Design of monitoring and Control system using PIC 18F87j11

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***Abstract*—**Today, we are entering post-PC era where mobile devices (e.g. I-Pads, Smart phones and handheld tablets) are handling daily tasks that traditional desktop and laptop computers once handled. Several reports show that personal computers are no longer on the leading the edge of computing and the use of mobile devices are quickly taking over[1]. A smart home automation system is based on ensuring security and making user's life easier. In this paper, a solution to transform a normal house to a smart house while reducing the energy consumption is proposed. This can be realized with the help of PIC controller. The smart phone is integrated into the system which allows the self control of the energy utilized of difficult rooms in house from anywhere in the home. The protocol model is developed to demonstrate the effective utilizations of smart phone in home automation.

***Keywords*—** RS232, PIC,MCU,USART.

1. INTRODUCTION

The concept of "automation" has existed for many years. It began with a student connecting two electric wires to the hands of an alarm clock in order to close a circuit of a battery and light bulb. Later, Security monitoring and control of a home or apartment is become more and more commonplace, and perhaps even a necessity, in households today. However the monitoring costs for professional monitoring can be very expensive and provide limited remote control of the system. This project lays the foundation for a self-monitored

home alarm and control system. It incorporates real sensors used in home monitoring of windows and doors. It also

incorporates a "deterrent" system in the form of a remotely controlled light. There is also a web based interface that allows for the monitoring and control of the system from any device that has a simple web browser and internet access.

2. BLOCK DIAGRAM

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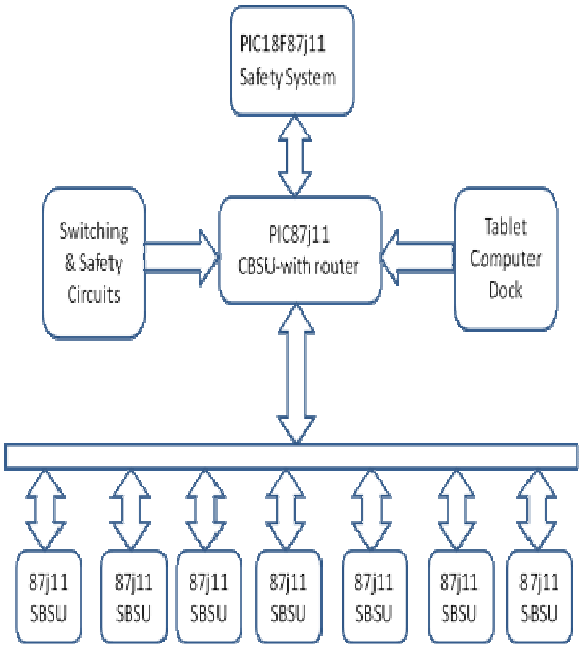

Fig.1 Block Diagram.

2.1 CBSU. (Central Board Switching Unit)

Its main function is to select the Sub board according to selection and identify its ID It is interfaced with tablet using android interface. There is one Protocol defined for it which includes different board identification.

2.2 SBSU. (Sub Board Switching Unit)

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3. HARDWARE DESIGN

3.1 PIC MICROCONTROLLERS

A microcontroller is an electronic device that integrates several or all the features required to control a process with a minimum of additional devices. For this reason, it is often regarded as a "computer on a chip". Considering the ease with which it can be programmed and reprogrammed in situ, it offers a dynamic upgrading solution to many interfacing and control problems Of particular interest in this paper is the PIC18f87j11 device[2]. The abbreviation PIC stands for programmable integrated circuit, a class of fast and highly popular processors made by Microchip Incorporated. This PIC is a natural choice if a high performance to cost ratio is desired. The features employed in this project are the eight analogue to digital inputs and the asynchronous serial port which enables a half-duplex serial communication with a personal computer using the RS232 standard.

