TONEVIRUS

FX TYPE: PLL-style monophonic synth

Based on the EQD® Data Corrupter™

Enclosure Size: 1590BB

"Softie" compatibility: Softie1 (sorta)

Overview

The **Tone Virus** is exactly the sort of device guitars players should use when they everyone in the room to look at them and ask "WTF are you doing? This is a country song!" It is part suboctave generator, oscillator, monophonic synthesizer, harmonizer and all noise maker. But, in a cool way. And, there are some very musical tones to be found here. It's just layered in a lot of weirdness and borderline chaos.

Based on the EQD Data Corrupter™, the Tone Virus is a PLL (phase locked loop) style synth. Probably the best example of this is the Schumann PLL pedal for which you can find demos, discussion and DIY projects. The Data Corrupter is not quite the same thing as the Schumann but certainly gets in that territory. And, the Tone Virus is an easier build than taking on a full PLL clone. I won't pretend that I understand every single aspect or nuance of this design but I'll do my best to describe what's going on in the controls description below (I'll try to keep it in order of signal flow). The most important takeaway is there are two engines: an oscillator that outputs upper harmonized intervals and a subs generator the outputs lower ones. Most of the controls are about manipulating those two "engines".

Controls

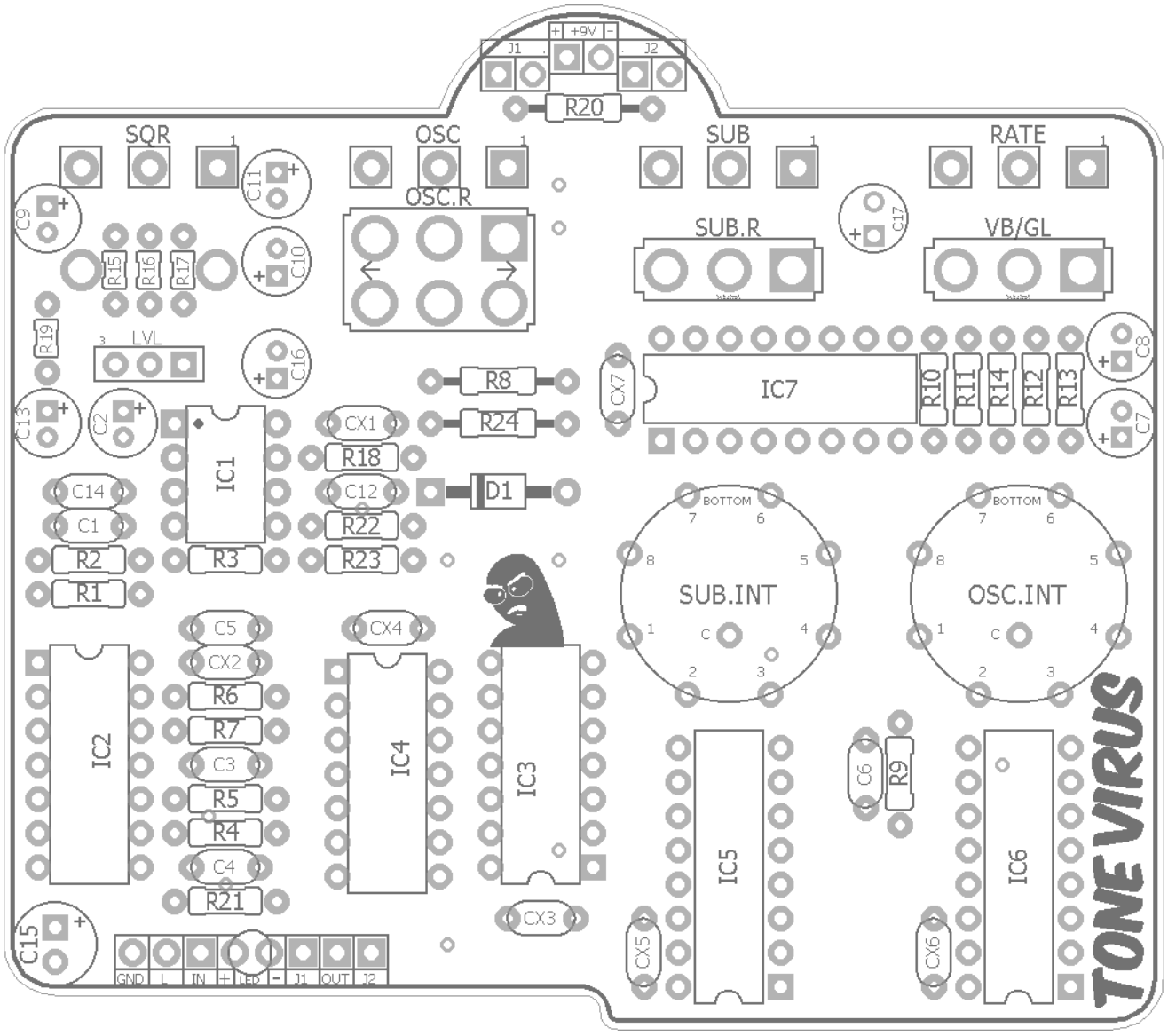
- **SQR (pot):** Sets the level of the fuzzed-up signal which is fed to the last output stage.

