Freeloader

FX Type: **FUZZ/OCTAVE**
Build Level: Beginner
Based On: EHX® Lizard Queen™

Last Updated: April 25, 2024 9:22 AM

Overview

From the EHX website

“Originally designed by Josh Scott of JHS Pedals and graphic designer, Daniel Danger as a homage to Electro-Harmonix in what Josh and Daniel consider the company’s design heyday of the 1970s, the EHX Lizard Queen Octave Fuzz is a nano-sized version of the pedal brought to life by the engineers at Electro-Harmonix that has all of the tones and vibes of the original circuit design by Josh. The tone is inspired by EHX’s fuzz pedigree with a unique analog octave up circuit that has all the vibe of the original design first featured on the JHS Show in 2022. This creates a completely new and unique EHX fuzz sound we’ve never heard before. To further tell the tale, the pedal is adorned with vintage EHX-inspired graphics designed by Daniel.”

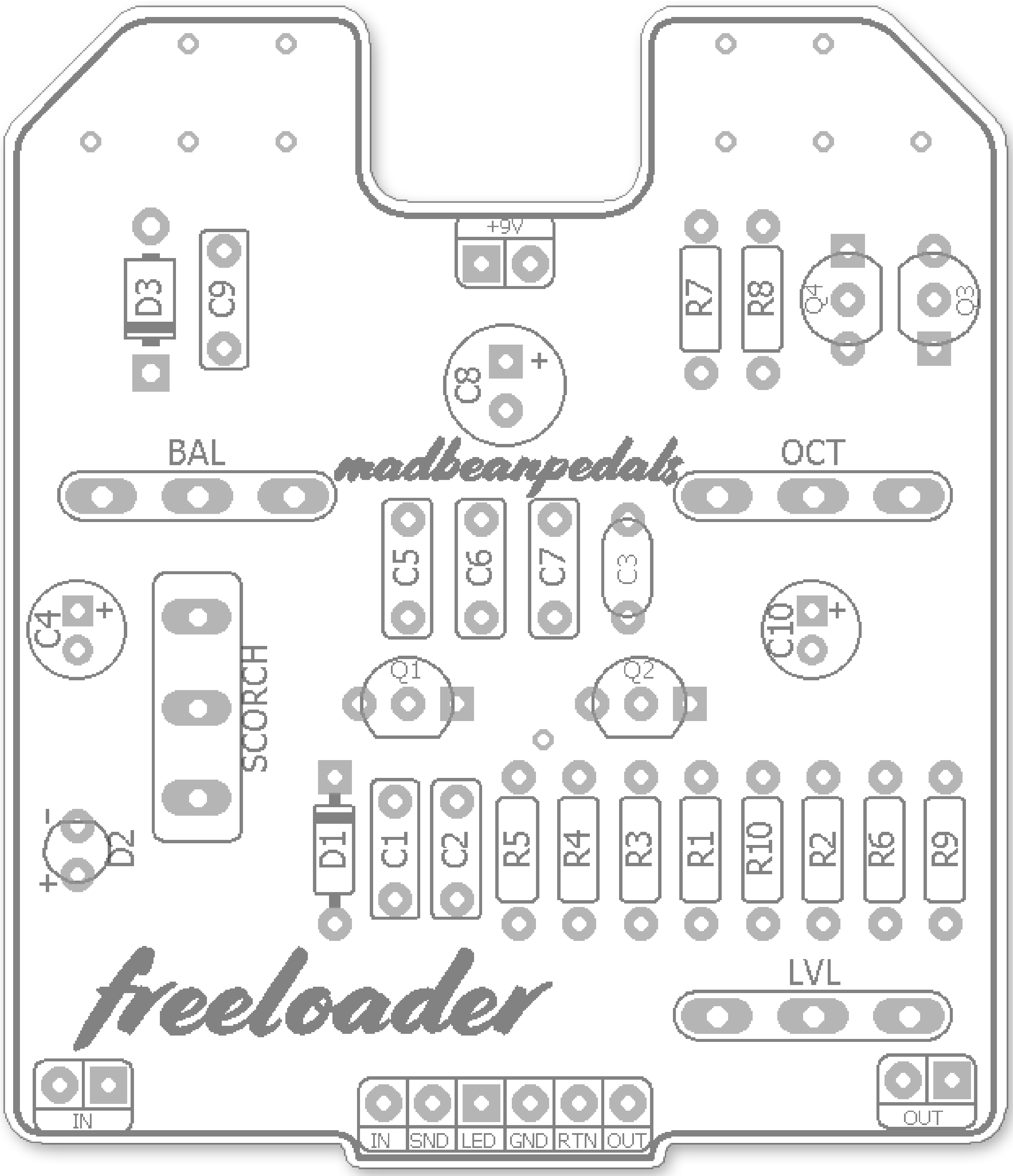
But, of course, the Lizard Queen™ is well documented as a mashup of two popular DIY circuits. Namely, the Bazz Fuss and Tim Escobedo’s Push Me Pull You. And, it does make for a great combo: a gnarly sounding fuzz with a decent octave up. This is a must for DIY fuzz lovers! The Freeloader adds two mods: the Scorch switch and an optional volume reduction resistor to tame the considerable output of the Lizard Queen™.

