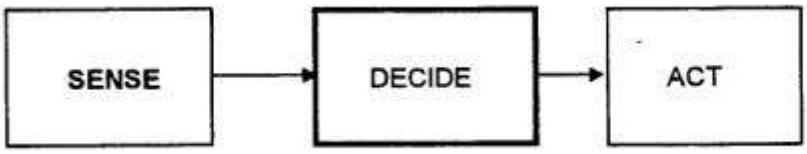
Relays



RELAYS are OUTPUT interface devices. They are electro-mechanical switches, which act as a go/between in the middle of two circuits.

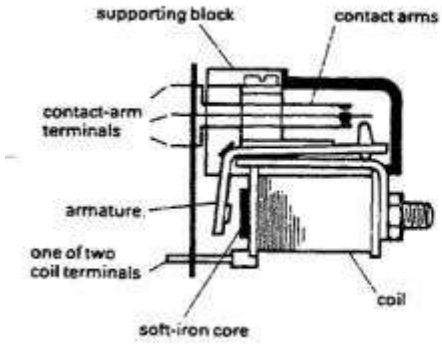
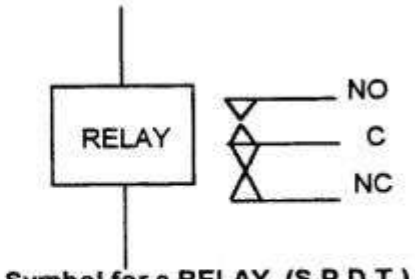


Fig.1

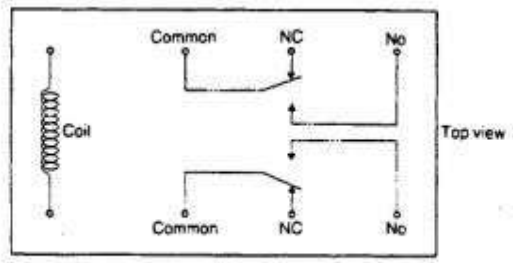


Symbol for a RELAY (S.P.D.T.)

The second circuit could be positioned to the right of the transistor switch, which in turn would be switched by the relay. Indeed this is why a RELAY is used, i.e., two separate circuits, one controlling the other but each having its own power supply. In this way a small current circuit (transistor switch circuit) could in turn switch on a circuit requiring a much larger current.

A RELAY contains a coil and when this is energised the **NORMALLY**

CLOSED (NC) contacts OPEN and the **NORMALLY OPEN** (NC) contacts CLOSED. The middle connection in the symbol diagram in Fig.1 is what is called the **COMMON** terminal, i.e., common to both. The common and the NC contacts would be used to hold a second circuit permanently switched ON until switched OFF by your circuit, and the common and the NO contacts would be used if you want a circuit to be permanently switched OFF until switched ON, again by your circuit.



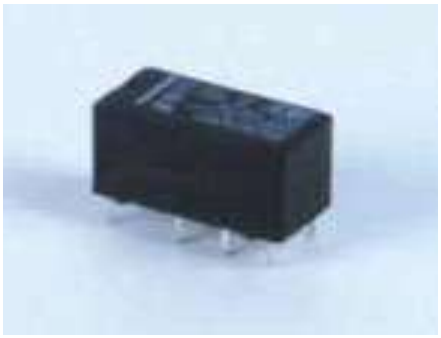


Fig.2 is typical of what are called **PIN-OUT DIAGRAMS**. The example in Fig.2 is in fact that of a **SUB-MINIATURE DOUBLE POLE DOUBLE THROW (D.P.D.T) RELAY**. Notice the two coil pins and the two sets of independent switches.

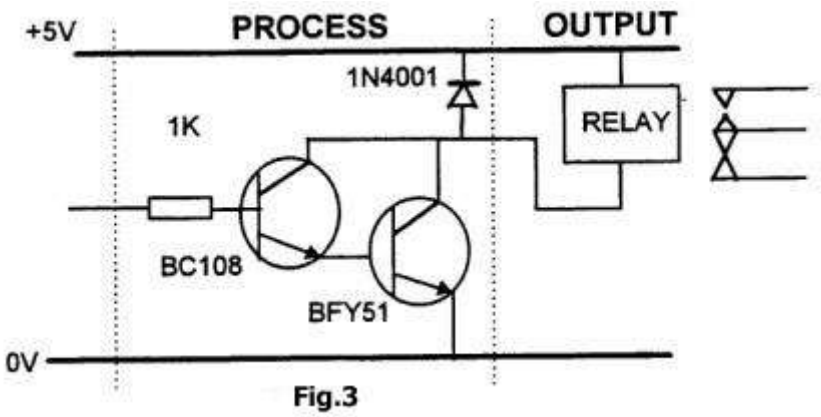


Fig.3

The coil is positioned in the small current circuit, i.e., the OUTPUT of your circuit, and the mechanical switches would be part of the higher current circuit to the right of yours. It is important to remember that no current flows from the first to the second circuit and therefore the latter would need its own supply.

