ULTRASONIC SENSOR INTERFACE WITH ARDUINO

FIND A DISTANCE TO AN OBJECT BY INTERFACING ULTRASONIC MODULE HC-SR04 WITH ARDUINO AND DISPLAY THE DISTANCE ON THE SERIAL MONITOR/LCD

ULTRASONIC SENSOR

- Ultrasonic Module HC-SR04 works on the principle of SONAR and RADAR system.
- The signals are sent out as short pulses which may be reflected by objects in their path, in part reflecting back to the radar. When these pulses intercept precipitation, part of the energy is scattered back to the radar.
- It can be used to determine the distance of an object in the range of 2 cm – 400 cm.

- The module has only 4 pins,

i. VCC

ii. GND

iii. Trig

iv. Echo

```
long time;
float distance;
#define speed 0.034
int trig=8;
int echo=9;
void setup()
{Serial.begin(9600);
pinMode(trig,OUTPUT);  pinMode(echo,INPUT);}
void loop()
{digitalWrite(trig,LOW);  delayMicroseconds(4);
digitalWrite(trig,HIGH);  delayMicroseconds(10);
digitalWrite(trig,LOW);  time= pulseIn(echo,HIGH);
distance=0.5*speed*time;  Serial.println(distance);  delay(2000);}
```

- When a pulse of 10µsec or more is given to the Trig pin, 8 pulses of 40 kHz are generated. After this, the Echo pin is made high by the control circuit in the module. Echo pin remains high till it gets echo signal of the transmitted pulses back.
- The time for which the echo pin remains high, i.e. the width of the Echo pin gives the time taken for generated ultrasonic sound to travel to the object and back.
- Using this time and the speed of sound in air, we can find the distance of the object using a simple formula for distance using speed and time

- pulseIn()

i. Reads a pulse (either HIGH or LOW) on a pin.

ii. e.g. pulseIn(7, HIGH);

iii. pulseIn(Pin,HIGH,Timeout);

iv. If value is HIGH, pulseIn() waits for the pin to go from LOW to HIGH, starts timing, then waits for the pin to go LOW and stops timing. Returns the length of the pulse in microseconds or returns 0 if no complete pulse was received within the timeout.