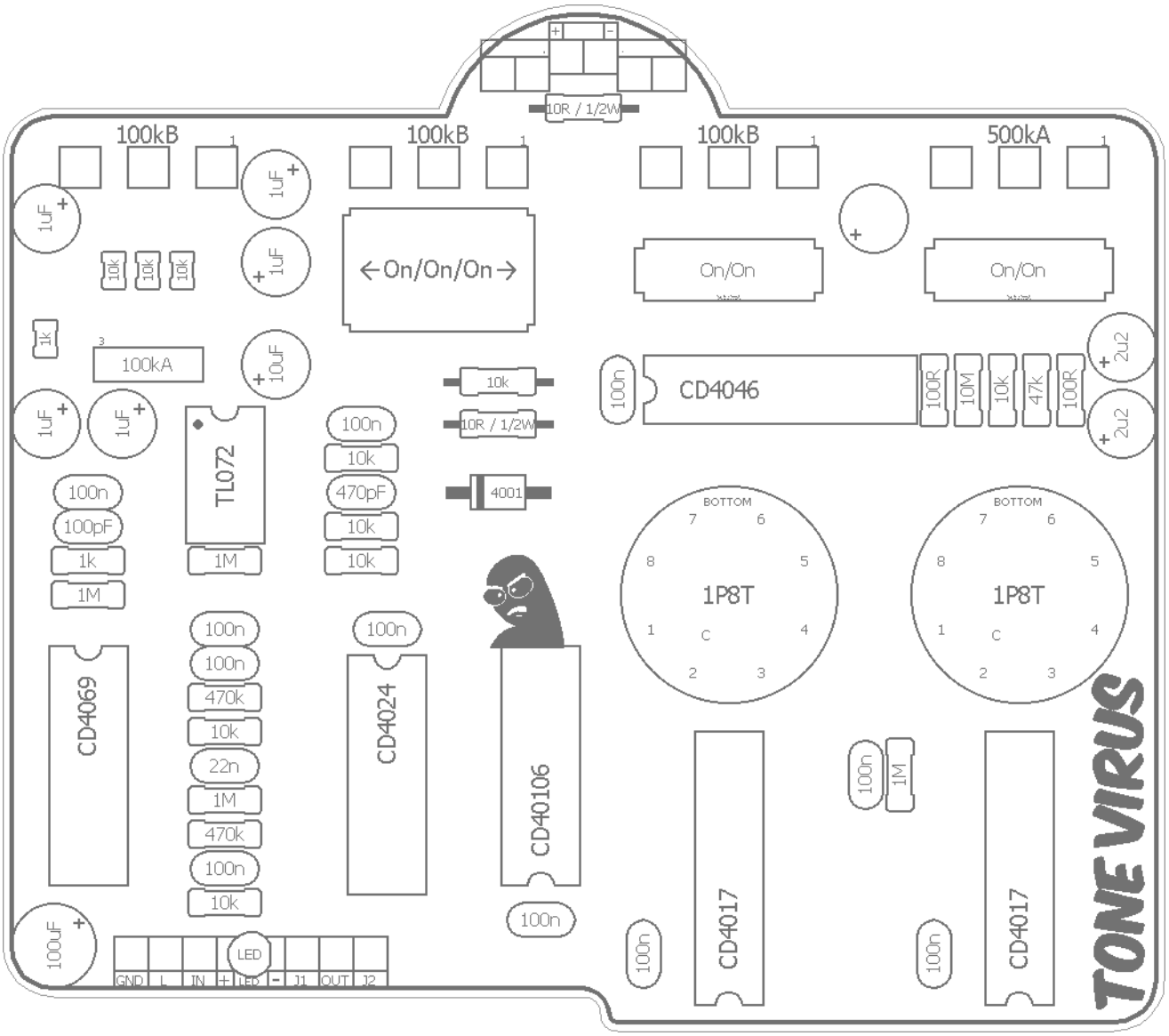
- **OSC.R (switch):** The fuzz signal is fed into the *binary* counter (CD4024) to create the lower octaves and then the **OSC.R** switch sends that output to the next stage as the original octave, one octave down or two octaves down.
- **OSC.INT (rotary):** The signal is fed to the PLL (CD4046) for modulation then its output goes to the *decade* counter (CD4017) which outputs different upper intervals. The interval type is selected by the **OSC.INT.** rotary.
- **RATE (pot):** Controls the modulation speed of the synthesized/harmonized sound.
- **VB/GL (switch):** This switch chooses how the modulated synthesizer notes behave - as sliding pitch intervals or vibrato.
- **OSC (pot):** Sets the level of the oscillator section which is fed to the last output stage.

