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RESEARCH ARTICLE

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# A NOVEL APPROACH FOR INTERFACING SWITCHES ON GLOVES WITH PIC MICRO CONTROLLER IMPLEMENTATION

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## ABSTRACT

Now a day there is a trend in using a wireless keyboard and mouse. The wireless user interface technology is vastly changing and many day to day objects are being transformed into user interface so that it can be easy for us. In this paper, we propose a system which uses gloves for interacting with the personal computer. In addition to keyboard, mouse interface is also included in the Glove. To verify the proposed prototype is created. This proposes that when a person presses the switches on fingertip mouse movement also inputting character can be done.

***Key words:*** Zigbee, Tactile Switches, PIC Microcontroller

## INTRODUCTION

Keyboard and mouse now provide the means of virtually all input. Use of other options than a mouse or keyboard i.e. Grasping virtual objects, hand, head or body gesture, eye fixation tracking is becoming popular with the popularity of ubiquitous and ambient devices like digital TV, play stations. We will see more elderly people and fewer younger people as a process of huge demographic change. The older population will

continue to grow significantly in the future. It is widely accepted that we need to address this issue through more research work.

The research work includes the use of switches on fingertips and inputting in the form of ASCII codes, and involves the allocation of fingers properly. We find such application [1]. We also find another application which introduces a chording glove, provide a speed of 8.9±1.4 words/min, and requires a hard surface and practice to use it [3]. In another application, a data glove is developed by using sensors and generator coils to track the fingertip position [6]

In this paper the system consists of PIC16F877A, decoder, UART, glove, with switches, memory, RF transmitter and receiver, power supply. Here in this project, we can able to perform the mouse movements as well as keyboard operations like inputting characters , etc. Simultaneous operations can also be performed using the gloves. ON/OFF switches are integrated with the gloves and thus it is possible to use it as a wireless input interface to the personal computer.

**SYSTEM DESCRIPTION**

The block diagram of the interfacing of switches to a personal computer is shown in Fig. 1. The transmitter side consists of PIC16F877A, gloves with switches and Zigbee transmitter to transmit it wirelessly.

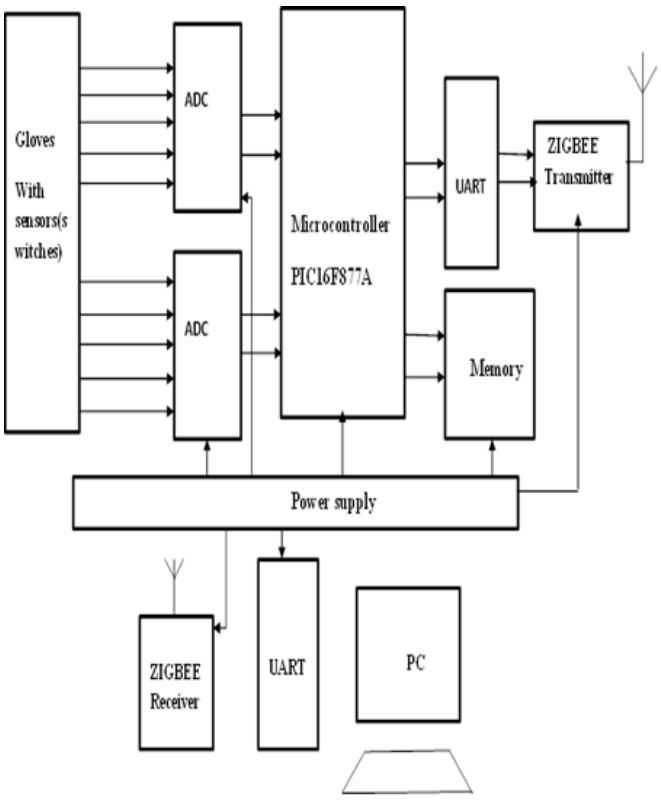


**Fig.1** Block diagram of the system

According to the movement of gloves, the switches get activated and the electrical signal from the same is given to the decoder unit. The decoder unit can sense up to 10 switches. For a mouse movement separate four switches are added, it is provided to indicate the position. The decoded digital signal is fed to the microcontroller where it gets processed. The microcontroller controls the UART functions as well as the wireless transmissions. The UART module is directly connected to the RF transmitter from which we can able to send the controlling signals wirelessly. The block diagram of the transmitter is shown in Fig. 2. The gloves with transmitter circuit representation are shown in Fig 6.

