

Figure 5. The track pattern and component layout for the printed circuit board used for the precision power supply.

Parts list

Resistors:

R1,R3,R6,R8,R12,R13,R14 = 4k7
 R2 = 22 Ω
 R4,R16 - see text
 R5 = 10 k
 R7,R10 = 1 k
 R9 = 2k2
 R11 = 470 Ω /1 W
 R15 = 15 k
 R17 = 10 Ω /1 W
 R18,R19,R20 = 0.22 Ω /3 W
 R22 = 4k7/1 W
 R23,R24 = 47 Ω
 R25 = 5k6
 R26 = 270 k
 P1 = 50 k potentiometer
 P2 = 1 k potentiometer
 P3 = 2k5 preset
 P4 = 250 k preset

Capacitors:

C1,C2 = 100 μ /25 V
 C3 = 100 μ /10 V
 C4 = 100 p
 C5 = 10 μ /25 V
 C6 = 1 n
 C7 = 100 p
 C8 = 56 p
 C9 = 47 μ /50 V
 C10 = 4700 μ /63 V
 C11 = 820 n
 C12 = 100 n

Semiconductors:

S1 = bridge rectifier B40C1000
 S2 = bridge rectifier B80C5000/3300
 D1,D8 = 1N4001
 D2...D5 = 1N4148
 D6 = 3V3 400 mW zener
 D7 = LED red
 T1 = BC559C
 T2 = BD 241
 T3,T4,T5 = 2N3055
 IC1 = 723
 IC2,IC3 = 741

Miscellaneous:

S1 = double pole mains switch
 M1,M2 = 100 μ A meter
 T1 = 2 x 12 V/400 mA mains transformer
 T2 = 33 V/4 A mains transformer
 F = 1 A fuse

output load resistance is necessary. This is taken care of by R22. It will be noted that there appear to be more output terminals than the usual power supply needs. The two extra outputs, $+U_s$ and $-U_s$, are in fact inputs. These so-called 'sense' inputs are used to allow for voltage drop compensation when working with long connecting cables between the power supply and its load. Figure 4 illustrates how the inputs are used. Two extra wires are connected as shown between the load and the sense inputs. The result of this is that the supply voltage level is now effectively measured at the load and not at the output terminals of the power supply. This enables the circuit to compensate for any voltage drop resulting from the resistance in the main supply cables. It should be noted that if the total resistance of the two main supply cables is 1 Ω , at the current level of 1 A the voltage drop will be 1 V. In normal use,

6

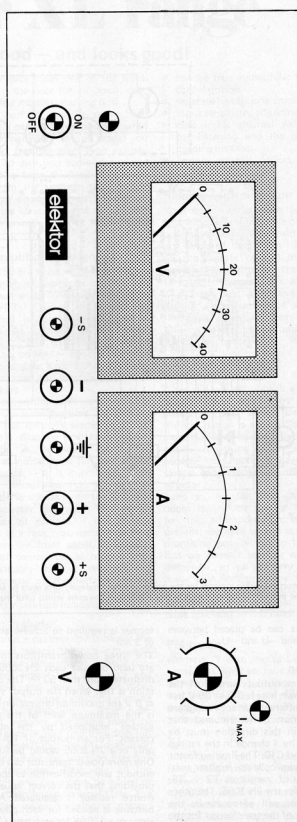


Figure 7. The design of the front panel that is available from Elektor. It is manufactured from scratch resistant polycarbonate material and is self-adhesive. The illustration is at a reduced scale, the actual size is 11 cm by 30 cm.