Controls

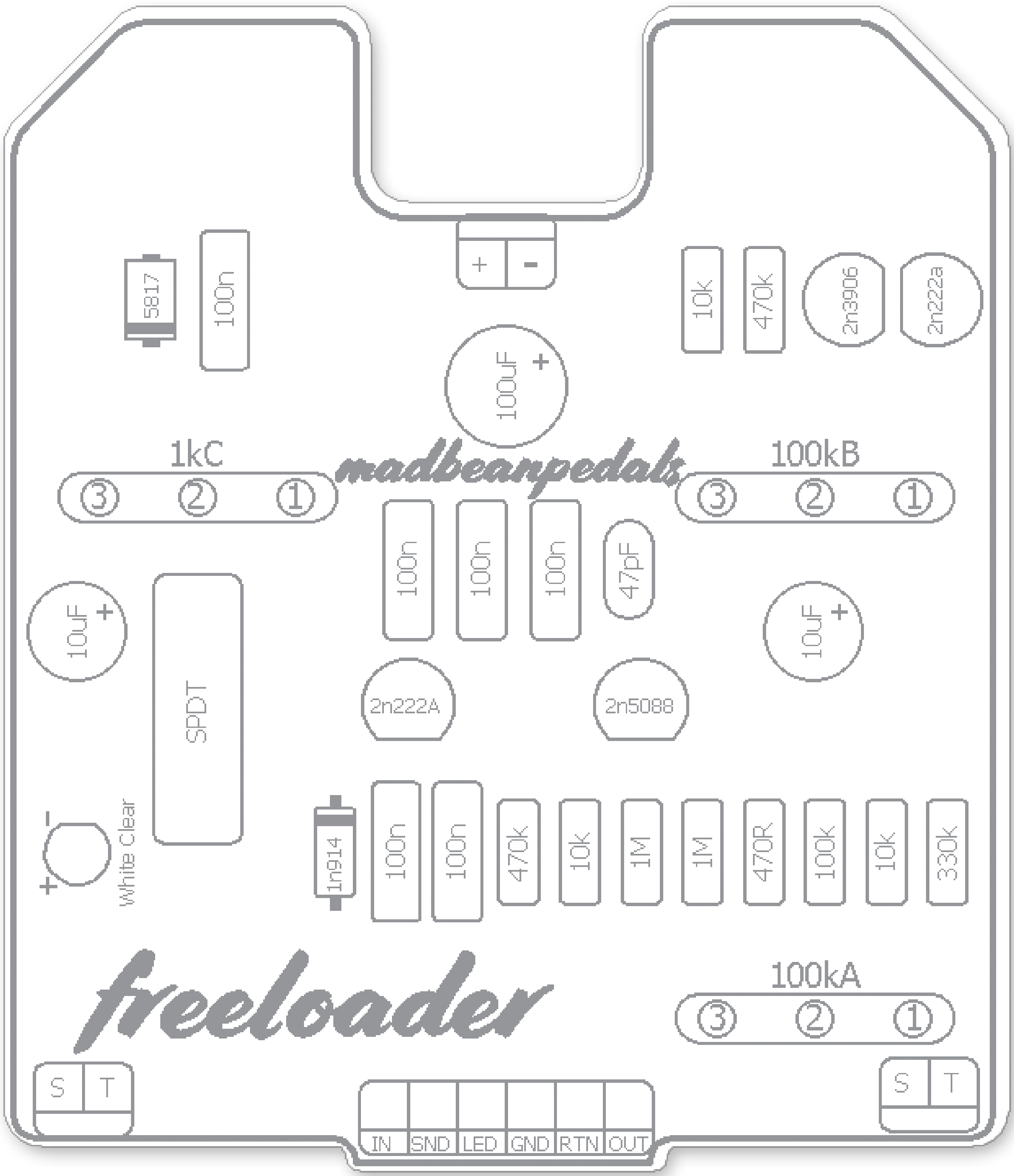
- **LVL:** Total effect output.
- **BAL:** Fuzz amount.
- **OCT:** Adds a slight octave up to single notes when turned CW.
- **SCORCH:** The down mode is stock. The up mode swaps the biasing diode of Q1 from a 1n914 to an LED. This subtle change adds a bit more aggression and attack to single notes when the BAL control is set low. It has little to no effect when the BAL control is full up.

