IMP2022

FX TYPE: Overdrive

Based on the Klon® Siberia™

Enclosure Size: 1590B

“Softie” compatibility: none

Overview

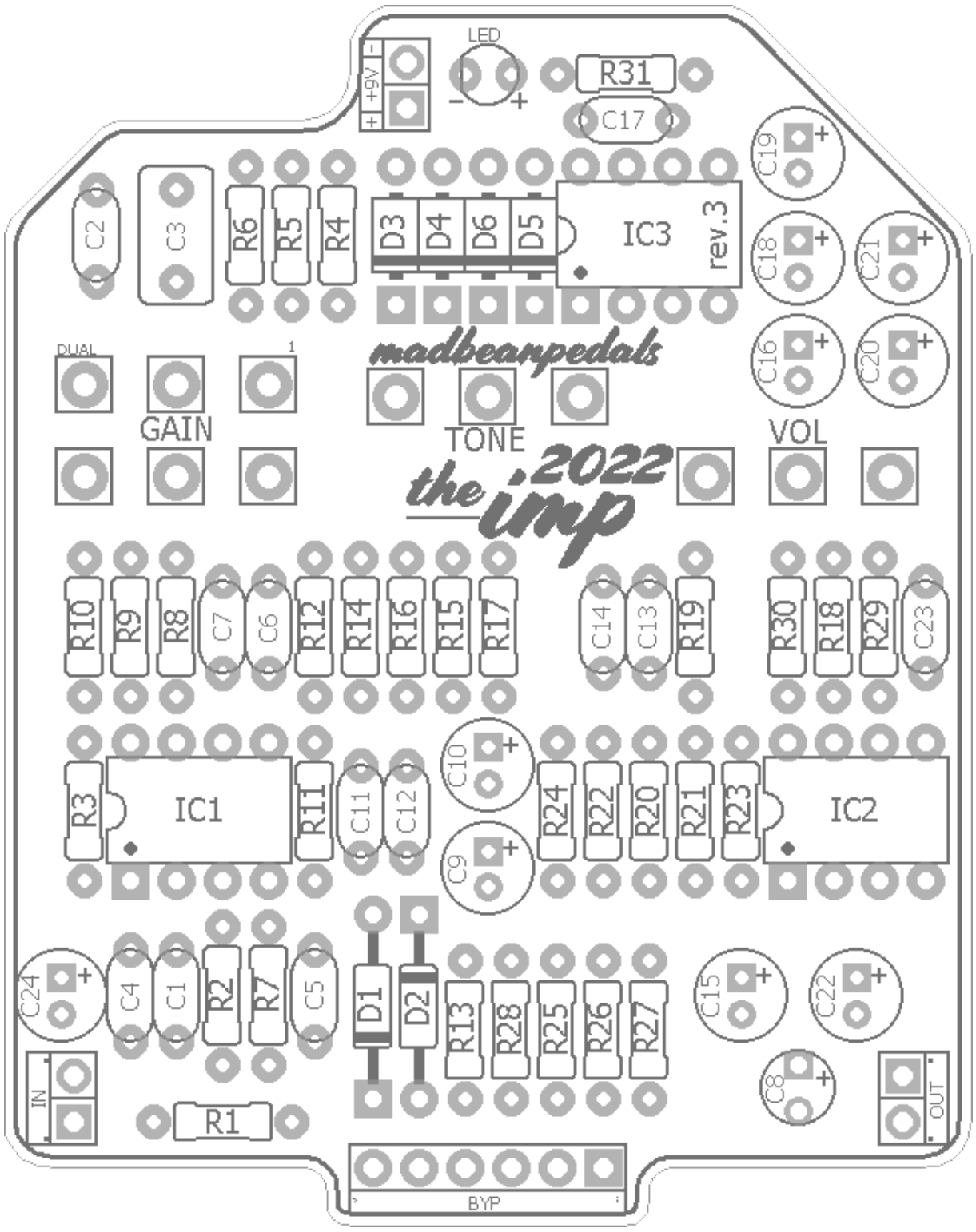
This is the third version of the IMP, which is just a vanilla Klon® type circuit with minimal mods. The first two versions were for the 1590A enclosure (first was true bypass and second version was buffered bypass). Since I am starting to wind down some of the 1590A offerings, the IMP seemed to be a good one to convert to 1590B. This keeps it compact and makes for a much easier build than the 1590A layout. No messy wiring or tiny resistors and caps to squeeze in.

