

CS 257 Lesson 2

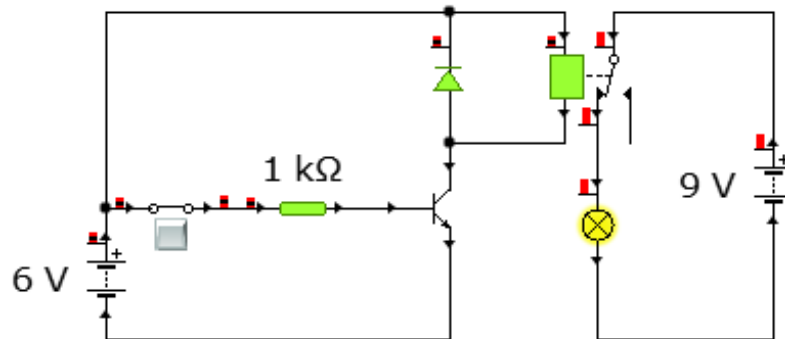
Activity 7: Using a Transistor to Control A Relay

Using a Transistor to Energize a Relay

Introducing Solid State Relay Control

Look at the figure. I am using a simple transistor to turn on a relay. When the switch is closed, voltage at the base of the transistor will turn it on. The 10K resistor connected to the base of the transistor is used to limit current flow.

With the transistor on, current can flow to energize the relay's coils. This will make its contact points close and power can flow through the lamp.



Pressing the switch increases the base-emitter potential difference in the transistor, allowing current to flow through the relay. This closes the right-hand circuit, turning on the lamp.

Notice that I use a diode in this circuit and take note that it is connected so that the cathode (-) is connected to the + side of the battery. This diode is used to protect our transistor and other components. Current flowing through a relay coil creates a magnetic field which collapses suddenly when the current is switched off. The sudden collapse of the magnetic field induces a brief high voltage across the relay coil which is very likely to damage transistors and ICs. The protection diode allows the induced voltage to drive a brief current through the coil (and diode) so the magnetic field dies away quickly rather than instantly. This prevents the induced voltage becoming high enough to cause damage to transistors and ICs.