

Password Based Remote Controlled Door Opening by Mobile Bluetooth

by

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A comprehensive project report has been submitted in partial fulfillment of the requirements for the degree of

Bachelor of Technology *in* **ELECTRONICS & COMMUNICATION ENGINEERING**

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CERTIFICATE OF APPROVAL



This is to certify that the project titled “**Password Based Remote Controlled Door Opening by Mobile Bluetooth**” carried out by

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for the partial fulfillment of the requirements for B.Tech degree in **Electronics and Communication Engineering** from **Maulana Abul Kalam Azad University of Technology, West Bengal** absolutely based on his own work under the supervision of **Mrs. Arpita Banerjee(Roy)**. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

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DECLARATION



“We Do hereby declare that this submission is our own work conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute and that, to the best of our knowledge and belief, it contains no material previously written by another neither person nor material (data, theoretical analysis, figures, and text) which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.”

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CERTIFICATE of ACCEPTANCE



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Name of the Examiner Signature with Date

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ABSTRACT

Our project serves the needs of people. It uses the Bluetooth technology to establish communication between user's Smartphone and controller board. This project to lock and unlock home door using a unique password entered through the keypad of the phone. By connecting the circuit with a DTMF(Dual Tone Multi- Frequency) decoder it can be controlled by a Bluetooth available to provide remote access from tablet or Smartphone. This project addresses the development and the functionality of the Android-based application (Android app) to assist people gain control of their living area.

The present status and future prospects of our Password based Remote Controlled Door Opening by Mobile Bluetooth will be reviewed here.

LIST OF ABBREVIATIONS

LED	Light Emitting Diode
XTL	Crystal
GND	Ground
VCC	+9V
DTMF	Dual Tone Multi- Frequency

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1. Introduction

1.1 PROBLEM DEFINITION

This system allows the user to lock and unlock a door in a short range. Since Bluetooth has become so prevalent in mobile devices, it was seen as a simple, low cost and secure solution for wirelessly connecting a mobile device to a home automation system. Therefore, this project developed a security system by exploiting Bluetooth as a wireless connection protocol on Android Mobile Device to control only one electrical appliance which is magnetic door lock. The user can easily use the Graphic User Interface (GUI) application that has been created in the Android Smartphone to lock or unlock the magnetic door through Bluetooth Protocol. A pop-up block will automatically appear on the screen to show the status of the door. At the same time, a small bulb that is attached to the door will switch "ON" once the door is opened.



1.2 PROBLEM STATEMENT

The main objective of this project is to unlock a door by Mobile Bluetooth using a unique password entered through the device. Opening and closing of door involves human labor. In this proposed system, the opening and closing of a door is achieved by using Mobile Bluetooth. The owner can connect device to the system through Bluetooth, which in turn is connected to a door that can open/close the door by entering the password. This method is very convenient as one doesn't have to open/close the door physically.

1.3 ANALYSIS

DTMF signaling is used for telephone signaling over voice frequency band to the call switching centre. DTMF assigns a specific frequency (consisting of two separate tones) to each key so that it can be easily be identified by the electronic circuit. The signal generated by the DTMF decoder is a direct algebraic summation, in real time, of the amplitudes of two sine (cosine) waves of different frequencies.

Dial your number using DTMF phone or cell phone from anywhere and remotely turns on/off the relay. The circuit that lets you to unlock a door by Mobile Bluetooth using a unique password entered through the device. Remote operation is achieved by any smart-phone/Tablet etc, upon a GUI (Graphical User Interface) based touch screen operation. This project is based on data sent through Bluetooth.

Another Bluetooth device connected at the receiving end which is fed to the DTMF decoder. The sent data (password entered by the user) matches with the password stored in the DTMF decoder, and then the DTMF decoder initiates a mechanism to open the door.

2. System Design

2.1 Hardware

2.1.1 Overview

Hardware of this system contains Bluetooth device, DTMF receiver and other hardware objects.

2.1.2 DTMF Receiver

The CAMD MT8870 provides full DTMF receiver capability by integrating both the band split filter and digital decoder functions into a single 18-pin DIP, SOIC, or 20-pin PLCC package. The MT8870 is manufactured using state-of-the-art CMOS process technology for low power consumption (35mW, max.) and precise data handling. The filter section uses a switched capacitor technique for both high and low group filters and dial tone rejection. The MT8870 decoder uses digital counting techniques for the detection and decoding of all 16 DTMF tone pairs into a 4-bit code. This DTMF receiver minimizes external component count by providing an on-chip differential input amplifier, clock generator, and a latched three-state interface bus. The on-chip clock generator requires only a low cost TV crystal or ceramic resonator as an external component.

