Switchbox for Loudspeakers/Amplifiers

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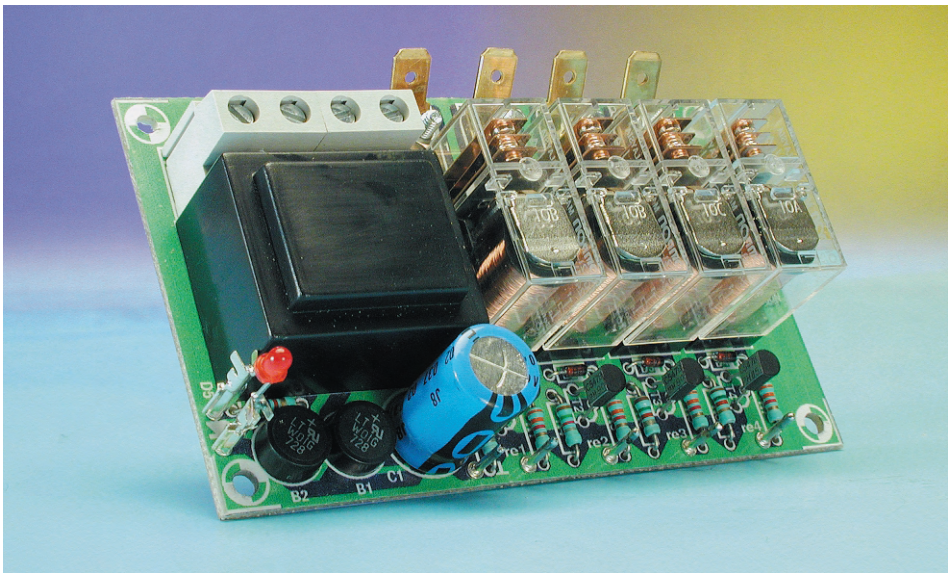
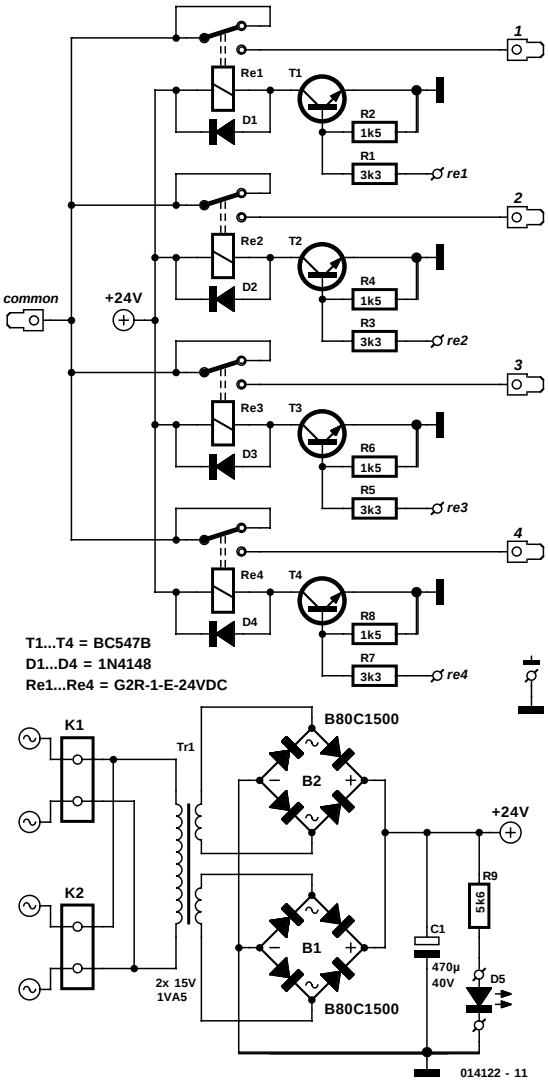


Anyone who has ever taken part in a listening test with various loudspeaker systems and amplifiers knows that the differences are often very subtle and difficult to judge. To make a good comparison it is absolutely necessary that changes from one combination to another can be made quickly. The adjacent circuit will be a welcome aid in these cases. It is specifically intended to switch between four amplifiers or loudspeakers. Also, when using the 'Simple Remote Control' described elsewhere in this issue it is not even necessary to leave your listening position.



The circuit consists of four relays, each with its own switching transistor and power supply. The connections for the loudspeakers/amplifiers are deliberately made with robust connectors, in order to deal with large currents and minimise the influence on the quality. The relays that have been selected are rated 16 A and each contact has two pins. The voltage dividers have been chosen such that the transistors will start to conduct at a voltage of around 2 V.

