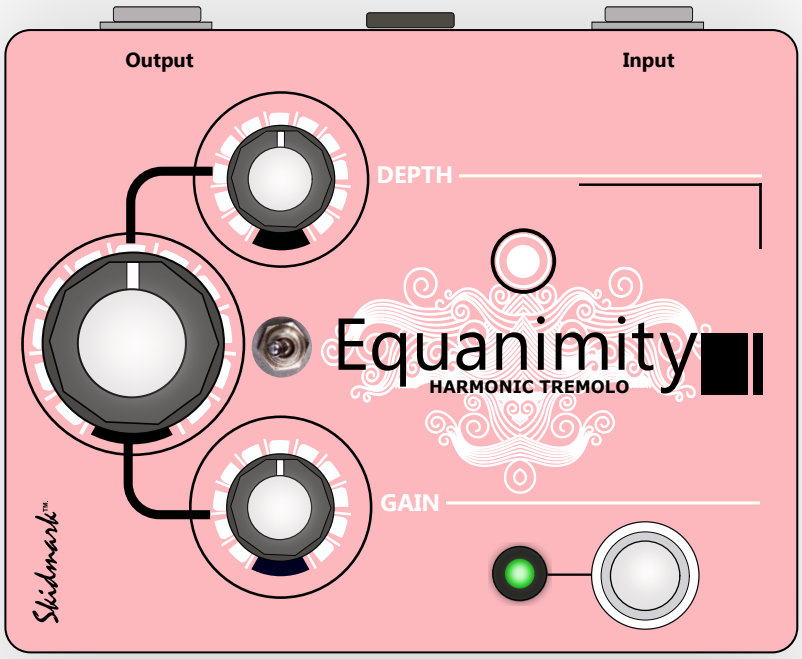
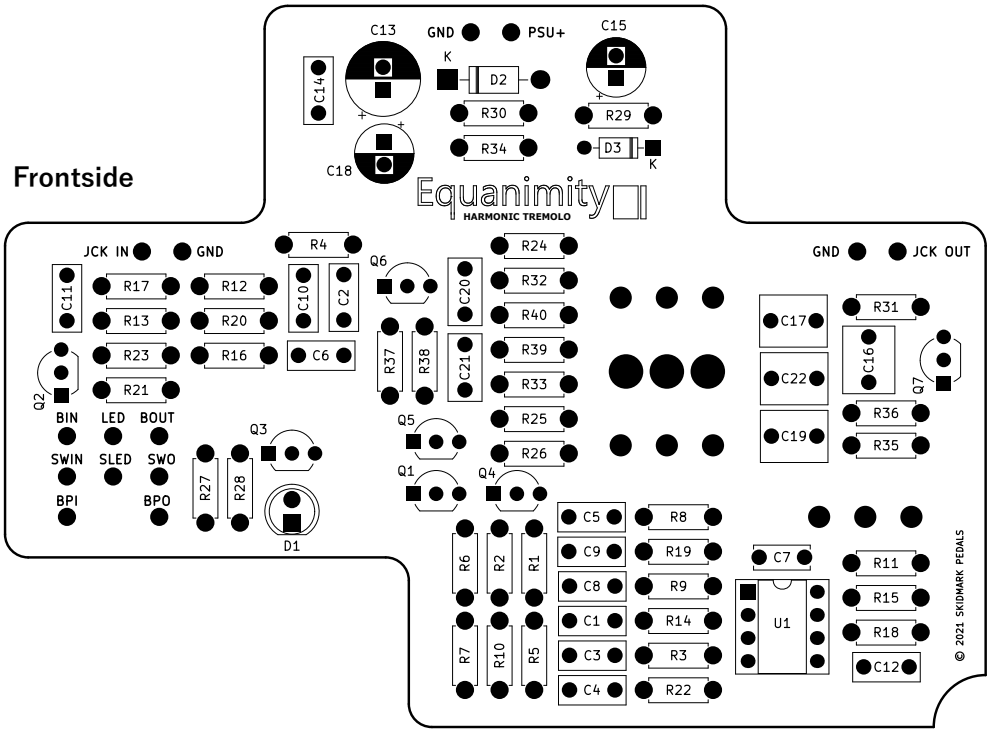
BUILDING DOCUMENTS

