miniature amplifier

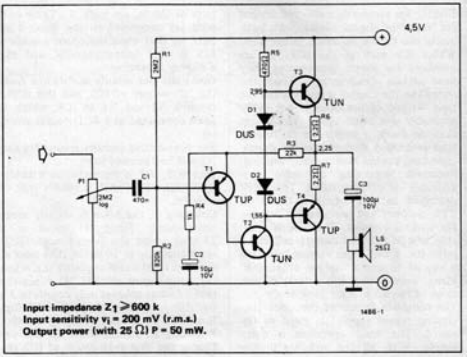
For the younger constructor with limited funds it is necessary to be very cost-conscious when designing circuits. This circuit for a simple record player amplifier fulfils these requirements. The circuit will operate from a 4.5 V battery and can be used to amplify the output of a crystal pickup to drive a small loudspeaker or headphones. The circuit is not outstanding for its power or quality, but it is simple and reliable.

The input and driver stages T1 and T2 operate as voltage amplifiers. The output stage, T3 and T4, operates in class B to achieve long battery life. D.C. feedback is provided by means of R3 and A.C. feedback by means of R3, R4 and C2. This defines the gain, stabilises the operating point and increases the input impedance.

The biassing of T1 is critical and the values for R1 and R2 must be adhered to. Should the circuit fail to operate correctly the D.C. conditions may be checked at the base of T3 and T4 and the junction of R6 and R7.

If 25 ohm loudspeakers are difficult to obtain, then 8 or 15 ohm types may be used instead. In that case R6 and R7 should be replaced by wire links.

As can be seen from figure 2 the p.c. board is extremely miniature and finding space in the record player cabinet should be no problem. To improve loudspeaker efficiency the loudspeaker cabinet should be as large as possible.



Input impedance $Z_i \geqslant 600$ k
Input sensitivity $v_i = 200$ mV (r.m.s.)
Output power (with 25 Ω) P = 50 mW.

Figure 1. The very simple amplifier circuit.

Parts list.

Resistors:
R1 = 2M2
R2 = 820 k
R9 = 22 k
R4 = 1 k
R5 = 470 Ω
R6 = 2.2 Ω
R7 = 2.2 Ω
P1 = 2M2 log

Capacitors:
C1 = 470 n
C2 = 10 µ/10 V
C3 = 100 µ/10 V

Semiconductors:
T1,T4 = TUP
T2,T3 = TUN
D1,D2 = DUS

Sundries:
Torch battery 4.5 V
Loudspeaker 25 Ω

Figure 2. Layout of match-box size printed-circuit board.

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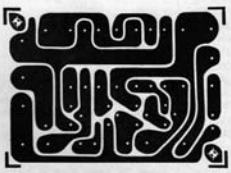

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