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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Today it is essential to provide security systems employing various sensors and alarm system in residential communities. Security is one of the biggest challenges everywhere since thefts are increasing day by day owing to the unsafe and insecure security systems in homes, commercial complexes and industries. Several conventional technologies are available to keep home properties safe from intruders, but most common smart home security systems work on wireless GSM communication.

A home security system with the GSM technology achieves control of door lock by short message service (SMS). PIC is the microcontroller which controls the whole driver unit. Keypad, GSM module, LED display, relays are connected. GSM system allows the person with unregistered personnel open the door after entering the OTP which is sent to the any one of the registered users. The Keypad module is used for entering the 4-digit password by the unregistered personnel.

1.2 GOALS AND OBJECTIVES

In today's age of digital technology and intelligent systems, automation has become one of the fastest developing application - based technologies in the world. In this Mini-Project our goal is to understand the basic concepts and implementing the concepts involving in the GSM and BLUETOOTH based locking systems.

1.3 LITERATURE REVIEW

S.NO	PAPER	INFERENCE
1	“SMS based smart Door Locking System” - S. UMBARKAR, G. RAJPUT, S. HALDER, P. HARNAME AND S. MENDGUDLE	<ul style="list-style-type: none">➤ Implementation of doorlock system using Arduino platform.➤ Unlocking the door using GSM module.
2	“Development of a Low-Cost GSM-Bluetooth Home Automation System” -SALIHU ALIYU, ABDULAZEEZ YUSUF, UMAR ABDULLAHII, MUSTAPHA HAFIZ, AND LUKMAN A. AJAO	<ul style="list-style-type: none">➤ Consumers neither require internet connection nor a computer to make use of the proposed system.➤ But this system does not allow anyone unless their Bluetooth is connected.
3	“The system designed for Home observance and Security system” - S.SURESH	<ul style="list-style-type: none">➤ On activating the system, the SMS is straight away sent to the house owner. the required signaling is embedded within the GSM module.

1.3 EXISTING SYSTEM :

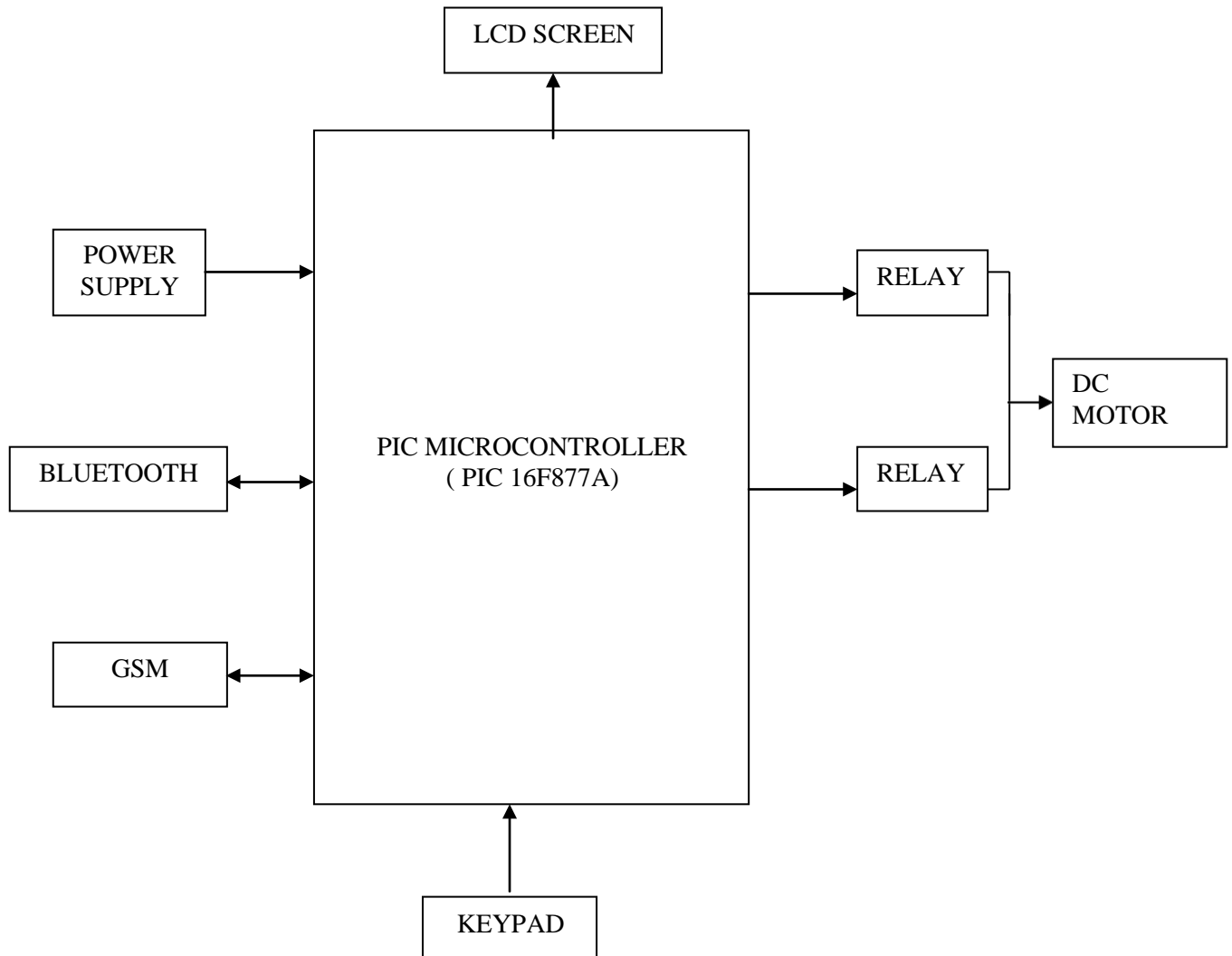
The existing systems include biometric systems, facial recognition(by users) system etc. But the issue with such systems include the misuse and procurement of the key features by thieves such. Our aim is to provide some added security to the users.

