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QUADROVIBE

FX TYPE: VIBRATO

The **Quadrovibe** is a unique Vibrato/Tremolo design that offers smooth, classic vibrato. Its origins can be found in the Tim Escobedo Wobbletron. Many changes and enhancements were made to the original circuit. These include the addition of an input JFET buffer, an output gain stage, and a switch to select either vibrato or tremolo. Lastly, the original Wobbletron LFO was swapped out for a true Univibe device that drives a miniature incandescent lamp. This is the reason for the Quadrovibe's smoothness and gentle up and down ramp.

Controls

SPEED: Sets the overall rate of the LFO section.
VOL: Sets the amount of gain applied to the output stage.
INT: The intensity knob sets how much vibrato or tremolo is applied to the guitar signal.
SW1: Switches between vibrato and tremolo modes.
T1: This trimpot lets you match the tremolo output with the vibrato so there is no volume jump when switching between modes.
CHOP: This trimpot lets you fine-tune the intensity of the up/down ramp of the lamp.
GAIN: This trimpot sets the brightness of the LFO-driven lamp.

The Quadrovibe requires a charge pump to supply 18v to the lamp! Instructions are included for creating your own charge pump or utilizing the madbeanpedals Road Rage board.

A specific lamp has been designated in the Bill of Materials. It is the JKL 560-8099SB. This lamp is rated at 18v / 26mA. It was chosen for this project due to its size and for the ease of fit into a 1590B. The JKL is about half the size of the more common 7371, 14v lamp (used in many Univibe projects). You are welcome to use the 7371 however the added height of that lamp may prevent you from housing the Quadrovibe in a 1590B enclosure.

Smallbear has kindly agreed to carry the JKL lamp for this project!

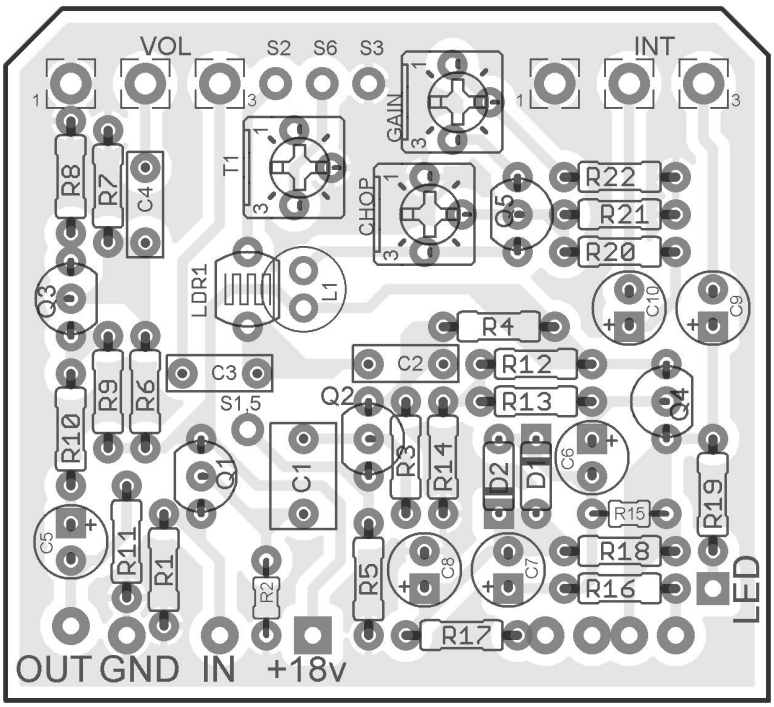
Photocell
9203: http://www.smallbearelec.com/Detail.bok?no=711
NSL-7532 (alternate): http://www.smallbearelec.com/Detail.bok?no=1003