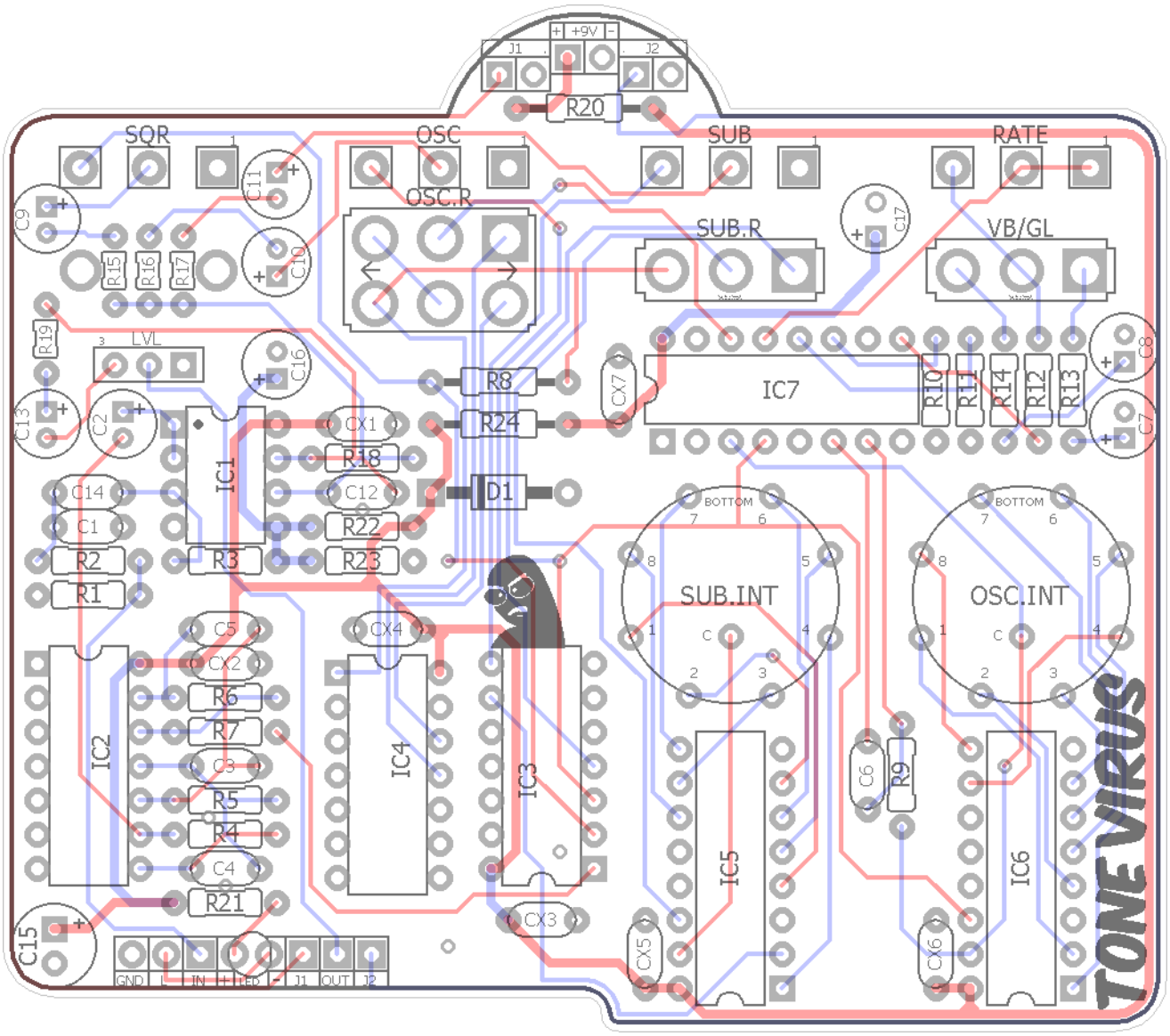
- **SUB.R (switch):** This switch selects whether the subharmonics section receives input from the original fuzz signal or the oscillator.
- **SUB.INT (rotary):** This rotary switch selects between a set of lower harmonized intervals similar to how the **OSC.INT** switch selects upper harmonized intervals.
- **SUB (pot):** Sets the level of the subharmonic section which is fed to the last output stage.

- **LEVEL (pot):** Sets the final output level of the effect.

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.


+9V
J1
J2
R20
SQR
OSC
SUB
RATE
OSC.R
SUB.R
VB/GL
LVL
IC1
IC2
IC3
IC4
IC5
IC6
IC7
SUB.INT
OSC.INT
BOTTOM
D1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R21
R22
R23
R24
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
CX1
CX2
CX3
CX4
CX5
CX6
CX7
GND
L
IN
+
LED
-
J1
OUT
J2
TONE VIRUS


10R / 1/2W
100kB
100kB
100kB
500kA
1uF
1uF
1uF
10k
10k
10k
←On/On/On→
On/On
On/On
1k
100kA
10uF
1uF
1uF
10k
10R / 1/2W
4001
100n
CD4046
100R
10M
10k
47k
100R
2u2
2u2
TL072
100n
10k
470pF
10k
10k
100n
100pF
1k
1M
1M
BOTTOM
1P8T
BOTTOM
1P8T
100n
100n
470k
10k
22n
1M
470k
100n
10k
CD4069
CD4024
100n
CD40106
100n
100n
1M
CD4017
CD4017
100n
100n
100uF
LED
GND
L
IN
+
LED
-
J1
OUT
J2
TONE VIRUS


