SMART ATM ACCESS &
SECURITY SYSTEM

A PROJECT REPORT

Submitted by

AARTHI J **Reg. No.: 1110107001**

KALPANA K **Reg. No.: 1110107038**

in partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

KUMARAGURU COLLEGE OF TECHNOLOGY

COIMBATORE-641049

(An Autonomous Institution Affiliated to Anna University, Chennai)

APRIL 2015

KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE-641049

(An Autonomous Institution Affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this project report **"SMART ATM ACCESS & SECURITY SYSTEM"** is the bonafide work of **AARTHI J, KALPANA K** who carried out the project work under my supervision.

SIGNATURE

Dr. Rajeswari Mariappan
Head Of the Department
Department of ECE
Kumaraguru College of Technology,
Coimbatore-641049

SIGNATURE

Dr. Rajeswari Mariappan
Head Of The Department
Department of ECE
Kumaraguru College of Technology,
Coimbatore-641049

The candidates with Register numbers 1110107001 and 1110107038 are examined by us in the project viva-voce examination held on …………………….

Internal Examiner **External Examiner**

ACKNOWLEDGEMENT

First we would like to express our praise and gratitude to the Lord, who has showered his grace and blessing enabling us to complete this project in an excellent manner. He has made all things in beautiful in his time.

We express our sincere thanks to our beloved Joint Correspondent, **Shri. Shankar Vanavarayar for** his kind support and for providing necessary facilities to carry out the project work.

We would like to express our sincere thanks to our beloved Principal **Dr.R.S.Kumar M.E., Ph.D.,** who encouraged us with his valuable thoughts.

We would like to express our sincere thanks and deep sense of gratitude to our HOD, **Dr. Rajeswari Mariappan M.E., Ph.D.,** for her valuable suggestions and encouragement which paved way for the successful completion of the project.

We are greatly privileged to express our deep sense of gratitude to the Project Coordinator **Ms.S.Nagarathinam M.E., (Ph.D)**, Assistant Professor (SRG), for her continuous support throughout the course.

In particular, we wish to thank and express our everlasting gratitude to the Supervisor Dr**.Rajeswari Mariappan M.E., Ph.D.,** Head Of the Department for her expert counselling in each and every steps of project work and we wish to convey our deep sense of gratitude to all teaching and non-teaching staff members of ECE Department for their help and cooperation.

Finally, we thank our parents and our family members for giving us the moral support in all of our activities and our dear friends who helped us to endure our difficult times with their unfailing support and warm wishes.

ABSTRACT

The basic aim of this project is to design a system, which is used for ATM access to cash withdrawal with more security. In day to day life we often see that any ATM (Automatic Teller Machine) gets robbed by a burglar which creates huge Damage to public and bank assets. In this proposed project, an ATM security system which helps to get rid against criminal acts is developed. This system automatically sends a SMS to nearby police stations and the branch manager with the address of ATM being robbed.

The RFID card reader is used as an identity for particular users. If the identity (serial number of the tag) of the user is matched with the one already stored in this system, he gets one time password to mobile phone through GSM Modem and it should be entered by the user. If it is matched then the transaction is done.

Another system to secure ATM from thief and fire is also implemented. If position of ATM changes it will turn off shutter of ATM by using DC motor. For detecting position of ATM tilt sensor will be used. For detecting temperature of ATM temperature sensor will be used. Also when the robber tries to harm the cash chamber of the ATM then the vibration sensor attached with the ATM detects the vibration and sends the input pulse to the microcontroller. The microcontroller detects the vibration through vibration sensor and sends the ATM location through the GSM (Global System for Mobile Communication) kit to nearby police station and branch manager. It automatically closes the Door of ATM. The results will be very beneficial against the criminal activities and robbery of ATM Cash

TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
	ABSTRACT	iv
	LIST OF ABBREVIATIONS	viii
	LIST OF FIGURES	ix
1	**INTRODUCTION**	1
	1.1 Block diagram of SMART ATM	
2	**HARDWARE DESCRIPTION**	3
	2.1 RFID	3
	2.1.1Components of RFID System	3
	2.1.2.Pin Diagram of RFID Reader	4
	2.2 PIC16F877A	5
	2.2.1 Features	5
	2.2.2 Block Diagram	6
	2.2.3 Pin Diagram	7
	2.2.4MemoryOrganization	7
	2.2.5 Special Function Register	8
	2.2.6 Timer Module	8
	2.2.6.1 Timer 0 module	8
	2.2.6.2 Timer 1 module	8
	2.2.6.3 Timer 2 module	8
	2.2.7 Reading Program Memory	11

2.3 LCD display unit 12
2.3.1 Pin diagram of LCD 12
2.3.2 Algorithm to send data to LCD 13
2.3.3 LCD initialization 13
2.4 Keypad 14
2.4.1 Matrix Keypad Basic Connection 14
2.4.2 Interfacing of PIC16F877A with Keypad module 15
2.5 Buzzer 16
2.6 Vibration sensor 17
2.6.1 Features 17
2.6.2 Functional Block Diagram 17
2.6.3 Theory of operation 17
2.7 Temperature sensor 18
2.7.1 Pin diagram 18
2.7.2 Importance of LM 35 19
2.7.3 Working 19
2.8 Serial RS232 19
2.8.1 Interfacing GSM with PIC using Max232 20
2.9 Power supply 21
2.9.1 Block Diagram of power supply 21
2.9.2 Power supply circuit diagram 22

	2.10 GSM	22
	2.10.1 Interfacing GSM with PIC	24
3	**SOFTWARE DESCRIPTION**	25
	3.1 MPLAB	25
	3.1.1 Features of MPLAB	25
	3.1.2 Components of MPLAB	26
	3.2 Proteus Software	28
	3.2.1 Proteus products	28
4	**APPENDIX**	29
5	**CONCLUSION**	42
6	**REFERENCES**	43

LIST OF ABBREVATIONS

ATM	Automatic Teller Machine
RFID	Radio Frequency Identification
GSM	Global System for Mobile communication
PIC	Peripheral Interface Controller
RISC	Reduced Instruction Set Computer
EEPROM	Electrically Erasable Programmable Read Only Memory
SRAM	Static Random Access Memory
LED	Light Emitting Diode
LCD	Liquid Crystal Display
IDE	Integrated Development Environment
ICSP	In-Circuit Serial Programming
WDT	Watch dog timer
UPC	Universal Product Code
GUI	Graphical User Interface
SIM	Subscriber Identification Number

LIST OF FIGURES

FIGURE NO NO	TITLE	PAGE
2.1	Block diagram of SMART ATM	10
2.2.1	Components of RFID system	11
2.2.2	Pin diagram of RFID reader module	12
2.3.2	Block diagram of PIC16F877A	15
2.3.3	Pin diagram of PIC 16F877A	16
2.4.3	LCD initialization	21
2.5.1	Matrix keypad basic connection	23
2.5.2	Interfacing of PIC micro-controller with keypad module	24
2.7.2	Functional block diagram of vibration sensor	26
2.8.1	Pin diagram of temperature sensor	28
2.9	Serial RS232	30
2.9.1	Interfacing GSM with PIC microcontroller using max232	31
2.10	Block diagram of power supply	32
2.10.1	Circuit diagram of power supply	33
2.11.1	Circuit diagram of interfacing GSM with PIC	34

1.INTRODUCTION

In modern era ATM system is very essential part of our life. It makes very easy our transactions which was very tedious in early time. Now it's time to make it more advance. This project makes more advancements and proves to be helpful for society with the help of technologies like GSM and RFID .An ATM with a currency dispenser includes a contactless card reader and the status of the transaction through text message .The contactless card reader can read data from an RFID tag of a customer's ATM card. The contactless card reader, such as an RFID tag reader can be located so as to provide additional space for another transaction component. The contactless card reader can also be used in conjunction with a magnetic stripe card reader.

