INTERNATIONAL JOURNAL OF APPLIED AND PURE SCIENCE AND AGRICULTURE
E- ISSN: 23945532 P- ISSN: 2394823X
Scientific Journal Impact Factor: 3.762

AUTOMATIC OPENING AND CLOSING OF DOOR

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I. INTRODUCTION

1.1 Introduction:

The project mainly aims in designing a completely automated security access system for domestic and industrial applications. Security is the bigger concern for an individual or a firm. Recognizing the need of security we developed an automated security access system with user friendly access. This project makes use of DTMF technology to enter the password which makes very secure opening or closing of door. When the user enters the wrong password then the system automatically sends alerting SMS messages to the predefined authority number.

This onboard computer consists of number of input and output ports. The onboard computer is commonly termed as micro controller. The input and output port of the micro controller are interfaced with different input and output modules depending on the requirements. In other words micro controller acts as a communication medium for all the modules involved in the project.

The controlling device of the whole system is a PIC Microcontroller. DTMF decoder reader, Stepper motor, GSM modem, LCD display is interfaced to the Microcontroller. Whenever a call is made to the phone in the system, it will be answered automatically and password is entered through phone keypad. The DTMF decoder gets the password and feds as input to Microcontroller. The Microcontroller validates the password. If the password is valid it opens the door which is linked to the stepper motor interfaced to the Controller. The status of the door is displayed on the LCD display. When there is any wrong entry of the password the system alerts automatically in the form of SMS messages to the respective authorities. The Microcontroller used in the project is programmed using Embedded 'C' language.

Features:

1. Tone enabled operation instructions.
2. Designing a secure access control system
3. Designing a secure access control system
4. Display of door status on LCD.

1.2 Project Overview:

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.

Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as

inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

The project "**Automatic Door Opening and Closing**" using PIC16F72 microcontroller is an exclusive project which is used to control door using mobile phone.

II. EMBEDDED SYSTEMS

2.1 Embedded Systems:

An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today.

Embedded systems are controlled by one or more main processing cores that are typically either microcontrollers or digital signal processors (DSP). The key characteristic, however, is being dedicated to handle a particular task, which may require very powerful processors. For example, air traffic control systems may usefully be viewed as embedded, even though they involve mainframe computers and dedicated regional and national networks between airports and radar sites. (Each radar probably includes one or more embedded systems of its own.)

Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

Physically embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

In general, "embedded system" is not a strictly definable term, as most systems have some element of extensibility or programmability. For example, handheld computers share some elements with embedded systems such as the operating systems and microprocessors which power them, but they allow different applications to be loaded and peripherals to be connected. Moreover, even systems which don't expose programmability as a primary feature generally need to support software updates. On a continuum from "general purpose" to "embedded", large application systems will have subcomponents at most points even if the system as a whole is "designed to perform one or a few dedicated functions", and is thus appropriate to call "embedded". A modern example of embedded system is shown in fig: 2.1.

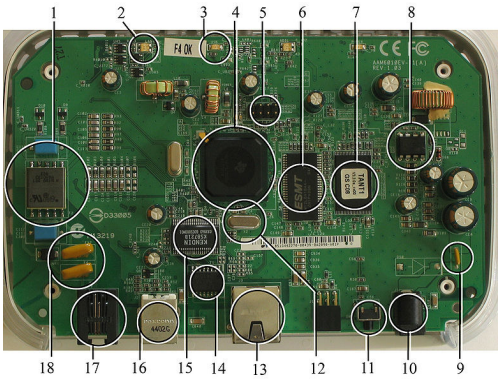

Fig 2.1:A modern example of embedded system

Labeled parts include microprocessor (4), RAM (6), flash memory (7).Embedded systems programming is not like normal PC programming. In many ways, programming for an embedded system is like programming PC 15 years ago. The hardware for the system is usually chosen to make the device as cheap as possible. Spending an extra dollar a unit in order to make things easier to program can cost millions. Hiring a programmer for an extra month is cheap in comparison. This means the programmer must make do with slow processors and low memory, while at the same time battling a need for efficiency not seen in most PC applications. Below is a list of issues specific to the embedded field.

III. HARDWARE DESCRIPTION

3.1 Introduction:

In this chapter the block diagram of the project and design aspect of independent modules are considered. Block diagram is shown in fig: 3.1

