CHAPTER 01

INTRODUCTION

We come across hospitals and NGO's serving paralytic patients who have their whole or partial body disabled by the Paralysis attack. These people in most cases are not able to convey their needs as they are neither able to speak properly nor do they convey through sign language due to loss in motor control by their brain. In such a situation we propose a system that helps disabled person in displaying a message over the LCD by just simple motion of any part of his body which has motion abilities. This system also takes care of the situation wherein no one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS.

"AUTOMATED PARALYSIS PATIENT HEALTH CARE SYSTEM "is a recognition system for the vocally disabled. In real world, there are many people who are paralytic and cannot communicate easily. Motions can be used to communicate words and sentence to audience. The work of this project is to provide aid to such people with the help of motions and sensors. A motion is used to provide a medium of sign for communication.

The work includeincludees use of various electronic components such as sensors, microcontrollers which will help the disabled as well as the society.

For communication of paralytic people and electronic automated paralysis patient health care system is developed. It is portable and very easy to handle. In this project angle sensor are used to convert physical parameter into electrical signal, which can be read by an observer or by an instrument. So with help of this system the barrier faced by the paralytic people in communicating with society can be reduced to great extent.

Various conditions such as stress, blood pressure and improper functioning of central nervous systems are reasons which lead in paralytic attacks. Patient who had paralytic attack have their whole or partial bodies disabled. This paralytic patient can neither speak nor express their demands or wishes. The particular aspect of this device is that if no one is near by the patient, he can send the message in the form of a SMS to the family members or their caretaker through the developed mechanism

1.1 BLOCK DIAGRAM

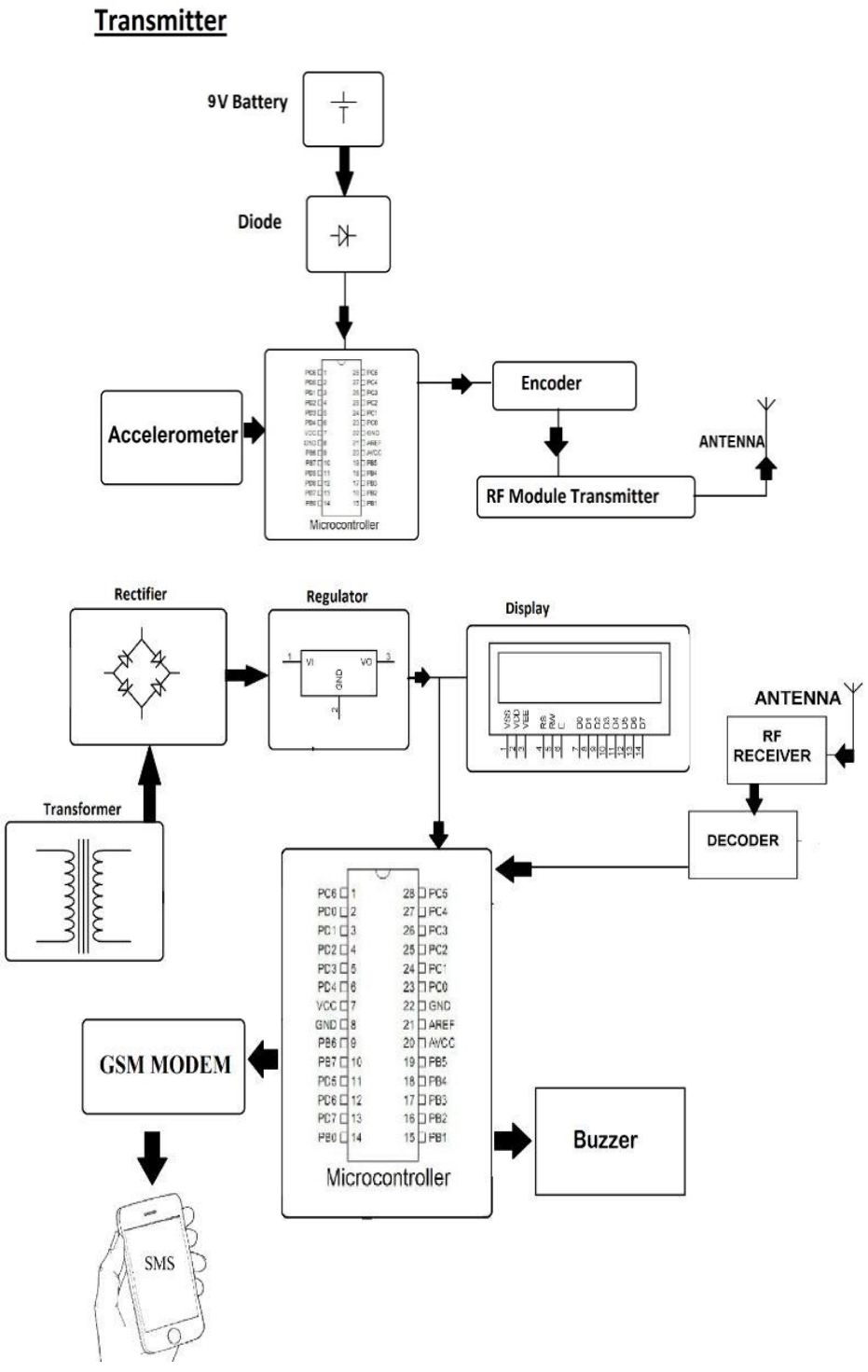


Fig. 1

1.2 DISCRIPTION OF BLOCKDIAGRM

1)POWER SUPPLY:-

Here microcontroller LED indicators accelerometer operates with DC 5 volt supply and 12 volt dc this applies provided by 9 volt battery in transmitter circuit. In receiver circuit can be implemented with ac based supply by using adaptor and rectifier.

