GSM Based Patient Monitoring

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Abstract **— In this project we have designed a working model which incorporates sensors to measure various patient monitoring parameters like body temperature of a patient and also monitors status of the saline. Whenever the temperature exceeds normal range of values and when the saline falls below the preset level the message send trough GSM to the concerned doctor. For more versatile medical applications, this project can be improvised, by incorporating heart beat rate, ECG, blood pressure monitoring systems, dental sensors. There by making it useful in hospitals as a very efficient and dedicated patient care system.**

Keywords**---- PIC16F877A, GSM, Sensor, LCD Display, Power Supply, RS232.**

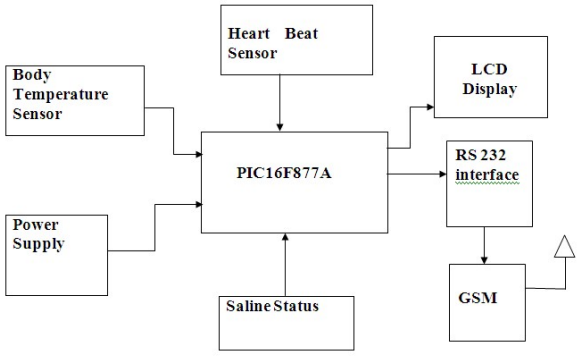
I. INTRODUCTION

Recently, the health care sensors are playing a vital role in hospitals. The patient monitoring systems is one of the major improvements because of its advanced technology. So we are here, just connecting the temperature sensor and heartbeat sensor so that simultaneously we can monitor the patient's condition. This project describes the design of a simple, microcontroller based heart rate & body temperature measuring device with LCD output. This information i.e. the Heart Rate & the Body Temperature and saline level is then transmitted wirelessly to the doctor which in not in the vicinity of the patient through GSM technique. The sensors measure the information and transmit it through GSM Modem on the same frequency as on which cell phones work.

II. DESIGN LAYOUT

The system basically consist of Heart Beat sensor, GSM , PIC16F877, LCD display, Body Temperature sensor, Power Supply.

The block diagram of GSM Based Patient Monitoring is shown in figure 1.



1. Body Temperature Measurement

The patient whose temperature needs to be taken, which alters the resistance value and, in turn, the temperature change that results, is graphically shown on the monitor. Additionally, the patient database is updated with all temperature readings. Here, we have employed LM35 in our project.

2. Monitoring System for Salinity

The infrared transmitter and detector are positioned so that the saline bottle travels between them for saline monitoring. They are positioned close to the saline bottle's neck.

3. Heart Rate Monitor

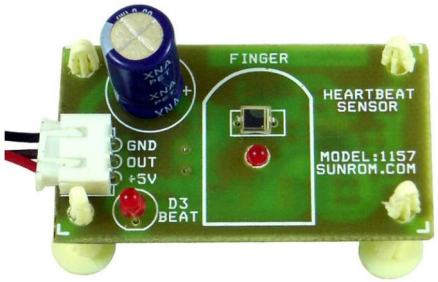
A heart beat sensor, which can detect the patient's pulse rate, is used to monitor the patient's heart rate. This approach to monitoring heart rate is more effective than the conventional one, which determines the beat rate

III. HARDWARE DESCRIPTION

LM35

The output voltage of the precision integrated-circuit temperature sensors in the LM35 series is linearly proportional to the temperature in Celsius (Centigrade). Because the user does not need to deduct a significant amount of constant voltage from the output of the LM35 in order to achieve suitable Centigrade scaling, it offers an advantage over linear temperature sensors calibrated in Kelvin. The LM35 can achieve typical accuracy levels of 14C at room temperature and 34C over the whole temperature range of 55 to +150C without the need for external calibration or trimming. Trimming and wafer-level calibration ensure low costs.

2.Heart Rate Monitor
When a finger is placed on a heart beat sensor, the sensor is intended to provide a digital output of the heartbeat. If the heart rate monitor is operational, the ECG.



