

ABSTRACT

RFID is a get-together for "Radio-Frequency Identification" and recommends a movement whereby pushed information encoded in RFID etchings or sharp names (depicted underneath) are gotten by a peruser by frameworks for radio waves. RFID takes in the wake of barcoding in that information from a tag or scratching are gotten by a contraption that stores the information in a database. RFID, in any case, has a couple of positive conditions over structures that use scanner mark resource following programming. The most staggering is that RFID mark information can be investigated outside the view, while standardized names must be concurred with an optical scanner. Kill of copy information area and mishandles when by then time of collaboration regions. Moreover, improve conspicuous quality understudy following and planning understudy and non-joint effort over different grounds.

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CHAPTER I. INTRODUCTION

The electro engaging wave are transmitted into space which are gotten by the recieving wire on the recipient.

To additionally store any information the assessment requires microcontroller 8051 and the thing to help the work as a nft tag

The rfid requies an inbult battery which changes and releases while contact with the reciver in any case its is exhausted and rather an em turn are connected with start the circuit

CHAPTER II. OBJECTIVE OF PROJECT

- The basic goal of this task is on a very basic level concerning filtering the RFID card and is far extra focused that replaces console data passage. Due to RFID is far speedier and extra benefit than console data passage. Its chief piece of breathing space is that in the event that it's any imperfection in its card, by then in the event that it's shaked on its code, by then it channels the distortion in addition. Likewise, in addition their data would be feed in the structure.
- Data Transfer
- Controlling register data
- Wireless information correspondence
- RFID Security Access Control System utilizing 8051 Microcontroller is a RFID Progression based security structure. Utilizing this structure, support of work power is done with a RFID card and just those with access can enter a guaranteed about zone.

CHAPTER III. THEORY

III.i. RFID: The History -

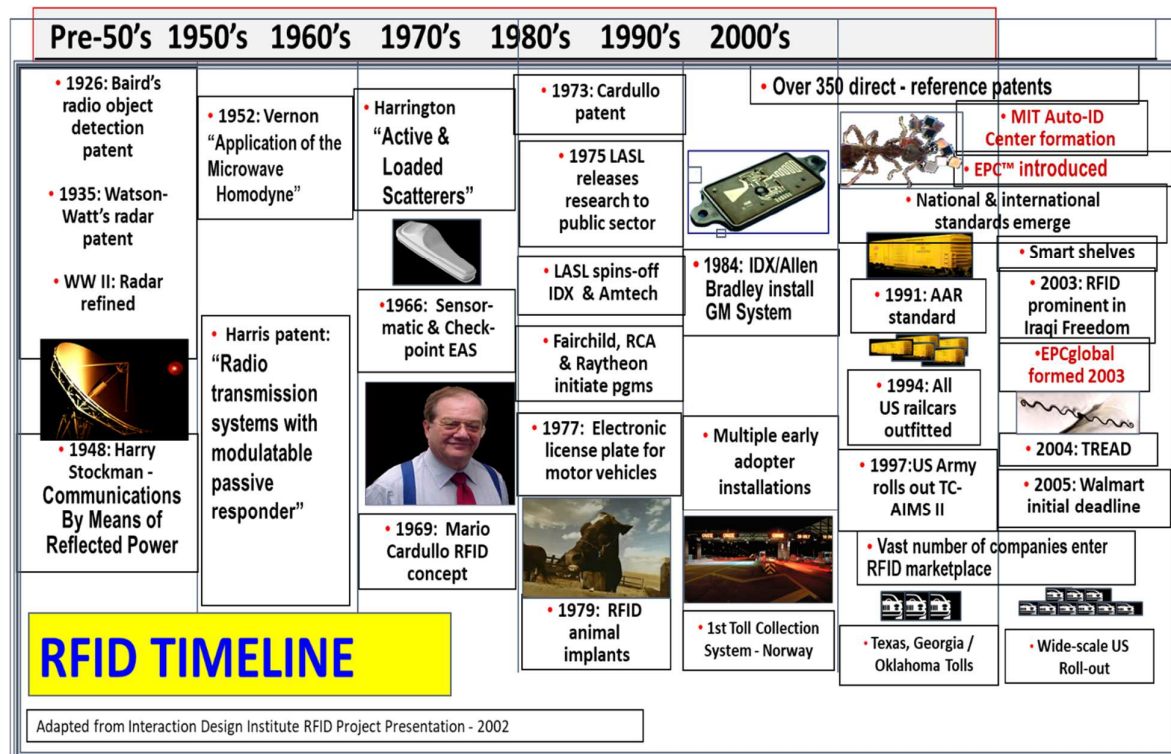


Figure (i)