Further study: https://www.youtube.com/watch?v=kn7j2QPRHz4

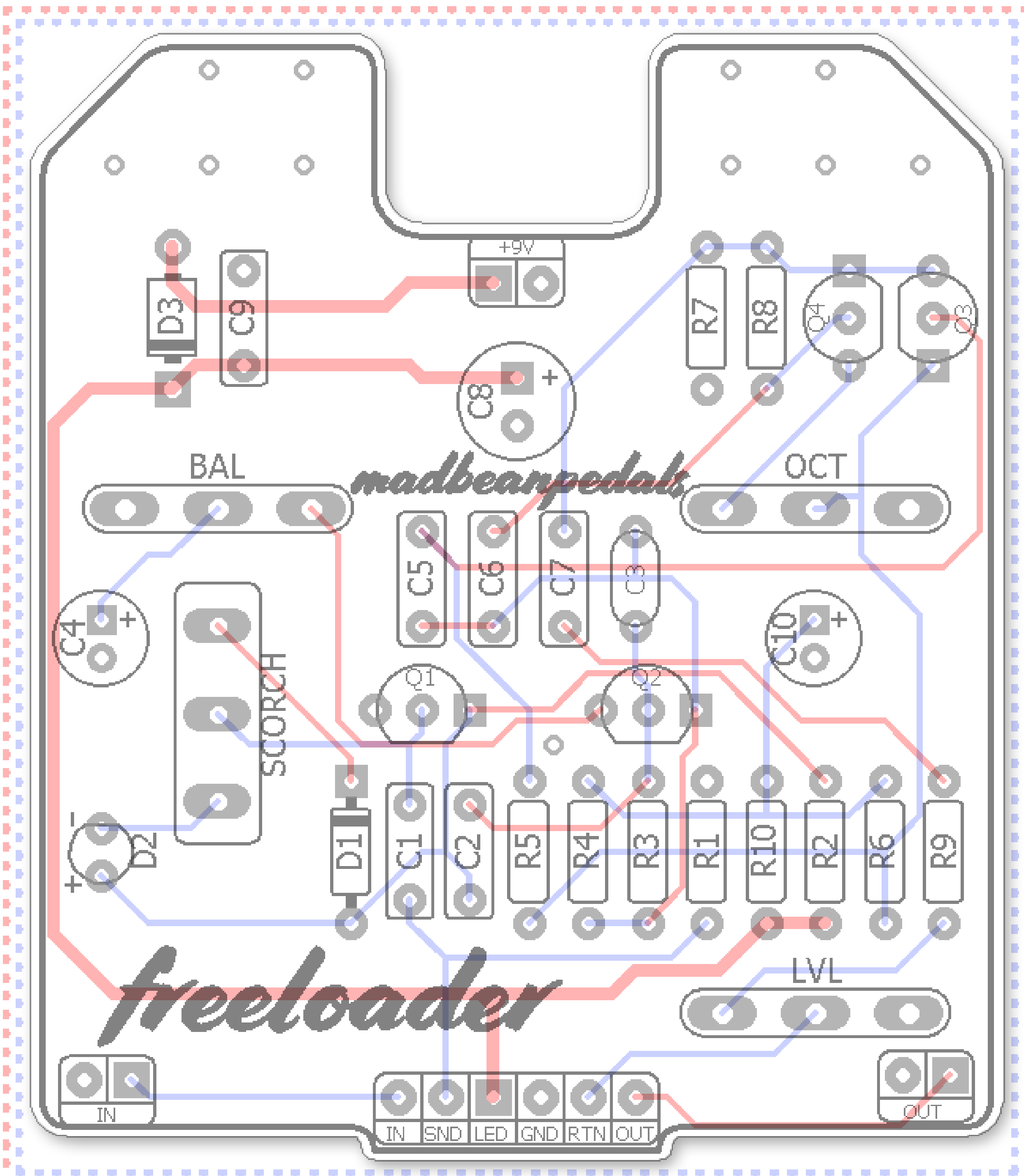
Parts Layout



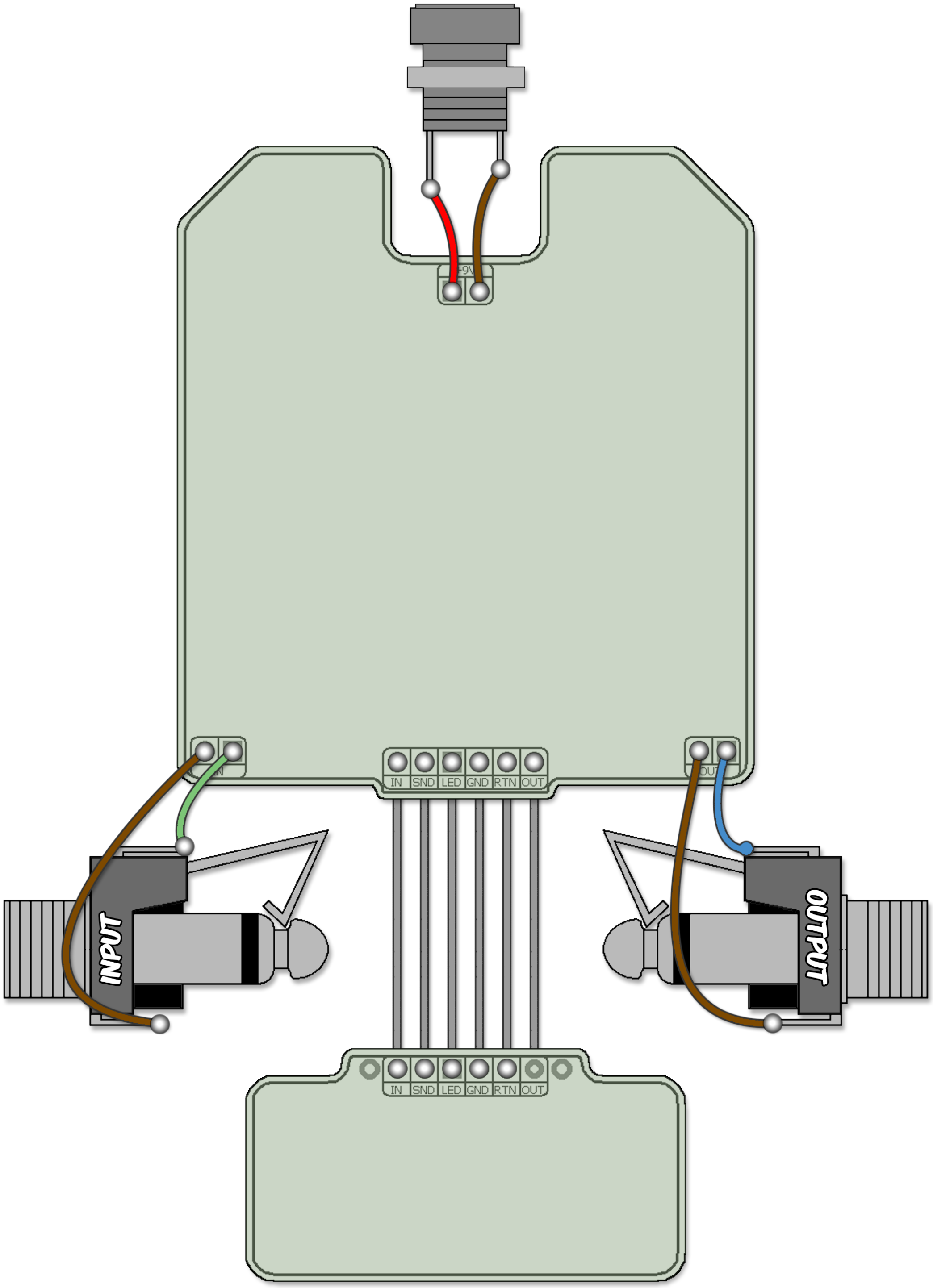
Component Values



Trace Layout



Wiring



Unless otherwise noted, all Standard Series projects have the same wiring regardless of which 3PDT bypass board is used. A 6-pin, 2” ribbon cable is recommended for soldering the connections between the two PCBs.

B.O.M.

Resistors		Caps		Diodes	
R1	1M	C1	100n	D1	1n914
R2	100k	C2	100n	D2	LED
R3	1M	C3	47pF	D3	1n5817
R4	10k	C4	10uF	**Transistors**	
R5	470k	C5	100n	Q1	2n222A
R6	10k	C6	100n	Q2	2n5088
R7	10k	C7	100n	Q3	2n222a
R8	470k	C8	100uF	Q4	2n3906
R9	330k	C9	100n	**Switches**	
R10	470R	C10	10uF	SCORCH	SPDT
				Pots	
				BAL	1kC
				LVL	100kA
				OCT	100kB

Shopping List

Value	QTY	Type	Rating
470R	1	Carbon or Metal Film	1/4W