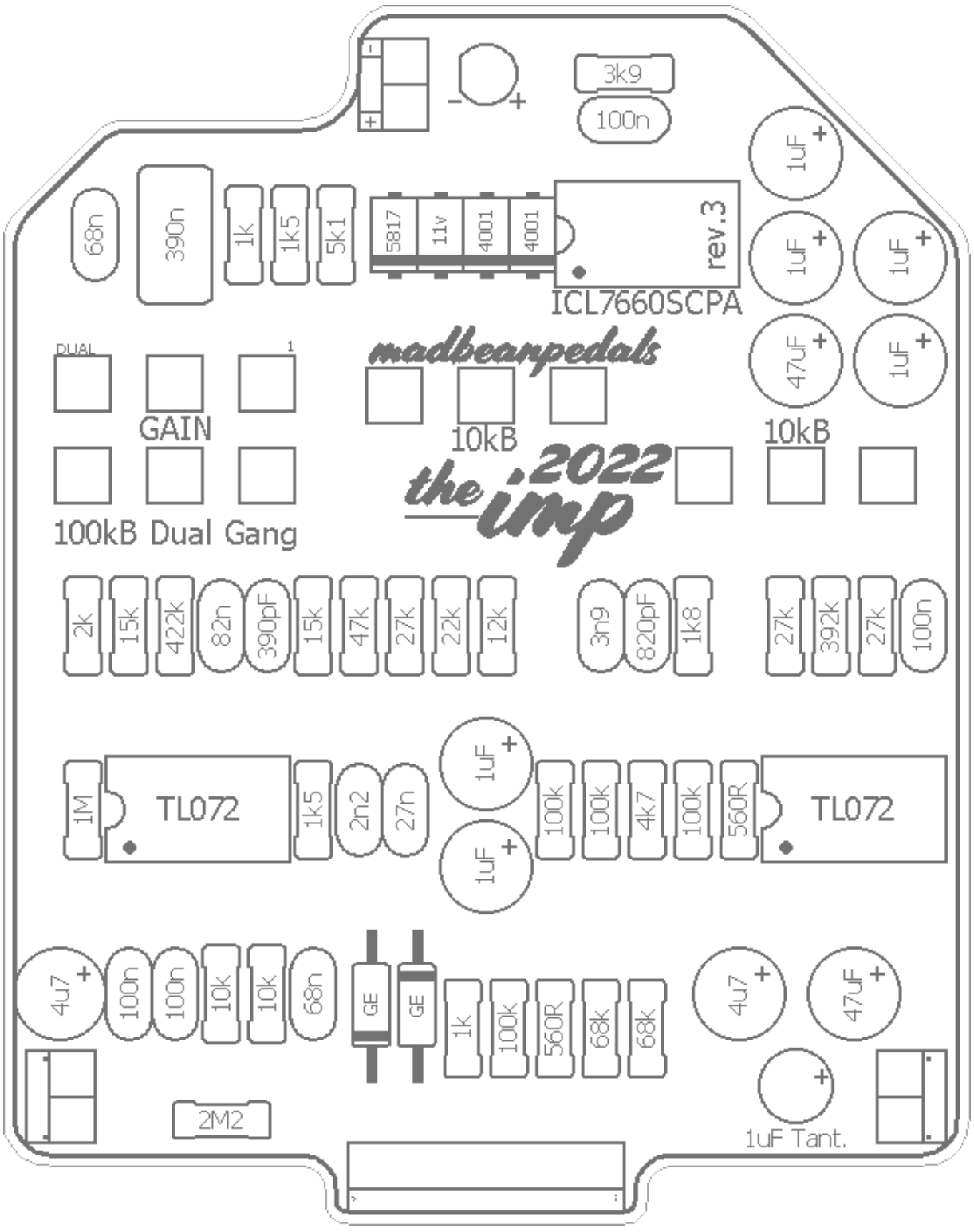
The IMP2022 remains 100% Klon® other than adding a reverse polarity protection diode and a 100n filter cap in parallel with the main DC reservoir cap (neither are present in the original circuit). And, too keep things tidy and lowest noise possible the circuit has been converted to a 4-layer PCB.

