Intelligent Monitoring System through PIC16F6877

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Abstract: This paper presents the design and development of an intelligent monitoring system is presented. The case of the designed system is tested with location based on the frequent entry building. The developed system recognizes and only allows entry to authorized personnel with a preset password. The system setup monitors the people who enter while keeping track of data like specific dates and time of entry. The system is equipped with sensors, closed circuit television camera, computer interfacing electronics lock and alarm siren. A microcontroller is used for the control and operation of the integrated modules. An computer interface is used for the data logging and monitoring of such a system.

Keywords: Intelligent, security, microcontroller

I INTRODUCTION

Intrusion is the most common happening at home and also at the work place due to varying factor. Recently a major portion os investment is beefed up for security systems. Home security and office security has become a critical issue for the citizens mainly because the amount of intrusion crime such as burglary and robbery is increasing rapidly. This is the main reason why more people are recognizing the urgency to install security systems in their offices and houses. This is rather important especially where company keep secrets to gain the competitive edge in terms of secured environment. This study focuses on the design of an intelligent security system with authorized personnel to enter the particular area. Most available systems are an integration of CCTV (Closed Circuit Television) with door access systems. There are quite a number of people have not installed the alarm system for their home. The main reason is that the security systems that are available in the market are relatively expansive. Besides, many people believe that security system is not relevant to them because their home or office is emptied only for few hours especially during lunch time for offices. The increase of intrusion crime that occurs during day time proves that a security system is a wise choice [1-4].

II METHODOLOGY

Nowadays security system is a common aspect in houses and offices. This study consists of the retaining a data base to monitor the entrance and also the break-ins. The security alarm system, which is designed to be user friendly, has a key pad outside the door or at the entrance of the office and only the authorized person will be allowed to access for entering the area. Once the correct password is entered, the door will open, and if there is any break in or someone who try to force in, the alarm siren will triggered and the emergency light will switch on. The main objective of this study is to make a simple design by connecting the system to the PC at all times and the camera should be mounted and connected to the PC for video surveillance and can be recorded for future reference. Figure 1 illustrates the flow of the system. The person who wants to enter the authorized area should key in the correct password. By doing this the magnetic lock will be deactivated meaning that the doors would be released.

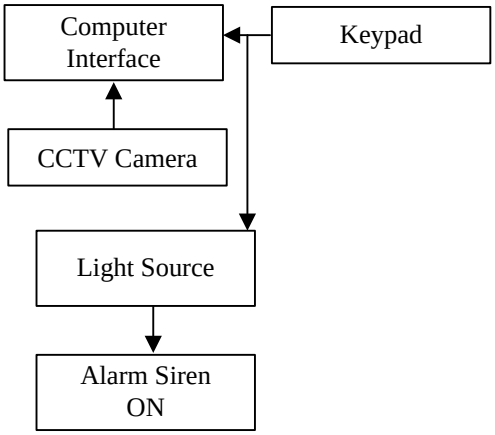

Figure1. Block diagram representation of the system under unauthorized entry

Figure 2 illustrates what happens when an unauthorized personal tries to enter the area. When there is any break in where the lock has not been deactivated, the alarm siren will be triggered and the emergency light will be switched on. The CCTV camera system which is interfaced with the PC is used to record the whole incident.