10k	3	Carbon or Metal Film	1/4W
100k	1	Carbon or Metal Film	1/4W
470k	2	Carbon or Metal Film	1/4W
1M	2	Carbon or Metal Film	1/4W
47pF	1	Ceramic or MLCC	16v min.
100n	6	Film	16v min.
10uF	2	Electrolytic	16v min.
100uF	1	Electrolytic	16v min.
1n914	1		
LED	1	Clear White	5mm
1n5817	1		
2n222A	2		
2n5088	1		
2n3906	1		
SPDT	1	On/On, Solder Lug or Pin Mount	
1kC	1	PCB Right Angle	16mm
100kA	1	PCB Right Angle	16mm
100kB	1	PCB Right Angle	16mm

Additional Hardware

(1) 1590B enclosure
(2) Lumberg 1/4” Compact mono jacks
(1) Slim 2.1mm DC jack
(1) Standard 3PDT footswitch
(1) 5mm LED

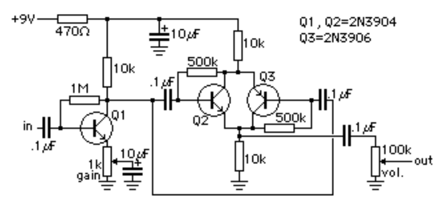
Build Notes

- R9 was added to tame the output of the Freeloader. Use a jumper if you want to build the circuit stock. You can mess around with the transistor types if you like. When I first built the Lizard Queen™ a couple years ago I used an MPSA13 Darlington for Q1 as recommended on the [Home Wrecker site](). I think I prefer the 2n222a instead, but whatever difference exists between the two is subtle.

- You can try other LED types for D2. A 5mm orange is recommended on Home Wrecker. I liked the clear white the best.

- Since the Tim Escobedo webpage seems to no longer be active, here is the original schematic for the octave portion of the Freeloader for reference.

Pushme Pullyou



v1.0
10/04

Decent octave up. Diodes, matched transistors need not apply. Gain stage drives a PNP/NPN pair for good fundamental cancellation. Transistors really aren't too critical. Q1 could be 2N3904 or higher gain transistor. Gain pot offers gains from about 10 to >100. At lower gains, the octave is fairly clean. Usual playing caveats apply for best octave.

