

# BallastJr

FX Type: **CHORUS**

Build Level: Intermediate

Based On: Little Angel Chorus

Last Updated: April 24, 2024 8:33 AM

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## Overview

If you've built frequencycentral's [Little Angel chorus](#) then the **Ballast JR** will seem very familiar. The basic idea is to utilize our very cheap friend, the PT2399, as a substitute for the more traditional BBD-based analog chorus effects. The Little Angel is designed so that the PT2399 is set for the shortest delay it can produce (using a little timer sub-circuit to prevent the PT2399 from locking up), then its internal reference voltage is modulated with an LFO. This serves as the substitution for how a BBD clock is modulated in traditional chorus. It keeps the parts count low and eliminates any need for calibration. Pretty neat!

The Ballast JR takes the basic idea behind the Little Angel, but substitutes the analog dry-through of a PT2399 style delay. It also adds a MIX control to blend between chorus and vibrato, which is something not available in the Little Angel.

Overall, this is a very pleasant modulator. Perhaps not quite as lush or mojo-ed up as a traditional chorus, but it is easy and cheap to build.

## Controls

- **RATE, DEPTH:** The modulation controls.
- **LEVEL:** Total effect output.
- **MIX:** 0 - dry signal only, 50% - chorus (equal wet and dry), 100% - vibrato (wet only).

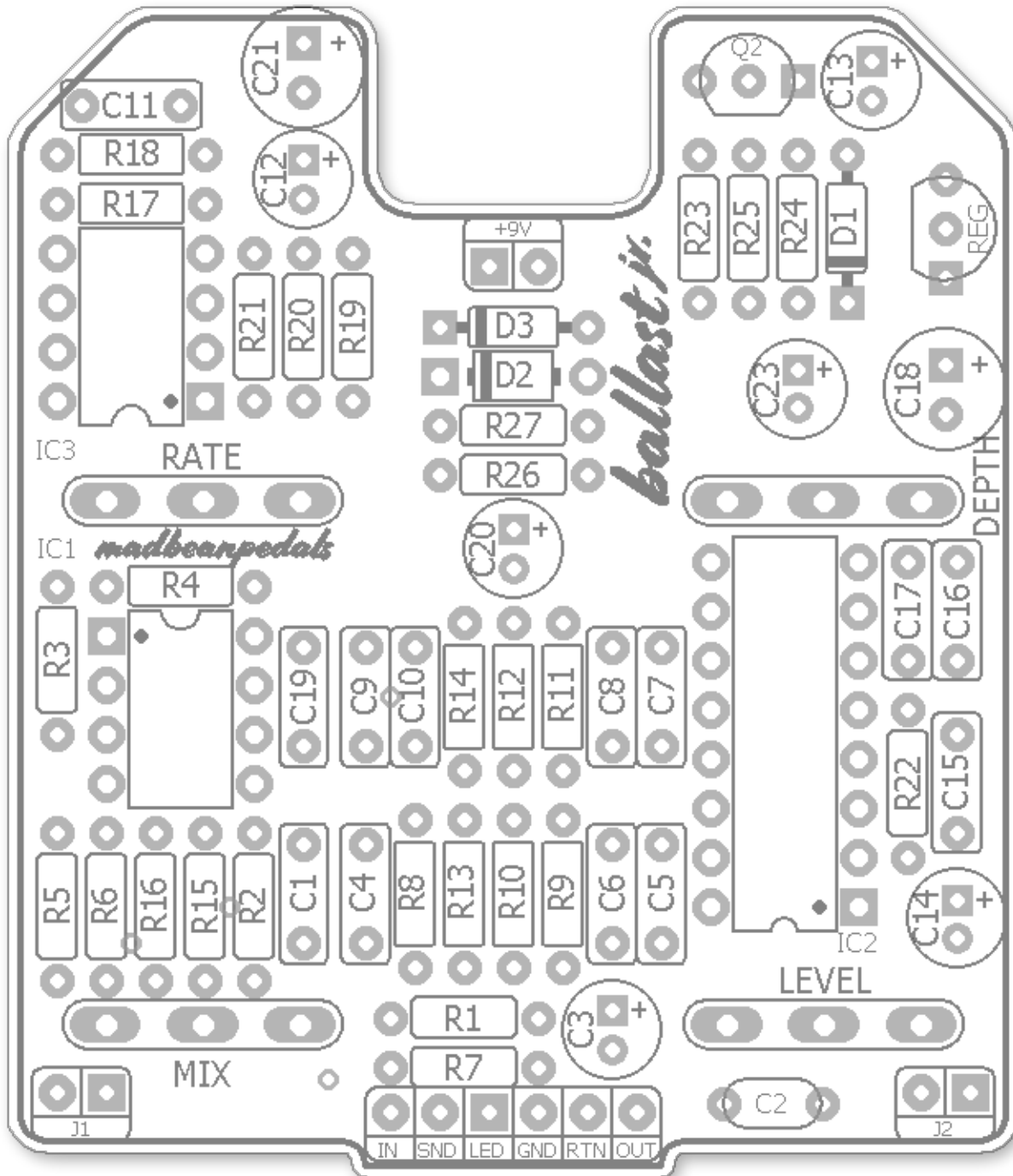
Further study: <https://www.diystompboxes.com/smfforum/index.php?topic=86297.0>

