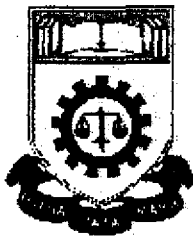


ULTRASONIC SENSOR DETECTION SYSTEM

**This is presented fulfillment for the award of the
Bachelor of Electrical Engineering (Honours)
INSTITUT TEKNOLOGI MARA**



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ABSTRACT

This paper describes the development of an ultrasonic sensor detection system. Since applications of an ultrasonic sensor system is very wide, this project focuses only on the security system. Ultrasonic sensor is normally used as an intelligent sensor, which used wave-propagation phenomena as a remote controller light. The development of ultrasonic transmitter and receiver operate at 23 kHz, above the hearing range of people. Ultrasonic waves can be detected and located for various material applications. The main device in this development is the transducer, which is designed for sending and receiving signal. The spectral and spatial radiation characteristic of transducer is the main determinant of sensor performance. The operating frequency in the range of 22 kHz to 26 kHz is a resonant that can produce the best output.

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TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
	ABSTRACT	i
	ACKNOWLEDGEMENT	ii
	TABLE OF CONTENTS	iii
	LIST OF APPENDICES	v
1.	INTRODUCTION	1
2.	SYSTEM DESCRIPTION	3
2.1	Frequency Oscillator (555 Timer)	7
2.2	Voltage Regulator	10
2.3	Ultrasonic Transducer	10
2.4	Crystal Oscillator	10
2.5	Tone Decoder	11
3.	SYSTEM DEVELOPMENT	
3.1	Circuit Operation Description	13
3.1.1	Transmitter Circuit	13
3.1.2	Receiver Circuit	14

CHAPTER 2

2.0 SYSTEM DESCRIPTION

Ultrasonic sensor detector system is used to activate alarm control box, which occurred when reflected signal sensed a person pass through the protected space. The system consists of two parts of transducers at the same type for both transmitting and receiving process. The signal of the transducer carries the information at 23 kHz. The type of transducer that is convenient to be used in this project is the magnetostrictive transducer, which is normally used in frequency not more than 40 kHz [6]. The transducer should have proper sensor performance such as robust design, stable radiating surface, high efficiency, high transmission level, high reliability and has good receiving sensitivity.

Depending on how an ultrasonic signal has been changed on its path from transmitting transducer to receiving transducer, the sonar sensors can be divided into distance sensor (reflection) and propagation path sensor. The classification of ultrasonic sensors is attached in appendix A. The distance sensors based on the ultrasonic principles is used in the travel time and amplitude of the received signal to derive the presence, distance and type of a sound reflecting object. In the part of ultrasonic propagation sensors, the effect of the tested variables on the transmission is evaluated. The parameters that are affected are the speed and attenuation of propagation, local changes of propagation (diffraction and refraction), directional and frequency dependency, acoustic impedance, scattering and wave guiding coefficients. The advantages of drift effect for high resolution flow sensor in propagation path, which have high accuracy, applicable for a wide variety of gases, proper recognition of the flow direction and have high sensitivity to temperature.