Dragonfish

FX Type: **DELAY**
Build Level: Intermediate
Based On: madbeanpedals original

Last Updated: February 14, 2025 6:20 PM

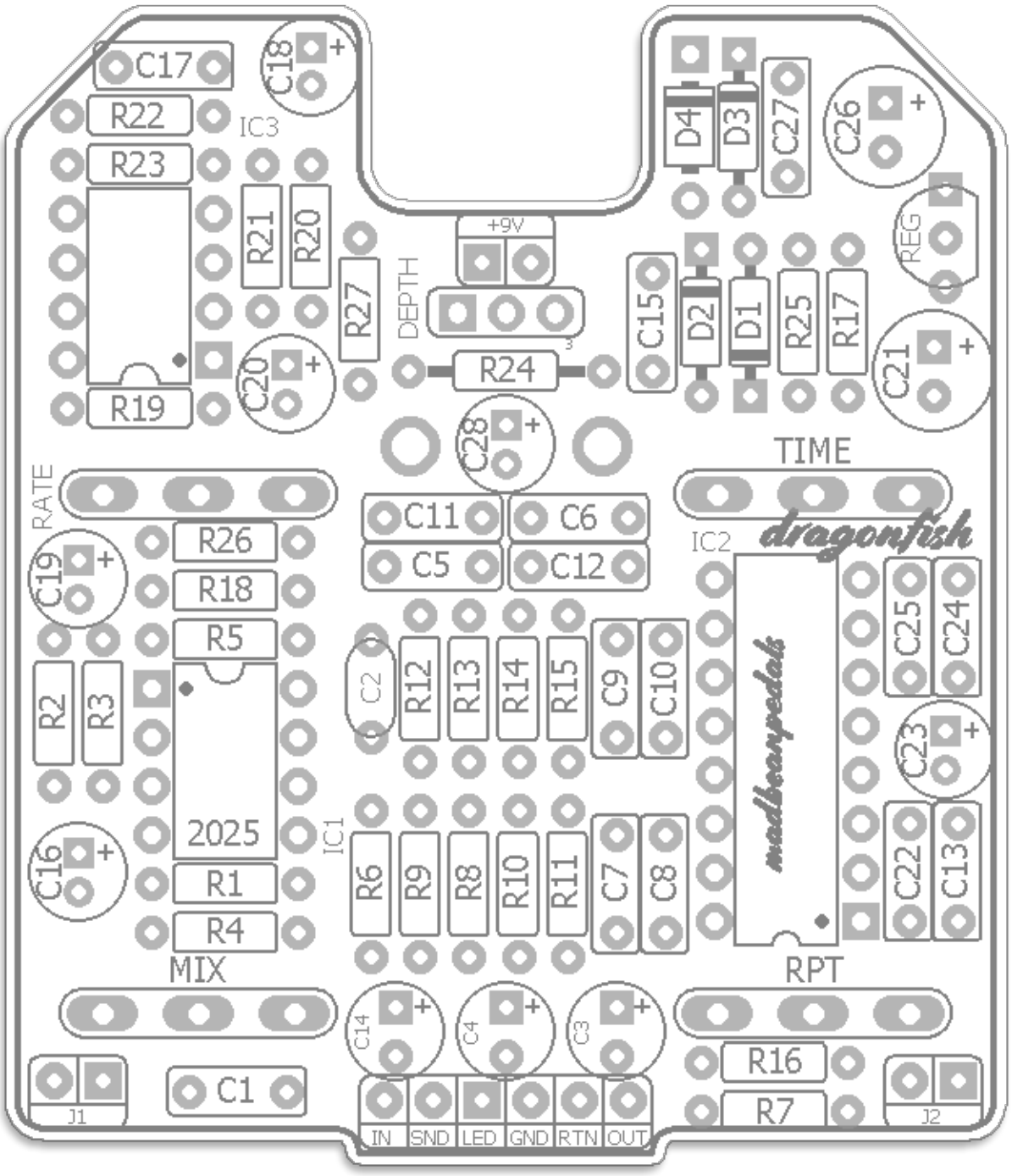
Overview

The **Dragonfish** is a compact, analog-voiced PT2399 delay with modulation. Whereas the two existing Standard Series PT2399 delay projects (the Degenerator and Transponder) have dynamic-based modulation, the Dragonfish has a full complement of LFO modulation with rate and depth controls.

