RainbowPuker

FX Type: **BIZZARE**
Build Level: Intermediate
Based On: EQD® Rainbow Machine™

Last Updated: April 23, 2024 6:51 PM

Overview

From the EQD® website:

"This one is for experimenters, adventurists, and noisemakers. Totally not for purists and/or tone hounds. There are no "natural sounds" that come from this box. It takes modern DSP and uses it as a tool of future past to create real-time pitch shifting using digital oscillators."

I built the PedalPCB Leprechaun a few years ago and thought it was pretty wild. At the time, the schematic wasn't available in the project doc so I traced the circuit directly from the PCB with the thought of doing a 125B version at some point. Well, how soon is now?

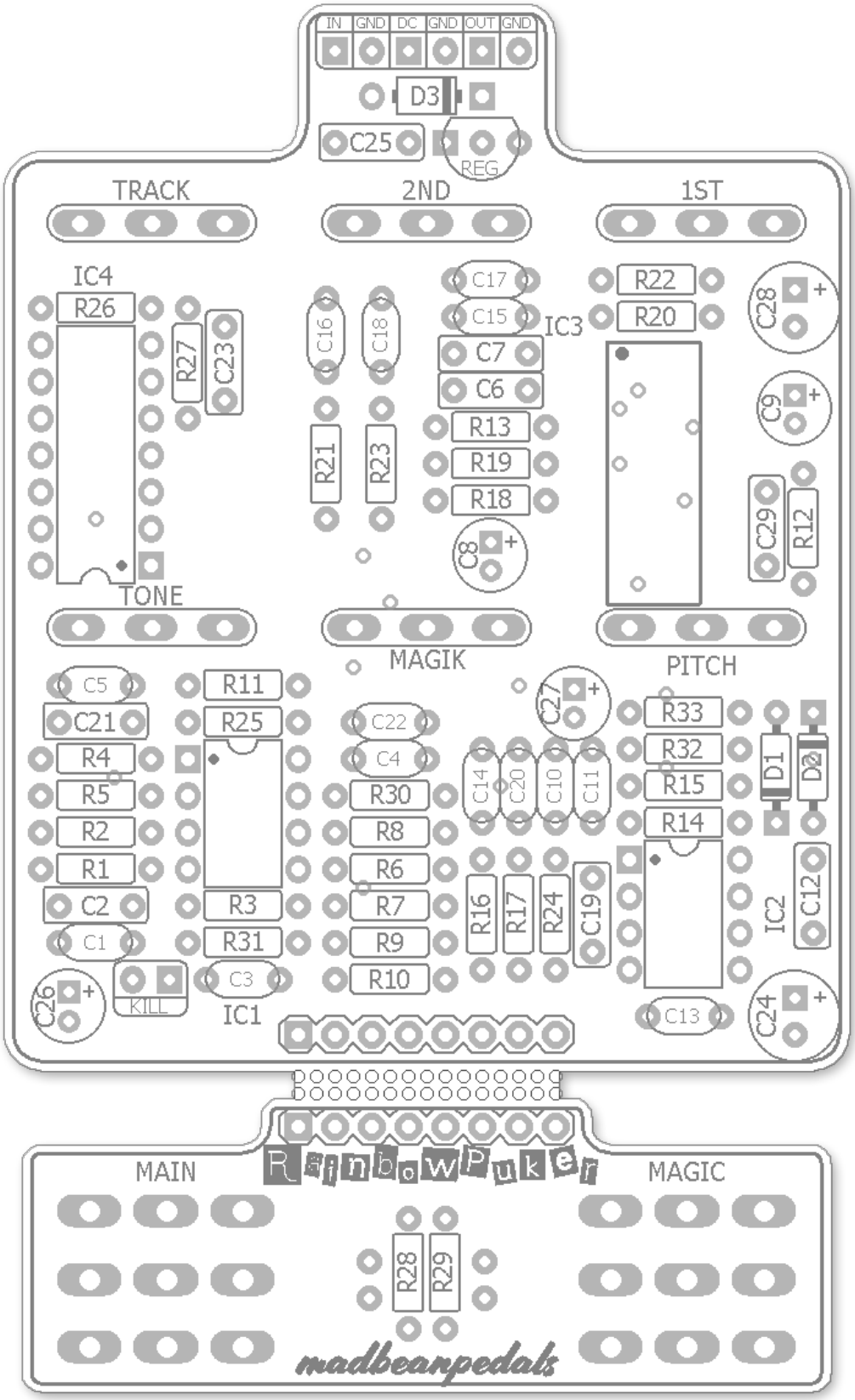
In order to miniaturize the project the expression control option was eliminated. The other compromise was to leave all the numerous 1uF coupling caps as MLCC type. One mod was added - a kill switch. When this switch is flipped it eliminates the dry signal so the effect output is wet only. This offers a new dimension to an already bizarre sounding pedal.