The ATM includes housing for the RFID tag reader that is adapted to prevent interception of radio signals and a GSM modem which helps to send text message for every transaction. The ATM is able to prevent dispensing of currency in situations where unauthorized detection of signals is sensed and this unauthorized signal can be text to security staffs so that they can take the desired action. In this project, when consumers usages their card for the transaction, after the transaction a corresponding message about the transaction will sent to the mobile no which was registered
by the consumer.

1.1 BLOCK DIAGRAM OF SMART ATM

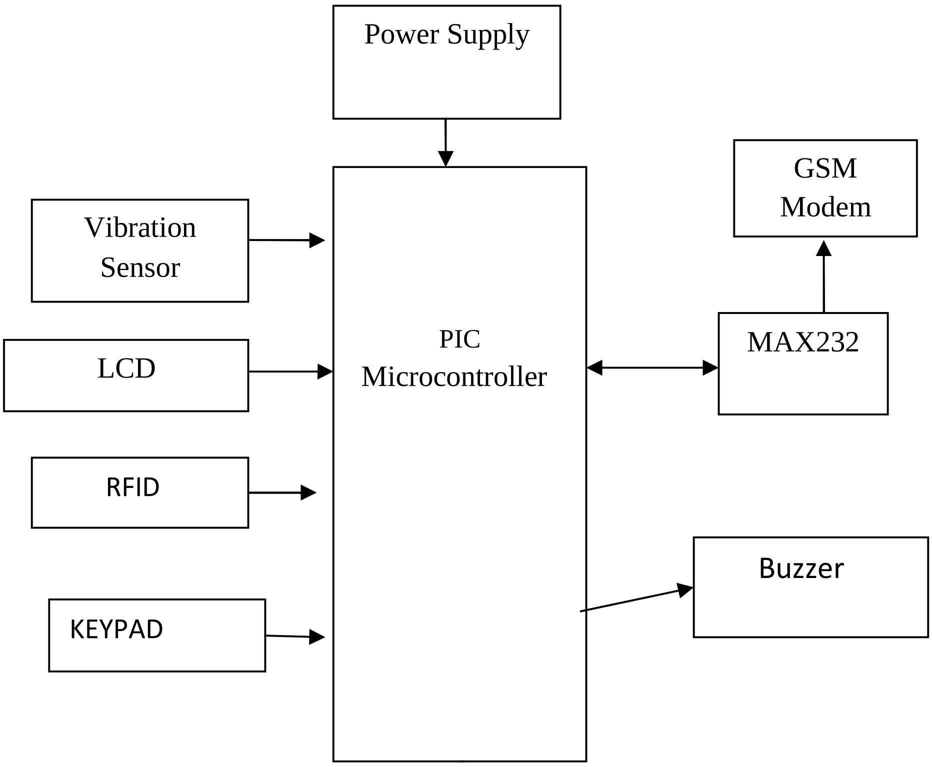


FIG: 1.1 Block Diagram Of Smart ATM

WORKING

In this system, RFID card is the input of micro-controller. When a person swaps the RFID card through RFID Card scanner which is connected with controller and user data will fetch in PC and communication is performed using serial driver IC. After, the same user data is transferred to GSM module with the help of serial driver IC and using GSM module the message with one time password is sent to mobile phone through GSM Modem and it should be entered by the user, if it is matched then the transaction is done.

Proposed System:

i. ATM security management against cash robbery and real time alert using embedded system

Advantage of proposed system:

i. Real Time Alert using SMS which has worldwide reach.
ii. 24*7 protection against ATM cash robbery.
iii. Criminals trap.
iv. Intimation for more than one user in the ATM room.
v. Sophisticated and accurate security.

2. HARDWARE DESCRIPTION

2.1 RFID

Radio Frequency Identification is a term that used to describe a wireless system that used for Automatic Identification and tracking, it uses Radio Frequency electromagnetic fields to transfer data from tag attached to an object. Unlike UPC (Universal Product Code) Bar Code, this technology doesn't need line of sight communication and it can be read through clothing, human body or any non metallic materials. Therefore it is an excellent replacement for UPC Bar Codes.

2.1.1 COMPONENETS OF RFID SYSTEM

- Tag or Transponder : Tag electronically programmed with unique information
- Coil or Antenna: To emit radio signals to activate tag and/or read radio signals emitted by the tag.
- Transceiver

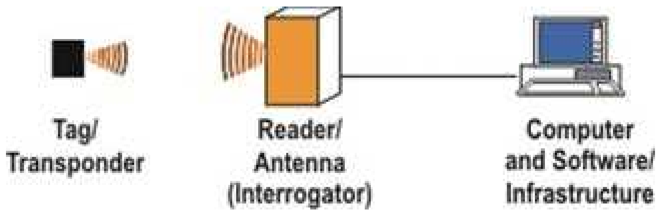
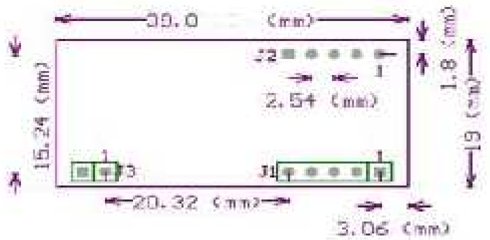


Fig 2.1Components Of RFID System

The RFID Reader Module generates and radiates RF Carrier Signals of a particular frequency (say 125 KHz) through its coils. When a RFID Tag which is designed to operate at that frequency (125 KHz) is brought in to this field, it will energize from it.

These tags have internal Rectifier and Filter to convert electromagnetic signals from the RFID Reader Module to DC Power required for its operation. It also gets its master clock from these RF waves. By changing the modulation current, tag will send back the information contained in the factory programmed memory array.

2.1.2 PIN DIAGRAM OF RFID READER MODULE



PIN Definition	
J1-PIN1	Obligate(RFU)
PIN2	Obligate(RFU)
PIN3	[illegible]
PIN4	LEDR
PIN5	BUZ
J2-PIN1	RESET
PIN2	RXD/DATA1
PIN3	TXD/DATA0
PIN4	GND
PIN5	+5V(DC)
J3-PIN1	ANTENNA-
PIN2	ANTENNA+

Fig2.2: Pin Diagram Of RFID

2.2 PIC16F877A

The PIC16F877A is a low-power, high-performance CMOS 8-bit microcontroller with 8K x 14 words of Flash Program Memory .The comparator outputs are externally accessible and is compatible to other 28-pin or 40/44-pin PIC16CXXX and PIC16FXXX microcontrollers.

2.2.1 FEATURES

ANALOG FEATURES:

- 10-bit, up to 8-channel Analog-to-Digital Converter (A/D)
- Brown-out Reset (BOR)
- Analog Comparator module with:
- Two analog comparators
- Programmable on-chip voltage reference (VREF) module
- Programmable input multiplexing from device inputs and internal voltage reference
- Comparator outputs are externally accessible

SPECIAL MICROCONTROLLER FEATURES:

• 100,000 erase/write cycle Enhanced Flash program memory typical

• 1,000,000 erase/write cycle Data EEPROM memory typical

• Data EEPROM Retention > 40 years

• In-Circuit Serial Programming™ (ICSP™) via two pins

• Single-supply 5V In-Circuit Serial Programming

• Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation

• Programmable code protection

• Power saving Sleep mode

• Selectable oscillator options

• In-Circuit Debug (ICD) via two pins

CMOS TECHNOLOGY:

• Low-power, high-speed Flash/EEPROM technology

• Fully static design

• Wide operating voltage range (2.0V to 5.5V)