III.ii. RFID/NFC –

- RFID enables the changed ID of things using radio wave without the need of physical contact with the article.
- RFID names contain a little microchip and a party mechanical social affair or a transmitter.
- Over three working frequencies; low frequencies(125-134kHz), high frequencies(13.56MHz), ultra high frequencies (860-960 MHz)
- One of the best challenges opposing any rf structure is its security. Since RFID structures uses remote methodologies for correspondences between the peruser and the names ,the RFID systems may be stood up to with MITM, playback, tune in, planning, and following risks, which raises correspondence security issues, especially the affirmation spills.

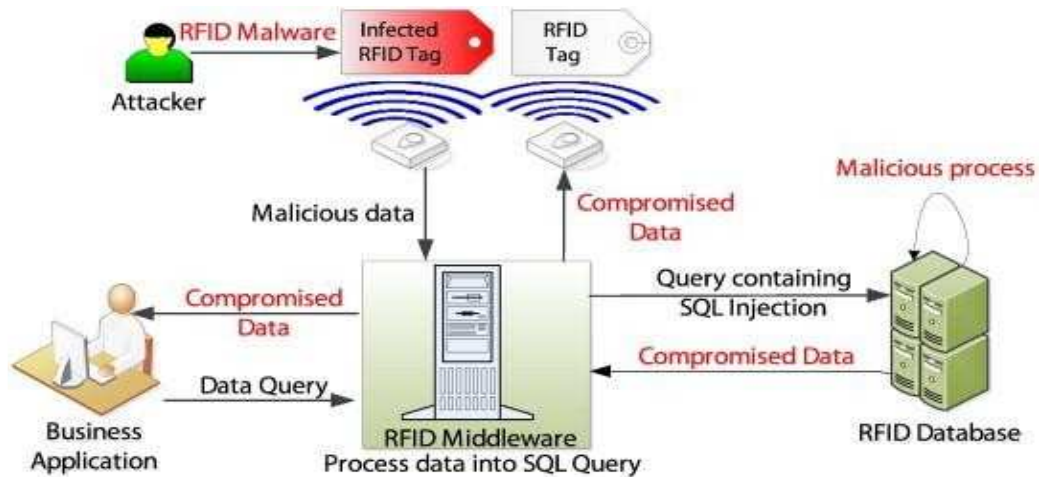


Figure (ii)

III.iii. Tag Types: Active -

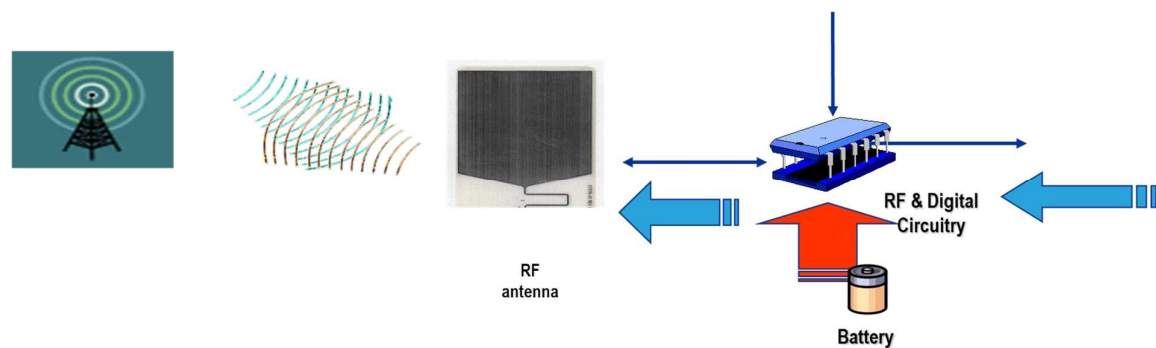


Figure (iii)

➤ Active:

- Standard: None, Mainly Manufacturers Proprietary Systems/Protocols
- Range: Generally 300 Feet or less
- Battery fueled/restricted life
- Used Predominantly in Transportation Systems (rail, cost structures, trucking, compartment).
- Characteristics: Tag with Internal Power Cell Mounted to Item or compartment/bed/box, Interrogator Queries Tags, Uploads/Downloads Data. Doesn't transmit consistently. Information Capacity Varies.