2) 8051 ATMEGA8 MICROCONTROLLER :-

The ATmega8 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8 achieves throughputs approaching 1 MIPS per MHz, allowing the system designer to optimize power consumption ver- sus processing speed.

3)ACCELEROMETER :-

An accelerometer is an electromechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic – caused by moving or vibrating the accelerometer. The accelerometer is used to measure the orientation or vertical and horizontal positioning. It is transducer generate potential difference at output by moving it.

4)GSM MODEM :

A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMs to identify their device to the network.

5)RF MODULE TRANSMITTER:

The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. This kind of modulation is known as Amplitude Shift Keying (ASK). Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable

for long range applications. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

6)REGULATOR :-

A voltage regulator is a system designed to automatically maintain a constant voltage. 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.

7)BUZZER :

A buzzer or beeper is an audio signaling device, which can be mechanical, electro mechanical or piezoelectric. Typical use of buzzer and beepers include alarm device. We have used piezoelectric buzzer at our project as an alert indication for Patient care system.

8)LCD DISPLAY:

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly but instead use a backlight or reflector to produce / Display message for patient such like For Attending patient, For Emergency condition , For giving food/ water.

9) ENCODER /DECODER :

An encoder is a device which can detect and convert mechanical motion to an analog or digital coded output signal.

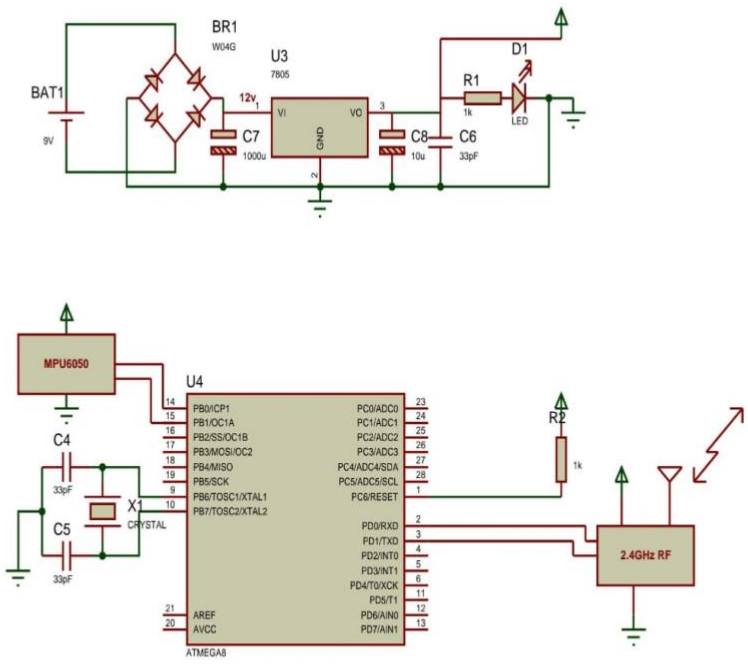
A decoder is a multiple-input, multiple-output combinational logic circuit. It converts the n bit data inputs into the coded 2n outputs. It decodes the information hidden by the encoder.

CHAPTER 02

CIRCUIT DIAGRAM

In this chapter we are going to study about the automatic paralysis patient health care system circuit diagram and working of circuit diagram.

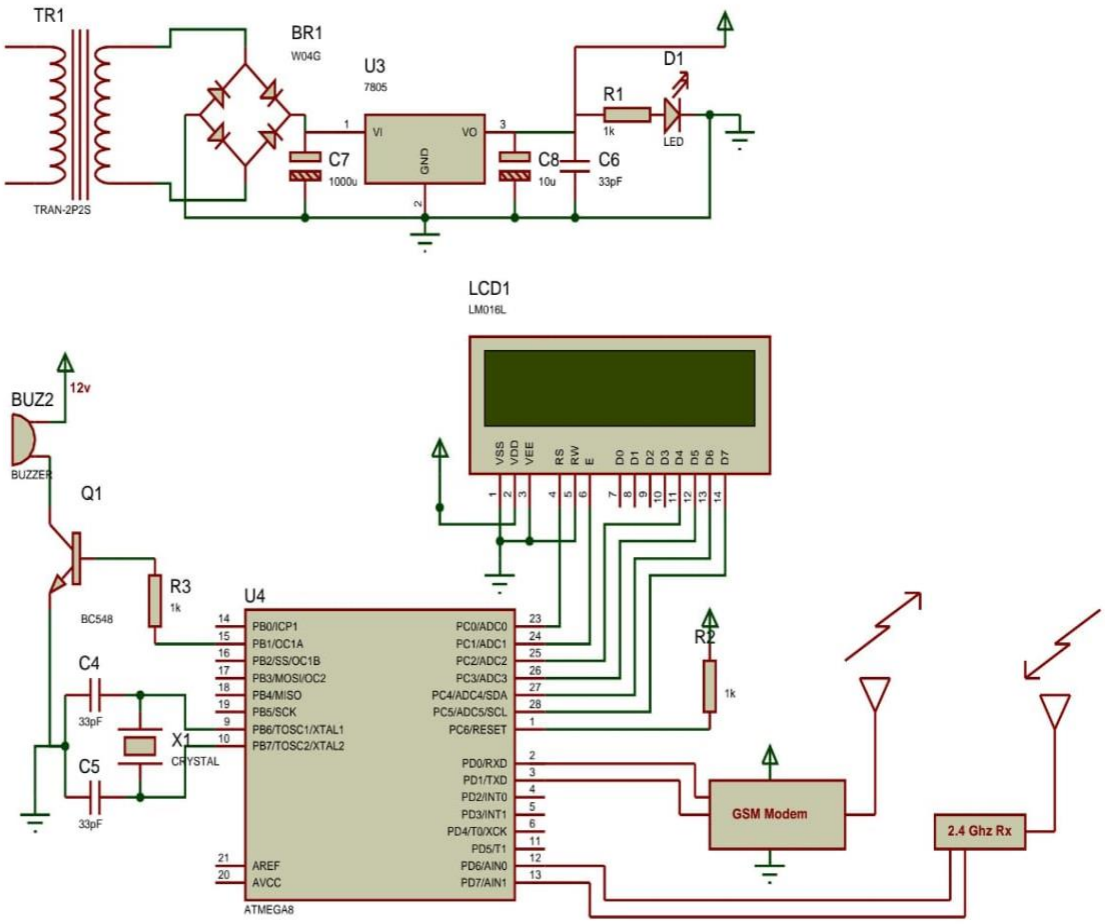
Here Following is the **Transmitter circuit** of Automated Paralysis Patient health care system.