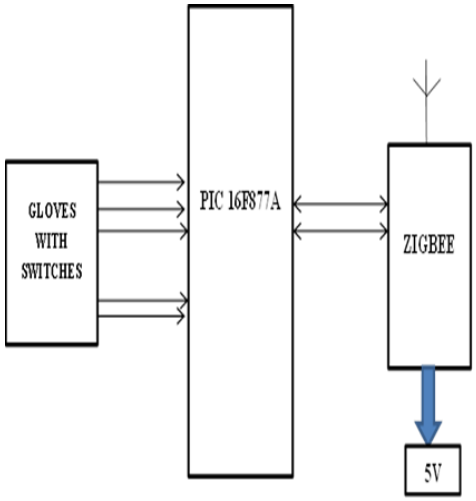


**Fig.2** Block diagram of the transmitter

The step-down transformer is used to step down the supply voltage of 230v ac from the mains to lower value of 9V AC. The transformer consists of primary and secondary coils. To reduce or step down the voltage, the transformer is designed to contain least number of turns in its secondary core. The outputs from the secondary coil which is center tapped are the ac values of 0v, 25v and 25v. The conversion of these ac values to dc values is done using the full wave rectifier unit. By using a voltage regulator (7805) it maintained in 5v.It will keep the voltage constant for any fluctuations in the value. The 5v DC is separately given topic micro controller, Zigbee, and MAX 232. MAX232 is the IC used to convert signals from RS232 to use by digital logic circuits. Zigbee transmits data in the range of 250 Kbits/s and provide a line of sight distance of 10 to 100 meters. The data rate varies from 20 Kbits/s in 868MHz to 250 Kbits/s in 2.4GHz. The block diagram of the power supply connection is shown in Fig. 3. The power supply has been given to all major components of the system.

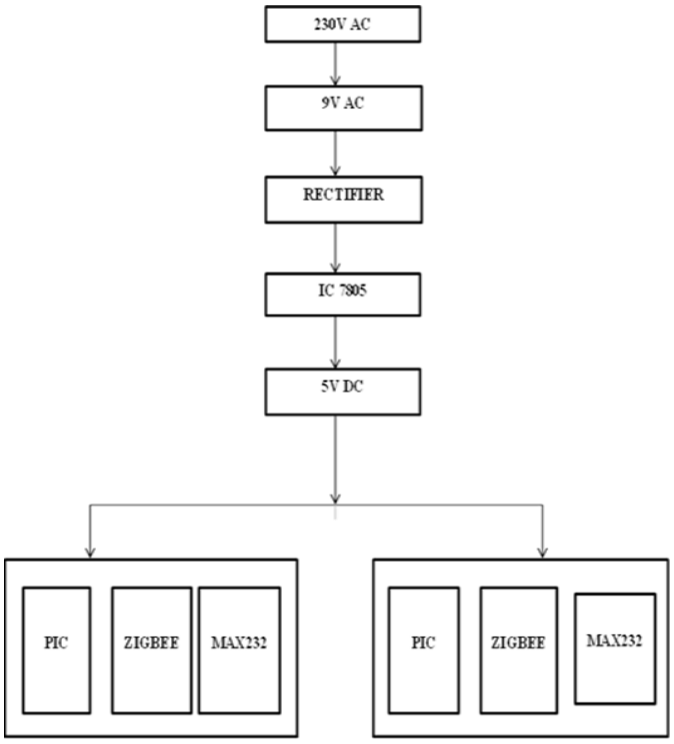


**Fig.3**Block diagram of Power supply connection

At the receiver side, an RF receiver has been placed through which digital signals can be received. Again, another UART has been used to receive the commands so that it can be interfaced with the Personal computer. In order to retrieve the data from the transmitter to the PC, two drivers, namely mouse and keyboard drivers have to be written. This driver gets the data commands from the UART and communicates to the operating system and finally mouse movements as well as keyboard operations can be done which will be seen on the screen. Hence the system is very easy and convenient to act as a wireless user interface for the personal computer.