• Commercial and Industrial temperature ranges

• Low-power consumption

2.2.2 BLOCK DIAGRAM OF PIC 16F877A

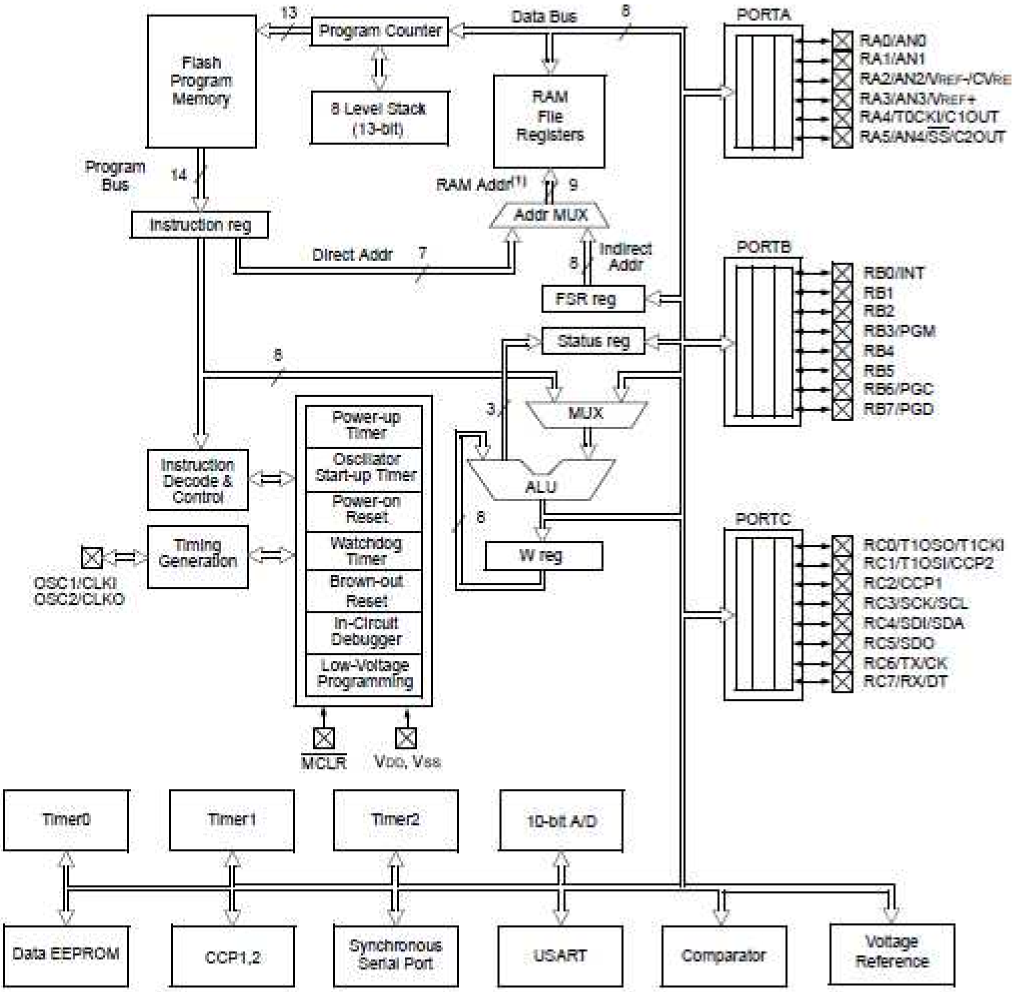


Fig 2.3: Block Diagram Of Pic16f877a

2.2.3 PIN DIAGRAM

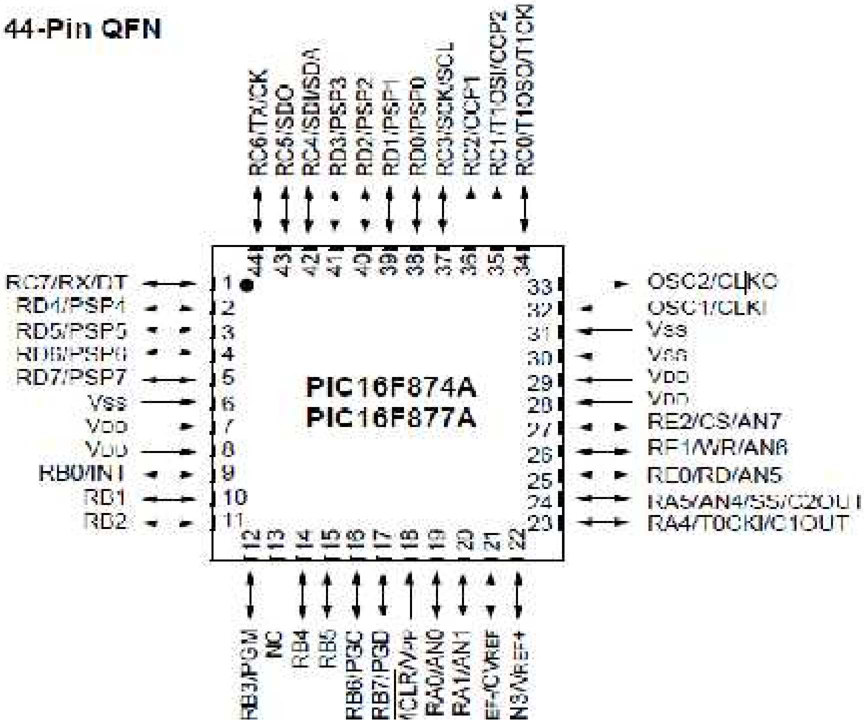


Fig 2.4: Pin Diagram PIC 16F877A

2.2.4 MEMORY ORGANIZATION

There are two memory blocks in the PIC16F77A device. These are the program memory and the data memory. Each block has separate buses so that concurrent access can occur. Program memory and data memory are explained in this section. Program memory can be read internally by the user code. The data memory can further be broken down into the general purpose RAM and the Special Function Registers (SFRs). The SFRs used to control the peripheral modules are described in the section discussing each individual peripheral module.

2.2.5 SPECIAL FUNCTION REGISTERS

The Special Function Registers are registers used by the CPU and peripheral modules for controlling the desired operation of the device. These registers are implemented as static RAM.

The Special Function Registers can be classified into two sets: core (CPU) and peripheral. Those registers associated with the core functions are described in detail in this section. Those related to the operation of the peripheral features are described in detail in the peripheral feature section.

2.2.6 TIMER MODULE

2.2.6.1 TIMER-0 MODULE

The Timer0 module timer/counter has the following features:

- 8-bit timer/counter
- Readable and writable
- 8-bit software programmable prescale
- Internal or external clock select
- Interrupt on overflow from FFh to 00h
- Edge select for external clock

2.2.6.2 TIMER-1 MODULE

The Timer1 module timer/counter has the following features:

- 16-bit timer/counter (Two 8-bit registers; TMR1H and TMR1L)
- Readable and writable (both registers)
- Internal or external clock select
- Interrupt on overflow from FFFFh to 0000h
- RESET from CCP module trigger

Timer1 can be enabled/disabled by setting/clearing control bit TMR1ON (T1CON<0>).

Timer1 Operation in Asynchronous Counter Mode

If control bit T1SYNC (T1CON<2>) is set, the external clock input is not synchronized. The timer continues to increment asynchronous to the internal phase clocks. The timer will continue to run during SLEEP and can generate an interrupt on overflow that will wake-up the processor. However, special precautions in software are needed to read/write the timer. In Asynchronous Counter mode, Timer1 cannot be used as a time base for capture or compare operations.

Reading and Writing Timer1 in Asynchronous Counter Mode

Reading TMR1H or TMR1L while the timer is running from an external asynchronous clock will ensure a valid read (taken care of in hardware). However, the user should keep in mind that reading the 16-bit timer in two 8-bit values itself, poses certain problems, since the timer may overflow between the reads. For writes, it is recommended that the user simply stop the timer and write the desired values.