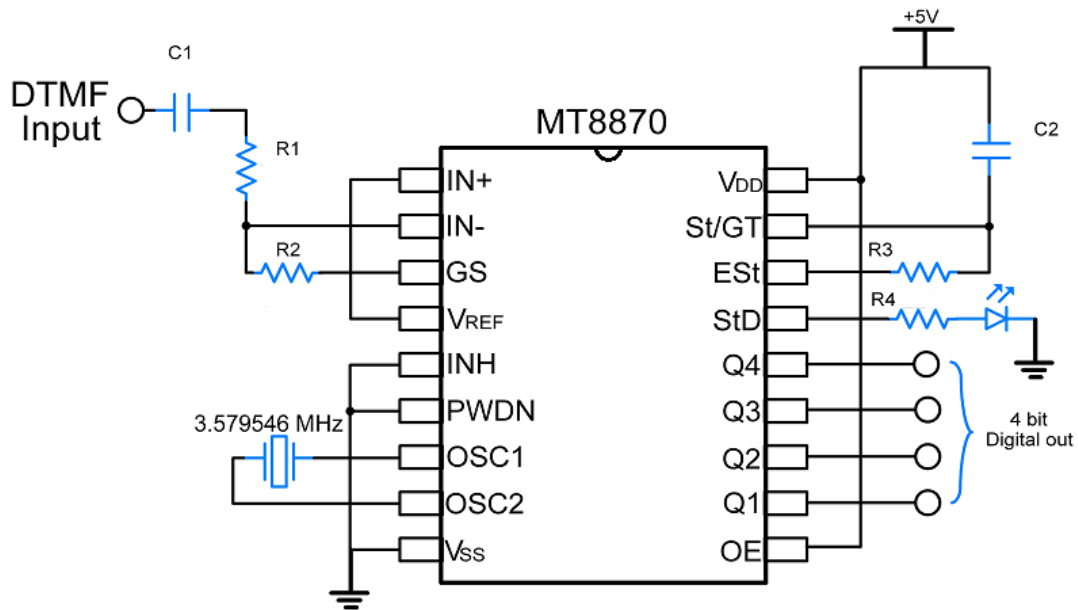


Figure 1: MT 8870 PIN Configuration

Features

- Full DTMF receiver
- Less than 35mW power consumption
- Industrial temperature range
- Uses quartz crystal or ceramic resonators
- Adjustable acquisition and release times
- 18-pin DIP, 18-pin DIP EIAJ, 18-pin SOIC, 20-pin PLCC

Applications

- PABX
- Central office
- Mobile radio
- Remote control
- Remote data entry

- Call limiting
- Telephone answering systems
- Paging systems

2.1.2 LED

LEDs are semiconductor diodes, electronic devices that permit current to flow in only one direction. The diode is formed by bringing two slightly different materials together to form a PN junction (Figure 2). In a PN junction, the P side contains excess positive charge ("holes," indicating the absence of electrons) while the N side contains excess negative charge (electrons).



Figure 2 : LED

2.1.3 Relay

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

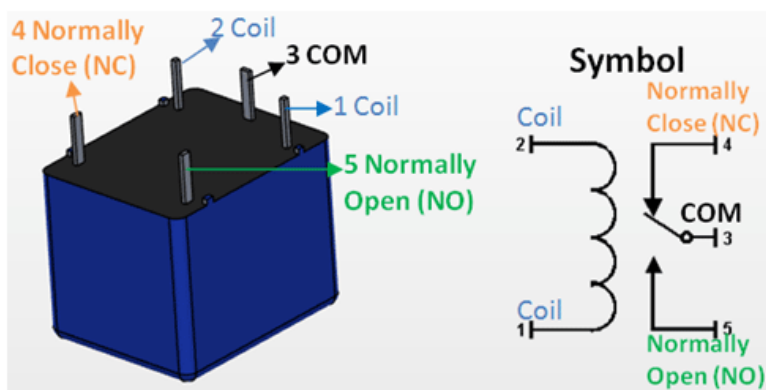


Figure 3: Relay

2.1.4 SL 100 Transistor

SL100 transistor is a general purpose, medium power NPN transistor. Being a general purpose transistor makes the SL100 transistor open to a wide spectrum of electronic applications. Major applications range from general switching, manufacture of logic gates, amplification and sound reproduction, radio transmission and signal processing. However, it's generally used as a switch in common emitter configuration.