Transmitter Unit

Fig 2.1

- **RECEIVER CIRCUIT**



Receiver Unit

Fig.2.2

2.1 WORKING OF CIRCUIT DIAGRAM

The working of the device here is shown by holding in the fingers of the mobile hand. The user now just needs to tilt the device in a particular angle to convey a message. Tilting the device in different directions conveys a different message. Here we use accelerometer in order to measure the statistics of motion. It then passes on this data to the microcontroller. The microcontroller processes the data and displays the particular message as per input obtained. The microcontroller now displays the associated message on the LCD screen. It also sounds a buzzer along with message as soon as it receives motion signal from the accelerometer. To get the power supply for the circuit, 230V AC mains is connected to adaptor, rectified by bridge rectifier R3151 and filtered by capacitor Cl(lOOOuF, 25V).

If there was no one to attend to the message displayed on the LCD, the patient can choose to tilt the device for some more amount of time which will trigger an SMS to be sent through a GSM modem to the registered care taker of the patient with the message that the patient wants to convey.

In this way the Automated Paralysis Patient Care System truly automates the care taking ability of the patient which ensures a timely attention to the patient and thus for a good health of the patient

These patients cannot have quick reflex system, hence there is no or less coordination between vocal systems, limbs and brain. In such situation, this proposed project can come to the rescue. The patient can communicate by displaying the message on the LCD screen by simple motion of their functioning body parts.

CHAPTER 3

LIST OF COMPONENTS

SR.NO.	COMPONENTS NAME	QUANTITY	PRICE
01	ATMEGA8 8O51 MICROCONTROLLER	01	149=00
02	ACCELEROMETER	01	125=00
03	2.4GHz RF MODULE	02	118=00
04	BUZZER	01	89=00
05	16×2 LCD DISPLAY	01	180=00
06	12MHz CRYSTAL OSCILLATOR	04	100 = 00
07	RESISTOR	05	50=00
08	10uf, 470uf CAPACITOR	10	100=00
09	VOLTAGE REGULATOR (7805)	02	80= 00
10	DIODES	08	100=00
11	LED	03	30=00
12	SWITCH	01	10=00
13	IC SOCKETS	02	20=00
14	PCB BOARD GLASS EPOXY	02	280=00

15	GSM MODEM	01	850=00
			Total= 2,281

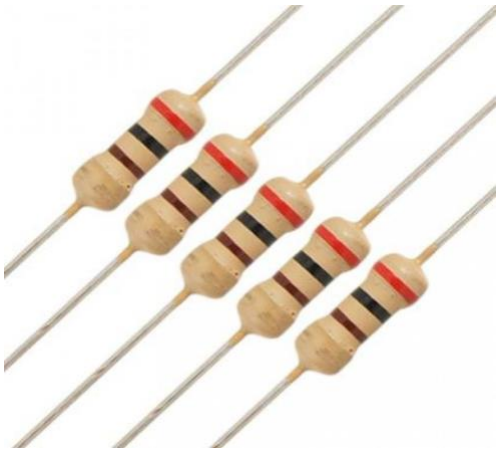
3.1 COMPONENT AND DATA SHEET

The Basic component used in this project it's description and function is given below.

- Resistor
- Diode
- Capacitor
- Data- sheet

RESISTOR MEASURMENT

Using a multi-meter to check for resistance is a much simpler task. The test leads will be kept plugged in the same sockets as for the voltage checks, but the selector switch will need to be turned until it points to the "horseshoe" resistance symbol. Touching the probes across the device whose resistance is to be measured, the meter should properly display the resistance in ohms:



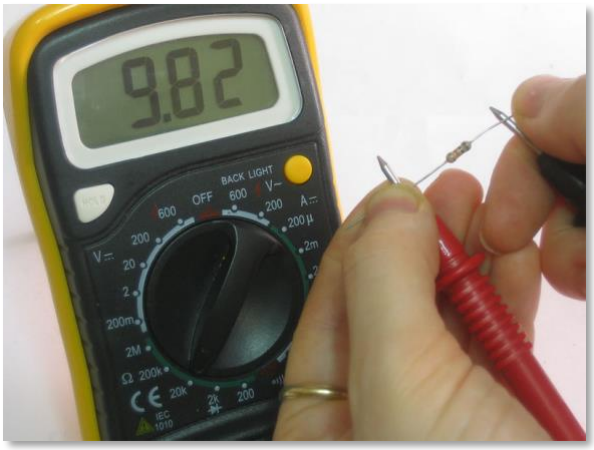


Fig.3.1. Fig.3.2

DIODE

There are many types of semiconductor diodes namely Selenium, Germanium and Silicon types.