III.iv. Tag Types: Passive –

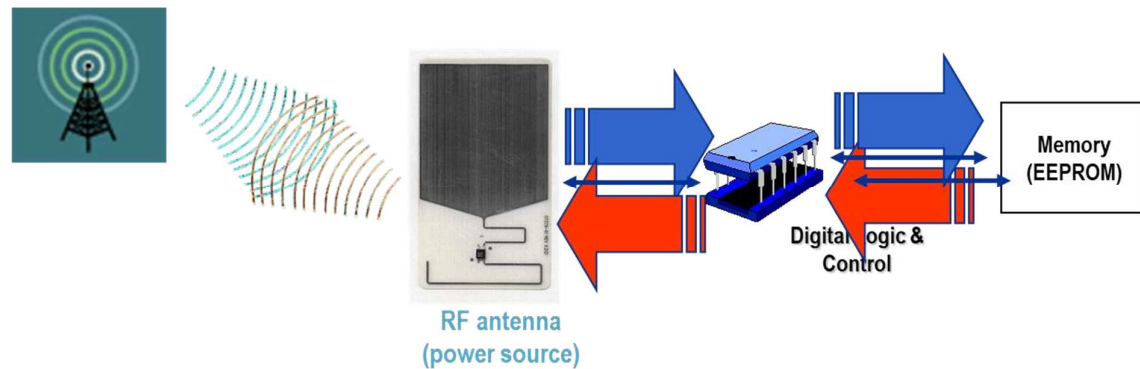


Figure (iv)

➤ Passive:

- Standard: None/many, Mainly Manufacturers Proprietary Systems/Protocols (uses back scatter improvement)
- Range: Typically Measured in “Inches”, Working Toward “Meters” (dependant structure framework, square, etc.)
- Used Predominantly in Retail Systems and Transportation Systems.
- Characteristics: Small Tag Loaded with License Plate Data
- Typically Mounted to End Item, Reader Captures Data as Item Moves Through Choke Point (passage, pathway, plot, etc.).
- Data Capacity Limited.

III.v. Tag Types: Semi-Active –

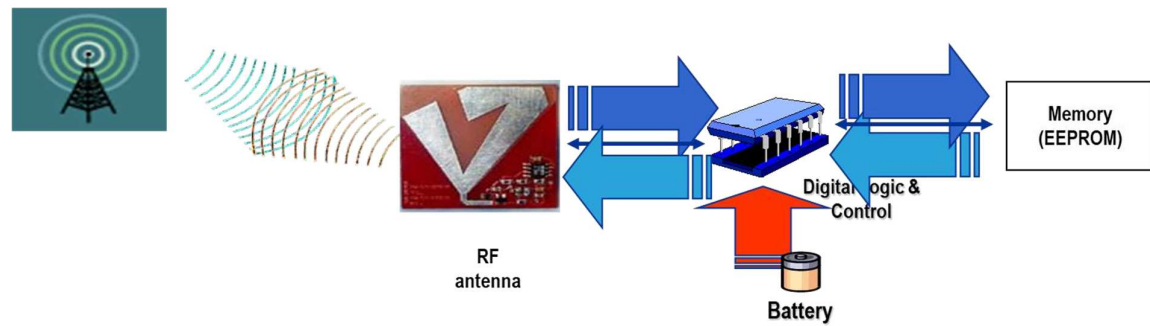


Figure (v)

Semi-Active or Battery Assisted Passive:

- On-board battery power source
- Uses Passive Technology (no transmitter)
- Greater go in any case progressively significant cost (not really one of a kind)
- Requires less force from peruser
- Finite life
- Can utilize shaky batteries (little change to plot factor)

III.vi. RFID security risks and threats:

- Physical RFID threats
- RFID Channel threats
- System threats

Channel threats:	Physical threats:	System threats:
▶ Eavesdropping,	Disabling tags,	Counterfeiting,
▶ Cloning tags ,	Snooping,	Tracking and tracing,
▶ Reverse engineering,	Skimming,	Password decoding
▶ Power analysis		

Table 1

CHAPTER IV. COMPONENTS

IV.i. Required Components:

- AT89C51 Microcontroller
- 16 x 2 LCD Display
- EM-18 RFID Reader Module
- L293D Motor Driver IC

IV.ii. Other Components :

- 11.0592 MHz Quartz Crystal
- 2 x 33pF Ceramic Capacitors
- 2 x 10K Ω Resistor
- 10 μ F Electrolytic Capacitor
- Push Button
- 3 x 1K Ω Resistor
- 10K Ω POT
- Motor
- Connecting Wires