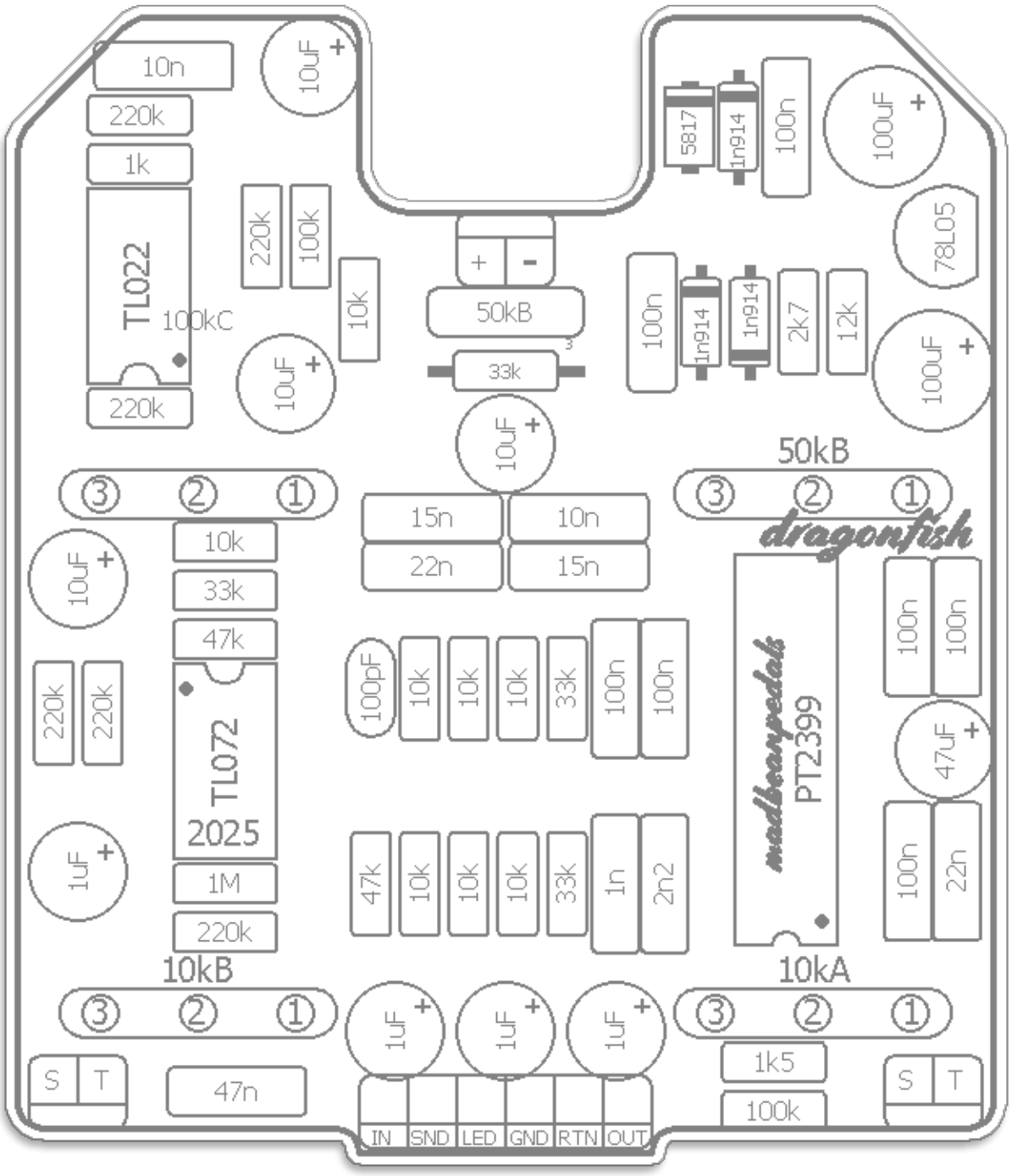
Controls

- **TIME:** The delay range is around 50ms to 600ms.
- **RPT:** Delay repeats from 1 to “infinity” or self-oscillation.
- **MIX:** Delay signal volume.
- **RATE:** Sets the speed of the delay modulation from a slow chorus effect (CCW) to a ridiculously fast choppy one (CW)
- **DEPTH:** The intensity of the modulation effect. Setting this CCW turns the modulation off completely.

