SPARKLEHORN 2014

FX Type: OD/Delay Hybrid

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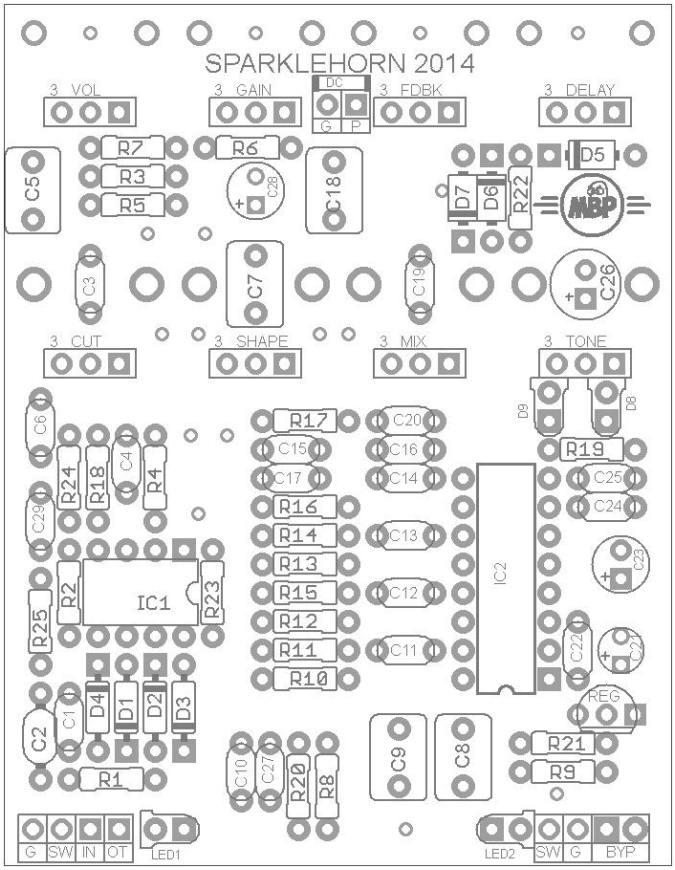
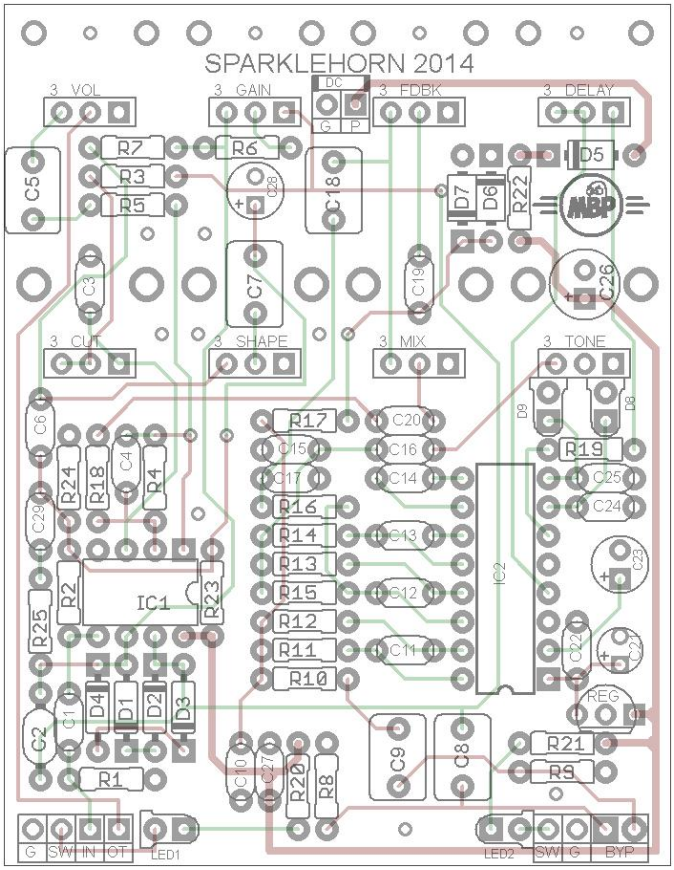
2.325” W x 3.0” H





