

Wireless Health Monitoring System using Labview

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Abstract - This project deals with the wireless communication devices and systems which have a significant impact on the healthcare industry nowadays. A correct characterization is to handle, analyze the data from the specified sensors fixed in the human body sends it to the microcontroller which transmits the data over the air through zigbee module and displays it on the LCD screen. At the receiving end, data is received and sent to the pc through max232 and these parameters are displayed in the computer by using LabVIEW. Thus zigbee is used to transmit and receive the data from PIC microcontroller, which connected directly with specified Human body sensors. Both the simulation and experimental results under diverse conditions are presented to clearly describe the process of characterization of our system.

Keywords: PIC microcontroller, LabVIEW, LCD, Zigbee.

INTRODUCTION

Telemedicine is the newest technology which is the combination of telecommunication and information technology for medical purposes. It gives a new way to deliver health care services when the distance between the doctor and patient is significantly away. Rural area will get the benefit from this application. Patient monitoring is one of the major sectors in telemedicine, which always needs improvement to make it better. It is also important for respiratory therapy, recovery rooms, out-patient care, radiology, ambulatory, home and sleep screening applications. Previously, the available medical monitoring system is generally bulky and thus uncomfortable to be carried by patients. The objectives of the project are:

- To design and fabricate patient monitoring system for monitoring Body temperature, Heart Beat, Respiration and ECG from the Human body .
- To develop wireless system of monitoring system using Zigbee.
- To develop data monitoring system using integration between LabVIEW.

1. TRANSMITTER OPERATION

In the transmitting module continuously reads patients body Temperature, Heart beat and Respiration through the respective sensor and display in the LCD and sends it to the PIC microcontroller which transmits the data through the zigbee module.

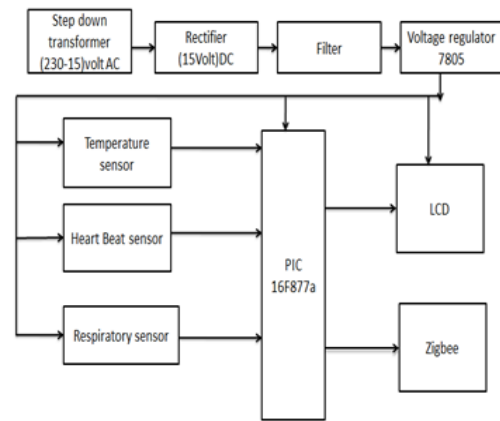


Fig 1. Block diagram of transmitter

2. RECEIVER OPERATION

In this receiving module the signal received by the zigbee module displays the data in the Hyper terminal software. It receives the signal from the Zigbee in the transmitter side and displays the data to the receiver which is kept inside the doctors chamber. And in case of emergency condition the abnormal condition will be indicated.

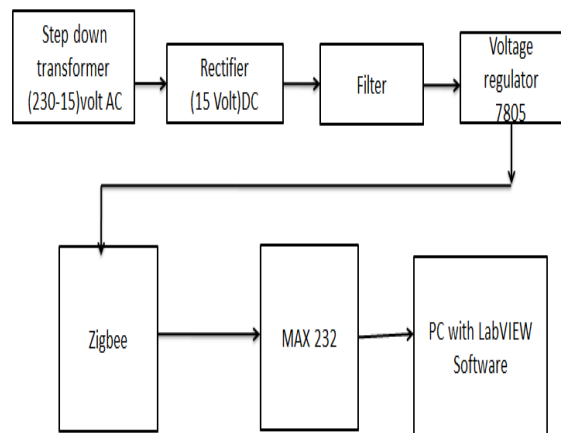


Fig 2. Block diagram of receiver

3. HARDWARE DESCRIPTION

3.1 Temperature Sensor

LM 35 is a precision IC temperature sensor with its output proportional to the temperature (in Celsius). This sensor possesses low self-heating and does not melt. The sensor circuitry is sealed and therefore it is not subjected to oxidation.

With LM35, temperature can be accurately measured more than with the thermistor. This sensor may possess three pins namely voltage input and output pins, ground.

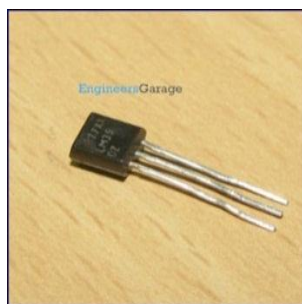


Fig 3. Temperature sensor

3.2 Zigbee Module

Zigbee is a new technology based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios and it can be used to transmit and receive signals.

It is easy to use and consumes less power and complexity. It requires short range low-rate wireless data transfer.

It is used in applications like wireless light switches, traffic management systems, electrical meters with in-home-displays.

Zigbee is less expensive and simpler than other wireless communication network systems.



Fig 4. Zigbee module

3.3 PIC16F877A Microcontroller

PIC is the Peripheral Interface Controller which is user-friendly and low power consumption. It is the oldest form of microcontroller.