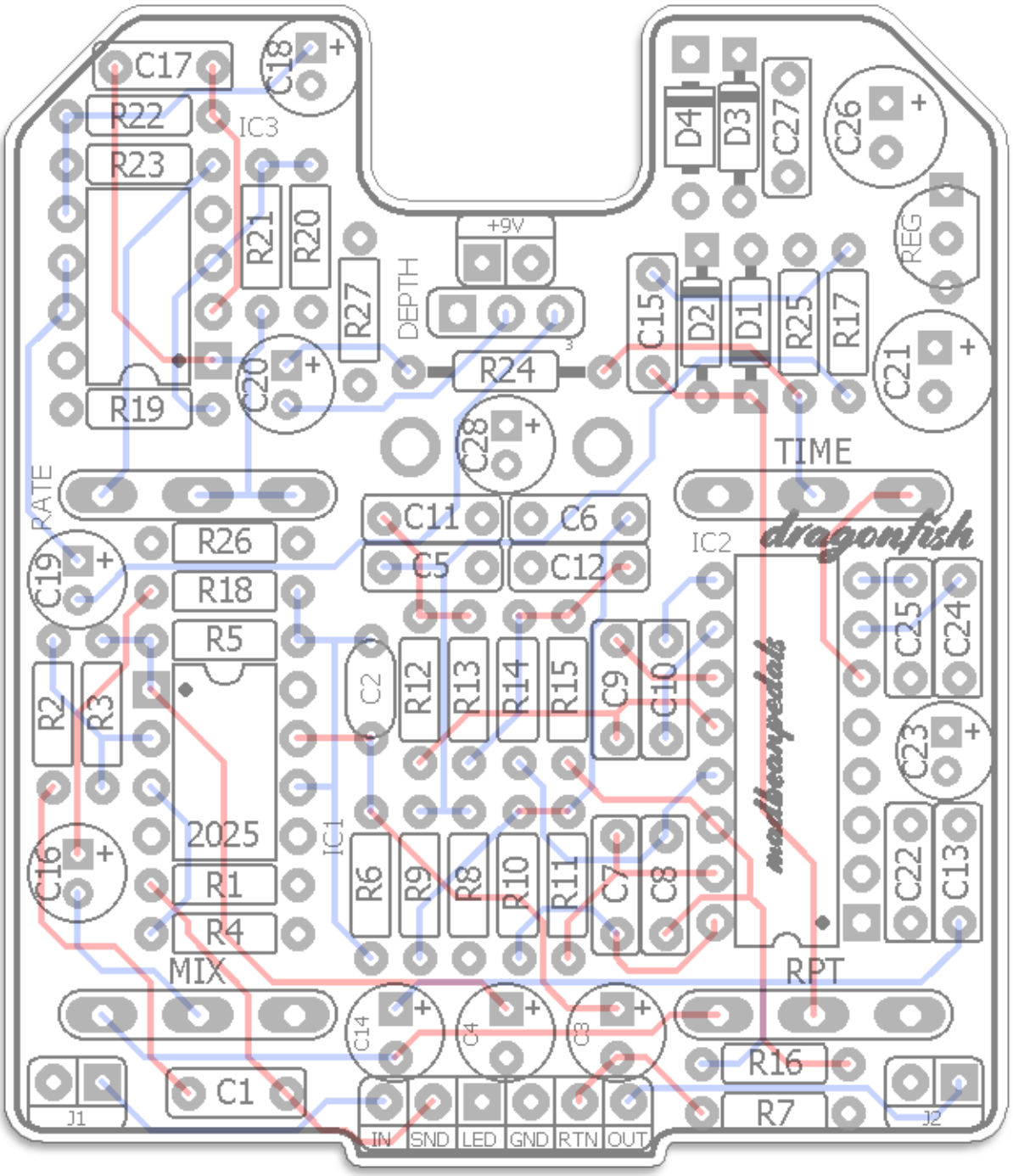
Parts Layout



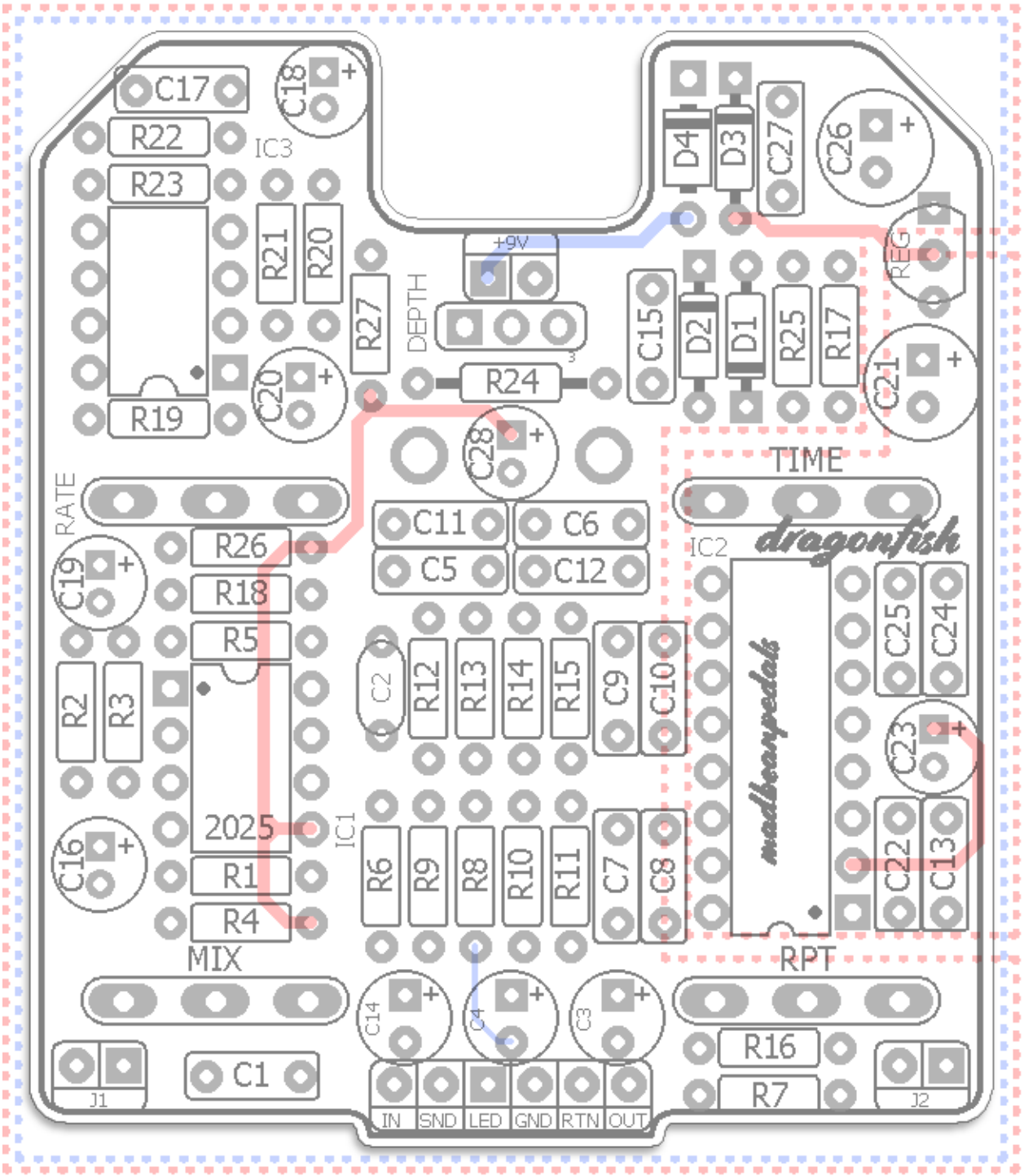
Component Values



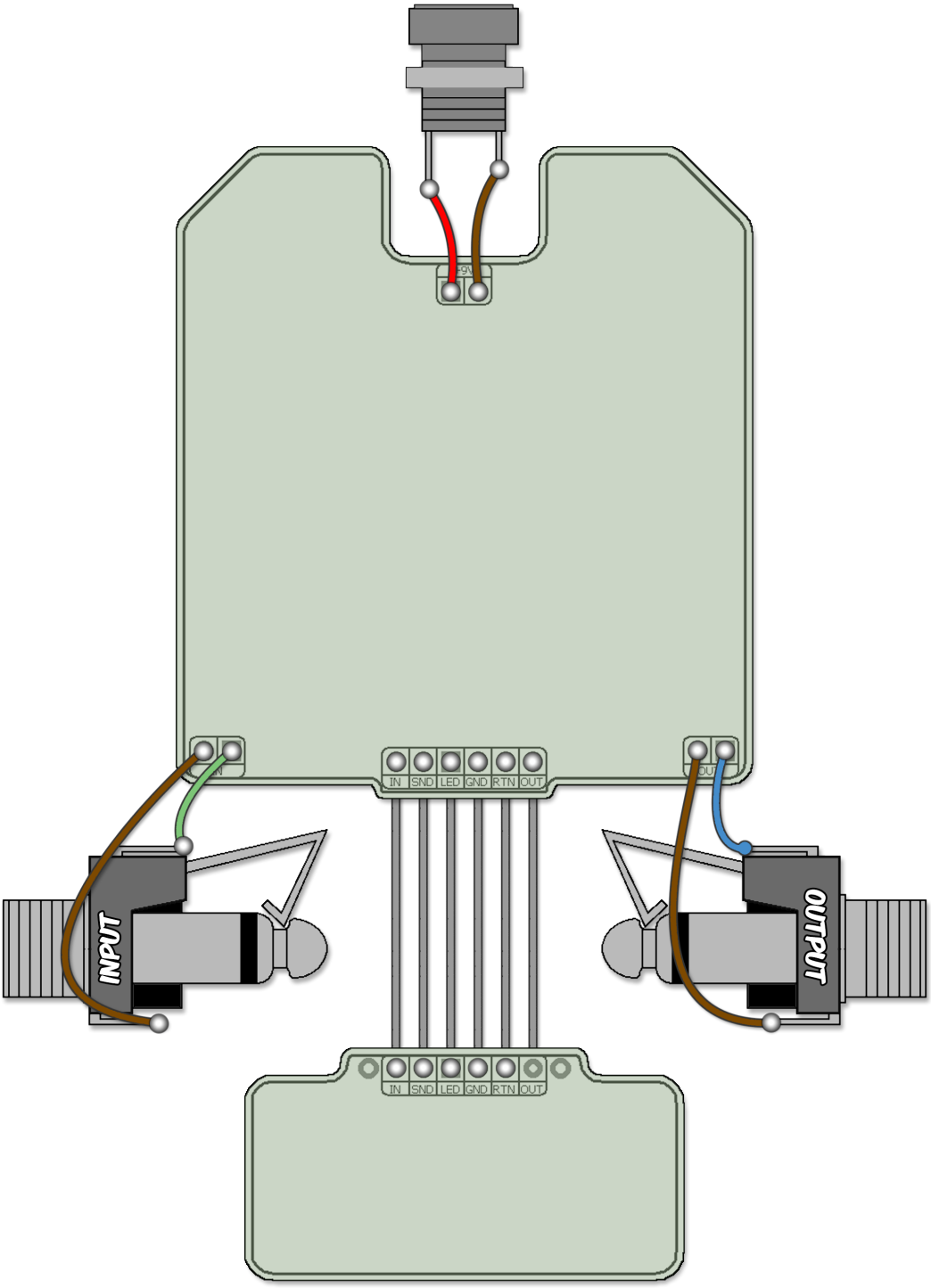
Trace Layout - Outer Layers



Trace Layout - Inner Layers



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	47n	D1	1n914
R2	220k	C2	100pF	D2	1n914
R3	220k	C3	1uF	D3	1n914
R4	220k	C4	1uF	D4	1n5817
R5	47k	C5	22n	Regulator	
R6	47k	C6	10n	REG	78L05
R7	100k	C7	1n	ICs	
R8	10k	C8	2n2	IC1	TL072
R9	10k	C9	100n	IC2	PT2399
R10	10k	C10	100n	IC3	TL022
R11	33k	C11	15n	Pots	
R12	10k	C12	15n	RPT	10kA
R13	10k	C13	22n	MIX	10kB
R14	10k	C14	1uF	DEPTH	50kB
R15	33k	C15	100n	TIME	50kB
R16	1k5	C16	1uF	RATE	100kC
R17	12k	C17	10n		
R18	33k	C18	10uF		
R19	220k	C19	10uF		
R20	100k	C20	10uF		
R21	220k	C21	100uF		
R22	220k	C22	100n		
R23	1k	C23	47uF		
R24	33k	C24	100n		
R25	2k7	C25	100n		
R26	10k	C26	100uF		
R27	10k	C27	100n		
		C28	10uF		

Shopping List

Value	QTY	Type	Rating
1k	1	Metal / Carbon Film	1/4W