Controls

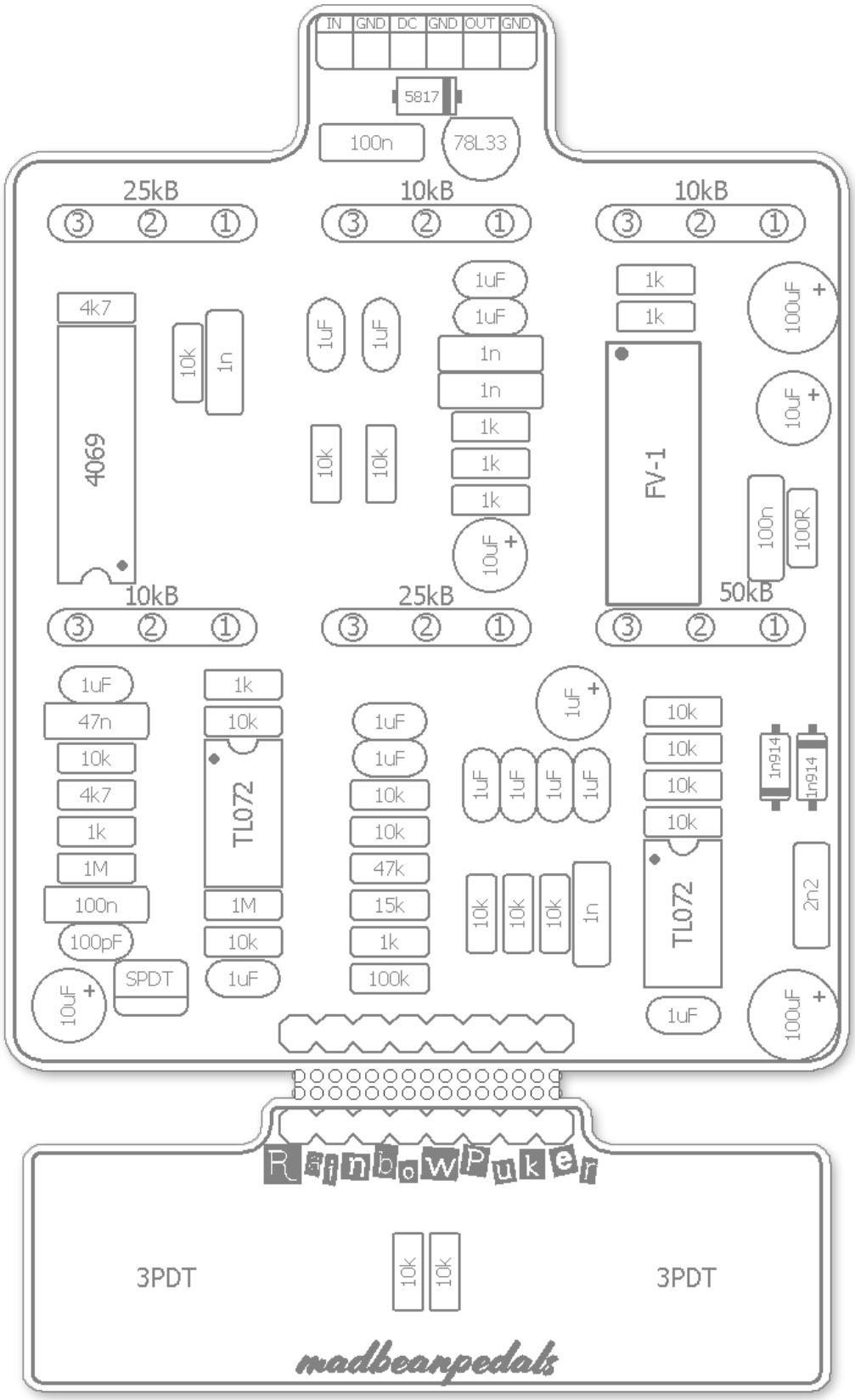
- **1st:** Controls the level of the primary harmony.
- **2nd:** Outputs an octave above or below the primary harmony (depending on where the PITCH control is set).
- **TRACK:** Changes the operational clock frequency of the FV-1. In practice, it changes the amount of delay between the wet and dry signal.
- **PITCH:** Changes the harmonic pitch shifting of the FV-1 input from a 4th interval below to a 3rd interval above.
- **MAGIK:** Sets the feedback amount when the "MAGIC" footswitch in engaged.
- **TONE:** A passive low pass filter.
- **KILL:** This switch lifts the dry signal from the audio path so the output comes directly from the wet (FV-1) signal.

