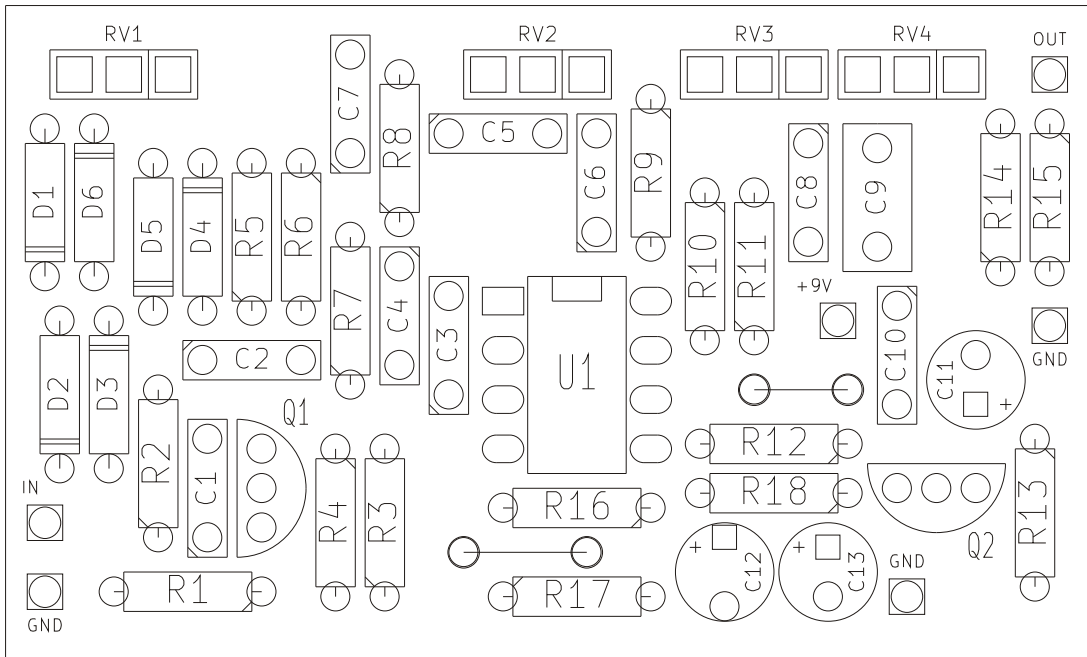


PCB parts placement diagram:

