

## LAB – 6 Switching a High-Power DC Device

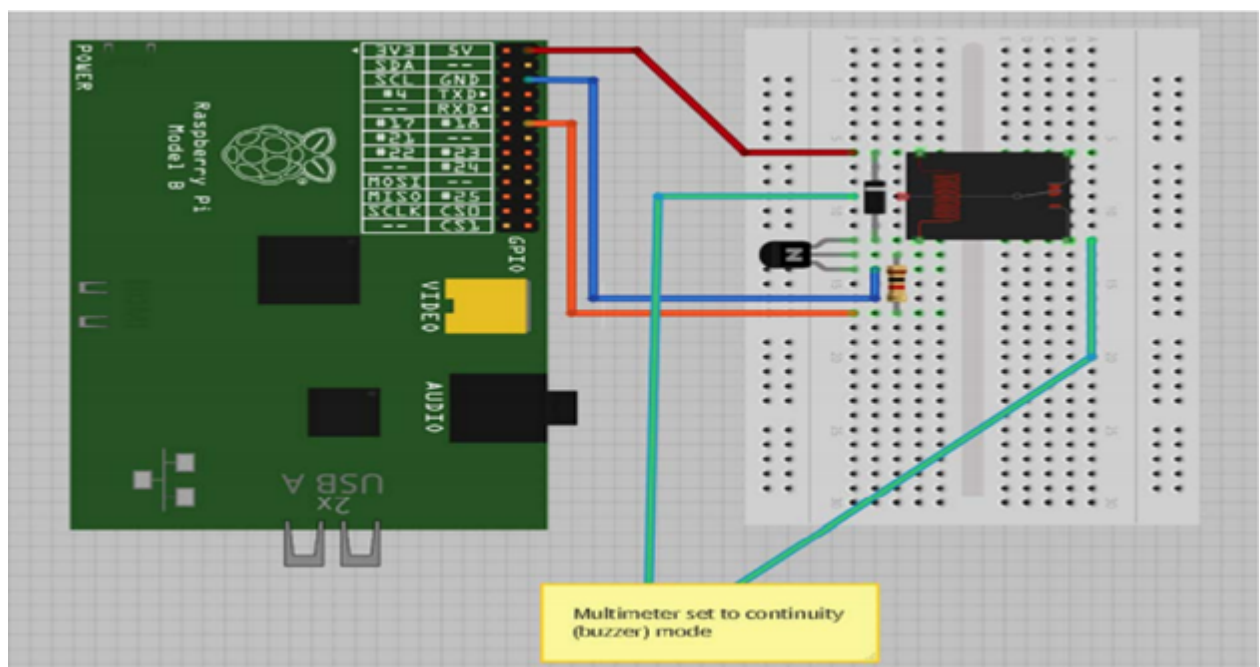
### Aim:

To write a program to switch a high-power DC device using a relay or transistor.

### Task:

1. Write a Python program to switch a high-power DC device using a relay.

### Pin & Circuit Diagram:



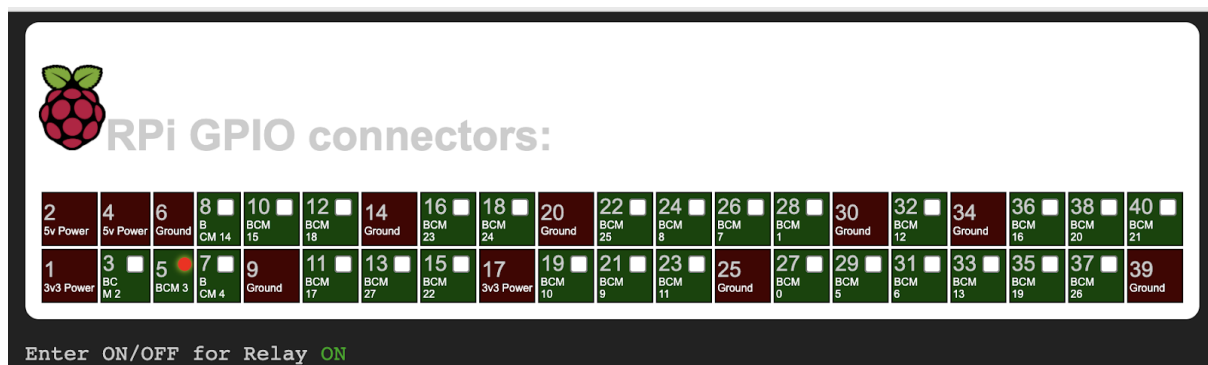
## Algorithm:

- 1.Start
- 2.Import the **RPI** Python module to control the GPIO on Raspberry Pi.
- 3.Set the GPIO mode as **BCM** i.e. Broadcom SOC Channel.
- 4.Configure GPIO pin 3 as output.
- 5.Run an infinite while loop to continuously prompt the user for input with the message and store the input in the variable.
- 6.Check the value of x:
  - If x is equal to 'ON', execute the following steps:
    1. Set GPIO pin 3 to HIGH (True) to turn on the relay.
    2. Add a delay of 1 second using the sleep function to keep the relay on for a second.
  - If x is equal to 'OFF', execute the following steps:
    1. Set GPIO pin 3 to LOW (False) to turn off the relay.
    2. Add a delay of 1 second using the sleep function to keep the relay off for a second.
  - If x is neither 'ON' nor 'OFF', print "Invalid Entry" to inform the user of an invalid input.
- 7.Exit

## Programs:

```
1 import RPi.GPIO as GPIO
2 from time import sleep
3 GPIO.setmode(GPIO.BCM)
4 GPIO.setup(3,GPIO.OUT)
5 while True:
6     x=input("Enter ON/OFF for Relay")
7     if x=='ON':
8         GPIO.output(3,True)
9         sleep(1)
10    elif x=='OFF':
11        GPIO.output(3,False)
12        sleep(1)
13    else :
14        print("Invalid Entry")
```

## Output:





## RPi GPIO connectors:

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
5v Power	5v Power	Ground	BCM 14	BCM 15	BCM 18	Ground	BCM 23	BCM 24	Ground	BCM 25	BCM 8	BCM 7	BCM 1	Ground	BCM 12	Ground	BCM 16	BCM 20	BCM 21
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
3v3 Power	BCM 2	BCM 3	BCM 4	Ground	BCM 17	BCM 27	BCM 22	3v3 Power	BCM 10	BCM 9	BCM 11	Ground	BCM 0	BCM 5	BCM 6	BCM 13	BCM 19	BCM 26	Ground

Enter ON/OFF for Relay **OFF**

### Pre Lab Questions:

1. Can we switch a high-power device using a conventional GPIO pin? Justify your answer.
2. With the aid of a diagram, write the working of a relay.
3. Write the characteristics of a high power MOSFET transistor.

**Post Lab Questions:**

1. What are the limitations of relay?
2. Explain how to switch 110 V or 240 V AC devices using Raspberry Pi.

**Result:**

Thus, the python code for switching a high-power DC device using a relay in Raspberry Pi was written and successfully tested.