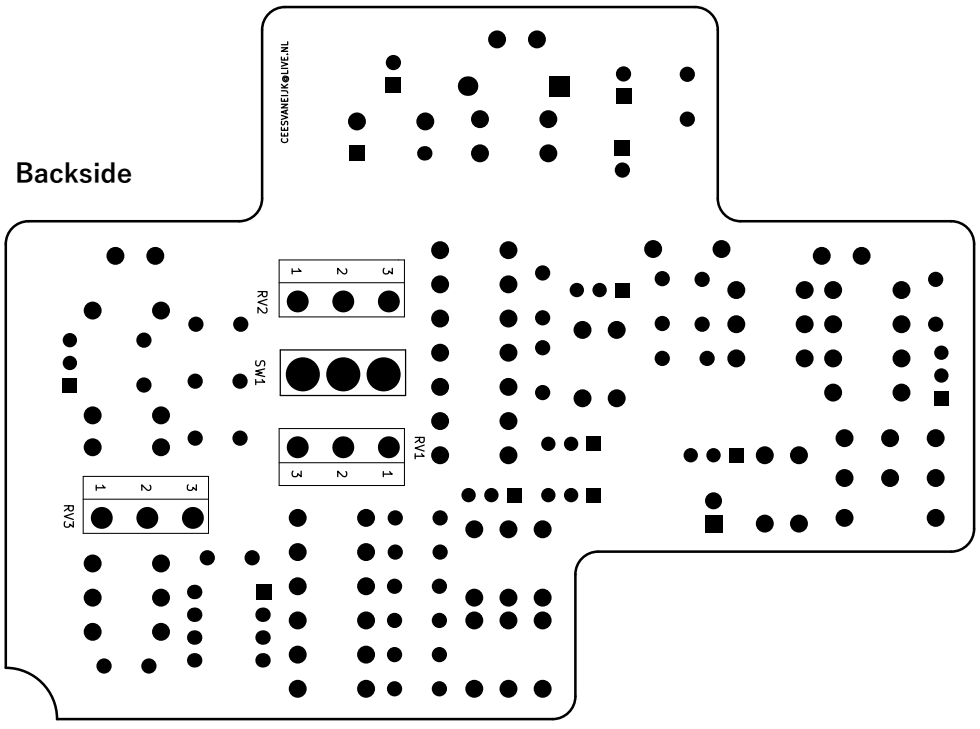


Equanimity is my take on the harmonic tremolo circuits of yesteryear. Although it's not a super complex circuit by itself, it did take me quite some time and effort to cook up the final design. Honestly I've never been a huge tremolo aficionado, and for a long time I (mis)placed its harmonic counterpart in the same category. But about two years ago I stumbled on a overhaul video of an old Fender amp, and it became (painfully) clear that I couldn't have been more wrong … Especially on the slower rate settings it gives this unique somewhat 'vibey' swirl, which is simply unmatched by a normal tremolo. Long story short, the seed was planted, and I started thinking about the building blocks that could make up my own little pedal version. During the lockdown here in The Netherlands, I finally found the time to bring my ideas into realization. So fellow pedal people, meet Equanimity, a choppy harmonic tremolo which doesn't only sound good, but is truly fun to build!

Frontside



Backside



Equanimity
HARMONIC TREMOLO

Sourcing sheet

Capacitors

1	470pF	Capacitor MLCC/Ceramic (D5.0 x W2.5 - P5.00 mm)
2	4n7	Film capacitor (L7.2 x W3.0 - P5.0 mm)
2	10nF	Film capacitor (L7.2 x W3.0 - P5.0 mm)
1	22nF	Film capacitor (L7.2 x W3.0 - P5.0 mm)
1	47nF	Film capacitor (L7.2 x W3.0 - P5.0 mm)
6	100nF	Film capacitor (L7.2 x W3.0 - P5.0 mm)
4	1uF (NP)	Film capacitor (L7.2 x W5.5 - P5.0 mm)
2	470nF	Film capacitor (L7.2 x W3.5 - P5.0 mm)
1	22uF	Electrolytic capacitor radial (D6.3 - P2.50 mm)
1	47uF	Electrolytic capacitor radial (D6.3 - P2.50 mm)
1	100uF	Electrolytic capacitor radial (D8.0 - P2.50 mm)