Further study: https://www.earthquakerdevices.com/rainbow-machine

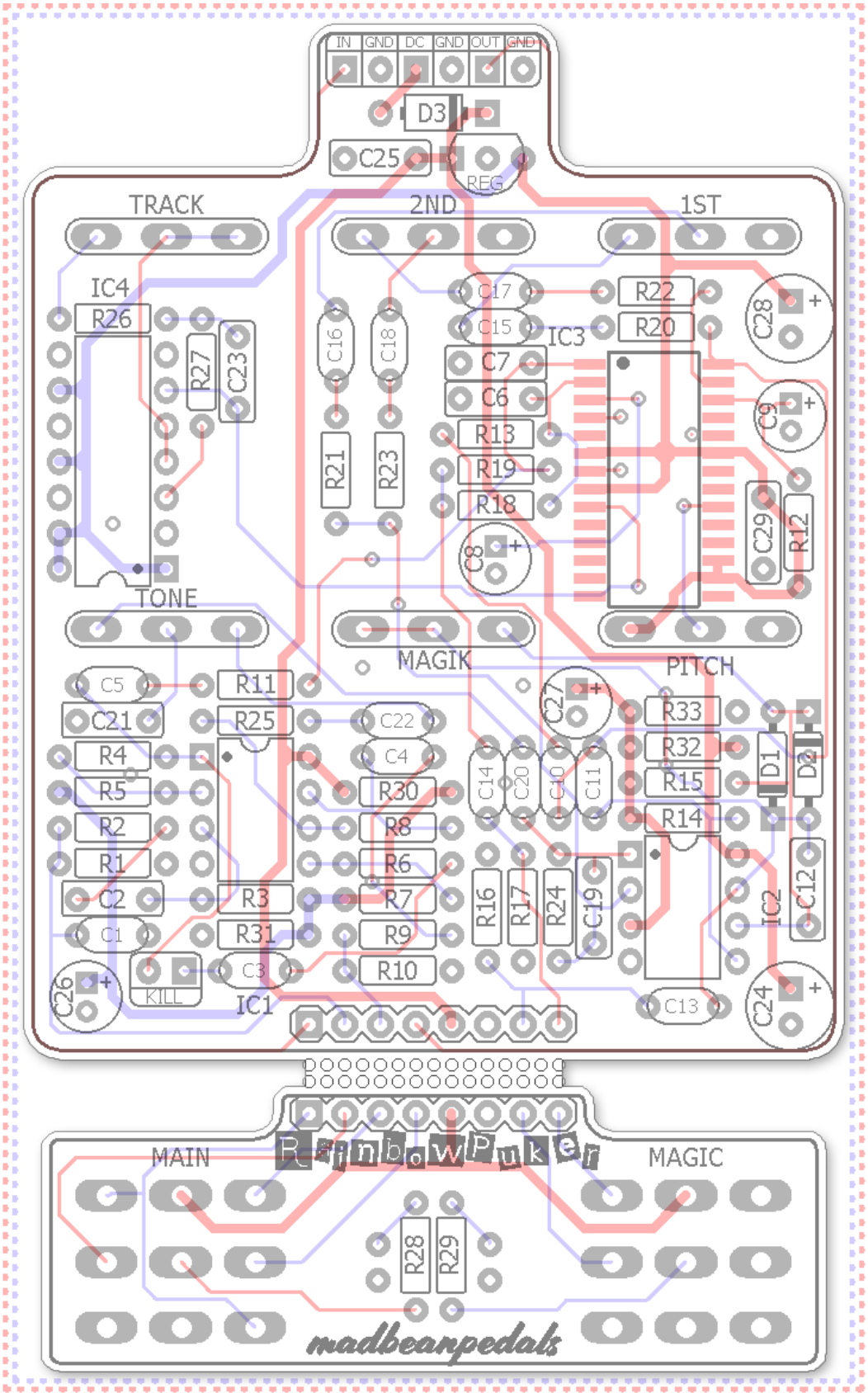
Parts Layout



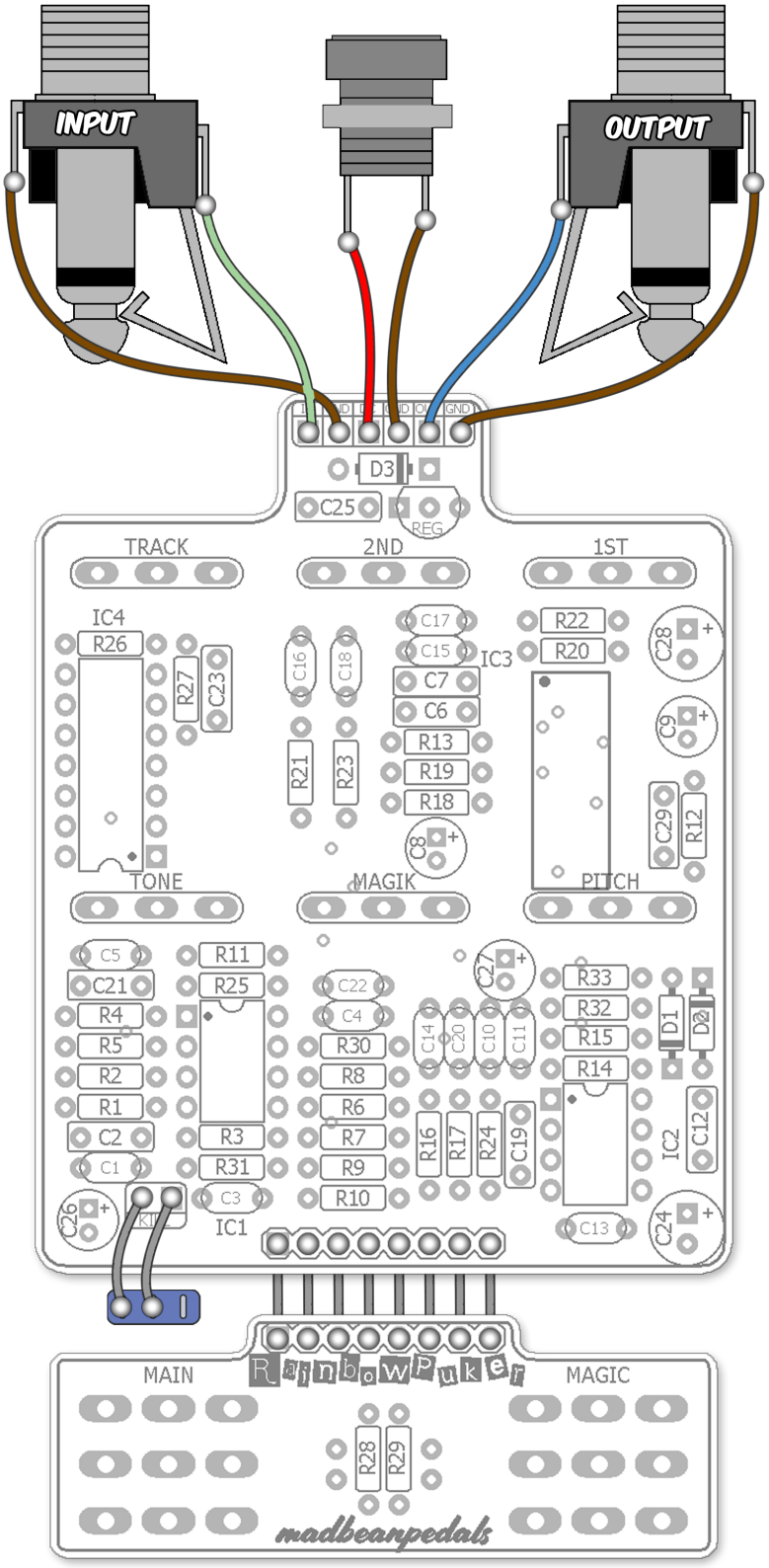
Component Values



Trace Layout



Wiring



An 8-pin, 1” ribbon cable is recommended for soldering the connections between the two PCBs.

B.O.M.

Resistors		Caps		Diodes	
R1	1M	C1	100pF	D1	1n914
R2	1k	C2	100n	D2	1n914
R3	1M	C3	1uF	D3	1n5817
R4	10k	C4	1uF	LED1	any
R5	4k7	C5	1uF	LED2	any
R6	47k	C6	1n	Regulator	
R7	15k	C7	1n	REG	78L33
R8	10k	C8	10uF	IC	
R9	1k	C9	10uF	IC1	TL072
R10	100k	C10	1uF	IC2	TL072
R11	1k	C11	1uF	IC3	FV-1
R12	100R	C12	2n2	IC4	CD4069
R13	1k	C13	1uF	Switches	
R14	10k	C14	1uF	KILL	SPDT
R15	10k	C15	1uF	MAGIC	3PDT
R16	10k	C16	1uF	MAIN	3PDT
R17	10k	C17	1uF	Pots	
R18	1k	C18	1uF	1ST	10kB
R19	1k	C19	1n	2ND	10kB
R20	1k	C20	1uF	TONE	10kB
R21	10k	C21	47n	MAGIK	25kB
R22	1k	C22	1uF	TRACK	25kB