Replace the LED/resistor OUTPUT on your circuit with a RELAY.

If the circuit is working you should hear the switches clicking as you cover and uncover the LDR. If this is not the case then make sure that you have made the right connections to the **1N4001** diode and the relay. If the diode has the wrong polarity, i.e., **NOT** reversed bias with the silver bar nearer to the OV, then the current will flow through the diode and not the coil of the relay.

Two Important Uses of a Relay

1. LATCHING A RELAY

It is possible to use a relay to hold, or ‘LATCH', a circuit permanently ON once switched. Update your circuit so that it is like that in Fig.4 below.

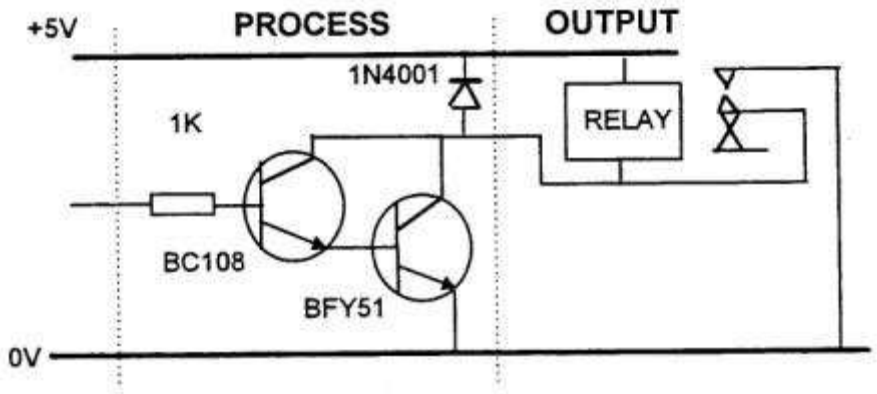


Fig.4

A typical use for this circuit is in a BURGLAR ALARM. Once the LDR triggers the DARLINGTON DRIVER the coil of the RELAY is energised closing the NORMALLY OPEN (NO) pair of contacts. This keeps the electricity flowing through the coil of the relay and therefore holding it switched ON.

What can you do to switch OFF the relay?

Add what ever you need to your circuit to make it a latching burglar alarm circuit, which can easily be turned OFF.
(Remember you have two sets of **C-NC-NO** contacts with the relay you are using, i.e., D.P.D.T).

2. REVERSING A DC MOTOR

Remodel the circuit to the right of the relay so that it is like Fig.5 below.

Re-model the ciircuit to the right of the relay so that it is like Fig. 5 below.

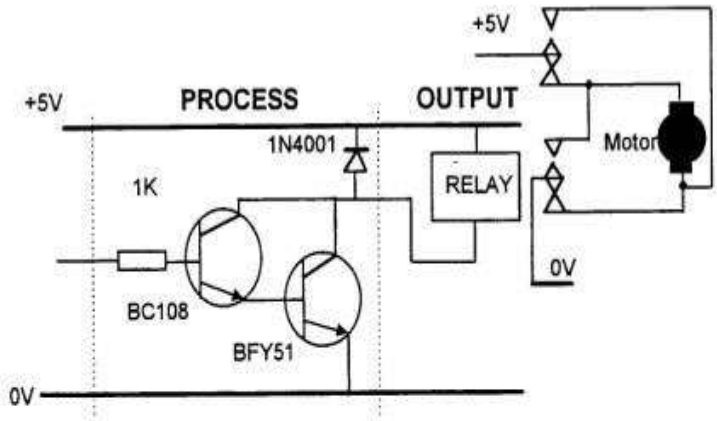


Fig.5

If your circuit is correctly connected then your motor will operate in one direction and when the LDR is covered the motor will run in the opposite direction.

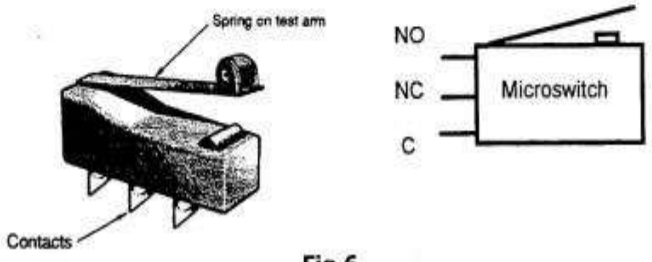


Fig.6

Design Problem

Fig.6 illustrates - what are called **MICRO SWITCHES**. These are simply sensitive switches. Add two such switches to your circuit to act as **'LIMIT SWITCHES'** for a car park barrier system. One of the switches will limit the UP movement and cut OFF the electricity to the motor when it is switched and the other switch will cut OFF the electricity supply to the motor when it has reversed into the DOWN position.