+9V
J1
J2
R20
SQR
OSC
SUB
RATE
OSC.R
SUB.R
VB/GL
C9
C11
C10
C17
R15
R16
R17
R19
LVL
C16
C13
C2
C8
C7
IC7
R10
R11
R14
R12
R13
CX7
R8
R24
D1
IC1
CX1
R18
C12
R22
R23
C14
C1
R2
R1
R3
BOTTOM
SUB.INT
OSC.INT
C5
CX2
R6
R7
C3
R5
R4
C4
R21
CX4
IC2
IC4
IC3
CX3
C6
R9
IC5
IC6
CX5
CX6
C15
GND
IN
OUT
TONE VIRUS

Resistors		Caps		Diodes	
R1	1M	C1	100pF	D1	1N4001
R2	1k	C2	1uF	ICs	
R3	1M	C3	22n	IC1	TL072
R4	470k	C4	100n	IC2	CD4069
R5	1M	C5	100n	IC3	CD40106
R6	470k	C6	100n	IC4	CD4024
R7	10k	C7	2u2	IC5	CD4017
R8	10k	C8	2u2	IC6	CD4017
R9	1M	C9	1uF	IC7	CD4046
R10	100R	C10	1uF	Switches	
R11	10M	C11	1uF	OSC.R	On/On/On
R12	47k	C12	470pF	SUB.R	On/On
R13	100R	C13	1uF	VB/GL	On/On
R14	10k	C14	100n	Rotary	
R15	10k	C15	100uF	OSC.INT	1P8T
R16	10k	C16	10uF	SUB.INT	1P8T
R17	10k	C17	10uF	Pots	
R18	10k	CX1	100n	LVL	100kA
R19	1k	CX2	100n	OSC	100kB
R20	10R	CX3	100n	SQR	100kB
R21	10k	CX4	100n	SUB	100kB
R22	10k	CX5	100n	RATE	500kA
R23	10k	CX6	100n		
R24	10R	CX7	100n		

Values	QTY	Type	Rating
10R	2	included w/ PCB	1/2W
100R	2	Metal / Carbon Film	1/4W
1k	2	Metal / Carbon Film	1/4W
10k	10	Metal / Carbon Film	1/4W
47k	1	Metal / Carbon Film	1/4W
470k	2	Metal / Carbon Film	1/4W
1M	4	Metal / Carbon Film	1/4W
10M	1	Metal / Carbon Film	1/4W
100pF	1	Ceramic / MLCC	16v min.
470pF	1	Ceramic / MLCC	16v min.
22n	1	Film	16v min.
100n	11	Film	16v min.
1uF	5	Electrolytic	16v min.
2u2	2	Electrolytic	16v min.
10uF	2	Electrolytic	16v min.
100uF	1	Electrolytic	16v min.
1N4001	1		
TL072	1		
CD4069	1		
CD40106	1		
CD4024	1		
CD4017	2		
CD4046	1		
On/On/On	1	DPDT, Solder Lug	
On/On	2	SPDT, Solder Lug	
1P8T	2	Mini Rotary	
100kA	1	PCB Right Angle, Plastic Shaft	9mm
100kB	3	PCB Right Angle	16mm
500kA	1	PCB Right Angle	16mm

10R 1/2W:
***Included w/PCB**

TL072:
http://smallbear-electronics.mybigcommerce.com/ic-tl072cp/

CD4069:
http://smallbear-electronics.mybigcommerce.com/ic-cd4069ube/

CD40106:
http://smallbear-electronics.mybigcommerce.com/ic-cd40106/

CD4024:
http://smallbear-electronics.mybigcommerce.com/ic-cd4024be/

CD4017:
http://smallbear-electronics.mybigcommerce.com/ic-cd4017/

CD4046:
http://smallbear-electronics.mybigcommerce.com/ic-cd4046/

On/On/On:
http://smallbear-electronics.mybigcommerce.com/dpdt-on-on-on-solder-term/

On/On:
http://smallbear-electronics.mybigcommerce.com/spdt-on-on/

1P8T:
http://smallbear-electronics.mybigcommerce.com/rotary-switch-miniature-1p8t/

9mm Right Angle Plastic Shaft (100kA):
http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-right-angle-pc-mount-w-knurled-plastic-shaft/