A write contention may occur by writing to the timer registers, while the register is incrementing. This may produce an unpredictable value in the timer register. Data in the Timer1 register (TMR1) may become corrupted. Corruption occurs when the timer enable is turned off at the same instant that a ripple carry occurs in the timer module. Reading the 16-bit value requires some care. Family Reference Manual (DS33023) show how to read and write Timer1 when it is running in Asynchronous mode.

Timer1 Oscillator

A crystal oscillator circuit is built between pins T1OSI (input) and T1OSO (amplifier output). It is enabled by setting control bit T1OSCEN (T1CON<3>). The oscillator is a low power oscillator rated up to 200 kHz. It will continue to run during SLEEP. It is primarily intended for a 32 kHz crystal.

The Timer1 oscillator is identical to the LP oscillator. The user must provide a software time delay to ensure proper oscillator start-up .

Timer1 Interrupt

The TMR1 register pair (TMR1H:TMR1L) increments from 0000h to FFFFh and rolls over to 0000h. The TMR1 interrupt, if enabled, is generated on overflow, which is latched in interrupt flag bit TMR1IF (PIR1<0>). This interrupt can be enabled/disabled by setting clearing TMR1 interrupt enable bit TMR1IE (PIE1<0>).

Resetting Timer1 Using a CCP Trigger Output

If the CCP module is configured in Compare mode to generate a special event trigger" signal (CCP1M3:CCP1M0 = 1011), the signal will reset Timer1 and start an A/D conversion (if the A/D module is enabled). Timer1 must be configured for either Timer or Synchronized Counter mode to take advantage of this feature. If Timer1 is running in Asynchronous Counter mode, this RESET operation may not work. In the event that a write to Timer1 coincides with a special event trigger from CCP1, the write will take precedence. In this mode of operation, the CCPR1H:CCPR1L registers pair effectively becomes the period register for Timer1.

Since each resonator/crystal has its own characteristics, the user should consult the resonator/crystal manufacturer for appropriate values of external components. The special event triggers from the CCP1 module will not set interrupt flag bit TMR1IF (PIR1<0>).

2.2.6.3 TIMER-2 MODULE

The Timer2 module timer has the following features:

• 8-bit timer (TMR2 register)

• 8-bit period register (PR2)

• Readable and writable (both registers)

• Software programmable prescaler (1:1, 1:4, 1:16)

• Interrupt on TMR2 match of PR2

• SSP module optional use of TMR2 output to generate clock shift

Timer2 can be shut-off by clearing control bit TMR2ON (T2CON<2>) to minimize power consumption.

2.2.7 READING PROGRAM MEMORY

The FLASH Program Memory is readable during normal operation over the entire VDD range. It is indirectly addressed through Special Function Registers (SFR). Up to 14-bit wide numbers can be stored in memory for use as calibration parameters, serial numbers, packed 7-bit ASCII, etc. Executing program memory location containing data that forms an invalid instruction results in a NOP. There are five SFRs used to read the program and memory:

• PMCON1

• PMDATL

• PMDATH

• PMADRL

• PMADRH

The program memory allows word reads. Program memory access allows for checksum calculation and reading calibration tables. When interfacing to the program memory block, the PMDATH:PMDATL registers form a two-byte word, which holds the 14-bit data for reads.

The PMADRH:PMADRL registers form a two-byte word, which holds the 13-bit address of the FLASH location being accessed. This device has up to 2K words of program FLASH, with an address range from 0h to 07FFh.

2.3 LCD DISPLAY UNIT

A liquid crystal display (LCD) is a thin, flat electronic visual, 2*16 matrix display that uses the light modulating properties of liquid crystals (LCs). LCDs do not emit light directly. Liquid crystal displays (LCDs) are a passive display technology. This means they do not emit light; instead, they use the ambient light in the environment. By manipulating this light, they display images using very little power.

This has made LCDs the preferred technology whenever low power consumption and compact size are critical. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes.

2.3.1 Pin Information of LCD

Pin No	Symbol	Details
1	GND	Ground
2	Vcc	Supply Voltage +5V
3	Vo	Contrast adjustment
4	RS	0->Control input, 1-> Data input
5	R/W	Read/ Write
6	E	Enable
7 to 14	D0 to D7	Data
15	VB1	Backlight +5V
16	VB0	Backlight ground

Fig 2.5: Pin Information of LCD

2.3.2 Algorithm to send data to LCD:

- Make R/W low
- Make RS=0 ; if data byte is command RS=1 ;if data byte is data (ASCII value)
- Place data byte on data register
- Pulse E (HIGH to LOW)
- Repeat the steps to send another data byte.

2.3.3 LCD Initialization:

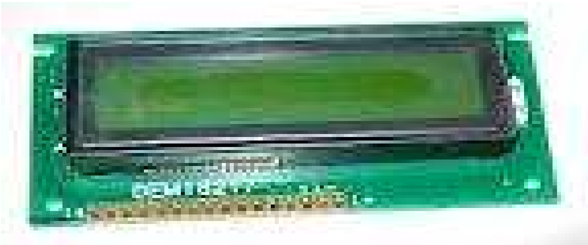


Fig 2.6 LCD Initialization

Working of LCD depend on the how the LCD is initialized. We have to send few command bytes to initialize the lcd.

Simple steps to initialize the LCD.

- Specify function set: Send 38H for 8-bit, double line and 5x7 dot character format.
- Display On-Off control: Send 0FH for display and blink cursor on.
- Entry mode set: Send 06H for cursor in increment position and shift is invisible.
- Clear display: Send 01H to clear display and return cursor to home position

2.4 KEYPAD

Matrix Keypad switches are widely used as digital input devices. Normally one switch requires one digital I/P pin of a microcontroller, to interface a matrix of such switches (say a 16 digit keypad), assigning a digital I/O pin for each key it‘s not possible. To minimize the required number of digital I/O pins of microcontroller. A very popular method is a keypad matrix where the keys are arranged into rows and columns so that a 4×4 (16) switches can be interfaced to a microcontroller using only 4+4 = 8 I/O pins.

- 4 x 4 matrix keypad organized in the row and column format
- Four columns are connected to the lower half of PORTB (RB0-RB3)
- Four rows are connected to upper half of PORTB (RB4-RB7)
- When a key is pressed, it makes a contact with the corresponding row and column.

2.4.1 Matrix Keypad Basic Connection

The rows R0 to R3 are connected to Input lines of Microcontroller. The i/o pins where they are connected are made Input. This is done by setting the proper in AVR and TRIS Register in PIC. The columns C0 to C3 are also connected to MCUs i/o line. These are kept at High Impedance State (AKA input), in high z state (z= impedance) state these pins are neither HIGH nor LOW they are in TRISTATE. And in their PORT value we set them all as low, so as soon as we change their DDR bit to 1 they become output with value LOW.

