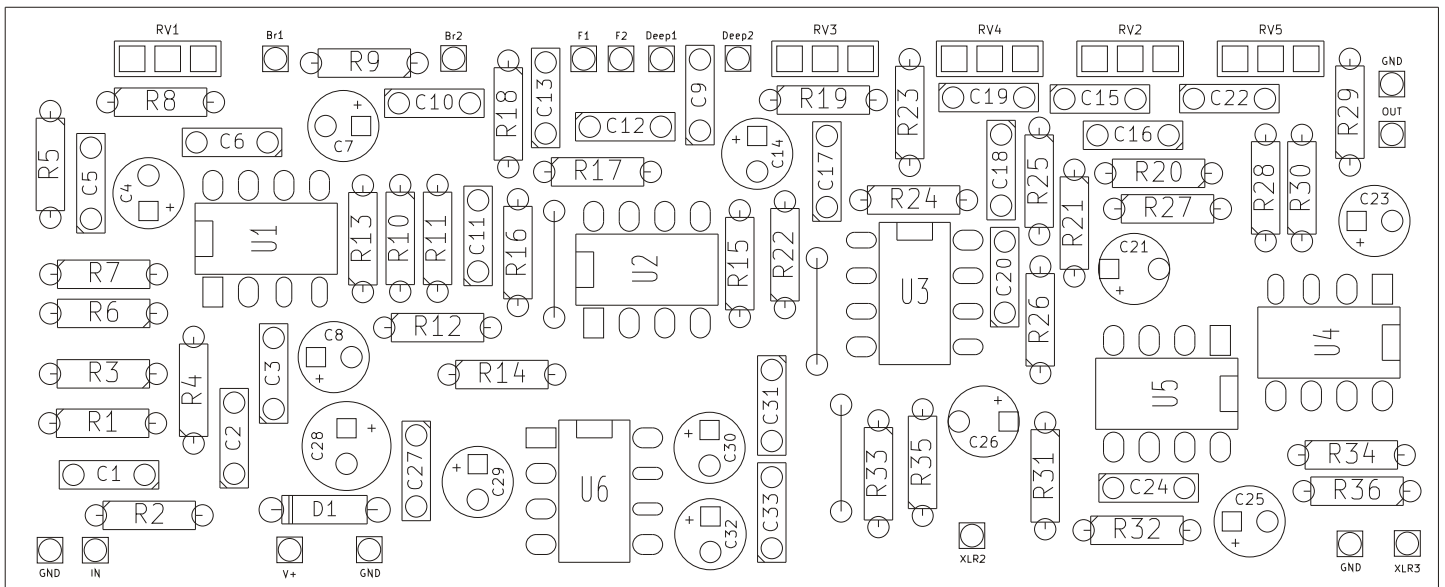
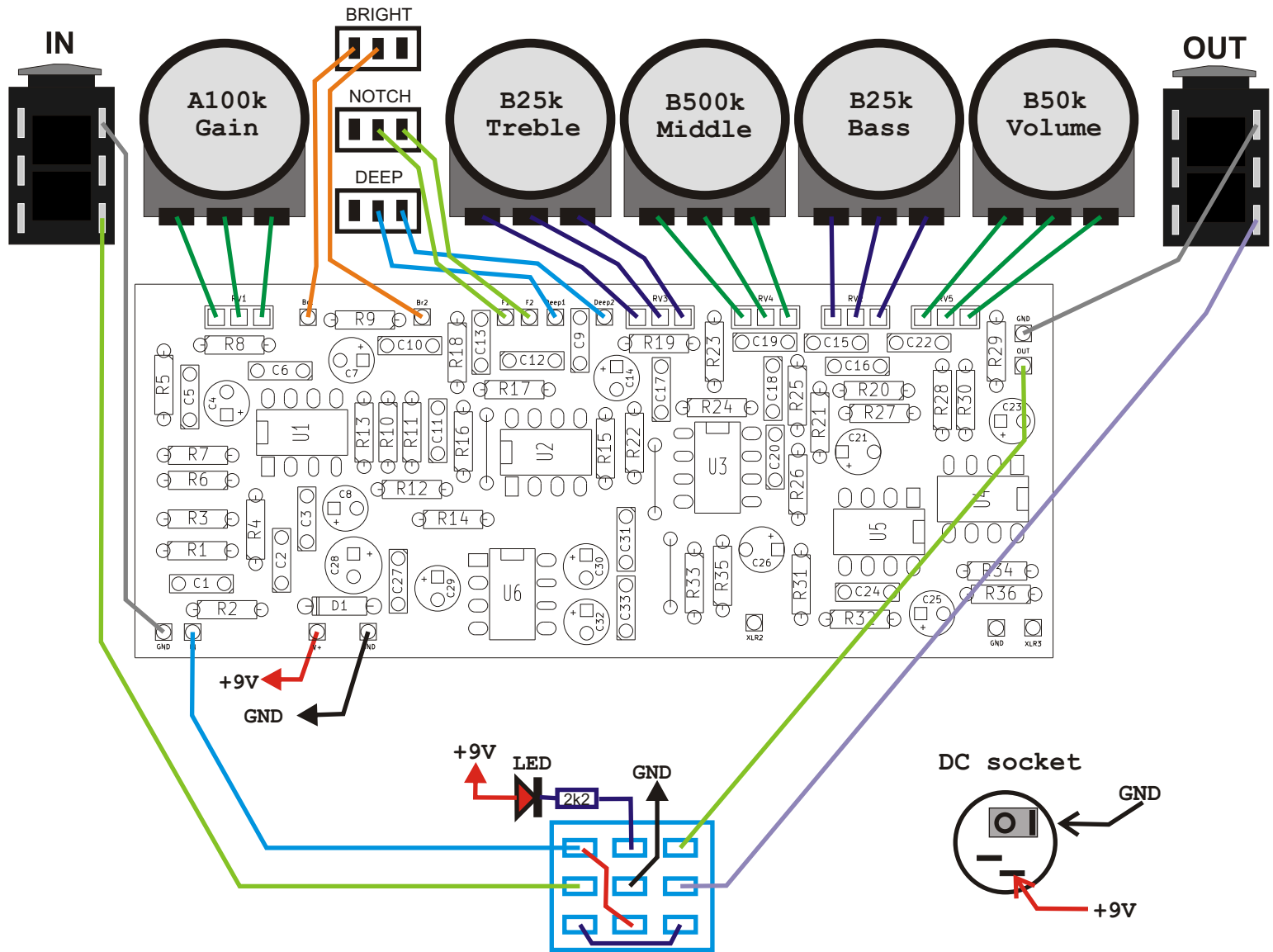