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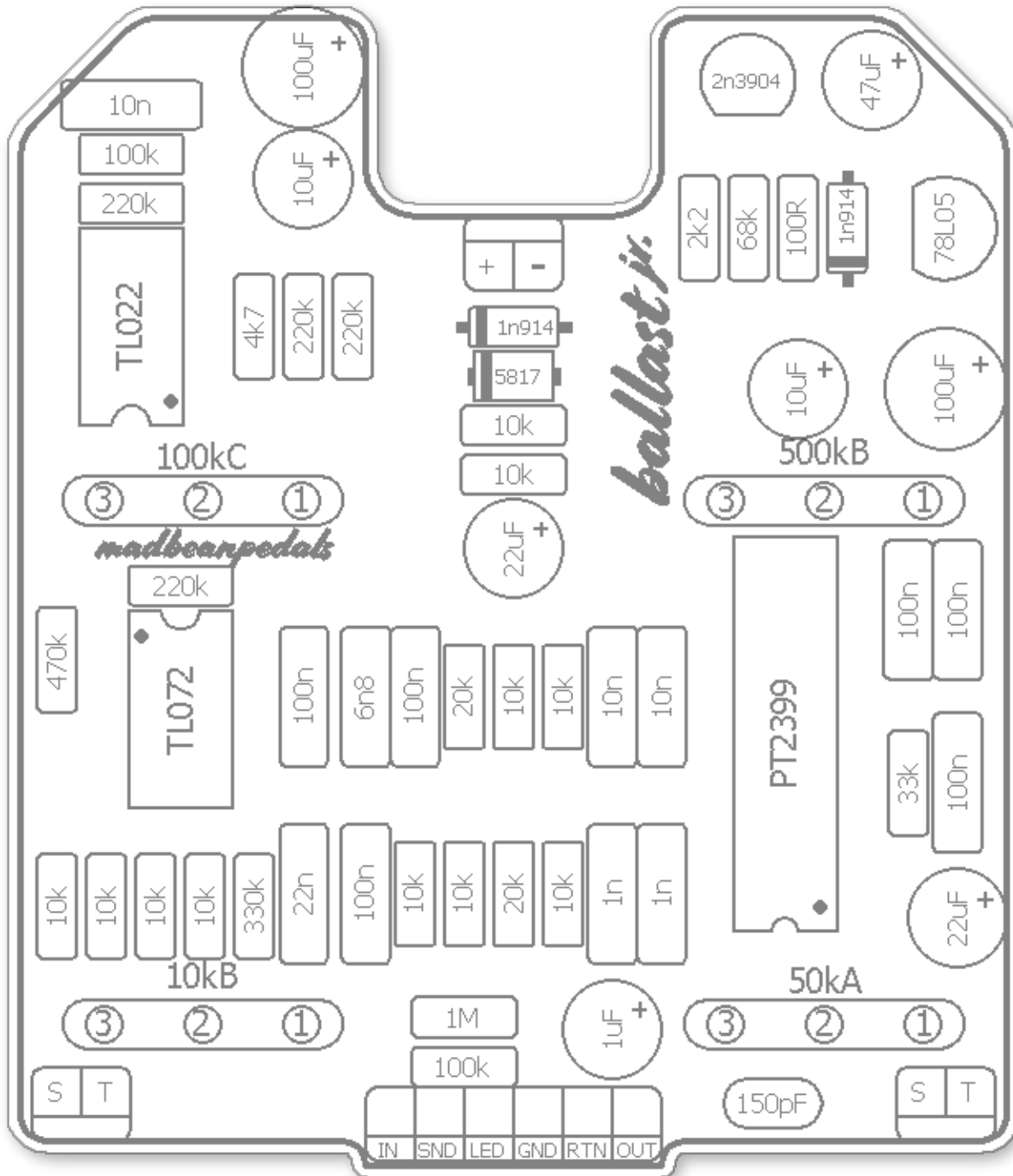