1k5	1	Metal / Carbon Film	1/4W
2k7	1	Metal / Carbon Film	1/4W
10k	8	Metal / Carbon Film	1/4W
12k	1	Metal / Carbon Film	1/4W
33k	4	Metal / Carbon Film	1/4W
47k	2	Metal / Carbon Film	1/4W
100k	2	Metal / Carbon Film	1/4W
220k	6	Metal / Carbon Film	1/4W
1M	1	Metal / Carbon Film	1/4W
100pF	1	Ceramic / MLCC	16v min.
1n	1	Film	16v min.
2n2	1	Film	16v min.
10n	2	Film	16v min.
15n	2	Film	16v min.
22n	2	Film	16v min.
47n	1	Film	16v min.
100n	7	Film	16v min.
1uF	4	Electrolytic	16v min.
10uF	4	Electrolytic	16v min.
47uF	1	Electrolytic	16v min.
100uF	2	Electrolytic	16v min.
1n914	3		
1n5817	1		
78L05	1		
TL072	1		
PT2399	1		
TL022	1	or, TL062	
50kB	1	PCB Right Angle, Plastic Shaft	9mm
10kA	1	PCB Right Angle	16mm
10kB	1	PCB Right Angle	16mm
50kB	1	PCB Right Angle	16mm
100kC	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

- This is a very compact build and a 4-layer PCB was required to trace route the many components used. However, if you've ever built a PT2399 delay pedal this one should not be much of a challenge.

- One compromise made was the 9mm pot for the Depth control had to be placed upside down. This means the indexed pointer on the pot will go in the opposite direction (when the Depth is off at full CCW, the pointer is to the right instead off left. If this bothers you, I suggest using one of the "Micro Knobs" available at smallbear. These fit perfectly on the plastic shaft off the 9mm pot and will allow you to have the index pointer facing the correct way. https://smallbear-electronics.mybigcommerce.com/micro-knobs-colors/

- If you do use the Micro Knob, you'll need to drill the hole for the Depth control to 5/16" instead of 1/4". Similarly, when using the Tayda drill service, set the drill width to 8mm instead of 7.5mm.

- As with all PT2399 projects, I recommend you get them from a supplier like smallbear or Stompbox parts. I would avoid Tayda and eBay. PT2399s have been cloned and not all are equal (IMO).

