**Password based Remote Controlled Door Opening using Android Application**

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***Abstract*—**The main objective of this project is to unlock a garage door by an android application using a unique password entered through the android application device. Opening and closing & unlocking operation of garage door involves human labor. In this proposed system, the opening and closing & unlocking operation of a garage door is achieved by using an android application. The owner can connect an android application device to the system through Bluetooth, which in turn is connected through a HC-05 Bluetooth Module to a 8051 microcontroller controlled garage door that can open/close the door by entering the password. This method is very

convenient as one doesn’t have to get down of his car to open/close the door physically.

The user first has to pair a Smartphone with the HC-05 module; only then can the android application be used to transmit the password string to the HC-05 module. When the sent data (password entered by the user) matches with the password stored in the 8051 microcontroller, and then the 8051 microcontroller initiates a mechanism to open the door through a L293D motor driver interface.

In the case where the user does not have access to the Smartphone (battery low, misplaced ,etc), a 4X4 keypad interface will acts as a secondary unlocking device. While entering the password through the 4X4 Keypad, an LCD display will provide visual feedback to the user. This will prevent the user from entering an incorrect password multiple times.

In cases where in the user enters an incorrect password repeatedly within a short period of time(3 incorrect tries per minute), the system automatically stops the acceptance of passwords from both the HC-05 Bluetooth module & the 4X4 keypad for a timeout period of 3 minutes. This will prevent hackers from brute forcing their way through the system. In such a case warning alarm or siren will be triggered by the 8051 microcontroller through a buzzer.

Unlike conventional IR consumer electronics, there is no IR code used to unlock the device because of the use of Bluetooth in the system. This makes it tougher to extract the password during communication & increases the security of the system.

***Index Terms*— Smartphone, motor unlocking device, Serial Communication, AT89S51, Bluetooth (BT), motor ,buzzer.**

1. INTRODUCTION

In day to day life security of any object or place is plays a major role. This project has considered about that and

Created a secure access for a door which needs a password to open the door. Using keypad it enters a password To the system and if it is entered correctly door is open by motor which is used to rotate the handle of the door lock. It will give three attempts to enter the password when it is entered incorrectly a t the first time. Some features like adding new users and changing old password are configure by the keypad. LCD module is used to display messages to the user .Now a day’s most of the systems are automated in order to face new challenges and present day requirements to achieve good results. Automated systems have less manual operations, so that the flexibility, reliabilities are high and accurate. Hence every field prefers automated control systems, especially in

the field of electronics

The goal of the project is to develop a unique system through mobile technology which can control various units

of the houses, industries, and also provides a security system. The various appliances can be utilized by managing them BLUETOOTH MODULE, which enables the user to remotely control the operations of the appliances. Just by pressing keypad of remote telephone the user can perform ON/OFF operations on the appliances. The keypad interfaced to the controller is used as the password entry system to open/close the door. As soon as the user enters the correct password, the door lock opens. If the password entered is incorrect, then a security alarm is rung and at the s ame time it enables the security dial-up through the microcontroller.

1. OBJECTIVES

The main objective of this project is to unlock a garage door by an android application using a unique password entered through the android application device.. The communication between the cell phone and the controller board is wireless. This system is designed to be low cost and scalable allowing variety of devices to be controlled with minimum changes to its core.

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1. SYSTEM DESIGN

Fig 1.Block Diagram

Here we have used AT89C51 Microcontroller, with the help of which password based garage door opening System has been implemented for various features. This microcontroller works on 5V supply which is provided from regulated power supply. We are using main sensor HC-05 sensor. . The owner can connect an android application device to the system through Bluetooth, which in turn is connected through a HC-05 Bluetooth Module to a 8051 microcontroller controlled garage door that can open/close the door by entering the password. This method is very Convenient as one doesn’t have to get down of his car to open/close the door physically.

COMPONENTS

1. AT89S51



Fig 2.AT89S51 Micro-Controller

The Atmel AT89 series is an Intel 8051-compatible family of 8 bit microcontrollers (µCs) manufactured by the Atmel Corporation.

Based on the Intel 8051 core, the AT89 series remains very popular as general purpose microcontrollers, due to their industry standard instruction set, and low unit cost. This allows a great amount of legacy code to be reused without modification in new applications. While considerably less powerful than the newer AT90 series of AVR RISC microcontrollers, new product development has continued with the AT89 series for the aforementioned advantages.

More recently, the AT89 series has been augmented with 8051-cored special function microcontrollers, specifically in the areas of USB, I²C (two wire interface), SPI and CAN bus controllers, MP3 decoders and hardware PWM.

features

1. 4K bytes of Flash
2. 128 bytes of RAM
3. 32 I/O lines
4. Watchdog timer
5. Two data pointers
6. Two 16-bit timer/counters
7. A five-vector two-level interupt architecture.
8. A full duplex serial port
9. On-chip oscillator
10. Clock circuitry.
11. Bluetooth Module(HC-05)



Fig 3.HC-05 Bluetooth Module

HC‐05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04‐External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections .Master module can initiate a connection to other devices. The user can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project, etc.