Bridge Rectifier

Fig. 3.3. Fig 3.4

Selenium type is commonly used in the early days in ac power suppliers but in recent years it has been replaced by silicon type as it sometimes emit toxic fumes when it burnt out.. Silicon V-I characteristics are shown in the figure below. The junction barrier for silicon is about 0.7V and for Germanium is about 0.3V. In this project we form four diodes bridge for converting Current AC to DC

POLARIZED ELECTROLYTE CAPACITOR AND CERAMIC CAPACITOR :

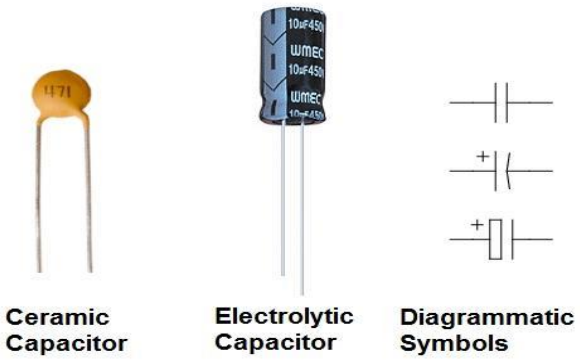


Fig. 3.5

The Electrolytic Capacitors are the capacitors which indicate by the name that some electrolyte is used in it. They are polarized capacitors which have anode + and cathode – with particular polarities.

Here for project 450 Micro Farad Capacitance value used for ceramic 22 Pico Farad is used.

9V BATTERY

The nine-volt battery, or 9-volt battery, is an electric battery that supplies a nominal voltage of 9 volts. Actual voltage measures 7.2 to 9.6 volts, depending on battery chemistry. Batteries of various sizes and capacities are manufactured;

Fig 3.6

9V Battery Nominal Voltage:…… 9 Volts

Capacity (Lithium Primary)…… 1200 mAh

Capacity (NiMH)…….175-300mAh

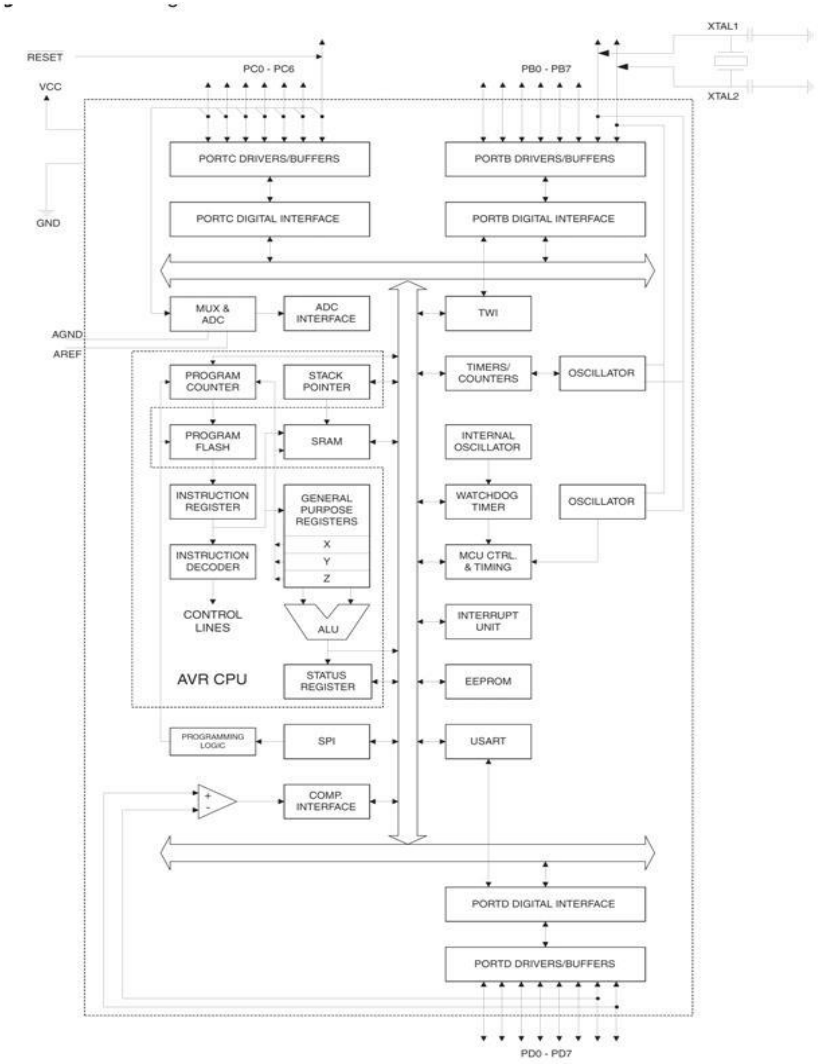
Operating Temperature…… 0°C – 60°C

Length…….. 17.5 mm

8051 ATMEGA8 MICROCONTROLLER

The Atmel AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. Resulting architecture is more code efficient while achieving throughputs up to ten times faster. The ATmega8 provides the following features: 8 Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 512 bytes of EEPROM, 1 Kbyte of SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters with compare Modes

