mains on delay circuit

The delay is intended to switch on the mains to heavy loads gradually to ensure that the switch-on current remains within certain limits and to prevent the fuses from blowing. The elements that cause high currents at switch-on are, for instance, the electrolytic capacitors in the power supply of an output amplifier. Since these are not charged at switch-on, they constitute a virtual short-circuit on the supply lines. The current can, however, be kept within limits by inserting the present delay circuit between the mains outlet and the transformer primary. The amplifier is then powered in two stages: in the first instance, the current is limited by a number of heavy-duty series resistors; a second later these resistors are shunted (short-circuited) by a relay contact.

In the diagram, R_4–R_7 are the heavy-duty series resistors, each with a value of 10 Ω and rated at 5 W. They limit the switch-on current to about 5.5 A.

The relay is a type whose contact is rated at 2000 VA, which will be sufficient in most cases. Its supply is derived directly from the mains via potential divider R_3-C_1-B_1-relay coil. The resistor, R_3 limits the current at switch-on, after which C_1 limits the current in normal operation to about 20 mA. The delay time is determined by electrolytic capacitors C_2 and C_3 in parallel with the relay. The delay time may be altered by suitably changing the value of one or both of these capacitors.

For safety's sake, the board also has provision for a mains fuse, F_1. The rating of this depends, of course, on the current drawn by the load.

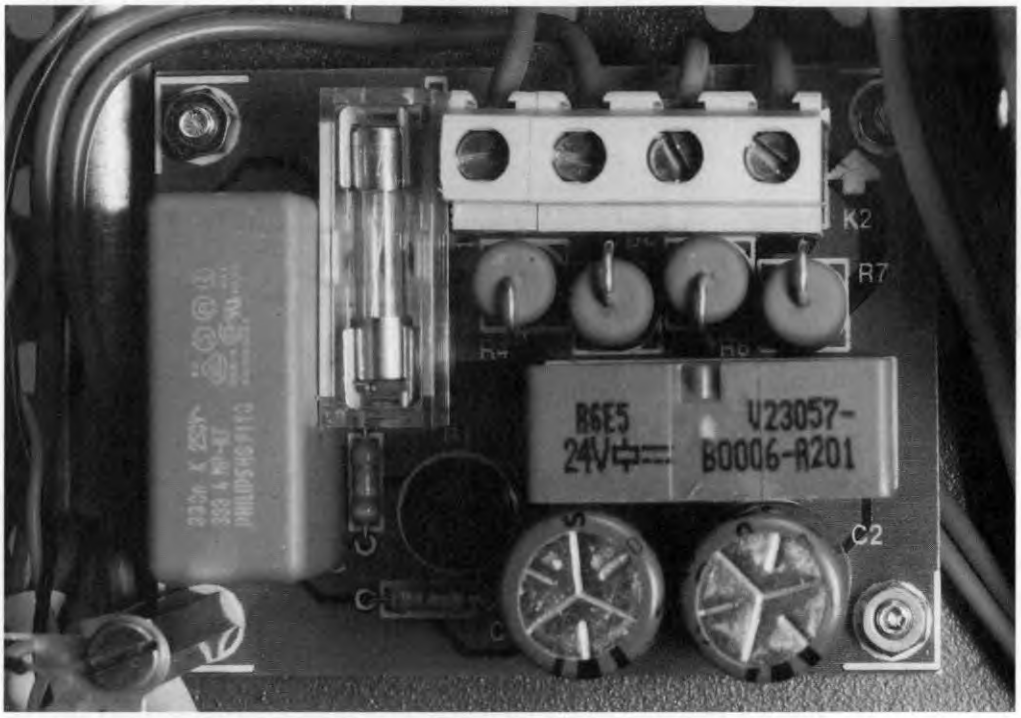
It should be noted that in the case of a double-mono stereo output amplifier (with separate power supplies) each of the mono amplifiers must be given a mains-on delay.