Keypad Matrix

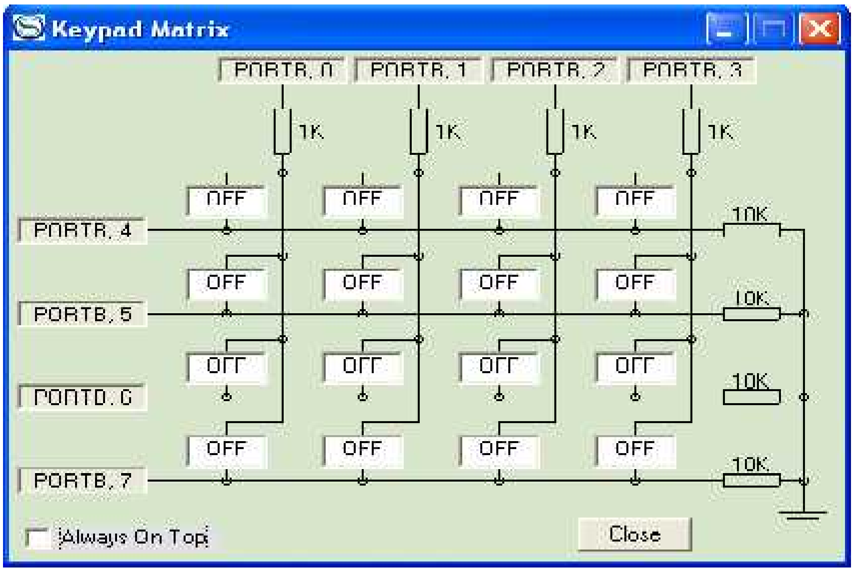


Fig2.7:Keypad Matrix

2.4.2 INTERFACING OF PIC MICRO-CONTROLLER WITH KEYPAD

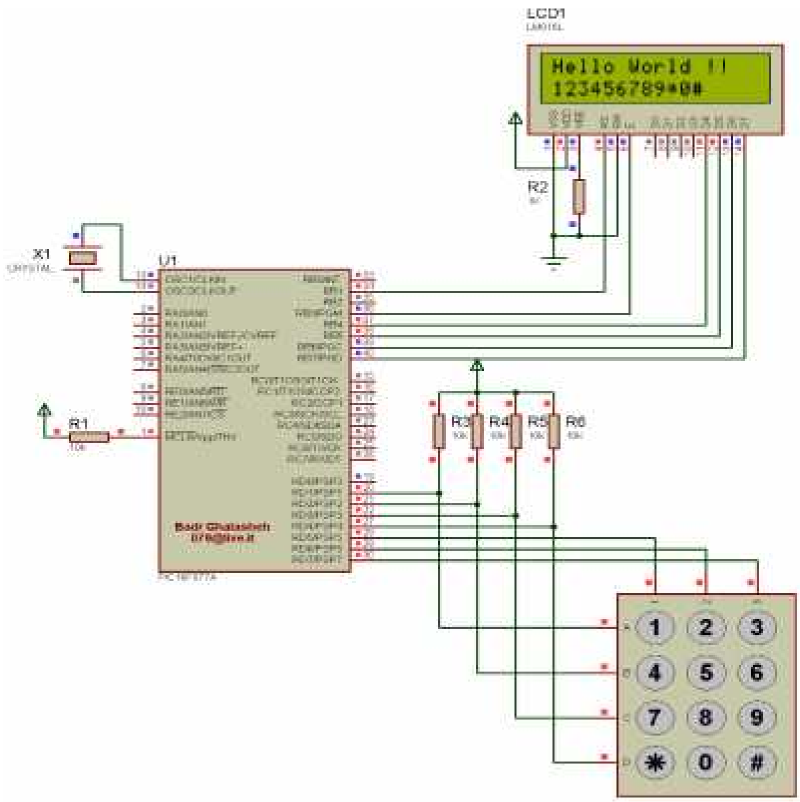


FIG2.8 INTERFACING OF PIC MICRO-CONTROLLER WITH KEYPAD

2.5 BUZZER

A buzzer or beeper is a signaling device. The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles.

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which 35
makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board.

Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Son alert which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound .

2.6 VIBRATION SENSOR

The ADXL335 is a small ,thin , low power complete axis accelerometer with signal conditioned voltage outputs .The product measures acceleration with a minimum full scale range of 3g.

2.6.1 FEATURES

3-axis sensing Small, low profile package 4 mm × 4 mm × 1.45 mm LFCSP Low power : 350 µA (typical) Single-supply operation: 1.8 V to 3.6 V 10,000 g shock survival Excellent temperature stability BW adjustment with a single capacitor per axis RoHS/WEEE lead-free compliant.

2.6.2 FUNCTIONAL BLOCK DIAGRAM

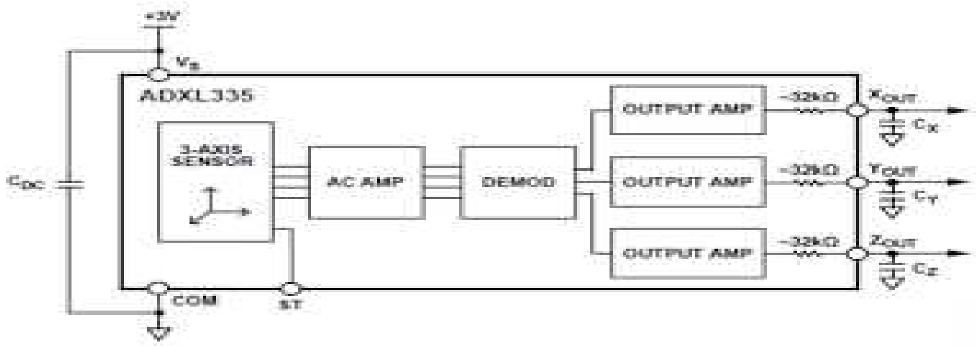


Fig2.9 Functional Block Diagram

2.6.3 THEORY OF OPERATION

The ADXL335 is a complete 3-axis acceleration measurement system. The ADXL335 has a measurement range of ±3 g minimum. It contains a polysilicon surface-micro machined sensor and signal conditioning circuitry to implement an open-loop acceleration measurement architecture.

The output signals are analog voltages that are proportional to acceleration. The accelerometer can measure the static acceleration of gravity in tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.

2.7 TEMPERATURE SENSOR

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in ^{o}C). It generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

2.7.1 PIN DIAGRAM

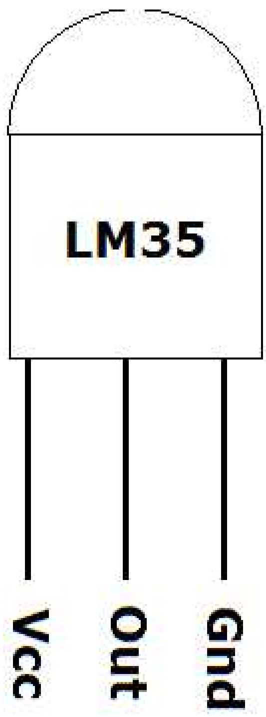


Fig2.10:Pin Diagram Of LM35

2.7.2 IMPORTANCE OF LM35

- You can measure temperature more accurately than a using a thermistor.
- The sensor circuitry is sealed and not subject to oxidation, etc.
- The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

2.7.3 WORKING

- It has an output voltage that is proportional to the Celsius temperature.
- The scale factor is .01V/^{o}C
- The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 ^{o}C at room temperature and +/- 0.8 ^{o}C over a range of 0 ^{o}C to +100 ^{o}C.
- Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a low self-heating capability. The sensor self-heating causes less than 0.1 ^{o}C temperature rise in still air.

2.8 SERIAL RS232

Serial communication is basically the transmission or reception of data one bit at a time. Today's computers generally address data in bytes or some multiple thereof. A byte contains 8 bits. A bit is basically either a logical 1 or zero. Every character on this page is actually expressed internally as one byte.

The serial port is used to convert each byte to a stream of ones and zeroes as well as to convert a stream of ones and zeroes to bytes. The serial port contains a electronic chip called a Universal Asynchronous Receiver/Transmitter (UART) that actually does the conversion.

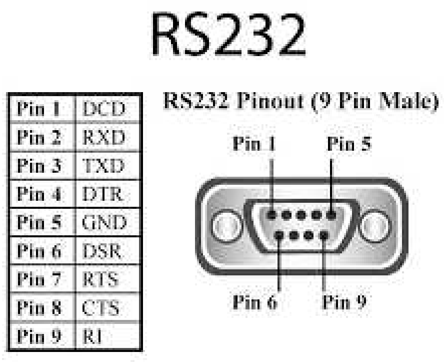


Fig2.11:Pin Diagram Of RS232

- When interfacing GSM Modem with PIC 16F877A need level shifter (max232 IC),because microcontroller and GSM Modem are different logic levels, connection diagram is shown below.

