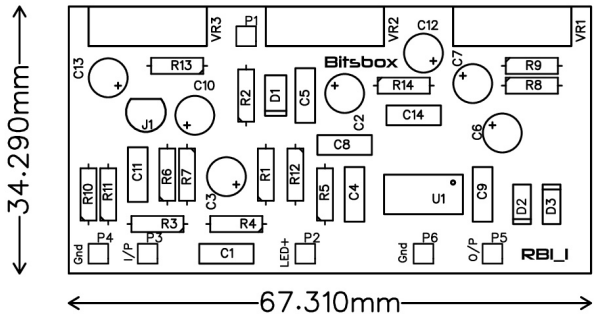
Bitsbox Rat-Box Effects Pedal Kit

Overview

Based on the legendary Pro Co Rat distortion pedal from the late 70's the three controls, distortion, filter and volume allow you to dial in effects ranging from subtle overdrive tones to full fuzz.
The kit consists of the PCB, electronics pack and hardware pack, each of which are available separately. It is intended for assembly into one of the Hammond 1590BB range of enclosures - that choice, and that of the control knobs are left to the builder.

PCB Layout



Note: Positions C10 & R10 are unused and should be left empty.

Electronics Pack Parts List

Name	Designator	Part Code	Quantity
Rat Box PCB		PCB014	1
2k2 resistor	R1	CR252K2	1
47R resistor	R2, R9	MR2547R2	
1M resistor	R3, R4, R11	MR251M	3
1k resistor	R5, R12	MR251K	2
10k resistor	R6, R7, R13	MR2510K	3
560R resistor	R8	MR25560R	1
1k5 resistor	R14	MR251K5	1
100k log pot	VR1, VR2, VR3	VR172	3
22nF Polybox	C1, C11	PY22N	2
100uF 16V Ecap	C2	EC100U16	1
47uF 16V Ecap	C3	EC47U16	1
1nF Polybox	C4	PY1N0	1
47nF Polybox	C5	PY47N	1
4.7uF 25V Ecap	C6, C12	EC4U725	2
2.2uF 50V Ecap	C7	EC2U250	1
100pF Ceramic	C8	CC100P	1
33pF Ceramic	C9	CC33P	1
1uF 50V Ecap	C13	EC1U050	1
3.3nF Polybox	C14	PY3N3	1
1N4001 Diode	D1	QD040	1
1N4148 Diode	D3, D2	QD022	2
2N5458 Transistor	J1	QD071	1
NE5534 IC	U1	QU119	1
8-Pin DIL Socket for U1 (optional).			

Resistor 

Electrolytic capacitor - Ecap. 

Polybox capacitor 

Ceramic capacitor 

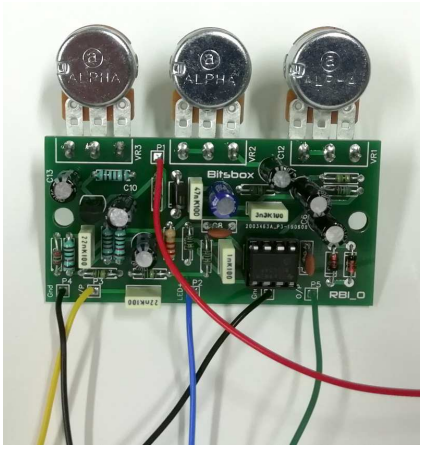
Diode 

Transistor 

Integrated Circuit - IC 

PCB Assembly

The PCB should be assembled according to the above layout, matching components to their designators. A suggested sequence is resistors followed by capacitors, semiconductors and finally potentiometers facing to the rear of the board. Make sure that the polarised parts such as electrolytic capacitors, diodes, transistor and IC are fitted with the correct orientation as indicated on the board. Resistors, ceramic capacitors and polybox capacitors can be fitted either way round.
Lengths of 7/0.2 wire (provided in the hardware pack) should be fitted to the 6 connection points labeled P1,2,etc. Wire colours are unimportant.
The finished board should look like the photo below.



Component Identification Tips

Resistors - Use the resistance setting on your multimeter.
Potentiometers - Marked with the value together with an 'A' prefix for log and a 'B' prefix for linear.
Electrolytic Capacitor - Marked with the value. The longer lead indicates the positive side and a stripe on the body indicates the negative side. Look for + on the PCB indicating the +ve pin and/or a solid coloured area indicating the -ve.
Polybox Capacitors - Marked with the part value.
Ceramic Capacitor - Value marked in picoFarrads (pF). Over 100pF a 3 digit code is used with the last digit indicating the number of zeros. 3.9nF (written 3n9) will be marked 392 i.e. 3900pF (1000pF = 1nF).
Diodes - Marked with their type reference. A band indicates the cathode end and should align with the band shown on the PCB.
Transistors - Marked with their type reference. A flat face indicates orientation and should align with the flat shown on the PCB.
ICs - Marked with their type reference. A dot or notch identifies the top edge of the IC with pin 1 top left. Pins are numbered sequentially anti-clockwise from pin 1.