R23	10k	C23	1n	PITCH	50kB
R24	10k	C24	100uF		
R25	10k	C25	100n		
R26	4k7	C26	10uF		
R27	10k	C27	1uF		
R28	10k	C28	100uF		
R29	10k	C29	100n		
R30	10k				
R31	10k				
R32	10k				
R33	10k				

Shopping List

Value	QTY	Type	Rating
100R	1	Carbon / Metal Film	1/4W
1k	8	Carbon / Metal Film	1/4W
4k7	2	Carbon / Metal Film	1/4W
10k	17	Carbon / Metal Film	1/4W
15k	1	Carbon / Metal Film	1/4W
47k	1	Carbon / Metal Film	1/4W
100k	1	Carbon / Metal Film	1/4W
1M	2	Carbon / Metal Film	1/4W
100pF	1	Ceramic / MLCC	
1n	4	Film	
2n2	1	Film	
47n	1	Film	
100n	3	Film	
1uF	13	MLCC	
1uF	1	Electrolytic	
10uF	3	Electrolytic	
100uF	2	Electrolytic	
1n914	2		
1n5817	1		
LED	2	your choice	3 or 5mm
78L33	1		
TL072	2		
FV-1	1		
CD4069	1		
SPDT	1	On, On, Sub-Mini SPDT	
3PDT	2	Footswitch, Solder Lug	
10kB	3	PCB Right Angle	16mm
25kB	2	PCB Right Angle	16mm
50kB	1	PCB Right Angle	16mm

