AUTOMATIC DETECTION ELECTRICAL FAILURE SYSTEM

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Specially…..

To my beloved parents

To my kind brothers and sister

And to all my friends

For their Love, Encouragements, and Best Wishes

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ABSTRACT

. This project is to design a Radio Frequency (RF) communication system that will be able to link from a station to PC as a monitoring system. This circuit is designed and simulated by using Proteus software and the hardware development is fabricated after that. The current detected by sensor will be decoded and transferred to the computer using the RF communication. The current will be analyzed by microcontroller and Hall Effect Sensor. The data is send by using the Radio Frequency communication. This project is enables to build a fully Automatic Detection Electrical Failure that can monitor a circuit using a RF communication system . The ultimate goal is to monitor the electrical circuit if there is some occurrence of electrical failure.

ABSTRAK

Projek ini membolehkan penghasilan sistem komunikasi secara Frekuensi Radio yang membenarkan perhubungan dari sesebuah stesyen ke sebuah komputer peribadi sebagai peralatan pemantau. Litar ini direka dan disimulasi menggunakan perisian Proteus dan kemudiannya pembangunan perkakasan difabrikasi.Arus yang dikesan oleh pengesan akan dikod dan dihantar ke komputer menggunakan perhubungan radio frekuensi. Arus akan dianalisa oleh pengawal mikro dan juga Pengesan Efek Hall.data yang dihantar menggunakan komunikasi frekeunsi radio. Projek ini membolehkan pembinaan sebuah Pengesan Automatik Kegagalan Elektrik yang membolehkan pemantauan litar tertentu dilakukan menggunakan sistem komunikasi radio frekeunsi Matlamat utamanya ialah memantau litar electric jika berlakunya kegagalan fungsi elektrik

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LIST OF ABBREVIATIONS

ADC	-	Analog to Digital Converter
AM	-	Amplitude Modulation
ASCII	-	American Standard Code for Information Interchange
ASK	-	Amplitude Shift Key
BCD	-	Binary Code Decimal
FM	-	Frequency Modulation
FSK	-	Frequency Shift Key
GPIB	-	General Purpose Interface Bus
IC	-	Integrated Circuit
LED	-	Light Emitted Diode
OOK	-	On Off Key
PC	-	Personal Computer
PCB	-	Printed Circuit Board
PIC	-	Programmable Integrated Cicuit
PSK	-	Phase Shift Key
RAM	-	Random Access Memory
RF	-	Radio Frequency
S/N	-	signal-to-noise
SCADA	-	supervisory control and data acquisition
SNR	-	Signal to Noise Ratio
SVM	-	Support Vector Machine
TNB	-	Tenaga Nasional Berhad

TV	-	Television
USB	-	Universal Serial Bus
UV	-	Ultra Violet

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CHAPTER 1

INTRODUCTION

1.1 Project Description and Problem Statement.

Automatic Detection Electrical Failure System is a project to enable the building of a fully control switch to solve the electrical failure problem by using wireless to monitor it. Easy to repair of electrical failures in the building for the most common of which is failure of the high current or short circuit and any condition will make the fault at electrical devices .

This project planning is to upgrade the building electrical system to automatic electrical failure detection system using wireless control and can be monitored. This system is going to improve service reliability and personnel safety. This system consist of replacement of obsolete cables, switches, and electrical devices with efficient equipment, built with the most up to date technology available in the industry and also planned service electrical connections for new buildings and facilities that are opening. This can be done by providing an electrical devices location and replace it in the short time. The installation of a new electrical device will also allow for increased reliability to perform the necessary maintenance into the future.

Any failures in the building for the most common of which is failure of the high current or short circuit and any condition will make the fault at electrical devices cable security system is more risky to malfunction or not working due to damage or disconnected

1.2 Project Objective

1.2.1 Objective of my project is to design a system for electrical monitoring detection f ailure by using Radio frequency System.

1.2.2 To ease the situation when electrical failure happen.

1.2.3 To monitor the situation when electrical failure happen.

1.3 Scope of work

Before doing any project, there are many have to be study. There are a lot of fields and knowledge that must be applied to make sure the project that we have been working on can be successful as expected from the beginning.