1.4 PROPOSED SYSTEM

The aim of the project is to open the door using BLUETOOTH application of the registered users. If any other person wants to open the door in case of an emergency, they need to press the “EMERGENCY BUTTON” on the keypad, which prompts the GSM to send an OTP to the any one of the registered users and when they get that OTP, the door can be opened.

CHAPTER 2

2.1 BLOCK DIADRAM



2.2 DESCRIPTION :

The working of the following layout is as follows : The users (say 5 family members) get their bluetooth registered in the bluetooth module and using the application which connects the bluetooth of the registered user with that of the module present in the device which will enable the user to open the door without hassle.

In the case of an emergency, the unregistered (say a friend) user can press the emergency button provided on the keypad panel which triggers the SIM module to send an OTP to any one of the registered users. The unregistered user can contact them, procure the OTP, enter it and unlock the door.

CHAPTER 3

COMPONENTS REQUIRED

- MICROCONTROLLER(PIC 16F877)
- BLUETOOTH HC MODULE
- SIM 800(GSM MODULE)
- RELAY
- DC MOTOR
- POWER SUPPLY
- LCD DISPLAY
- KEYPAD

3.1 MICROCONTROLLERS

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip: The CPU core, Memory(both ROM and RAM), some parallel digital i/o. Microcontrollers are smaller in size, consumes less power, inexpensive.

3.1.1 INTRODUCTION TO PIC :

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory.

3.1.2 PIC 16F877 :

PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. It is ideal for applications such as machine control applications, measurement devices, study purpose, and so on. The PIC 16F877 features all the components which modern microcontrollers normally have. Refer to figure 3.1. One of the main advantages is that it can be write-erase as many times as possible because it uses flash memory technology.



Fig : 3.1.PIC 16F877

PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and many industrial instruments. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. The cost of this controller is low and its handling is also easy. It is flexible and can be used in areas where microcontrollers have never been used before as in microprocessor applications and timer functions etc.

3.2 BLUETOOTH-HC-05 :



Fig :3.2.Bluetooth-HC-05

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions.

