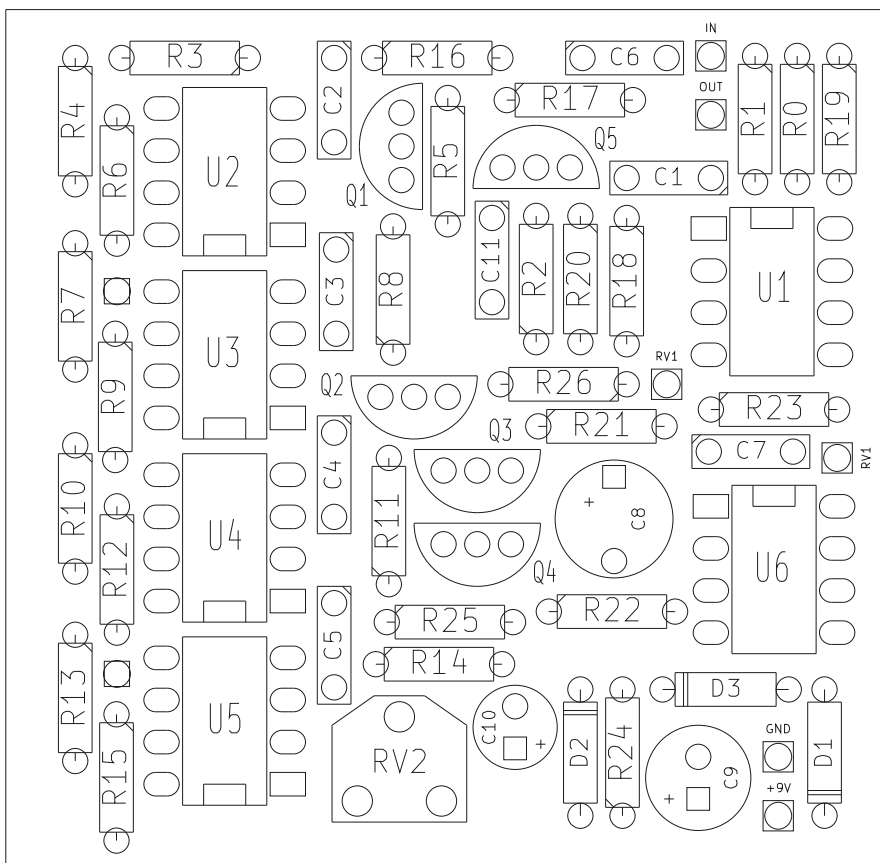


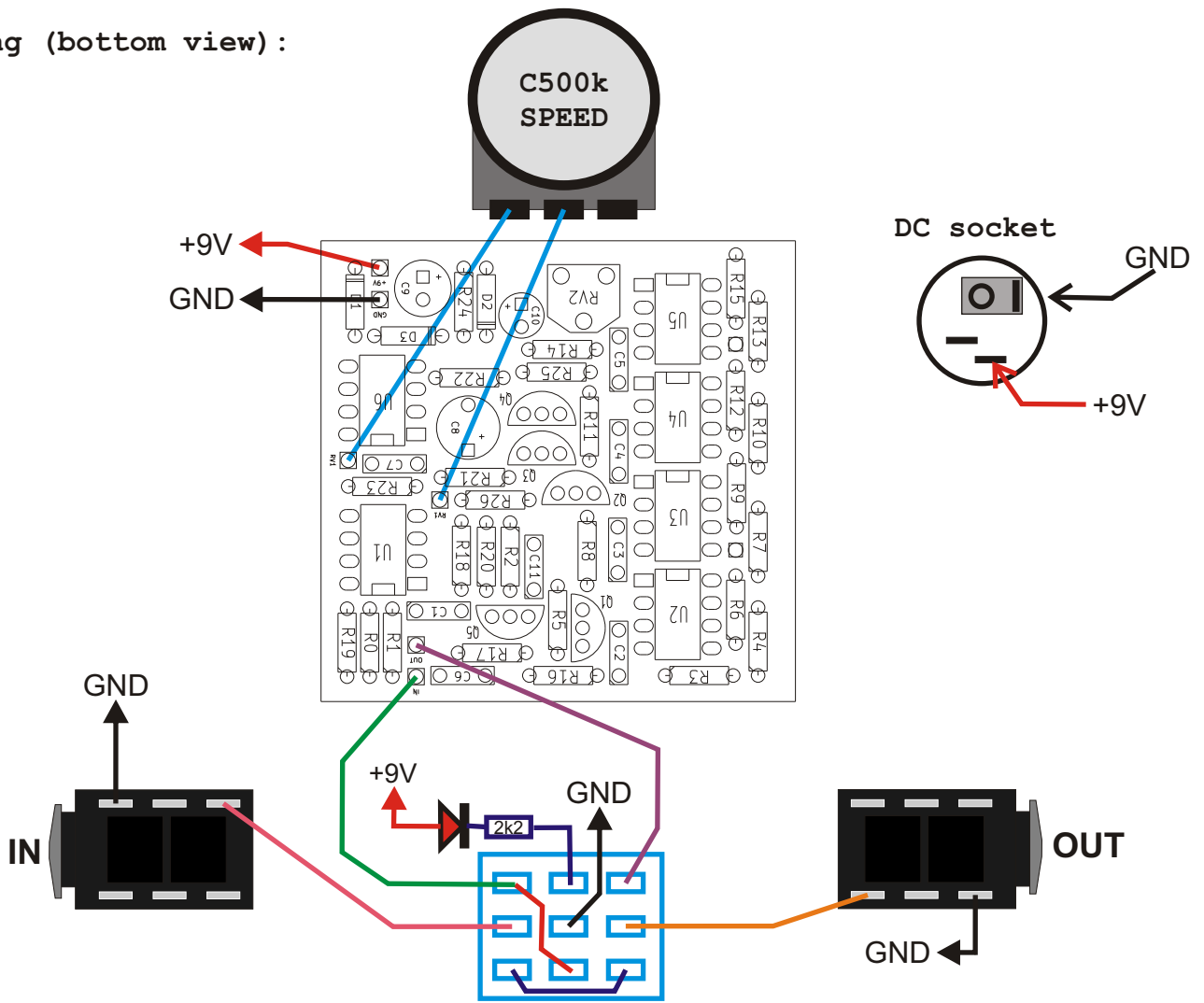
PCB parts placement diagram:



