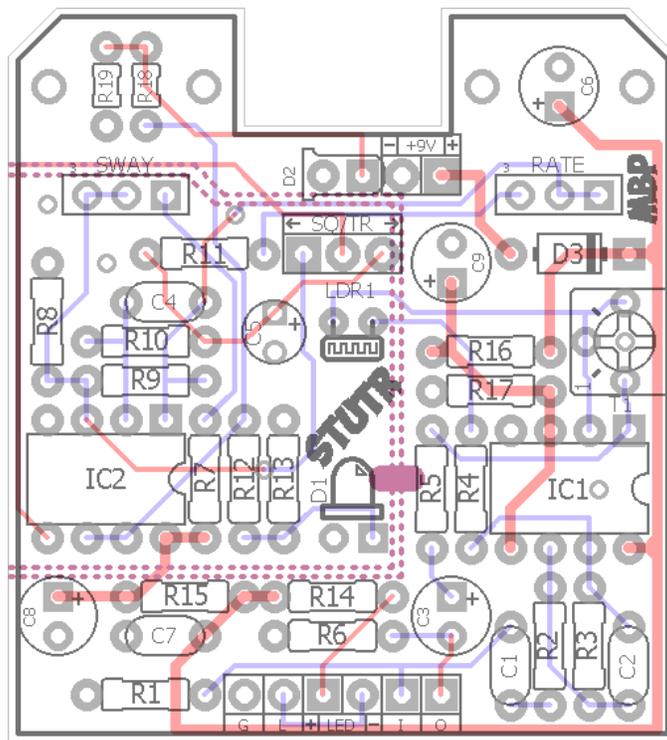
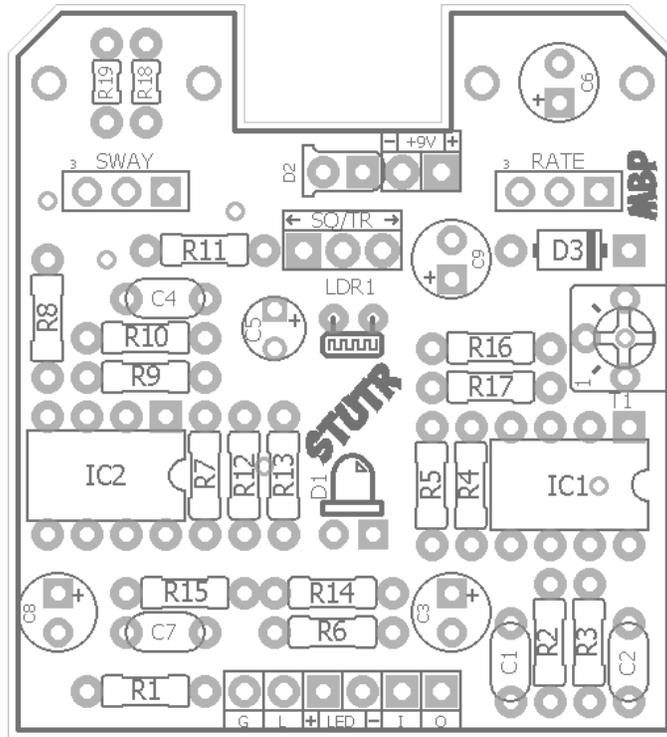


STUTR

FX TYPE: Tremolo
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1.7" W x 1.875" H



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B.O.M.					
Resistors		Caps		Diodes	
R1	1M	C1	100n	D2	LED
R2	1M	C2	10pF	D3	1N5817
R3	1M	C3	4u7	IC's	
R4	100R	C4	10n	IC1	TL072
R5	1k	C5	1uF	IC2	TL062
R6	100k	C6	47uF	Optocoupler	
R7	220k	C7	100n	LDR1	NSL-32
R8	470k	C8	10uF	D1	
R9	220k	C9	10uF	Switch	
R10	220k			SQ/TR	SPDT
R11	6k8			Trimmer	
R12	1k			T1	5k
R13	1k			Pots	
R14	4k7			SWAY	500kB
R15	100R			RATE	1MC
R16	100k				
R17	100k				
R18	1k				
R19	1k				

