MODULE 13: ULTRASONIC SENSOR

ULTRASONIC SENSOR

Ultrasonic sensing is one of the best ways to sense proximity and detect levels with high reliability. What is an ultrasonic sensor?

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves.
An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.
High-frequency sound waves reflect from boundaries to produce distinct echo patterns. Ultrasonic Sensors working

Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

The working principle of this module is simple. It sends an ultrasonic pulse out at 40kHz which travels through the air and if there is an obstacle or object, it will bounce back to the sensor. By calculating the travel time and the speed of sound, the distance can be calculated.

Ultrasonic sensors are a great solution for the detection of clear objects. For liquid level measurement, applications that use infrared sensors, for instance, struggle with this particular use case because of target translucence.

For presence detection, ultrasonic sensors detect objects regardless of the color, surface, or material (unless the material is very soft like wool, as it would absorb sound.)

To detect transparent and other items where optical technologies may fail, ultrasonic sensors are a reliable choice.

PIN DESCRIPTION:

This sensor includes four pins and the pin configuration of this sensor is discussed below.

• Pin1 (Vcc): This pin provides a +5V power supply to the sensor.
• Pin2 (Trigger): This is an input pin, used to initialize measurement by transmitting ultrasonic waves by keeping this pin high for 10us.
• Pin3 (Echo): This is an output pin, which goes high for a specific time period and it will be equivalent to the duration of the time for the wave to return back to the sensor. • Pin4 (Ground): This is a GND pin used to connect to the GND of the system.

MINI PROJECT

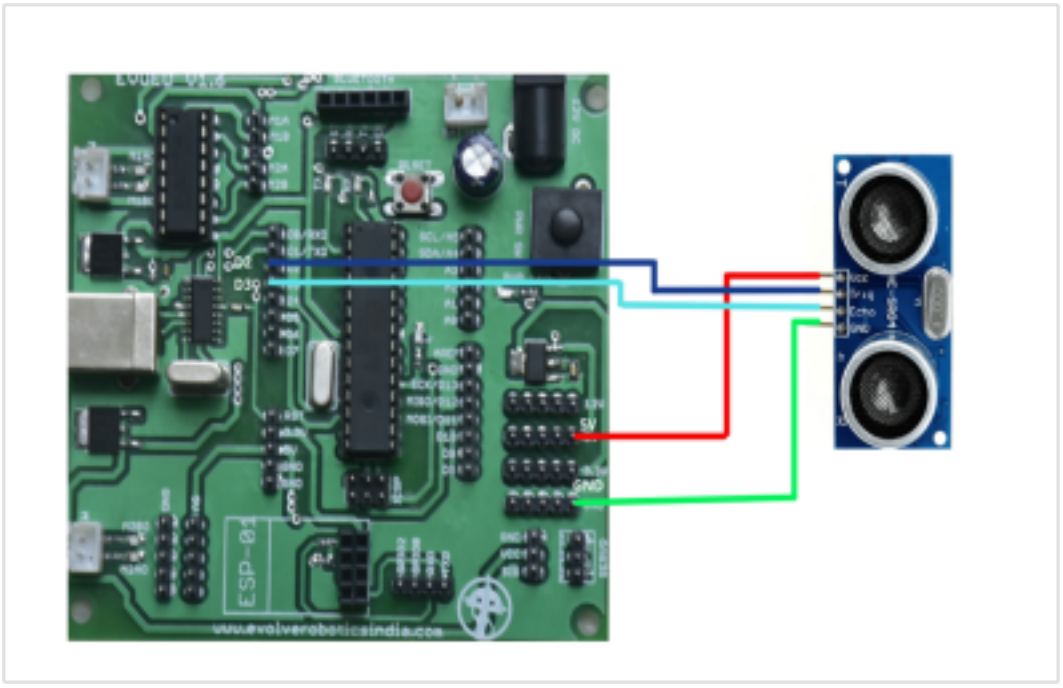
AIM:

CONSTRUCT A CIRCUIT TO MEASURE THE DISTANCE USING ULTRASONIC SENSOR.

COMPONENTS USED:

EVOED BOARD, ULTRASONIC SENSOR, JUMPER WIRES

CIRCUIT DIAGRAM:



PROGRAM :

```
#define echopin 2
#define trigpin 3
long duration;
```

```
int distance;

void setup()
{
  pinMode(buzzer, OUTPUT);
 pinMode(trigpin, OUTPUT);
 pinMode (echopin, INPUT);
Serial.begin(9600);
}

  void loop()
  {
  digitalWrite(trigpin,LOW);
  delayMicroseconds(2);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn
  (echopin,HIGH);
  distance=duration* 0.034/2;
  Serial.println (distance);
  }
```