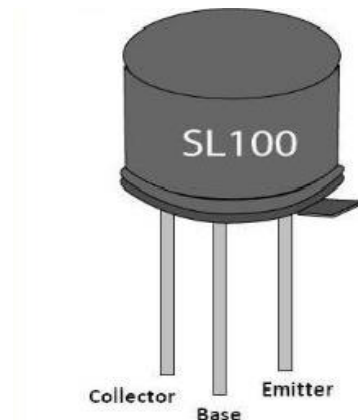
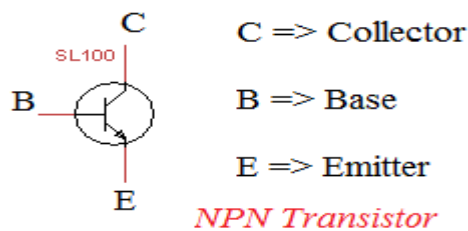


Figure 4: SL 100 Transistor

2.1.5 Transformer

One of the main reasons that we use alternating AC voltages and currents in our homes and workplace's is that AC supplies can be easily generated at a convenient voltage, transformed (hence the name transformer) into much higher voltages and then distributed around the country using a national grid of pylons and cables over very long distances.

The reason for transforming the voltage to a much higher level is that higher distribution voltages implies lower currents for the same power and therefore lower I^2R losses along the networked grid of cables. These higher AC transmission voltages and currents can then be reduced to a much lower, safer and usable voltage level where it can be used to supply electrical equipment in our homes and workplaces, and all this is possible thanks to the basic Voltage Transformer.

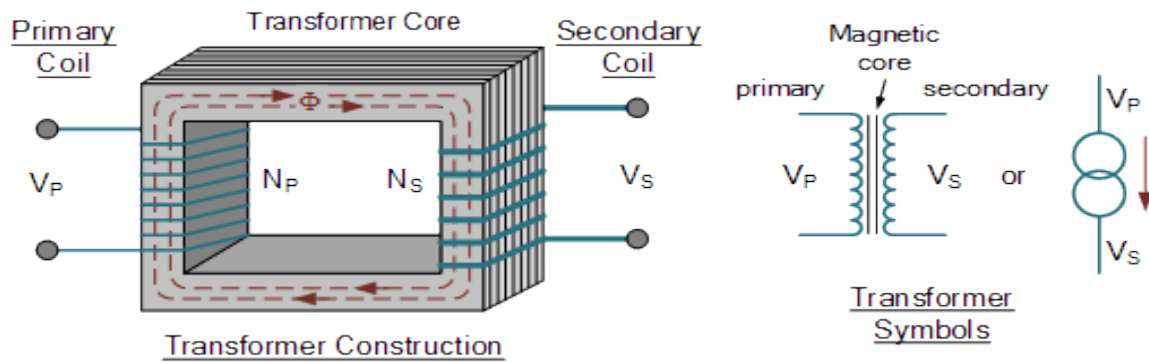


Figure 5 : Transformer

2.1.6 Crystal oscillator

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of material to create an electrical signal with a precise frequency.

This frequency is often used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators.



Figure 6 : Crystal oscillator

2.1.7 Voltage regulator

A voltage regulator is an electronic circuit that provides a stable DC voltage independent of the load current, temperature and AC line voltage variations. A voltage regulator may use a simple feed-forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages.