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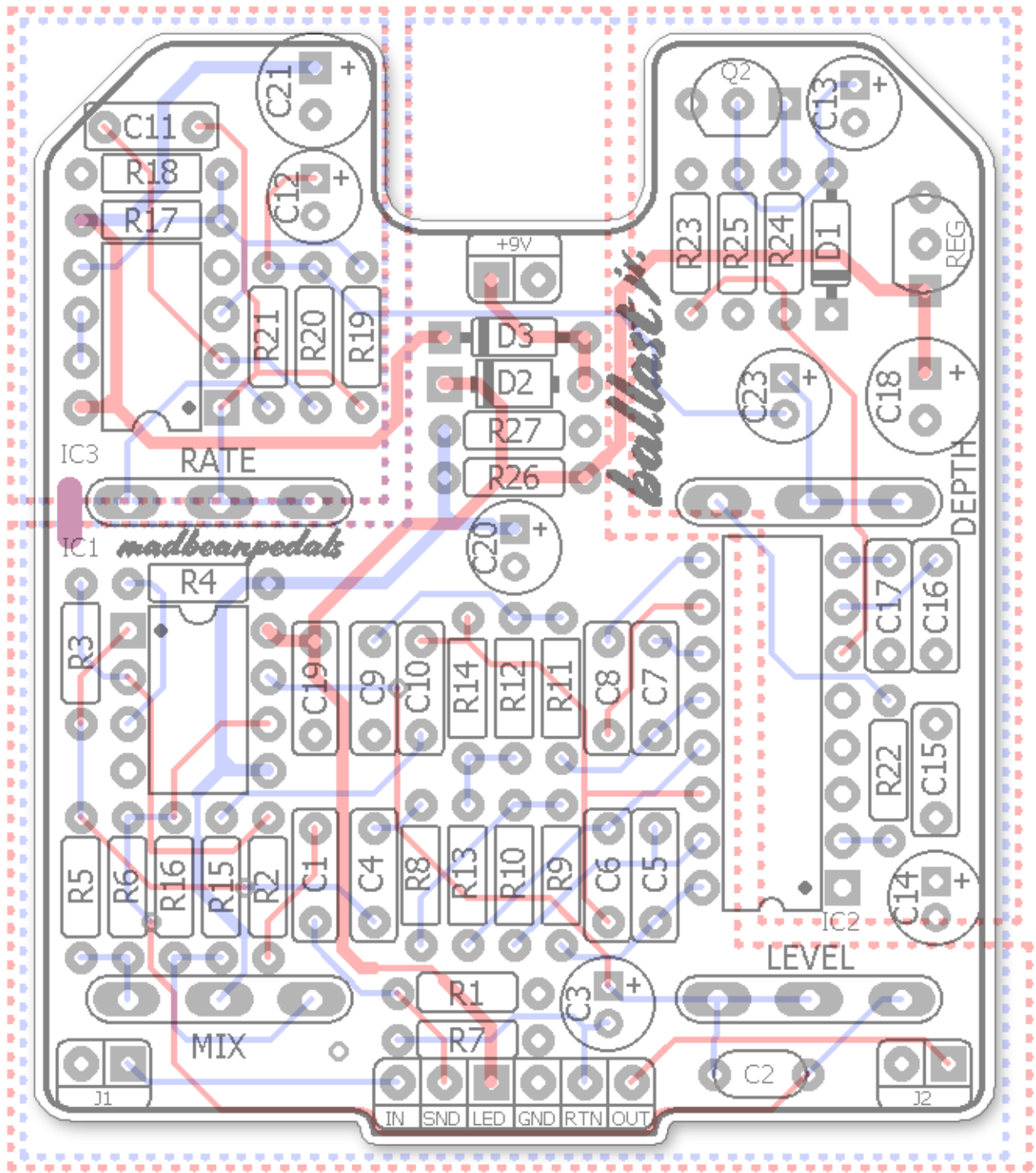
# Parts Layout



