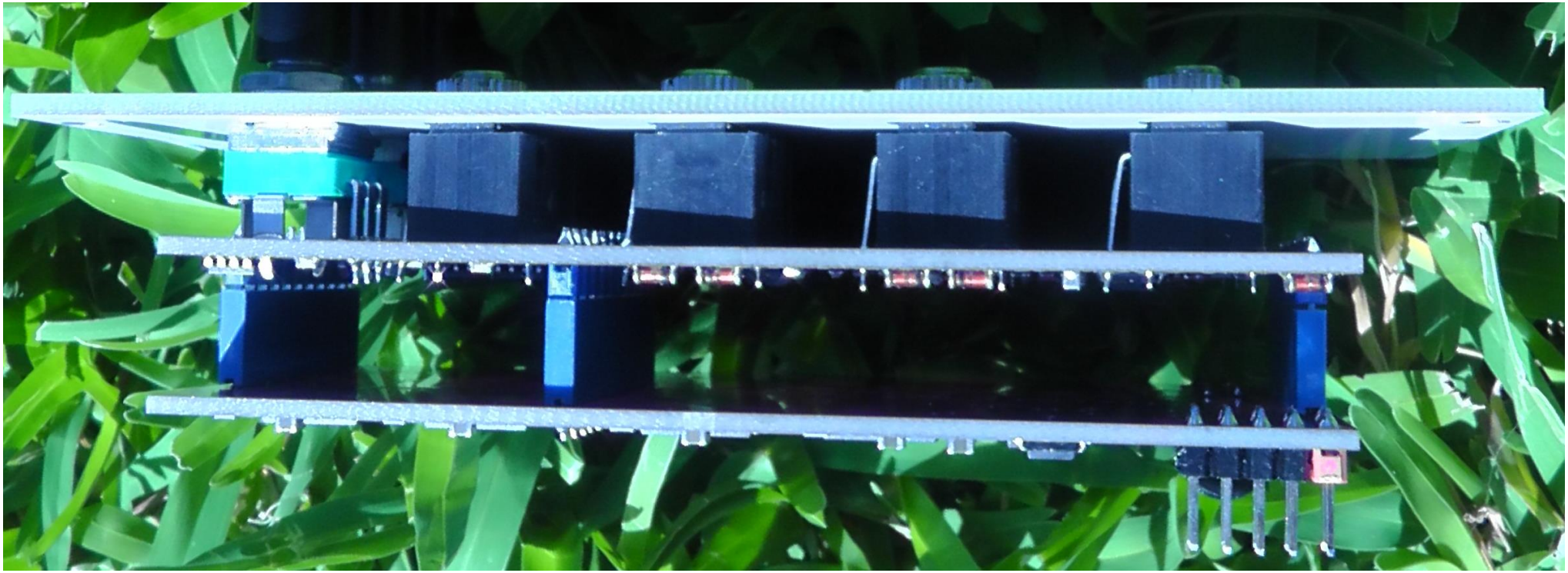
6. 100pF capacitors – these serve to reduce or remove any high freq oscillation/noise that may be attached to the signal. In rare cases, they can prevent a high gain op amp stage from going into oscillation, tho that is unlikely to happen here. The outputs from the delay chips already have some filtering, so the 100pF can be left off if you prefer. I tend to install them on the input stage and the ALL stage.