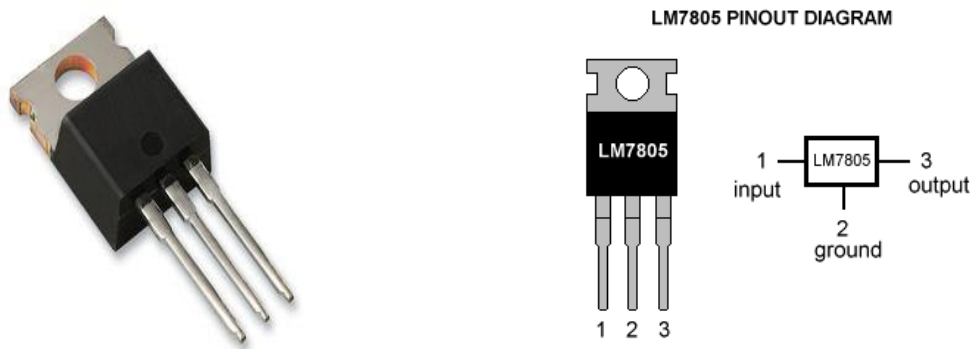


Figure 7 : Voltage regulator

2.1.8 Diode

A diode is a two-terminal electronic component that conducts current primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance in one direction, and high (ideally infinite) resistance in the other. A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p-n junction connected to two electrical terminals.¹ A vacuum tube diode has two electrodes, a plate (anode) and a heated cathode. Semiconductor diodes were the first semiconductor electronic devices. The discovery of crystals' rectifying ability was made by German physicist Ferdinand Braun in 1874. The first semiconductor diodes, called cat's whisker diodes, developed around 1906, were made of mineral crystals such as galena. Today, most diodes are made of silicon, but other materials such as selenium and germanium are sometimes used.

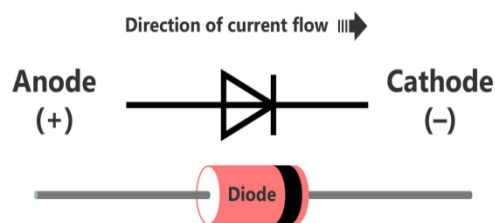


Figure 8 : Diode

2.1.9 Resistors

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Here we have used 1 K, 10K, 120K Ohm resistor.

2.1.10 Capacitors

A capacitor is a passive two-terminal electrical component that stores potential energy in an electric field. Here we have used 0.1mfd capacitor.

2.2 Software

The software side was running on the mobile phone.

2.2.1 Mobile Bluetooth

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz^[3]) from fixed and mobile devices, and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables.

Bluetooth is managed by the Bluetooth Special Interest Group (SIG), which has more than 30,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics. The IEEE standardized Bluetooth as IEEE 802.15.1, but no longer maintains the standard. The Bluetooth SIG oversees development of the specification, manages the qualification program, and protects the trademarks. A manufacturer must meet Bluetooth SIG standards to market it as a Bluetooth device. A network of patents apply to the technology, which are licensed to individual qualifying devices.



2.2.2 DTMF Tone Generator App

Play a tone, any tone. This app is basically two apps in one. One side is a simple DTMF tone generator, and the other side is produce-any-tone-you-want signal generator. You can hear what any frequency sounds like. The help screen in-app also provides the official frequencies for DTMF tones. When playing back recorded

DTMF numbers, put your Android phone near the analog telephone's speaker so that you can dial through your PSTN (Public switched telephone network) phone.