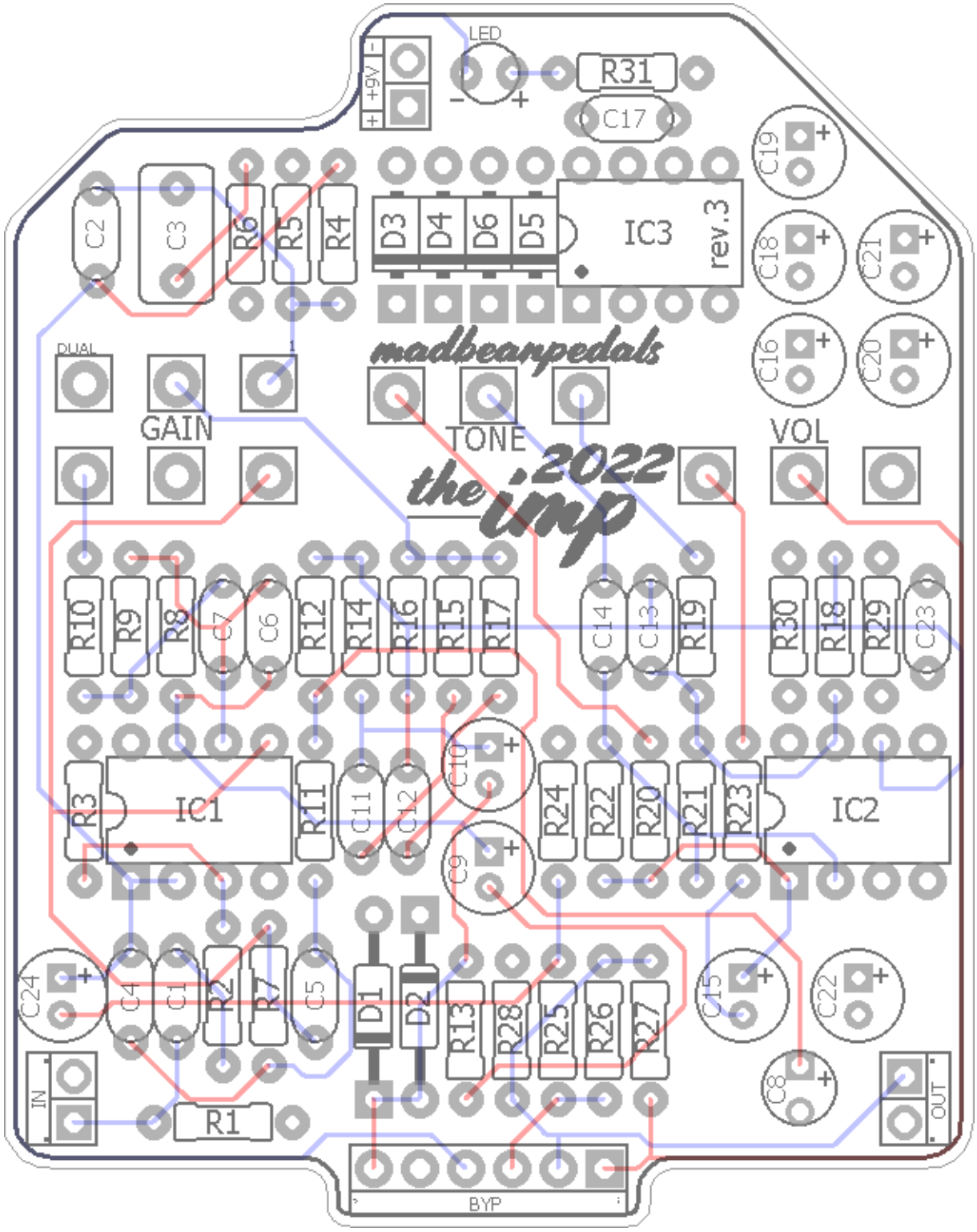
Controls

- **VOL -** Total Output.
- **TONE -** Active treble boost.
- **GAIN -** The Gain control blends between two different audio paths. CCW is the clean boost mode. As you turn the control CW, the audio blends through the gain stage and hard clipping. Many players love the sound of the Klon® with the gain set in the first 1/3rd and the Volume boosted to push their tube amps into breakup.

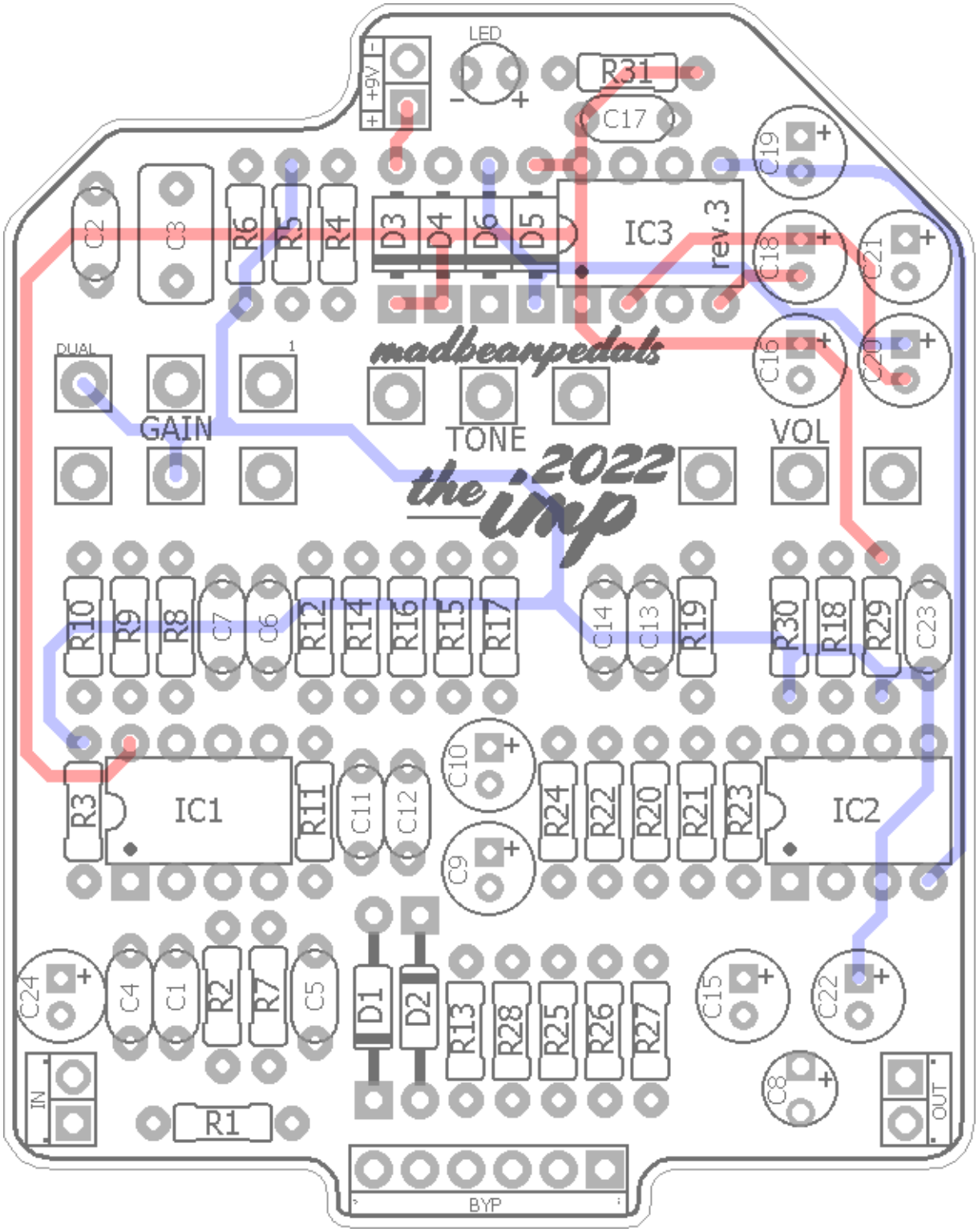
Technical assistance for your build(s) is available via the madbeanpedals forum. Please go there rather than emailing me for assistance on builds. This is because (1) I’m not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions in the forum creates a record from which other members may benefit.


