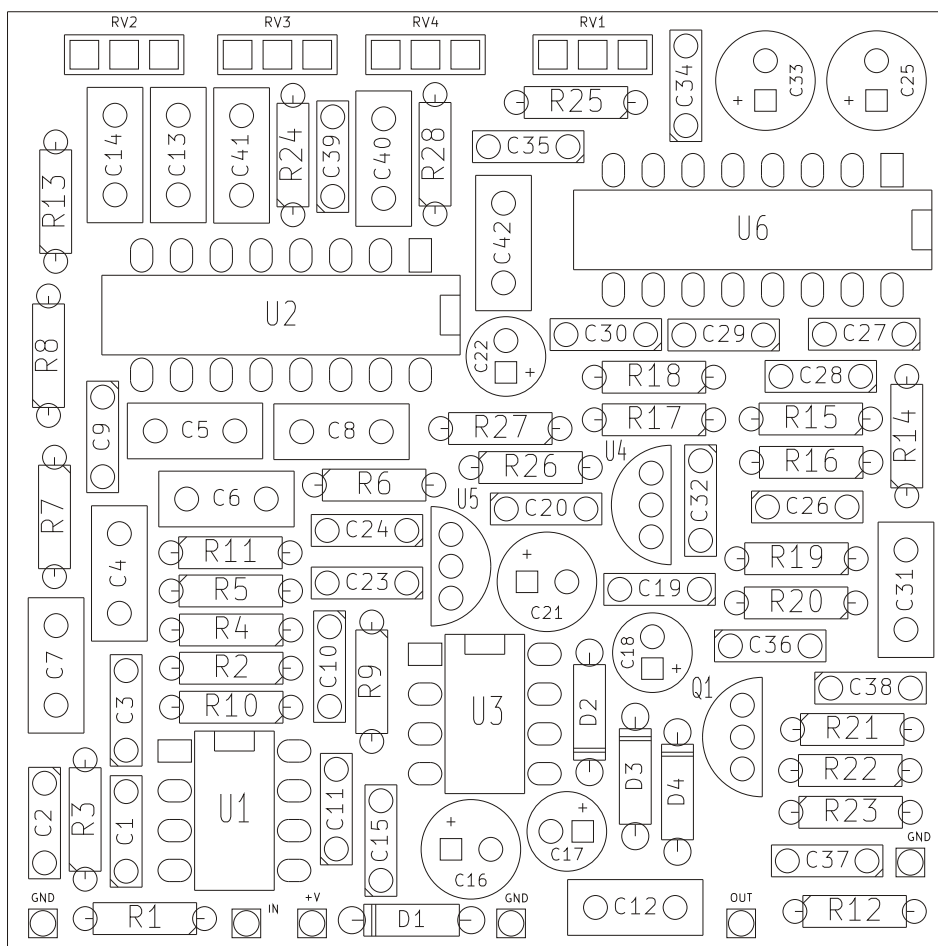
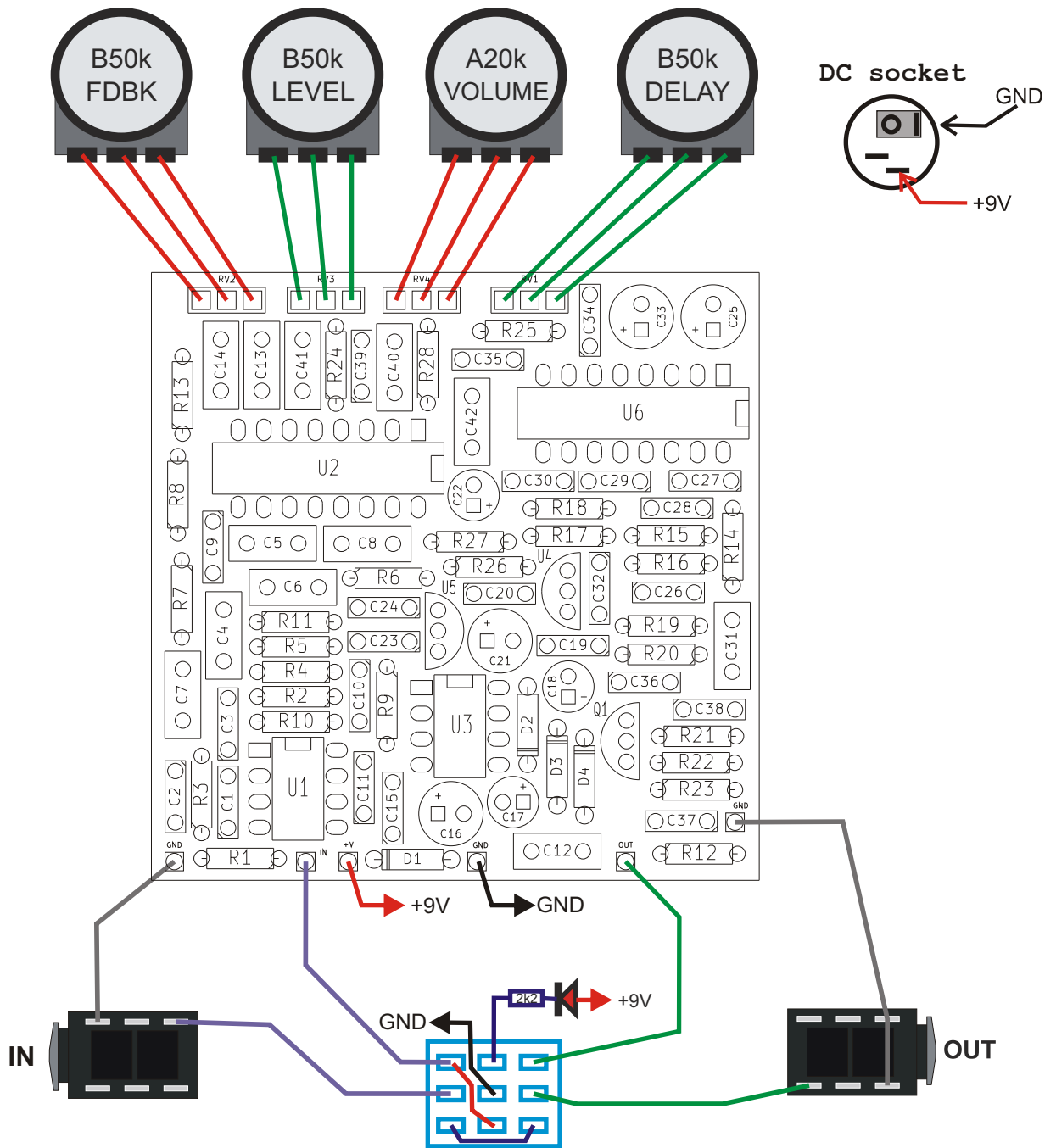