CHAPTER V. COMPONENTS DESCRIPTION

V.i. AT89C51 Microcontroller :

AT89C51 is a 8-piece microcontroller and has a spot with Atmel's 8051 family. AT89C51 has 4KB of Flash programmable and erasable read just memory and 128 bytes of RAM. It might be squashed and program to a most remote degrees of different occasions. In 40 pin AT89C51, there are four ports given out as P1, P2, P3 and P0. These ports are 8-piece bi-directional ports, i.e., they can be used as the two data and yield ports. Close P0 which needs outside improvements, rest of the ports have inside draw ups. Right when 1s are stayed in contact with these port pins, they are pulled high by inside motivations and can be used as wellsprings of information. These ports are in like manner bit addressable as necessities be their bits can other than be gotten to openly.

Port P0 and P2 are also used to give low byte and high byte addresses, freely, when related with an outside memory. Port 3 has multiplexed pins for phenomenal cutoff habitats like one of a kind correspondence, gear interrupts with, clock information sources and read/make improvement from external memory. AT89C51 has an inbuilt UART for consecutive correspondence. It will when everything is said in done be changed according to work at different baud rates. Checking cheats and contraption hops in on, it has a whole of six interferes.

The central features of 8051 microcontroller are:

- i. Beat – 128 Bytes (Data memory)
- ii. ROM – 4Kbytes (ROM choose the on – chip program space)

- iii. Tireless Port – Using UART makes it less remarkable to interface for dynamic correspondence.
- iv. Two 16 piece Timer/Counter
- v. Data/yield Pins – 4 Ports of 8 bits each on a singular chip.
- vi. 6 Interrupt Sources
- vii. 8 – bit ALU (Arithmetic Logic Unit)
- viii. Harvard Memory Architecture – It has 16 piece Address transport (the entire of RAM and ROM) and 8 piece Data Bus.
- ix. 8051 can execute 1 million one-cycle drives each second with a clock repeat of 12MHz.

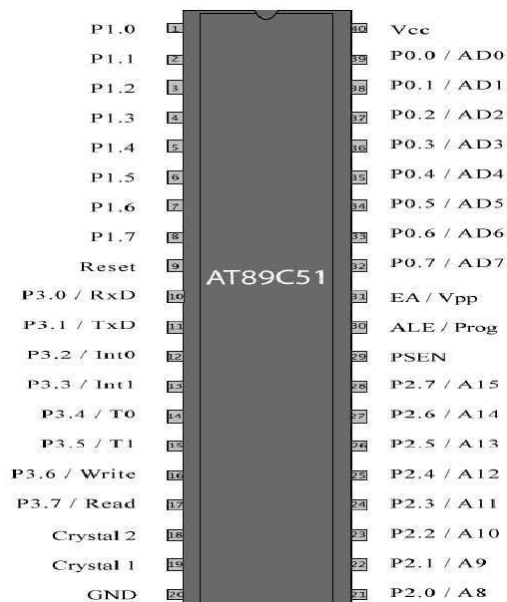


Figure (vi)

V.ii. 16 x 2 LCD Display :

16*2 LCD is a general utilized portion for inserted applications. Here is the concise clarification about pins and working of 16*2 LCD show up. There are two central registers inside the LCD. They are information register and mentioning register. Cash register is utilized to send orders, for example, clear show, cursor at home, and so forth., information register is utilized to send information which is to be showed up on 16*2 LCD. Underneath table shows the pin depiction of 16*2 lcd.

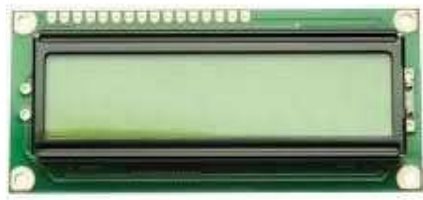


Figure (vii)

V.iii. EM-18 RFID Reader Module :

EM-18 RFID peruser works at 125 KHz and it goes with an on-chip radio wire and it might be filled with 5V power deftly. It gives successive yield along weigand yield. The range is around 8-12cm. consecutive correspondence parameters are 9600bps, 8 data bits, 1 stop bit. Its applications fuse Authentication, e-cost road assessing, e-ticketing for open vehicle, support structures, etc. Check all the RFID Projects here.

The yield gave by EM-18 RFID peruser is in 12 digit ASCII plan. Out of 12 digits beginning 10 digits are card number and the last two digits are the XOR eventual outcome of the card number. Last two digits are used for screw up checking.

