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Special Sensor Report

My special sensor is an array of eight Devantech SRF-04 sonar range finders.



A sonar range finder works by generating a short burst of sound - a "ping" - then listening for the echo of the sound when it bounces off the nearest object. By accurately measuring the time from the start of the ping until the echo returns back to the sensor, the distance to the nearest object can be determined.

The Devantech SRF04 sonar range finder is operated by generating a pulse of greater than 10 microseconds on its trigger input signal. This causes the range finder to issue a ping. The range finder enables its receiver 100 microseconds after the ping and raises the sensor's echo

output signal. (The delay in enabling the receiver prevents the receiver from hearing the transmission of the ping.) When the receiver hears the echo it drops the output signal. The elapsed time between the ping and the echo can be determined by measuring the pulse duration on the echo line and adding 100 microseconds, as follows –

$$\text{ElapsedTime} = \text{PulseDuration} + 100$$

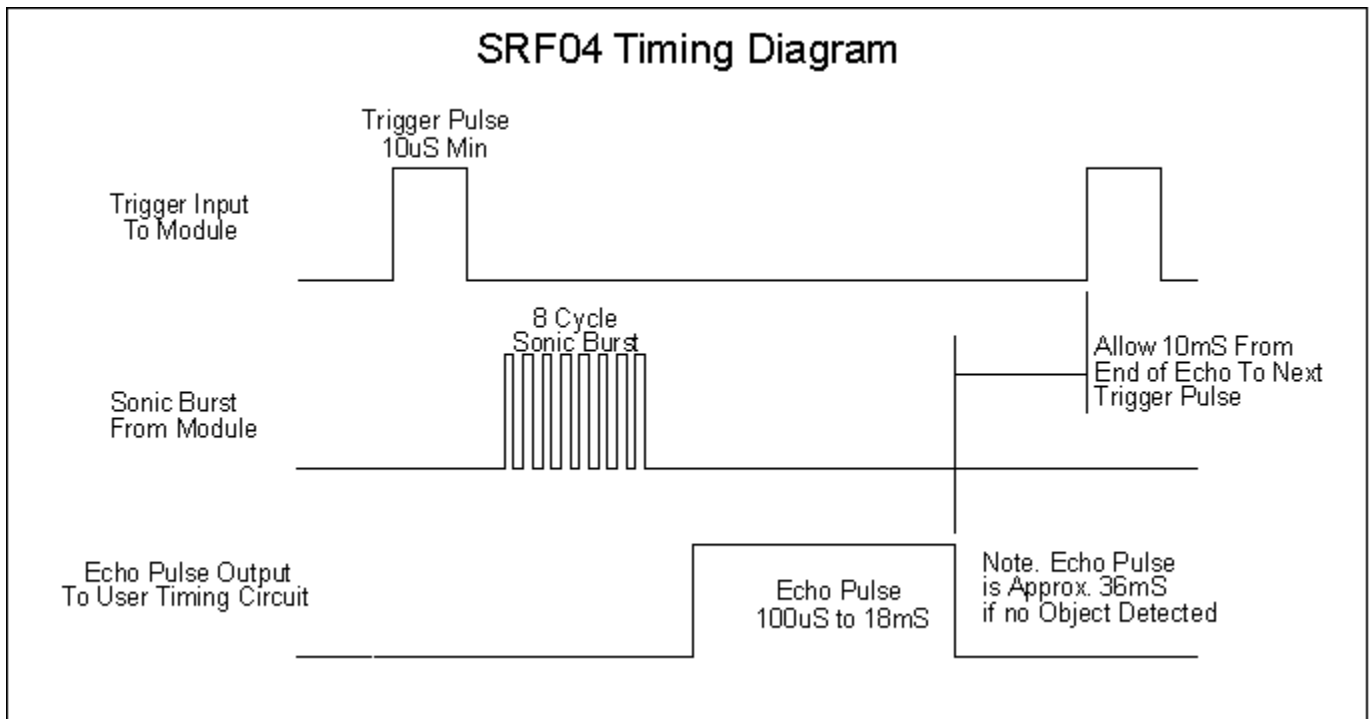
Specifications

Voltage	5v
Current	30mA Typical / 50mA Max
Frequency	40KHz
Maximum Range	3 m
Minimum Range	3 cm
Sensitivity	Detect a 3cm diameter stick at > 2 m
Input Trigger	10uS Min. TTL level pulse
Echo Pulse	Positive TTL level signal, width proportional to range.
Weight	0.4 oz.
Size	1.75" w x 0.625" h x 0.5" d

Connections

The SRF04 requires four connections to operate – even though there are five open connections. The two outside connections are for the power and ground lines. The SRF04 requires a 5 volt power supply capable of delivering a roughly 50 mA of continuous output. The remaining two connections are for the trigger pulse in and the echo pulse out. These two can be connected directly via lines to my micro controller.

object. By timing the pulse it is possible to calculate the range in inches/centimeters or anything else. If nothing is detected then the SRF04 will lower its echo line anyway after about 36mS.



Beam Pattern

One of the strongest aspects of the SRF04 sonar range finder is its beam pattern. It senses a roughly 45 degree angle cone, and can detect very narrow things such as a broomstick or a chair leg. The beam pattern cannot be changed and is a function of the surface area of the transducers. So, to change the beam pattern one would likely need to acquire new transducers and attach them to the SRF04's circuit board. The beam pattern on acroname's website is shown below –