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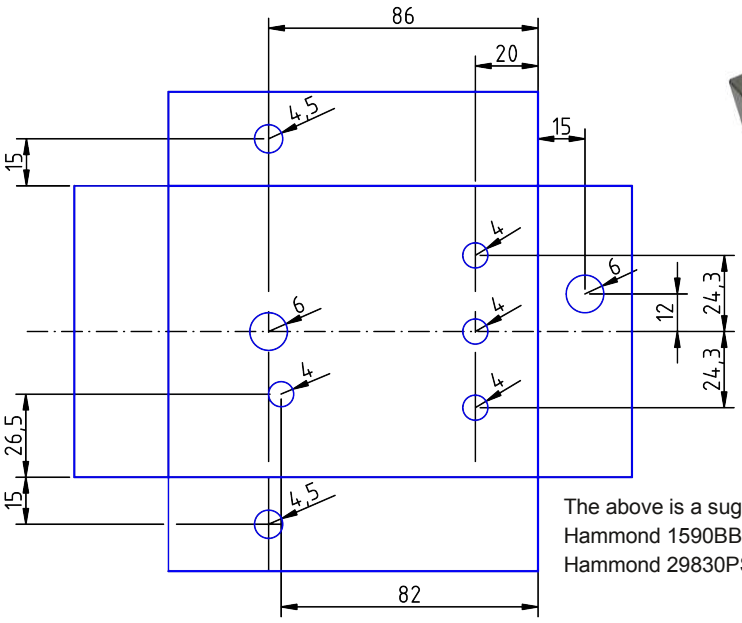
Enclosure Drilling

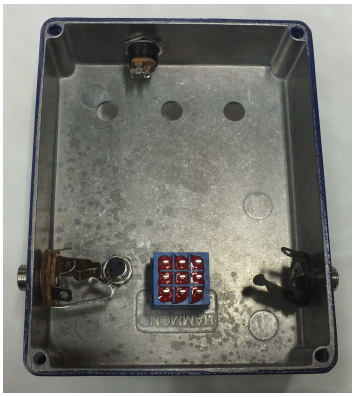


The above is a suggested drilling detail based on the Hammond 1590BB range of diecast enclosures - the Hammond 29830PSLA is also suitable.

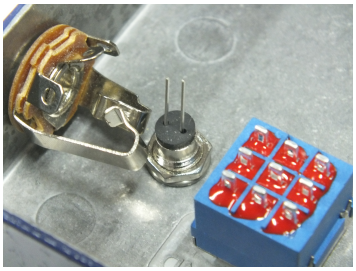
Hardware Installation and Wiring

The hardware kit contains the following:
DC Jack Socket (CN306)
Stereo Input Jack Socket (CN141)
Mono Output Jack Socket (CN140)
3PDT Footswitch (SW108)
Chrome LED Bezel (HW042)
5mm Red LED (OP002)
PP3 Battery Clip (BAT043)
7/0.2 Wire Bundle (CN112)
5 x Cable Ties (HW046)
Heatshrink sleeving 1.6mm (HW031)

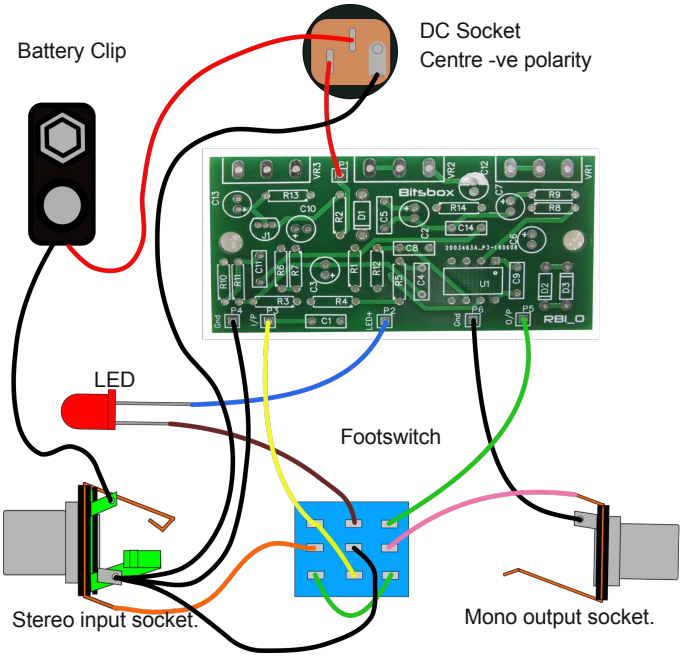
1. Referring to the picture below, fit the DC connector (top), stereo input jack (left), mono output jack (right), footswitch and LED bezel to the drilled enclosure.