Lamp
JKL 560-8099SB: http://www.smallbearelec.com/Detail.bok?no=1141

100kC Dual Gang Pot
http://www.smallbearelec.com/Detail.bok?no=1032

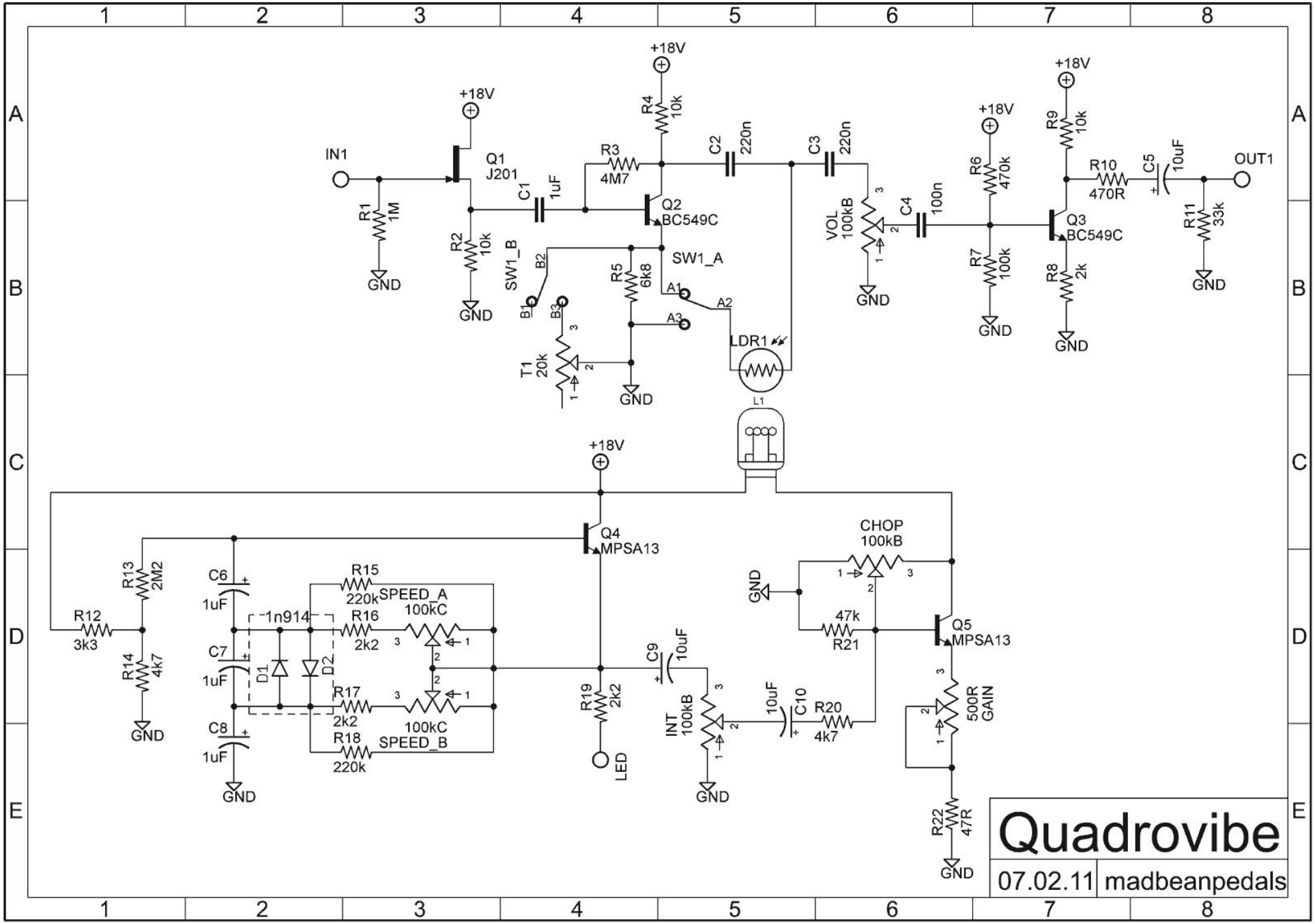
Trimpots
http://www.smallbearelec.com/Detail.bok?no=1101
Bourns 3362P (alternate): http://www.mouser.com/Passive-Components/Trimmer-Resistors/Trimmer-Resistors-Single-Turn/_/N-76qcw?Keyword=bourns+3362P&FS=True

