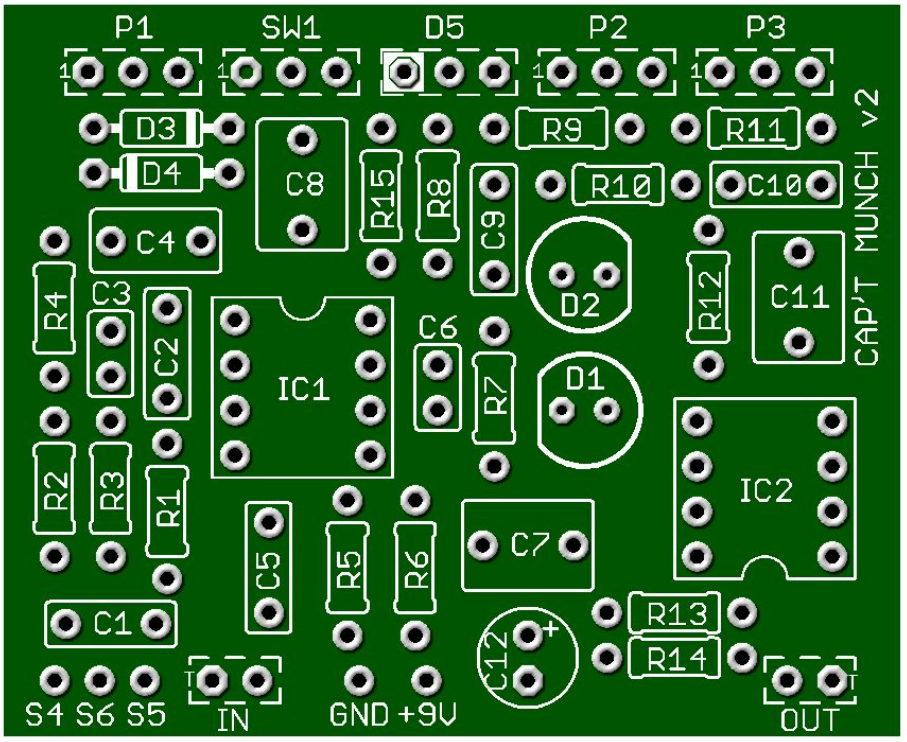
CAP'T MUNCH v2

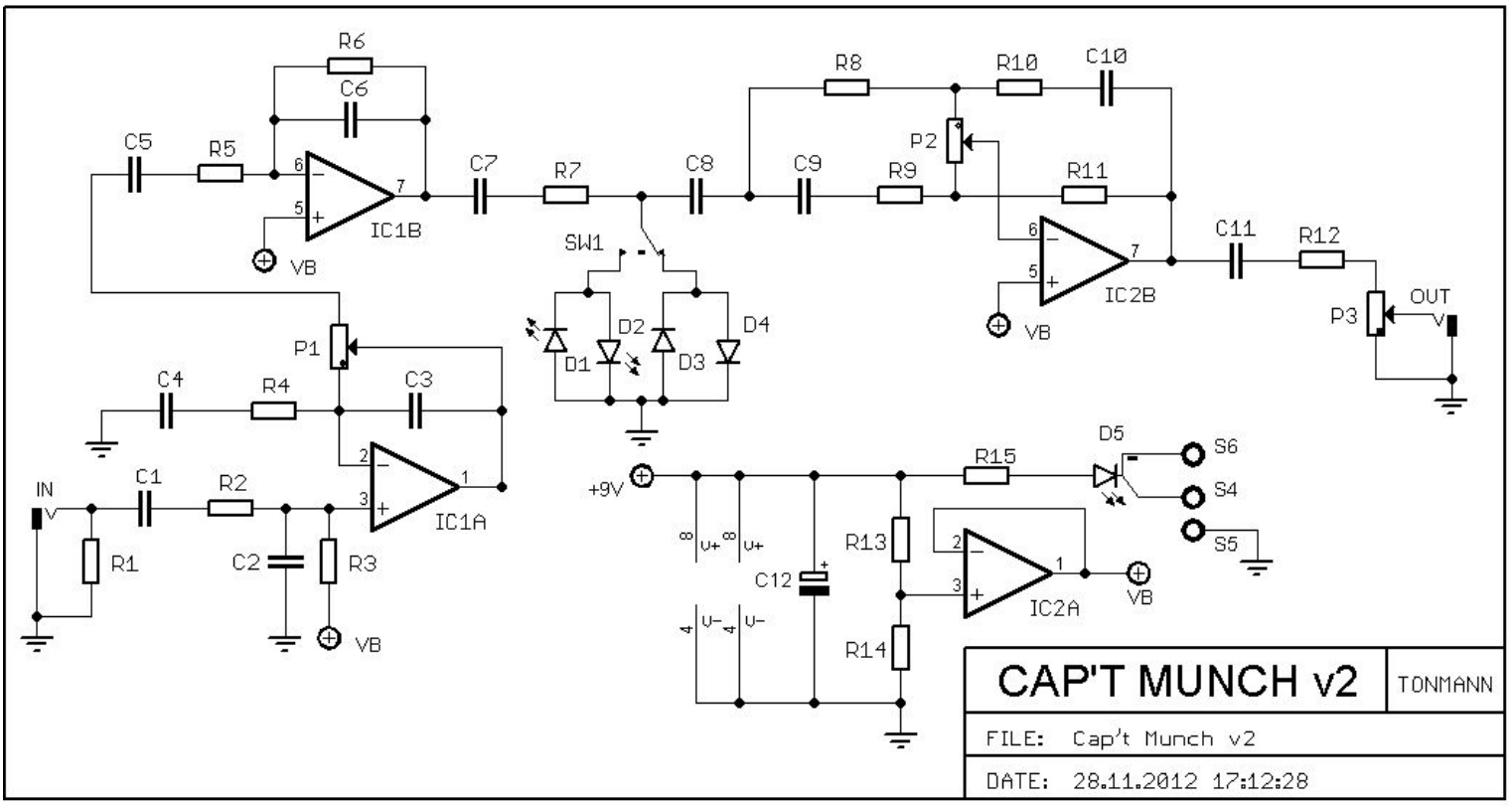
Part of the Tube Screamer Family, but with Dual Op-Amps driving each other, while a pair of Clipping Diodes to Ground add extra Muscle. This Circuit uses Red 5mm LEDs for a High Gain with Tube style tone.



Board Dimensions (W x H) 2" x 1.63" ca. 50.8mm x 41.3mm

R1	1M	C1	22n	63V	D1	LED	
R2	1k	C2	1n	63V	D2	LED	
R3	1M	C3	100p	63V	D3	1N4148 or 1N914	
R4	3k3	C4	220n	63V	D4	1N4148 or 1N914	
R5	10k	C5	100n	63V	D5	CA bi-colour LED	
R6	470k	C6	100p	63V			
R7	470R	C7	680n	63V	IC1	NE 5532	
R8	10k	C8	680n	63V	IC2	NE 5532	
R9	2k2	C9	47n	63V			
R10	2k2	C10	47n	63V	P1	GAIN	100k Lin
R11	10k	C11	680n	63V	P2	TONE	100k Lin
R12	***Jumper**	C12	100µ	16V	P3	VOLUME	100k Log
R13	22k						
R14	22k				SW1	SPDT On-Off-On	
R15	1k8						

*See Text for R12. R15 is the CLR. Value 1k8 to 4k7 depending on desired brightness.



This is a very high gain circuit that could start to oscillate if wiring precautions are not taken:

Keep the input wiring between the input jack and bypass switch and the bypass switch and board input as far away from other wiring as possible.

Keep the input wiring as short as possible – shielding the input wiring should certainly be considered.

One indication that problems are likely to occur is if the LEDs (D1 &D2) start to light up with no input signal applied. If this should happen, increase the value of R4 and/or R5 or decrease the value of R6.

The NE5532 op amps used for IC1 and IC2 are “standard” pin-out dual op amps – other standard Pin-out dual op amps (such as TL072) can be used.