LED
+9V
R31
C17
C19
C2
C3
R6
R5
R4
D3
D4
D6
D5
IC3
rev.3
C18
C21
C16
C20
DUAL
GAIN
TONE
VOL
madbeanpedals
the imp 2022
R10
R9
R8
C7
C6
R12
R14
R16
R15
R17
C14
C13
R19
R30
R18
R29
C23
R3
IC1
R11
C11
C12
C10
C9
R24
R22
R20
R21
R23
IC2
C24
C4
C1
R2
R7
C5
D1
D2
R13
R28
R25
R26
R27
C15
C22
C8
IN
R1
OUT
BYP


3k9
100n
1uF
68n
390n
1k
1k5
5k1
5817
11v
4001
4001
rev.3
ICL7660SCPA
1uF
1uF
47uF
1uF
DUAL
1
GAIN
madbeanpedals
10kB
10kB
100kB Dual Gang
the imp 2022
2k
15k
422k
82n
390pF
15k
47k
27k
22k
12k
3n9
820pF
1k8
27k
392k
27k
100n
1M
TL072
1k5
2n2
27n
1uF
1uF
100k
100k
4k7
100k
560R
TL072
4u7
100n
100n
10k
10k
68n
GE
GE
1k
100k
560R
68k
68k
4u7
47uF
2M2
1uF Tant.



The top and bottom layers are comprised of audio-only traces for the circuit.



The two inner layers are for power and ground traces/pours.

Resistors		Caps		Diodes	
R1	2M2	C1	100n	D1	GE
R2	10k	C2	68n	D2	GE
R3	1M	C3	390n	D3	1n5817
R4	5k1	C4	100n	D4	11v Zener
R5	1k5	C5	68n	D5	1n4001
R6	1k	C6	390pF	D6	1n4001
R7	10k	C7	82n	ICs	
R8	422k	C8	1uF Tant.	IC1	TL072
R9	15k	C9	1uF	IC2	TL072
R10	2k	C10	1uF	IC3	ICL7660SCPA
R11	1k5	C11	2n2	Pots	
R12	15k	C12	27n	TONE	10kB
R13	1k	C13	820pF	VOL	10kB
R14	47k	C14	3n9	GAIN	100kB Dual Gang
R15	22k	C15	4u7		
R16	27k	C16	47uF		
R17	12k	C17	100n		
R18	392k	C18	1uF		
R19	1k8	C19	1uF		
R20	4k7	C20	1uF		
R21	100k	C21	1uF		
R22	100k	C22	47uF		
R23	560R	C23	100n		
R24	100k	C24	4u7		
R25	560R				
R26	68k				
R27	68k				
R28	100k				
R29	27k				
R30	27k				
R31	3k9				

Value	Qty	Type	Rating
560R	2	Carbon / Metal Film	1/4W
1k	2	Carbon / Metal Film	1/4W
1k5	2	Carbon / Metal Film	1/4W
1k8	1	Carbon / Metal Film	1/4W
2k	1	Carbon / Metal Film	1/4W
3k9	1	Carbon / Metal Film	1/4W
4k7	1	Carbon / Metal Film	1/4W
5k1	1	Carbon / Metal Film	1/4W
10k	2	Carbon / Metal Film	1/4W
12k	1	Carbon / Metal Film	1/4W
15k	2	Carbon / Metal Film	1/4W
22k	1	Carbon / Metal Film	1/4W
27k	3	Carbon / Metal Film	1/4W
47k	1	Carbon / Metal Film	1/4W
68k	2	Carbon / Metal Film	1/4W
100k	4	Carbon / Metal Film	1/4W
392k	1	Carbon / Metal Film	1/4W
422k	1	Carbon / Metal Film	1/4W
1M	1	Carbon / Metal Film	1/4W
2M2	1	Carbon / Metal Film	1/4W
390pF	1	Ceramic/Film/MLCC	25v min.
820pF	1	Ceramic/Film/MLCC	25v min.
2n2	1	Film	25v min.
3n9	1	Film	25v min.
27n	1	Film	25v min.
68n	2	Film	25v min.
82n	1	Film	25v min.
100n	4	Film	25v min.
390n	1	Film	25v min.
1uF	1	Tantalum	25v min.
1uF	6	Electrolytic	
4u7	2	Electrolytic	25v min.
47uF	2	Electrolytic	25v min.
GE	2	1n34a or D9E	
1n5817	1		
Zener	1	11v, 1W	
1n4001	2		
TL072	2		
ICL7660SCPA	1	or, TC1044**SCPA**, MAX1044**CPA**	
10kB	2	PCB Right Angle	16mm
100kB Dual Gang	1	PCB Right Angle	16mm