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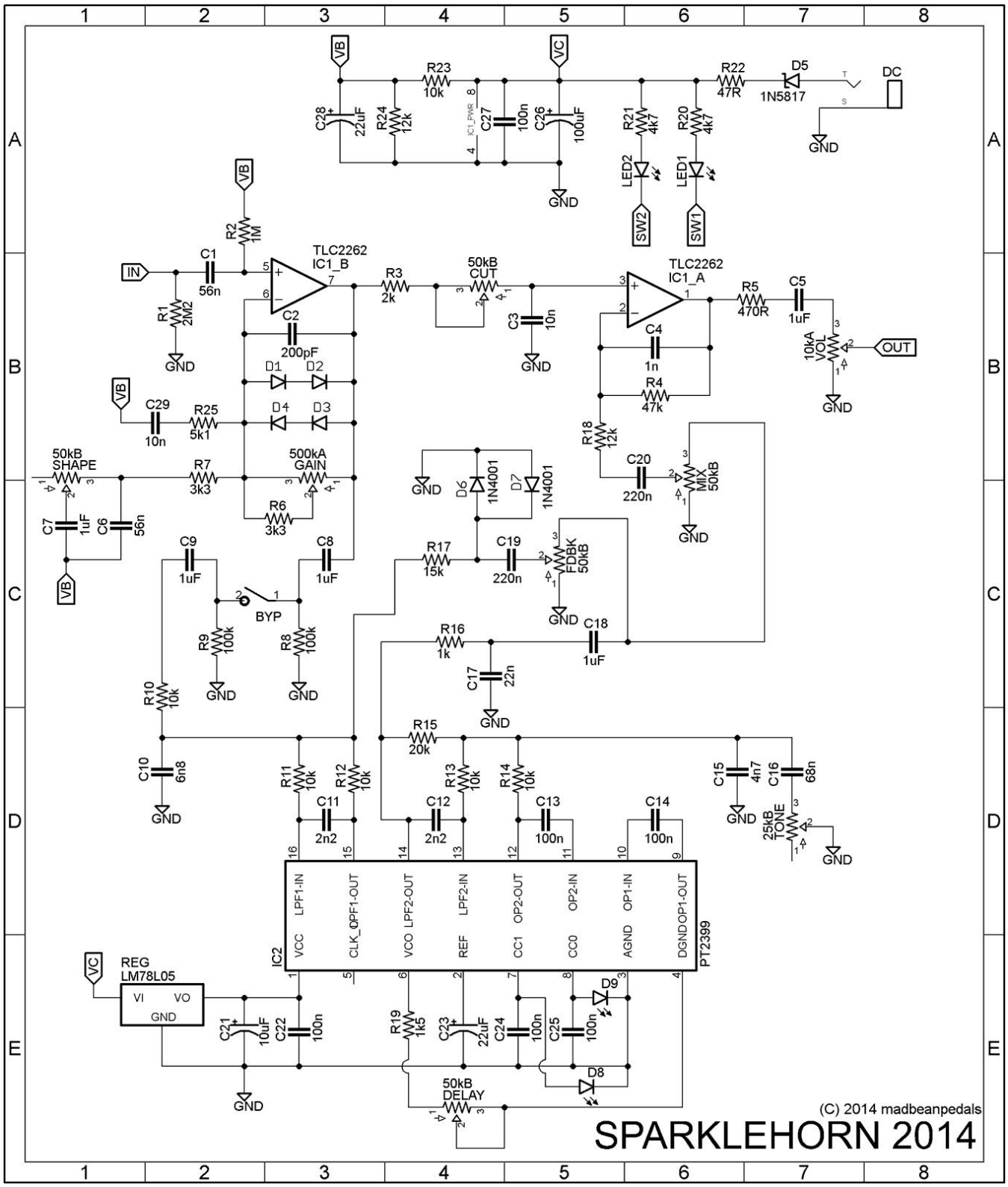
B.O.M.					
Resistors		Caps		Diodes	
R1	2M2	C1	56n	D1 - D4	1n914
R2	1M	C2	200pF	D5	1N5817
R3	2k	C3	10n	D8	RED 3MM
R4	47k	C4	1n	ICs	
R5	470R	C5	1uF	IC1	TLC2262
R6	3k3	C6	56n	IC2	PT2399
R7	3k3	C7	1uF	Regulator	
R8	100k	C8	1uF	REG	LM78L05
R9	100k	C9	1uF	Pots	
R10	10k	C10	6n8	CUT	50kB
R11	10k	C11	2n2	DELAY	50kB
R12	10k	C12	2n2	FDBK	50kB
R13	10k	C13	100n	GAIN	500kA
R14	10k	C14	100n	MIX	50kB
R15	20k	C15	4n7	SHAPE	50kB
R16	1k	C16	68n	TONE	25kB
R17	15k	C17	22n	VOL	10kA
R18	12k	C18	1uF		
R19	1k5	C19	220n		
R20	4k7	C20	220n		
R21	4k7	C21	10uF		
R22	47R	C22	100n		
R23	10k	C23	22uF		
R24	12k	C24	100n		
R25	5k1	C25	100n		
		C26	100uF		
		C27	100n		
		C28	22uF		
		C29	10n		

