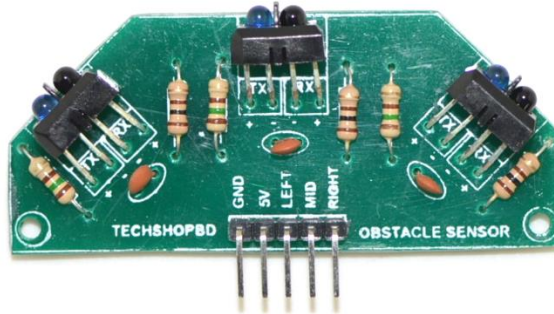# USER MANUAL

TCRT OBSTACLE SENSOR

Description:

This obstacle sensor uses three sets of infrared transmitters and receivers to detect obstacles at right, left and in front of it. This makes it ideal for using with an obstacle avoiding robot and object detection. The range is about **12cm** for dark/black colored obstacles and about **20cm** for light/white colored obstacles.

It can also measure the distance of the obstacle like sonar/ultrasonic sensors within its range. This is possible because it measures distance and presence of obstacle based on capacitor discharge time rather than using voltage threshold level like other infrared led based obstacle sensors available in the market.

Specifications:

- Features TCRT500 that has effective plastic packaging and built-in sunlight effect compensation.

- Detects obstacles at right, left and in front of the sensor.

- Obstacle detection range: **about 12cm** for dark colored obstacles and **about 20cm** for light colored obstacles.

- Detects presence and distance of obstacle using capacitor discharge time.

- Low current consumption and small size makes it ideal for obstacle avoiding robots.

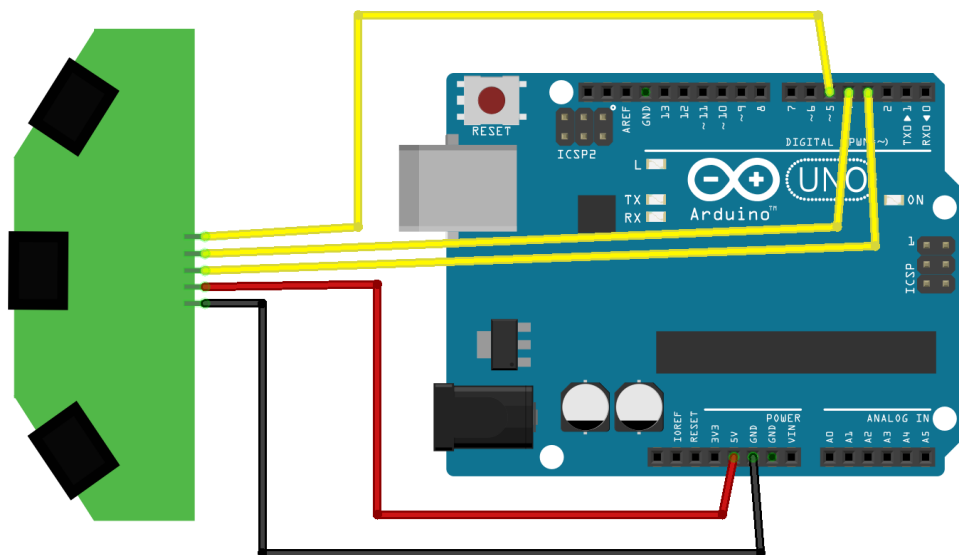- Any Arduino pin can read sensor data.

Dimensions:
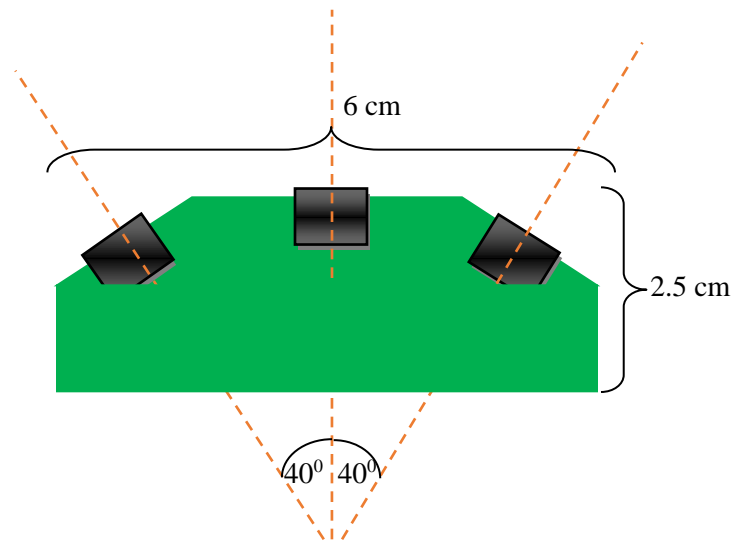
Connecting to Arduino:

Sensor Pin	Arduino Pin	
GND	GND	
5V	5V	
LEFT	3	Any arduino pin except 13 will work
MID	4	
RIGHT	5	

Arduino Code:

```
unsigned int sensor[3];   /*sensor readings are saved here*/
boolean firstData[3];      /*to eliminate effect of noise*/
byte sensorPin[3]={3,4,5};   /*arduino pins connected to left, middle and
right sensors*/
byte NumOfSensor=3;
byte i; /*just to run for loop!!*/
unsigned int MaxWaitTime=4096; /*maximum distance*/


void setup()
{
  Serial.begin(9600);
  pinMode(13,OUTPUT);
}

void loop()
{
  readSensor();
  showsensorData();
}

void readSensor()
{
  for(i=0;i<NumOfSensor;i++)
  {
    digitalWrite(sensorPin[i], HIGH);
    pinMode(sensorPin[i], OUTPUT);
  }
  delayMicroseconds(10);
  for(i=0;i<NumOfSensor;i++)
  {
    pinMode(sensorPin[i], INPUT);
    digitalWrite(sensorPin[i], LOW);
    sensor[i]=MaxWaitTime;
    firstData[i]=false;
  }
  unsigned long startTime = micros();
  while (micros() - startTime < MaxWaitTime)
  {
    unsigned int time = micros() - startTime;
    for(i=0;i<NumOfSensor;i++)
    {
      if ((digitalRead(sensorPin[i]) == LOW)&& (firstData[i]==false))
      {
        sensor[i] = time;
        firstData[i]=true;
      }
    }
  }
}
```

```
void showsensorData()
{
  for(i=0;i<NumOfSensor;i++)
  {
    Serial.print(sensor[i]);
    Serial.print("  ");
  }
  Serial.println();

  if((sensor[0]==4096)&&(sensor[1]==4096)&&(sensor[2]==4096))
digitalWrite(13,LOW);
  else digitalWrite(13,HIGH);
}
```

Upload the code to your arduino, connect the sensor and open serial monitor at 9600 baud rate.
The LED connected to Arduino pin 13 will turn on when any of the 3 sensor finds an obstacle
inside its range. Serial monitor will show obstacle distance from each of the 3 sensors.

Note:

1. **Do not** connect any of the signal pins to arduino **pin 13** or any other pins that you have
   connected to an LED.
2. **Do not** connect any of the signal pins to arduino **Serial0** pins (**digital pin 0 & digital pin
   1**) **if** you are about to view data in serial monitor.
3. The sensor value isn't in any length unit (e.g.: centimeters). It's just the capacitor
   discharge time in microseconds. It will be different for white and black colored obstacles
   at the same distance.