Additional Hardware

(1) 125B enclosure
(2) 1/4” mono jacks
(1) DC jack

Build Notes

- Before you begin, gently break apart the two PCBs. You can do it easily by hand. Use wire cutters to trim any left-over nubs.

- If you plan on using the Kill switch, I recommend sticking with the sub-mini SPDT like these:

https://lovemyswitches.com/taiway-sub-mini-spdt-on-on-switch-solder-lug-short-shaft/
https://smallbear-electronics.mybigcommerce.com/spdt-on-on-sub-mini-toggle-short-lever-pc-pin/

- If you do not wish to use the Kill switch option, solder a jumper wire between the two pads together on the Main PCB.

- Make sure you solder the two 3PDTs on the bottom of the I/O PCB!!

Circuit Voltages

IC1	TL072
1	4.57
2	4.57
3	3.85
4	0.00
5	4.54
6	4.57
7	4.57
8	9.16

IC2	TL072
1	4.57
2	4.58
3	4.57
4	0.00
5	4.57
6	4.57
7	4.57
8	9.16

IC3	FV-1
1	1.63
2	1.63
3	1.63
4	0.00
5	3.26
6	3.26
7	0.00
8	3.26
9	1.58
10	1.65
11	0.00
12	0.00
13	0.00
14	3.26
15	3.26
16	3.26
17	3.26
18	0
19	0
20	2.11
21	1.46
22	1.44
23	3.26
24	0
25	0
26	3.23
27	1.67
28	1.67

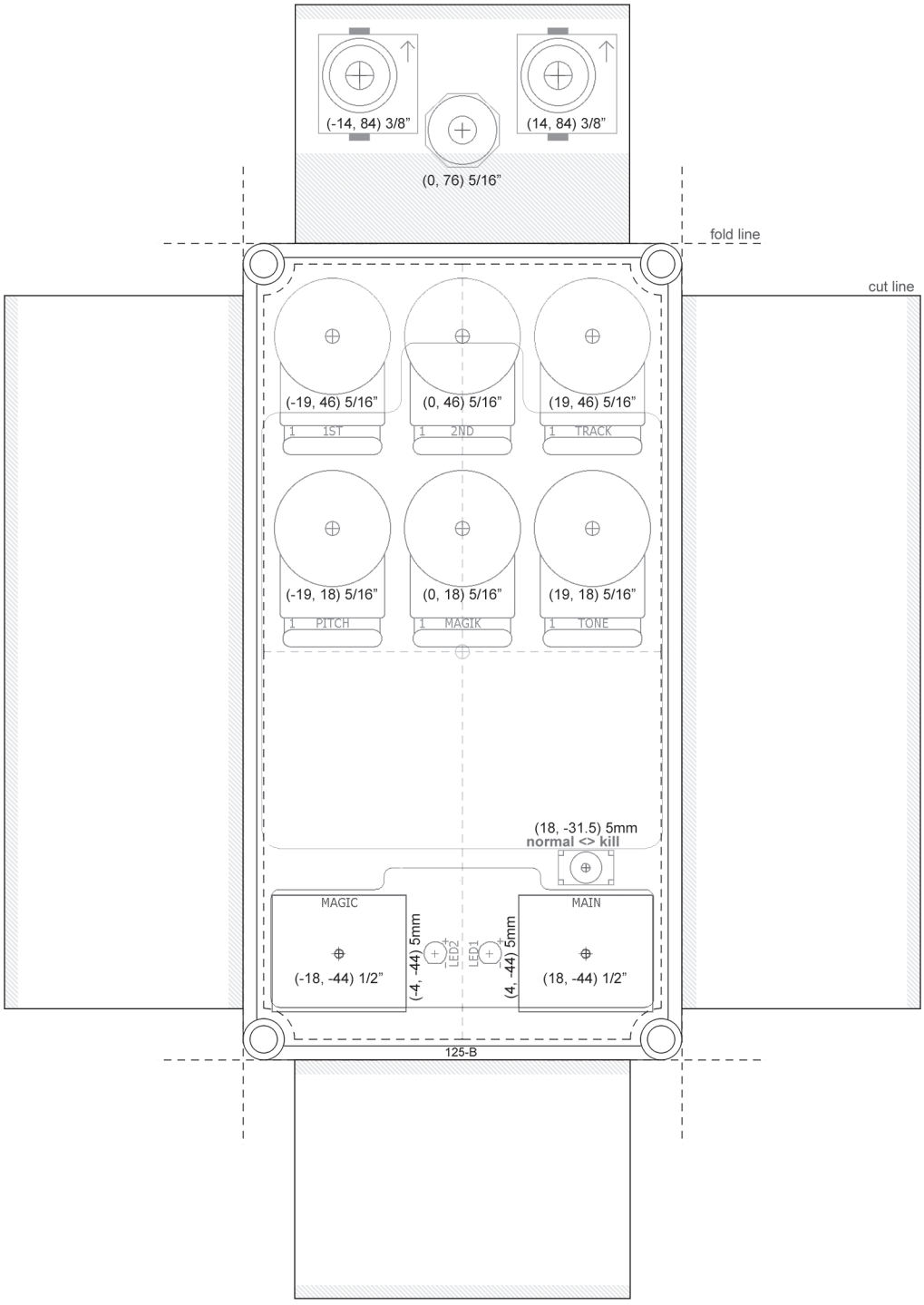
IC4	CD4069
1	3.26
2	0.00
3	1.59
4	1.57
5	1.57
6	1.58
7	0.00
8	0.00
9	3.26
10	0
11	3.26
12	0
13	3.26
14	3.26

