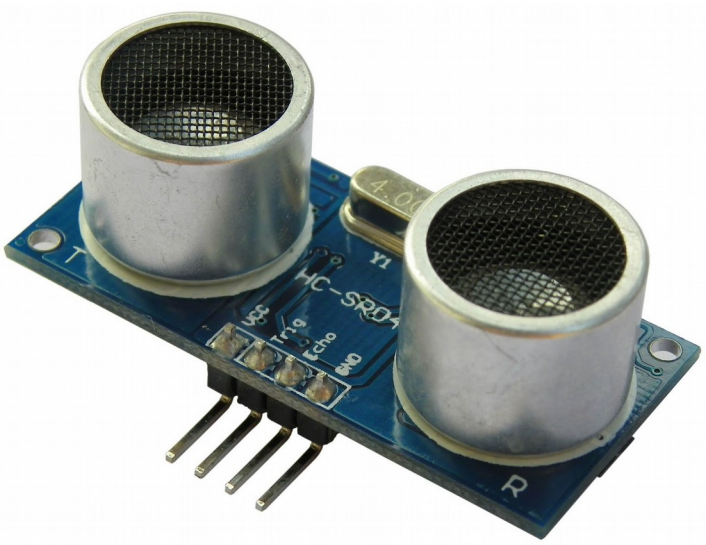
Using Ultra-Sound Sensor with Raspberry-Pi

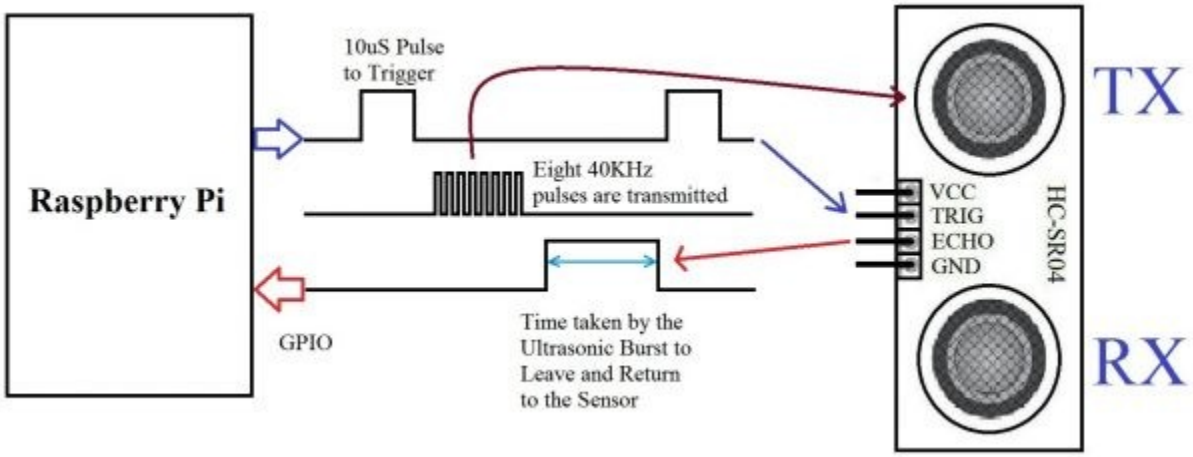
About HC-SR04 & Ultra sound Sensor:



Ultrasonic distance sensors are designed to measure distance between the source and target using ultrasonic waves. We use ultrasonic waves because they are relatively accurate across short distances and don't cause disturbances as they are inaudible to human ear. HC-SR04 is a commonly used module for non contact distance measurement for distances from 2cm to 400cm.

