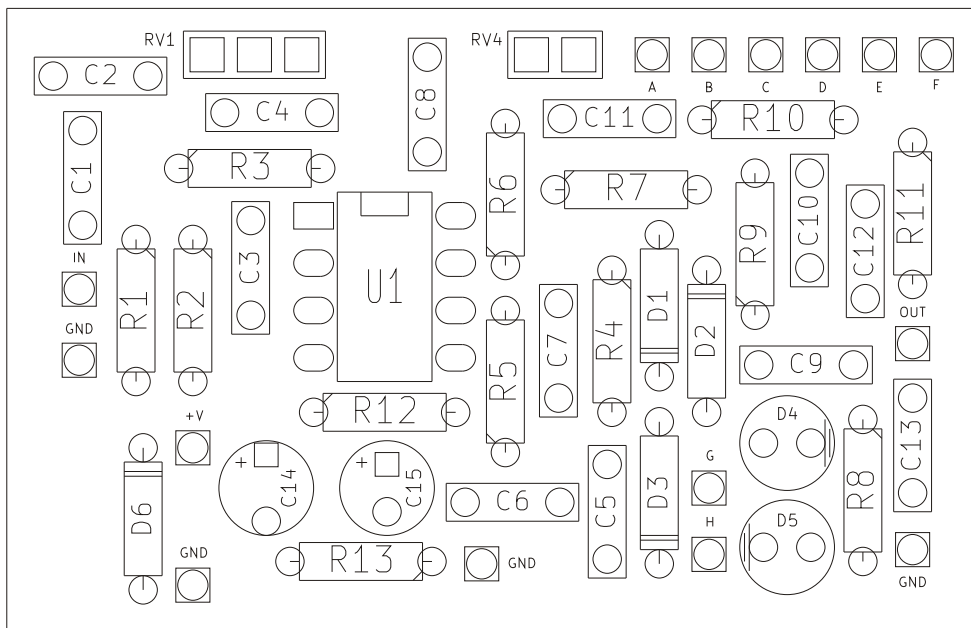
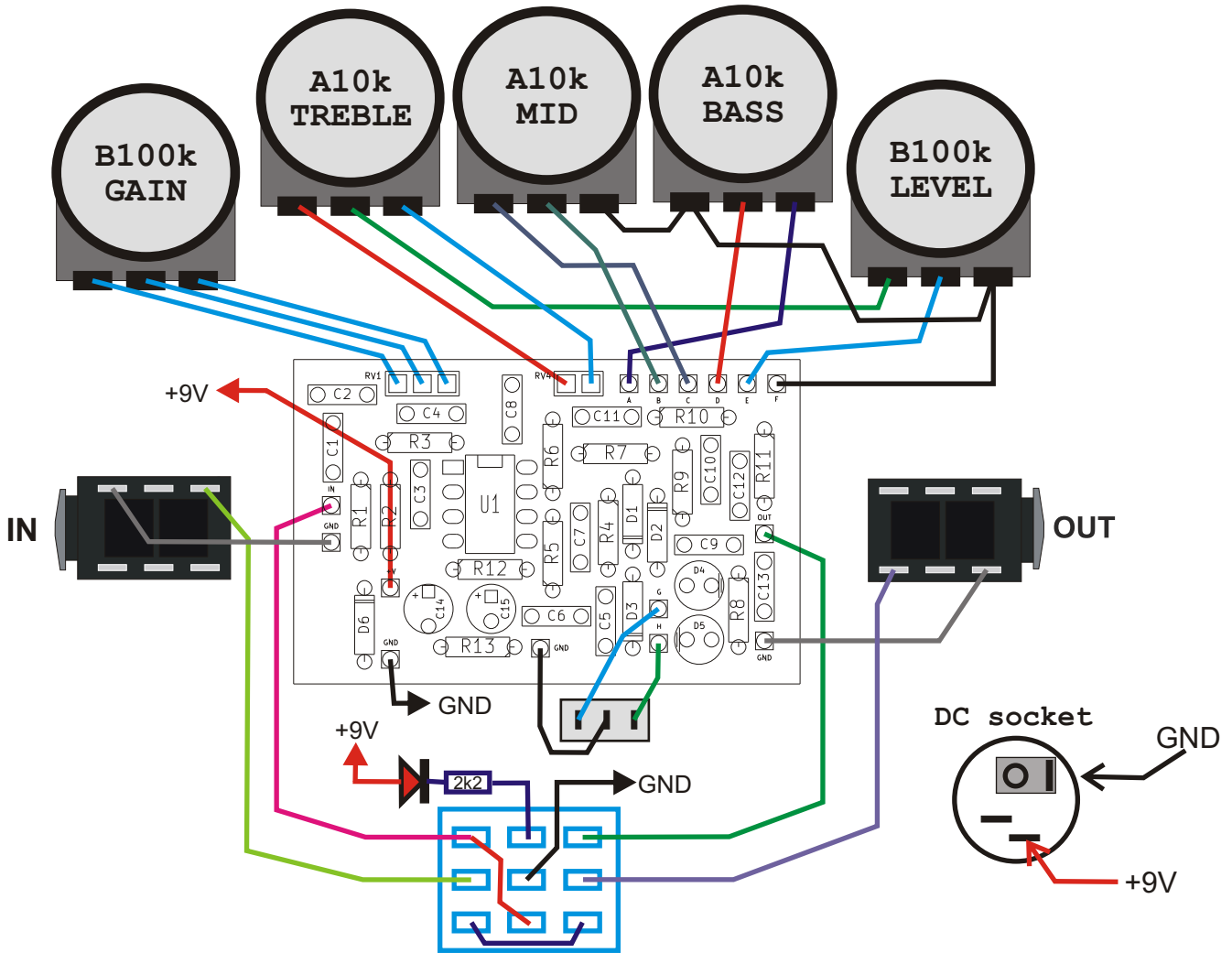


