

# HC-SR04 Ultrasonic Range Finder

## Manual

### Features

- Distance measurement range: 2cm - 400cm
- Accuracy: 0.3cm
- Detect angle: 15 degree
- Single +5V DC operation
- Current consumption: 15mA



Fig. 1

### How It Works

HC-SR04 consists of ultrasonic transmitter, receiver, and control circuits. When triggered it sends out a series of 40KHz ultrasonic pulses and receives echo from an object. The distance between the unit and the object is calculated by measuring the traveling time of sound and output it as the width of a TTL pulse.

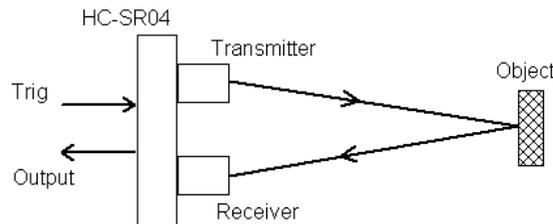


Fig. 2

### How To Use It

To measure distance you need to generate a trig signal and drive it to the Trig Input pin. The trig signal level must meet TTL level requirements (i.e. High level > 2.4V, low level < 0.8V) and its width must be greater than 10us. At the same time you need to monitor the Output pin by measuring the pulse width of output signal. The detected distance can be calculated by the formula below.

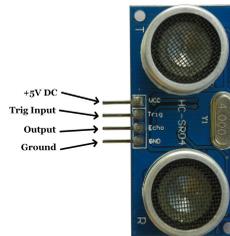


Fig.3

$$\text{Distance} = \frac{\text{Pulse Width} * \text{Sound Speed}}{2}$$

where the pulse width is in unit of second and sound speed is in unit of meter/second. Normally sound speed is 340m/s under room temperature.

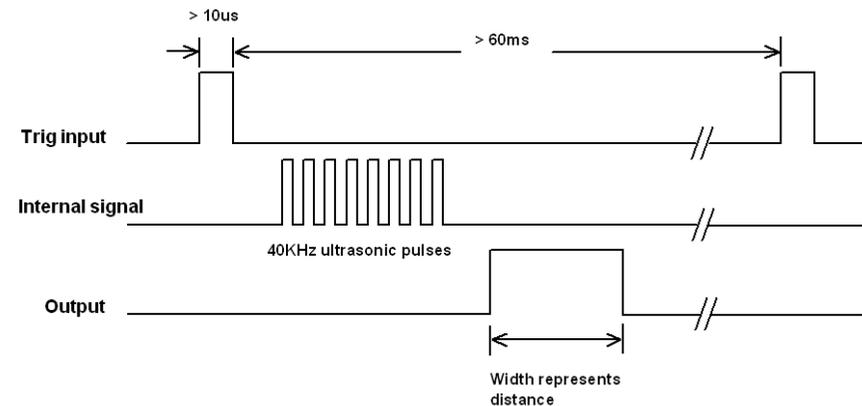


Fig. 4

- Notes:**
1. The width of trig signal must be greater than 10us
  2. The repeat interval of trig signal should be greater than 60ms to avoid interference between consecutive measurements.

### Specifications

Parameters	Specification
Operating Voltage	+5V DC
Operating Current	15mA
Operating Frequency	40KHz
Maximum Distance	400cm
Minimum Distance	2cm
Detect Angle	15 degree
Resolution	0.3cm
Input Trig Signal	>10us TTL pulse
Output Signal	TTL pulse with width representing distance
Weight	
Dimension	45 x 20 x 15 mm