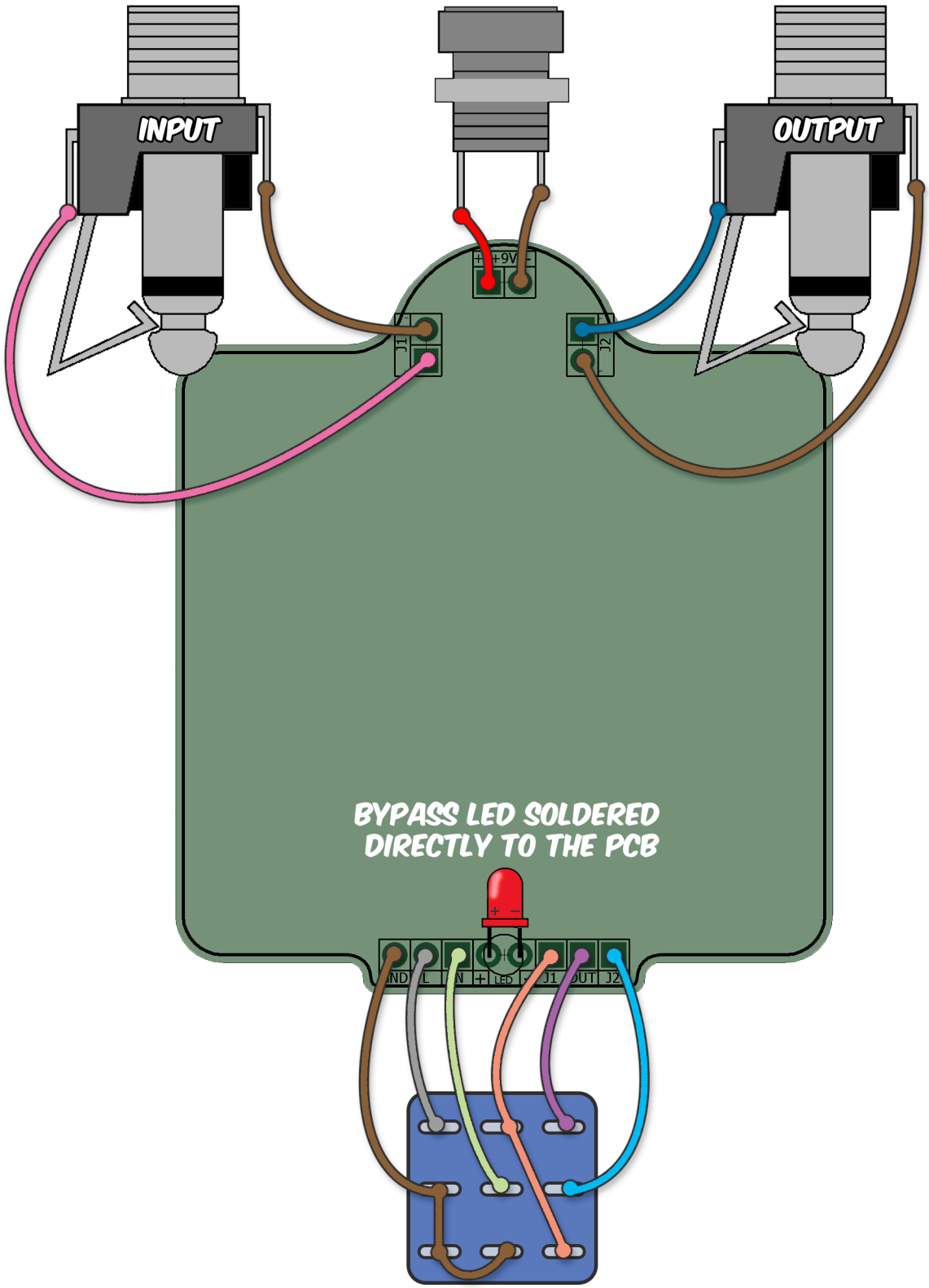
16mm Right Angle Pots (100kB, 500kA):
http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/

Thinline DC Jack:
http://smallbear-electronics.mybigcommerce.com/dc-power-jack-all-plastic-unswitched-2-1-mm/

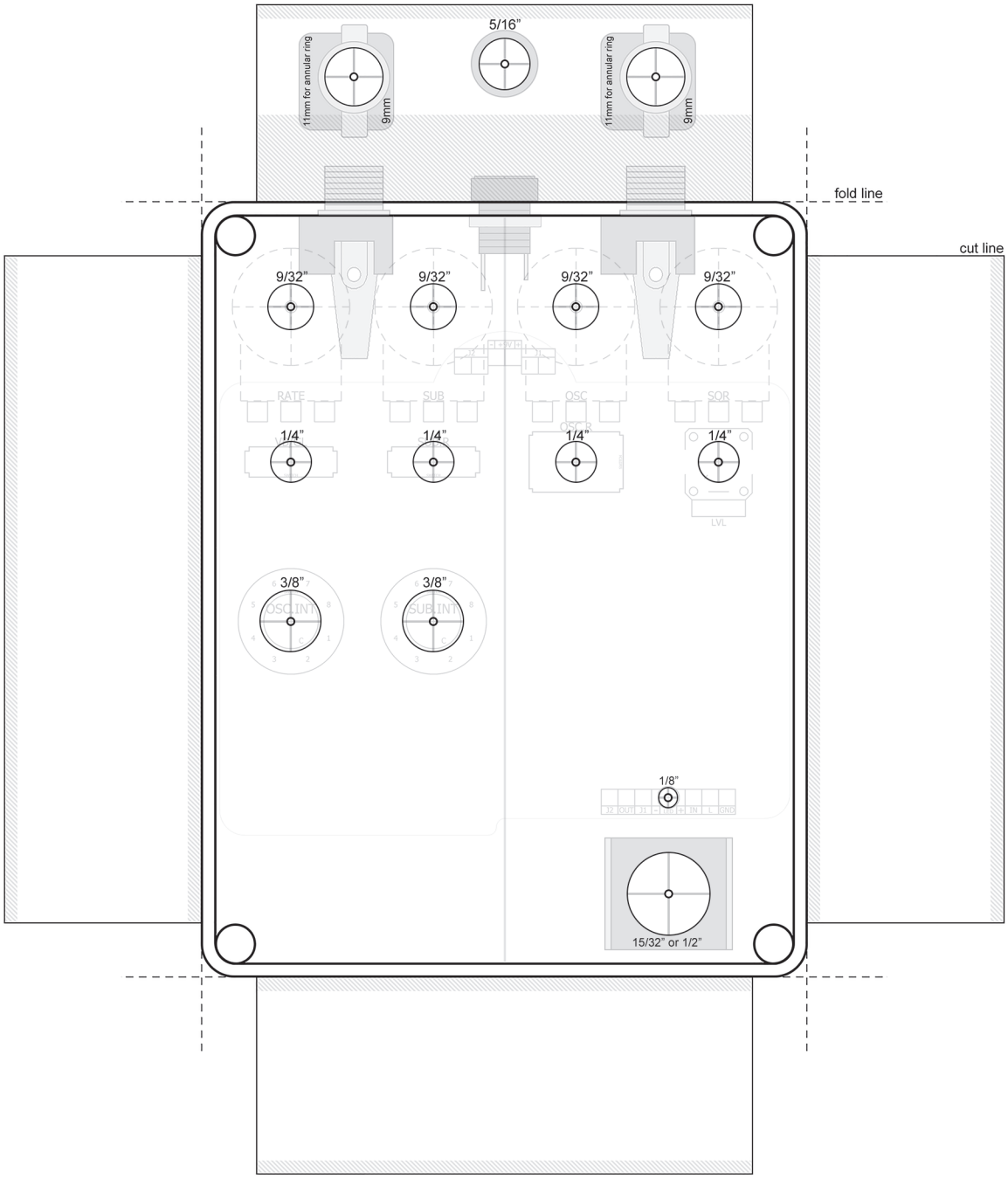
Enclosed Mono:
http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-jack/
http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-switchcraft-111x/

