DESIGN OF THE GUI BASED REMOTE ON/OFF CONTROL AND MONITORING SINGLE PHASE AUTOMATION DEVICE

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LAPORAN AKHIR PENYELIDIKAN 'DESIGN OF THE GUI BASED REMOTE ON/OFF CONTROL AND MONITORING SINGLE PHASE AUTOMATION DEVICE'

Merujuk kepada perkara di atas, bersama-sama ini disertakan 3 (tiga) naskah Laporan Akhir Penyelidikan bertajuk 'Design of The GUI Based Remote On/Off Control and Monitoring Single Phase Automation Device'.

Sekian, terima kasih.

Yang benar,

MOHD SUHAIMI B. SULAIMAN
Ketua
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ABSTRACT

The Microcontrollers are very popular in electronics and computer controlled systems overall in the world. Remote control of a system by using computers is applied to lots of processes. It is very important about reducing the time loss and also cost of employees. This thesis presents the controlling of a microcontroller based system using computer. First of all microcontrollers are introduced. The main differences between microcontrollers and microprocessors are discussed with reasons. Also, the reasons of why PICs (Peripheral Interface Controller) are the most popular type of the microcontrollers are explained. The hardware and software parts of microcontroller are clarified comprehensively. One of the most important parts of this thesis is the communication between PIC microcontroller and computer, so communication protocol is described in depth. PIC MPASM is used for programming PIC microcontroller and Visual Basic is used for programming the computer. The thesis concludes with explanations of these programs.

The main station for operation of the system is monitored using Graphical User Interface (GUI) developed based on visual basic environment. A stand-alone main station can be also developed by PIC microcontroller as an alternative central station. The GUI based on Visual Basic software is also developed for upgrading the capability with a new communication computer port operating under window environment. The developed system has shown that the auto switching mode of transmission could be implemented via the PIC microcontroller and RS485 transceiver. The use of PIC microcontroller has made the proposed system to be small in size that meets the trend of current technology. The complete prototype system is developed and the performance is reported.

In this thesis, the automation of the long term and cyclic processes by using a programmable control unit is aimed. To achieve this goal, timing relays and various microcontrollers are investigated. PIC microcontroller is chosen to implement the control unit due to its advantages like high speed, Harvard and RISC architecture, low cost and

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

1.0 Introduction

Controlling and monitoring the machines remotely is an important field of study these days. Since we are living in the mobile communication evolution, some researchers study the methodology of implementing a communication system that can be used by the machine. The monitoring and remote control of electric devices and equipments are more and more used by the energetic operators and monitoring. The whole supervision, control and monitoring process of electric devices and equipments from electric power station and distribution grids is based on automation, protection, data acquisition and control equipments. There is a close relation between the equipments [1]-[5].

There are many methods to manage the power management in the building. The popular method is controlling the maximum demand, which controls the power equipments in the building, such as motor, heater, lamp and air-conditioner. The power management problems are the remote control adjustment, which results from carelessness of the consumers. They do not pay attention in switching on/off. This case leads to energy loss. The central station works as local or field bus device and the host computer work as field bus supervisor. These units can be controlled by user in the room and controlled by computer's command. The computer is connected to each unit via serial communication RS485 standard by twisted pair. This system is distributing function; on/off control which is one of the network system. All of functions are developed by PIC 16F877 microcontroller. Those receive command from central station by command packet format within the software on computer. The software uses visual basic to monitor and control [6]-[9].