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration. It has 6 pins namely: Key/EN, Data mode, Command mode, VCC, GND, TXD, RXD, State. Refer to figure 3.2. To communicate smartphone with HC-05 Bluetooth module, smartphone requires Bluetooth terminal application for transmitting and receiving data.

3.3 SIM 800(GSM MODULE) :

GSM is a mobile communication modem; it stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. SIM800 is a quad-band GSM/GPRS module that works on frequencies 850MHz GSM, 900MHz EGSM, 1800MHz DCS, and 1900MHz PCS. It can be used to transmit voice, SMS and data information with low power

consumption. Refer to figure 3.3. With a small size, it can fit into slim and compact demands of customer design specifications.



Fig : 3.3.Sim 800 GSM Module

3.4: RELAY :

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof. Low power devices such as microprocessors can drive relays to control electrical loads beyond their direct drive capability. Since relays are switches, the terminology applied to switches is also applied to relays; a relay switches one or more *poles*, each of whose contacts can be thrown by energizing the coil. Normally open (NO) contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. Normally closed (NC) contacts disconnect the circuit when the relay is activated; the circuit is connected when the relay is inactive. All of the contact forms involve combinations of NO and NC connections. Refer to figure 3.4.



JQC-3F(T73)
DC 24V 5A
AC 120V 7A
DC 3V~24V

Fig : 3.4.Relay

Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay.

3.5 DC MOTOR :

A dc motor with forward and reverse motion is used for the opening and closing operation of the lock respectively. The motor is supplied with a voltage of 12 volts. Refer to figure 3.5.

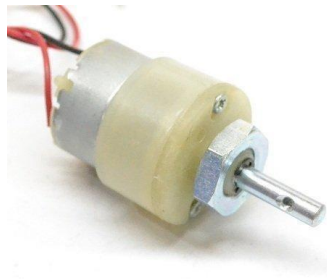


Fig : 3.5.DC Motor

3.6 POWER SUPPLY :

A power supply of 12 volts 5 ampere is given which is used to supply voltage to the PIC microcontroller, the GSM module and the keypad. Refer to figure 3.8.



Fig.3.8.Power Supply

All of the power supplies we sell are 12V DC. They take any input from 100V up to 220V AC, which is what comes out of your wall socket, and output 12V DC. This is what most digital devices such as LCD screens, DVD players, Hard Drives, Audio Gear, and most other digital devices use.

3.7 LCD SCREEN:

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels. Refer to figure 3.7. Here, the LCD screen is used to display the code entered and also shows if the door is unlocked or otherwise .

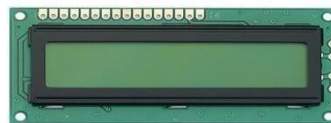


Fig : 3.7.LCD Screen

3.8 KEYPAD :

A keypad is used to enter the digits of the code in case of emergency situations mentioned above wherein the person gets the OTP from the registered members. Refer to figure 3.8. This concludes the introduction to the key components used in the completion of the project.



Fig.3.8.Keypad

CHAPTER 4

4.1 CONCEPT AND OVERVIEW :

If we are using mobile communication obviously we will go for wireless communication like Bluetooth, Wi-Fi technology, GSM technology. Among these things, most effective communication is GSM, because it can be operated from a very long distance and output will be very accurate because we are going to control the door locks by an SMS using GSM modem. This modem uses a SIM card and operates through a subscription with the mobile operator. GSM is generally called as Modem (Global System for Mobile Communications). It is a wireless communication module, which will be used to communicate with a computer or processor over the network.

This GSM modem needs a SIM card to operate through a network range subscribed by the network operator. This modem can be connected to a computer via a serial, Bluetooth . This modem is also a standard GSM mobile phone with a suitable cable and software driver to connect to a USB port on your PC. Generally, this modem is preferred instead of a GSM mobile phone, but we are using this GSM module. We will program the microcontroller in such a way that says whenever you send SMS to the SIM inside the GSM module, from your operational mobile, the door lock will be opened.

CHAPTER 5

ADVANTAGES, DISADVANTAGES AND APPLICATIONS

5.1 ADVANTAGES :

- By using this project wireless controls can be within the hands of the user. It's secure.. Simple and easy to access
- It's pick proof. We can add all our family members phone numbers.

