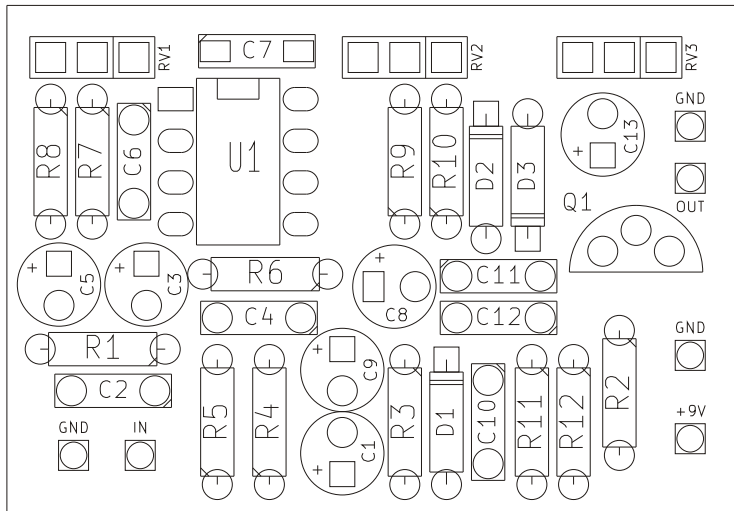
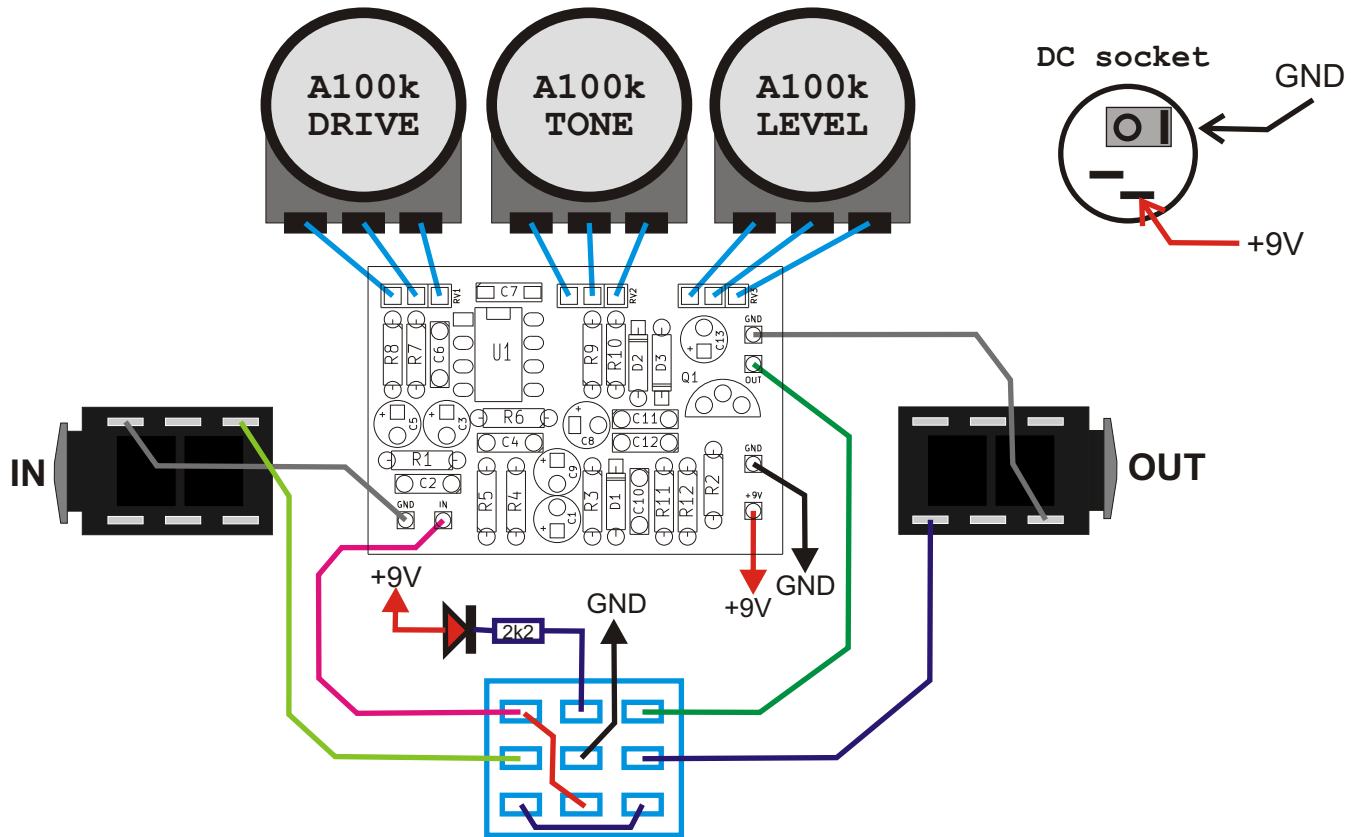