BLOCK DIAGRAM AND PIN DIAGRAM OF AT8MEGA MICROCONTROLLER



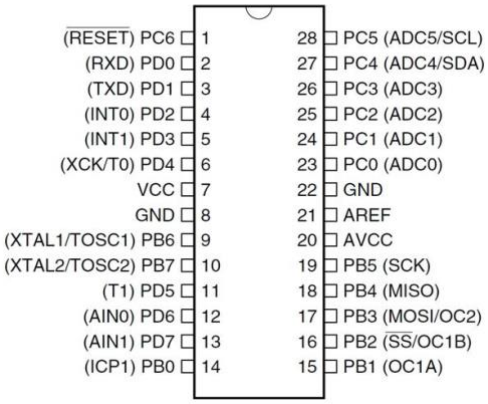


Fig 3.7

Pin Descriptions

VCC : Digital supply voltage.

GND : Ground.

Port B (PB7 ..PB0). XTAL1/XTAL2/TOSC1/TOSC2. : Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source Capability. As inputs, Port B pins that are externally pulled low will source current if the pull-up

Resistors are activated. The Port B pins are tri-stated when a reset condition becomes active,

Even if the clock is not running.

Port C (PC5..PC0). : Port C is an 7-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port C output buffers have symmetrical drive characteristics with both high sink and source Capability. As inputs, Port C pins that are externally pulled low will source current if the pull-up Resistors are activated. The Port C pins are tri-stated when a reset condition becomes active,Even if the clock is not running.

PC6/RESET : If the RSTDISBL Fuse is programmed, PC6 is used as an I/O pin. Note that the electrical characteristics of PC6 differ from those of the other pins of Port C.

Port D (PD7..PD0) : Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source Capability.

RESET : Reset input. A low level on this pin for longer than the minimum pulse length will generate Reset, even if the clock is not running.

MPU6050 ACCELEROMETER

Fig. 3.8

MPU6050 sensor module is complete 6-axis Motion Tracking Device. It combines 3-axis Gyroscope, 3-axis Accelerometer and Digital Motion Processor all in small package. Also, it has additional feature of on-chip Temperature sensor. It has I2C bus interface to communicate with the microcontrollers.

MPU6050 PINOUT DISCRIPTION

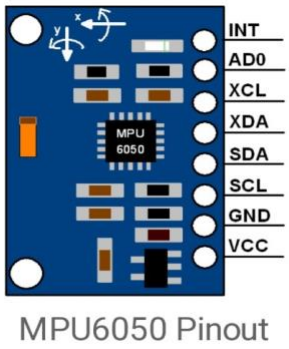


Fig 3.9

MPU6050 Pin Description

The MPU-6050 module has 8 pins,

INT: Interrupt digital output pin.

AD0: I2C Slave Address LSB pin. This is 0^{th} bit in 7-bit slave address of device. If connected to VCC then it is read as logic one and slave address changes.

XCL: Auxiliary Serial Clock pin. This pin is used to connect other I2C interface enabled sensors SCL pin to MPU-6050.

XDA: Auxiliary Serial Data pin. This pin is used to connect other I2C interface enabled sensors SDA pin to MPU-6050.

SCL: Serial Clock pin. Connect this pin to microcontrollers SCL pin.

SDA: Serial Data pin. Connect this pin to microcontrollers SDA pin.

GND: Ground pin. Connect this pin to ground connection.

VCC: Power supply pin. Connect this pin to +5V DC supply.

MPU-6050 module has Slave address (When AD0 = 0, i.e. it is not connected to Vcc) as,

Slave Write address(SLA+W): 0xD0

Slave Read address(SLA+R): 0xD1

GSM MODEM

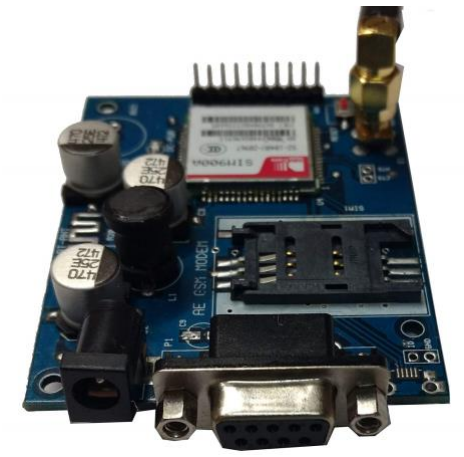


Fig. 3.10.

Fig. 3.11

A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMs to identify their device to the network