- | | |
|--------------|-----------|
| R0 1M | C1 10n |
| R1 10k | C2 47n |
| R2 470k | C3 47n |
| R3 10k | C4 47n |
| R4 10k | C5 47n |
| R5 24k | C6 47n |
| R6 10k | C7 10n |
| R7 10k | C8 15u |
| R8 24k | C9 47u |
| R9 10k | C10 22u |
| R10 10k | C11 47n |
| R11 24k | D1 1N400X |
| R12 10k | D2 1N914 |
| R13 10k | D3 5v1 |
| R14 24k | Q1 2n5952 |
| R15 150k | Q2 2n5952 |
| R16 150k | Q3 2n5952 |
| R17 150k | Q4 2n5952 |
| R18 56k | Q5 2n3906 |
| R19 150k | U1 741 |
| R20 3M9 | U2 741 |
| R21 150k | U3 741 |
| R22 150k | U4 741 |
| R23 470k | U5 741 |
| R24 10k | U6 741 |
| R25 1M | |
| R26 4k7 | |
| RV1 C500k | |
| RV2 Tr. 200k | |

Transistors Q1,Q2,Q3,Q4 must be matched!

Wiring (bottom view):



Use metal enclosure connected to ground.
 Set trimpot to hear modulation.
 Power supply: 9V DC

Bill of materials:

Resistors:

- 2k2 1pcs. "LED"
- 4k7 1pcs. "R26"
- 10k 10pcs. "R1 R3 R4 R6 R7 R9 R10 R12 R13 R24"
- 24k 4pcs. "R5 R8 R11 R14"
- 56k 1pcs. "R18"
- 150k 6pcs. "R15 R16 R17 R19 R21 R22"
- 470k 2pcs. "R2 R23"
- 1M 2pcs. "R0 R25"
- 3M9 1pcs. "R20"

Potentiometers:

- 200k trimpot 1pcs. "RV2"
- C500k 1pcs. "RV1"

Other:

- Knobs 1pcs.
- Footswitch 3PDT 1pcs.
- Jack socket 2pcs.
- DC socket 1pcs.

Capacitors:

- 10n 2pcs. "C1 C7"
- 47n 6pcs. "C2 C3 C4 C5 C6 C11"

Electrolytic capacitors:

- 15u 1pcs. "C8"
- 22u 1pcs. "C10"
- 47u 1pcs. "C9"

Semiconductors:

- 1N400X 1pcs. "D1"
- 1N914 1pcs. "D2"
- 5v1 1pcs. "D3"
- 2n5952 4pcs. "Q1 Q2 Q3 Q4"
- 2n3906 1pcs. "Q5"
- 741 6pcs. "U1 U2 U3 U4 U5 U6"
- LED 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 Ω	
Brown	1	1	1	10 Ω	1%
Red	2	2	2	100 Ω	2%
Orange	3	3	3	1k Ω	
Yellow	4	4	4	10 k Ω	
Green	5	5	5	100 k Ω	0,5%
Blue	6	6	6	1 M Ω	0,25%
Purple	7	7	7	10 M Ω	0,1%
Gray	8	8	8	100 M Ω	0,05%
White	9	9	9	1 G Ω	
Gold				0,1 Ω	5%
Silver				0,01 Ω	10%

Capacitors markings:

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

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

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

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

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

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

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

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

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

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

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

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