REG	78L33
I	9.16
G	0.00
O	3.26

9.44vDC One Spot supply
Current Draw: ~62mA
Knobs @ 50%

125B Drill Template

Tayda drill template: https://drill.taydakits.com/box-designs/new?public_key=N2s0WEN5WW1pMHBJUjNKWkMyMXlJdz09Cg==

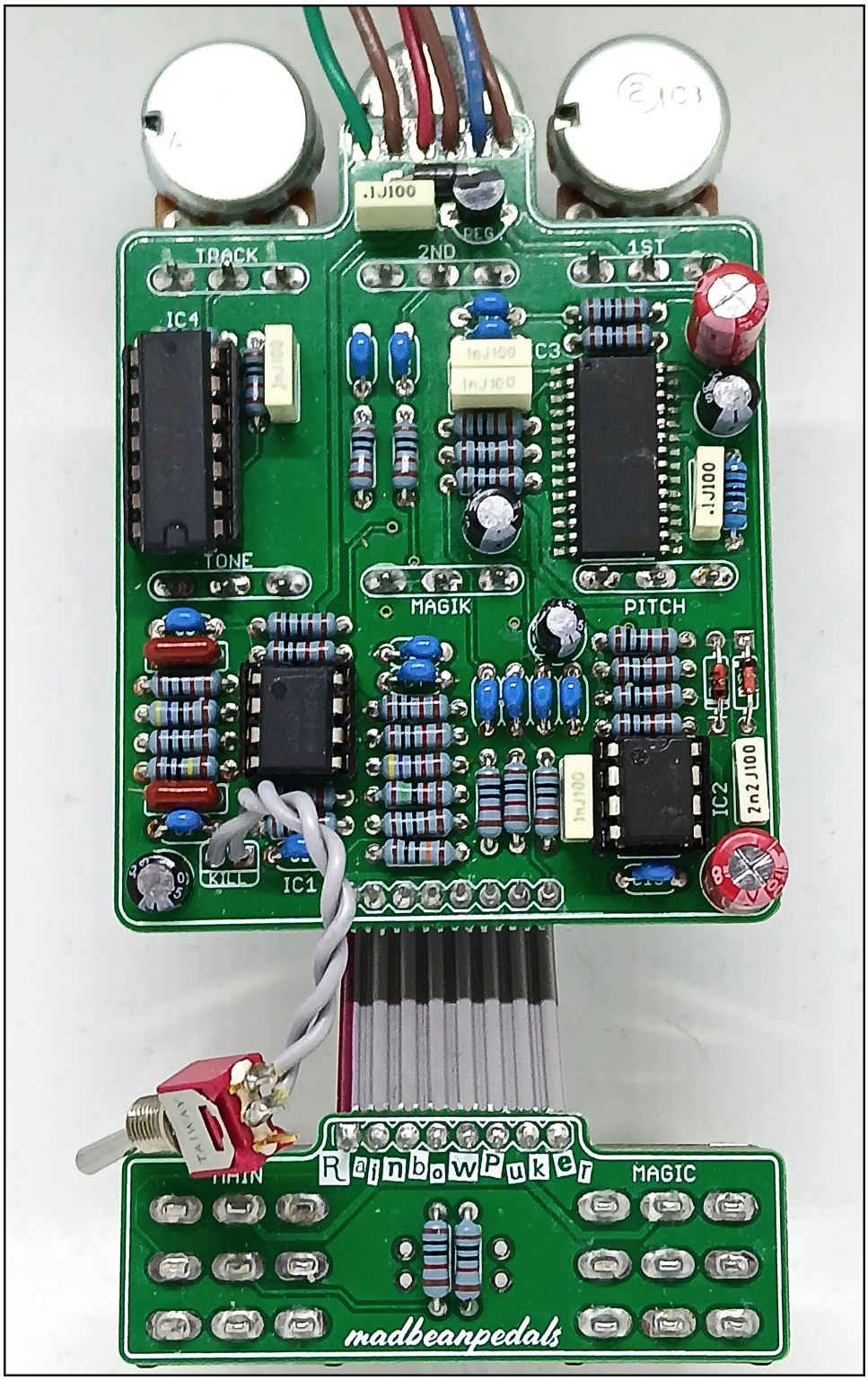


