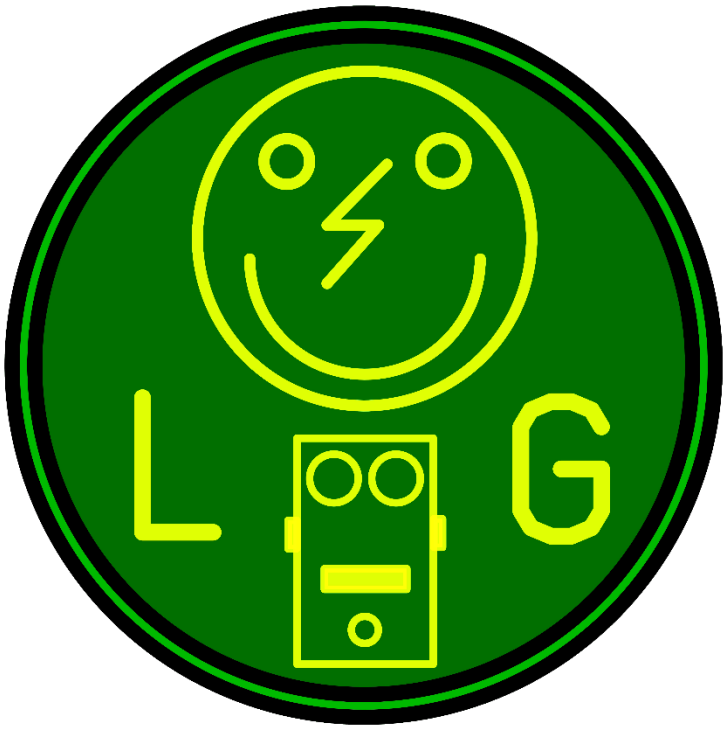
Little Sultan of Tone

Building instructions

V1.0



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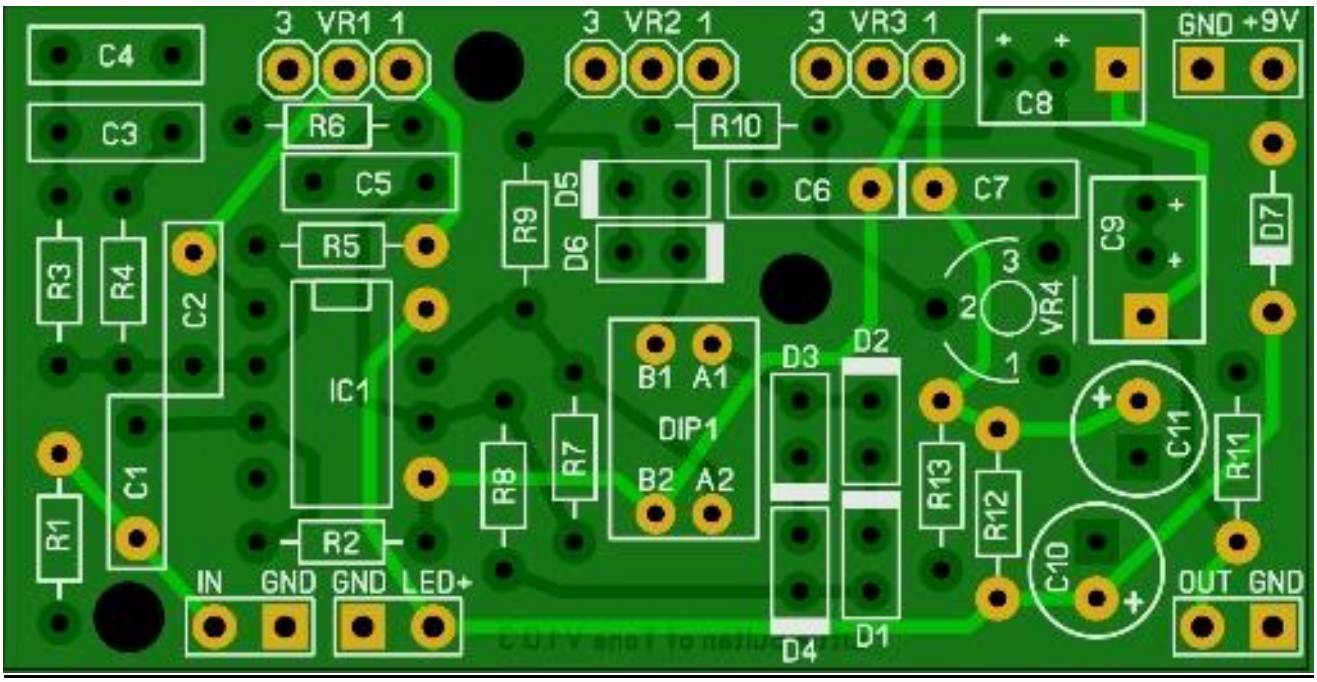
Components