PCB parts placement diagram:



|          |          |          |             |
|----------|----------|----------|-------------|
| R1 1M    | C1 47n   | C27 2n2  | D1 1N914    |
| R2 1M    | C2 15n   | C28 1n   | D2 1N914    |
| R3 1k    | C3 470p  | C29 100n | D3 1N914    |
| R4 10k   | C4 1uNP  | C30 100n | D4 1N914    |
| R5 10k   | C5 1uNP  | C31 1uNP | Q1 2N5088   |
| R6 22K   | C6 1uNP  | C32 10n  | U1 TL072    |
| R7 36k   | C7 1uNP  | C33 47u  | U2 NE570/1  |
| R8 36k   | C8 470n  | C34 100n | U3 ICL7660S |
| R9 1k    | C9 100p  | C35 100n | U4 78L12    |
| R10 1k   | C10 15n  | C36 2n2  | U5 78L05    |
| R11 10k  | C11 47p  | C37 3n3  | U6 PT2399   |
| R12 100k | C12 1uNP | C38 1n   |             |
| R13 22k  | C13 1uNP | C39 100p |             |
| R14 10k  | C14 1uNP | C40 470n |             |
| R15 22k  | C15 100n | C41 1uNP |             |
| R16 22k  | C16 100u | C42 1uNP |             |
| R17 10k  | C17 10u  |          |             |
| R18 22k  | C18 10u  |          |             |
| R19 100k | C19 100n | RV1 B50k |             |
| R20 10k  | C20 100n | RV2 B50k |             |
| R21 10k  | C21 47u  | RV3 B50k |             |
| R22 10k  | C22 22u  | RV4 A20k |             |
| R23 10k  | C23 100n |          |             |
| R24 10k  | C24 100n |          |             |
| R25 1k   | C25 47u  |          |             |
| R26 10k  | C26 10n  |          |             |
| R27 10k  |          |          |             |
| R28 6k8  |          |          |             |

Wiring (bottom view):



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

## Bill of materials:

### Resistors:

1k 4pcs. "R3 R9 R10 R25"  
2k2 1pcs. "LED"  
6k8 1pcs. "R28"  
10k 12pcs. "R4 R5 R11 R14 R17 R20  
R21 R22 R23 R24 R26 R27"  
22k 5pcs. "R6 R13 R15 R16 R18"  
36k 2pcs. "R7 R8"  
100k 2pcs. "R12 R19"  
1M 2pcs. "R1 R2"

### Potentiometers:

B50k 3pcs. "RV1 RV2 RV3"  
A20k 1pcs. "RV4"

### Capacitors:

47p 1pcs. "C11"  
100p 2pcs. "C9 C39"  
470p 1pcs. "C3"  
1n 2pcs. "C28 C38"  
2n2 2pcs. "C27 C36"  
3n3 1pcs. "C37"  
10n 2pcs. "C26 C32"  
15n 2pcs. "C2 C10"  
47n 1pcs. "C1"  
100n 9pcs. "C15 C19 C20 C23 C24  
C29 C30 C34 C35"  
470n 2pcs. "C8 C40"  
1u 10pcs. "C4 C5 C6 C7 C12 C13  
C14 C31 C41 C42"

### Electrolytic capacitors:

10u 2pcs. "C17 C18"  
22u 1pcs. "C22"  
47u 3pcs. "C21 C25 C33"  
100u 1pcs. "C16"

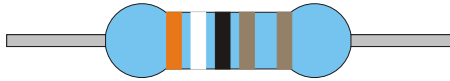
### Semiconductors:

1N914 4pcs. "D1 D2 D3 D4"  
2N5088 1pcs. "Q1"  
NE570/1 1pcs. "U2"  
TL072 1pcs. "U1"  
ICL7660S 1pcs. "U3"  
78L12 1pcs. "U4"  
78L05 1pcs. "U5"  
PT2399 1pcs. "U6"  
LED 1pcs.

### Other:

Footswitch 3PDT 1pcs.  
Knob 4pcs.  
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:

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

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