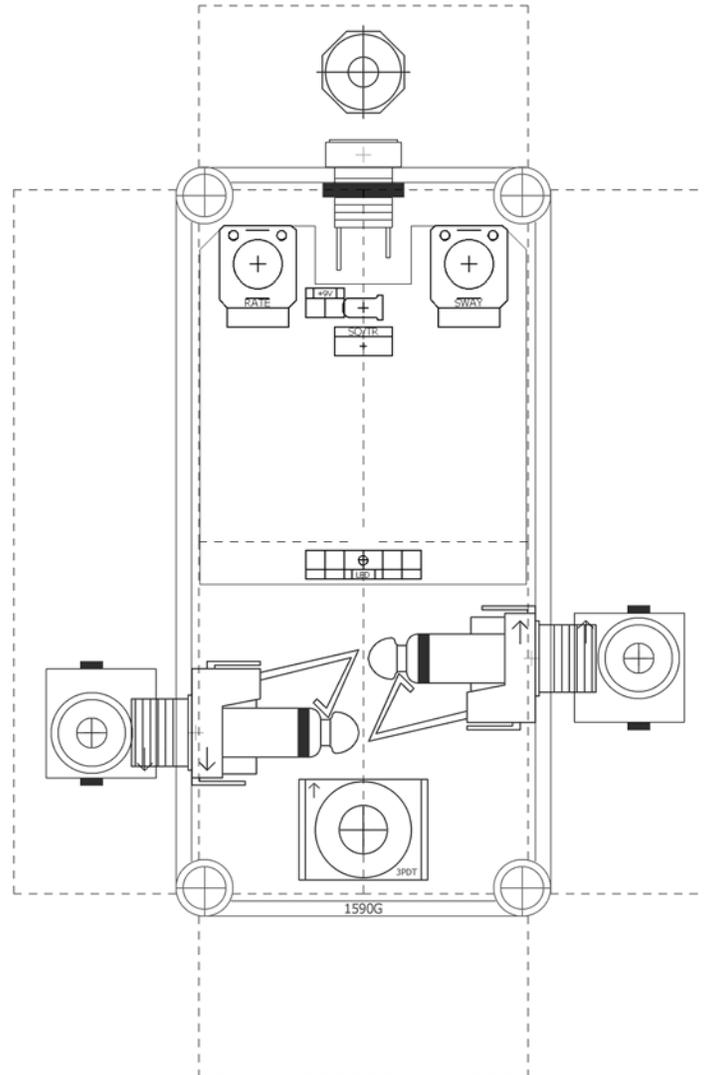
Shopping List				
Value	QTY	Type	Rating	
100R	2	Metal / Carbon Film	1/4W	
1k	5	Metal / Carbon Film	1/4W	
4k7	1	Metal / Carbon Film	1/4W	
6k8	1	Metal / Carbon Film	1/4W	
100k	3	Metal / Carbon Film	1/4W	
220k	3	Metal / Carbon Film	1/4W	
470k	1	Metal / Carbon Film	1/4W	
1M	3	Metal / Carbon Film	1/4W	
10pF	1	Ceramic	16v min.	
10n	1	Film	16v min.	
100n	2	Film	16v min.	
1uF	1	Electrolytic	16v min.	
4u7	1	Electrolytic	16v min.	
10uF	2	Electrolytic	16v min.	
47uF	1	Electrolytic	16v min.	
LED	1	Red, Diffused	3mm	
1N5817	1			
TL072	1			
TL062	1			
NSL-32	1			
SPDT	1	Mini, PCB Mount		
5k	1	Bourns 3362P		
500kB	1	PCB Right Angle, Metal Shaft	9mm	
1MC	1	PCB Right Angle, Metal Shaft	9mm	

NSL-32: <http://smallbear-electronics.mybigcommerce.com/photocoupler-silonex-nsl-32/>

SPDT: <http://smallbear-electronics.mybigcommerce.com/spdt-on-on-mountain-10tc410/>

1590G Drill Guide

3.66"W x 5.63"H



Indicator LED can be mounted directly to the PCB. Drill spot is directly above the “LED” text.
D2 drill spot is directly above the SQ/TR switch.

Overview

Anyone who's built a DIY tremolo in the last decade will recognize the design of the Stutr tremolo. It's based on the popular 4ms Tremulus Lune, a tried and true design. This simple tremolo is incredibly effective and has been used in tons of commercial and DIY designs over the years. So, that's nice.

Controls

Rate: Speed of the tremolo from slow to fast.

Sway: Intensity or "lilt" of the tremolo.

Sq/Tr: This switch chooses between Square and Triangle wave modulation.

T1: Sets the output volume (adjust for unity output).

Notes

The Stutr does not have a Depth control. Rather, the Sway control effectively alters the trem intensity in a slightly different way. This variable resistor changes the bias voltage to the LFO generator to modify the duty cycle into more of a "lilt" *instead* of reducing the peaks and valleys of the LED brightness through increasing resistance. I chose this method simply to offer a different option over the traditional Depth control and like it quite a bit. Hopefully you will too!

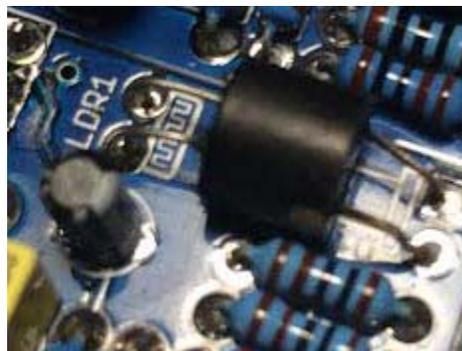
The Sway control is most effective in its middle 2/3rd of rotation. Very slow and fast trem speeds tend to not vary as much with the Sway control. However, within that 2/3rd range you will have plenty of intensity variation.

The NSL-32 is the recommended optocoupler for this project because it is fairly inexpensive and works perfectly. However, you can use other options. The VTL5C3 and its Macron equivalent will work fine. Or, you can roll your own with an LED and LDR of your choosing. If you do not use the NSL-32, *I recommend using a 25k trimmer instead of a 5k*. This is because the "on" resistance of the NSL is incredibly low and a 5k trimmer is sufficient for attaining unity output. Other options may require more resistance (gain recovery) so a 25k is more appropriate.

D2 is an external speed indicator. If you do not wish to use it omit D2, R18 and R19.

The SPDT switch should be soldered directly to the PCB.

One more note on the NSL opto: the "dot" demarcation on the component indicates the CATHODE of the LED, not the ANODE as one might expect. So, you should solder this part in with the marked lead on the negative side of the D1 LED.



Voltages

IC1	V	IC2	V
1	4.56	1	varies
2	4.56	2	varies
3	4.54	3	varies
4	0	4	0
5	4.54	5	varies
6	4.56	6	varies
7	4.56	7	varies
8	9.16	8	8.8