CHAPTER 4

C-PROGRAMMING

4.1 TRANSMITTER CIRCUIT PROGRAM

```
#include <LiquidCrystal.h>
#include <RF24.h>
LiquidCrystal lcd(8,7,6,5,4,3);//LCD's pin.
Unsigned long lastReceiveTime = 0;
Unsigned long currentTime = 0;
Const int Buzzer = 17;
Const int VT_LED = 18;
// Max size of this struct is 32 bytes – NRF24L01 buffer limit
Struct Data_Package
{
  Char msg;
 };
Void setup()
{
  pinMode(Buzzer,OUTPUT);
  pinMode(VT_LED,OUTPUT);
  digitalWrite(Buzzer,LOW);
  digitalWrite(VT_LED,LOW);
  Serial.begin(9600);
  Radio.begin();
  Lcd.begin(16,2);
  Lcd.setCursor(0, 0);
```

```
 Lcd.print("*  Welcome To  *");
 Lcd.setCursor(0, 1);
  Lcd.print("* Year 2022-23 *");
  Delay(1000);
  Lcd.clear();
  Lcd.setCursor(0, 0);
  Lcd.print("Initalising GSM");
  Lcd.setCursor(0, 1);
  Lcd.print("Connecting…");
  Lcd.clear();
  digitalWrite(Buzzer,HIGH);
  delay(511);
  digitalWrite(Buzzer,LOW);
}
Void loop()
{
  // Check whether there is data to be received
  If (radio.available()) {
   Radio.read(&data, sizeof(Data_Package)); // Read the whole data and store it into the 'data' structure
    digitalWrite(VT_LED,HIGH);
  }
  If ( currentTime – lastReceiveTime > 1000 ) { // If current time is more then 1 second since we have recived the last data, that means we have lost connection
   resetData(); // If connection is lost, reset the data. It prevents unwanted behavior, for example if a drone has a throttle up and we lose connection, it can keep flying unless we reset the values
```

```
   }
 Lcd.setCursor(0, 0);
  Lcd.print("Waiting For…  ");
Lcd.setCursor(0, 1);
  Lcd.print("Massage…       ");
 If(data.msg ==1)
 {
  Lcd.clear();
  Lcd.setCursor(0, 0);
  Lcd.print("Petient Need,");
  Lcd.setCursor(0, 1);
  Lcd.print("Food-Food…");
  digitalWrite(Buzzer,HIGH);
  delay(151);
  digitalWrite(Buzzer,LOW);
  delay(151);
 }
 If(data.msg ==2)
 {
  Lcd.clear();
  Lcd.setCursor(0, 0);
  Lcd.print("Petient Need,");
  Lcd.setCursor(0, 1);
  Lcd.print("Water-Water…");
  digitalWrite(Buzzer,HIGH);
```

```
 delay(151);
 digitalWrite(Buzzer,LOW);
delay(151);
}
If(data.msg ==3)
{
 Lcd.clear();
 Lcd.setCursor(0, 0);
 Lcd.print("Petient Need,");
  Lcd.setCursor(0, 1);
  Lcd.print("To Attend…");
 digitalWrite(Buzzer,HIGH);
 delay(151);
 digitalWrite(Buzzer,LOW);
 delay(151);
}
If(data.msg ==4)
{
 Lcd.clear();
 Lcd.setCursor(0, 0);
 Lcd.print("Emergence Call,");
 Lcd.setCursor(0, 1);
 Lcd.print("From Patient…");
 digitalWrite(Buzzer,HIGH);
  delay(151);
```

```
  digitalWrite(Buzzer,LOW);
  delay(151);
  SMS_Call();
 }
}//LOOP
Void resetData()
{
  // Reset the values when there is no radio connection – Set initial default values.
  Data.Right = 0;
  Data.Far   = 0;
  Data.Back  = 0;
  Data.Fall  = 0;
  digitalWrite(VT_LED,LOW);
  digitalWrite(Buzzer,LOW);
  }
  Void SMS_Call()
{
  digitalWrite(Buzzer,HIGH);
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Sending SMS…");
 //-------------------------------------------------SMS Sending Routing
    Serial.write("AT+CMGF=1\r\n");   //Set SMS format to ASCII
    Serial.write("AT+CMGS=\"08668909740\"\r\n");   //Send new SMS command and message
number
```

```
  Serial.print("Attention!! Patient Is Serious, Please Do Needfull Action…."); //Send SMS content
  Lcd.setCursor(0, 0);
  Lcd.print("Sending SMS  ");
  Lcd.setCursor(0, 1);
  Lcd.print("Is Finished  ");
  Lcd.setCursor(0, 0);
  Lcd.print("Calling To Dr..");
  Lcd.setCursor(0, 1);
  Lcd.print("          ");
   Serial.println("ATD+918668909740;");
   Delay(5100);
 Lcd.setCursor(0, 1);
  Lcd.print("Is Finished  ");
  Serial.println("ATH0");
  Delay(500);
  Lcd.clear();
  digitalWrite(Buzzer,LOW);
}
```

4.2 RECEIVER CIRCUIT PROGRAM

```
#include <RF24.h>
#include <Wire.h>
Float elapsedTime, currentTime, previousTime;
// Max size of this struct is 32 bytes – NRF24L01 buffer limit
Struct Data_Package
{
Char msg;
 };
// ---------------------------------------
#include <Adafruit_MPU6050.h>
Adafruit_MPU6050 mpu;
// ---------------------------------------
Void setup()
{
Serial.begin(9600);
// Define the radio communication
Radio.begin()
  // Set initial default values
Data.msg  = 0;
```

```
}
Void loop()
{
//---------------MPU6050----------------------
/* Get new sensor events with the readings */
  Sensors_event_t a,;
 If(a.acceleration.x >=2)
  {
Data.msg = 1;
}
 Else{data.msg= 0;}
  If(a.acceleration.x <=-2)
  {
     Data.msg= 2;
  }
  Else{data.msg= 0;}
  If(a.acceleration.y >=2)
{
 Data.msg= 3;
}
Else{data.msg= 0;}
If(a.acceleration.y <=-2)
{
 Data.msg= 4;
}
```