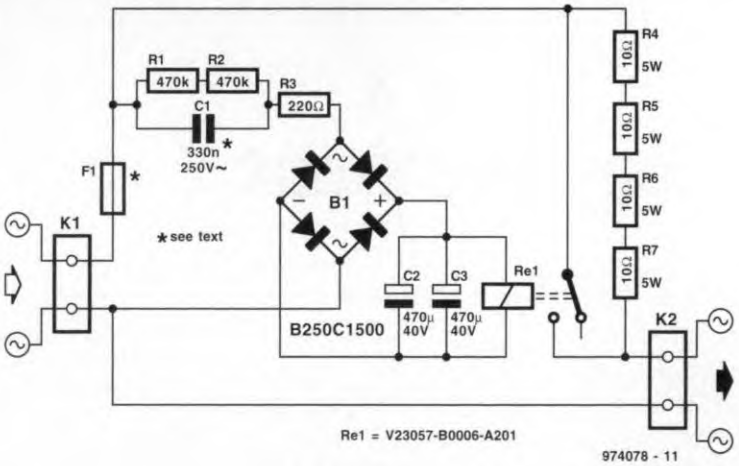
As mentioned earlier, the values of R_4–R_7 refer to a switch-on current of about 5.5 A. If the power rating of the load is lower than 200 VA, it is advisable to use resistors with a slightly higher value.

Note that C_1 is a metallized paper type, which is designed specially for mains voltage applications and meets stringent regulatory requirements.

Finally, at all times bear in mind that the circuit is connected to the mains, so do not touch anything inside the unit during operation and make sure that all wiring is safe and secure.

[Giesberts – 974078]



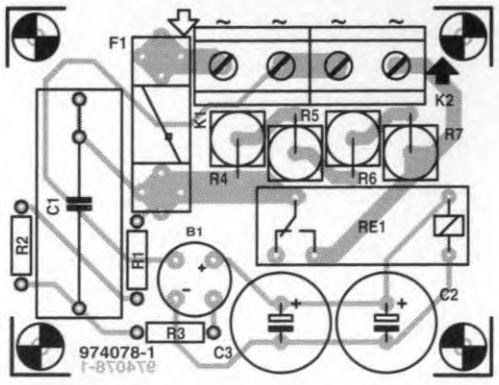


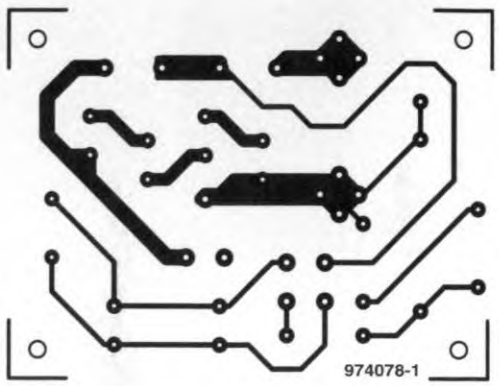
Parts list

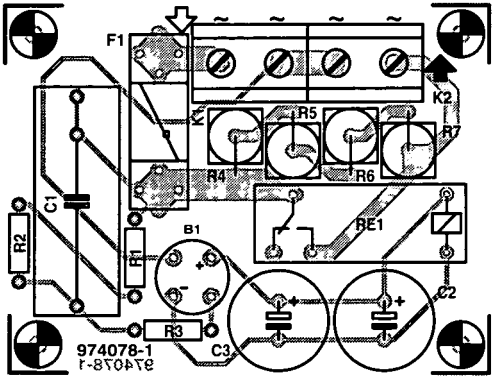
Resistors:
R_1, R_2 = 470 kΩ
R_3 = 220 Ω
R_4–R_7 = 10 Ω, 5 W

Miscellaneous:
K_1, K_2 = 2-way terminal block, pitch 7.5 mm
B_1 = B250C1500, round
Re_1 = contact rating 250 V, 8 A, coil 24 V, 1200 Ω
F_1 = see text

Capacitors:
C_1 = 0.33 µF, 250 VAC, metallized paper
C_2, C_3 = 470 µF, 40 V






F1
K2
R5
R7
R4
R6
C1
R2
B1
RE1
R1
C2
R3
C3
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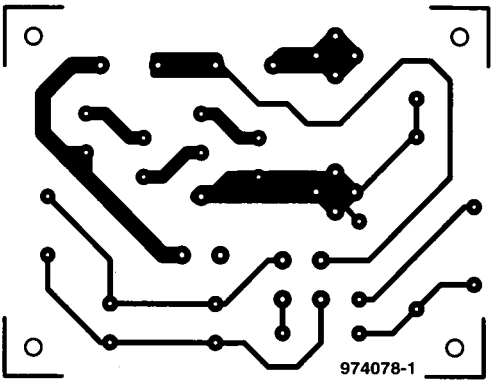
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