HC-SR04 Ultrasonic Module

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

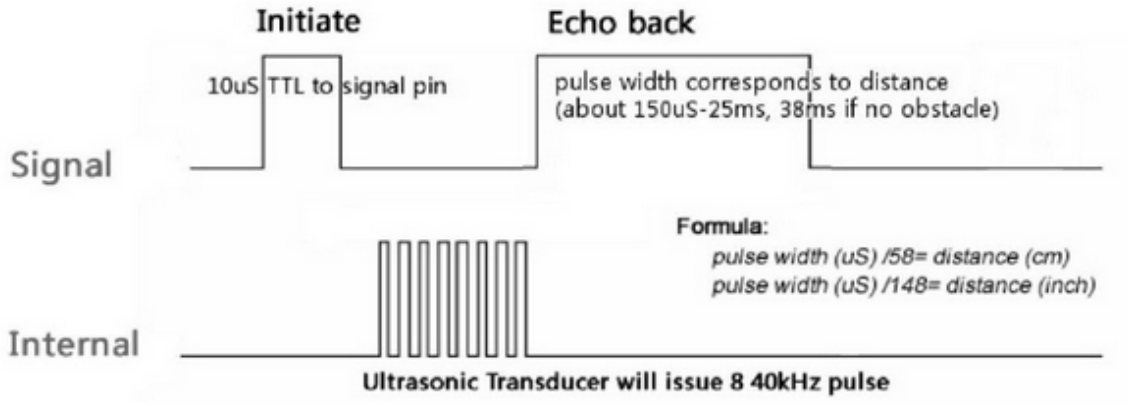
Electric Parameter

Working Voltage	DC 5 V
Working Current	15mA
Working Frequency	40Hz
Max Range	4m
Min Range	2cm
Measuring Angle	15 degree
Trigger Input Signal	10uS TTL pulse
Echo Output Signal	Input TTL lever signal and the range in proportion
Dimension	45*20*15mm

BASIC PRINCIPLE

The HC-SR04 uses ‘SONAR’ to measure its distance from surrounding objects kind of like how bats do. Its operation is not affected by sunlight or black material like sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect). It comes complete with ultrasonic transmitter and receiver module.

1. The transmitter (trig pin) sends a signal which is a high-frequency sound
2. When the signal reaches an obstacle, it is reflected back towards the sensor.
3. The reciever (echo pin) receives it.

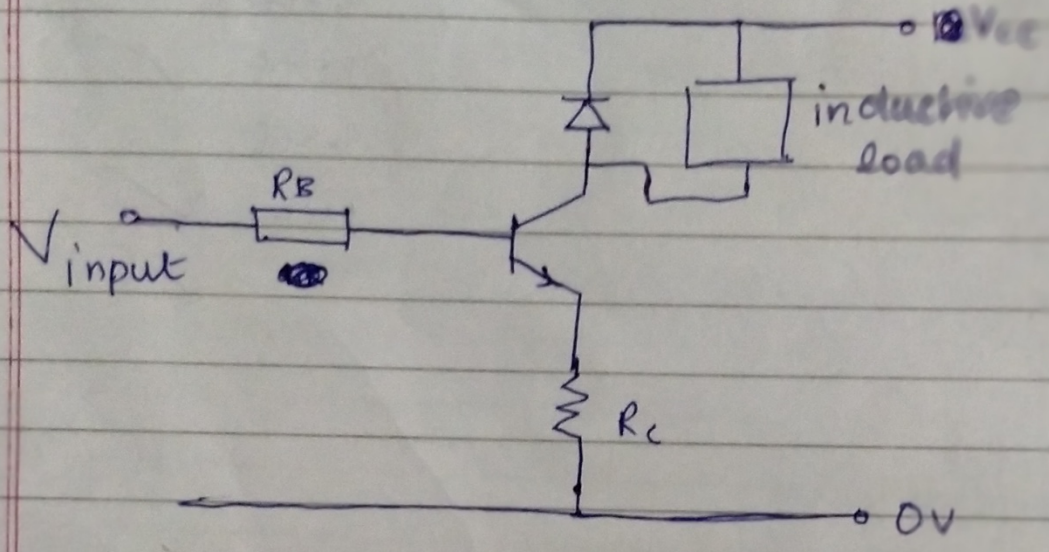


Interfacing the sensor with an Arduino Uno

The actual working of the sensor is quite complicated but using it with an Arduino Uno is relatively simple, which allows beginners to make simple projects with it. Libraries like ‘NewPing’ make lives much more easier when working with this sensor.

Troubleshooting

In case the HC-SR04 does not receive an echo then the output never goes low. Devantec and Parallax sensors time out after 36ms and 28ms respectively. If one uses Pulsin then with no return echo the program will hang for 1 second which is the standard timeout for Pulsin. One needs to utilize the timeout parameter. The HC-SR04 works up to 10 feet giving a total path length of 20 feet and a path time of about 20ms so set the timeout to above 20ms.



* I forgot adding the base resistor !!