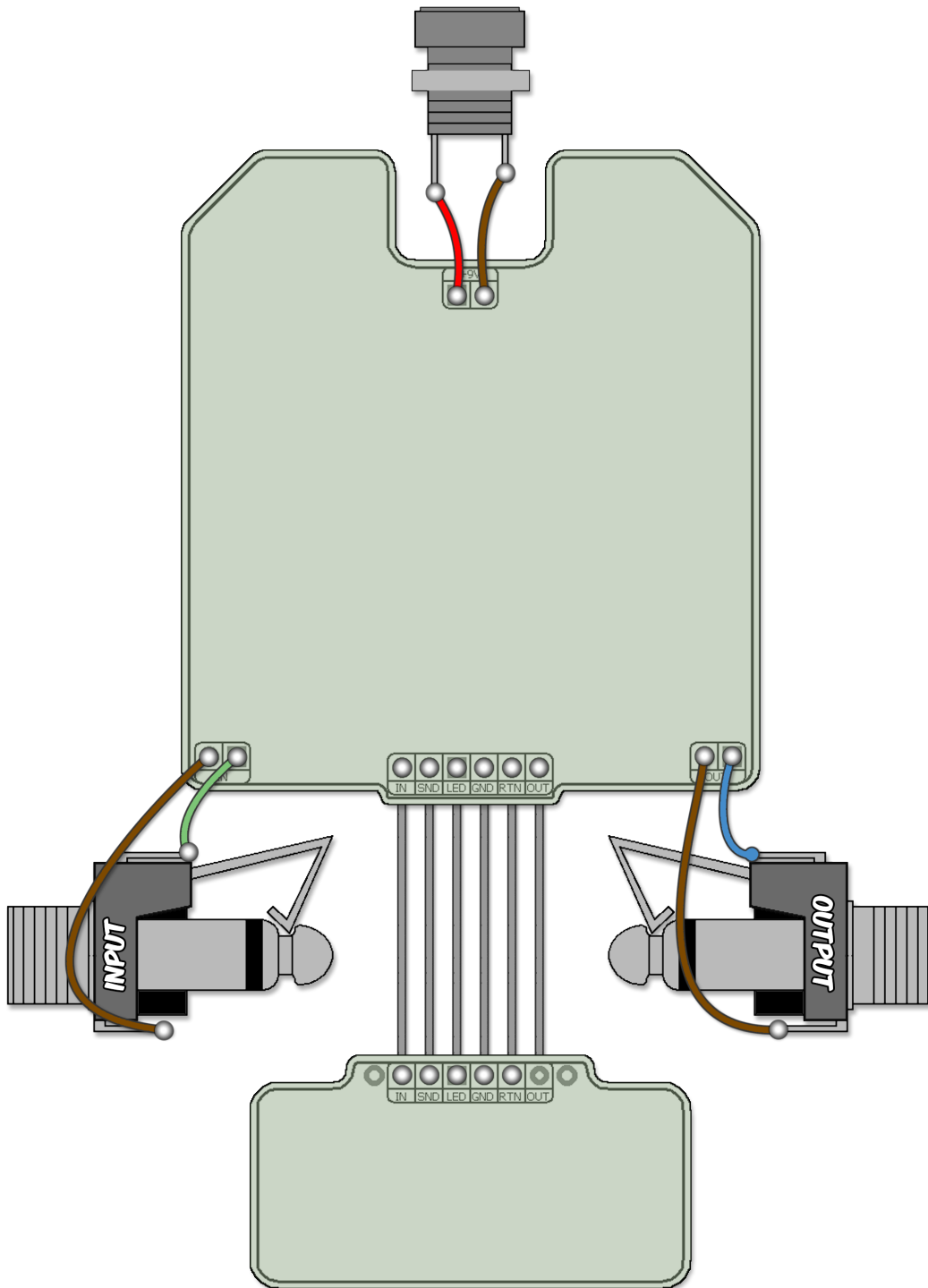
## Component Values



# 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	22n	D1	1n914
R2	330k	C2	150pF	D2	1n5817
R3	470k	C3	1uF	D3	1n914
R4	220k	C4	100n	Transistors	
R5	10k	C5	1n	Q2	2n3904
R6	10k	C6	1n	Regulators	
R7	100k	C7	10n	REG	78L05
R8	10k	C8	10n	IC	
R9	10k	C9	6n8	IC1	TL072
R10	20k	C10	100n	IC2	PT2399
R11	10k	C11	10n	IC3	TL022
R12	10k	C12	10uF	Pots	
R13	10k	C13	47uF	MIX	10kB
R14	20k	C14	22uF	LEVEL	50kA
R15	10k	C15	100n	RATE	100kC
R16	10k	C16	100n	DEPTH	500kB
R17	220k	C17	100n		
R18	100k	C18	100uF		
R19	220k	C19	100n		
R20	220k	C20	22uF		
R21	4k7	C21	100uF		
R22	33k	C23	10uF		
R23	2k2				
R24	100R				
R25	68k				
R26	10k				
R27	10k				

## Shopping List

Value	QTY	Type	Rating
100R	1	Carbon or Metal Film	1/4W
2k2	1	Carbon or Metal Film	1/4W
4k7	1	Carbon or Metal Film	1/4W
10k	11	Carbon or Metal Film	1/4W
20k	2	Carbon or Metal Film	1/4W
68k	1	Carbon or Metal Film	1/4W
100k	2	Carbon or Metal Film	1/4W
220k	4	Carbon or Metal Film	1/4W
330k	1	Carbon or Metal Film	1/4W
33k	1	Carbon or Metal Film	1/4W
1M	1	Carbon or Metal Film	1/4W
150pF	1	Ceramic or MLCC	16v min.
1n	2	Film	16v min.
6n8	1	Film	16v min.
10n	3	Film	16v min.
22n	1	Film	16v min.
100n	6	Film	16v min.
1uF	1	Film	16v min.
10uF	2	Film	16v min.
22uF	2	Film	16v min.
47uF	1	Film	16v min.
100uF	2	Film	16v min.
1n5817	1		
1n914	2		
2n3904	1		
78L05	1		
TL072	1		
PT2399	1		
TL022	1		
10kB	1	PCB Right Angle	16mm
50kA	1	PCB Right Angle	16mm
100kC	1	PCB Right Angle	16mm
500kB	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 pretty compact layout so take your time. I suggest waiting to solder C2 until after you've soldered in the LEVEL pot. It will make navigating the soldering iron easier.
- The tone of the Ballast JR is moderately bright. If you want a very bright chorus, reduce (or omit) the value of C8. If you like a darker sounding chorus, increase C8. I suggest 15n or 22n.
- You can change the max speed of the Rate control by changing the value of R21. Lower values will increase the max speed, larger values will reduce max speed. Note: too small a value may cause the LFO to lock up. Try 2k2 or 1k5 and you might get some wild ring mod type tones.



