



UNIVERSITI TEKNOLOGI MARA

**INVESTIGATION ON FALSE ALARM
CORRECTION FOR ULTRASONIC SENSORS**

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Final Year Project Report is submitted in fulfilment of the requirements
for the degree of **Bachelor of Engineering (Hons) Electronics
Engineering**

Faculty of Electrical Engineering

January 2019

ABSTRACT

The HC-SR04 was used as a basis for the study of parking sensors since they are both ultrasound sensor that applies the use of ultrasound to detect obstacles. The schematics of the HC-SR04 was studied and based on previous research the schematics were reversed, drawn and modified or added some form of small improvements to tackle the problems of false echoes that cause the sensor to detect obstacles which does is not desired or 0 returns where the sensor is unable to receive the reflected waves of its transmission when faced with an obstacle made up of soft material particularly that absorbs ultrasound waves. A new circuit was built based on the HC-SR04 schematics with significant alterations and the coding of the new circuit is slightly altered to obtain better signal results compared to the HC-SR04. The findings revealed that the circuit revealed some changes to the experimental set up for the alarm problem. The designed circuit could transmit ultrasound signals properly however its receiver configuration could not properly receive the desired reflected ultrasound signal. The problems with the receiver could be attributed to its configuration, temperature of surroundings and other noises inaudible to the human ear.

ACKNOWLEDGEMENT

In the name of Allah, The Most Generous and The Most Merciful. I bow myself humbly in gratitude to The Almighty for giving me His blessing and strength in completing my final year project and final year project report.

I express my deepest gratitude towards my supervisor, Dr Suhana Binti Sulaiman whose guidance, wisdom and advice she provided for throughout the course of this final year project. The staff of the Electrical Engineering Faculty for their cooperation in lending me the use of their equipment for me to carry out my investigation.

And lastly, my family and friends for their support and help whether directly or indirectly for me to carry on and finish this project.

Thank You.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Sound waves with high frequencies higher than the upper audible limit of human hearing generally higher than 20 kHz are called ultrasound. Ultrasonic sensor utilizes sound waves by propagating them through the air at a high frequency towards an object. The reflected sound waves will then travel back to the sensor where the elapsed time between the transmitted and received sound waves is recorded and used to calculate the distance between the detected object and the sensors. In air, sound travels at the speed of 344 m/s [1]. At such high speed, ultrasonic sensors can generally receive results relatively fast even if the distances either increases or decreases. However in [2], ultrasonic requires a hard levelled surface opposite to it in order to obtain adequate sound reverberation. Depending on the type of material of the object detected, ultrasonic sensors may return erroneous results

In this project, the HC-SR04 ultrasonic sensor was used as the basis of my investigation to further understand the workings of an ultrasonic sensor. The HC-SR04 uses the same principle of any ultrasonic sensors at a rudimentary level where it will transmit an ultrasound signal at a high frequency which will reflect off a surface and the echo will be received by the sensors. The HC-SR04 was studied and its schematic was reversed which will then be studied to understand how it chooses to