2.3 Block Diagram

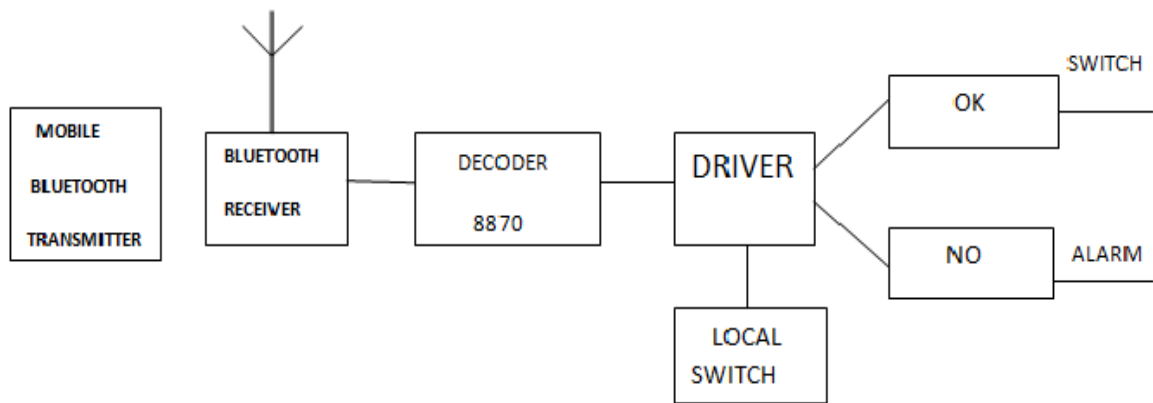
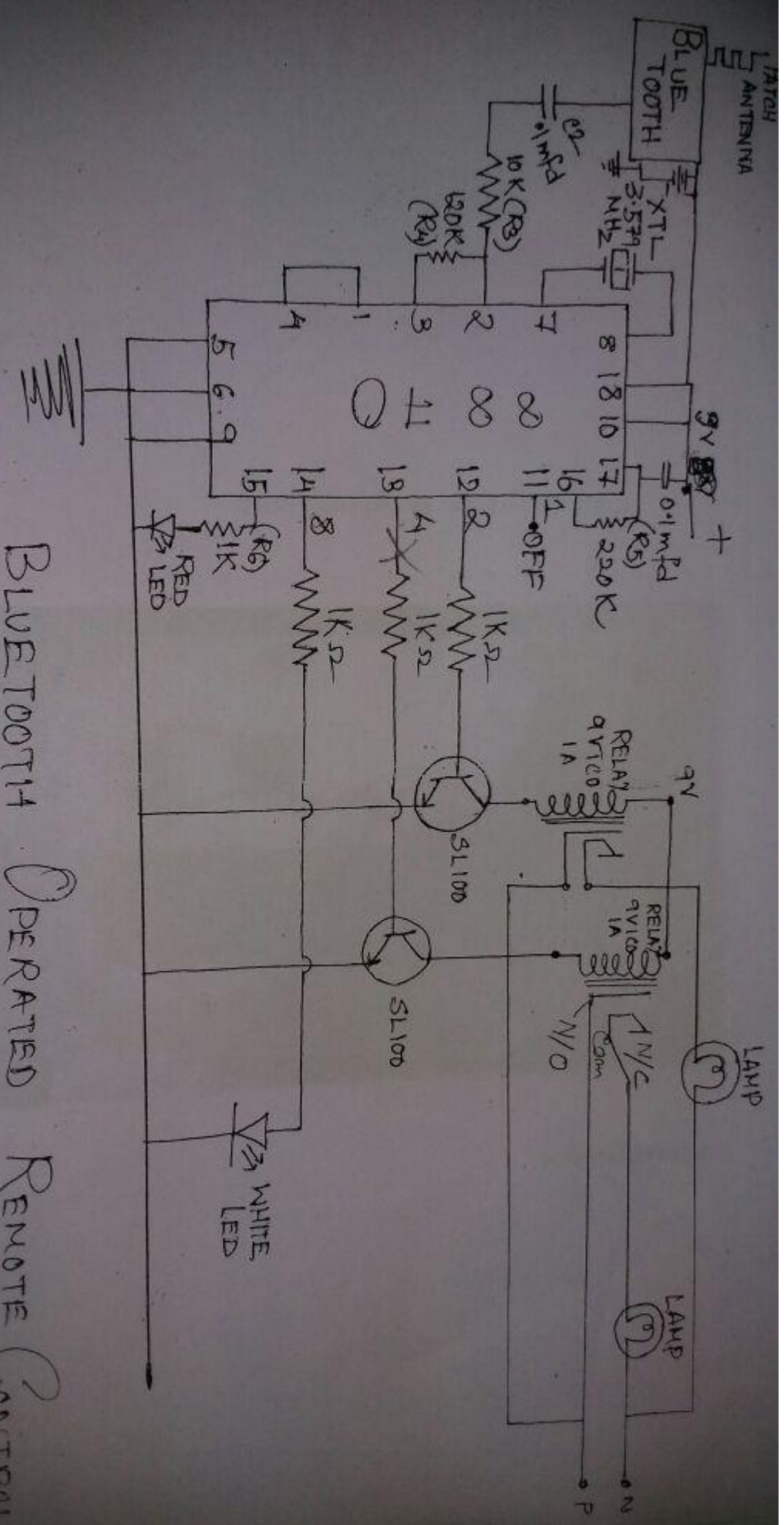