Layout Diagram



Bill of Materials

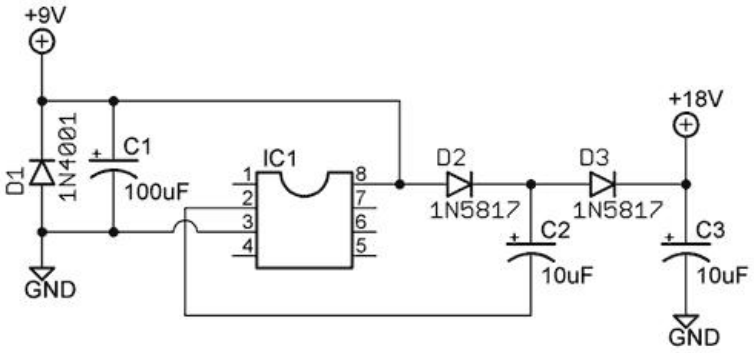
Resistors		Caps		Trimpots	
R1	1M	C1	1uF	T1	20k
R2	10k	C2	220n	CHOP	100k
R3	4M7	C3	220n	GAIN	500R
R4	10k	C4	100n	**Pots**	
R5	6k8	C5	10uF	SPEED	Dual 100kC
R6	470k	C6	1uF	VOL	100kB
R7	100k	C7	1uF	INT	100kB
R8	2k	C8	1uF		
R9	10k	C9	10uF	**Charge Pump**	
R10	470R	C10	10uF	D1	1N4001
R11	33k	**Diodes**		D2, D3	1N5817
R12	3k3	D1, D2	1n914	C1	100uF
R13	2M2	**Transistors**		C2, C3	10uF
R14	4k7	Q1	J201	IC	LT1054
R15	220k	Q2, Q3	BC549C		
R16	2k2	Q4, Q5	MPSA13		
R17	2k2	**Lamp**			
R18	220k	L1	560-8099SB		
R19	2k2	LDR1	9203		
R20	4k7	**Switch**			
R21	47k	SW1	DPDT		
R22	47R				


Quadrovibe
07.02.11
madbeanpedals
IN1
OUT1
+18V
GND
Q1
J201
Q2
BC549C
Q3
BC549C
Q4
MPSA13
Q5
MPSA13
R1 1M
R2 10k
R3 4M7
R4 10k
R5 6k8
R6 470k
R7 100k
R8 2k
R9 10k
R10 470R
R11 33k
R12 3k3
R13 2M2
R14 4k7
R15 220k
R16 2k2
R17 2k2
R18 220k
R19 2k2
R20 4k7
R21 47k
R22 47R
C1 1uF
C2 220n
C3 220n
C4 100n
C5 10uF
C6 1uF
C7 1uF
C8 1uF
C9 10uF
C10 10uF
D1
D2
1n914
SW1_A
SW1_B
A1
A2
A3
B1
B2
B3
T1 20k
VOL 100kB
SPEED_A 100kC
SPEED_B 100kC
INT 100kB
CHOP 100kB
500R GAIN
LDR1
L1
LED

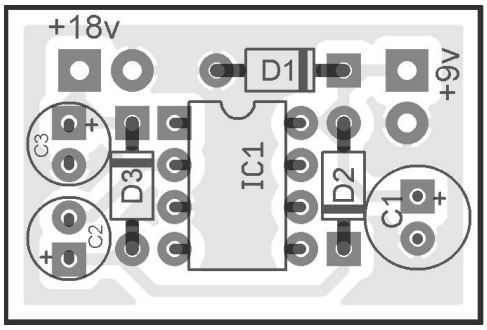
** CHOOSING A CHARGE PUMP **

The Quadrovibe requires 18v to operate the lamp. While you can use an 18v adaptor, a charge pump is preferred due to the absence of any power supply filtering or polarity protection on the Quadrovibe board (this was done to preserve space on the PCB).

18v charge pump with an LT1054

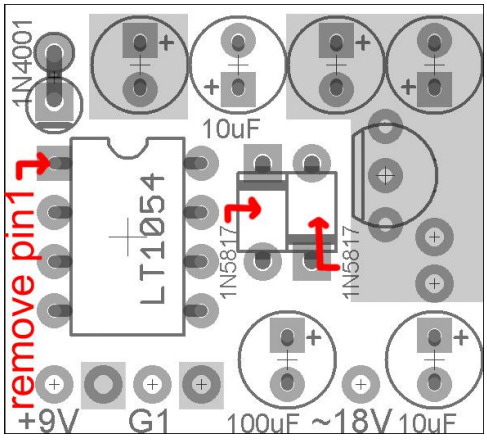


The LT1054 is used due to its higher current output. **D2** and **D3** are designated as 1N5817 for minimal voltage drop. Note that when using an LT1054, pins 1 and 8 of the IC are not connected.