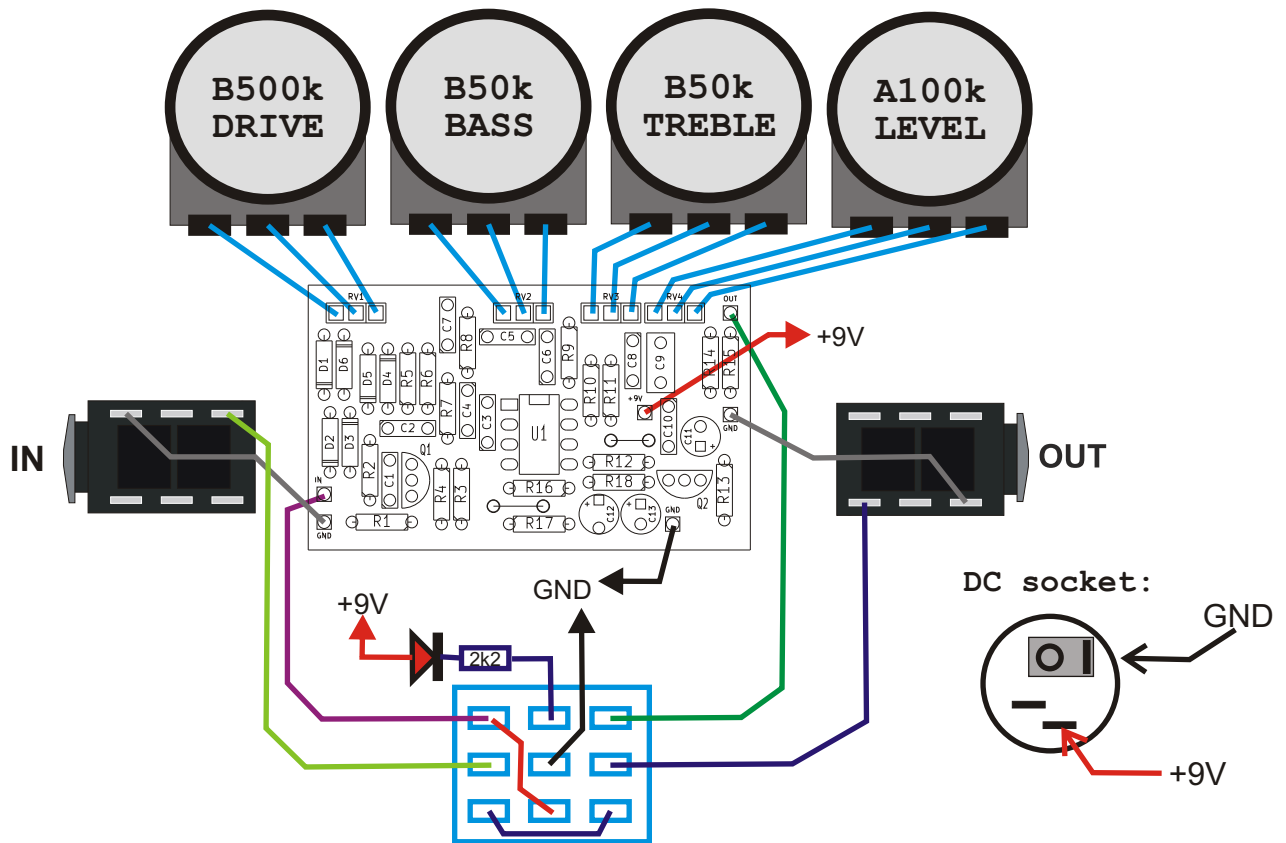


- D1 4148
- D2 4148
- D3 jumper
- D4 4148
- D5 jumper
- D6 jumper
- Q1 2N5088
- Q2 2N5088
- U1 4558

- R1 1M
- R2 10k
- R3 1M
- R4 10k
- R5 10k
- R6 47k
- R7 1k
- R8 4k7
- R9 4k7
- R10 33k
- R11 10k
- R12 470k
- R13 10k
- R14 470R
- R15 100k
- R16 6k8
- R17 15k
- R18 22k
- RV1 B500k
- RV2 B50k
- RV3 B50k
- RV4 A100k

- C1 22n
- C2 100n
- C3 150p
- C4 100n
- C5 33n
- C6 33n
- C7 4n7
- C8 4n7
- C9 1u
- C10 100n
- C11 10u
- C12 10u
- C13 10u

Wiring (bottom view):



Use metal enclosure connected to ground.

Power supply: 9V DC

Bill of materials:

**Resistors:**

470R 1pcs. "R14"  
 1k 1pcs. "R7"  
 2k2 1pcs. "LED"  
 4k7 2pcs. "R8 R9"  
 6k8 1pcs. "R16"  
 10k 5pcs. "R2 R4 R5 R11 R13"  
 15k 1pcs. "R17"  
 22k 1pcs. "R18"  
 33k 1pcs. "R10"  
 47k 1pcs. "R6"  
 100k 1pcs. "R15"  
 470k 1pcs. "R12"  
 1M 2pcs. "R1 R3"

**Capacitors:**

150p 1pcs. "C3"  
 4n7 2pcs. "C7 C8"  
 22n 1pcs. "C1"  
 33n 2pcs. "C5 C6"  
 100n 3pcs. "C2 C4 C10"  
 1u 1pcs. "C9"

**Electrolytic capacitors:**

10u 3pcs. "C11 C12 C13"

**Semiconductors:**

1N4148 3pcs. "D1 D2 D4"  
 4558 1pcs. "U1"  
 2N5088 2pcs. "Q1 Q2"  
 LED 1pcs.

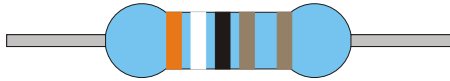
**Potentiometers:**

B50k 2pcs. "RV2 RV3"  
 A100k 1pcs. "RV4"  
 B500k 1pcs. "RV1"

**Other:**

Knobs 4pcs.  
 Footswitch 3PDT 1pcs.  
 DC socket 5.5/2.1 1pcs.  
 JACK socket 2pcs.

## 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:

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

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