Figure 9: Block Diagram



BLUE TOOTH OPERATED REMOTE CONTROL

2.4 Circuit diagram

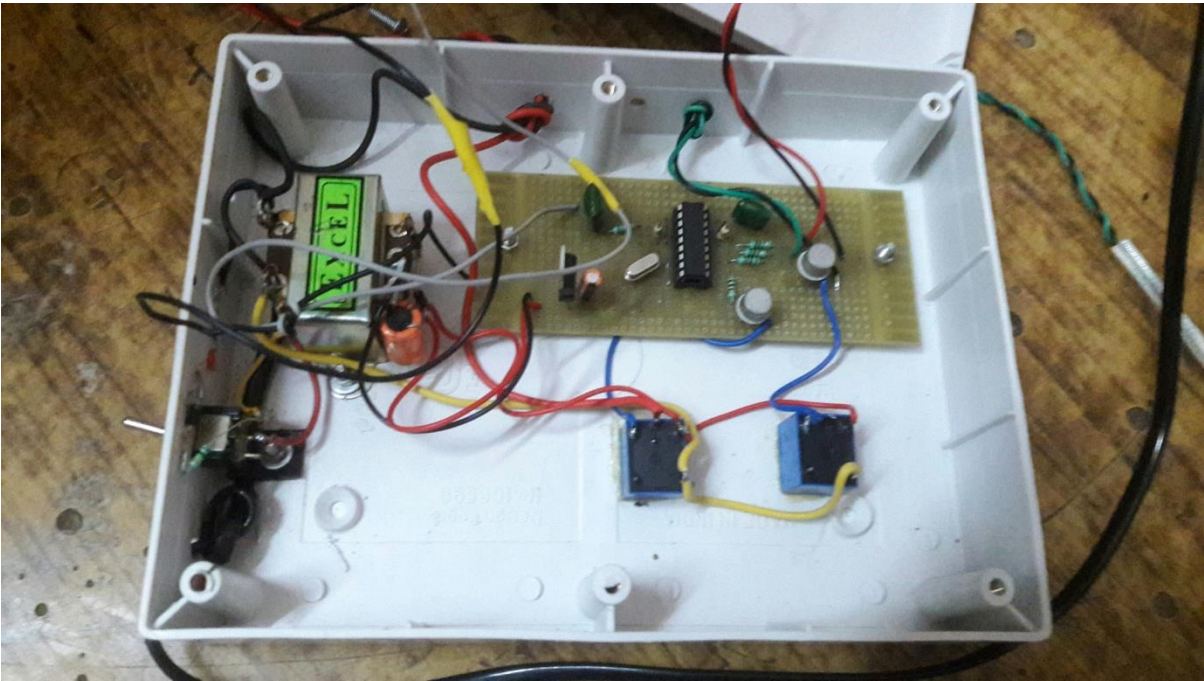


Figure 10: Complete Circuit



Figure 11: When Right Number Is Entered



Figure 12: When Wrong Number Is Entered



Figure 13: when the wrong password is a sum of numbers and right password is one of its addends

3. Working Principle:

Remote operation is achieved by any smart-phone/Tablet etc, upon a GUI (Graphical User Interface) based touch screen operation. This project is based on data sent through Bluetooth.

Once the circuit is powered ON, we need to enter the password using the keypad. Once password is entered, Now the decoder compares the entered password with predefined password. If the password is matched, then the the motor driver gets the input signals for forward motion of the motor. As a result, the Door Motor rotates in forward direction to open the door.

If the password is not matched, then the door motor is stationary so that door remains closed.

4. Advantages of Password Based Door Lock System

- This project provides security
- Power consumption is less
- Used commonly available components
- Project is simple and easy

5.Applications of Password Based Door Lock System

- This simple circuit can be used at residential places to ensure better safety.
- It can be used at organizations to ensure authorized access to highly secured places.
- With a slight modification this Project can be used to control the switching of loads through password.

6.Limitations of Password Based Door Lock System

- It is a low range circuit, i.e. it is not possible to operate the circuit remotely.
- If you forget the password it is not possible to open the door.

7. Status Of The Project

We have completed the project but this will work in short distance only wouldn't work from a long distance.

8.Conclusion

Password Based Door Opening Security System is used in the process where we need more security. It can also used to secure lockers and other protective doors. The system will allow the person who knows the password and it will not allow who don't know the password.

9.References

BOOK REFERENCE :Electronic devices and circuits

WEB REFERENCES : www.atmel.com

www.electronicshub.org