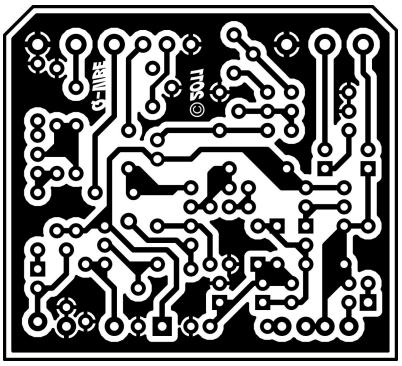


Road Rage

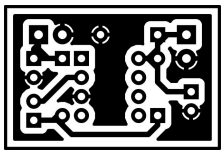
You can also use a madbeanpedals **Road Rage** board if you do not want to make your own charge pump. The **Road Rage** has pins 1&8 connected via a trace. This means you will need to either use a socket, and cut out the tab on pin1 or snip off pin1 on the actual LT1054. Do not leave pins 1&8 connected or it may fail to operate correctly. The component numbering is a little different on the RR than the schematic above, so values are shown instead. Leave off the components in the gray boxes…they are not needed for this type of operation.

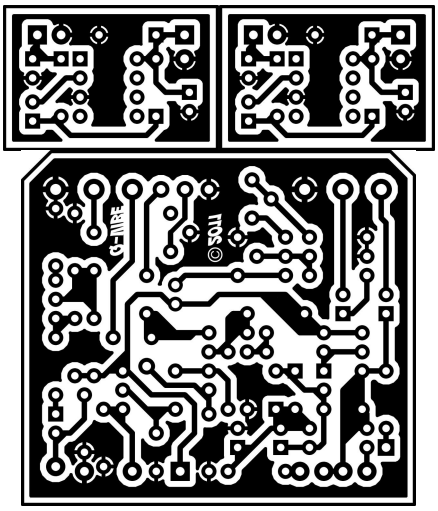


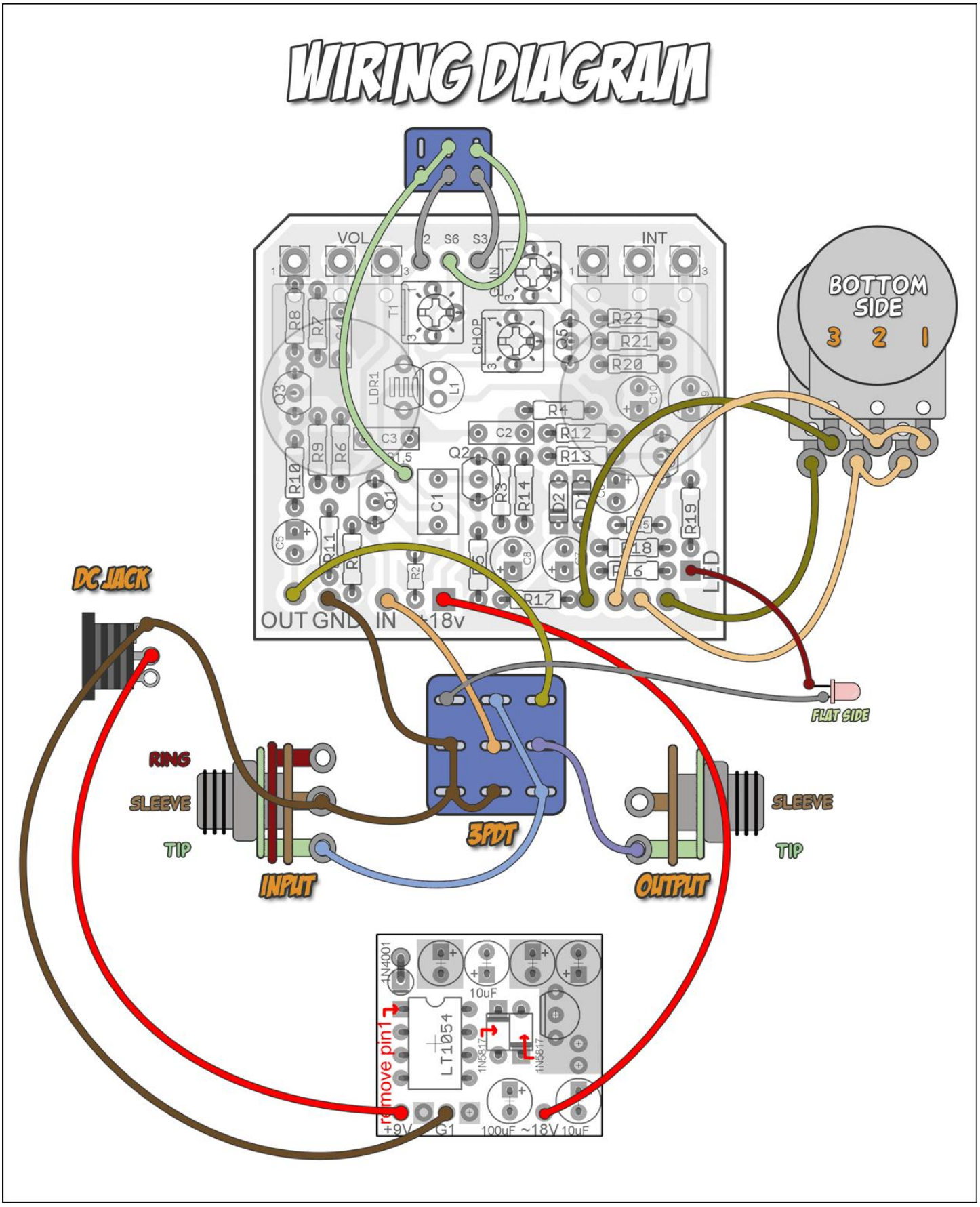
2.05”W x .1.85”H



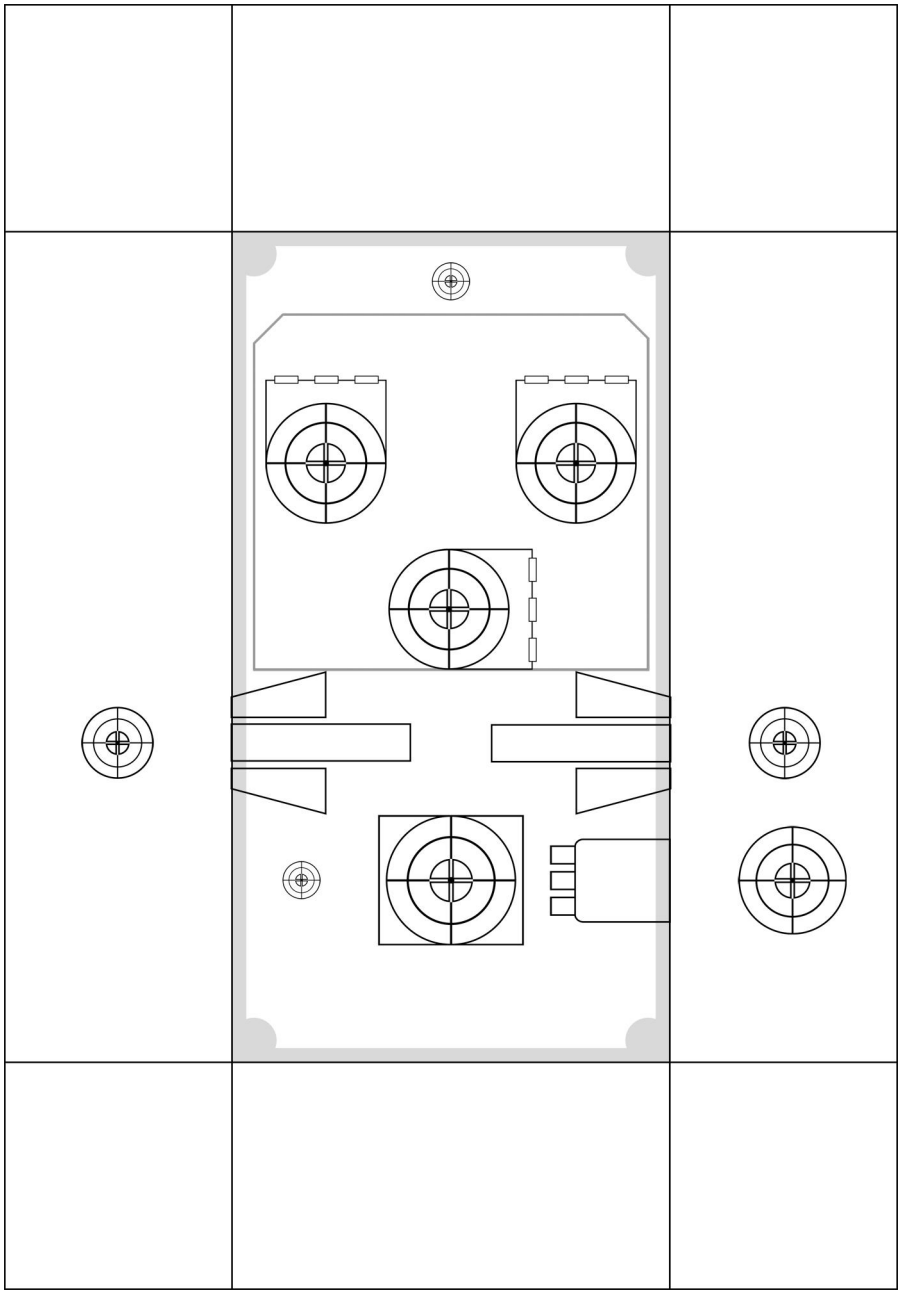
1.13”W x .76’W






WIRING DIAGRAM
VOL
INT
S6
S3
CHOP
LED
OUT GND IN +18v
BOTTOM SIDE
3 2 1
DC JACK
FLAT SIDE
RING
SLEEVE
TIP
INPUT
3PDT
OUTPUT
SLEEVE
TIP
1N4001
10uF
LT1054
1N5817
remove pin1
+9V
G1
100uF
~18V
10uF

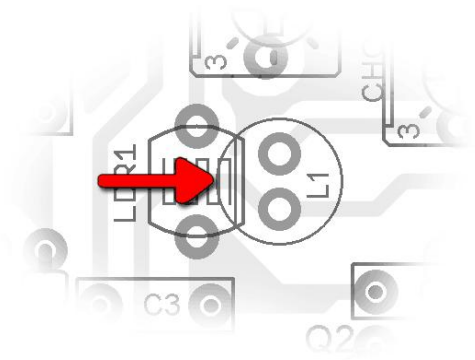
1590B
4.64” x 6.69”



Notes