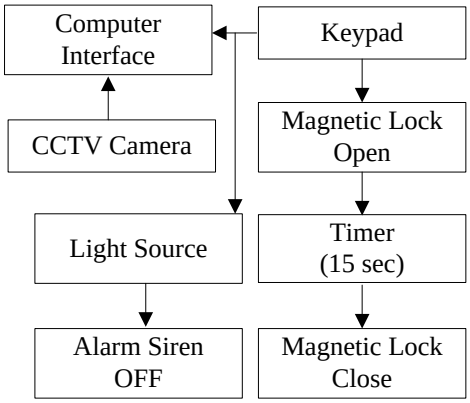

Figure2. Block diagram representation of the system for authorized entry

III MODULE DEVELOPEMENT

As seen from the block diagram presented earlier, it is noticed that this circuit is broken down to seven smaller parts. The complete circuit consists of Power supply module, a control circuitry, a microcontroller, sensor module, buzzer and magnetic switch, computer interface module, GSM communication circuit. It is noted that the control circuitry consists of microcontroller and keypad. These two are the main things which control all other parts of the system. The microcontroller used for this study is PIC16F877A. From the circuit there is a reset button on the circuit, the buzzer in conducted on pin 3 and the button is conducted in pin 1. For port B the function is used for the key pad from pin 33 to pin 40.the microcontroller port c function is used for the relay on pin 24. the PC (pin29 and pin 30) and GSM module (pin 25 and pin 26) is used in port c also .it is conducted through the MAX 232 for the serial port to interface with the microcontroller PIC16F877. the function of port D is used as the magnetic sensor for the front door and back door on pin 19 and pin 20.lastly the oscillator is conducted on pin 13 (CLKIN) and pin 14 (CLKOUT) to the 4MHz oscillator.

The sensor works perfectly for doors and windows. Initially, when the magnet is placed elsewhere, the contact is open. A 1K resistor is place in series is to provide current limiting to the microcontroller input. Hence, current will not flow from the source which is also known as open circuit. However, when the magnet is place near approximately 2-3cm from the sensor causing the close contact at the sensor. Therefore, voltage level is high when the sensor is near and vice versa. Reaches the threshold voltage, the transistor is ON. Once the transistor is ON the relay gets energized and it As seen in the diagram the operation of this module is very simple as seen in the diagram the port RD0 (Pin19) and RD1 (pin20) of the microcontroller is connected to the module and it is controlled by the PIC16F6877A. If the correct password enters at the keypad, then the port RD0 or RD1 will give logic high. This logic high makes the NPN transistor to become ON from the state of OFF. That means the transistor acts like a switch.. As a result the 9V supply is connected to the door sensor, activates the door sensor. This point of time the door is free to open and the person can enter the premise of testing facility. The computer interface circuit is connected to RD6 (Pin 29) and RD7 (Pin 30) of the microcontroller. The port RD7 declared as input port and RD6 declared as output for the PIC. The main function of the PC interface circuit is to create a medium to communicate with the computer. The main purpose of this module is to save the data in the if there is any need for security system to view the database for any information. The start of a transmission is signified by the TX pin going low to form the start bit. This is followed by the 8 bits; with bit zero (LSB) first. The sequence is terminated with the stop bit, with the TX pin high. Another start bit may immediately succeed the stop bit, but it is not uncommon for the TX pin to remain high for an extended duration. This would be the case if the 16F877A is waiting on a response to a transmission, which is received on the RX/RC7 (pin 26). Microsoft's Visual basic 6.0 is used to develop the GUI (Graphical User Interface). The main purpose of this program is to receive and read input from the alarm send a signal to the modem to auto dial a number. Visual Basic 6.0 allows user to write a program that can be run in Windows environment [1,4]. Figure 4, Figure 5 and Figure 6 represents the functional description of the module in flow chart representations.

