Blues Crusher

Design By Erik Vincent

Sonically a hybrid fuzz and overdrive, the blues crusher is good balance between grit but soul.

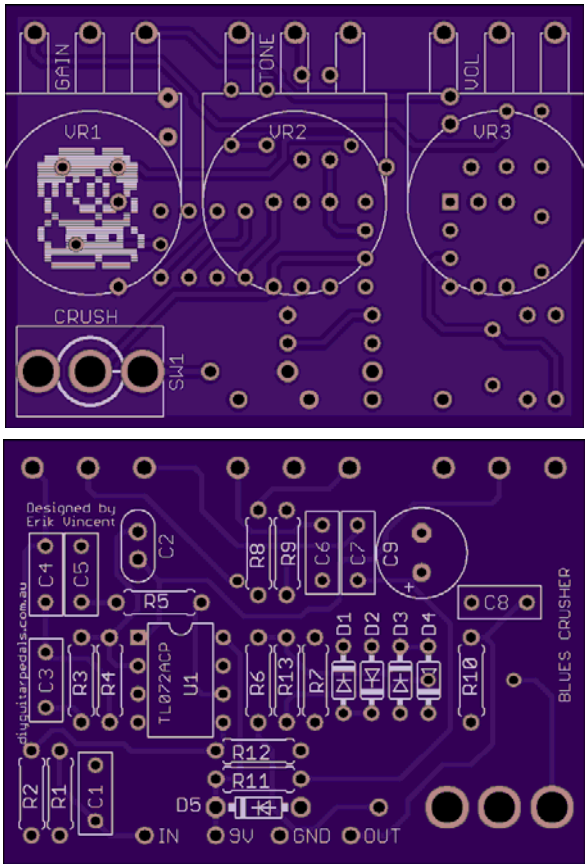
Want fuzz that Gilby Clarke used for all those years? This take on the Marshall Blues Breaker pedal will accomplish this. This pedal uses the standard 3 pot control of Volume, Tone, and Gain as well as a switch to add some harshness to the fuzz.

This project is at an easy level as there are only a few parts and is in a spacious layout that is easy to understand.

The PCB itself isn't too big and will fit snug into a 1590B enclosure very easily.

Bill of Materials, Stock Blues Crusher

Capacitor		Resistor	
C1	10nF (film)	**R1**	2.2M
C2	47pF (ceramic)	**R2**	1M
C3	10nF (film)	**R3**	3.3K
C4	10nF (film)	**R4**	4.7K
C5	100nF (film)	**R5**	10K
C6	10nF (film)	**R6**	220K
C7	10nF (film)	**R7**	6.8K
C8	100nF (film)	**R8**	1K
C9	100µF (Electrolytic)	**R9**	6.8K
		R10	1M
Diode		**R11**	47K
D1	1N4448	**R12**	47K
D2	1N4448	**R13**	470K
D3	1N4448		
D4	1N4448	**Switch**	
D5	1N4001	**Crush**	SPDT Micro-switch
ICs		**Potentiometer**	
U1	TL072	**Gain**	100kb (16mm)
		Tone	25kb (16mm)
		Volume	100ka (16mm)



PCB Spacing
The Blues Crusher PCB is spaced for 1590B sized enclosures

Pot Spacing
The Blues Crusher PCB mounted potentiometers are spaced for Alpha 16mm potentiometers.

Modifications

Following is a couple of worthwhile modifications that can be applied to the Blues Crusher.

Resistors

The first resistors that are an obvious choice are the ones tied to the Crush switch, which effects the clipping stage directly. On the stock Blues Crusher, the choice is R6, which is what the Blues Breaker from Marshall originally came with, but by roughly doubling the value to 470K (via the switch and R13), it can add a bit more harsher clipping effect making the pedal more distortion than overdrive or fuzz. So R6 could go to a lower resistance for tamer tastes and R13 can be raised to a higher value for more distorted tastes.

Capacitors

Changing the values of C6 and C7, as noted directly on the schematic, will give more bottom end for tone control by increasing them to a larger value. A nice value to push up to is going from the mere 10nF to a beefy 220nF. This rolls the RC filter on the tone stage to allow much more bass to come through.

Like C6 and C7, changing the input stage C1 to a larger value will also increase bass saturation. For guitarist using lower tunings, going from the 10nF to 100nF may be desired, while pushing up to 220nF may be desired for bass players implementing this pedal.

