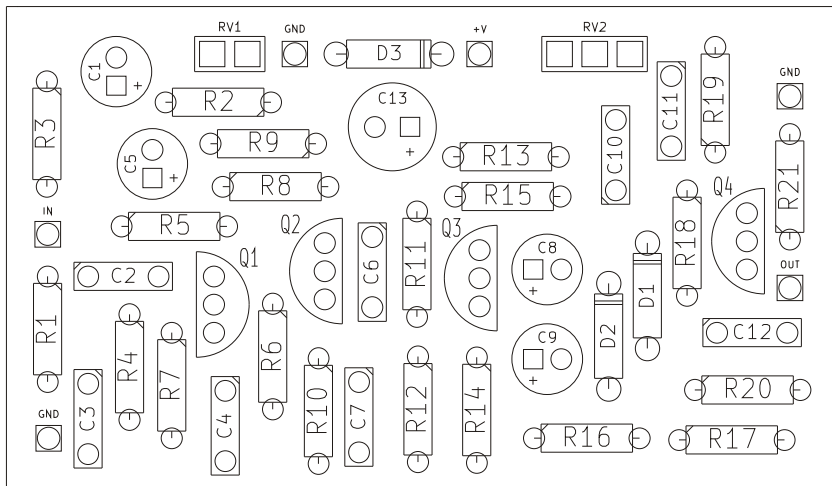
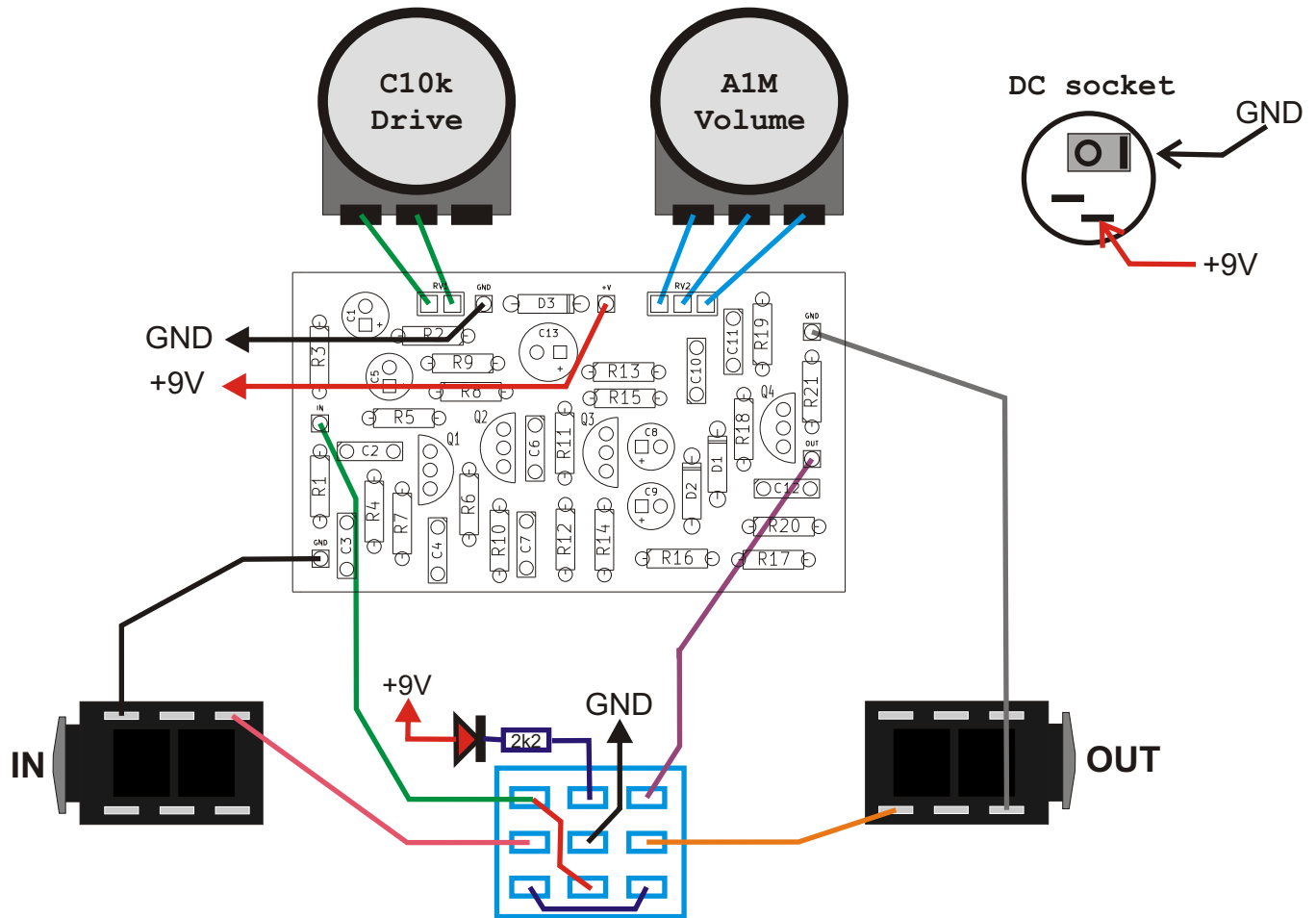


