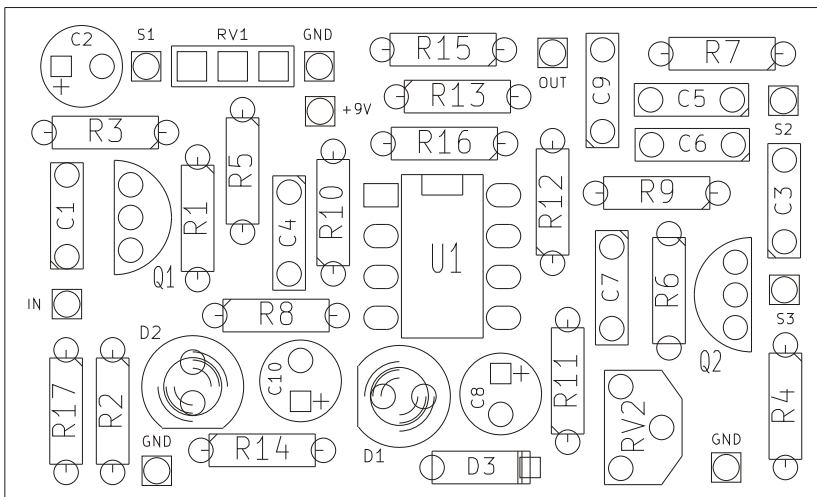
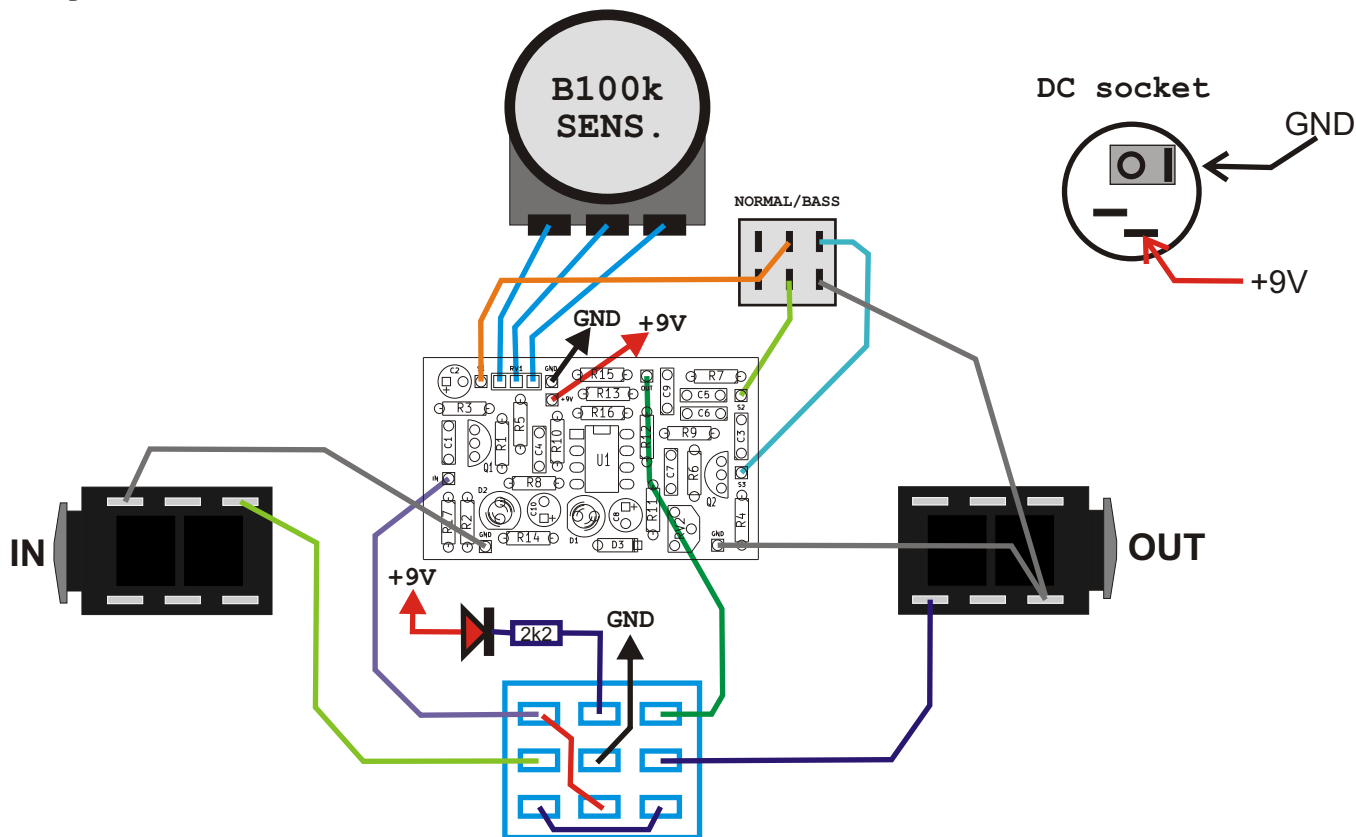


PCB parts placement diagram:



R1	1M	C1	47n	D1	LED
R2	1M	C2	10u	D2	LED
R3	10k	C3	10n	D3	1N914
R4	47k	C4	47n	Q1	2N5457
R5	47k	C5	4n7	Q2	2N3904
R6	22k	C6	4n7	U1	TL072
R7	47k	C7	1n		
R8	10k	C8	10u		
R9	470k	C9	47n		
R10	2M2	C10	10u		
R11	47k				
R12	470k	RV1	B100k		
R13	47k	RV2	25k trim.		
R14	100R				
R15	470k				
R16	47R				
R17	2M2				

Wiring (bottom view):



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

Bill of materials:

Resistors:

47R 1pcs. "R16"  
 100R 1pcs. "R14"  
 2k2 1pcs. "LED"  
 10k 2pcs. "R3 R8"  
 22k 1pcs. "R6"  
 47k 5pcs. "R4 R5 R7 R11 R13"  
 470k 3pcs. "R9 R12 R15"  
 1M 2pcs. "R1 R2"  
 2M2 2pcs. "R10 R17"

Potentiometers:

B100k 1pcs. "RV1"  
 25k trymer 1pcs. "RV2"

Other:

Knob 1pcs.  
 Footswitch 3PDT 1pcs.  
 DC socket 1pcs.  
 JACK socket 2pcs.  
 Switch MTS202 1pcs.

Capacitors:

1n 1pcs. "C7"  
 4n7 2pcs. "C5 C6"  
 47n 3pcs. "C1 C4 C9"  
 10n 1pcs. "C3"

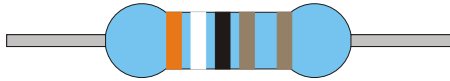
Electrolytic capacitors:

10u 3pcs. "C2 C8 C10"

Semiconductors:

TL072 1pcs. "U1"  
 2N3904 1pcs. "Q2"  
 2N5457 1pcs. "Q1"  
 1N914 1pcs. "D3"  
 LED 3pcs. "D1 D1"

## 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:

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

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

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

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

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

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

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

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

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

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

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

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