Potentiometers

1	B100k	Alpha (right angle) 16 mm Potentiometer
1	B1M	Alpha (right angle) 16 mm Potentiometer
1	B50K	Alpha (right angle) 16 mm Potentiometer

Semiconductors

1	LED	LED
1	1N5817	Diode (DO-41)
1	1N4148	Diode (DO-35)
1	TL072	Dual Low-Noise Operational Amplier (DIP-8)
3	2N3904	NPN Transistor (TO-92)
4	2N5088	NPN Transistor (TO-92)

Hardware

1	Toggle switch SPDT (on-on)
1	Standard 3PDT 12mm latching footswitch
2	6,35 mm jack (Lumberg style) solder lugs
1	DC jack Isolated (Small - Lumberg style)
1	1590BB style enclosure (or larger)
1	LED bezel/holder 3 - 5 mm
3	Knobs
1	DIP-8 Socket
7	TO-92 Socket (in-line wide)

Resistors

1	R33	Metal film resistor 1/4W (DIN0207)
2	R150	Metal film resistor 1/4W (DIN0207)
2	1k2	Metal film resistor 1/4W (DIN0207)
1	1k8	Metal film resistor 1/4W (DIN0207)
1	2k	Metal film resistor 1/4W (DIN0207)
1	2k7	Metal film resistor 1/4W (DIN0207)
3	4k7	Metal film resistor 1/4W (DIN0207)
1	6k2	Metal film resistor 1/4W (DIN0207)
5	10k	Metal film resistor 1/4W (DIN0207)
1	12k	Metal film resistor 1/4W (DIN0207)
1	18k	Metal film resistor 1/4W (DIN0207)
2	22k	Metal film resistor 1/4W (DIN0207)
1	27k	Metal film resistor 1/4W (DIN0207)
1	33k	Metal film resistor 1/4W (DIN0207)
4	47k	Metal film resistor 1/4W (DIN0207)
1	68k	Metal film resistor 1/4W (DIN0207)
3	100k	Metal film resistor 1/4W (DIN0207)
2	150k	Metal film resistor 1/4W (DIN0207)
2	680k	Metal film resistor 1/4W (DIN0207)
4	1M	Metal film resistor 1/4W (DIN0207)
1	2M4	Metal film resistor 1/4W (DIN0207)

Equanimity
HARMONIC TREMOLO

References

Capacitors

C1	100nF
C2	4n7
C3	4n7
C4	100nF
C5	47nF
C6	100nF
C7	470pF
C8	100nF
C9	100nF
C10	10nF
C11	10nF
C12	22nF
C13	100uF
C14	100nF
C15	47uF
C16	1uF (NP)
C17	1uF (NP)
C18	22uF
C19	1uF (NP)
C20	470nF
C21	470nF
C22	1uF (NP)