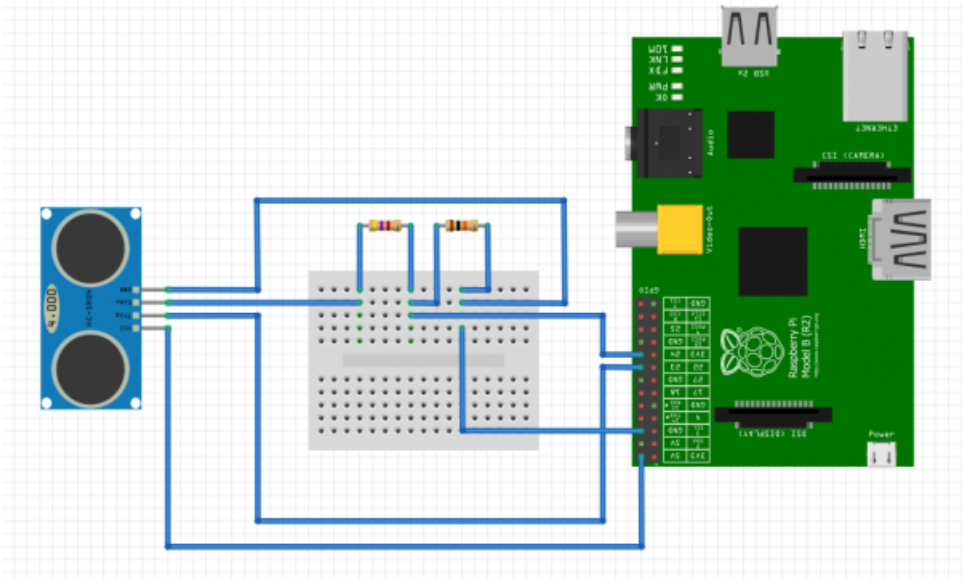
The time difference between transmission and reception of ultrasonic signals is calculated. Using the speed of sound and '**Speed = Distance/Time'** equation, the distance between the source and target can be easily calculated.

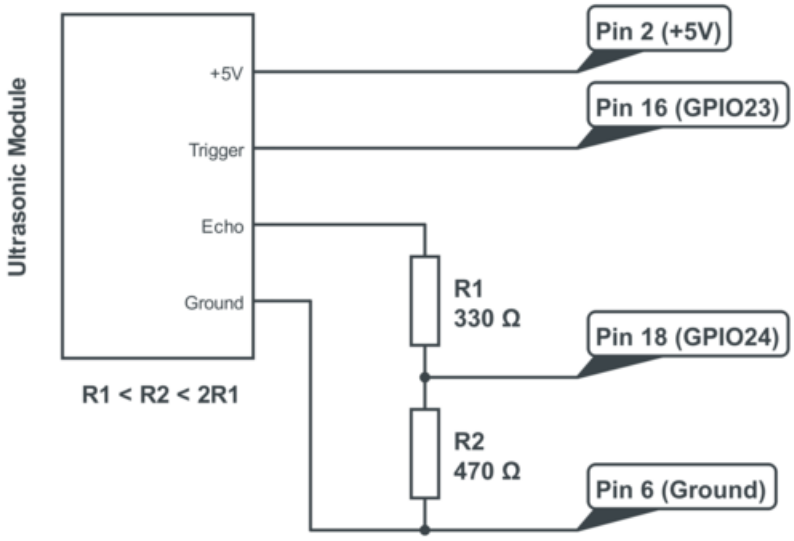
Fig. Show interfacing raspberry-pi with HC-SR04.



Pin Connection:

VCC– 5V, input power
TRIG– Trigger Input
ECHO – Echo Output
GND – Ground





Code:

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BCM)

TRIG = 23
ECHO = 24

print "Distance Measurement In Progress"
GPIO.setup(TRIG,GPIO.OUT)

GPIO.setup(ECHO,GPIO.IN)
GPIO.output(TRIG, False)

print "Waiting For Sensor To Settle"

time.sleep(2)
GPIO.output(TRIG, True)

time.sleep(0.00001)
GPIO.output(TRIG, False)

while GPIO.input(ECHO)==0:
  pulse_start = time.time()

while GPIO.input(ECHO)==1:
  pulse_end = time.time()

pulse_duration = pulse_end - pulse_start

distance = pulse_duration * 17150
print "Distance:",distance,"cm"
GPIO.cleanup()
```

Note:

Speed of sound at sea level = 343 m/s or 34300 cm/s
Thus, **Distance = 17150 * Time (unit cm)**

Reference:

https://electrosome.com/hc-sr04-ultrasonic-sensor-raspberry-pi/