Diodes

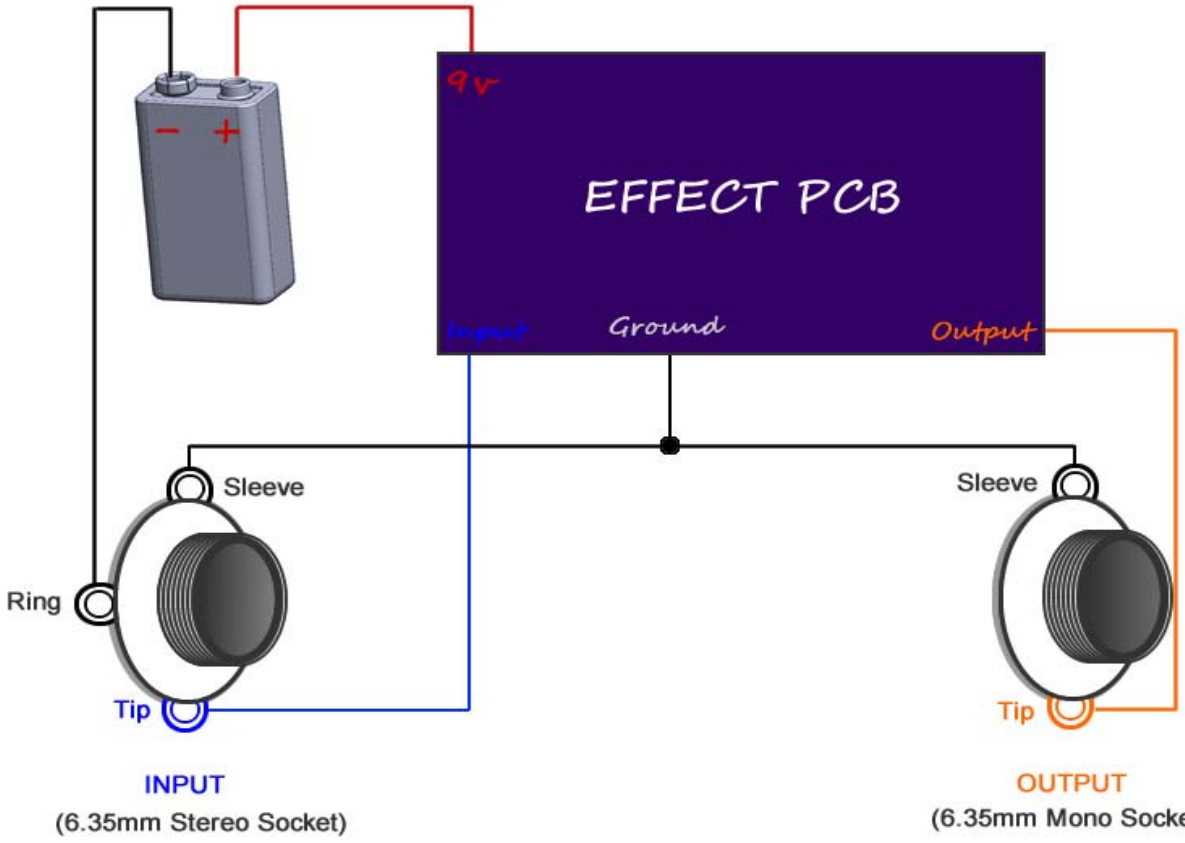
Changing diodes in the clipping stage will also affect the sound of the distortion. Using germanium diodes, such as the 1N34A or a series 1N34A with a 1N4001 can make a more “old school fuzz”

OpAmps

Changing the dual OpAmp will affect the soft clipping that occurs in the circuit. Using M5218A’s or 4558’s will be a little harsher on that clipping.

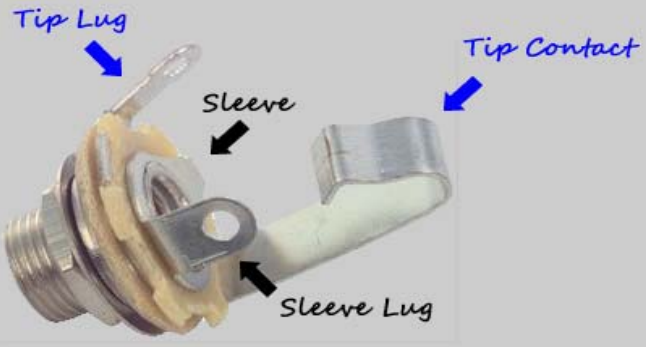
Testing Your Effect

Using aligator clips or soldering directly, wire your effect as in the following...