ID	Value	Comment	ID	Value	Comment
C1	10n	SMF	IC1	JRC4580D	Socketed
C2	100p	Ceramic	R1	1M	
C3	10n	SMF	R2	1M	
C4	10n	SMF	R3	27k	
C5	100n	SMF	R4	33k	
C6	10n	SMF	R5	10k	
C7	10n	SMF	R6	10k	
C8	1u	Electrolyte 35V	R7	220k	
C9	1u	SMF	R8	6k8	
C10	100u	Electrolyte	R9	1k	
C11	100u	Electrolyte	R10	6k8	
D1	MA856		R11	1M	
D2	MA856		R12	47k	
D3	MA856		R13	47k	
D4	MA856				
D5	1S1588		VR1	B100k	Gain
D6	1S1588		VR2	B25k	Tone
D7	1N5817		VR3	A100k	Volume
DIP1	2 switch DIP	A=OD B=Distortion	VR4	B50k	Presence Trim pot



General guideline for components

- Capacitors: All values under 1nF should be ceramic disks. From 1nF up to 1uF should be MKT (foil/metal film capacitors) and over 1uF use electrolyte caps (or tantalum) 16V+ rated and watch out for polarity!
- Resistors: use 1% metal film for the best results.
- Socket the IC. This way you can easily mod them or replace them if they break.

General building tips

Soldering this board can be very complicated for some people since the solder pads are very close together. Use a magnifying glass to make the job easier. If you want to experiment with other diodes than you could socket them instead of soldering them to the board. You'll need a 20 SIL, break off the sockets and solder them to the board.

Start by soldering the resistors R1-R13. Then solder D1 – D6. They need to be soldered in an upright position. Now solder the IC socket and then D5 and D6 also in an upright position.

Note: diodes are fragile!! Do not expose them to heat for too long or they'll break. Do not blow on your solder in an attempt to cool it down. That will possibly result in a bad join that might corrode.

Solder the small ceramic capacitator C2 next. Solder the MKT/SMF capacitors and the electrolyte capacitors. C8 and C9 are made to fit both MKT as well as electrolyte watch the polarity the rectangle pad is – the others are +.

Finally solder the Presence trim pot VR4 and the Dipswitches. If you want to switch the diodes externally than you can mount 2 SPDT switches (A and B). Lug 1 on switch A goes to A1 and lug 2 to A2. Ditto for switch B but the B1 and B2 off course. If you want to control the presence externally than do not solder VR4 but use a B50k pot. For your convenience I marked the pinning on the PCB for you. **In version 1.0.3 pins 1 and 3 are reversed!**

Place the IC and you are almost ready to rock.

