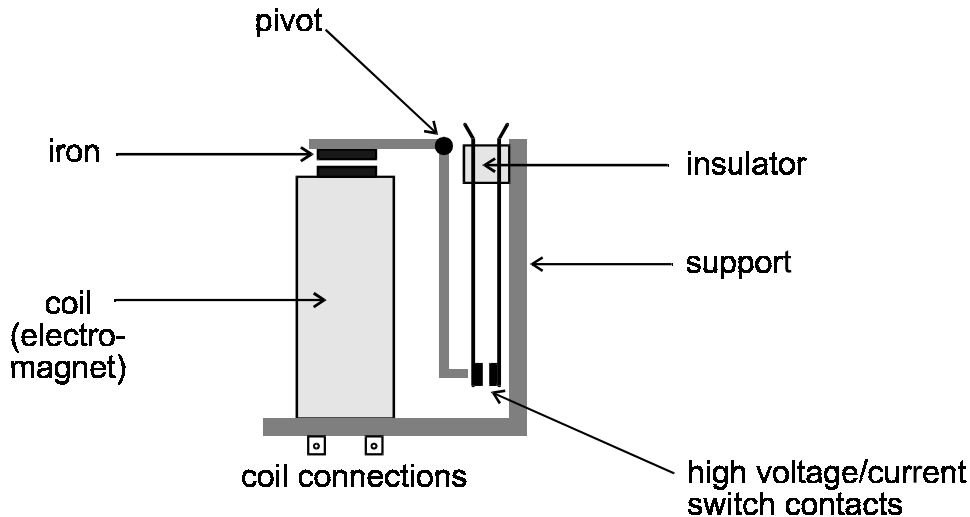


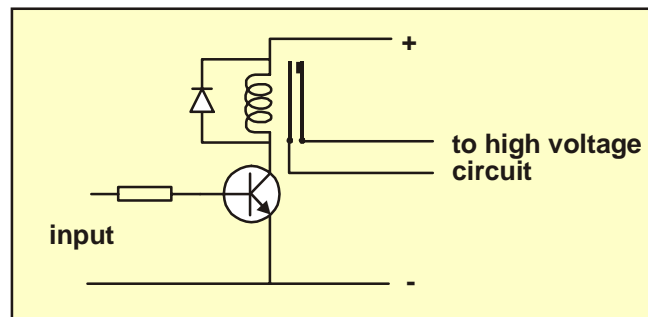
Relay Driver

A relay is an electro-magnetic switch which is useful if you want to use a low voltage circuit to switch on and off a light bulb (or anything else) connected to the 220v mains supply.

The diagram below shows a typical relay (with “normally-open” contacts).



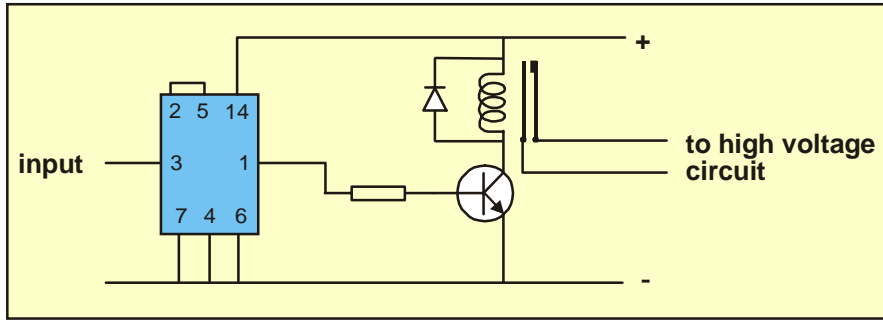
The current needed to operate the relay coil is more than can be supplied by most chips (op. amps etc), so a transistor is usually needed, as shown in the diagram below.



Use BC109C or similar. A resistor of about 4k7 will probably be alright. The diode is needed to short circuit the high voltage “back emf” induced when current flowing through the coil is suddenly switched off.

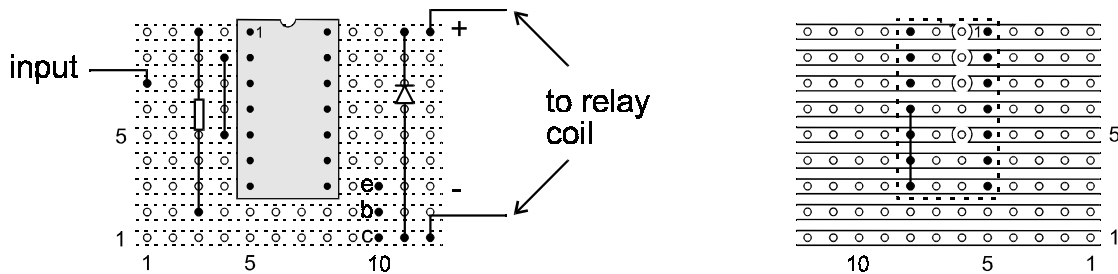
Relay Driver with Flip-Flop

In many situations in which you use a relay, you will also need a bistable flip-flop. One useful integrated circuit flip-flop is the 4013. (This i.c. actually contains two flip-flops.) With the connections as shown in the circuit below, when the voltage on pin 3 changes (rapidly) from 0v to the positive supply voltage, the flip-flop changes state (it “flips”). The next time the same thing happens, the flip-flop changes back to its original state again (it “flops”).



The transistor is still needed because the 4013 can only supply a very small amount of current (about 1mA).

Vero diagram for relay driver with flip-flop



The diagram below shows how the relay is used in circuits such as the sound operated switch.

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