5.2 DISADVANTAGES :

- Bluetooth is used in this home automation system, which have a range 10 to 20 meters so the control cannot be achieved from outside this range.
- Application is connected after disconnect of the Bluetooth.
- When the new users want to connect the first download application software then the code and configuration must be done

5.3 APPLICATIONS :

- The proposed system as a wide range of applications, some of them are as follows:
- Home security.Used in garage doors gates.
- Faster operation and efficient and Easy for differently abled person and elderly people to access.Can be used in offices
- Can be used to secure industrial plants against intruders and can be installed at any place where remote access is required.

5.4 SNAPSHOT OF PROJECT :

SNAPSHOT :

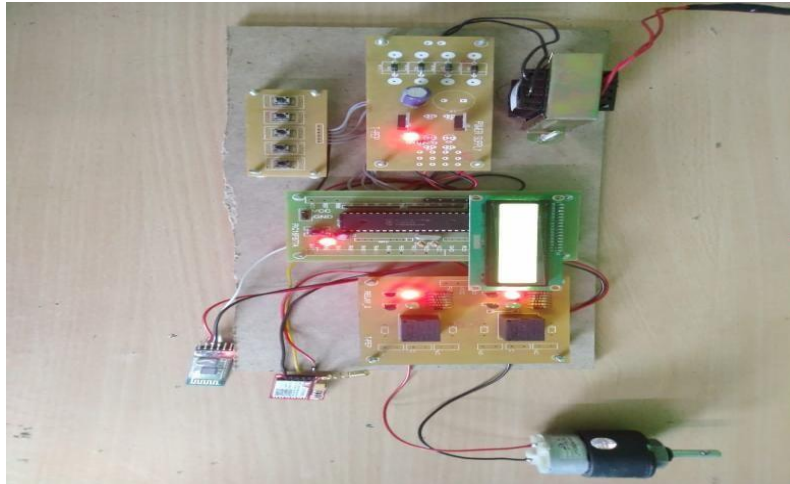


Fig: 5.1

RESULT :

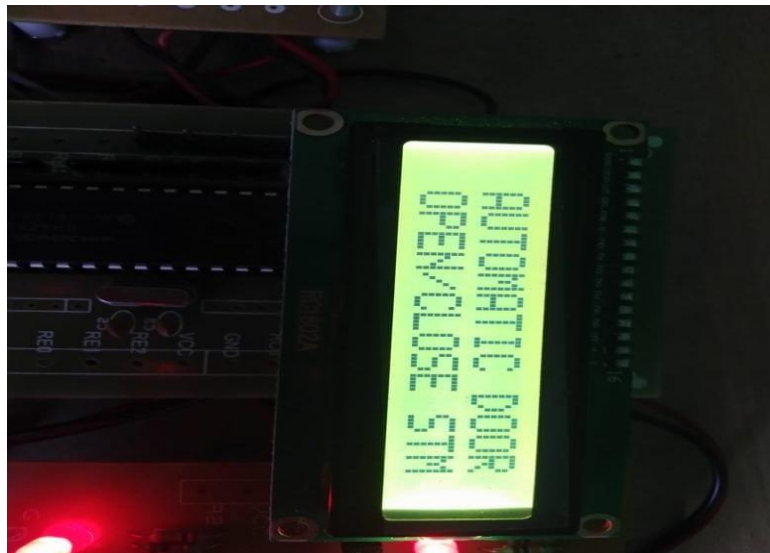


Fig: 5.2

CHAPTER 6

CONCLUSION & FUTURE SCOPE

6.1 CONCLUSION

In today's technologically advanced world, autonomous systems are gaining rapid popularity so the advancement in latest technology is continuously and rapidly made on different latest automatic door lock security systems. The need for an advanced door lock security systems using new technologies is increases day by day as security become a very important or serious issue for everybody. Due to the recent trends in various methods of security for home, buildings, companies" vehicles etc, there is no need to worry about this security any longer, as automatic security systems are here to deal with it. The door lock system using GSM module was implemented successfully. The design can be used for security based systems and procedures. It is a safe and secure system. The system can be used in residential and commercial development. The following improvements can be suggested for further improvements of system:-