Semiconductors

D1	LED
D2	1N5817
D3	1N4148
U1	TL072
Q1	2N3904
Q2	2N3904
Q3	2N3904
Q4	2N5088
Q5	2N5088
Q6	2N5088
Q7	2N5088

Resistors

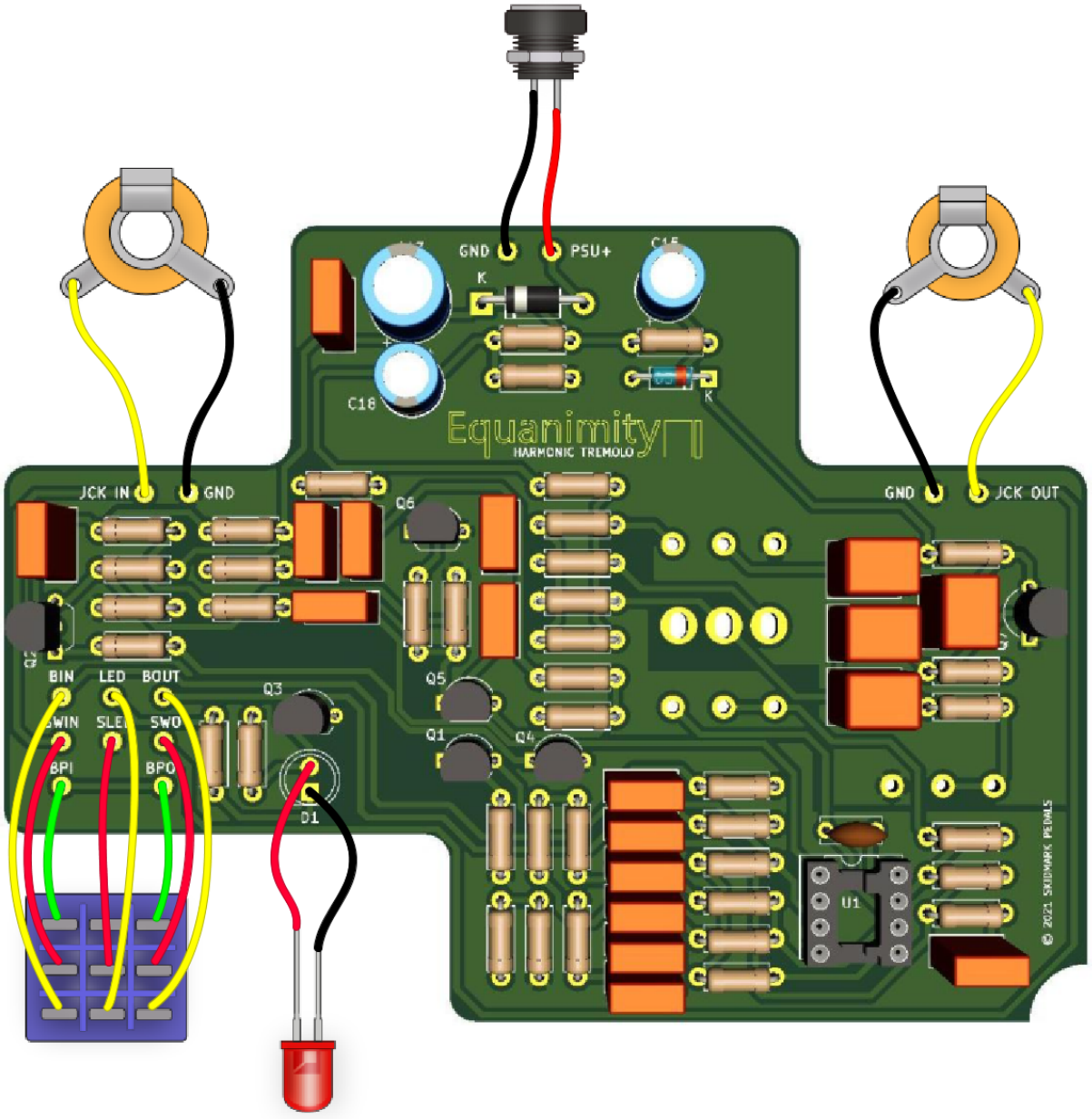
R1	680k
R2	2k7
R3	22k
R4	47k
R5	47k
R6	150k
R7	R150
R8	1M
R9	1M
R10	1k2
R11	10k
R12	680k
R13	1k8
R14	22k
R15	10k
R16	27k
R17	68k
R18	4k7
R19	100k
R20	150k
R21	R150
R22	1M
R23	1k2
R24	1M
R25	10k
R26	12k
R27	4k7 (CLR)
R28	10k
R29	R33
R30	47k
R31	18k
R32	100k
R33	100k
R34	47k
R35	4k7
R36	2M4
R37	2k
R38	10k
R39	33k
R40	6k2