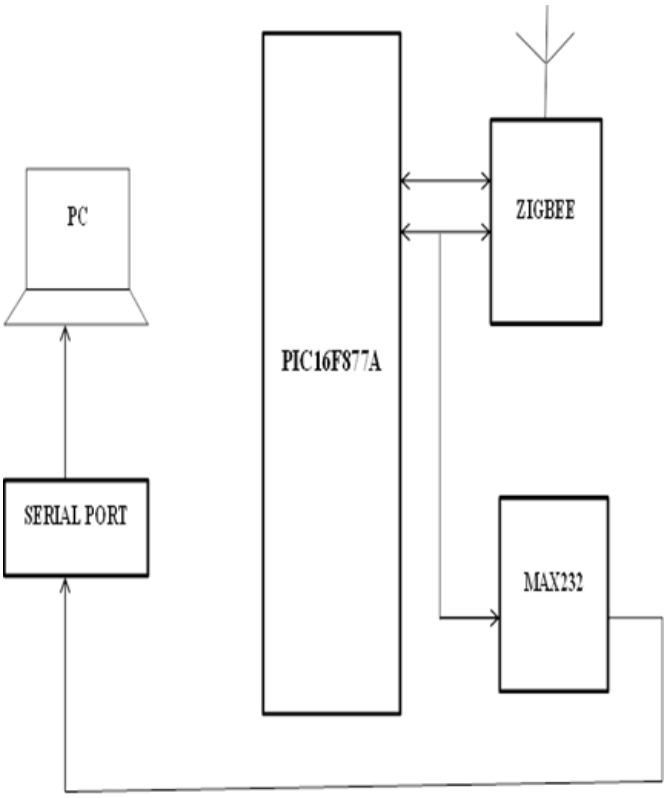


**Fig.4.** Block diagram of Receiver

**SIMULATION RESULT AND DISCUSSION**

The software we used is Proteus and MP lab IDE. MPLAB IDE is a software program that runs on a PC to develop applications for Microchip microcontrollers, called an Integrated Development Environment, or IDE, because it provides a single integrated environment to develop code for embedded microcontrollers. The output of 26 characters and special characters and numbers are done. The mouse movement for different positions, i.e. angles of (20, 0), (0, 20), (-20, 0), (0,-20) has done. The simulated output for the switches and mouse movement can be obtained. The simulated output is as shown in Fig. 5. The names of design and development crew 'BENSON AIDA ARUN GREESHMA PARK COLLEGE' have been entered using the system and the simulated output is shown in the Fig 5.

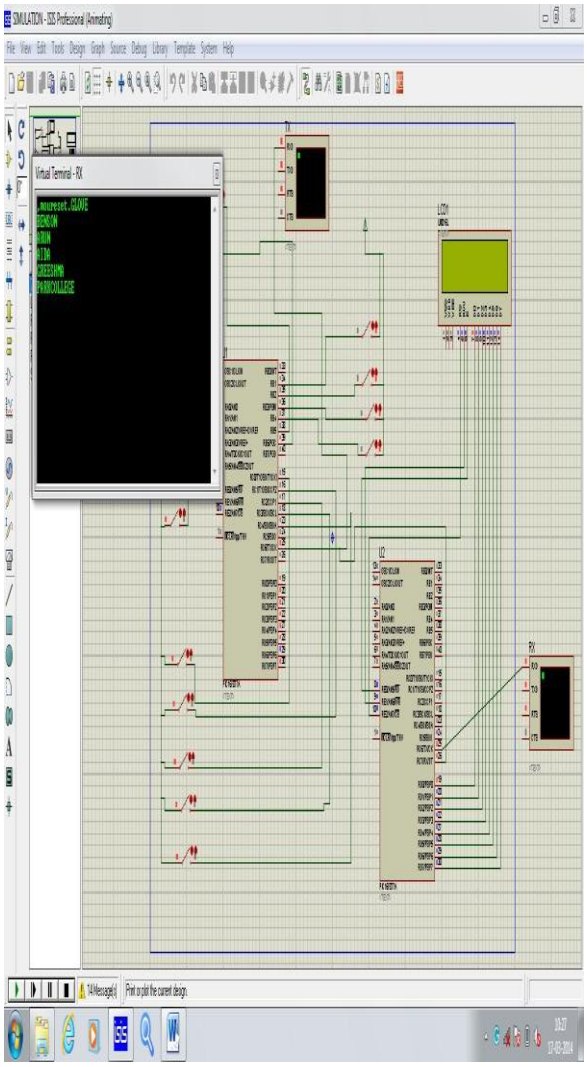

Fig.5 Simulated output

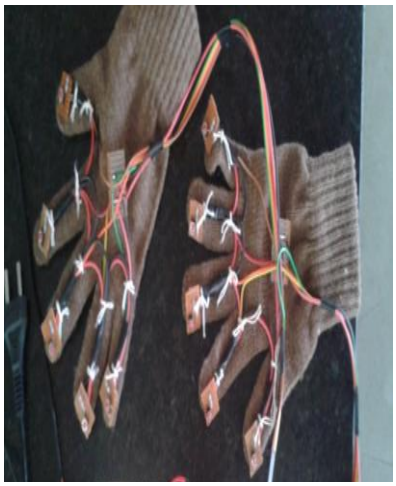

Fig.6. Glove with the transmitter

The simulated output of a glove input interface system using the software MPLAB IDE provides a development environment to further enhance the system. As an enhancement this system can be developed as battery operated system instead of consuming electrical power supply. The same glove input interface system can also be designed as solar powered system where this can be performed by including solar panels in the design system.

**CONCLUSION AND FUTURE WORK**

The new electronic device instead of mouse and keyboard as a glove to make human interaction easier with a personal computer is done. The inputting of character numbers and special characters can be done by using this proposed system. The data are inputting wirelessly. The proposed one is reliable, easy and convenient to use. Due to the reducing size of the system, it is easily portable. It is cost effective and efficient also. Moreover the mouse movements can be implemented in the glove. So we can integrate a number of processes in the glove.

The proposed method and experiment gave us the possibility of using gloves as a text input device. For the purposes of achieving the popular use of the glove as a text input device, more convenient and swifter methods should be proposed. The combination of characters onto the fingertips can be changed by users depending on their needs. The movement can be improved in the future. As an enhancement this system can be developed as battery operated system instead of consuming electrical power supply. The same glove input

interface system can also be designed as solar powered system where this can be performed by including solar panels in the design system.

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