Specifications

Hardware Features

1. Typical -80dBm sensitivity
2. Up to +4dBm RF transmit power
3. Low Power 1.8V Operation ,1.8 to 3.6V I/O .
4. PIO control.
5. UART interface with programmable baud rate .
6. With integrated antenna.
7. With edge connector.

Software Features

1. Default Baud rate: 38400, Data bits:8, Stop bit:1,Parity:No parity, Data control: has Supported baud rate 19200,38400,57600,115200,230400,460800.
2. Given a rising pulse in PIO0, device will be disconnected.
3. Status instruction port PIO1: low-disconnected, high-connected.
4. PIO10 and PIO11 can be connected to red and blue led separately. When master and slave are paired, red and blue led blinks 1time/2s in interval, while disconnected only blue led blinks 2times/s.
5. Auto-connect to the last device on power
6. as default.
7. Permit pairing device to connect as default.
8. Auto-pairing PINCODE:”0000” as default.
9. Auto-reconnect in 30 min when disconnected as a result of beyond the range of connection.
10. IMPLEMENTATION
11. HARDWARE

Fig 7.Schematic Diagram

Above schematic circuit diagram of password based garage door lock opening using android System is designed using Eagle Software.

Eagle is a scriptable electronic design automation application with schematic capture. EAGLE stands for Easily Applicable Graphical Layout Editor, and is developed by Cadsoft Computer GmbH.

Fig8.Component View

All the electronic hardware components are available in its library from where we can use them to design the schematic diagram. This software provides PCB layout of given schematic design. All the components are placed on other side of tracks. Component view and circuit layout is shown below.

Fig 9.PCB Design

1. **SOFTWARE**

The entire programming of project is done by using KeilµVision where, keil was founded in 1982 by Gunter and Reinhard Keil, initially as a German GbR. in April 1985 the company was converted to Keil Elektronik GmbH to market add-on products for the development tools provided by many of the silicon vendors.

The basic concept of software design is it should scan the pressed key values by the microcontroller and

according to that signal change of the port D it return which key has pressed and check whether that entered 4

digit password and stored password in the EEPROM are matching. If they will match motor is activated and

door is opened.

We have created four different librabries for simplicity. The main one being the file 'main.h'. The three other files are namely, keypad.h, lcd.h and delay.h. In the keypad.h file, we have assigned various values to the keys as per our requirement. We have grounded each row at a time to figure out which row has been pressed at a given time. In the lcd.h file, we have initialised the lcd as per our need. We have assigned certain bits as RS, EN and RW. This code will be responsible for accepting the input provided at the keypad and then display it on the lcd. The last sub-part of the code is the delay.h file. This is used to delay certain provcesses as per the need. We have used two kinds of delays in this project. The first one offers delays in microseconds and the other one offers delays in term of milliseconds. Both of these are required every now and then throughout the various codes.

The main code that brings all of these togeather is the final one, 'main.c'. The desired password has to be set at first. If the door is locked, the lcd display so and if not, the lcd displays the opposite. We can enter the password with the app that has already been installed on the device. If that is not possible, we can use the keypad thatb has been interfaced. The typed password is then verified by the controller. If it is correct, the door is unlocked. The user gets three tries with the password. More than three wrong tries initialtes a buzzer, thereby protecting the user from any theft. The user can alos change the password as and when he wishes to do so.

**fig 10.Code**

1. **DEBUGGING**
2. **RESULT AND ANALYSIS**
3. **V. SOFTWARE AND PROGRAMMING LANGUAGES**

The following software were used for development of the proposed system

• EAGLE software for PCB designing

• KEIL compiler

1. **VI. STEPS IN PROJECT DEVELOPMENT**

The following steps were taken during the development of the proposed system:

• Defining the problem.

• Research about existing systems.

• Developing the block diagram.

• Designing and testing the circuits.

• Developing the PCB layout using EAGLE software.

• Etching the PCB.

• Soldering all components on the PCB board.

• Testing and troubleshooting the PCB board.

• Software development.

• Testing and debugging the code.

• Burning the code on the IC.

• Testing the entire system.

• Preparing a working model.

• Documentation.

1. **VII. APPLICATIONS**

The proposed system as a wide range of applications, some of them are as follows:

• Home security

• Can be used in offices

1. **ADVANTAGES**

1 . No physical labour required.

2. Smartphone & Manual entry possible.

3. Timeout Period & Alarm.

4. Superiority over IR systems (no IRcodes).

5. Password sharing among multiple users.

2. The project (password detector) can be used to automate the door locking process, so the user need not to carry the door lock keys along with him, he can just remember the password and use it later to open the door

1. **LIMITATIONS**
2. Using Bluetooth, leaves you susceptible to interference and jamming.  Especially in regions where you have high population density.
3. Bluetooth is used in this project, which have a rage 10 to 20 meters so the control cannot be achieved from outside this range.
4. Application is connected after disconnect of the Bluetooth.
5. when the new users want to connect the first download application software then the code and configuration must be done.

**FUTURE SCOPE**

1. We can send this data to a remote location using mobile or internet

My area of interest is control of door lock using mobile phones via Bluetooth. My future study of this project includes implementing more complex security mechanisms such as fingerprint detection and face detection for a more robust security mechanism as well as extending support to windows and ‘iOS’ devices so as to cover a wider range of devices

1. REFERENCE