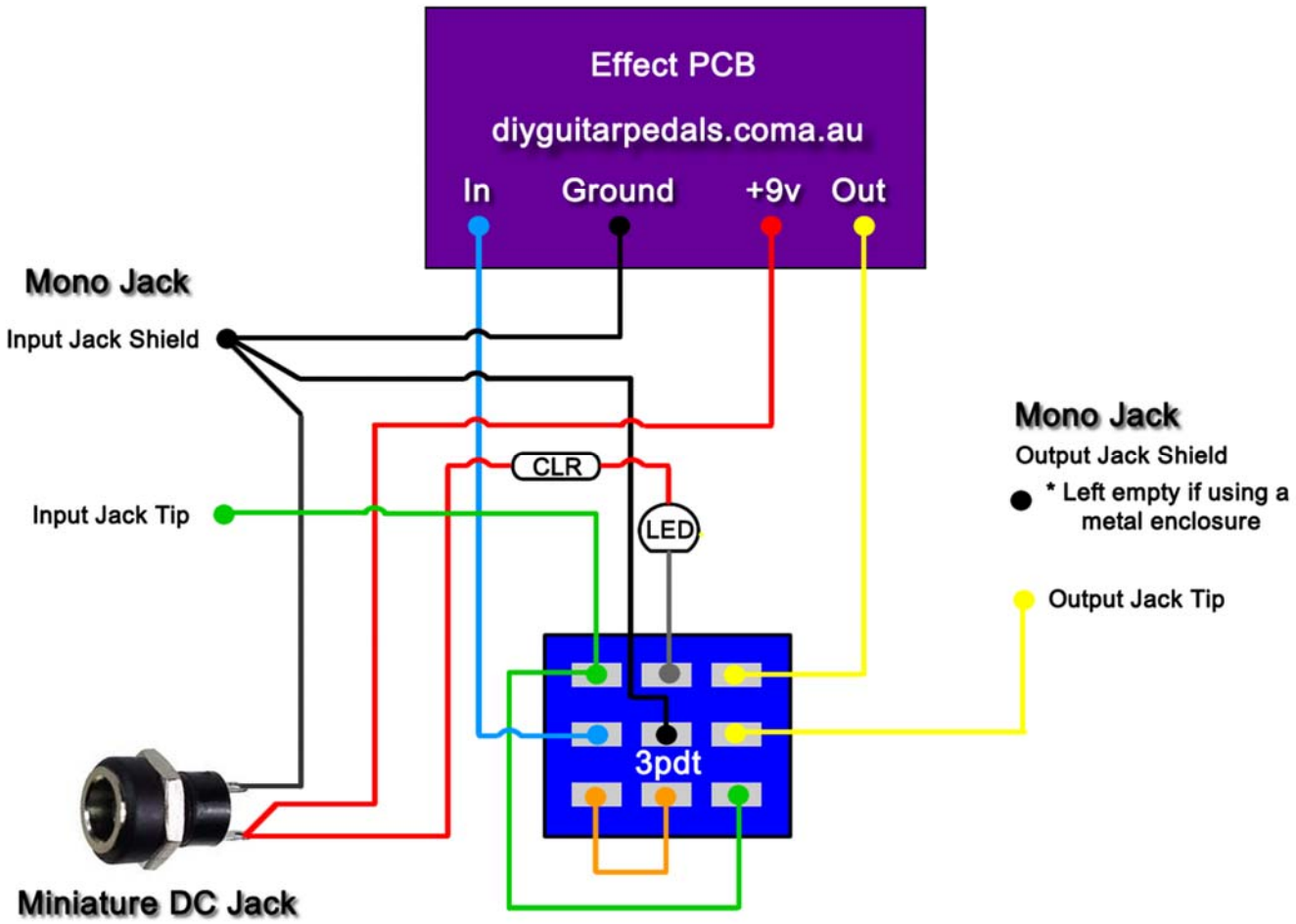
Input and Output Sockets

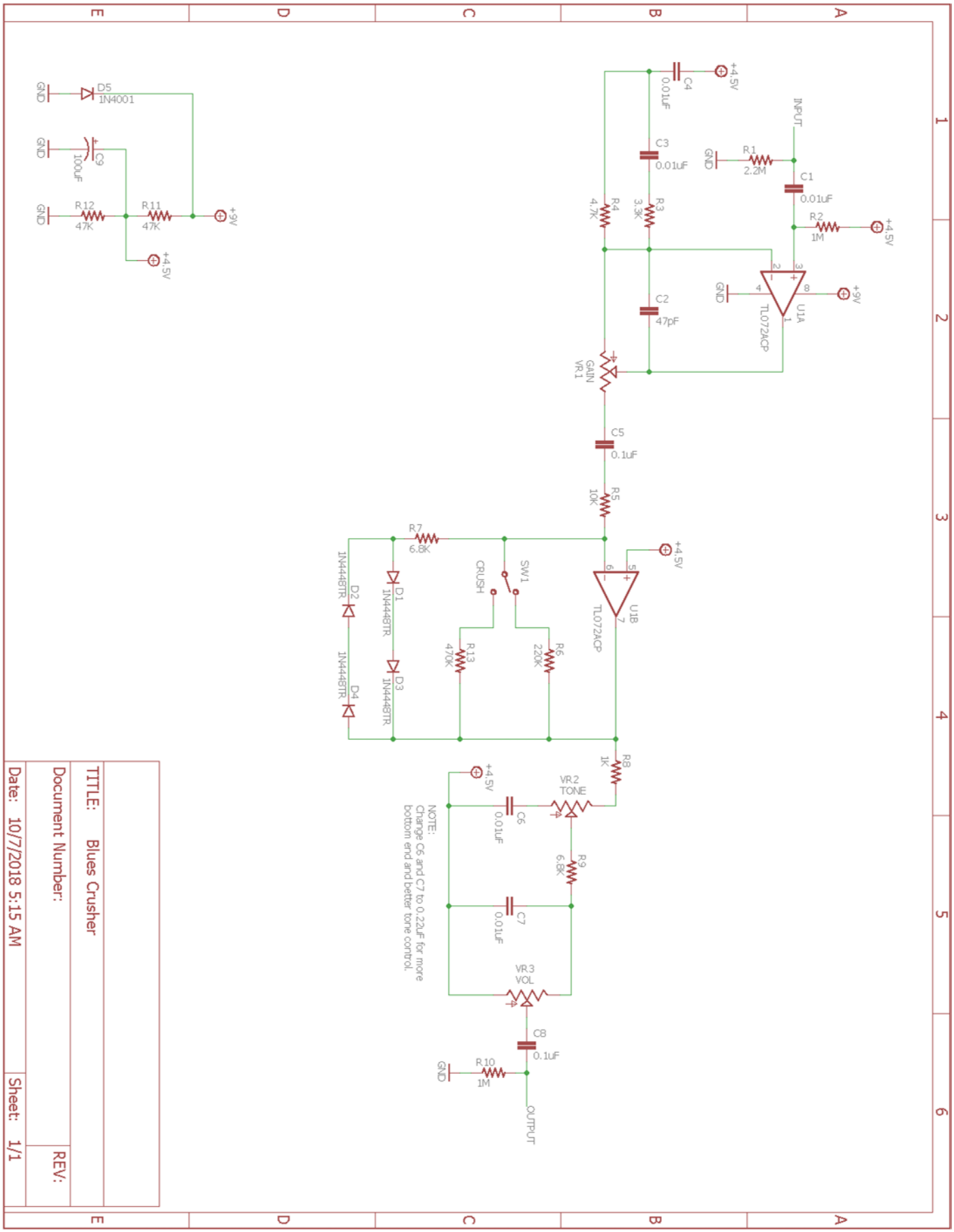
Pay close attention to the lugs of your sockets. Look at them side on so that you can distinguish the sockets individual layers. For instance the tip lug is connected to tip contact. The stereo jack looks the same as the socket below except it has an extra lug and contact for “Ring”.



Offboard Wiring Diagram

Using a non-switched Miniature DC Jacks and 2 Mono Jacks




D5
1N4001
C9
100uF
R12
47K
R11
47K
+9V
+4.5V