- 1) Face recognition
- 2) Designing based on the individual need
- 3) Integrating with thumb impression
- 4) Integrating with CCTV network

6.2 FUTURE SCOPE

As we have discussed, the first thing is to combining all the related systems to make an overall system which could work with high efficiency and might perform several task such as Prevention of entry of unauthorized person in the house, letting the owner know about any mis-happenings going on in the house in the absence of the owner. We could use the GSM Module to let the owner stay connected with the house and to control the system from any

location outside the house. Forthcoming system should also be capable enough to recognize the owner and must be connected to the various government department for the emergency case.

CHAPTER 7

7.1 REFERENCES

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CHAPTER 8

8.1 ANNEXTURE

SOFTWARE REQUIRED : MPLAB SOFTWARE

EMBEDDED C

```
#include<pic.h>
__CONFIG(0X3F31);
#include"Lcd4.h"
#include"serial.h"

#define setkey RB0
#define incrementkey RB1
#define decrementkey RB2
#define cursorkey RB3
#define enterkey RB4

#define motor1 RC0
#define motor2 RC1
unsigned int b[15];
unsigned int m=0,close=0;
unsigned int rec[15],val=0;
unsigned int s[]={ 1234,2345,3456,4567,5678,6789,7890,8901,9012,1111 };
void mobile_keypad();
void otp_keypad();
void mobile_init();
void msg_send();
void Received();
int x1,x2,x3,x4,x5,x6,d=0;
void interrupt receiver()
```

```

{
    if(RCIF==1)
    {
        rec[val]=RCREG;
        if(rec[0] == '*')
        {
            val++;
        }
        RCIF=0;
    }
}

void main()
{

    TRISB=0xFF;
    TRISC=0x80;
    TRISD=0x00;
    PORTB=0xff;
    PORTC=0xcf;

    GIE=1;
    PEIE=1;
    motor1=1;motor2=1;

    Lcd4_Init();
    Lcd4_Display(0x80," AUTOMATIC DOOR ");
    Lcd4_Display(0xc0," OPEN/CLOSE STM ");
    Delay(65000);Delay(65000);Delay(65000);

```

```

Lcd4_Command(0x01);
Serial_Init(9600);
Receive(1);
Lcd4_Display(0x80," SELECT INPUT ");
Lcd4_Display(0xC0," 2ND KEY OR APP ");
while(1)
{
    Received();
    if(setkey == 0)
    {
        otp_keypad();
    }
    if(incrementkey==0)
    {
        while(incrementkey==0);
        m++;
        msg_send();
        x1=s[m]/1000;
        x5=s[m]%1000;
        x2=x5/100;
        x6=x5%100;
        x3=x6/10;
        x4=x6%10;
        // Lcd4_Decimal1(0xc0,x1);Lcd4_Decimal1(0xc2,x2);
        // Lcd4_Decimal1(0xc4,x3);Lcd4_Decimal1(0xc6,x4);

    }
    if(decrementkey==0 && d==1)

```

```

{
// Lcd4_Decimal1(0x80,b[0]);Lcd4_Decimal1(0x82,b[1]);
// Lcd4_Decimal1(0x84,b[2]);Lcd4_Decimal1(0x86,b[3]);

if(b[0]==x1 && b[1]==x2 && b[2]==x3 && b[3]==x4)
{
    Lcd4_Display(0x80,"P.WORD OK  ");
    Lcd4_Display(0xC0,"DOOR OPENING ...");
    motor1=0;motor2=1;
    Delay(65000);Delay(65000);Delay(65000);
    motor1=1;motor2=1;
    close=1;
}
else
{
    Lcd4_Display(0x80,"P.WORD NOT OK  ");
    motor1=1;motor2=1;
    Delay(65000);Delay(65000);Delay(65000);
}
d=0;
Lcd4_Command(0x01);
m++;

}

if(cursorkey==0 && close==1)
{
    Lcd4_Display(0xC0,"DOOR CLOSING....");
    motor1=1;motor2=0;