Lumberg Mono:
http://smallbear-electronics.mybigcommerce.com/lumberg-1-4-compact-shrouded-mono-jack/

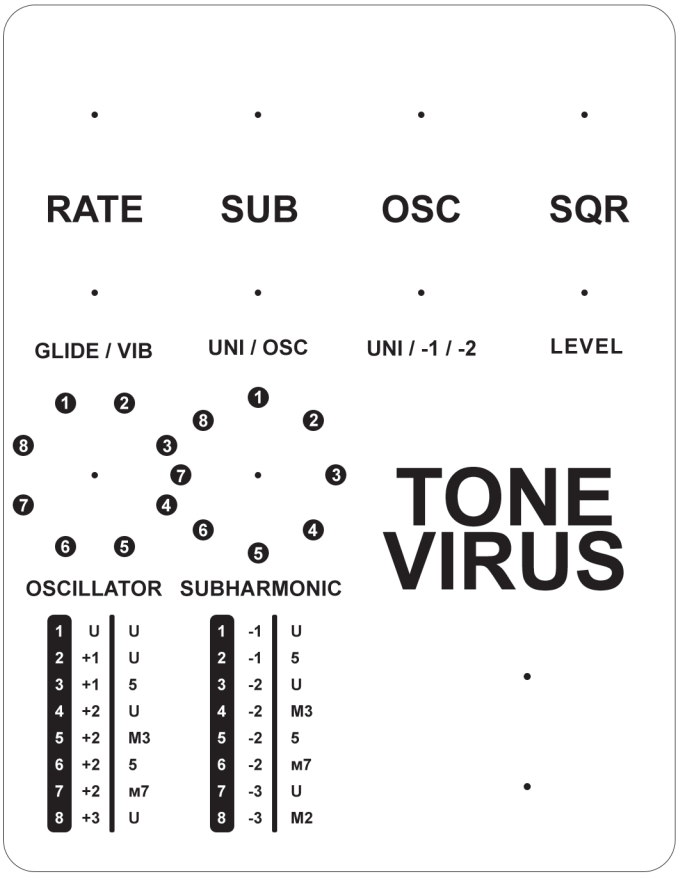
- Despite the complexity of controls and excessive soldering this is actually a pretty simple build. There is not a lot of variety in resistor/cap values. Just take your time.
- You can expect to spend a lot of time dialing in sounds you like once you've completed the build. There are so many interesting and unique settings I couldn't even begin to describe them. Some are more musical than others, to be sure. But, there will be at least something for everyone who likes making their guitar sound like not a guitar.


INPUT
OUTPUT
+9V
J1
J2
BYPASS LED SOLDERED
DIRECTLY TO THE PCB
LED
J1
J2

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



- It's possible to use a Softie1 soft relay bypass with this project. My build pic at the end of this document shows how I did it. Here the diagram shows simple 3PDT bypass switch. Drill location for bypass switch is the same no matter what you do.



- Because the Tone Virus has so much going on, I've made a simplified version of the artwork I used for my own build available here. If you use clear labels, you can print directly from this page (do not use any page scaling). Trim your print just inside the outer border.

- I've included this artwork in the .PSD file located in the ToneVirus.zip. So, if you have a compatible gfx program you can use this artwork as a starting point to add your own graphics, choose your own fonts, etc.