1. LCD Display

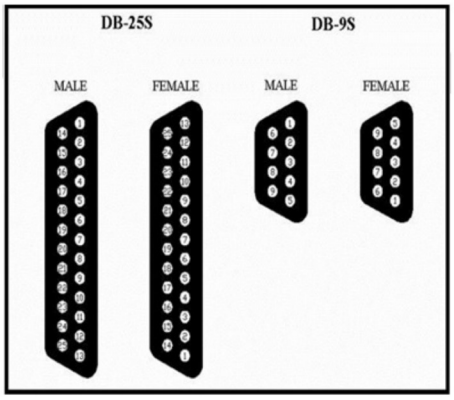
1. LCD Panel
An electrical display module with many uses is the LCD (Liquid Crystal Display) screen. A 16x2 LCD display is a relatively basic module that is frequently seen in many different kinds of circuits and devices. Compared to other multi-segment LEDs particularly those with seven segments, these modules are preferable. The benefits of LCDs are as follows: they may display unique and even personalized characters, animations, and more; they are inexpensive and simple to program. An LCD that is 16 by 2 may show up to 16 characters on each of its two lines. Every character on this LCD is shown as a 5x7 pixel matrix. There are two registers on this LCD: Command and Data. The command instructions sent to the LCD are kept in the command register. An instruction is a command. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predened task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

2. GSM 900A

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine-SIM900A, works on frequencies 900/1800MHz. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS; attend the incoming calls and internet etc. through simple AT commands.

3. RS232 Connectors

The RS-232 standard defines the voltage levels that correspond to logical one and logical zero levels for the data transmission and the control signal lines. Valid signals are plus or minus 3 to 15 volts; the 3 V range near zero volts is not a valid RS-232 level. The standard specifies a maximum open-circuit voltage of 25 volts: signal levels of 5 V, 10 V, 12 V, and 15V are all commonly seen depending on the power supplies available within a device. RS-232 drivers and receivers must be able to withstand indefinite short circuit to ground or to any voltage level up to 25 volts. The slew rate, or how fast the signal changes between levels, is also controlled.



IV. SOFTWARE USED

PCB Design Software

Express PCB is a simple electronics circuit board design tool. Drawing a schematic with the ExpressSCH program is as easy as placing the components on the page and wiring the pins together. The schematic can then be linked to your PCB file, so

that the PCB knows what needs to be connected together. Free PCB software is a snap to learn and use. For the_rst time, designing circuit boards is simple for the beginner and efficient for the professional.Designing 2 or 4 layer boards using the ExpressPCB program is very simple. Start by inserting the component footprints, then drag them into position. Next, connect the pins by drawing the traces.If you link your schematic file to the PCB, the ExpressPCB program will highlight the pins that should be wired together in blue. We recommend that you begin your project by drawing a schematic. While not required, it will save you time when designing your PCB. Drawing a schematic with the ExpressSCH program is as easy as placing the components on the page and wiring the pins together.The schematic can then be linked to your PCB file, so that the PCB knows what needs to be connected together.It is very easy to use, but it does have several limitations. It can be likened to more of a toy then a professional CAD program. It has a poor part librar It cannot import or export _les in different formats It cannot be used to make prepare boards for DIY production. ExpressPCB does not have a nice print layout.ExpressPCB is designed to enable very fast rapid development of Electronic Schematics and Printed Circuit Board Layouts.

V. CONCLUSION

The PIC 16F877A based patient monitoring system is found to perform as expected. The body temperature of a patient is detected by temperature sensor and the temperature is displayed on the LCD screen. Whenever the temperature exceed normal range of values and when the saline falls below the preset level the message is sent through GSM to the concerned doctor.

VI. FUTURE ENHANCEMENTS

For more versatile medical applications, this project can be improvised, by incorporating heart beat rate , ECG , blood pressure monitoring systems, dental sensors and annunciation systems, thereby making it useful in hospitals as a very e_cient and dedicated patient care system. The entire medical data acquisition could be made wireless and wearable.

VII. REFERENCES

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