```



```

        Delay(65000);Delay(65000);Delay(65000);
        motor1=1;motor2=1;
        Lcd4_Command(0x01);
        close=0;
    }
}
}
void otp_keypad()
{
    Lcd4_Command(0x01);
    Lcd4_Display(0x80,"ENT PASSWORD NO");
    unsigned int val=0;
    unsigned int i=0;
    unsigned int a;
    while(enterkey)
    {
        if(incrementkey==0)
        {
            while(incrementkey==0);
            val++;
            if(val>9)
            {
                val=0;
            }
            a=val%10;
            b[i]=a;
            Lcd4_Decimal1(0xc0+i,a);
        }
    }
}

```

```

if(decrementkey==0)
{
while(decrementkey==0);
val--;
if(val>3)
{
val=0;
}
a=val%10;
b[i]=a;
Lcd4_Decimal1(0xc0+i,a);
}
if(cursorkey==0)
{
while(cursorkey==0);
i++;
if(i>3)
{
i=0;
}
Lcd4_Command(0xc0+i);
}
}

```

```

Lcd4_Command(0x01);
Delay(1500);
for(i=0;i<=3;i++)
{

```

```

EEPROM_WRITE(i,b[i]);
Delay(500);
Lcd4_Decimal1(0x80+i,b[i]);
}

for(i=0;i<=3;i++)
{
b[i] =EEPROM_READ(i);
Lcd4_Decimal1(0xc0+i,b[i]);
Delay(500);
}
// d=1;
Lcd4_Command(0x01);

}
void Received()
{
if(val>2)
{
Receive(0);
if(rec[1]=='D')
{
if(rec[2]=='O')
{
Lcd4_Display(0xC0,"DOOR OPENING ...");
motor1=0;motor2=1;
Delay(65000);Delay(65000);Delay(65000);
motor1=1;motor2=1;

```

```

        close=1;
        Lcd4_Command(0x01);
    }
}
if(rec[1]=='D')
{
    if(rec[2]=='C')
    {
        Lcd4_Display(0xC0,"DOOR CLOSING....");
        motor1=1;motor2=0;
        Delay(65000);Delay(65000);Delay(65000);
        motor1=1;motor2=1;
        Lcd4_Command(0x01);
    }
}

val=0;
Receive(1);
}
}
void mobile_init()
{
    Lcd4_Display(0xc0,"INITZ..... ");
    Serial_Conout("AT");
    Serial_Out(0x0d);
    Serial_Out(0x0a);
    Delay(65000);Delay(65000);

```

```
Serial_Conout("AT+CMGF=1");    //integer type value indicating in the text mode
Serial_Out(0x0d);
Serial_Out(0x0a);
```

```
Delay(65000);Delay(65000);
```

```
Serial_Conout("AT+CNMI=2,2,0,0,0");    //read message
Serial_Out(0x0d);
Serial_Out(0x0a);
```

```
Delay(65000);Delay(65000);
```

```
Lcd4_Command(0x01);
```

```
}
```

```
void msg_send()
```

```
{
```

```
    d=1;
```

```
    mobile_init();
```

```
    unsigned int i=0;
```

```
    Serial_Conout("AT+CMGS=");    // send message
```

```
    Serial_Out("");
```

```
    Lcd4_Command(0x01);
```

```
    Lcd4_Display(0x80,"8300817450 ");
```

```
    Lcd4_Display(0xc0,"MSG SENDING ..... ");
```

```
    Serial_Conout("8300817450");
```

```
    Serial_Out("");
```

```
Serial_Out(0x0d);
```

```
Serial_Out(0x0a);
```

```
Delay(65000);Delay(65000);
```

```
Serial_Conout("OTP PASSWORD \n\r");
```

```
Serial_Decimal4(s[m]);
```

```
Delay(65000); Delay(65000);
```

```
Serial_Out(0x1a);           // CONTROL+Z
```

```
Delay(65000);Delay(65000);
```

```
Lcd4_Command(0x01);
```

```
}
```