- For the rotary knobs, the best way to affix them is first dial in the #1 setting on both the Oscillator and Subharmonic controls (U|U and -1|U resp.). Then mount your knobs pointing at the "1" label of each. You can use either set screw or press fit knobs with the 1P8T rotaries. Good luck.

- I've named all the controls the same as their real-world counterpart for the sake of clarity.

IC1	TL072
1	4.57
2	4.57
3	4.16
4	0
5	4.57
6	4.57
7	4.71
8	9.14

IC2	CD4069
1	-
2	-
3	-
4	-
5	-
6	-
7	0
8	3.98
9	3.98
10	3.97
11	3.95
12	4.02
13	3.96
14	9.08

IC3	CD40106
1	4.04
2	9.14
3	9.16
4	0
5	-
6	-
7	0
8	0
9	9.16
10	-
11	-
12	-
13	-
14	9.16

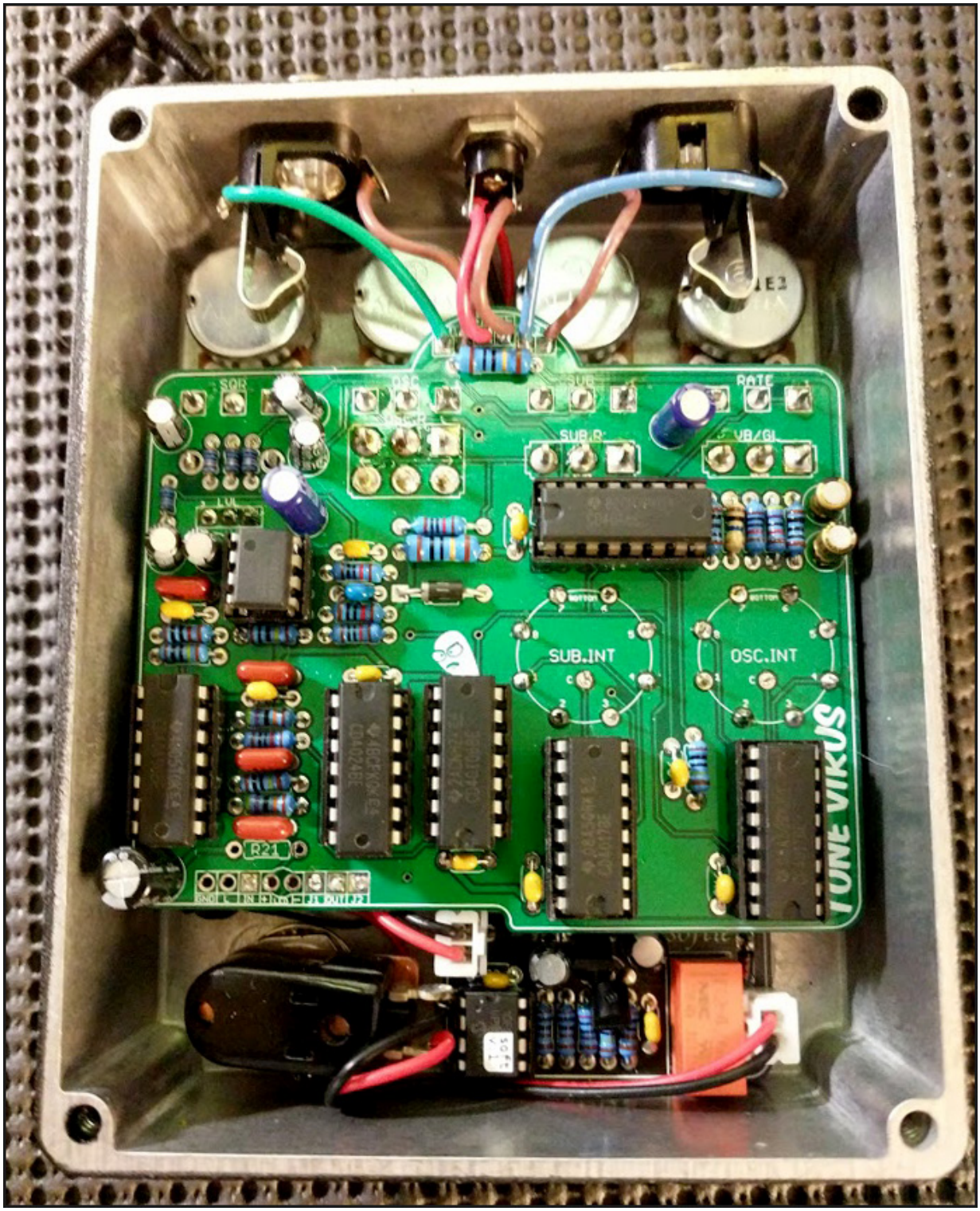
IC4	CD4024
1	9.14
2	0
3	-
4	-
5	-
6	-
7	0
8	-
9	-
10	-
11	9.14
12	0
13	-
14	9.14

IC5	CD4017
1	0
2	9.16
3	-
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	-
13	0
14	9.12
15	0
16	9.15