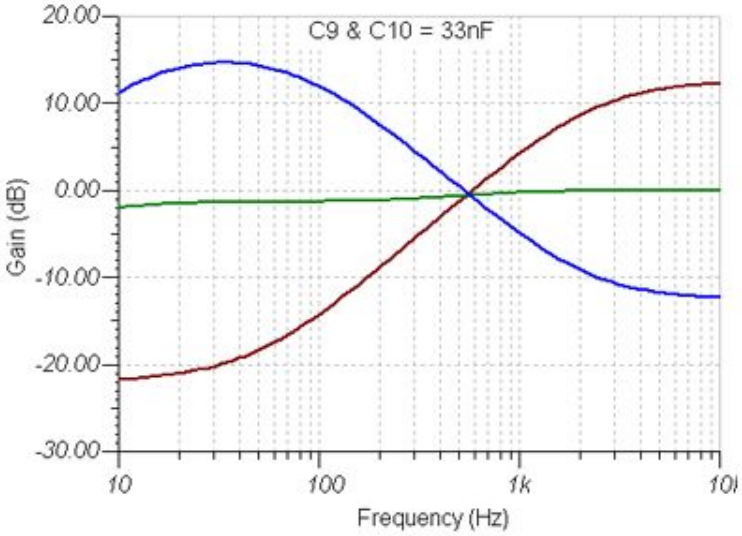
Any silicon diode equivalent to 1N4418 can be used for D3 and D4.

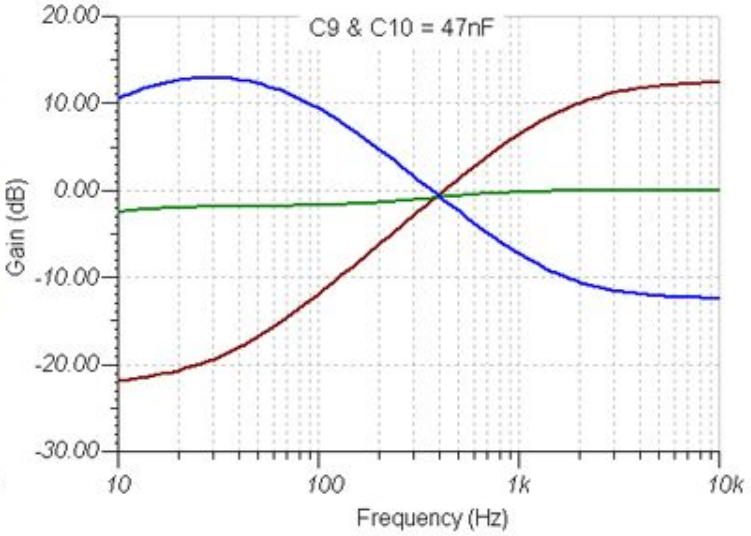
R12 has been included should the output signal be too high and the volume pot has to be turned down to a low level to get a reasonable output signal. Initially R12 is a wire jumper, if the signal is too high a resistor in the range of 47k to 100k should replace the wire jumper.

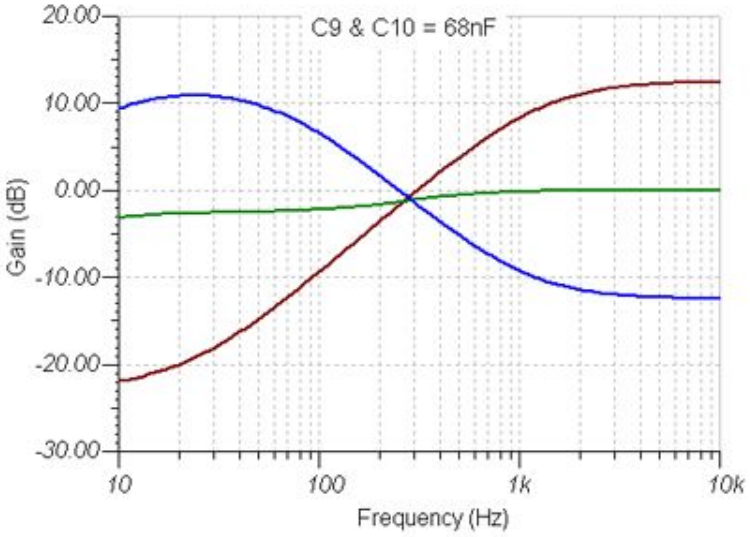
SW1 is a SPDT On-Off-On switch. This will give you a choice of the LEDs and silicon diodes in the up and down positions and no diodes in the middle position. A DPDT On-Off-On switch can be used, in which case the three lugs on one side of the switch should be used.

The tone control is an active control – it boosts as well as cuts frequencies. With the control in the mid position no frequencies are boosted or cut, turning the control anti-clockwise will boost bass frequencies and cut high frequencies, turning the control clockwise will cut bass frequencies and boost high frequencies.