3.2 INTERFACING TO MICROCONTROLLER

This section explains how to interface many different input and output devices to the PIC microcontroller. BASIC code examples are provided for users of the Basic Stamp or PICAXE systems. Explanations of BASIC commands are provided in the Commands section (available separately). The interfacing circuits can also be used with any PIC microcontrollers such as the PIC16F84, although these microcontrollers may require programming in assembler code. This section is split into four subsections:

- Introduction to 'standard' interfacing circuits
- Output Device Interfacing
- Input Device Interfacing
- Advanced Component Interfacing

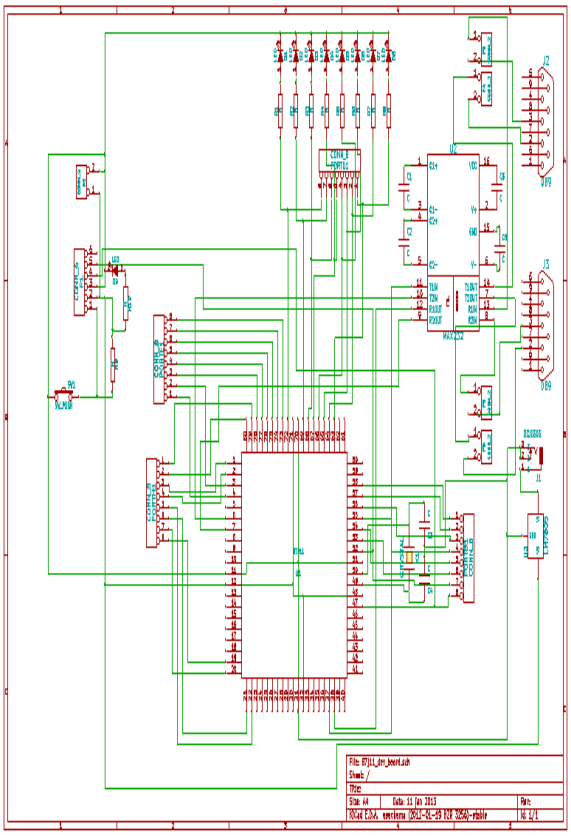

Fig.2 interfacing diagram of Micro-controller based card.

4. SERIAL INTERFACING

4.1 INTRODUCTION

The serial port is convenient albeit slower because of the fewer interconnects and ease of programming. In the past, access to the hardware ports was not particularly difficult but as operating systems evolved, so did the urgency to guarantee system stability and security especially on networked computers [1]. Many operating systems have placed constraints on direct port access. In such cases the operating

system acts as the arbitration layer, generally making it more difficult to implement interfaces that were once easy to use. Fig. 2 shows the layout of the interrupt-driven 8-channel serial data acquisition system connected for

half-duplex communication with the host. The cycle of operation is as follows: the PIC receives a command from the host, decodes the command, carries out the command, and sends a response back to the host, which in the meantime would be engaged in other tasks. In order to maximize speed, all but the simplest processing is done on the sampled data immediately. Instead, data is accumulated into a spreadsheet file by the data storage block for later processing[6].

4.2 Universal Synchronous Asynchronous Receiver Transmitter (USART)

The Universal Synchronous Asynchronous Receiver Transmitter (USART) module is one of the three serial I/O modules. (USART is also known as a Serial Communications Interface or SCI.) The USART can be configured as a full-duplex asynchronous system that can communicate with peripheral devices, such as CRT terminals and personal computers. It can also be configured as a half-duplex synchronous system that can communicate with peripheral devices, such as A/D or D/A integrated circuits, serial EEPROMs and so on.

5. SOFTWARE DESIGN

With the help of MPLAB C compiler the code for PIC18F87j11 can be written. MPLAB C is designed to provide the programmer with the easiest possible solution for developing application for the embedded systems. It allows user to quickly develop and deploy complex application. We can write C source code using the built I code editor. Here MPLAB C libraries can be use to speed up the development. In this code we used the syntaxes ad functions provided by MPLAB C compiler.

CONCLUSION

This system use serial port of personal computer to receive and transfer data on RS232, and connected to the network through the PIC MCU. On the one hand, it can receive data from and transfer it to the computer in standard RS232 format; On the other hand it can be put the data flow that is received in RS-232 format. IC18F87j11 chip in SMD package is used which makes the industrial applications convenient.

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