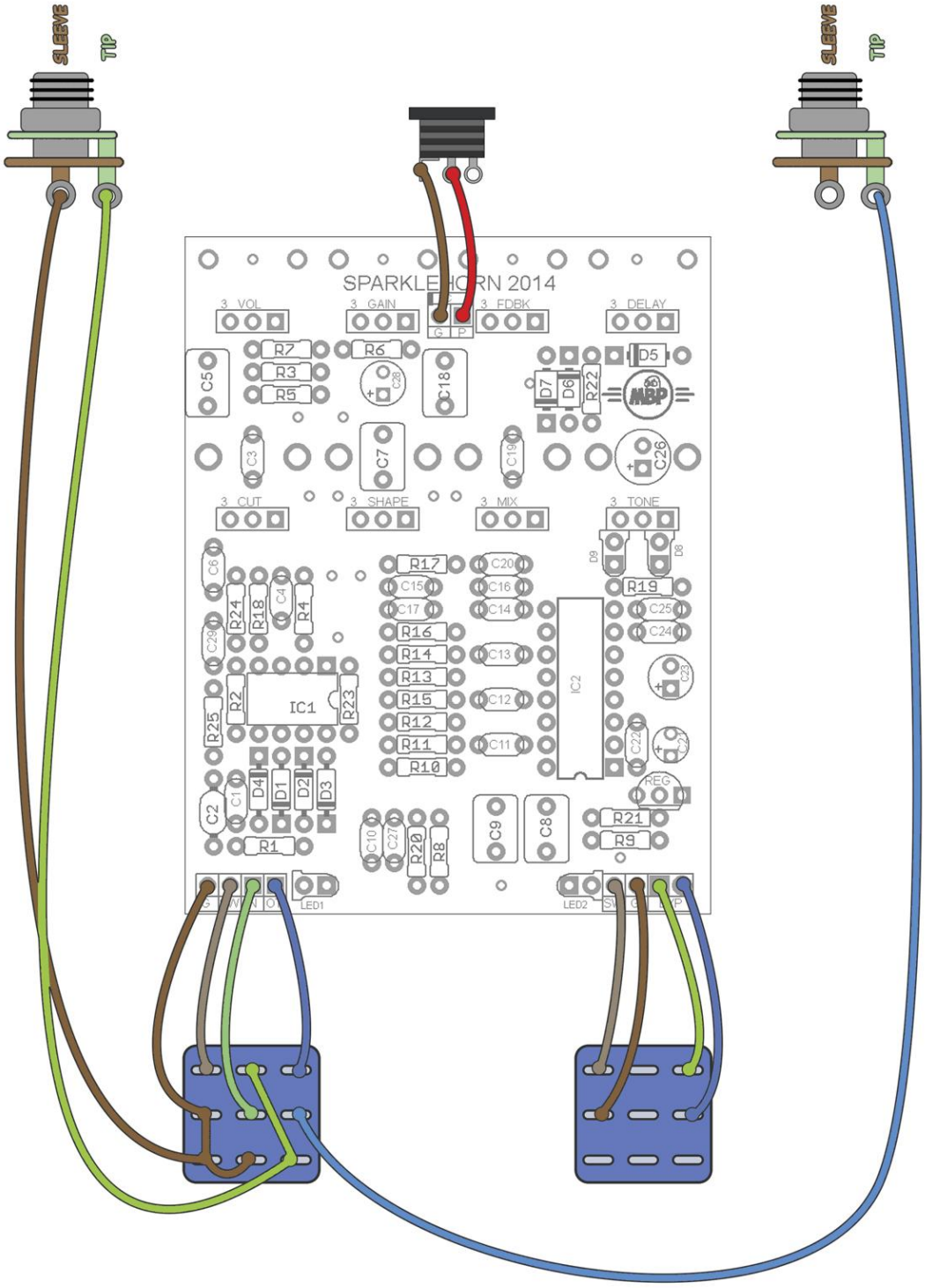
Shopping List			
Value	QTY	Type	Rating
47R	1	Metal / Carbon Film	1/4W
470R	1	Metal / Carbon Film	1/4W
1k	1	Metal / Carbon Film	1/4W
1k5	1	Metal / Carbon Film	1/4W
2k	1	Metal / Carbon Film	1/4W
3k3	2	Metal / Carbon Film	1/4W
4k7	2	Metal / Carbon Film	1/4W
5k1	1	Metal / Carbon Film	1/4W
10k	6	Metal / Carbon Film	1/4W
12k	2	Metal / Carbon Film	1/4W
15k	1	Metal / Carbon Film	1/4W
20k	1	Metal / Carbon Film	1/4W
47k	1	Metal / Carbon Film	1/4W
100k	2	Metal / Carbon Film	1/4W
1M	1	Metal / Carbon Film	1/4W
2M2	1	Metal / Carbon Film	1/4W
200pF	1	Silver Mica	16v min.
1n	1	Film	16v min.
2n2	2	Film	16v min.
4n7	1	Film	16v min.
6n8	1	Film	16v min.
10n	2	Film	16v min.
22n	1	Film	16v min.
56n	2	Film	16v min.
68n	1	Film	16v min.
100n	6	Film	16v min.
220n	2	Film	16v min.
1uF	5	Film	16v min.
10uF	1	Electrolytic	16v min.
22uF	2	Electrolytic	16v min.
100uF	1	Electrolytic	16v min.
1n914	4		
1N5817	1		
LED	1	3mm red diffused	
TLC2262	1		
PT2399	1		
LM78L05	1	T0-92 style	
50kB	2	9mm Right Angle	Metal Shaft
10kA	1	9mm Right Angle	Metal Shaft
50kB	3	9mm Right Angle	Plastic Shaft
25kB	1	9mm Right Angle	Plastic Shaft