Potentiometers

RV1	B100k
RV2	B1M
RV3	B50K

Switch

SW1	SPDT (on/on)



Please duly note that it's probably best to solder the in- and output leads before mounting the pots. There's very little room to access the pads, once the pots are mounted …

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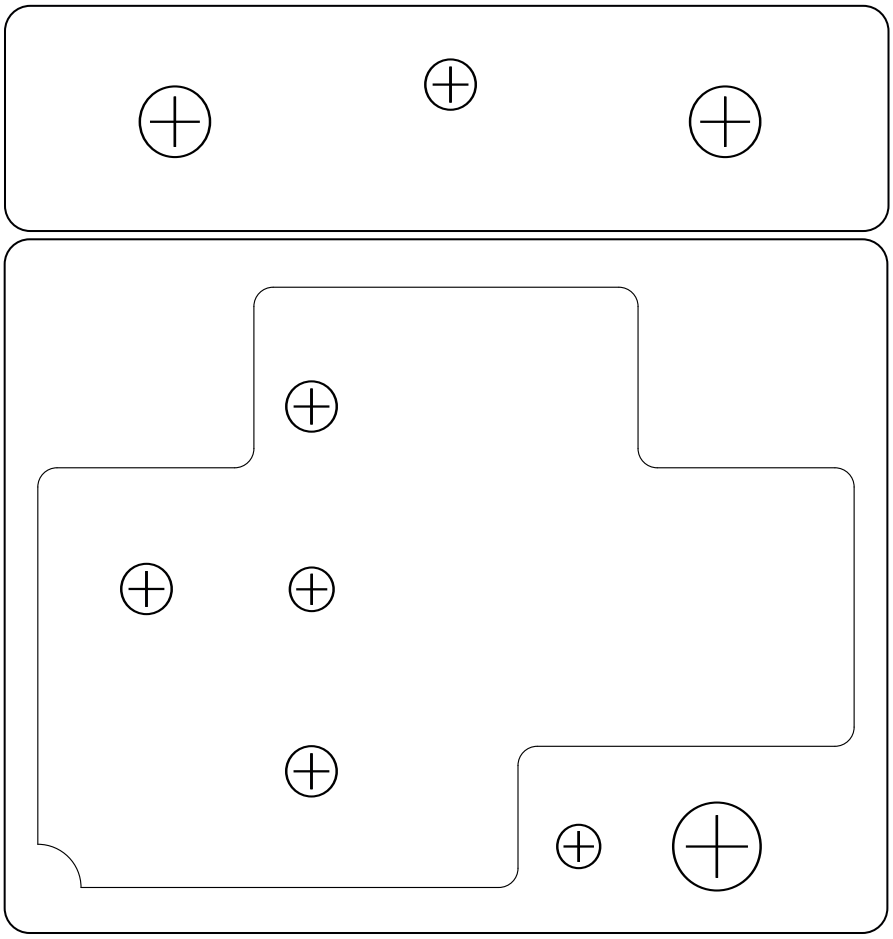
Drill Template



Generic 1590BB

117 x 192 mm (top side)

***Note**: make sure you have your printing settings set to 'actual size' or 100 % when printing!*

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Addendum

Drill coordinates

Hole	Side (Tayda)	Diameter (mm) Powder coated	Diameter (mm) Bare	X Position (mm)	Y Position (mm)
Depth	A	8,2	8	22,99	18,41
Rate	A	6,5	6,3	-1,14	18,41
Gain	A	8,2	8	-25,27	18,41
Speed	A	8,2	8	-1,14	40,26
3PDT	A	12,7	12,5	-35,31	-35,18
Led	A	8,1	7,9	-35,31	-16,89
Output	E	9,5	9,3	0	36,58
Input	E	9,5	9,3	0	-36,58
PSU	E	8,2	8	5	0

I've submitted these drill coordinates for 'Tayda's Drill service', but I suppose they will work just fine with any other drill service. When you're using a powder coated enclosure, make sure you are taking the drill diameter sizes from the 'powder coated' column (+0,2 mm) Also you might notice that the diameter sizes are slightly larger than they strictly should be. That's because with board mounted parts like pots and switches, it's wise to create at least some clearance. Otherwise it could become a real pain getting the finished board mounted in the enclosure, trust me I've been there ;)

Notes

For optimum performance use a dedicated (isolated) 9 volt outlet from your PSU. A daisy chained supply and/or switching supply could introduce hum/noise in to your signal chain.