Else{data.msg= 0;}

// Send the whole data from the structure to the receive

Radio.write(&data, sizeof(Data_Packa

CHAPTER 05

PCB DESIGNING

TOP AND BOTTOM DESIGN OF PCB

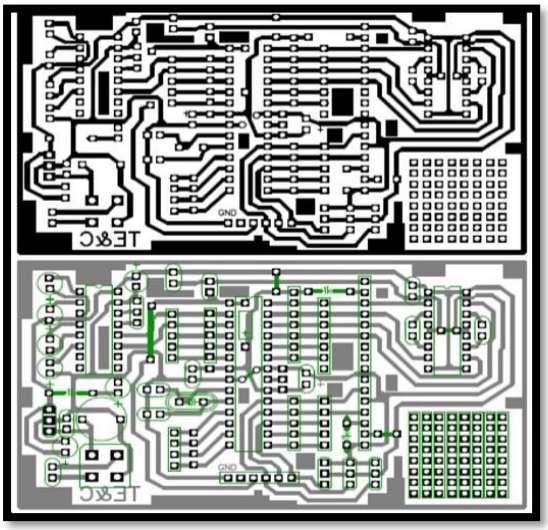


Fig 5.1

THERE ARE TWO TYPES OF PCB MAKING

- Photo printing.
- Screen printing.

SCREEN PRINTING

PCB production by photo printing method is expensive, through accurate. The screen process uses a resist ink applied through a stencil or mask to the surface of the blank circuit board. The stencil is produced and attached to a fine mesh, metal, nylon, polyester or silk screen. The resist ink is forced through openings in the stencil onto the surface of the blank board. This process produces a positive of the circuit on the copper foil. When dry the board is ready for etching.

PREPARATION OF SCREEN

A light rectangular wooden frame is used for this purpose. A piece of screen fabric material is stretched tightly over the frame. Commercial screens are often made of a fine wire mesh. Special frames are available in the market to hold this screen. The frame is hinged on one end of the base of printing board. This base of the printing board is larger in area than the frame. The following equipments are used for screen printing process.

- GLASS EPOXY PCB

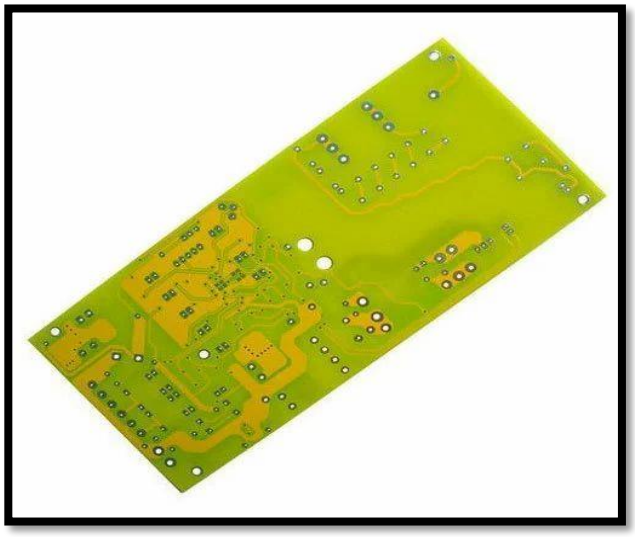


Fig 5.2

Thickness : 1mm – 1.6mm

Layer Count : 1

Material : FR4/Glass epoxy

Width And Spacing as per requirement

Min Hole Size. : 0.5mm

Epoxy and polyurethane resins are excellent insulators against aggressive environments and contribute to the mechanical protection of the PCBs. Epoxy resins and polyurethane are used for protection in thickness

CHAPTER 06

RESULT

5.1 Circuit connection

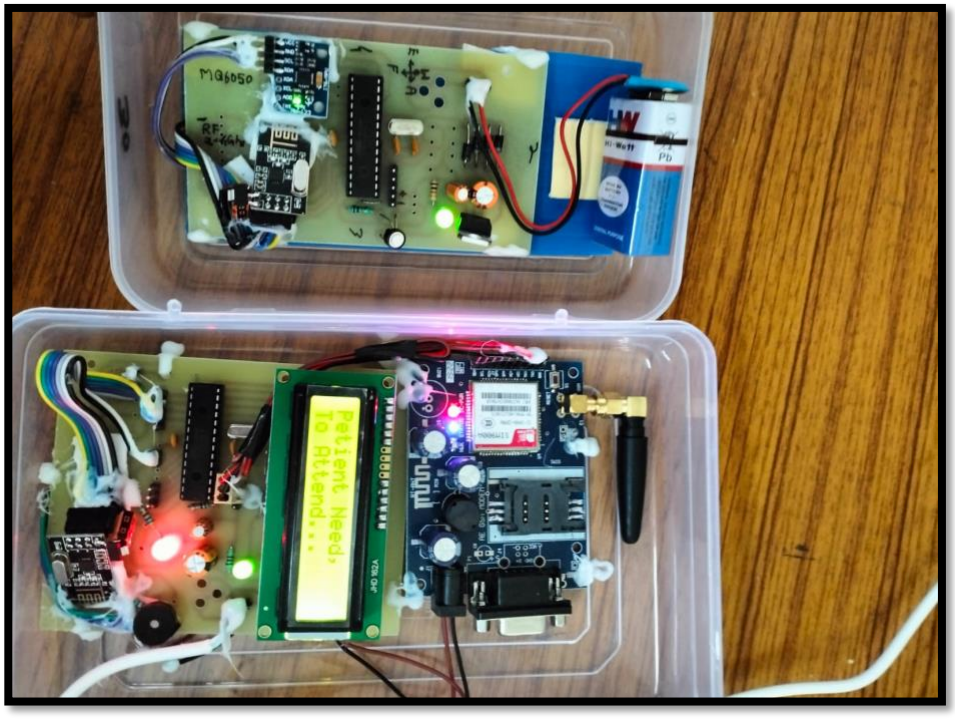


Fig 6.1

This is our final circuit connection.There lated message has now been shown on the LCDpanel bythehelpof microcontroller

- **LCD Display Need Food**

Fig 6.2

The performance will be shown depending on the patient's needs. If the Accelerometeris set to a certain angle,it will mean that they need food and sound an alarm.