Circuit Voltages

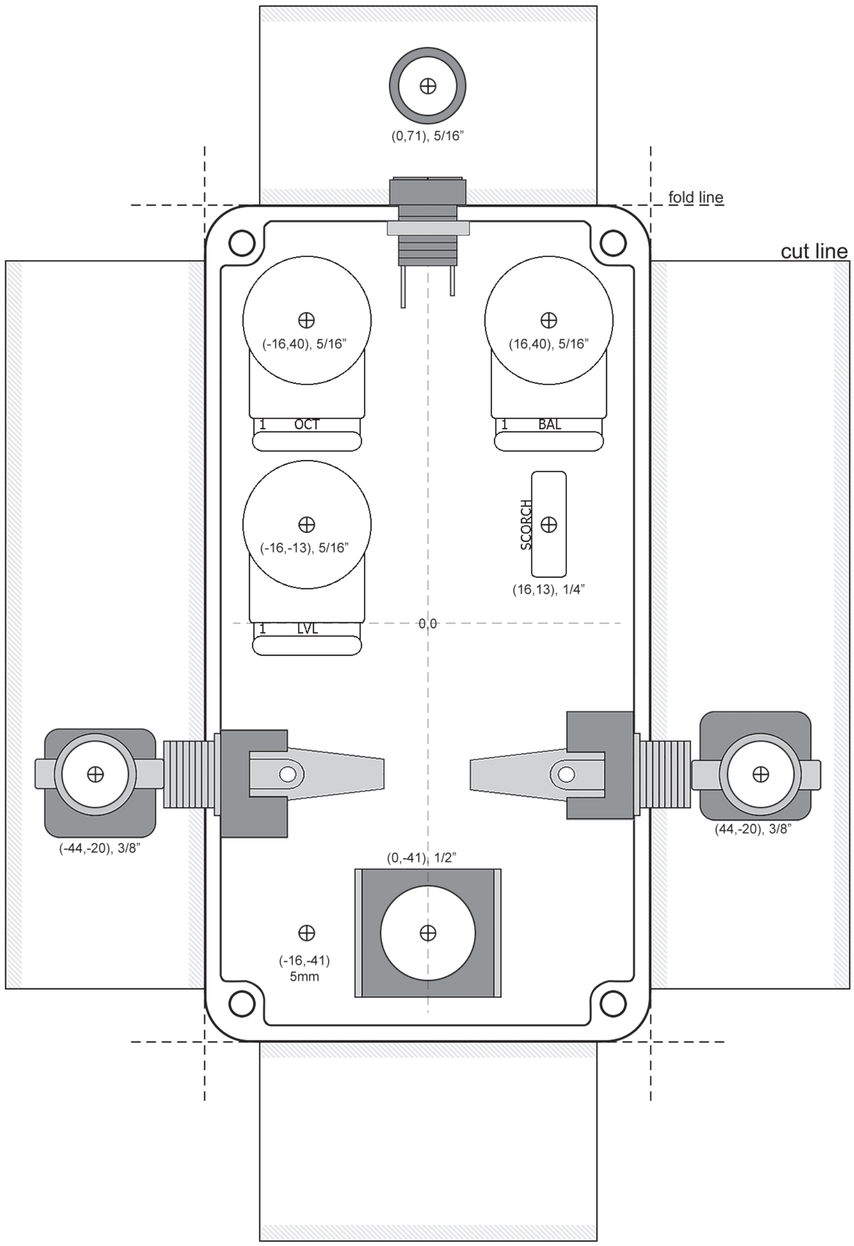
Q1	2n2222a
C	0.81
B	0.55
E	0.00
Q2	**2n5088**
C	2.54
B	1.24
E	0.65
Q3	**2n2222a**
C	5.19
B	4.16
E	3.63
Q4	**2n3906**
C	3.63
B	3.55
E	4.26

9.44vDC One Spot supply
Current Draw: ~2mA
Knobs @ 50%, switch down

1590B Drill Template

Coordinates are denoted in (X,Y), drill size format starting from the center (0,0) location of the enclosure.