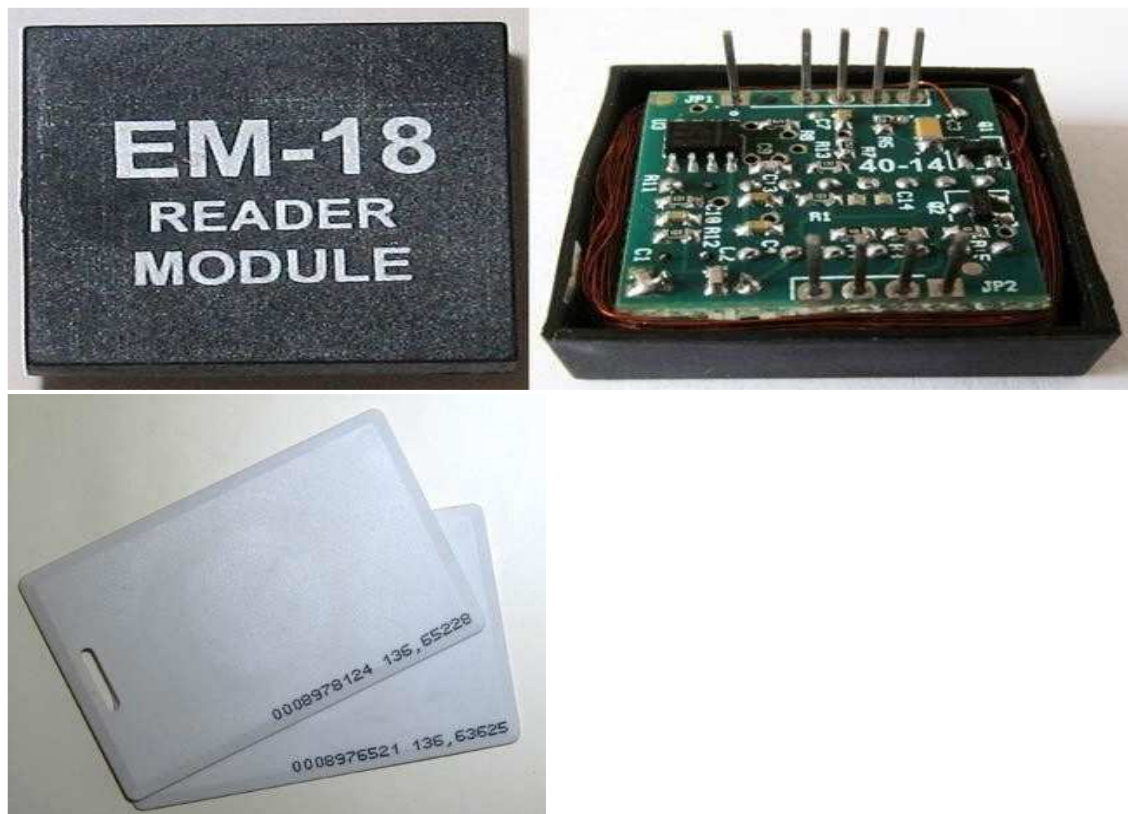


Figure (viii)

V.iv. L293D Motor Driver IC :

L293D and L293 are two such ICs. These are twofold H-bridge motor drivers, ie by using one IC we can control two DC Motors in both clockwise and counter clockwise directions.

The L293D can give bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V while L293 can present to 1A at same voltages. The two ICs are expected to drive inductive loads, for instance, dc motors, bipolar wandering motors, relays and solenoids nearly as other high-current or high-voltage stacks in positive-effectively applications. All obligations of these ICs are TTL commendable and yield reinforce diodes for inductive transient spread are furthermore given inside. These diodes shield our circuit from the Back EMF of DC

Motor.



Figure (ix)

V.v. Other Components:

11.0592 MHz Quartz Crystal



Figure (x)

33pF Ceramic Capacitors



Figure (xi)

10KΩ Resistor



Figure (xii)

10μF Electrolytic Capacitor



Figure (xiii)

Push Button



Figure (xiv)

1KΩ Resistor



Figure (xv)

10K Ω POT



Figure (xvi)

Connecting Wires



Figure (xvii)

CHAPTER VI. WORKING OF PROJECT

The inspiration driving this endeavor is to structure a RFID Technology based Attendance System and to store the data in the structure to keep the record using 8051 microcontroller, in which the endeavor of understudies or laborers is routinely recorded with the swipe of a card and been regulated in the PC with no other individual to keeps the record of the person. The working of the errand is explained here.