PCB parts placement diagram:



- |     |      |     |        |
|-----|------|-----|--------|
| R1  | 2M2  | C1  | 22u    |
| R2  | 180k | C2  | 10n    |
| R3  | 820k | C3  | 470p   |
| R4  | 680k | C4  | 1n     |
| R5  | 220R | C5  | 22u    |
| R6  | 100k | C6  | 10n    |
| R7  | 220R | C7  | 100n   |
| R8  | 47k  | C8  | 22u    |
| R9  | 39k  | C9  | 22u    |
| R10 | 39k  | C10 | 10n    |
| R11 | 470k | C11 | 10n    |
| R12 | 330k | C12 | 100n   |
| R13 | 10k  | C13 | 100u   |
| R14 | 10k  |     |        |
| R15 | 2M2  | D1  | 4148   |
| R16 | 820k | D2  | 4148   |
| R17 | 100k | D3  | 400X   |
| R18 | 2M2  |     |        |
| R19 | 2M2  | Q1  | 2N3906 |
| R20 | 10k  | Q2  | MP5A13 |
| R21 | 150k | Q3  | MP5A13 |
|     |      | Q4  | MP5A13 |
| RV1 | C10k |     |        |
| RV2 | A1M  |     |        |

Wiring (single version, bottom view):



Use metal enclosure connected to ground.

Power supply: 9V DC

Bill of materials:

Resistors:

1pcs. 2k2 "LED"  
 2pcs. 220R "R5 R7"  
 3pcs. 10k "R13 R14 R20"  
 2pcs. 39k "R9 R10"  
 1pcs. 47k "R8"  
 2pcs. 100k "R6 R17"  
 1pcs. 150k "R21"  
 1pcs. 180k "R2"  
 1pcs. 330k "R12"  
 1pcs. 470k "R11"  
 1pcs. 680k "R4"  
 2pcs. 820k "R3 R16"  
 4pcs. 2M2 "R1 R15 R18 R19"

Potentiometers:

1pcs. C10k "RV1"  
 1pcs. A1M "RV2"

Capacitors:

1pcs. 470p "C3"  
 1pcs. 1n "C4"  
 4pcs. 10n "C2 C6 C10 C11"  
 2pcs. 100n "C7 C12"

Electrolytic capacitors:

4pcs. 22u "C1 C5 C8 C9"  
 1pcs. 100u "C13"

Semiconductors:

1pcs. LED  
 2pcs. 4148 "D1 D2"  
 1pcs. 400X "D3"  
 1pcs. 2N3906 "Q1"  
 3pcs. MPSA13 "Q2 Q3 Q4"

Other:

2pcs. Knob  
 1pcs. Footswitch 3PDT  
 2pcs. Jack socket  
 1pcs. DC socket 5.5/2.1

## 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:

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

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

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

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

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

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

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

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

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

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

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

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