Hardware

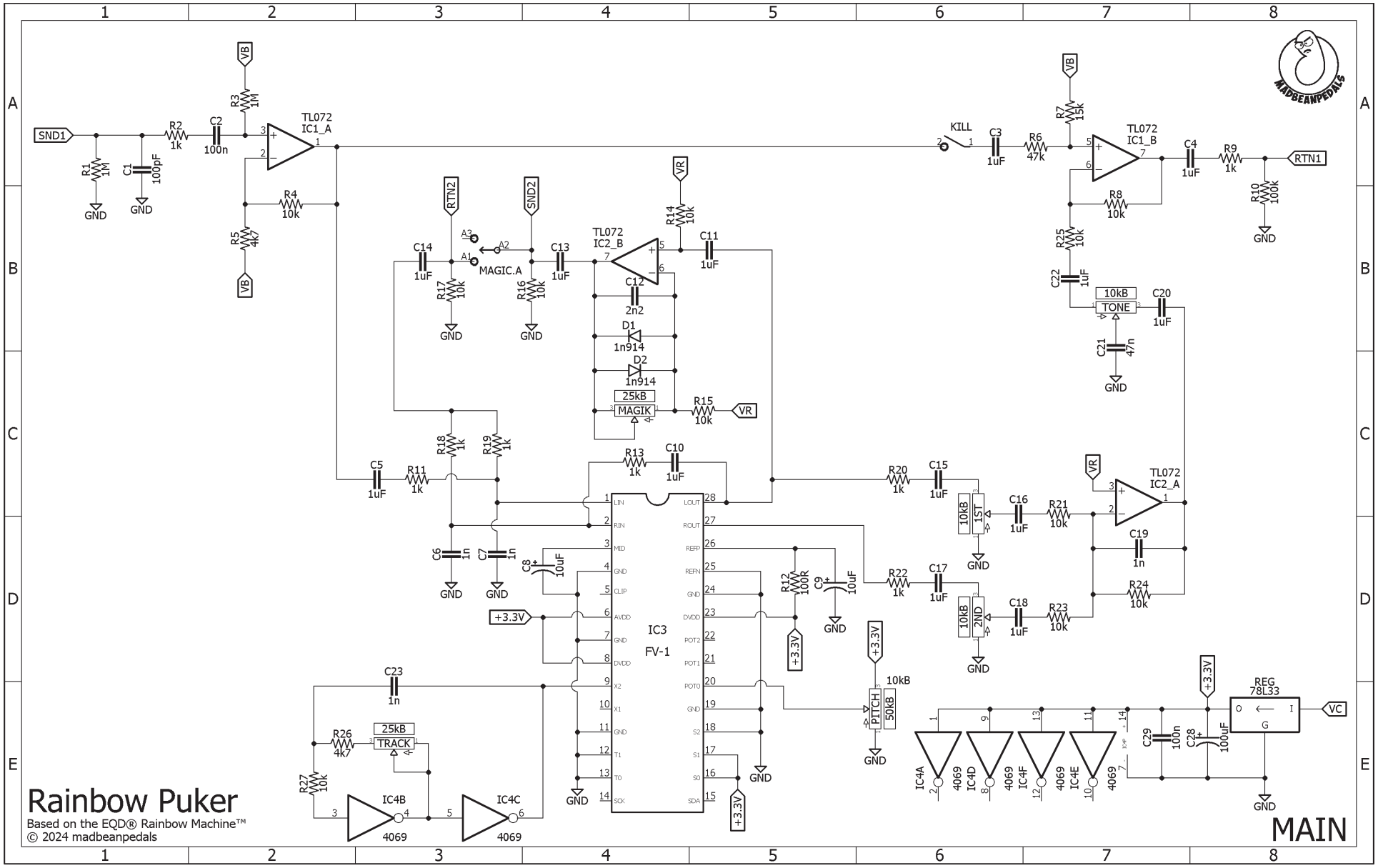
125B enclosure
Lumberg 1/4” Compact mono jacks
Slim 2.1mm DC jack
Standard 3PDT footswitches
5mm LED

NOTE: Different 1/4” and DC jack styles may require different sized drill holes.