- The LED hookup allows you to have your indicator flash on and off at the rate set by the Speed knob. When the effect is off, the lamp is partially disconnected from the LFO. The advantage of this system is that not only do you get a rate indicator, but it also helps preserve the life of the lamp by reducing the amount that it is driven when the effect is bypassed. The disadvantage is that there will be a slight delay until the lamp reaches full brightness when the effect is switched on. If you wish to eliminate this delay, jumper R14 directly to ground, and set up a normal LED indicator (be sure to use a current limiting resistor) with your 3PDT switch.

- LDR/Lamp: Mount your photocell so that the flat portion points directly to the lamp. When you first set the trimpots, do it in low light and watch how the lamp responds to changes. Once you are satisfied with your settings, you can use heat shrink around the lamp/photocell if you wish to enclose them for light shielding. You should leave the top portion of the heat shrink open, though, so you can make visual changes to the settings in the future.



- Sockets for **R11** and **R12** are strongly recommended. The value of these resistors sets the maximum rate of the **Speed** knob. You may find the indicated value of 2k2 in the BOM too high or too low, depending on your preference. Note that too low of a value for **R11/12** may cause the lamp to “lock up” temporarily. If this happens, just turn the speed knob down and the lamp will re-start. Experiment with different values there (1k8 – 4k7) until you find what’s right for you.

- Setting the trimpots is very simple. Start with the **GAIN** fully counter-clockwise and the **CHOP** a little less than half-way. In Vibrato mode, slowly turn the **GAIN** up until the lamp starts to fire. Set the **GAIN** for the maximum brightness you want (this determines how strong the vibrato is). Now set the **CHOP** trimpot to control how quickly the lamp shuts on and off. You will most likely spend some time playing with both of these trimpots until you get exactly the sound you want. After you are satisfied with how the lamp is behaving, switch to Tremolo mode and adjust **T1** so that the Tremolo volume matches the Vibrato volume. Be careful when setting the **GAIN** and **CHOP** close to maximum as this might cause the lamp to fail via excessive brightness.

- You can use PCB mounted pots for the **VOL** and **INT** controls: http://www.smallbearelec.com/Detail.bok?no=692


VIBRATO ENGINE
QUADROVIBE

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