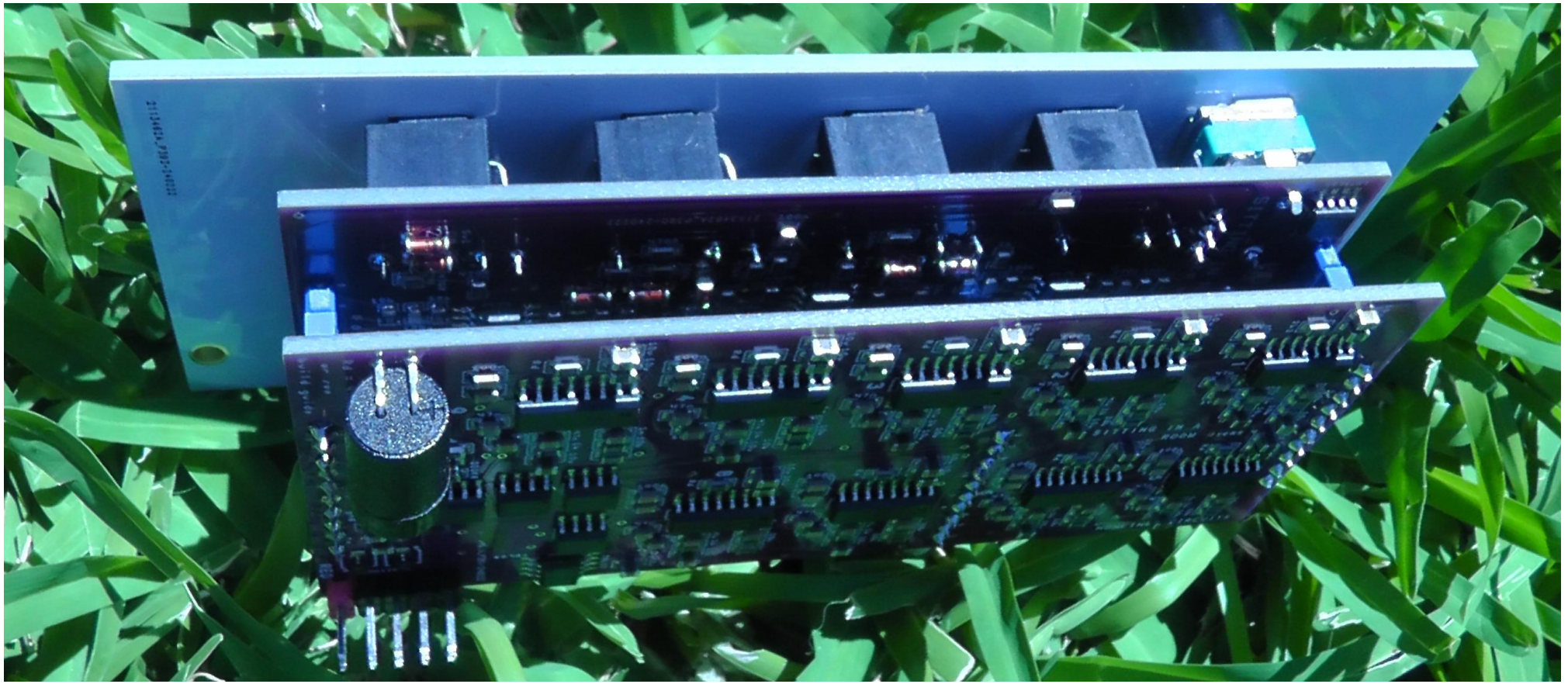

LM78L05
+12v
in
Com
Out
100n
GND
10u
pt2399
10k
1n
1k
47n
8k2
to next stage
THIS SECTION 9X
100p
100k
47k
out1-9
THIS SECTION ONCE
in 1
33k
68k
cv
Q
RL
D
22k
R
47k-220k
delay
J
F/BACK
470R
in from previous stage
Rd
to next stage
to op amp
DELAY section repeated 8x in boxes below
2
3
4
5
6
7
8
9
out
5v1
nonlinearcircuits
I was sitting in a room
andrewF
6sep2023
Rev 1.1

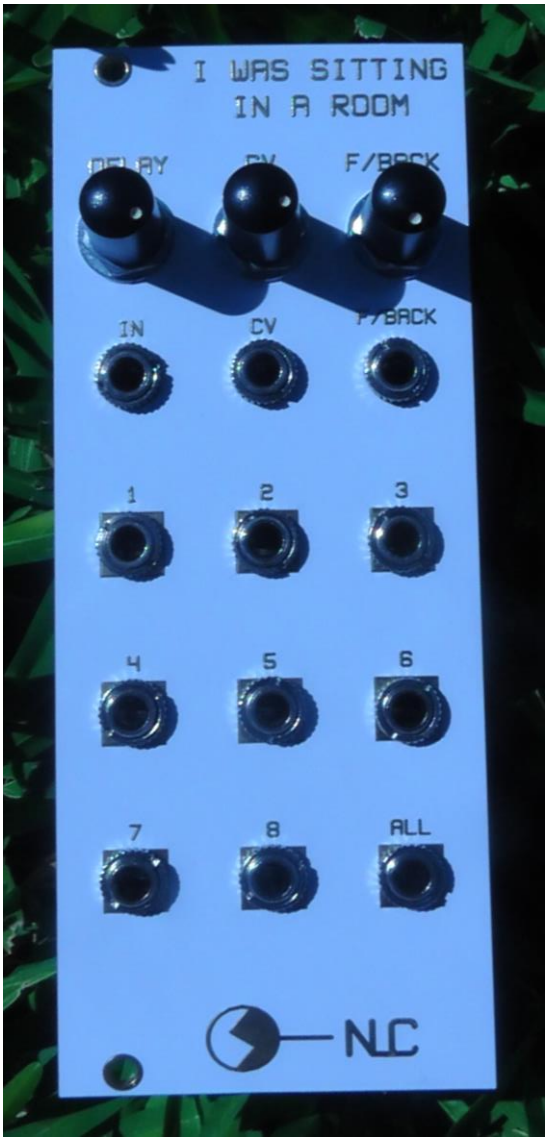

SITTING IN A ROOM VERS 4
NONLINEARCIRCUITS
PT2399
Rd
10k
1n
47n
1k
10u
10v
100n
10n
2k2
22k
BC857
78L05
IN
-V
gnd
+v
RL
VACTROL
A
K
Rd = 47k
or see
build guide
SCHEMATICS
RED


SITTING IN A ROOM
btm v4
nonlinearcircuits
PATS & JOCK'S GO ON THE OTHER SIDE
LM78L05
TL072
-V
gnd
+V


SITTING IN A ROOM VERS 4
NONLINEARCIRCUITS
78L05
220KΩ
2113462A_P391-240222
2113462A_P392-240222






I WAS SITTING
IN A ROOM
DELAY
CV
F/BACK
IN
CV
F/BACK
1
2
3
4
5
6
7
8
ALL
NLC