- **LCD Display Need water**

The displayed outputs will assist patients in meeting their needs.They need water or their requirements if the angle changed based on their need it will alert the persons.

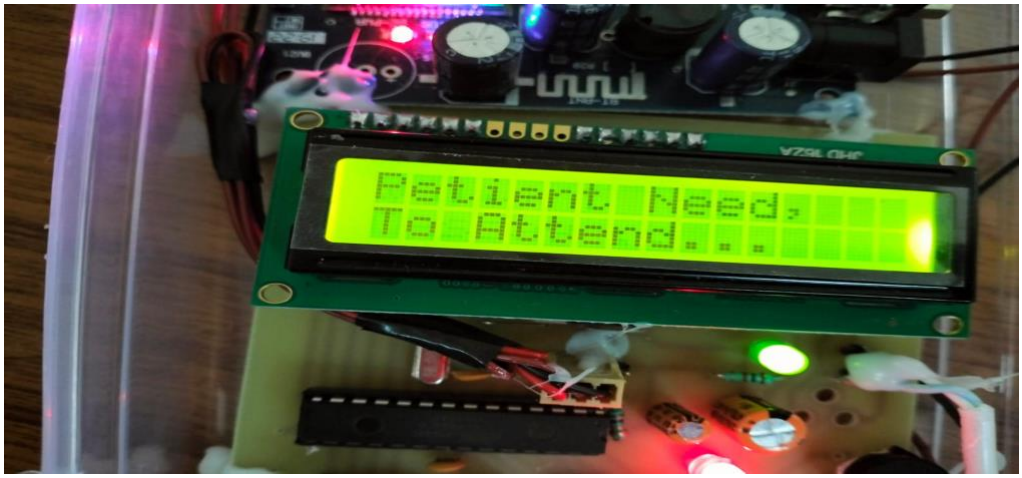


Fig 6.3

- **LCD Display Emergency**

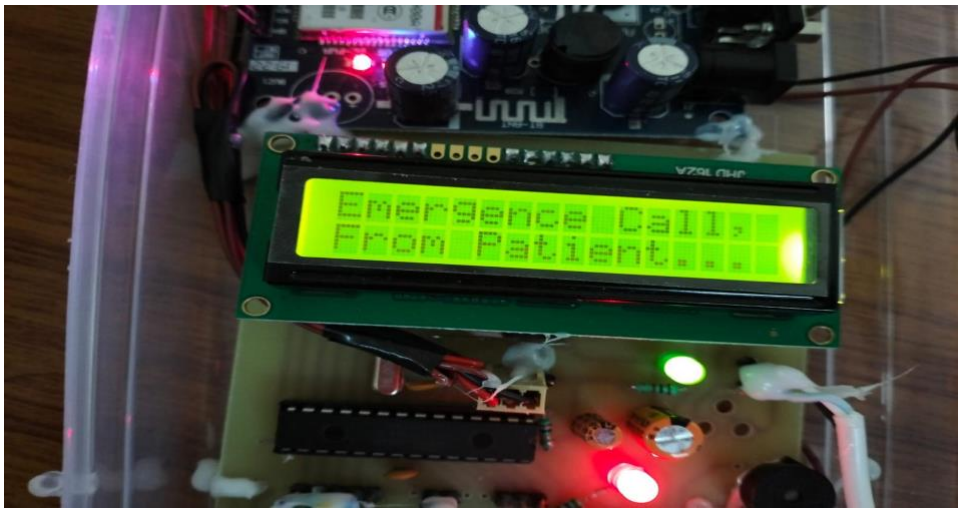


Fig 6.4

Pulse And Body Temperature will Be Registered, as well as fear, so that if the patient is in an emergency, or else if they fall down On the floor the in Formation Will Be shown automatically and Continuous warning sound will be produced through buzzer.

- **LCD Display Attend**

Pulse rate and body temperature will be registered, as well as fear,so that if the patient is in an emergency, or else if they fall down on the floor the in formation will be shown automatically and acontinuous warning sound will be produced through buzzer.

Fig 6.5

CHAPTER 07

✧ ADVANTAGE

- This project will make paralyses patients to achieve a Independent of mobility by taking caring of patient.
- Reliable & cheap & less weight.
- Motions can be used to communicate wards and sentence to audience & used to of sign for communication provide.

✧ FUTURE SCOPE

- According to the availability of sensors or development in biomedical trend more parameter can be sensed and monitored which will drastically improve the efficiency of the wireless monitoring system in biomedical field.

Our duty to develop never technologies to assist paralyzed patient also it will trend to develop WIFI, Bluetooth technology and Telemetry system.

✧ CONCLUSION

- This system is really helpful for paralyses patients. When they need help then they Can ask by using some movements they can also survive in this world like normal people by Using this movement detection. This system is reliable and cheap and less weight.
- So they can Buy without doubt. This system will make paralyses patients to achieve a independent of Mobility. This is not a trivial task just because it varies from person to person in its Nature and type.Therefore,different methods are essential to support these people, And it is our duty, as future engineers, to develop new technologies to help paralyzed Patients.

✧ REFERENCE

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