

Ultrasonic Ranging Module

MDU2

MDU2 is an ultrasonic ranging module designed for embedded system projects. It has a resolution of 0.3cm and the ranging distance is from 2cm to 300cm. It operates from a 5V DC supply and the standby current is less than 2mA. The module transmits an ultrasonic signal, picks up its echo, measures the time elapsed between the two events and outputs a waveform whose high time is modulated by the measured time which is proportional to the distance.

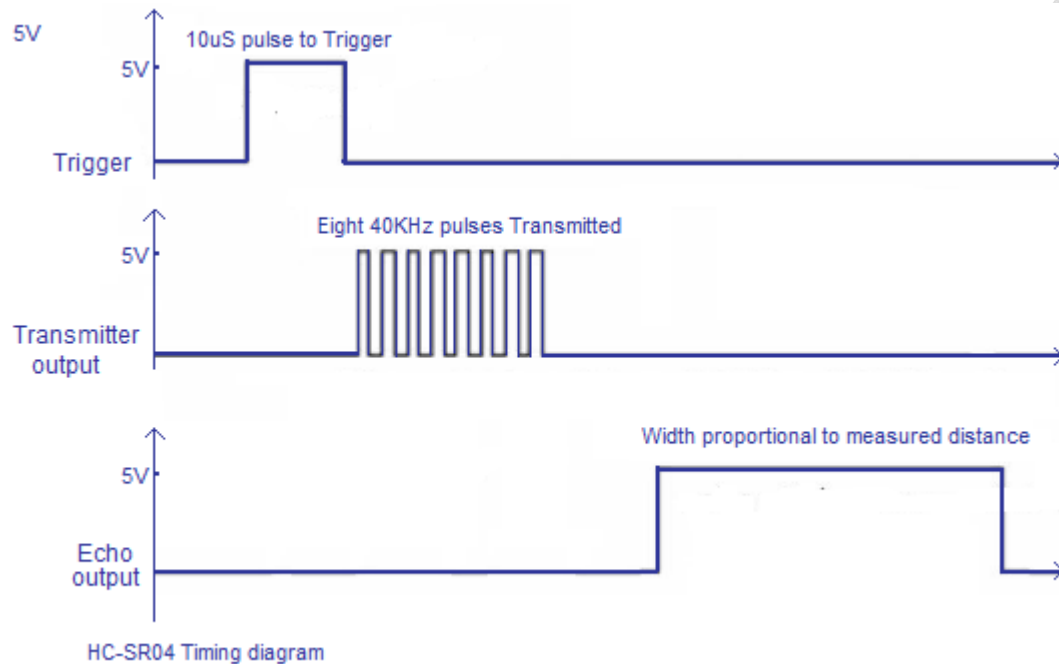


The supporting circuits fabricated on the module makes it almost stand alone and what the programmer need to do is to send a trigger signal to it for initiating transmission and receive the echo signal from it for distance calculation. This module has four pins namely Vcc, Trigger, Echo, GND and they are explained in detail below.

- 1) **VCC** : 5V DC supply voltage is connected to this pin.
- 2) **Trigger**: The trigger signal for starting the transmission is given to this pin. The trigger signal must be a pulse with 10uS high time. When the module receives a valid trigger signal it issues 8 pulses of 40KHz ultrasonic sound from the transmitter. The echo of this sound is picked by the receiver.

3) **Echo:** At this pin, the module outputs a waveform with high time proportional to the distance.

4) **GND:** Ground is connected to this pin.



From the timing diagram, you can see that the 40KHz pulse train is transmitted just after the 10µS triggering pulse and the echo output is obtained after some more time. The next triggering pulse can be given only after the echo is faded away and this time period is called cycle period. The cycle period for HC-SR04 must not be below 50mS. According to datasheet, the distance can be calculated from the echo pulse width using the following equations.

Distance in cm = echo pulse width in µS/58

Distance in inch = echo pulse width in µS/148