2.8.1 INTERFACING GSM WITH PIC MICROCONTROLLER USING MAX232

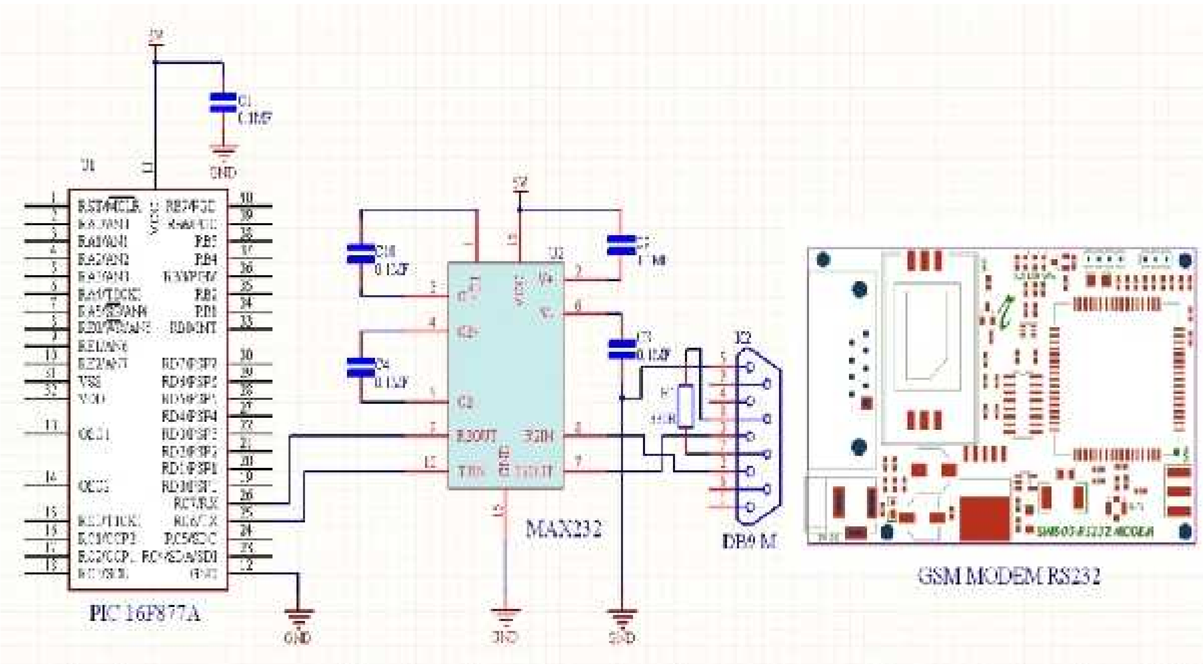


Fig2.12: Interfacing GSM With Pic Microcontroller Using Max232

2.9 POWER SUPPLY

The part of equipment that converts ac into dc is called DC power supply. In general at the input of the power supply there is a power transformer. It is followed by a rectifier (a diode circuit)a smoothing filter and then by a voltage regulator circuit.

2.9.1 BLOCK DIAGRAM OF POWER SUPPLY

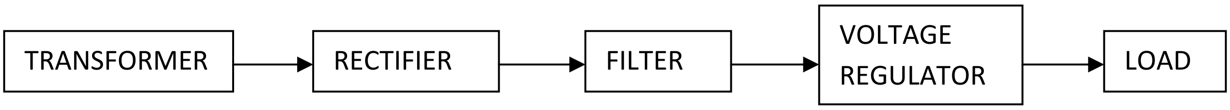


Fig2.13:Block Diagram Of Power Supply

From the block diagram, the basic power supply is constituted by four elements via a transformer, a rectifier filter, and a regulator put together. The output of the dc power supply is used to provide a constant dc voltage across the load. Let us briefly outline the function of each of the elements of the dc power supply.

Transformer is used to step-up or step-down (usually to step-down) the-supply voltage as per need of the solid-state electronic devices and circuits to be supplied by the dc power supply. It can provide isolation from the supply line-an important safety consideration. It may also include internal shielding to prevent unwanted electrical noise signal on the power line from getting into the power supply and possibly disturbing the load.

Rectifier is a device which converts the sinusoidal ac voltage into either positive or negative pulsating dc. P-N junction diode, which conducts when forward biased and practically does not conduct when reverse biased, can be used for rectification i.e. for conversion of ac into dc. The rectifier typically needs one, two or four diodes. Rectifiers may be either half-wave rectifiers or full-wave rectifiers (centre-tap or bridge) type.

The output voltage from a rectifier circuit has a pulsating character i.e., it contains unwanted ac components (components of supply frequency f and its harmonics) along with dc component. For most supply purposes, constant direct voltage is required than that furnished by a rectifier. To reduce ac components from the rectifier output voltage a filter circuit is required.

2.9.2POWER SUPPLY CIRCUIT DIAGRAM

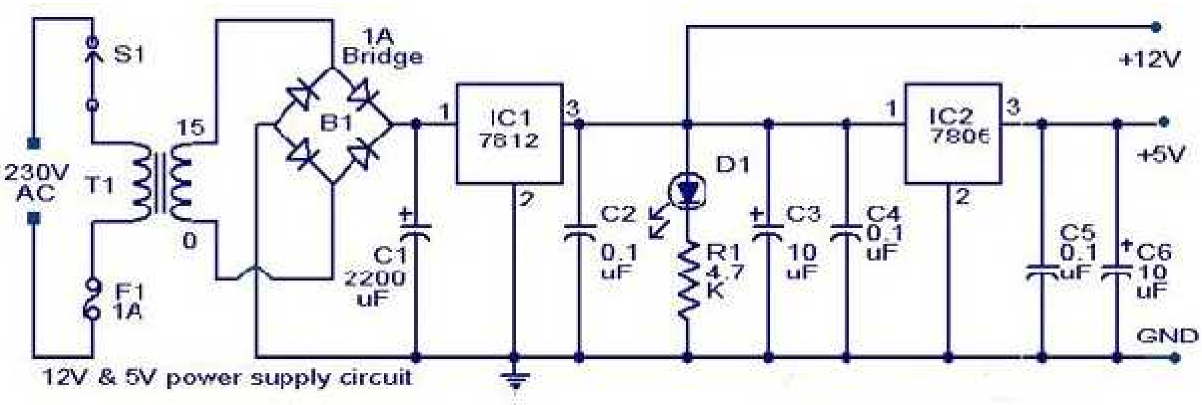


Fig2.14 Power Supply Circuit Diagram

2.10 GSM:

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem.

In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.
- Reading, writing and searching phone book entries.

The number of SMS messages that can be processed by a GSM modem per minute is very low -- only about six to ten SMS messages per minute.