## Circuit Voltages

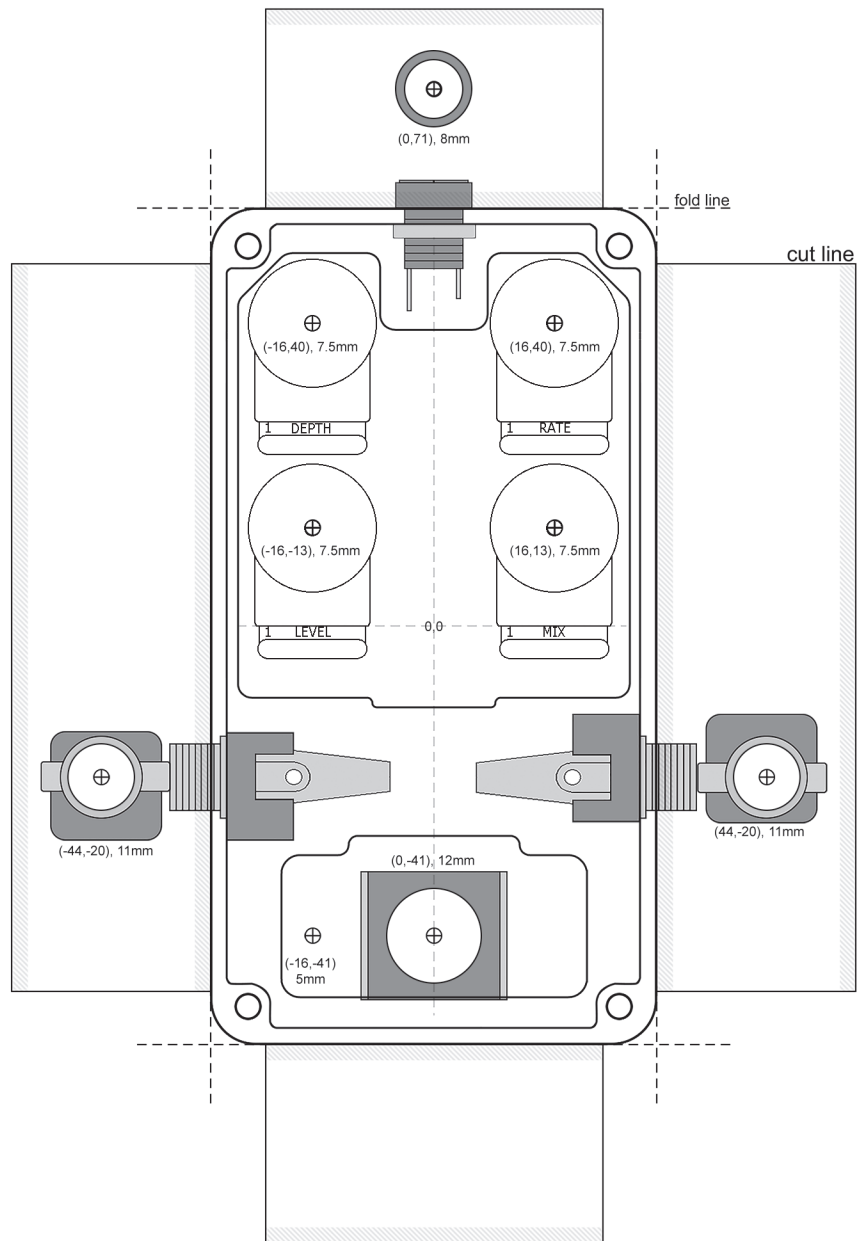
IC1	TL072	IC2	PT2399	IC3	TL022
1	4.60	1	5.03	1	varies
2	4.73	2	~2.5	2	varies
3	4.48	3	0	3	varies
4	0.00	4	0	4	0.00
5	4.59	5	2.73	5	varies
6	4.60	6	0.8	6	varies
7	4.60	7	0.97	7	varies
8	9.19	8	0.99	8	8.94
<b>REG</b>	<b>78L05</b>	9	2.51		
I	9.19	10	2.52		
G	0.00	11	2.51		
O	5.03	12	2.52		
<b>Q2</b>	<b>2n3904</b>	13	2.51		
C	165mV	14	2.52		
B	700mV	15	2.52		
E	0.00	16	2.52		

9.44vDC One Spot supply  
 Current Draw: ~33mA  
 Knobs @ 50%

## 1590B Drill Template

Coordinates are denoted in (X,Y), drill size format starting from the center (0,0) location of the enclosure. If you are drilling your own enclosure, use the closest sized drill bit using imperial measurements.

