## HC-SR04 Ultrasonic Range Finder

 Manual
## Features

$>$ Distance measurement range: $2 \mathrm{~cm}-400 \mathrm{~cm}$Accuracy: 0.3 cm
Detect angle: 15 degreeSingle +5 V DC operation
Current comsuption: 15 mA

## How It Works

Fig. 1

HC-SR04 consists of ultrasonic transmitter, receiver, and control circuits. When trigged it sends out a series of 40 KHz 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 leve must meet TTL level requirements (i.e. High level $>2.4 \mathrm{~V}$, low level $<0.8 \mathrm{~V}$ ) and its width must be greater than 10 us. 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.

Distance $=$
Pulse Width * Sound Speed


Fig. 3
where the pulse width is in unit of second and sound speed is in unit of meter/second. Normally sound speed is $340 \mathrm{~m} / \mathrm{s}$ under room temperature.


Fig. 4
Notes: 1. The width of trig signal must be greater than 10 us
2. The repeat interval of trig signal should be greater than 60 ms to avoid interference between connective measurements.

## Specifications

| Parameters | Specification |
| :--- | :--- |
| Operating Voltage | +5 V DC |
| Operating Current | 15 mA |
| Operating Frequency | 40 KHz |
| Maximum Distance | 400 cm |
| Minimum Distance | 2 cm |
| Detect Angle | 15 degree |
| Resolution | 0.3 cm |
| Input Trig Signal | $>10 \mathrm{us}$ TTL pulse |
| Output Signal | TTL pulse with width representing distance |
| Weight |  |
| Dimension | $45 \times 20 \times 15 \mathrm{~mm}$ |

