ultrasonic sensor with an Arduino Uno

Aim:

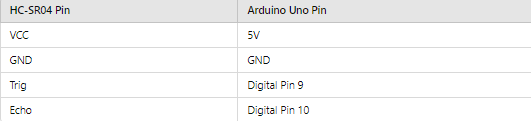
An ultrasonic sensor with an Arduino Uno is a popular project for beginners in electronics and programming. The most common ultrasonic sensor used in these projects is the HC-SR04. It measures distance by sending out a sound wave and measuring the time it takes for the echo to return.

**Components Required**

1. **Arduino Uno**
2. **HC-SR04 Ultrasonic Sensor**
3. **Breadboard** (optional, for easier connections)
4. **Jumper Wires**

### Wiring Diagram

Here’s how to connect the HC-SR04 to the Arduino Uno:



### Code

Below is a simple Arduino sketch to use the HC-SR04 ultrasonic sensor. This code will measure the distance and print the result to the Serial Monitor.

#define TRIG\_PIN 9 // Trigger pin connected to digital pin 9

#define ECHO\_PIN 10 // Echo pin connected to digital pin 10

void setup() {

Serial.begin(9600); // Initialize Serial communication at 9600 bits per second

pinMode(TRIG\_PIN, OUTPUT); // Set the Trigger pin as OUTPUT

pinMode(ECHO\_PIN, INPUT); // Set the Echo pin as INPUT

}

void loop() {

long duration, distance;

// Clear the Trigger pin

digitalWrite(TRIG\_PIN, LOW);

delayMicroseconds(2);

// Set the Trigger pin HIGH for 10 microseconds

digitalWrite(TRIG\_PIN, HIGH);

delayMicroseconds(10);

digitalWrite(TRIG\_PIN, LOW);

// Read the Echo pin, and get the duration of the echo

duration = pulseIn(ECHO\_PIN, HIGH);

// Calculate distance in cm (speed of sound is 34300 cm/s)

distance = duration \* 0.034 / 2;

// Print the distance to the Serial Monitor

Serial.print("Distance: ");

Serial.print(distance);

Serial.println(" cm");

// Wait for a short period before the next measurement

delay(500);

}

R**unning the Code**

1. Open the Arduino IDE and connect your Arduino Uno to your computer.
2. Copy the provided code into the Arduino IDE.
3. Select the correct board and port from the Tools menu.
4. Upload the sketch to the Arduino.
5. Open the Serial Monitor from the Arduino IDE to see the distance readings.

**Applications**

The HC-SR04 ultrasonic sensor can be used in various applications such as:

* **Obstacle Detection**: For robotics projects to avoid collisions.
* **Distance Measurement**: For simple distance measuring tools.
* **Parking Assistance Systems**: To assist in parking by providing distance feedback.