- You can substitute 220pF for the 200pF cap
- You will need two more LED's of your choosing for the effect indicators



D6, D7 and D9 should be omitted from the PCB. They are not necessary.

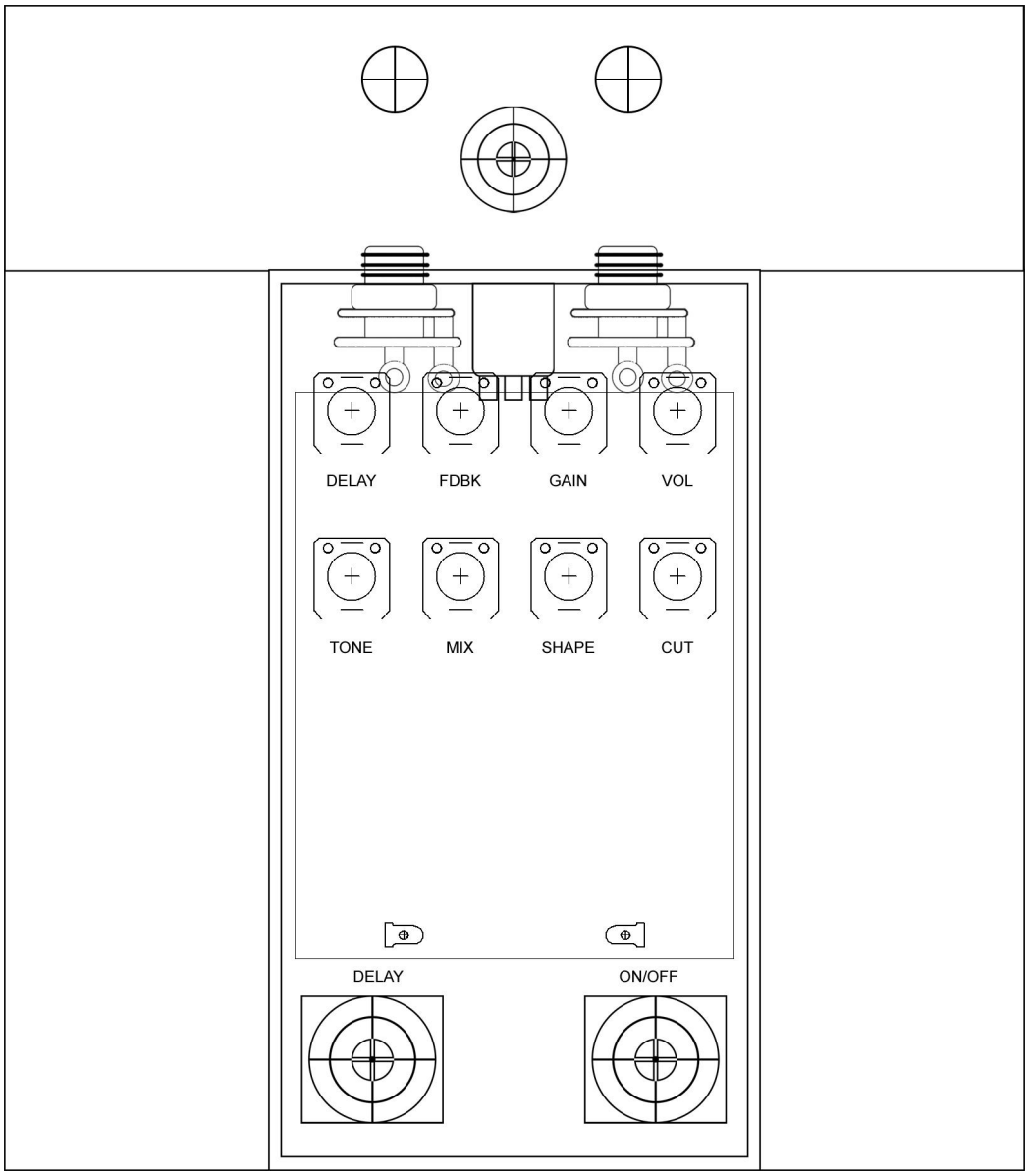
Wiring


SLEEVE
TIP
SLEEVE
TIP
SPARKLEHORN 2014
3_VOL
3_GAIN
3_FDBK
3_DELAY
3_CUT
3_SHAPE
3_MIX
3_TONE
IC1
IC2
LED1
LED2

125B Drilling Diagram

5.41 “W x 6.18 “H

Top-Down view



This template is approximate. Always check before committing to drilling.