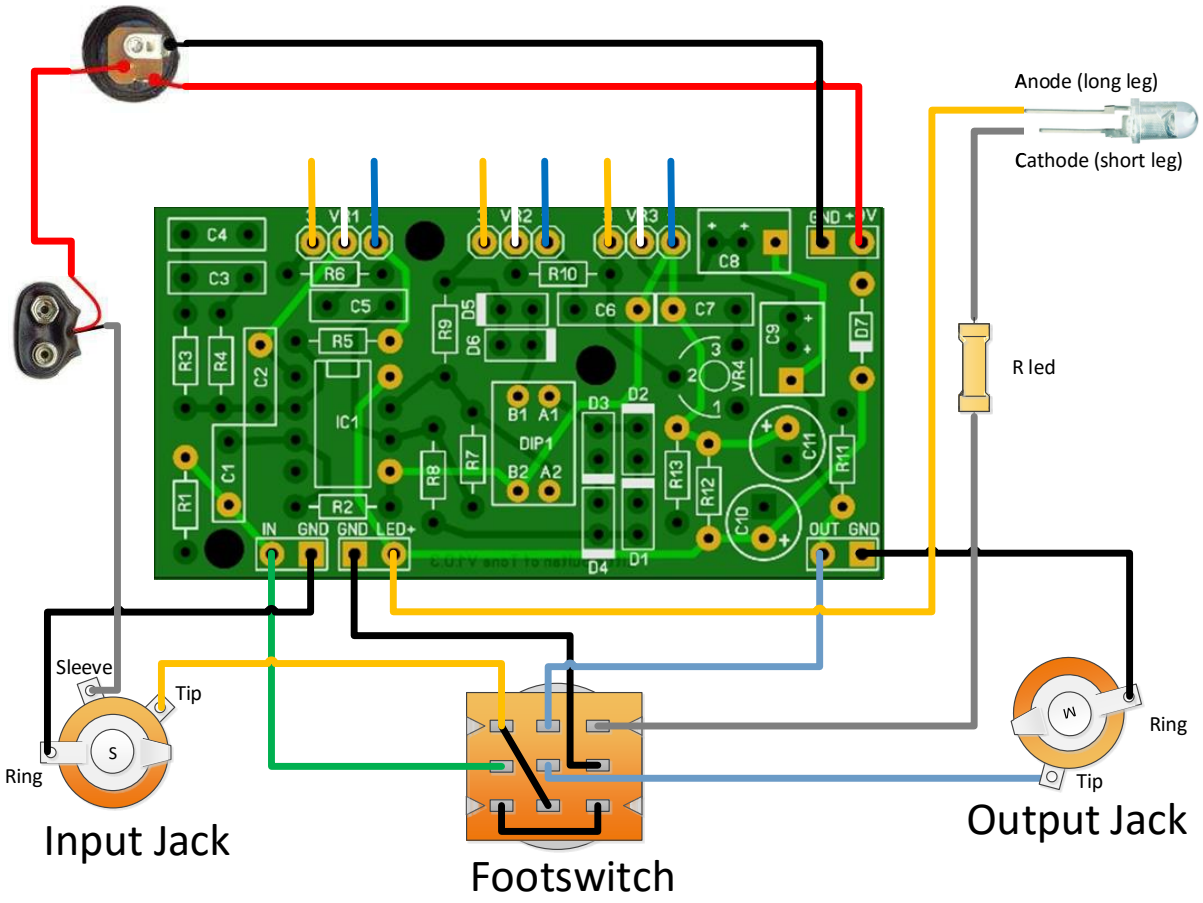
Besides the components mentioned in the table on the first page, you will need:

- **2 input jacks**. 2 mono jacks if you are not going to use a battery but only the 9V adapter. 1 mono (for output) and 1 stereo jack (for input) if you will be using both a 9V battery and the 9V adapter.
- **3PDT footswitch** (9 pins). I also carry an easy off board circuit for true bypass.
- **2,1mm DC jack** (isolated).
- **9v battery clip** (optional).
- **LED**
- **Hammond 1590B** case (or similar) in your favorite color. A 1590BB will give you more room to experiment with.

Modifications

- You can experiment with different diodes for D1-D6. MA856 and 1S1588 are very hard to find and there are a lot of fakes sold from China. An alternative for MA856 is BA282 for 1S1588 there are 1N4001, BAT41, BAT46, but also think outside the box with 1n4148, 1n914 etc.
- Using 2 Little Sultans of Tone are the same as the single board Sultan of Tone. The only difference is that you'll need to connect the 9V to both boards, but it will give you some more flexibility when building it into the effect casing.
- If you want the higher gain, then you simply need to switch out the B100k VR1 for a B250k.
- You can also try different OpAmps like TL072, OPA2134, AD712, NE5532, JRC4558 etc.

Off board wiring



Blue = pin 1
White = pin 2
Yellow = pin 3

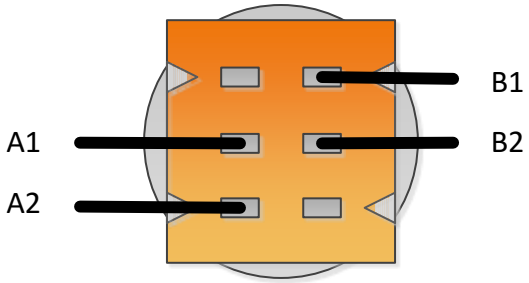
Notice that in the "off" position the effect input is connected to ground to prevent possible oscillation.

The LED requires a resistor (R led in the diagram) depending on the type of LED you are using. An ultra-bright red or blue LED requires a 1k5 resistor, Green requires 680R. If you want to be more exact then go here: http://www.muzique.com/schem/led.htm

Dipswitch settings

Switch A (right switch) is CLEAN in the OFF setting and OD in the ON setting. Switch B (left switch) is distortion in the ON setting. The position of the A switch is irrelevant at that point.