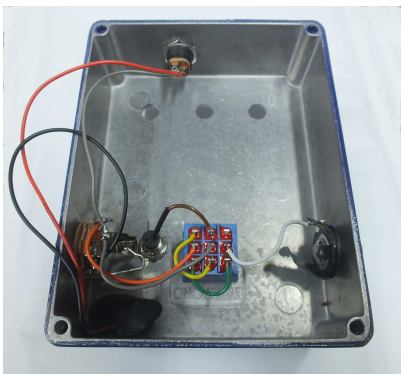
2. Fit the LED to the bezel.
Note that the LED has one long leg (+ve) and one short (-ve).



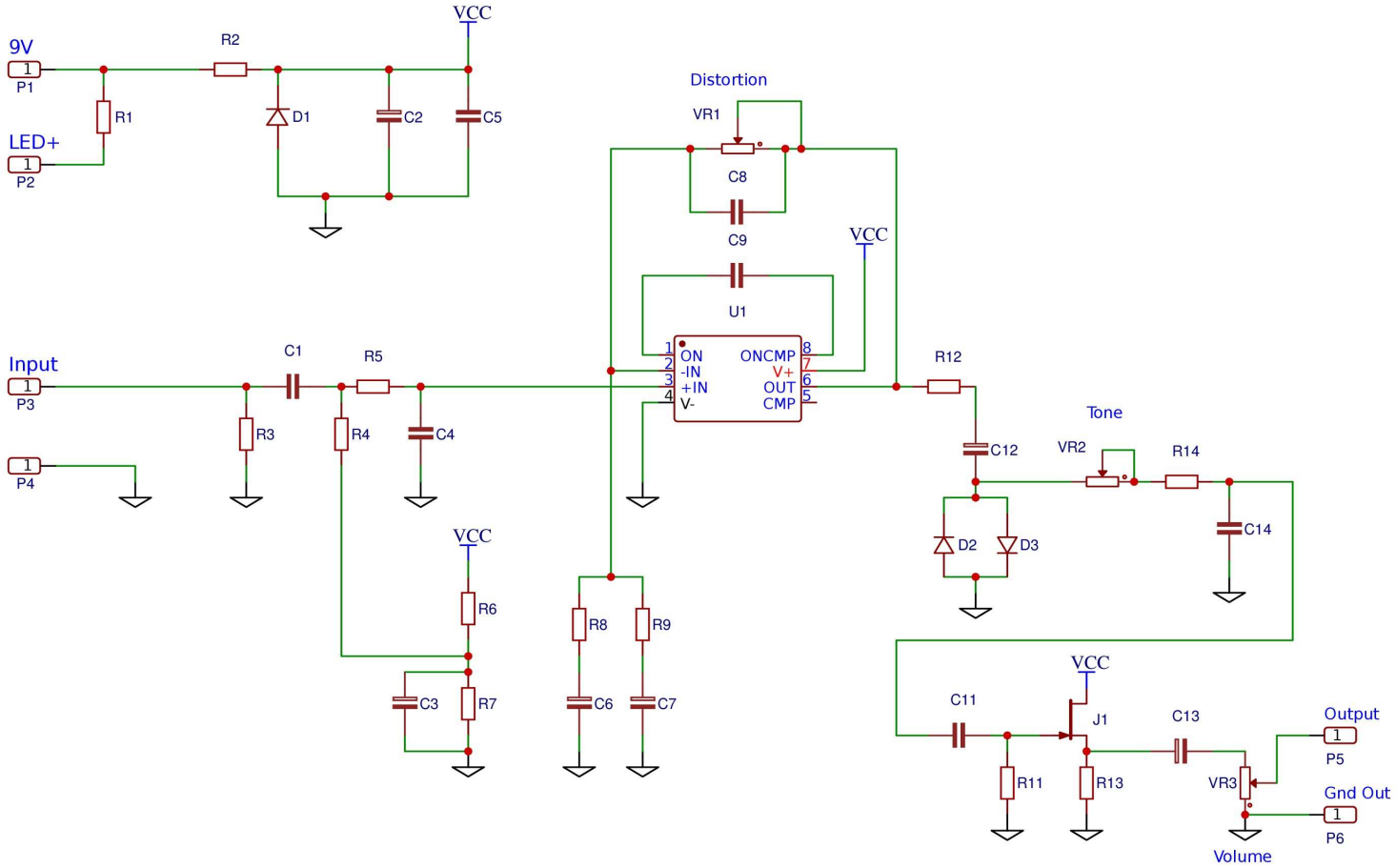
Wiring Schematic



3. Before fitting the PCB assembly, fit the wiring that does not connect to the PCB - see the wiring schematic (above) for reference.
Add heatshrink sleeving to the connection to the short leg of the LED.



4. Fit the PCB assembly and complete the wiring.
Add heatshrink sleeving to the LED connection.
Tidy the wiring using cable ties to complete.
The exterior can be finished off with your choice of graphics and control knobs.



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	Company: Bitsbox	Sheet: 1/1
	Date: 2019-04-05 Drawn By: R Dent	