PCB parts placement diagram:



R1 1M	R19 3k6	C1 47p	C19 6n8	RV1 A100k
R2 68k	R20 3k6	C2 10n	C20 3n3	RV2 B25k
R3 750k	R21 33k	C3 10n	C21 10u	RV3 B25k
R4 270k	R22 10k	C4 2u2	C22 22p	RV4 B500k
R5 3k3	R23 10k	C5 220n	C23 10u	RV5 B50k
R6 10k	R24 100k	C6 22p	C24 empty	
R7 1k	R25 10k	C7 10u	C25 empty	D1 1N400X
R8 10k	R26 100k	C8 1u	C26 empty	U1 TL072
R9 10M	R27 22k	C9 47n	C27 100n	U2 TL072
R10 10k	R28 empty	C10 15n	C28 47u	U3 TL072
R11 1k8	R29 100k	C11 22n	C29 1u	U4 TL072
R12 10k	R30 empty	C12 22n	C30 10u	U5 empty
R13 3k6	R31 empty	C13 22n	C31 10n	U6 ICL7660S
R14 10k	R32 empty	C14 2u2	C32 10u	
R15 10k	R33 empty	C15 150n	C33 10n	
R16 13k	R34 empty	C16 150n		
R17 13k	R35 empty	C17 1n5		
R18 6k2	R36 empty	C18 4n7		

Wiring (bottom view):



Use metal enclosure connected to ground.

Power supply: 9V DC

Bill of materials:

Resistors:

1k 1pcs. "R7"  
 1k8 1pcs. "R11"  
 2k2 1pcs. "LED"  
 3k3 1pcs. "R5"  
 3k6 3pcs. "R13 R19 R20"  
 6k2 1pcs. "R18"  
 10k 9pcs. "R6 R8 R10 R12 R14  
 R15 R22 R23 R25"  
 13k 2pcs. "R16 R17"  
 22k 1pcs. "R27"  
 33k 1pcs. "R21"  
 68k 1pcs. "R2"  
 100k 3pcs. "R24 R26 R29"  
 270k 1pcs. "R4"  
 750k 1pcs. "R3"  
 1M 1pcs. "R1"  
 10M 1pcs. "R9"

Potentiometers:

B50k 1pcs. "RV5"  
 A100k 1pcs. "RV1"  
 B25k 2pcs. "RV2 RV3"  
 B500k 1pcs. "RV4"

Capacitors:

22p 2pcs. "C6 C22"  
 47p 1pcs. "C1"  
 1n5 1pcs. "C17"  
 3n3 1pcs. "C20"  
 4n7 1pcs. "C18"  
 6n8 1pcs. "C19"  
 10n 4pcs. "C2 C3 C31 C33"  
 15n 1pcs. "C10"  
 22n 3pcs. "C11 C12 C13"  
 47n 1pcs. "C9"  
 100n 1pcs. "C27"  
 150n 2pcs. "C15 C16"  
 220n 1pcs. "C5"

Electrolytic capacitors:

1u 2pcs. "C8 C29"  
 2u2 2pcs. "C4 C14"  
 10u 5pcs. "C7 C21 C23 C30 C32"  
 47u 1pcs. "C28"

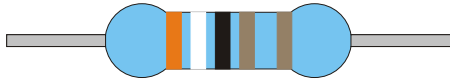
Semiconductors:

1N400X 1pcs. "D1"  
 T1072 4pcs. "U1 U2 U3 U4"  
 ICL7660S 1pcs. "U6"

Other:

Knobs 5pcs.  
 Footswitch 3PDT 1pcs.  
 JACK socket 2pcs.  
 DC socket 5.5/2.1 1pcs.  
 SPDT switch 3pcs.

## 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:

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

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