The following diagram shows the frequency responses with the tone pot fully anti-clockwise (blue), mid position (green) and fully clockwise (brown):







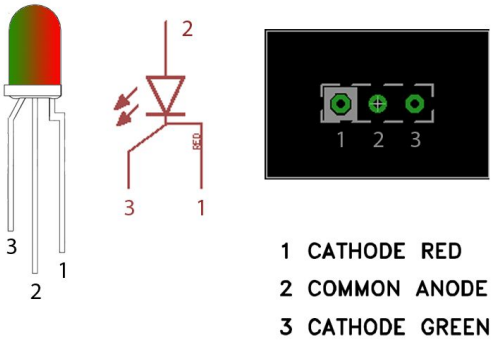
The mid point where frequencies are boosted or cut (the point where the blue and red lines cross) is determined by the values of C9 and C10:

33nF – about 600 Hz
47nF – about 400 Hz
68nF – about 300Hz

Although 47nF for C9 and C10 is suggested, you are encouraged to experiment with different values. C9 and C10 should be changed as a pair.

STATUS LED

D5 is a common anode bi-colour LED



The diagram above shows the pin-out, schematic symbol and pad connection for a common anode LED.

The pin-out for the bi-colour LED is as follows:

1st Colour Cathode	90 degree bend in the lead
Common Anode	Middle lead
2nd Colour Cathode	45 degree bend in the lead

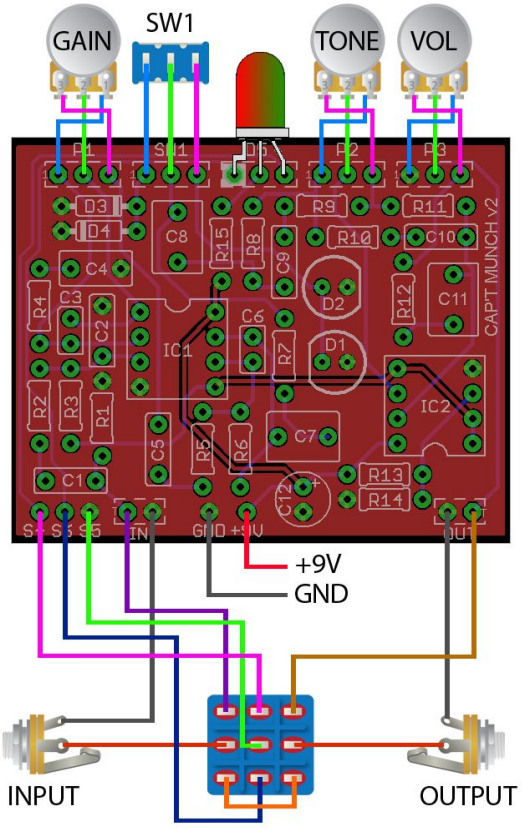
The pad for lead 1 on the circuit board is marked with a white box.

When connected correctly D5 will light red when power is applied and the circuit is in bypass mode and light green when the circuit is in effects mode.

If you wish to use a standard LED the anode is connected to the middle pad and the cathode to the right pad (non-white pad).

If you are using one of GuitarPCB's 3PDT Wiring Boards pads S4, S5 and S6 are ignored, D5 and R15 are not installed.

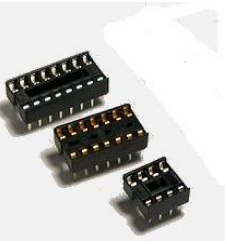
WIRING

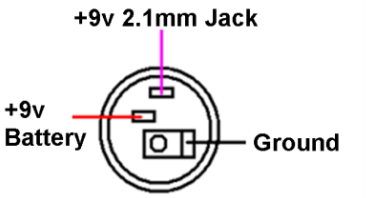


Other important notes:

- Socket your Transistors – You may wish to change them later and makes troubleshooting a lot easier.
- R15 is the current limiting resistor. Brightness is a preference. 1k8 will yield a very bright LED and the higher the resistance the dimmer the light. 3k or even 4.7k has been used. This is your choice.

IC's and transistors are easily damaged by heat from soldering and should never be directly soldered to the PCB.
For transistors, diodes, and LED's, use SIP (Single inline package) sockets. You simply cut the number of sockets required with an Exacto / Stanley knife or by gripping and rocking with pliers. This allows for easy changes and troubleshooting.





[Soldering Tutorial on Youtube]

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