Right when this circuit is controlled ON, from the earliest starting point stage the microcontroller will show the message as Swipe the card on the LCD appear. Unequivocally when the RFID peruser sees the ID card, it will send the novel card no to the humbler degree controller by strategies for dynamic terminal.

With the help of sensible programming, we need to take a gander at the got card no. with the numbers that are starting at now set aside in the microcontroller or any database.

Once, if any of these numbers are animate with the got card no., by then the seeing name set aside in that no. is appeared on the LCD appear and moreover the assistance for the name set aside in the separating number is checked. Moreover, some time later that information is managed in the PC and further proceeding is done

By crushing the catch, the speculation recording will be closed and the nuances are appeared on the LCD again and again until the microcontroller has been reset.

CHAPTER VII. CIRCUIT DIAGRAM

The standard of action of this assignment relies on the working of the RFID Circuit.

A Passive kind RFID Card is used in this endeavor. Accurately when this card is put near the RFID Reader Module, the radio wave in the Reader energizes the chip in the RFID card through common confirmation. From this time forward, the microchip in the peruser in like manner gets enough ability to turn it on.

After a short time the curve in the peruser goes about as a get-together mechanical social gathering and moves the data in the microchip to the peruser module through radio correspondence.

The peruser module, by then talks with the microcontroller through UART show to move the data got from the card.

CIRCUIT DIAGRAM

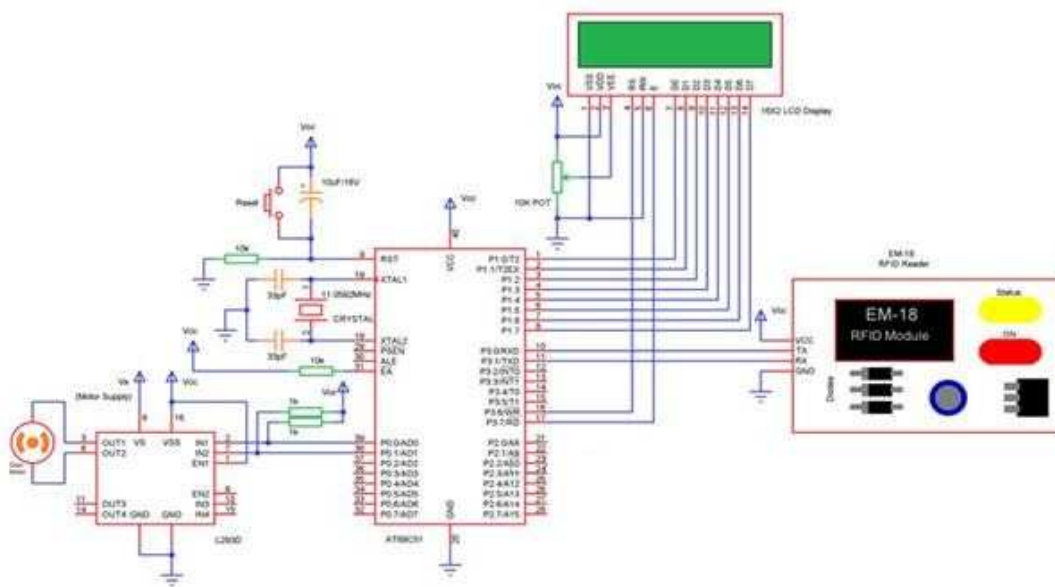


Figure (xviii)

VII.i. Circuit Design:

The fundamental bits of the endeavor are 8051 based microcontroller, 16×2 LCD, and RFID peruser module.

First we'll consider the to be relationship concerning the microcontroller. Here, we'll have to interface a pearl, a reset circuit and outside access.

To utilize the on-chip oscillator, a 11.0592 MHz quartz pearl is related with pins 18 (XTAL2) and 19 (XTAL1) of the microcontroller. Two 33pF earth capacitors are related from the imperative stone to ground.

The reset on the 8051 microcontroller is dynamic high for example coming about to applying a high heartbeat to RST pin, the microcontroller will reset. A 10KΩ resistor is related from the RST (Pin 9) of the microcontroller to ground.

A 10μF electrolytic capacitor is related between the positive viably and RST pin. A press button is related over the capacitor.

The External Access (Pin 31) is related with positive deftly utilizing a 10KΩ resistor. This finishes the central relationship regarding microcontroller.