ICL7660SCPA:
https://www.taydaelectronics.com/ic-integrated-circuits/voltage-regulators/icl7660scpaz-icl7660-cmos-voltage-converter-ic.html
https://www.mouser.com/ProductDetail/968-ICL7660SCPAZ

Subs:
https://smallbear-electronics.mybigcommerce.com/ic-max1044cpa/
https://stompboxparts.com/semiconductors/tc1044scpa-charge-pump-ic/

1n34A Germanium Diodes:
https://stompboxparts.com/semiconductors/1n34a-germanium-diode/

D9E Germanium Diode (popular sub for the Klon®):
https://stompboxparts.com/semiconductors/d9e-nos-soviet-germanium-diode/

11v Zener:
https://www.taydaelectronics.com/1n4741a-zener-diode-1w-11v.html
https://www.mouser.com/ProductDetail/512-1N4741A

100kB Dual Gang 16mm Pot:
https://smallbear-electronics.mybigcommerce.com/alpha-dual-gang-16mm-pc-mount/
https://stompboxparts.com/pots/16mm-dual-gang-potentiometer-smooth-shaft-short-pcb-leg/
https://www.taydaelectronics.com/potentiometer-variable-resistors/rotary-potentiometer/linear/tayda-100k-ohm-linear-dual-taper-potentiometer-pcb-mount-round-shaft-dia-6-35-mm.html

16mm pots:
https://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/
https://stompboxparts.com/pots/16mm-potentiometer-short-pcb-leg/
https://lovemyswitches.com/16mm-potentiometers-1-4-smooth-shaft-right-angle-pcb-mount/

DC Jacks:
https://smallbear-electronics.mybigcommerce.com/2-1-mm-all-plastic-round/
https://stompboxparts.com/power-connections/dc-power-jack-2-1mm-low-profile/
https://lovemyswitches.com/thinline-lumberg-dc-power-jack-2-1mm/

1/4” jacks:
https://smallbear-electronics.mybigcommerce.com/1-4-in-mono-nys229/
https://smallbear-electronics.mybigcommerce.com/1-4-in-mono-switchcraft-11/
https://lovemyswitches.com/1-4-mono-jack-lumberg-klbm-3/
https://lovemyswitches.com/1-4-mono-jack-neutrik-rean-nys229/

My preferred 3PDT switch:
https://lovemyswitches.com/pro-3pdt-latched-foot-switch-solder-lugs-feather-soft-click/

- R1 (2M2) is not used in the stock version. I've added it as a safeguard. It provides a path to ground for DC should C1 ever fail. It's not necessary to include it but it also will not impact the final output/tone. Basically, it's good design practice.