PCB parts placement diagram:



R1 2M2	C1 10n	D1 1N914
R2 1M	C2 100n	D2 1N914
R3 2k2	C3 100p	D3 1N914
R4 10k	C4 220n	D4 LED
R5 680k	C5 100n	D5 LED
R6 1k	C6 220p	D6 1N400X
R7 1k5	C7 220n	
R8 680R	C8 4n7	U1 TL072
R9 680R	C9 100n	
R10 100R	C10 220n	
R11 22k	C11 10n	
R12 47k	C12 68n	
R13 47k	C13 470p	
	C14 47u	
	C15 10u	
RV1 B100k		
RV2 A10k		
RV3 A10k		
RV4 A10k		
RV5 B100k		

Wiring (bottom view) :



Use metal enclosure connected to ground.

Power supply: 9V DC

Bill of materials:

**Resistors:**

100R 1pcs. "R10"  
 680R 2pcs. "R8 R9"  
 1k 1pcs. "R6"  
 1k5 1pcs. "R7"  
 2k2 2pcs. "R3 LED"  
 10k 1pcs. "R4"  
 22k 1pcs. "R11"  
 47k 2pcs. "R12 R13"  
 680k 1pcs. "R5"  
 1M 1pcs. "R2"  
 2M2 1pcs. "R1"

**Capacitors:**

100p 1pcs. "C3"  
 220p 1pcs. "C6"  
 470p 1pcs. "C13"  
 4n7 1pcs. "C8"  
 10n 2pcs. "C1 C11"  
 68n 1pcs. "C12"  
 100n 3pcs. "C2 C5 C9"  
 220n 3pcs. "C4 C7 C10"

**Electrolytic capacitors:**

10u 1pcs. "C15"  
 47u 1pcs. "C14"

**Potentiometers:**

B100k 2pcs. "RV1 RV5"  
 A10k 3pcs. "RV2 RV3 RV4"

**Semiconductors:**

1N914 3pcs. "D1 D2 D3"  
 LED 3pcs. "D4 D5 LED"  
 1N400X 1pcs. "D6"  
 TL072 1pcs. "U1"

**Other:**

Knobs 5pcs.  
 Footswitch 3PDT 1pcs.  
 Jack socket 2pcs.  
 DC socket 5.5/2.1 1pcs.  
 Switch MTS102 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:

$$471 = 47 \times 10^1 \text{ pF} = 470 \text{ pF}$$

$$472 = 47 \times 10^2 \text{ pF} = 4700 \text{ pF} = 4,7 \text{ nF}$$

$$473 = 47 \times 10^3 \text{ pF} = 47000 \text{ pF} = 47 \text{ nF}$$

$$474 = 47 \times 10^4 \text{ pF} = 470000 \text{ pF} = 470 \text{ nF}$$

$$100 \text{ pF} = 100 \text{ p} = 100 = 101$$

$$220 \text{ pF} = 220 \text{ p} = 220 = 221$$

$$4,7 \text{ nF} = 4 \text{ n}7 = 0.0047 = 472$$

$$10 \text{ nF} = 10 \text{ n} = 0.01 = 103$$

$$100 \text{ nF} = 100 \text{ n} = 0.1 = 104$$

$$220 \text{ nF} = 220 \text{ n} = 0.22 = 224$$

$$470 \text{ nF} = 470 \text{ n} = 0.47 = 474$$

$$1000 \text{ nF} = 1 \mu\text{F} = 1 \mu = 105$$