Build Pic


TRACK
2ND
1ST
IC4
C3
TONE
MAGIK
PITCH
IC2
IC1
KILL
MAIN
RainbowPuker
MAGIC
madbeanpedals

Schematic


Rainbow Puker
Based on the EQD® Rainbow Machine™
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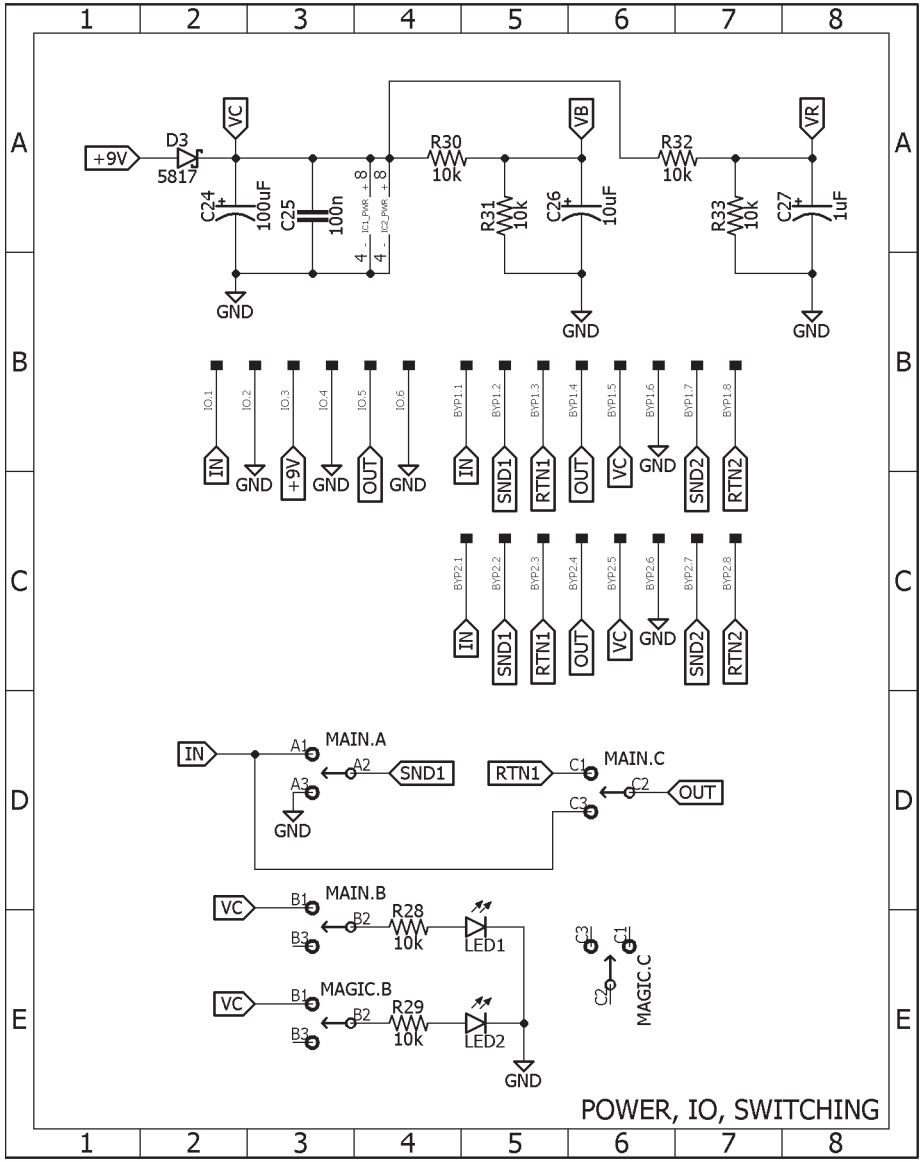
MAIN
TL072 IC1_A
TL072 IC1_B
TL072 IC2_A
TL072 IC2_B
IC3 FV-1
IC4A 4069
IC4B 4069
IC4C 4069
IC4D 4069
IC4E 4069
IC4F 4069
REG 78L33
SND1
SND2
RTN1
RTN2
VB
VR
+3.3V
GND
KILL
MAGIC.A
TONE
PITCH
TRACK
MAGIK
1ST
2ND

Schematic


1
2
3
4
5
6
7
8
A
B
C
D
E
+9V
D3
5817
VC
C24
100uF
C25
100n
R30
10k
VB
R31
10k
C26
10uF
R32
10k
VR
R33
10k
C27
1uF
GND
IO.1
IO.2
IO.3
IO.4
IO.5
IO.6
IN
OUT
BYP1.1
BYP1.2
BYP1.3
BYP1.4
BYP1.5
BYP1.6
BYP1.7
BYP1.8
SND1
RTN1
SND2
RTN2
BYP2.1
BYP2.2
BYP2.3
BYP2.4
BYP2.5
BYP2.6
BYP2.7
BYP2.8
MAIN.A
MAIN.C
MAIN.B
MAGIC.B
MAGIC.C
R28
R29
LED1
LED2
POWER, IO, SWITCHING