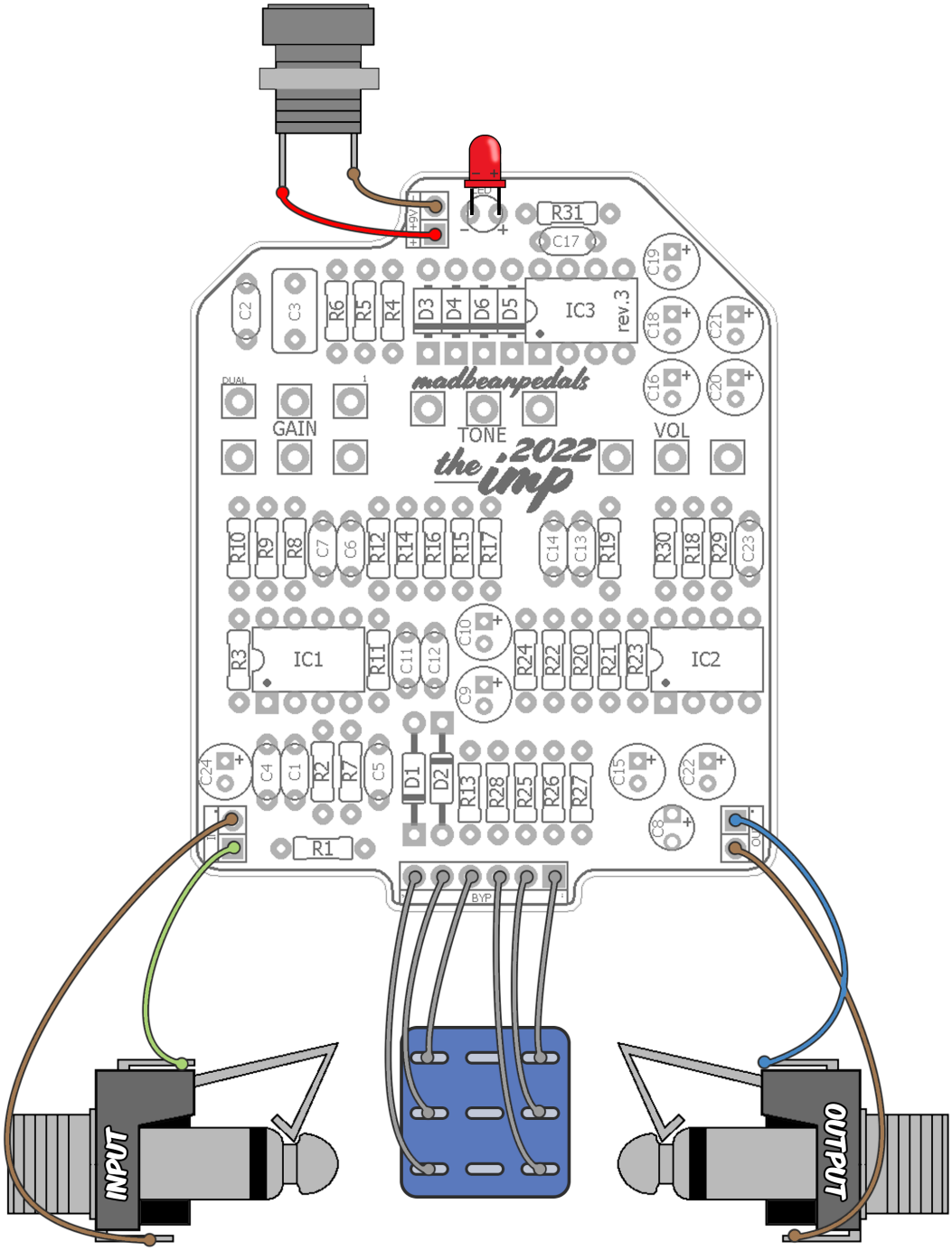
- Some versions of the Klon® used the R2 series input resistor (10k) and some did not. You can jumper this resistor if you want.

- C8 can be regular electrolytic instead of tantalum. There is no discernible difference in tone between the two, IMO.

- You can sub either the MAX1044**CPA** or TC1044**SCPA** for the ICL7660**SCPA**. For the MAX and TC subs, you can use a 12v Zener for D4 instead of 11v, but either is fine. The ICL7660SCPA has a max input voltage of 10v, so that's why the 11v Zener protection diode was used.