PCB parts placement diagram:



C1	1u	R1	1M	D1	1N400X
C2	22n	R2	47R	D2	1N914
C3	4u7	R3	100k	D3	1N914
C4	1n	R4	100k	Q1	BF247
C5	2u2	R5	1M	U1	Op07
C6	100p	R6	1k		
C7	33p	R7	560		
C8	4u7	R8	47R		
C9	47u	R9	1k		
C10	10n	R10	1k5		
C11	3n3	R11	1M		
C12	22n	R12	10k		
C13	1u	RV1	100kA		
		RV2	100kA		
		RV3	100kA		

Wiring (bottom view) :



Use metal enclosure connected to ground.  
Power supply: 9V DC

Bill of materials:

**Resistors:**

47R 2pcs. "R2 R8"  
560R 1pcs. "R7"  
1k 2pcs. "R6 R9"  
1k5 1pcs. "R10"  
2k2 1pcs. "LED"  
10k 1pcs. "R12"  
100k 2pcs. "R3 R4"  
1M 3pcs. "R1 R5 R11"

**Potentiometers:**

100kA 3pcs. "RV1 RV2 RV3"

**Other:**

Knobs 3pcs.  
Footswitch 3PDT 1pcs.  
JACK socket 2pcs.  
DC socket 5.5/2.1 1pcs.

**Capacitors:**

33p 1pcs. "C7"  
100p 1pcs. "C6"  
1n 1pcs. "C4"  
3n3 1pcs. "C11"  
10n 1pcs. "C10"  
22n 2pcs. "C2 C12"

**Electrolytic capacitors:**

1u 2pcs. "C1 C13"  
2u2 1pcs. "C5"  
4u7 2pcs. "C3 C8"  
47u 1pcs. "C9"

**Semiconductors:**

OP07 1pcs. "U1"  
BF247 1pcs. "Q1"  
1N400X 1pcs. "D1"  
1N914 2pcs. "D2 D3"  
LED 1pcs.

## Resistor color code:



$$390 \times 10\Omega = 3,9k\Omega$$

Color	Band 1	Band 2	Band 3	Multiplier	Tolerance
Black	0	0	0	1 $\Omega$	
Brown	1	1	1	10 $\Omega$	1%
Red	2	2	2	100 $\Omega$	2%
Orange	3	3	3	1k $\Omega$	
Yellow	4	4	4	10 k $\Omega$	
Green	5	5	5	100 k $\Omega$	0,5%
Blue	6	6	6	1 M $\Omega$	0,25%
Purple	7	7	7	10 M $\Omega$	0,1%
Gray	8	8	8	100 M $\Omega$	0,05%
White	9	9	9	1 G $\Omega$	
Gold				0,1 $\Omega$	5%
Silver				0,01 $\Omega$	10%

## Capacitors markings:

$$\begin{aligned}
 471 &= 47 \times 10^1 \text{ pF} = 470 \text{ pF} \\
 472 &= 47 \times 10^2 \text{ pF} = 4700 \text{ pF} = 4,7 \text{ nF} \\
 473 &= 47 \times 10^3 \text{ pF} = 47000 \text{ pF} = 47 \text{ nF} \\
 474 &= 47 \times 10^4 \text{ pF} = 470000 \text{ pF} = 470 \text{ nF}
 \end{aligned}$$

$$\begin{aligned}
 100 \text{ pF} &= 100 \text{ p} = 100 = 101 \\
 220 \text{ pF} &= 220 \text{ p} = 220 = 221 \\
 4,7 \text{ nF} &= 4 \text{ n}7 = 0.0047 = 472 \\
 10 \text{ nF} &= 10 \text{ n} = 0.01 = 103 \\
 100 \text{ nF} &= 100 \text{ n} = 0.1 = 104 \\
 220 \text{ nF} &= 220 \text{ n} = 0.22 = 224 \\
 470 \text{ nF} &= 470 \text{ n} = 0.47 = 474 \\
 1000 \text{ nF} &= 1 \mu\text{F} = 1 \mu = 105
 \end{aligned}$$