- Bonus: the design is very similar to the Tonepad Rebote 2.5, but with different values. In fact, it's not really fair to call it a madbean "original" since I only added the modulation and a few tweaks. Point being, you can use the Dragonfish PCB to build a Rebote 2.5 with modulation by using the Rebote values where applicable. Both projects sound great, but a little different from one another.

- D3 is used to push the supply voltage of the PT2399 to its max value of 5.5v in hopes of getting a little extra headroom from the chip. While this does create the possibility of early failure for the chip, in practice I've had yet to see it happen (having used this trick on a few PT2399 designs up to this point). But, if you want to play it super safe, just solder in a jumper in place of D3 to reduce the regulator output down to 5vDC.

Circuit Voltages

IC1	TL072
1	4.59
2	4.58
3	4.49
4	0
5	4.6
6	4.6
7	4.61
8	9.21

IC3	TL022
1	varies
2	varies
3	varies
4	0
5	varies
6	varies
7	varies
8	9.21

IC2	PT2399
1	5.69
2	2.85
3	0
4	0
5	3.04
6	2.82
7	0.61
8	0.94
9	2.85
10	2.85
11	2.85
12	2.85
13	2.85
14	2.85
15	2.85
16	2.85

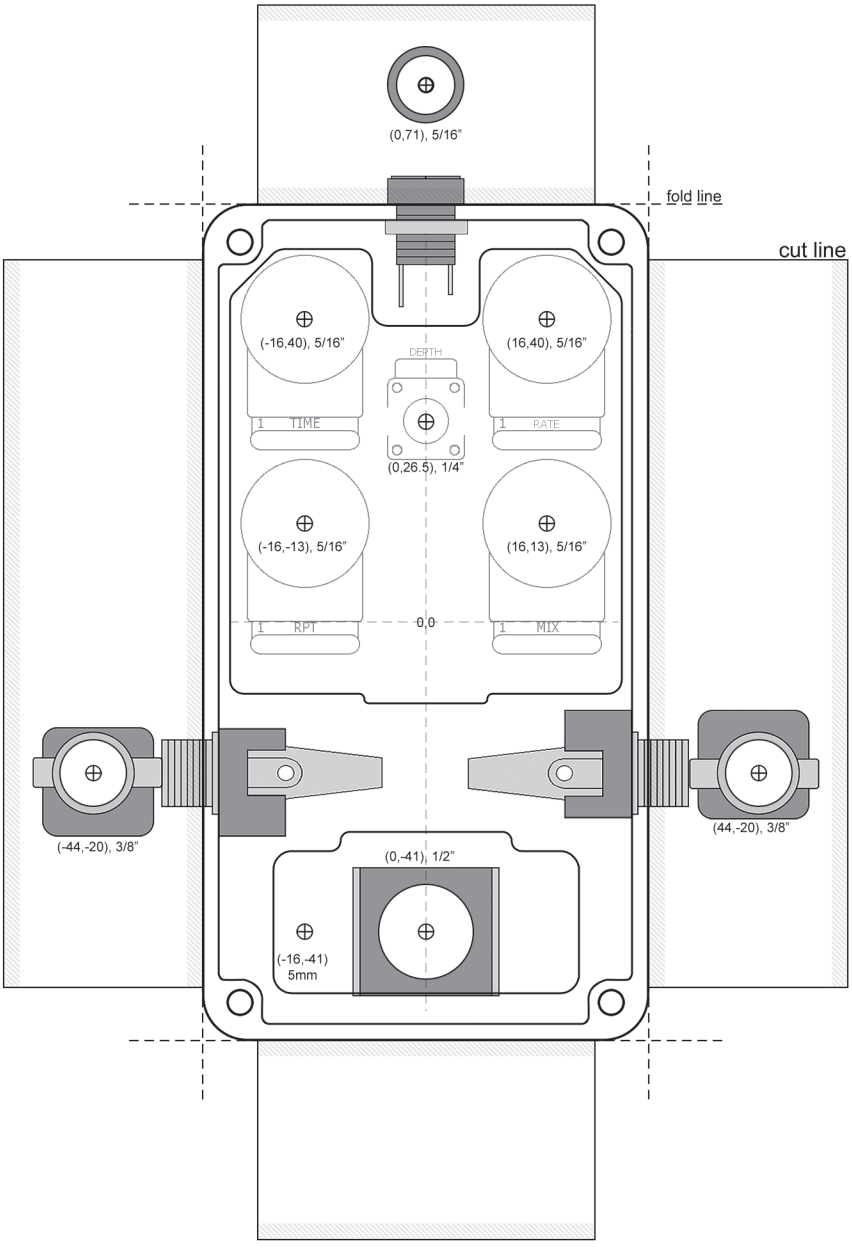
REG	78L05
In	9.21
Gnd	0
Out	5.69

9.52vDC One Spot supply
Current Draw: ~22mA

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

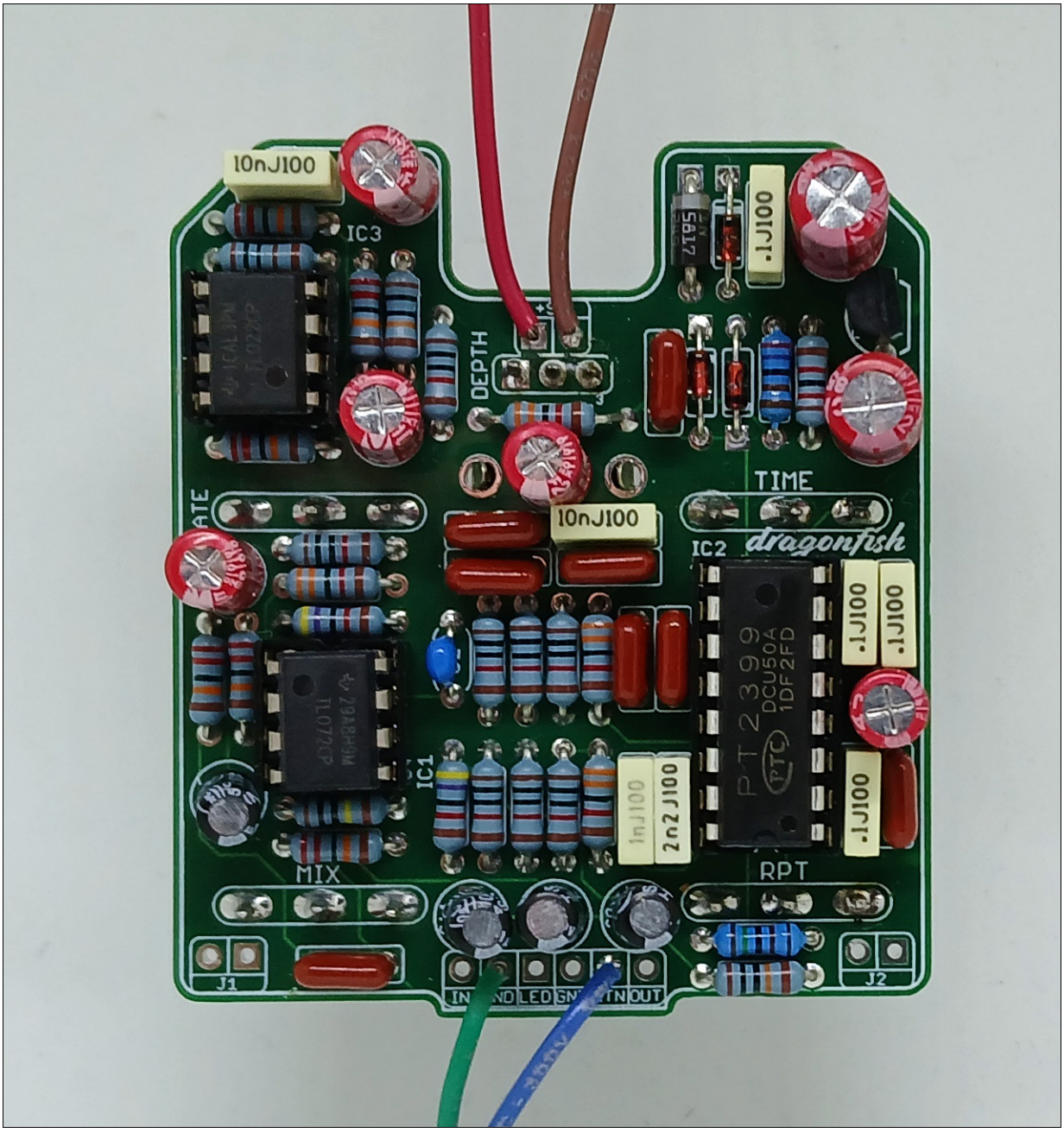


Hardware

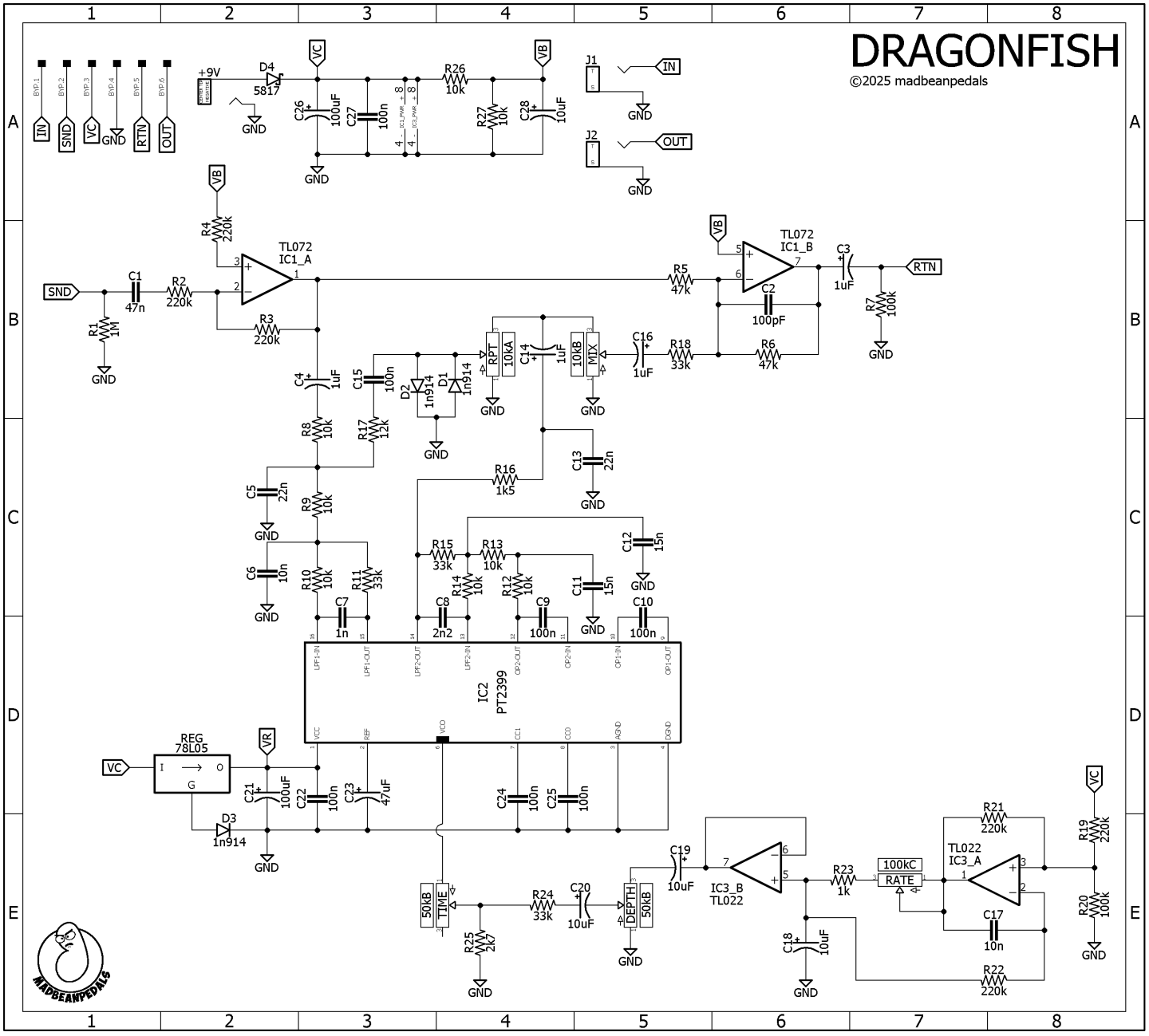
1590B enclosure
16mm pots
Lumberg 1/4” Compact mono jacks
Slim 2.1mm DC jack
Standard 3PDT footswitch
5mm LED

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

Build Pic


10nJ100
IC3
DEPTH
.1J100
S8J7
TIME
10nJ100