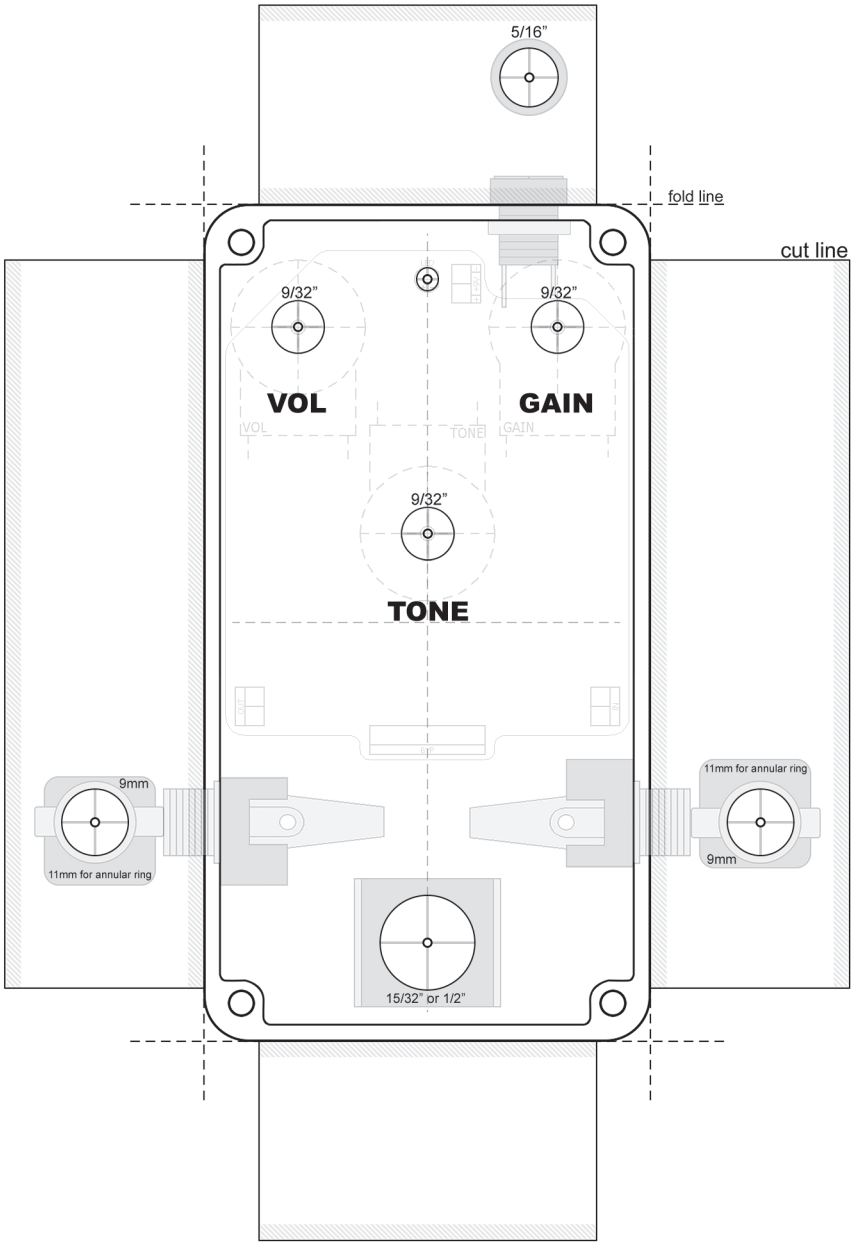
MODS

Gain mod: Most players use the Klon® as a "hairy" boost rather than a full-on overdrive. But if you want more gain on tap then change the value of R10. The stock value is 2k. You could try reducing that value to 1k or 470R to goose the overdrive a bit more. Socket to experiment.



The LED is soldered directly to the PCB. You should do this as a “last step” after the PCB is mounted to your enclosure.