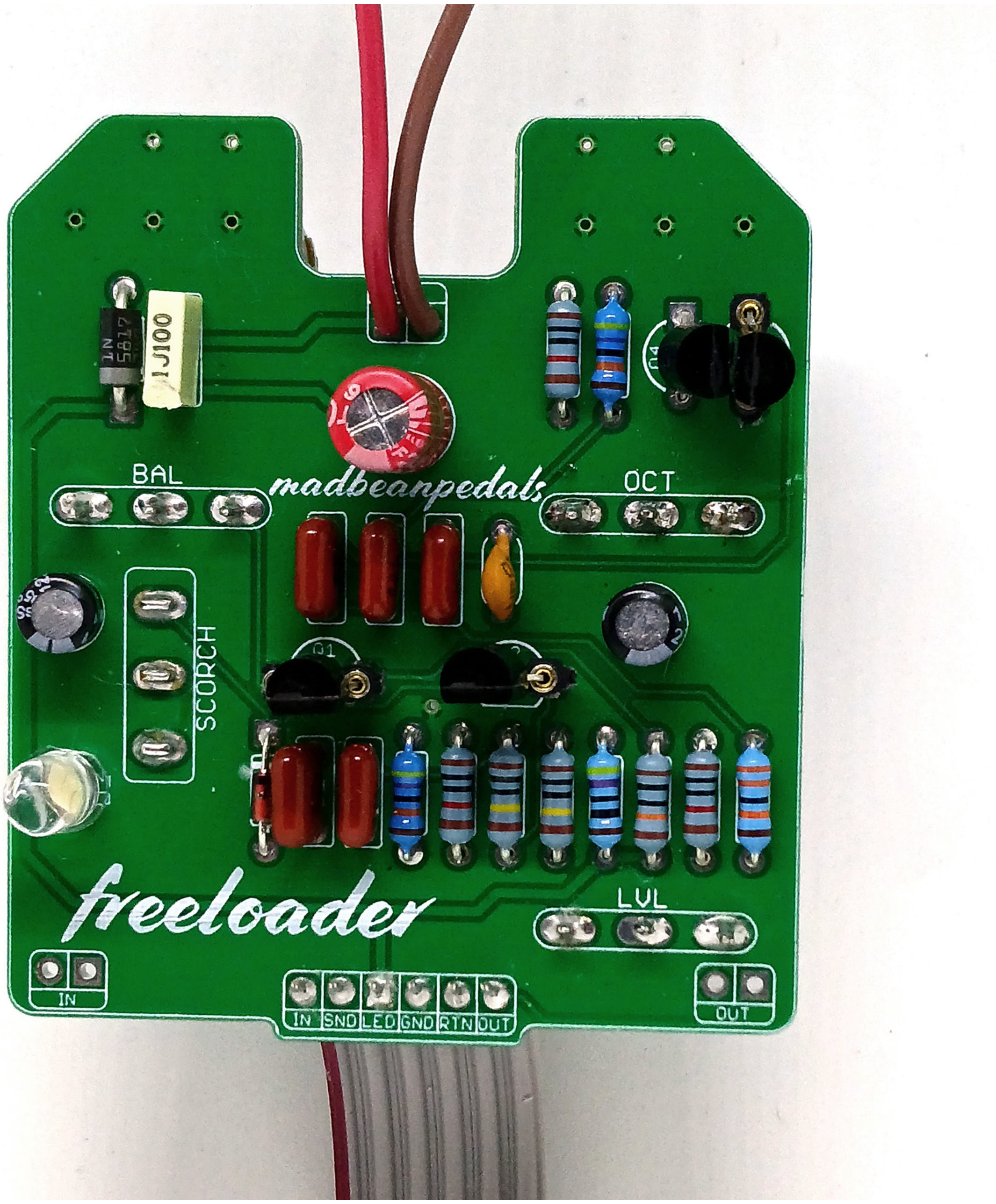
[Link to Tayda Standard Series master drill template]()