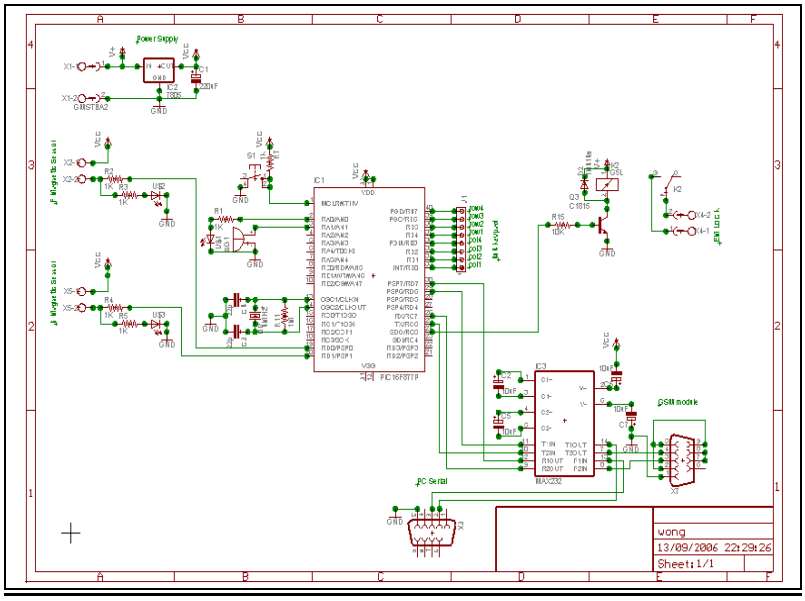

Figure 3: Schematics of the system

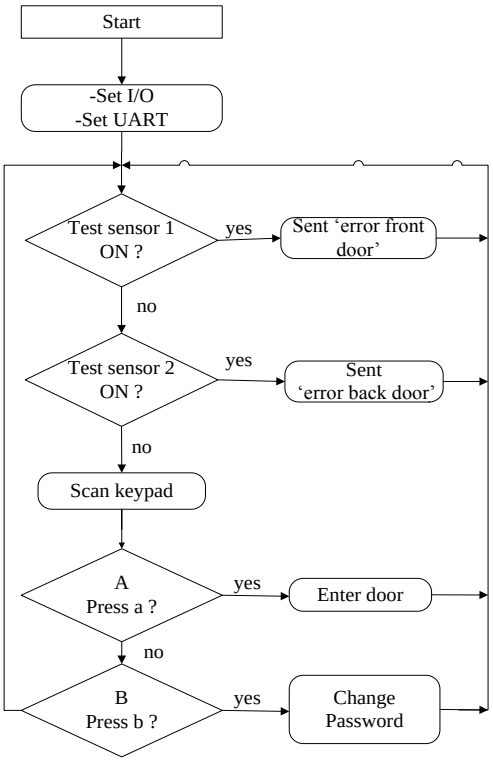

Figure4. Main flow chart of the system

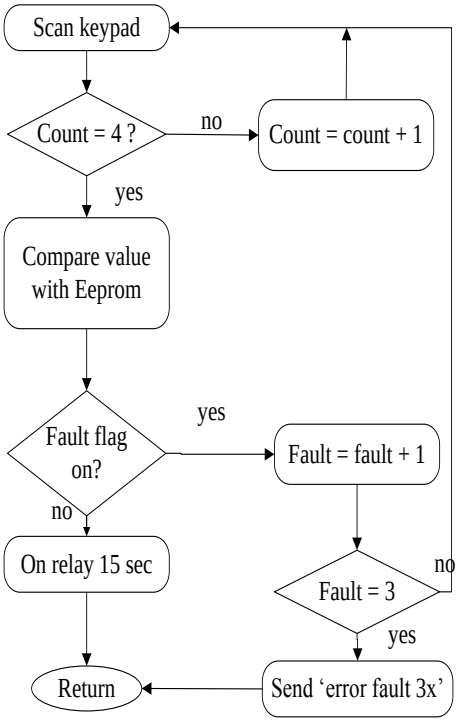

Figure5. Flow chart for entering the door (key pad)