You can also replace the dipswitches with a 2P3T ON/OFF/ON switch to get OD/Clean/Distortion. You will need to wire it like this:



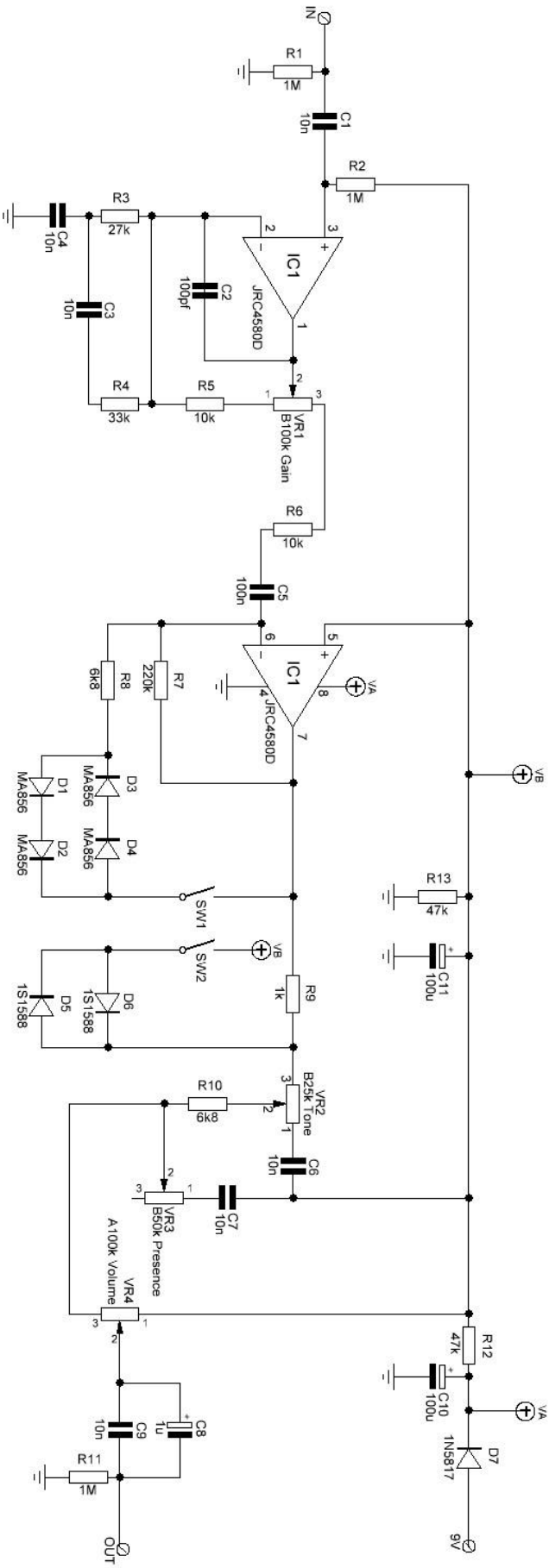
Troubleshooting

All PCB's have been e-tested 100% in the factory, so there should not be a connection problem on the PCB itself.

The board is not working (at all), what now?

- Check if your 9V is plugged in correctly (and/or soldered correctly on the board).
- Check that you oriented the capacitors, IC's ,transistors and diodes the right way. MKT capacitors and resistors do not need to be oriented.
- Check if you used the correct values of the components. For resistors you can look here: http://www.diyaudioandvideo.com/Electronics/Color/
- Double and triple check your soldering! A lose or cold solder can be really bad for your board.
- Replace the IC's and transistors, one might be defective. Before doing that first unplug the 9V and wait 5 seconds.
- Check that you have good/high grade components. A lot of Chinese sourced parts are fakes (especially high end opamps, vintage diodes and transistors) so be careful that you source your parts from reliable suppliers.

Schematic


IN
R1
1M
C1
10n
R2
1M
R3
27k
C4
10n
C3
10n
C2
100pf
IC1
JRC4580D
R4
33k
R5
10k
VR1
B100k Gain
R6
10k
C5
100n
R8
6k8
R7
220k
IC1
JRC4580D
VA
D1
MA856
D2
MA856
D3
MA856
D4
MA856
VB
SW1
SW2
R13
47k
C11
100u
D5
1S1588
D6
1S1588
R9
1k
R10
6k8
VR2
B25k Tone
C6
10n
VR3
B50k Presence
C7
10n
VR4
A100k Volume
R12
47k
C10
100u
D7
1N5817
9V
C9
10n
C8
1u
R11
1M
OUT