Download the Photoshop file used to make this template:

http://www.madbeanpedals.com/projects/Sparklehorn/Sparklehorn_Drill.zip

You should use open-frame metal jacks for the input and output. A “Lumberg” style DC jack is recommended for the smaller footprint and because a battery is not used.

The **Sparklehorn 2014** project is a hybrid effect that combines overdrive and delay into a single design. This is not a 2-in-1 design even though it uses two footswitches. While the overdrive can be used on its own, the delay cannot. Instead, the delay is set-up for a "tails" type bypass, meaning that when the delay switch is turned off the repeats will "spillover" rather than end abruptly.

The overdrive section is inspired by the Timmy with a few key changes for tone shaping and to make it work with the delay. The delay section is a pretty standard PT2399 setup with an additional tone control. This means that the tone of the overdrive and delay can be adjusted independently, although they will have some interaction. The delay section also makes use of midwayfair's excellent PT2399 diode limiting mod (D8) as featured on his "Hamlet" delay.

Controls

- Each effect has four controls: two on the top row and two on the bottom.
- The top row of controls is set up for Alpha 9mm PC mount right angle pots http://www.smallbearelec.com/servlet/Detail?no=1139
- The bottom row uses the same pots, but with the plastic shafts http://www.smallbearelec.com/servlet/Detail?no=1277
- The top four controls require knobs (no more than ½" in diameter). The bottom row of pots does not require knobs. These are adjusted directly with the plastic shafts.

Delay Controls

DELAY: The total delay time from shortest (a few ms) to longest (about 600ms).
FDBK: The amount of signal fed back into the delay input for repeats.
MIX: The volume of the delayed signal.
TONE: The amount of filtering on the delayed signal. Full left is neutral, and full right is heavily filtered.

Overdrive Controls

GAIN: The total amount of distortion from least to greatest.
VOL: The total output of both the overdrive and delay effect.
SHAPE: The clipping frequency of the gain control. Higher settings clip *more* bass (this is the opposite of the Timmy™).
CUT: A tone cut for the overdrive. Higher settings reduce the amount of treble in the OD signal.

Notes

The TLC2262 is recommended for this build, although other ICs will work. The 2262 seems to offer the best dynamic range vs. power consumption and noise. I also tried several others with success: the 4558, 4580D and OPA2604.

Get your PT2399 from a known source. There are a lot of cheap PT2399s on eBay and from some online suppliers. These can be problematic due to inconsistencies in manufacturing and the prevalence of counterfeits. Even though it tends to be more expensive, I have found the ones smallbear carries to be the best choice. Some of the ones I have bought on eBay and from Tayda have noise problems and whine at high delay times. YMMV.

The behavior of the FDBK control is dependent on the TONE control to a degree. When the TONE control is down, the FDBK pot will go into self-oscillation at around 2/3rd up. When the TONE control is set up for filtered repeats, the point of self-oscillation on the FDBK control will move forward (around ½ up). To tweak this, you can increase the value of R17 to either 18k or 20k.

If you prefer to have a one footswitch setup (meaning the delay and overdrive are always on together):

1. Wire the bypass switch as shown in the wiring diagram.
2. Jumper the two BYP pads on the right side of the PCB.
3. Leave off the LED indicator on the right side (LED2).
4. Populate C9, but jumper C8. Omit R21, R8 and R9.

Voltages (DC) from a 9.3v supply

IC1

1 – 4.57
2 – 4.57
3 – 4.57
4 – 0.0
5 – 4.13
6 – 4.58
7 – 4.57
8 – 8.38

IC2

1 – 4.99
2 – 2.91
3 – 0.0
4 – 24mV
5 – 2.86
6 – 2.51
7 – 0.71
8 – 0.72
9 – 2.51
10 – 2.51
11 – 2.51
12 – 2.51
13 – 2.51
14 – 2.52
15 – 2.51
16 – 2.51