#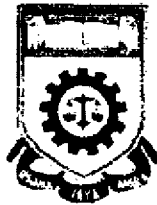 SIGNAL CONDITIONING AND COMPUTER INTERFACE FOR A LOW COST PORTABLE FIBRE OPTIC SENSOR : (SOFTWARE AND HARDWARE DEVELOPMENT)

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ABSTRACT

On-line measurement and monitoring system is an important criteria in the present industrial and environmental measurement application. Thus, interfacing an instrument to a data acquisition system is one of the main issue. This project describes some considerations about the concept and implementation in the design of fiber optic sensor to sense and measure colors and displacements using computer. A signal conditioning circuitry is developed to obtain an optimum resolution. It also described general view of the C / C++ software programming design. PICO–ADC11 is used as interfacing between the hardware and computer by using parallel port or printer port. The system is able to interprete the signals from optical fiber sensor instrument that record and display the measurands (colours and displacement) continuously. The actual colour can be displayed using look-up table and the displacement measurement can be achieved with a standard deviation of $\pm$ 0.05 micrometer

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CHAPTER 1

1. INTRODUCTION

Fiber optic can do more than just as a transmission medium, they can convert mechanical, electrical thermal and other parameter of the physical world into variations of intensity, phase, speed, modal distribution and other characteristics of the light wave, and thus act as transducers.

This is not only fascinating but also very valuable in its optical guide. Transducer-generated information can travel great distance, unharmed by electrical interference, while generating none itself and remaining intrinsically more than can be said of electric transducers. Thus, in the years to come, Optic Fiber Sensors (OFSs) are likely to invade process control plants in which a small spark can cause a great conflagration, places where chemical agent threaten metallic leads with corrosion, and hospitals where the absence of all galvanic patient-equipment connection offers a guarantee of intrinsic safety[1].

This project will focus on the signal conditioning circuitry development and data representation. A C/C++ program that can interpret the signals from OFS and measurement system will be explored The objective is to develop an on-line data acquisition system for OFSs.