Hardware

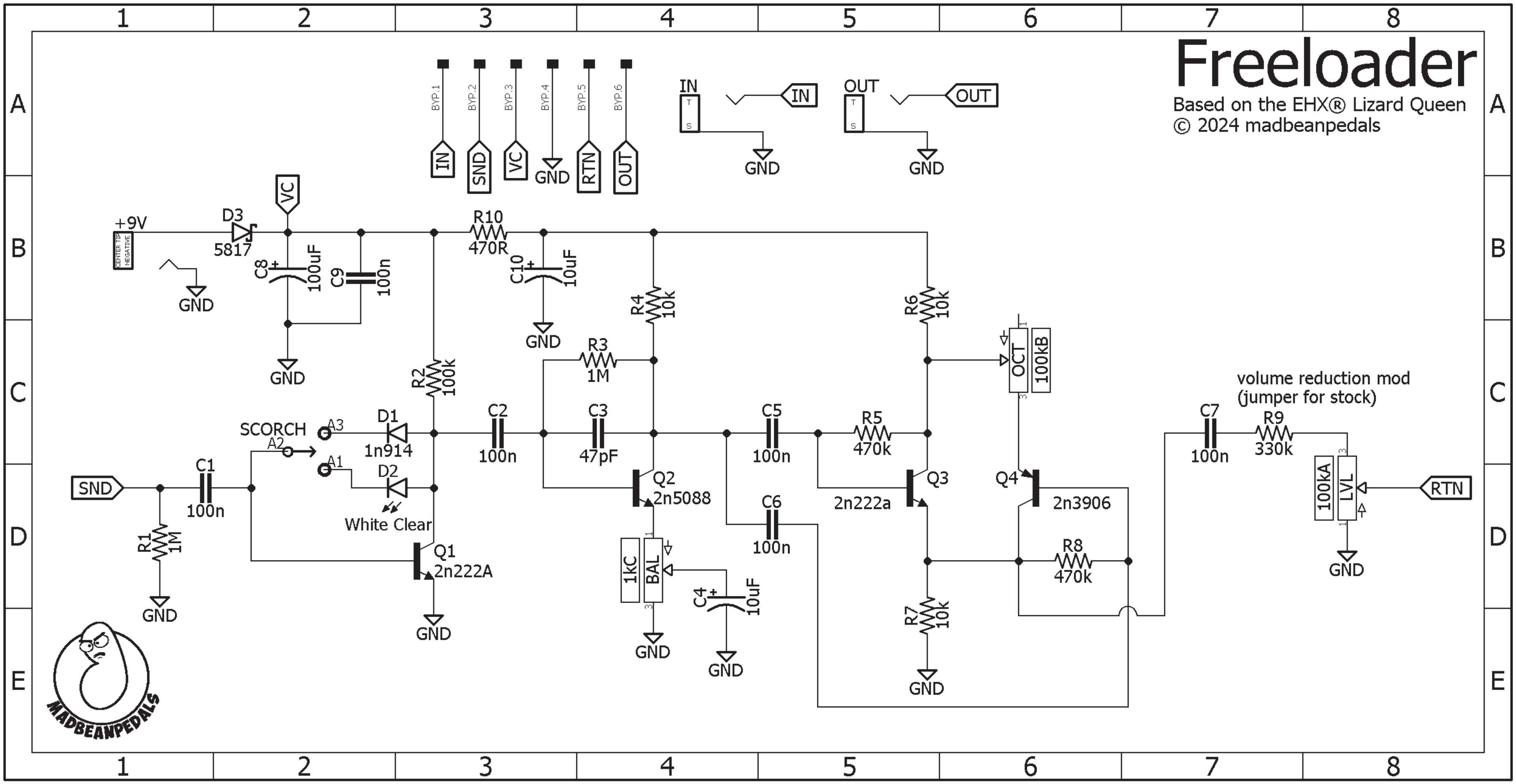
1590B enclosure
16mm pots
Lumberg 1/4” Compact mono jacks
Slim 2.1mm DC jack
Standard 3PDT footswitch
5mm LED
NOTE: Different 1/4” and DC jack styles may require different sized drill holes.

Build Pic



Even beans burn capacitors now and then.

Schematic


Freeloader
Based on the EHX® Lizard Queen
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+9V
D3
5817
VC
C8
100uF
C9
100n
GND
R10
470R
C10
10uF
R4
10k
R6
10k
R2
100k
R3
1M
SCORCH
A3
A2
A1
D1
1n914
D2
White Clear
C1
100n
SND
R1
1M
Q1
2n222A
C2
100n
C3
47pF
Q2
2n5088
1kC
BAL
C4
10uF
C5
100n
C6
100n
R5
470k
Q3
2n222a
OCT
100kB
Q4
2n3906
R8
470k
R7
10k
volume reduction mod
(jumper for stock)
C7
100n
R9
330k
100kA
LVL
RTN
IN
OUT
BYP.1
BYP.2
BYP.3
BYP.4
BYP.5
BYP.6
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