There are many fields or areas that have to be covered and studied. Anything regarding to this project such as microcontroller, RF technology, components that are needed and also the problems related to this project is important to understand. All the necessary things that need to be done, such as how this technology is working and how to apply it, the necessary equipments and devices that are going to be use and a lot more factors that need to consider. While doing the project the ability of the RF module must be tested for the maximum distance, different condition and situation.

For the implementation part, the main technology covered in this project is about RF technology. The simulation and hardware is been designed by using simulation software (PROTEUS), circuit and few electronic devices. RF module is the main component to the hardware controller, where it will control the whole operation of the transmission signal. The assembly language that used also must be suitable. Therefore the implementation of microprocessor language is important while working on this project.

CHAPTER 2

LITERATURE REVIEW

2.1 Review from another project

To be able to work out on the automatic detection electrical failure, research and study on the previous project in the internet which has been done by someone else; most of them are by Professor or Master Level students.. The objective and application are suitable to mine, so this example is been used as a guideline and reference in order to work out on my project.

2.1.1 A Microprocessor Based Bus Relay Using A Current Transformer Saturation Detector

A microprocessor based bus protection scheme is presented. It uses a novel technique to overcome the problem of current transformer saturation. The protection algorithm uses a combination of the percentage differential principles and the phase comparison technique. With a sampling rate of 1440 Hz (24 samples/cycle on a 60 Hz system) a realistic bus is considered for algorithm testing. With the incorporation of this saturation detector, the relay can yield a correct trip/block decision for either an internal

or an external fault in the presence of current transformer saturation within one cycle. In the best case, this protection scheme can give a trip/block decision in a quarter cycles. Simulation results show that the saturation detection algorithm and the hybrid bus protection algorithm (using percentage differential and phase comparison principles) are simple, efficient, and accurate. [1]

2.1.2 Intelligent System for Automatic Fire Detection in Forests

The use of smoke-analysis is described for fire detection by means of standard TV cameras. The smoke detection technique is given and a method to obtain a suitable description of the scene is discussed. The 'intelligent' part of the system is described and the methods and heuristics to speed-up the decision process are covered. The sub-system devoted to the translation of the sensor data into a form suitable for logic manipulation is presented. [2]

2.1.3 High Current Arc Accidents In Superconducting Magnets

Experimental data on electric high-current arcs that took place during the tests of superconducting coils for tokomak T-15 are analyzed. Possible locations in magnet system components where circuits shortened with arcs may originate are identified. Models used for numerical simulation of arc discharges in coils and feeding lines are described. Possible arc development scenarios are analyzed. Accident consequences for different scenarios are estimated [3]

2.1.4 Disturbance analysis in TNB transmission system

With deregulation, utility such as Tenaga Nasional Berhad (TNB) recognize the need to examine one of the key indicators which is reliability in order to be competitive.

To examine the reliability needs, TNB has embarked on an extensive program of installing disturbance recorders on all its 275kV substation and important 132kV substation. This enables TNB to monitor and evaluate protective relay equipment which is essential to the system reliability. Prior to the application of disturbance recorder monitoring and fault analysis relied mainly on the relay operation. This at times led to inaccuracies in the fault analysis due to uncertainty of correct relay operation. It describes the application and field experience over the last five years including the problem of circuit transmission of data by modem to the analysis centre and the future move towards transmission by internet protocol. [4]

2.1.5 RF Module

RF modules are partially circuits that can be incorporated into larger designs. They include receivers, transmitters, and transceivers. RF modules use several different modulation methods and radio techniques. On-off key (OOK) modulation turns a signal on or off. Amplitude Modulation (AM) causes the baseband signal to vary the amplitude or height of the carrier wave to create the desired information content. Frequency Modulation (FM) causes the instantaneous frequency of a sine wave carrier to depart from the center frequency by an amount proportional to the instantaneous value of the modulating signal. Amplitude Shift Key (ASK) is a modulation method that transmits data by varying the amplitude of the transmitted signal. Frequency Shift Key (FSK) is a digital modulation scheme that uses two or more output frequencies. Phase Shift Key (PSK) varies the phase of transmitted digital signals in accordance to the baseband data signal. Radio techniques limit localized interference and noise. Direct sequence spread spectrum techniques spread signals over a large band by multiplexing the signal with a code or signature that modulates each bit. [5]

Performance specifications for RF modules are including sensitivity, output power, communication interface, operating frequency, measurement resolution, and maximum transmission distance. Sensitivity is the minimum input signal required to