2.10.1 CIRCUIT DIAGRAM OF INTERFACING GSM WITH PIC

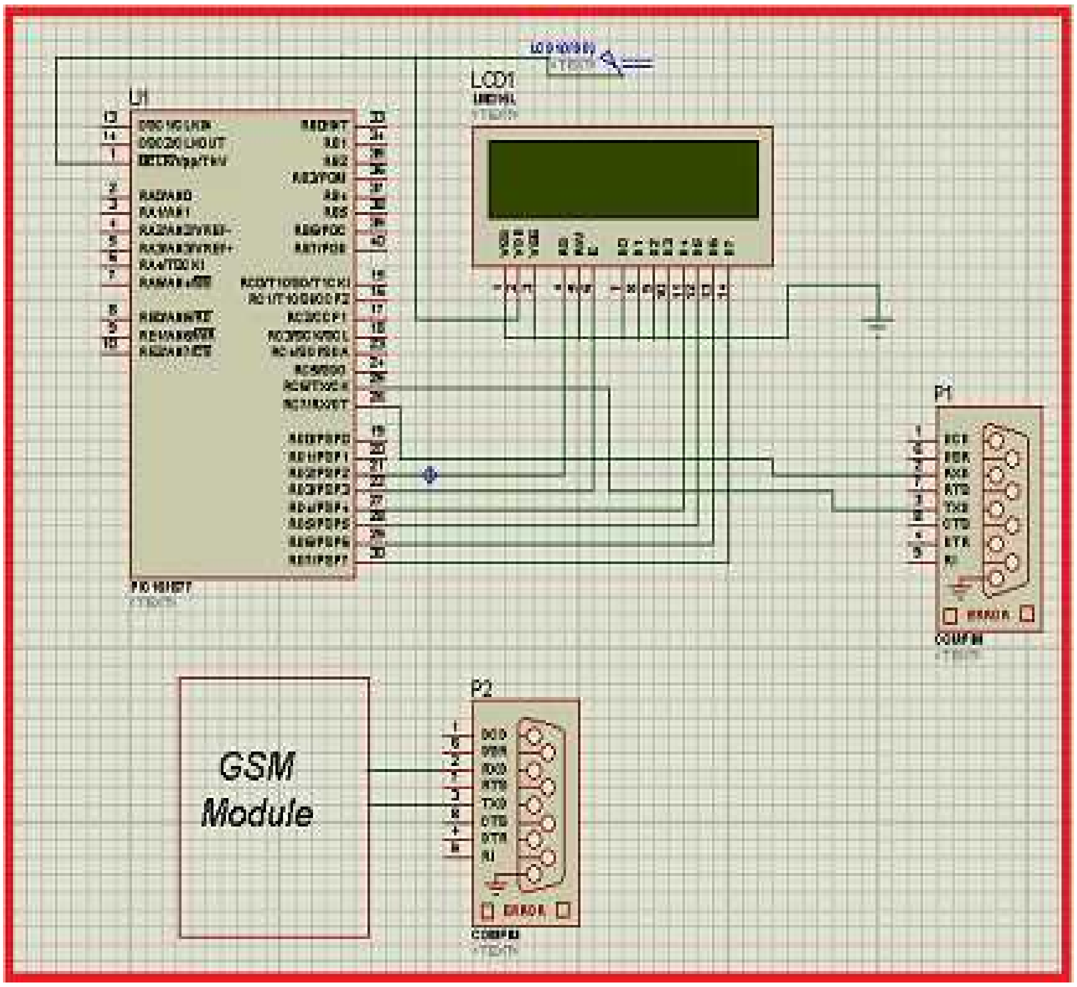


Fig 2.15: Circuit Diagram Of Interfacing GSM With PIC

3.SOFTWARE DESCRIPTION

3.1 MPLAB

MPLAB is a free integrated development environment for the development of embedded applications on PIC and dsPICmicrocontrollers, and is developed by Microchip Technology.

MPLAB X is the latest edition of MPLAB, and is developed on the NetBeans platform. MPLAB and MPLAB X support project management, code editing, debugging and programming of Microchip 8-bit, 16-bit and 32-bit PIC microcontrollers.

MPLAB is designed to work with MPLAB-certified devices such as the MPLAB ICD 3 and MPLAB REAL ICE, for programming and debugging PIC microcontrollers using a personal computer. PICKit programmers are also supported by MPLAB.

MPLAB Integrated Development Environment (IDE) is a free, integrated toolset for the development of embedded applications employing Microchips PIC and dsPIC microcontrollers. MPLAB IDE runs as a 32-bit application on Microsoft Windows, is easy to use and includes a host of free software components for fast application development and super-charged debugging.

3.1.1FEATURES

- Provides a new Call Graph for navigating complex code
- Supports Multiple Configurations within your projects
- Supports Multiple Versions of the same compiler
- Support for multiple Debug Tools of the same type
- Supports Live Parsing Import existing MPLAB® 8 IDE projects and use either IDE for the same source.
- Supports hyperlinks for fast navigation to declarations and includes

- Supports Live Code Templates
- Supports the ability to enter File Code Templates with license headers or template codeMPLAB® X IDE can Track Changes within your own system using local history
- Within MPLAB® X IDE, a user can configure their own Code Format Style

3.1.2 COMPONENTS OF MPLAB IDE

The MPLAB IDE has both built-in components and plug-in modules to configure the system for a variety of software and hardware tools.

MPLAB IDE Built-In Components

The built-in components consist of:

Project Manager

The project manager provides integration and communication between the IDE and the language tools.

Editor

The editor is a full-featured programmer's text editor that also serves as a window into the debugger.

Assembler/Linker and Language Tools

The assembler can be used standalone to assemble a single file, or can be used with the linker to build a project from separate source files, libraries and recompiled objects. The linker is responsible for positioning the compiled code into memory areas of the target microcontroller.

Debugger

The Microchip debugger allows breakpoints, single-stepping, watch windows and all the features of a modern debugger for the MPLAB IDE. It works in conjunction with the editor to reference information from the target being debugged back to the source code.

Execution Engines

There are software simulators in MPLAB IDE for all PICmicro and dsPIC devices. These simulators use the PC to simulate the instructions and some peripheral functions of the PIC micro and dsPIC devices.

Additional Optional Components for MPLAB IDE

Optional in-circuit emulators and in-circuit debuggers are also available to test code as it runs in the applications hardware.

Compiler Language Tools

MPLAB C17, MPLAB C18 and MPLAB C30 from Microchip provide fully integrated, optimized code. Along with compilers from HI-TECH, IAR, micro Engineering Labs, CCS and Byte Craft, they are invoked by the MPLAB IDE project manager to compile code that is automatically loaded into the target debugger for instant testing and verification.

Programmers

PICSTART Plus, PRO MATE II, MPLAB PM3 as well as MPLAB ICD 2 can program code into target microcontrollers. MPLAB IDE offers full control over programming code and data, as well as the configuration bits to set the various operating modes of the target microcontroller.

In-Circuit Emulators

MPLAB ICE 2000 and MPLAB ICE 4000 are full-featured emulators for the PIC micro and PIC devices. They connect to the PC via I/O ports and allow full control over the operation of microcontroller in the target applications.

In-Circuit Debugger

MPLAB ICD 2 provides an economic alternative to an emulator. By using some of the on-chip resources, MPLAB ICD 2 can download code into a target microcontroller inserted in the application, set breakpoints, single step and monitor registers and variables.

3.2 PROTEUS SOFTWARE

Proteus is an EDA tool which can simulate microcontroller and peripheral devices. Proteus can truly turn a complete design from concept into product. Proteus can program based on the virtual prototype directly. Together with display and output devices, input and output can be seen after running of programs. Proteus establishes a comprehensive electronic design and development environment.

Proteus 8 is best simulation software for various designs with microcontroller. It is mainly popular because of availability of almost all microcontrollers in it. So it is a handy tool to test programs and embedded designs for electronics hobbyist.

Proteus combines advanced schematic capture, mixed mode SPICE simulation, PCB layout and auto routing to make a complete electronic design system.

The Proteus product range also includes our revolutionary **VSM technology**, which allow you to simulate micro-controller based design, complete with all the surrounding electronic.