Note: *Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.*

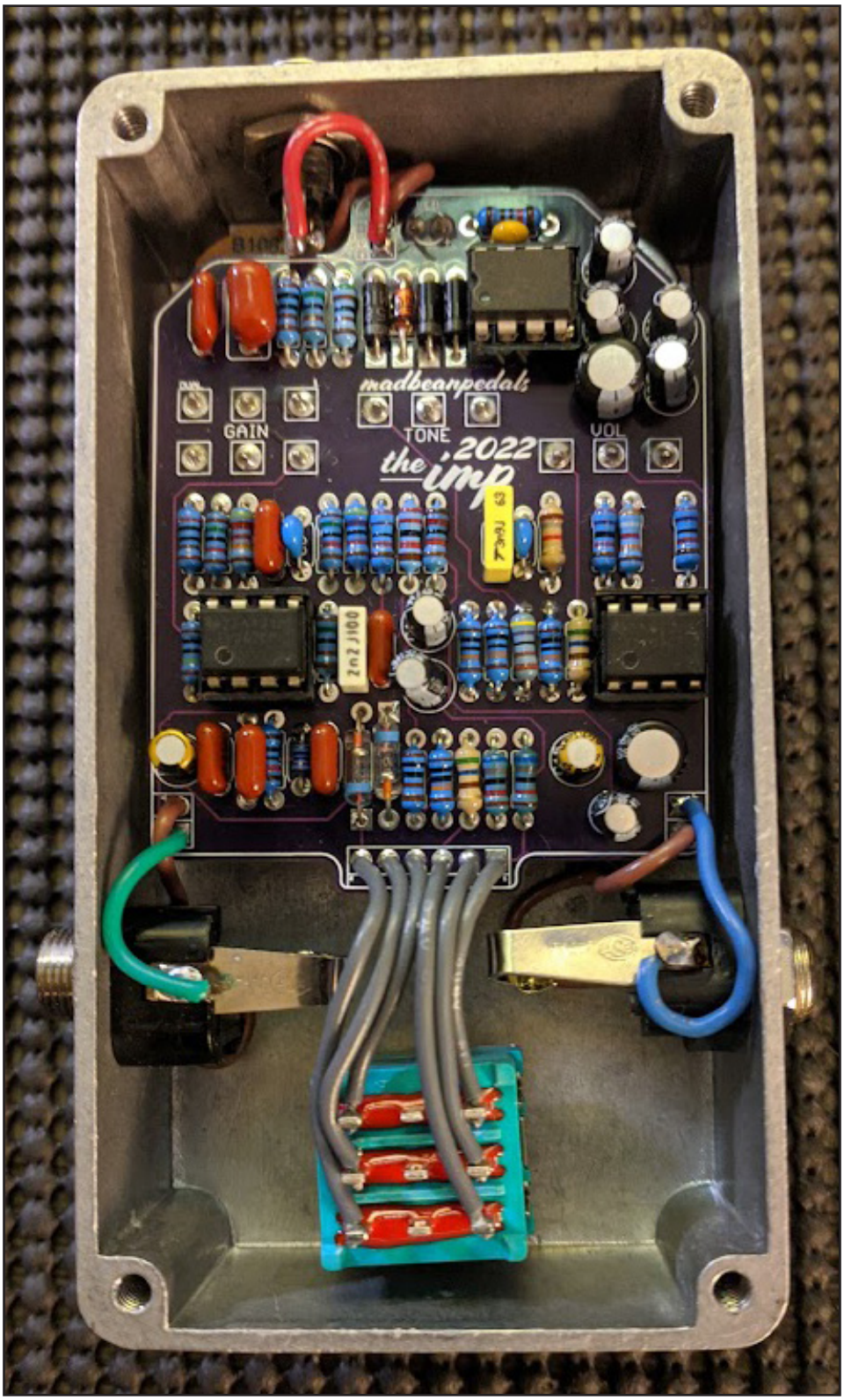


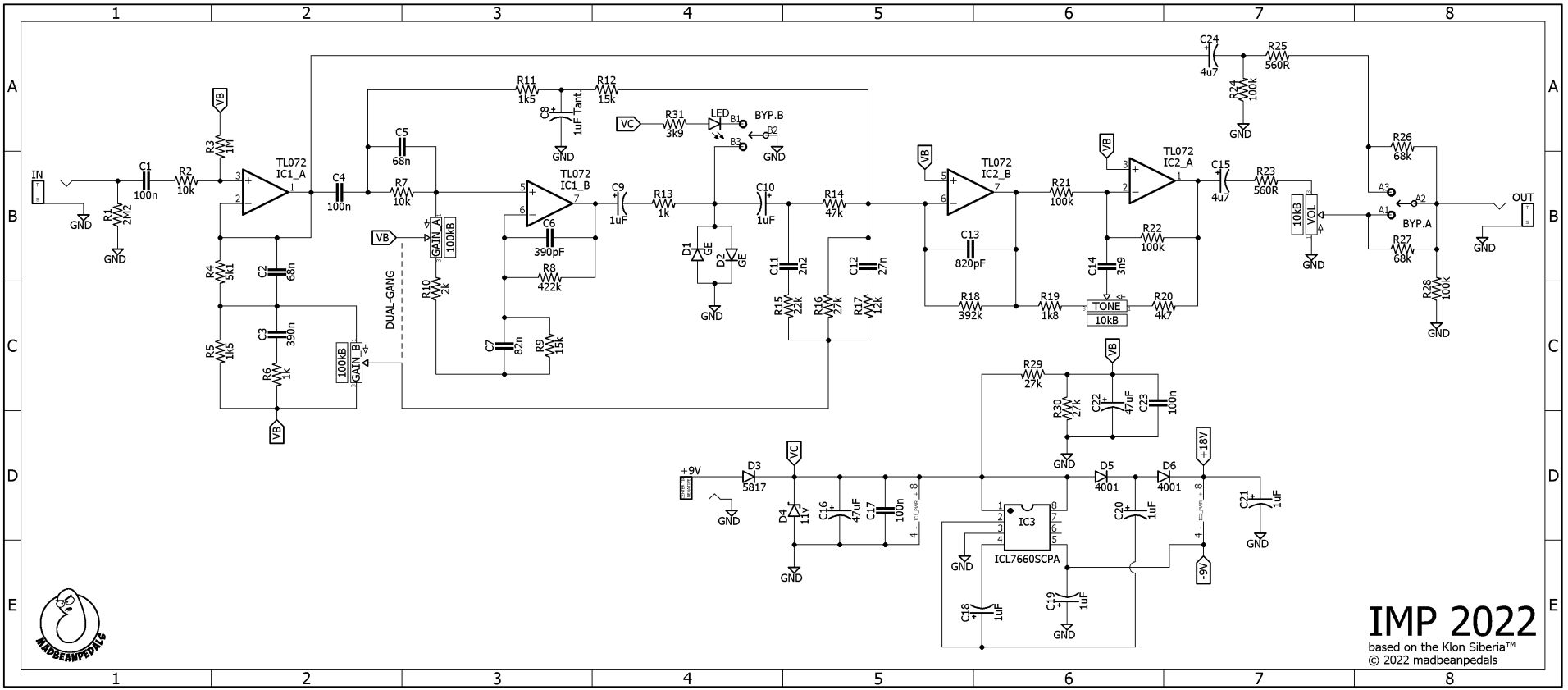
IC1	TL072	IC2	TL072	IC3	1044SCPA
1	4.57	1	4.57	1	9.29
2	4.57	2	4.59	2	5.37
3	0.64	3	4.59	3	0
4	0	4	-9.23	4	-3.89
5	4.58	5	4.59	5	-9.23
6	4.59	6	4.59	6	4.37
7	4.54	7	4.62	7	5.77
8	9.29	8	18.16	8	9.29

- 9.42vDC One Spot
- Current Draw: 2mA
- Testing Conditions: All knobs about 1/2 up

There seems to be a marked difference in current consumption of the IMP2022 to the previous versions and that remains consistent with different charge pumps (TC1044SCPA and ICL7660SCPA). I'm not exactly sure why this is the case.

Possibly the use of a 4-layer board in this version eliminated any trace impedances which may have been present in the 2-layer versions. Also note that the split rail voltages produced by the charge pump are very efficient (+18.16 and -9.23)!!!


madbeanpedals
GAIN
TONE
VOL
2022
the imp


IMP 2022
based on the Klon Siberia™
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TL072 IC1_A
TL072 IC1_B
TL072 IC2_B
TL072 IC2_A
ICL7660SCPA
DUAL-GANG
BYP.A
BYP.B
LED
TONE
VOL
GAIN_A
GAIN_B
IN
OUT
VB
VC
GND
+9V
-9V
+18V