GND
C4
0.01uF
C3
0.01uF
R4
4.7K
R3
3.3K
C2
47pF
INPUT
R1
2.2M
C1
0.01uF
R2
1M
U1A
TL072ACP
GAIN
VR1
C5
0.1uF
R5
10K
R7
6.8K
SW1
CRUSH
D1
1N4448TR
D2
1N4448TR
D3
1N4448TR
D4
1N4448TR
R13
470K
R6
220K
U1B
TL072ACP
R8
1K
VR2
TONE
C6
0.01uF
R9
6.8K
C7
0.01uF
VR3
VOL
C8
0.1uF
R10
1M
OUTPUT
NOTE:
Change C6 and C7 to 0.22uF for more bottom end and better tone control.
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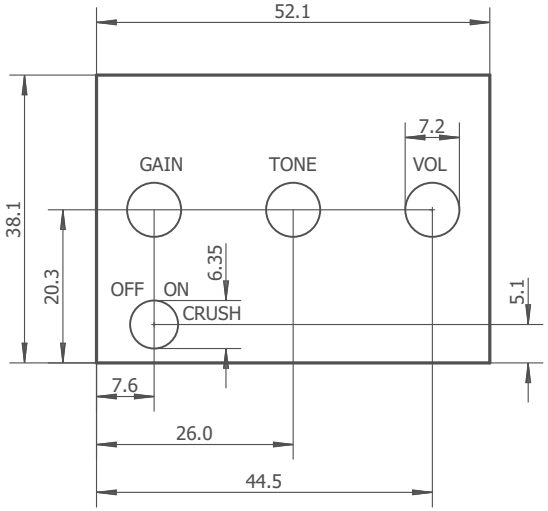
52.1
7.2
GAIN
TONE
VOL
38.1
20.3
6.35
OFF
ON
CRUSH
5.1
7.6
26.0
44.5