IC2
dragonfish
PT2399
DCU50A
1DF2FD
.1J100
.1J100
.1J100
IC1
1nJ100
2n2J100
MIX
RPT
J1
J2
IN
GND
LED
GND
TIN
OUT

Schematic


DRAGONFISH
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TL072 IC1_A
TL072 IC1_B
TL022 IC3_A
IC3_B TL022
IC2 PT2399
REG 78L05
5817
1n914
1n914
SND
RTN
IN
OUT
VC
VB
VR
GND
+9V
RPT 10kA
MIX 10kB
TIME 50kB
DEPTH 50kB
RATE 100kC
R1 1M
R2 220k
R3 220k
R4 220k
R5 47k
R6 47k
R7 100k
R8 10k
R9 10k
R10 10k
R11 33k
R12 10k
R13 10k
R14 10k
R15 33k
R16 1k5
R17 12k
R18 33k
R19 220k
R20 100k
R21 220k
R22 220k
R23 1k
R24 33k
R25 2k7
C1 47n
C2 100pF
C3 1uF
C4 1uF
C5 22n
C6 10n
C7 1n
C8 2n2
C9 100n
C10 100n
C11 15n
C12 15n
C13 22n
C14 1uF
C15 100n
C16 1uF
C17 10n
C18 10uF
C19 10uF
C20 10uF
C21 100uF
C22 100n
C23 47uF
C24 100n
C25 100n
C26 100uF
C27 100n
C28 10uF
J1
J2
MADBEANPEDALS