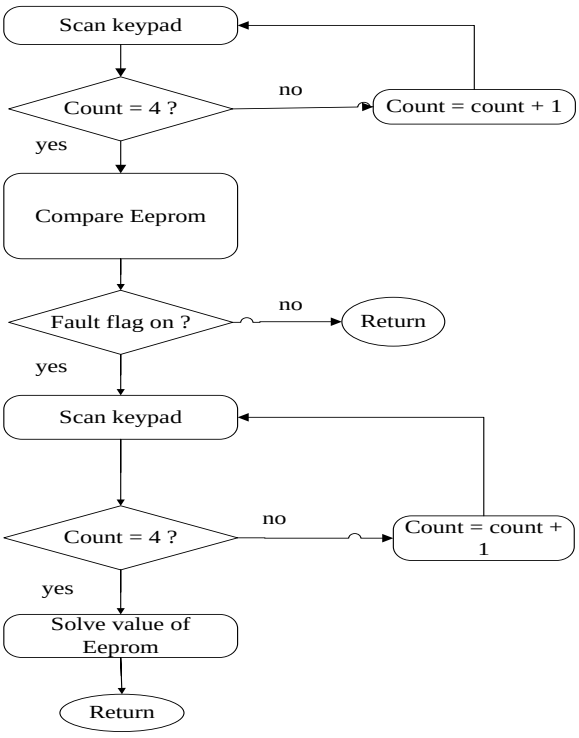

Figure6. Flow chart for changing for password

IV TESTING

Figure 7(a) shows the database recording for the module with authorized user entry. As seen it is noticed that the total number of authorized person who enter the area The figure above shows the 'in' record status of the system with the time and date and at this moment of time it has total of five authorized person who have entered the area. Figure 7(b) shows the time and date of the front door if there is any break in. Making it easier to check and find out who would have entered the area in case of burglary or any other incident going trough the front door. Figure 7(c) shows the time and date of the back door if there is any break in. Making it easier to check and find out who would have entered the area in case of burglary or any other incident going through the back door. Figure 7(d) shows the fault entry with the date and time on it. For example if the authorized has pressing the wrong password or forgotten the entry password, it is consider the fault entry.

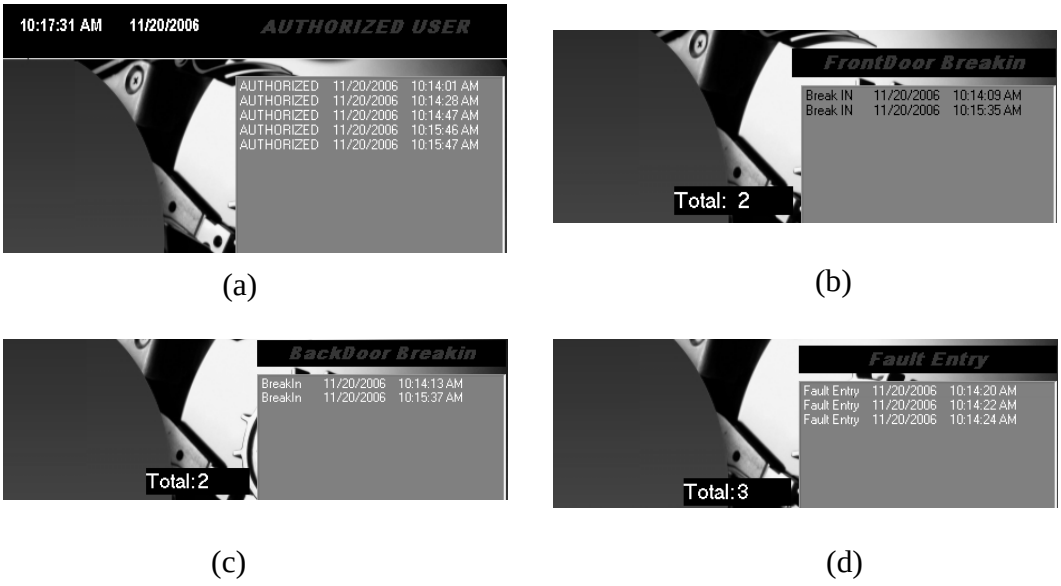

Figure7. Testing at the facility building
(a) Total authorized person (b) Front door breaks-in (c) Back door breaks-in (d) Fault entry

V CONCLUSION

In this paper, the development of a simple intelligent model of anti-theft security system based on a general purpose microcontroller is presented and is implemented at the university. Some future recommendations that could improve this study are like including a system that can auto dial a number or direct SMS when a break in occur in the area. Should there be a power failure; a back up power supply for the system can be included. Although during this study, a lot of problem were encountered, but as a project designer the entire problem has been be solve within the specific time period. Therefore the project was a success.

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