3.2.1Product Features

• ISIS Schematic Capture an easy to use yet and extremely powerful tool for entering your design

• PROSPICE Mixed mode SPICE Simulation industry standard SPICE3F5 simulator upgradeable to our unique virtual system modeling technology

• ARES PCB Layout

• Modern Graphical User Interface standardized across all modules

• Runs on Windows 98/ME/2000/XP or Later

• Technical Support direct form the author

• Rated best overall products

4.APPENDIX

```
#include<pic.h>
#include<stdio.h>
#include<conio.h>

#include<string.h>
#include"UART.H"

__CONFIG(0x3f72);

unsigned char temperature();
unsigned char pressure();
unsigned char temp,press;

#define Buzzer RC0
//lcd
#define RS RE0
#define RW RE1
```

```
#define EN RE2


#define DATA PORTD
#define ROW0 0x80   //lcd 1st lines
#define ROW1 0xc0   //lcd 2nd line addr


//lcd functions
void lcdinit(void);
void lcdclr(void);
void lcdcomd(unsigned char);
void lcddata(unsigned char);


//keypad
void ScanCol(void);
void ScanRow(void);
//rfid
unsigned char
data[]="13004C8830E77",store[12],count,i,pass[4],key_word[4],word[]="1234
";
void DelayMs(unsigned int);
unsigned char Row,Col,A,B,C,x;
//keypad
unsigned char KeyArray[4][3]= {'1','2','3','4','5','6','7','8','9','*','0','#'};
```

```
unsigned char ScanKey()
{
        TRISB=0X0F;//direction selection o/.p i/p
        RBPU = 0;
        PORTB=0X0F;//data
        while(PORTB==0x0f);
        ScanRow();
        TRISB=0xf0;
        PORTB=0XF0;
        RBPU = 0;
        while(PORTB==0xf0);
        ScanCol();
        return(KeyArray[Row][Col]);
}

unsigned char temperature()
{
    ADCON0=0x41;//channel select
    DelayMs(1);
    ADGO=1;//conversion select
    while(ADGO==1);//wait till complete the conversion
    temp = ADRESH;//result
    return(temp);
}
```

```
unsigned char pressure()
{
        ADCON0=0x49;
        DelayMs(1);
        ADGO=1;
        while(ADGO==1);
        press = ADRESH;
        return(press);
}

void main()
{
        unsigned char Temperature,Pressure;
        DelayMs(10);
        ADCON1=0x02;
        TRISA = 0xff;
        TRISD=0x00;
        TRISE=0x00;



        PORTD=0;
        PORTC=0x00;
```

```
      lcdinit();
      DelayMs(100);
TRISC |= 0x02;
      PORTC &= 0;
lcdcomd(0x80);
printf("     SMART      ");
lcdcomd(0xc0);
printf("      ATM       ");
      DelayMs(1000);
      UART_INIT(9600);
      lcdcomd(0x01);
lcdcomd(0x80);
printf(" SHOW YOUR RFID ");
lcdcomd(0xc0);
printf("                ");
Row=0;
Col=0;
      while(1)
      {

            DelayMs(500);
            lcdcomd(0x01);
      lcdcomd(0x80);
```

```
printf(" SHOW YOUR RFID ");
 lcdcomd(0xc0);
 printf("                ");
Row=0;
 Col=0;

for(count=0;count <= 11;count++)
{
           store[count] =  UART_GETC();
//        DelayMs(50);
//         TXREG = store[count];
           //DelayMs(50);
}

if((strncmp(data,store,11))==0)
{
          UART_PUTS("AT+CMGS=\"+917502642409\"\r");
          DelayMs(500);
          UART_PUTS("YOUR ONE TIME PASSWORD");
          DelayMs(500);
          UART_PUTS(word);
          DelayMs(500);
          UART_PUTC(0x1A);
          DelayMs(300);
```

```
        lcdcomd(0x01);
        lcdcomd(0x80);
printf("   Enter   ");
lcdcomd(0xc0);
printf("  password  ");
 Row=0;
Col=0;
DelayMs(1000);
        ScanKey();
lcdcomd(0x01);
        char cmd_pos=0x80;
        for(count=0;count<=3;count++)
        {
        key_word[count] = ScanKey();
                lcdcomd(cmd_pos++);
printf("%c",'*');
           DelayMs(500);
        }
        if((strncmp(word,key_word,4))==0)
        {
                lcdcomd(0x80);
        printf("ACCOUNT ACCESSED");
        lcdcomd(0xc0);
        printf("                ");
```

```
			UART_PUTS("AT+CMGS=\"+917502642409\"\r");
			DelayMs(500);
			UART_PUTS("ACCOUNT ACCESSED");
			DelayMs(500);
			UART_PUTC(0x1A);
			DelayMs(500);
			for(int i=0;i<4;i++)
			{
				word[i] = word[i]+1;
			}
		}
		else
		{
			Buzzer = 1;
			DelayMs(300);
			Buzzer = 0;
		}
	}
	else
	{
		Buzzer = 1;
		lcdcomd(0x80);
	printf("  ID INVALID   ");
		DelayMs(300);
```

```
        Buzzer = 0;
}

Temperature = temperature();
Pressure = pressure();
if(Temperature>30)
{
        Buzzer = 1;
        UART_PUTS("AT+CMGS=\"+917502642409\"\r");
        DelayMs(500);
        UART_PUTS("TEMPERATURE EXCEED");
        DelayMs(500);
        UART_PUTC(0x1A);
        DelayMs(500);
        lcdcomd(0x80);
printf("   TEMPERATURE   ");
        lcdcomd(0xc0);
printf("     EXCEED      ");
        DelayMs(500);
        Buzzer = 0;
}
if(Pressure >100)
{
        Buzzer = 1;
```

```
				UART_PUTS("AT+CMGS=\"+917502642409\"\r");
				DelayMs(500);
				UART_PUTS("VARIATIONS OCCUR");
				DelayMs(500);
				UART_PUTC(0x1A);
				DelayMs(500);
				lcdcomd(0x80);
			printf("     PRESSURE    ");
				lcdcomd(0xc0);
			printf("     EXCEED      ");
				DelayMs(500);
				Buzzer = 0;
			}

		}
}

void ScanRow()
{
		switch(PORTB)
		{
			case 0x07:
				Row=3;
				break;
```

```
        case 0x0b:
            Row=2;
            break;
        case 0x0d:
            Row=1;
            break;
        case 0x0e:
            Row=0;
            break;
    }
}

void ScanCol()
{
    switch(PORTB)
    {
        case 0x70:
            Col=3;
            break;
        case 0xb0:
            Col=2;
            break;
        case 0xd0:
            Col=1;
```

```
                break;
            case 0xe0:
                Col=0;
                break;
        }
}
void lcdinit(void)
{
        int i;
        unsigned char command[]={0x38,0x0c,0x06,0x01};
        for(i=0;i<4;i++)
        {
            lcdcomd(command[i]);
            DelayMs(2);
        }
}

void lcdcomd(unsigned char cmd)
{
        RS=0;
        RW=0;
        EN=1;
        DATA=cmd;
        DelayMs(3);
```

```
        EN=0;
}

void putch(unsigned char byte)
{

        RS=1;
        RW=0;
        EN=1;
        DATA=byte;
        DelayMs(3);
        EN=0;
}

void DelayMs(unsigned int del)
{
        unsigned int x=248,y;
        while(del>0)
        {
                y=x;
                while(y>0)
                y--;
                del--;
        }
```

}

5. CONCLUSION

In this project we investigated the feasibility of a new approach to use the available Infrared Sensor to help the visually disabled person in avoiding collision with obstacle in indoor environment with minimum cost as to

reach the large part of economy**.** A further use of two joint technology buzzer and vibrator both has been the more accurate estimates of the obstacle in the path and a manifest reduction in the localization error. A through measurement experiment was conducted in indoor environment to study the impact of main obstacle parameter affecting the final location accuracy, in order to determine the best operational condition.

6. REFERENCES:

1. www.ijettcs.org/Volume2Issue2/IJETTCS-2013-04-03-060.pdf
2 www.hbeonlabs.com/.../RFID%20PLUS%20GSM%20BASED%20ATM
3 www.edgefx.in/arduino-based-projects-on-security-system-for-engineering
4 www.svsembedded.com/.../LATEST_%20INNOVATIVESVSEMBEDDED
5. www.research.ijcaonline.org/volume57/number18/pxc3883761.pdf