Due to the minimalistic (or vintage;)) design of the LFO, the speed/depth knobs and the rate switch are rather interactive which each other. You might notice that with faster speed settings you will need to increase the depth a little to get a similar amount of effect.

I'm working on an updated .pdf file for UV printing (Roland VersaWorks). The positioning of the layout was slightly off, and the white.rdg layer wasn't detected during printing. Hence the grey coloring of the white parts, but I still think the enclosure looks pretty cool!. Nevertheless, I know where I messed up, so a file for UV printing will also be uploaded within short!

Equanimity
HARMONIC TREMOLO

Disclaimer

Please duly note that the PCB comes with no technical support ...* It has however been verified to work fine, just make sure you use parts from a trustworthy source. Keep in mind that you should at least have intermediate knowledge of electronics and ditto experience with populating a PCB.

Also make sure you got it 'right the first time'. The PCB contains fragile through hole connections, which makes desoldering a real pain ... If you want to experiment with (different) component values, I strongly recommend using sockets. Also (double) check the polarity and pin-outs of your components before mounting them.

One of the tricky steps when building a pedal with board mounted pot's and switches, is of course getting the hardware to line up with the holes in the enclosure. If you do not feel comfortable achieving this, then just wire up the pots and switches with short wire leads. This will create some clearance when drilling the enclosure.

Now that we have all that negativity out of the way, have fun building Equanimity!

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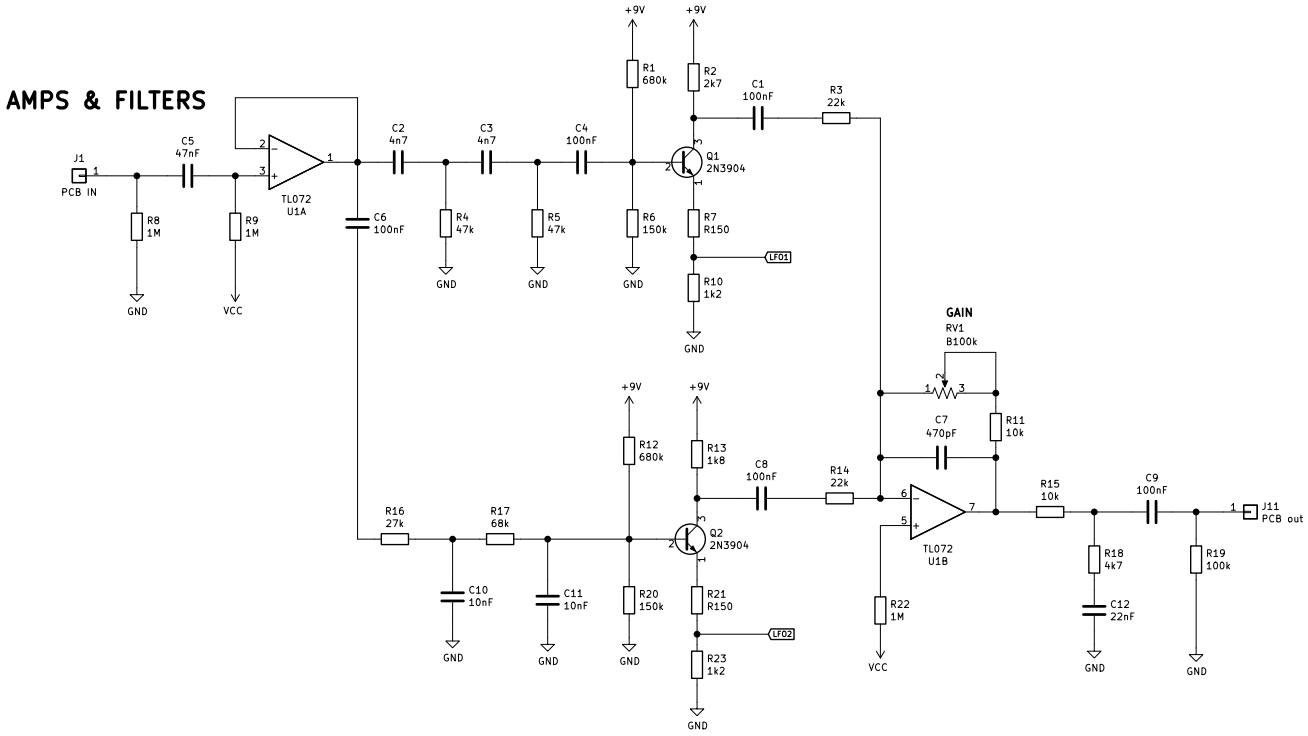
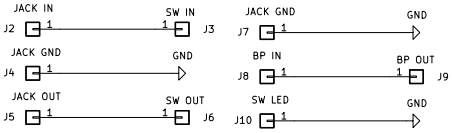
* of course you can always drop me a message and I will try to help you out where I can.

