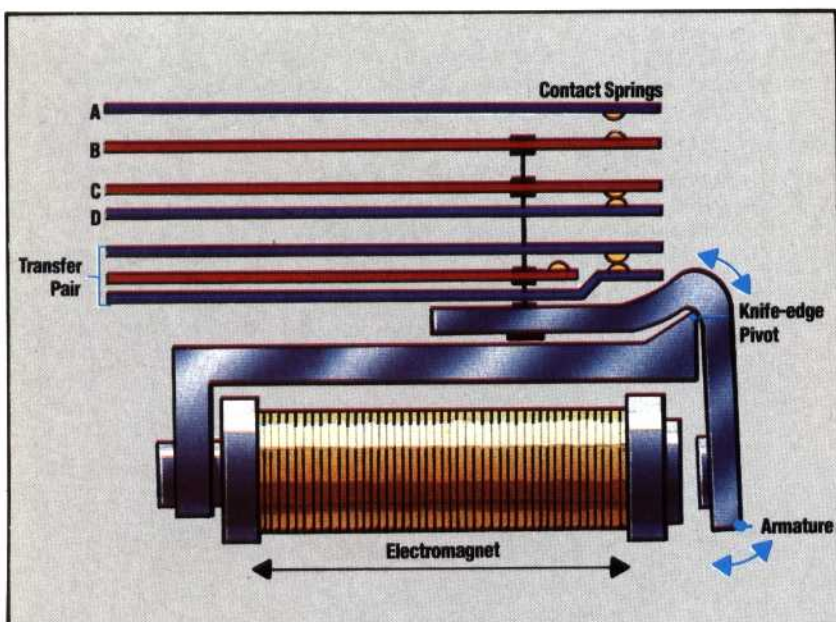




POWER SOURCE

Our Workshop series continues with an explanation of how to build a mains relay box. Using this, your computer will be able to switch the house lights on and off at preset or random intervals, and can be used to program a video or audio recorder.

Electrical relays are on/off switches that can be activated by an electrical signal. In our application, relays are used to switch high voltage and current appliances using a low voltage and current signal. Many types of relay are available, but the most common is the armature-type, which relies on a solenoid to make and break connections.



The relay makes and breaks contacts under the action of small movements in the armature. An appropriate voltage applied to the solenoid coil generates a magnetic field that attracts the armature. As the armature swings in towards the coil the spring contacts attached to the other end of the armature are made to move vertically upwards.

The arrangement shown is in the 'non-energised' position; that is, with no voltage applied to the solenoid. In this position, the contact pair AB is open and the pair CD is closed. When the solenoid is energised, springs B and C move upwards, causing A and B to close and C and D to open. This arrangement can be used in one of two ways: either to switch in one circuit whilst switching out another, or, more simply, to complete or break a circuit.

In addition to this mode of operation, a relay can also act as a transfer mechanism. In the diagram the lower three springs are arranged so that — in the non-energised position — the top and bottom springs are in contact. When the solenoid is energised, the middle spring moves up and makes contact with the top spring, thus breaking the contact between the top and bottom springs.

Parts List

Quantity	Item	Maplin Number
2	10A 240V contact 8-15V relay	YX97F
2	Single unswitched mains socket	HL68Y
2	Single 29mm pattress	YB15R
2 metres	6 amp 3-core mains cable	XR03D
2	Mains plug, 13 amp fused	RW67X
*	4mm plugs	*
*	0.5 metre 2-way ribbon cable	*
*	Small pieces of veroboard	*

NB: Items marked * should be left over from previous projects (see page 524). These quantities will provide two single-socket mains relay boxes. The output box can drive four such boxes — if so desired these may be double- or even triple-socket boxes; construction principles are exactly the same, only the parts differ.

Inside The Box

Check all connections for security and continuity, and inspect the board once again for track bridging. Ensure that there is no electrical path between the mains lead and the signal lines.

Glue the board into a corner of the pattress using an epoxy resin glue. Some makes of all-purpose household glues conduct electricity, so avoid these at all costs. If you are unsure of the conducting properties of your chosen adhesive, try spreading a thin strip of glue on a piece of card, allow it to dry, and then connect a multimeter to each end: if the meter gives a reading, use a different glue!

Once the glue has dried, screw the lid on the box and put the 4mm plugs on the signal lines (these can be the same colour, as the relay will work despite the direction of the current). Now connect the 13 amp plug to the mains lead. The relay is rated at 10 amps, but for safety you should probably not switch any more than 5 amps through it, so put a 5 amp fuse in the plug: this allows you to control appliances rated at up to 1.2 kW.