HC-SR04(Ultrasonic Sensor)

- Ultrasonic sensor used for distance measurement.
- It works by emitting ultrasonic sound waves and measuring the time it takes for the waves to bounce back after hitting an object (echo).
- The sensor then uses this time to calculate the distance between itself and the object.

Working Principle of HC-SR04

The sensor consists of two main components:

- **Transmitter (Trig Pin):** Emits an ultrasonic sound wave at 40 kHz.
- **Receiver (Echo Pin):** Detects the sound wave that reflects back after hitting an object.

How HC-SR04 Works

1. **Triggering the Sensor:**
   - The **Trig** pin needs to receive a high signal for at least 10 microseconds.
   - This action sends out a burst of 8 ultrasonic pulses at 40 kHz from the transmitter.

2. **Echo Reception:**
   - These sound waves travel through the air and reflect back when they hit an object.
   - The **Echo** pin stays low while waiting for the reflected wave. Once the echo is detected, the Echo pin goes high.

3. **Time Measurement:**
   - The time during which the Echo pin stays high is the time taken by the sound wave to travel to the object and back to the sensor.This time is used to calculate the distance.

4. **Distance Calculation:**
   - The speed of sound in air is approximately 343 meters per second (m/s). The distance is calculated by the following formula:

Distance = Time × Speed of Sound

2

Pin layout