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

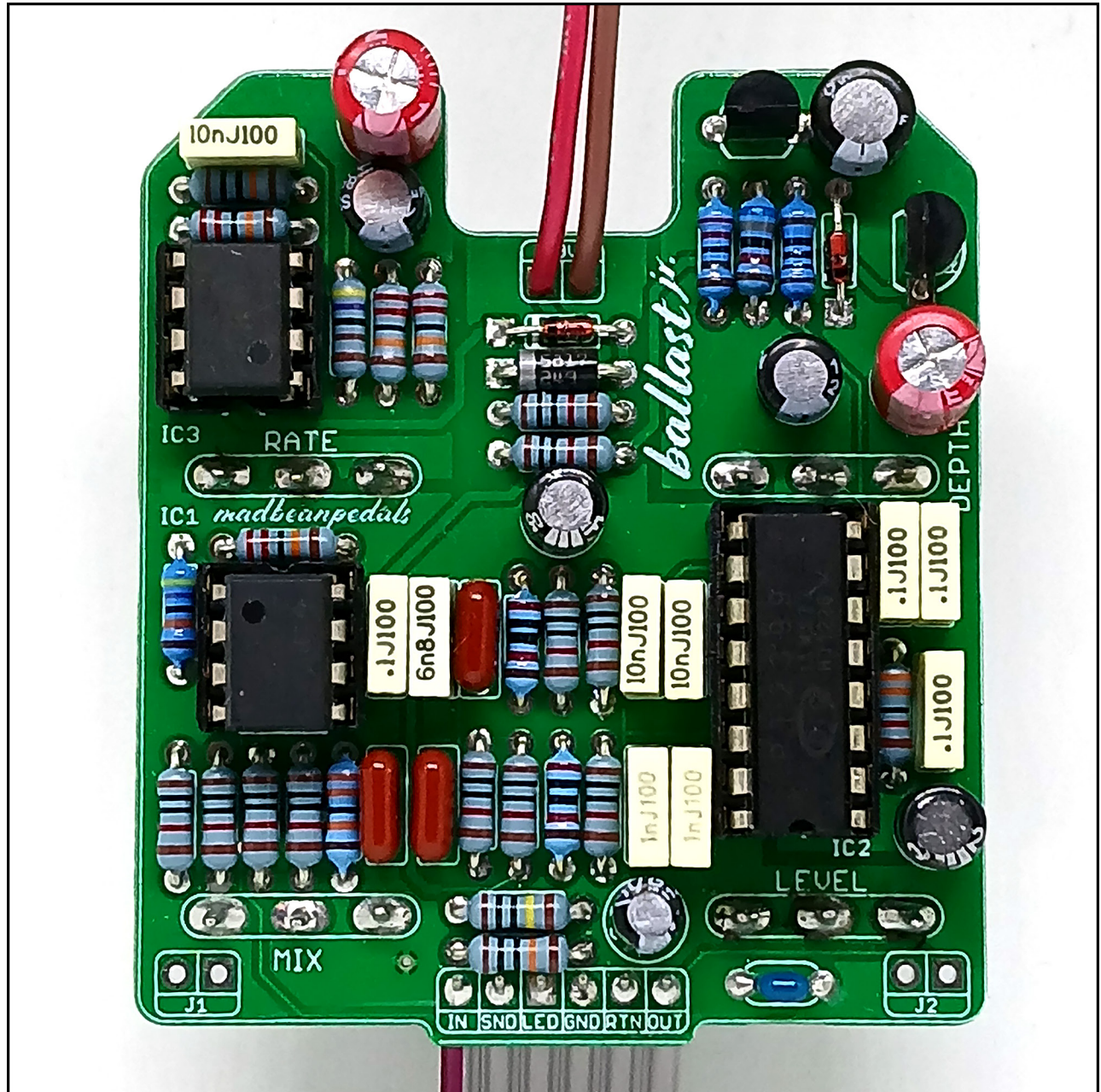


### Hardware

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



# Schematic