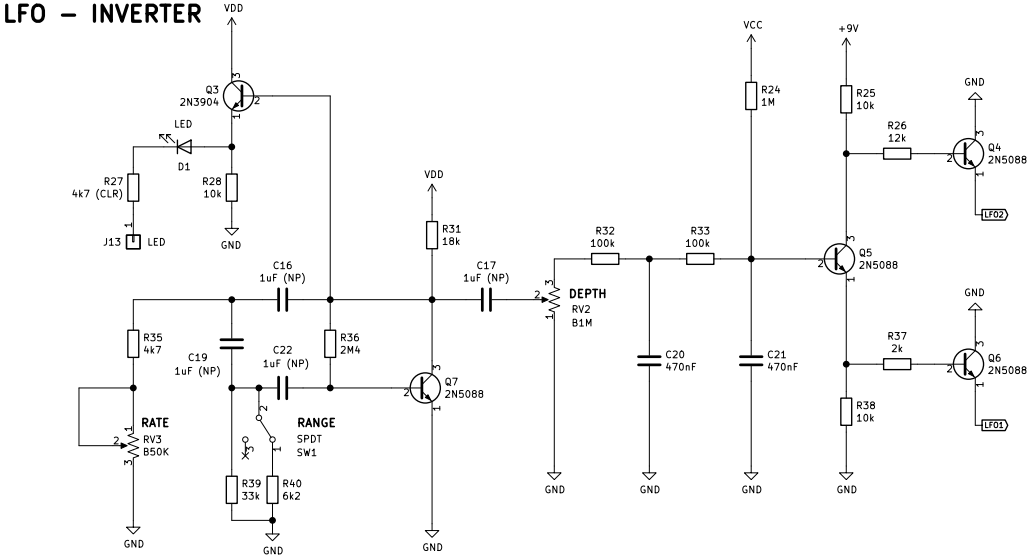
AMPS & FILTERS



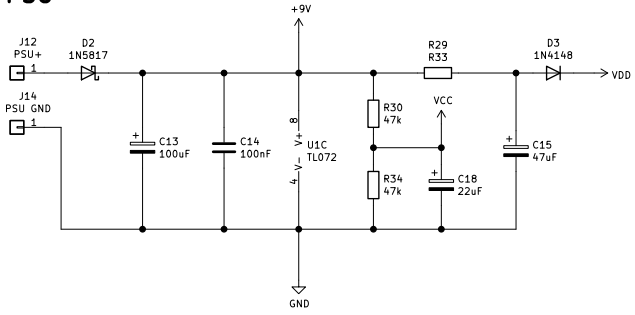
ONBOARD CONNECTIONS



LFO – INVERTER



PSU



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Skidmark Pedals

Sheet: /
File: Harmonic Tremolo.sch

Title: Equanimity

Size: A3	Date: 2021-03-31	**Rev: 1.0**
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