At long last we'll relate the LCD to microcontroller. To modify the bundle of the segment, a pot is related with self-ruling change pin for example Pin 3 of LCD.

In any case, extra the three control pins of the LCD for example RS, RW and E to P3.6, GND and P3.7. By then interface the 8 information pins of the LCD show to PORT1 pins of the microcontroller.

In the wake of frill the presentation, a little while later we will interface the RFID peruser module. Partner the TX pin of RFID Reader to RXD pin for example P3.0 of the microcontroller. In like manner, interface the RX pin of RFID Reader to TXD pin for example P3.1 of the microcontroller.

At last, a catch is related with P3.3 (IN) to see the speculation subtleties.

CHAPTER VIII. CODING FOR 8051 MICROCONTROLLER

Program for RFID based Secured access system using 8051 microcontroller(AT89C51)

```
#include<reg51.h>

sfr lcd_data_pin=0xA0; //P2 port

sbit rs=P1^0;

sbit rw=P1^1;

sbit en=P1^2;

sbit new_user=P1^3;

unsigned char card_id[12],index=0,key1=0,flag0=0,flag1=0,flag2=0,flag3=0;

unsigned char card_mem[6][12];

unsigned char current_byte = 0;

void display();

void memory();

void delay(unsigned int count) { //Function to provide time delay

    int i,j;

    for(i=0;i<count;i++) {

        for(j=0;j<1275;j++) {

void lcd_command(unsigned char comm) { //Lcd command funtion

    lcd_data_pin=comm;

    en=1;

    rs=0;

    rw=0;

    delay(1);

    en=0;

    } }

void lcd_data(unsigned char disp) { //Lcd data function

    lcd_data_pin=disp;

    en=1;
```

```
rs=1;
rw=0;
delay(1);
en=0;
}
lcd_string(unsigned char *disp) { //Lcd string function
int x;
for(x=0;disp[x]!=0;x++) {
lcd_data(disp[x]);
} }
void lcd_ini() { //Function to initialize the LCD
lcd_command(0x38);
delay(5);
lcd_command(0x0F);
delay(5);
lcd_command(0x80);
delay(5);
}
void display() { // Function to display the unique ID
unsigned char count,i,key,flag=0,val;
lcd_command(0x01);
lcd_command(0x80); //Place cursor to second position of second line
val=index;
for(i=0;i<index;i++) {
key=0;
for(count=0;count<12;count++) {
if(card_id[count]==card_mem[i][count]) {
key++;
} }
}
```

```
if(key==12) {
    flag=1;
    lcd_command(0x80);
    lcd_string("Access granted");
    lcd_command(0xC4);
    lcd_string("USER ");
    lcd_command(0xC9);
    lcd_data(49+i);
    delay(100);
    break;
} }
if(flag==0) {
    lcd_command(0x84);
    lcd_string("Wrong ID");
    delay(200);
}
lcd_command(0x01);
lcd_command(0x80);
lcd_string("Pls scan your ID");
current_byte=0;
}

void recieve() interrupt 4 { //Function to recieve data serialy from RS232
    card_id[current_byte]=SBUF;
    RI=0; // Reset the serial interrupt after recievingthe byte
    current_byte++;
}

void memory() {
    unsigned char i,key=0,count,try=0,head=0,select=0,mod=0,size;
    unsigned int in,j;
```

```
lcd_command(0x01);
lcd_string("scan your ID");
current_byte=0;
while(current_byte!=12) {
current_byte=0;
for(i=0;i<6;i++) {
key=0;
for(count=0;count<12;count++){
if(card_id[count]==card_mem[i][count]) {
key++;
} }
if(key==12) {
size=i;
lcd_command(0x01);
lcd_string("Like to delete");
lcd_command(0xC0);
lcd_string("If yes scan ID");
for(in=0;in<500;in++) {
for(j=0;j<1275;j++) {
if(current_byte==12) {
break;
} }
if(current_byte==12) {
break;
} }
if(current_byte==12) {
for(in=0;in<12;in++) {
if(card_id[in]==card_mem[size][in]){
mod++;
```

```
    }}  
    if(mod==12) {  
        for(in=0;in<12;in++) {  
            card_mem[size][in]=5;  
        }  
        lcd_command(0x01);  
        lcd_string("congratulation!");  
        lcd_command(0xC0);  
        lcd_string("You are deleted");  
        delay(200);  
        lcd_command(0x01);  
        lcd_string("Pls scan your ID");  
        key=0;  
        try=1;  
        break;  
    }  
    if(mod!=12) {  
        lcd_command(0x01);  
        lcd_string("You have shown");  
        lcd_command(0xC0);  
        lcd_string("different ID");  
        delay(200);  
        lcd_command(0x01);  
        lcd_string("Pls scan your ID");  
        key=0;try=1;  
        break;  
    } }  
    if(current_byte!=12) {  
        lcd_command(0x01);
```

```
lcd_string("Sorry ! You are");
lcd_command(0xC0);
lcd_string("already an user");
delay(200);
lcd_command(0x01);
lcd_string("Pls scan your ID");
key=0;
try=1;
break;
} } }
current_byte=0;
if(key<12 && try==0) {
key=0;
for(i=0;i<12;i++) {
card_mem[index][i]=card_id[i];
}
current_byte=0;
lcd_command(0x01);
lcd_string("Pls scan again");
while(current_byte!=12);for(i=0;i<12;i++) {
if(card_mem[index][i]==card_id[i]) {
key++;
} }
current_byte=0;
if(key==12) {
lcd_command(0x01);
lcd_string("Pls varify again ");
while(current_byte!=12) {
key=0;
```

```
for(i=0;i<12;i++) {
    if(card_mem[index][i]==card_id[i]) {
        key++;
    }
    current_byte=0;
}
else {
    lcd_command(0x01);
    lcd_string("ERROR");
    delay(200);
    for(i=0;i<12;i++) {
        card_mem[index][i]=0;
        lcd_command(0x01);
        lcd_string("Pls scan your ID");
    }
    if(key==12) {
        lcd_command(0x01);
        lcd_string("Congratulation !");
        lcd_command(0xC0);
        lcd_string("You are User");
        lcd_command(0xCC);
        lcd_data(index+49);
        delay(250);
        lcd_command(0x01);
        lcd_string("Pls scan your ID");
    }
    else {
        lcd_command(0x01);
        lcd_string("ERROR");
```

```
delay(200);
for(i=0;i<12;i++) {
    card_mem[index][i]=0;
}
lcd_command(0x01);
lcd_string("Pls scan your ID");
}
if(key==12) {
    index++;
}
}
void main() {
    new_user=1;
    TMOD=0x20; //Enable Timer 1
    H1=0XFD;
    SCON=0x50;
    TR1=1;
    IE=0x94;
    new_user=0; // Trigger Timer 1
    lcd_ini();
    lcd_command(0x80); //Place cursor to second position of first line
    lcd_string("Pls scan your ID");
    delay(200);
    while(1) {
        if(new_user==1) {
            memory();
        }
        if(current_byte==12) {
            display();
        }
    }
}
```

