DEVELOPMENT OF AN ULTRASONIC LISTENING DEVICE

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ABSTRACT

This project describes the studies and construction of an Ultrasonic Listening Device which can convert the ultrasound to audible sound up to 5 meters. It is built in a gun configuration with a barrel housing which is suitable as a detector and easy to carry anywhere. The system consists of two main parts namely transmitter and receiver. It is designed for the partial discharge detection in high voltage components such as in gas-insulated switchgear and the firing of spark gaps. The device contains the necessary batteries and provides a convenient method to get final assembly circuit. Simulation was carried out at oscillator part to predict the performance of the proposed system as a solution to problems. Experimental test were performed on schematic diagram of the overall project.

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In the name of Allah S.W.T, the Merciful, the Beneficent, the Only One. Praised be to Allah alone for HIS endowment that allows me to complete this project.

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CHAPTER 1

1. INTRODUCTION

Ultrasonic can be used to describe the study or application of sound waves with frequencies greater than can be detected by human ear [1]. The use of ultrasonic is to study the acoustical properties like liquids, gases and solids. It is widely used for several applications such as in the non-destructive testing of materials, medical diagnosis and various form of instrumentation and control.

This system can be used to detect a corona before the occurrence of spark breakdown in a Marx generator. Any other signal which exists in the range of 20 Hz to 41 kHz can also be detected. It is feasible to be applied as an alarm security system such as in car, bank and building. Another technique which complements this design equipment is the Infrared Viewer which is constructed by another student [4]. Research had been done on the improvement of ultrasonic wave at frequencies of up to 100 GHz [2] for more broader applications.

Ultrasonic is used in preference to audible sound in many applications for one or more of the following reasons which, it has directional properties, the higher the frequency, the greater is the directivity. This is the main consideration in flaw detection and under-water signalling. The second application is that, at the higher frequencies, the wavelengths become correspondingly shorter and are comparable width, or even much less than the dimensions of the samples of the material