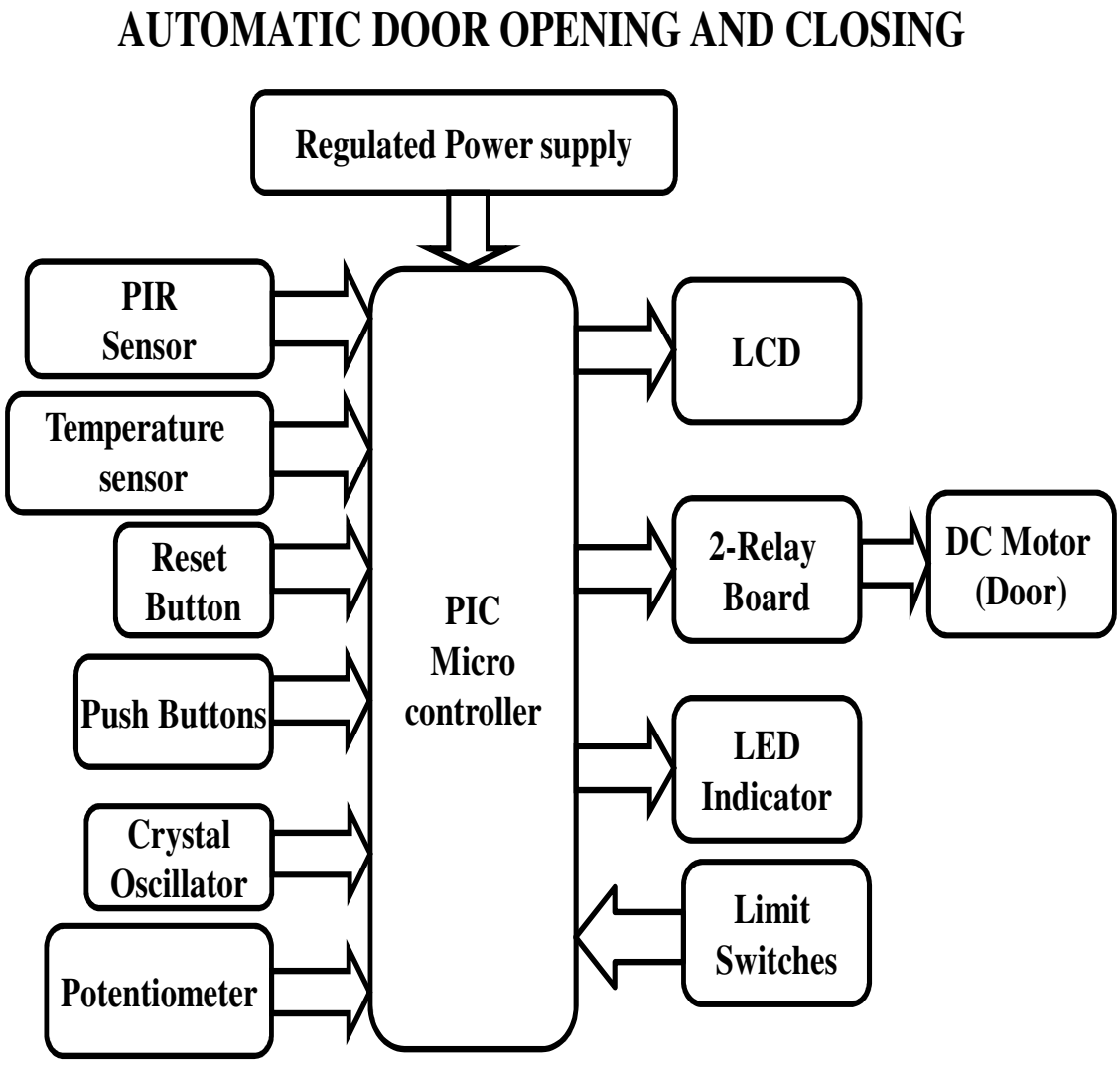

FIG: 3.1: Block diagram of AUTOMATIC DOOR OPENING AND CLOSING

The main blocks of this project are:

1. Micro controller (16F72)
2. Reset
3. Crystal oscillator
4. Regulated power supply (RPS)
5. LED Indicator
6. PIR sensor
7. DC Motor
8. LCD
9. Temperature sensor
10. Relay

IV. ADVANTAGES AND DISADVANTAGES

Advantages:

1. The Door Accesses can be controlled
2. Designing a secure access control system
3. Display of door status on LCD.
4. Efficient and low cost design.
5. Low power consumption.
6. Fast response.

Disadvantages:

1. This system doesn't acknowledge the status of devices being operated.

Applications:

This system is an efficient solution for operating many Security Applications through Real time implementation of door accessing, shopping malls, and library.

V. RESULTS

4.1 Result:

The project "**AUTOMATIC DOOR OPENING AND CLOSING**" was designed to automated security access system for domestic and industrial applications. The system makes use of a microcontroller. The output from PIR sensor is fed as input to the PIC microcontroller. The PIC microcontroller will continuously monitors the output from PIR sensor and generates logic low or high. The output generated from PIR sensor is used to control the DC motor. The system uses temperature sensor for the monitoring the room temperature. If the temperature is high then the door will be open.

4.2 Conclusion:

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the

unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

4.3 Future Scope:

Our project "**AUTOMATIC DOOR OPENING AND CLOSING**" is mainly intended to automated security access operations using a mobile phone. The mobile phone present in the system uses auto answer function to lift the call. Each key in the mobile phone transmits two tones with different frequencies when pressed. These transmitted frequencies are decoded using DTMF decoder and the decoded value is fed as input to micro controller which in turn operates Stepper Motor to which the Open/close of Door. The input value to the micro controller will be checked and respective operation of that key will be performed like Open/close of Door. When the user enters the wrong password then the system automatically sends alerting SMS messages to the predefined authority number.

The main disadvantage of this project is that the person who is operating the door doesn't know the status of the door whether it is opened or closed. This drawback can be eliminated by introducing a GSM module, through which intimation on the status of operated door can be sent.

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