The power supply is provided by a 1.5 VA transformer, which is actually capable of delivering more power than is required by the relays used (not even 0.6 VA). We make welcome use of the fact that the open-circuit voltage of short-circuit proof transformers is significantly higher than the rated voltage. With one relay energised, the power supply voltage is around 23 to 24 V, and that is more than may be expected from a 15 V winding.

A striking detail is that two bridge rectifiers have been used for the power supply. The reason is that with short-circuit proof transformers of this kind, the two secondary windings are usually not equal to a degree that permits direct parallel connection. Providing each winding with its own rectifier does make this possible. This way, current cannot flow from one winding to another and unnecessary losses are avoided. An additional advantage is that a transformer with a single secondary winding may also be used, in this case the current will flow through one bridge rectifier through the load to the other rectifier.

The ripple voltage on the power supply amounts to less than 350 mV_{pp}. The mains connection on the printed circuit board has been duplicated. This allows for an easy loop-through mains voltage when multiple PCBs are used. LED D5 is the power supply indicator.

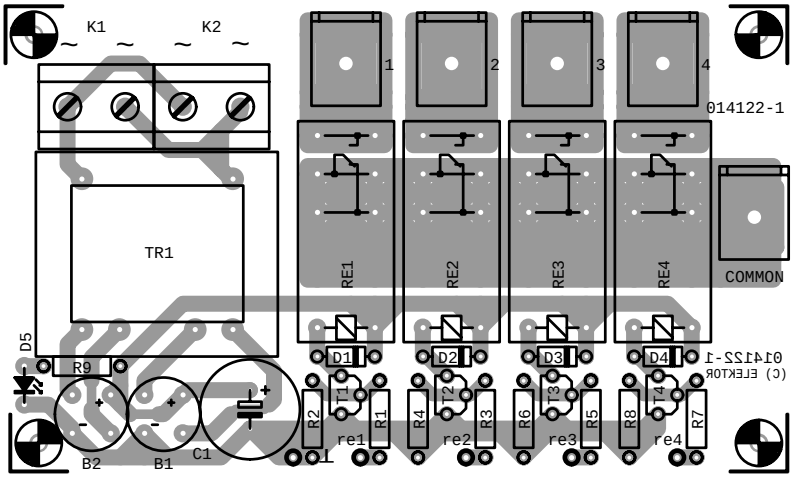
COMPONENTS LIST

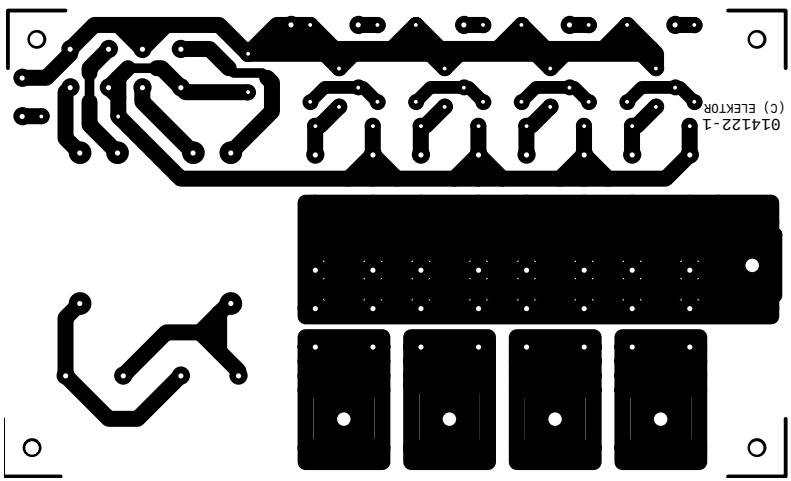
Resistors:
R1,R3,R5,R7 = 3kΩ3
R2,R4,R6,R8 = 1kΩ5
R9 = 5kΩ6

Capacitors:
C1 = 470µF 40V radial

Semiconductors:
B1,B2 = B80C1500, round case (80V piv, 1.5A peak)
D1-D4 = 1N4148
D5 = LED, high-efficiency
T1-T4 = BC547B

Miscellaneous:
Re1-Re4 = G2R-1-E-24VDC Omron (Conrad Electronics)
K1,K2 = 2-way PCB terminal block, lead pitch 7.5mm
Tr1 = 2 x 15 V/1VA5, e.g. Hahn type BV EI 302 2028
5 off spade terminal, screw mounting (3mm screw)





Considering that the circuit comprises a small number of parts, it is unlikely that the construction, with the aid of the PCB design shown here, should present any difficulties.

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