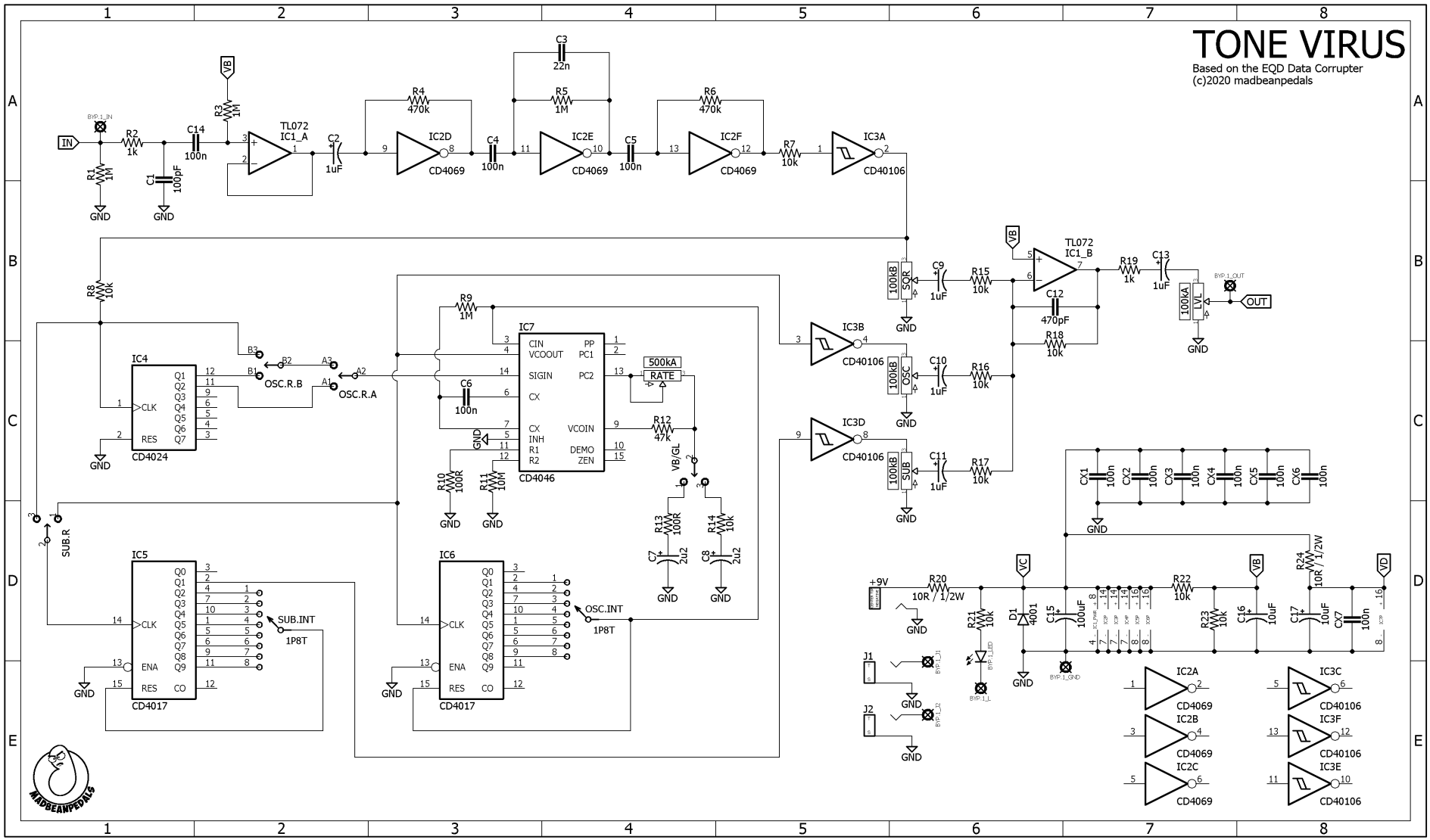
IC6	CD4017
1	0
2	0
3	-
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	-
12	-
13	0
14	9.15
15	0
16	9.15

IC7	CD4046
1	-
2	-
3	0
4	9.16
5	0
6	0
7	3.49
8	0
9	varies
10	-
11	0
12	8.52
13	0
14	0
15	-
16	9.16

- 9.42vDC One Spot
- Current Draw ~ 32mA
- Voltages for unconnected pins in circuit have been ignored.
- Some settings may vary depending on pot/switch settings.



- To use a Softie 1 relay bypass with this project you have to fit it partially under the Tone Virus board. I affixed the Softie PCB with 3M foam tape to keep it securely in place. This is kind of a big PITA so I'd only recommend it if you are hard-core about soft bypass.
- Note that I used 1/8W resistors in the upper left where the spacing is limited to 5mm. This is not required, so you can use either 1/4W or 1/8W there.


TONE VIRUS
Based on the EQD Data Corrupter
(c)2020 madbeanpedals
IN
OUT
TL072
IC1_A
IC1_B
IC2D
IC2E
IC2F
IC3A
IC3B
IC3D
CD4069
CD40106
IC4
CD4024
IC5
IC6
CD4017
IC7
CD4046
OSC.R.B
OSC.R.A
SUB.R
SUB.INT
OSC.INT
1P8T
RATE
500kA
100kB
SQR
OSC
SUB
LVL
VB
VC
VD
GND
+9V
D1
4001
J1
J2
IC2A
IC2B
IC2C
IC3C
IC3F
IC3E
MADBEANPEDALS