CHAPTER IX. CONCLUSION

It is remarkably helpful for secure information move. There is insignificant odds of information to be hacked.

It is extraordinarily helpful in little augmentation similarly as.

The reason for this undertaking is to structure a RFID based security find the opportunity to control framework utilizing 8051 microcontroller, in which just supported work force are permitted access to a guaranteed zone.

The working of the undertaking is clarified here.

Precisely when the circuit is filled ON, the microcontroller will from the start presentation a message as "Swipe the Card" on the LCD show up.

Precisely when the RFID Card or Tag is swiped against the RFID peruser, it will recognize the ID card and sends the novel card no. to the microcontroller by strategies for back to back terminal.

With the assistance of reasonable programming, we have to consider the got card no. with the numbers that are beginning at now put aside in the microcontroller or any database like outside memory unit.

On the off chance that the got number is created with the beginning at now put aside number, by then the microcontroller will show the name of the card holder on the LCD and requests the engine driver IC. As such, the passage is opened for a predefined extend after which the gateway is ordinarily shut.

On the off chance that there is no accomplice for the got numbers with the put aside numbers, by then the microcontroller won't open the entryway and presentations a message as "Access Denied" on the LCD show up.

CHAPTER X. APPLICATION

RFID based Security Access System is orchestrated in this task. As the structure utilizes RFID Technology based unmistakable proof, it may be utilized to get to guaranteed about regions like research systems, obstacle zones, and so on.

It is a low force structure what's more the RFID Cards or Tags utilized are of inactive kind.

X.i. Limitations :

Despite the way that RFID Technology is secure, the security can be reached out by joining other prosperity attempts like facial unmistakable verification, fascinating engraving scanner, and so forth.

As the card subtleties are dealt with in the microcontroller, just a destined number of card subtleties can be dealt with. This can be reached out by executing a memory unit like EEPROM.

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