It consists of 40 pins out of which 33 pins are input and output pins.

It perfectly uses to many uses for automotive industries and controlling home appliances to industrial instruments, remote sensors, electrical door locks and safety devices. It is also ideal for smart cards as well as for battery supplied devices because of its low consumption.

40-Pin PDIP

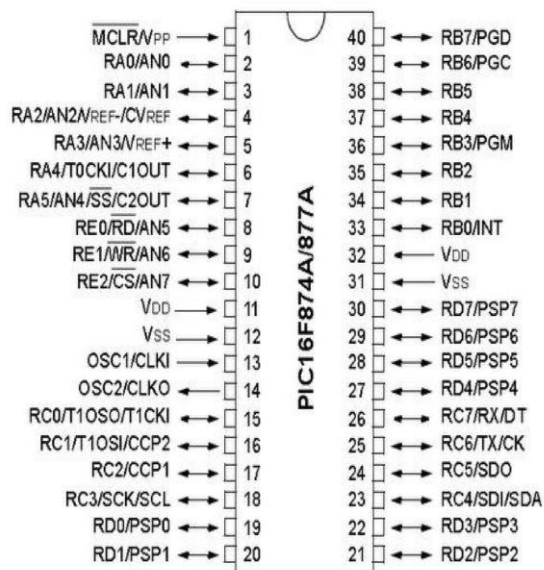


Fig 5. Pin diagram of pic microcontroller

3.4 Voltage Regulator 7805

7805 is a voltage regulator circuit. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC.

IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage.

It may consist of three terminals in which unregulated dc input voltage to one terminal, a regulated dc output voltage in another terminal with third terminal to ground.

Its advantage is Small size and less weight, less expensive, high reliable and versatile.

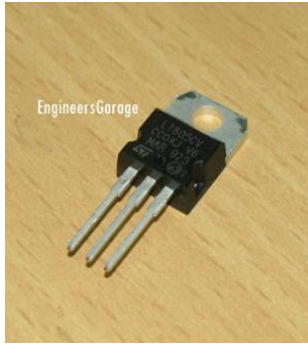


Fig 6. Voltage regulator IC

3.5 Liquid Crystal Display

- LCD displays are the most sophisticated display and is a flat panel display, electronic display that uses the light modulating properties of liquid crystals.
- This may also consists of backlight switch and works under electro optical modulation technology.

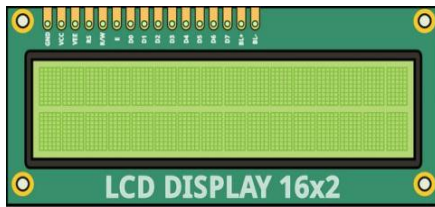


Fig7. LCD

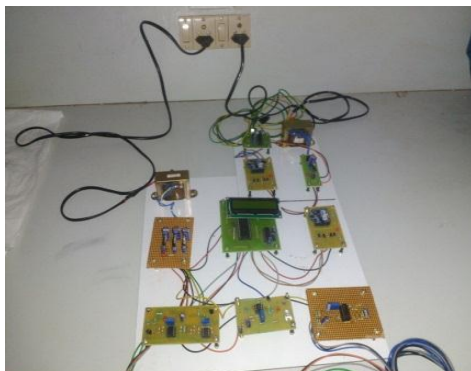
3.6 Labview SOFTWARE

Lab VIEW is the graphical programming to develop the sophisticated measurement, test and control systems

It is a virtual instrument due to their appearance and operation.

In this project, LabVIEW is used to display the ECG signal and body temperature of patients and ensure their conditions always can be monitor by healthcare professional and caregiver easily everywhere. It imitates the physical instrument. It also consists of toolkits and modules.

4. HARDWARE IMPLEMENTATION



5. SOFTWARE IMPLEMENTATION

The output voltage from the Heart Beat, Temperature and Respiration Sensor is given to PIC microcontroller and then to Zigbee module by dumping the code into PIC microcontroller. The simulation is done using MP Lab and PROTEUS .

Software Coding is done in such a way that the Temperature, Heart Beat and Respiration from one end and received at the other end and it ensures the Temperature between 0-35°C, Heart Beat between 60-80 beats/mins and Respiration 12-15 breath/mins are to be normal and if any of these parameters exceeds or lags behind the mentioned value it indicates the status of the patient as abnormal and warned.

6. CONCLUSION

Thus, we can able to transmit the data which is sensed from the remote patient to the sever by wireless transmission technology Zigbeemodule. Using Zigbee at the receiver the data is received and displayed on the hyperterminal software in the place of doctor. The doctor can view the patients detail at any time and if critical condition occurs the treatment will be provided at right time.

7. FUTURE ENHANCEMENT

There is always chance to improve any system as Research and Development is an endless process. Our system is no exception to this phenomenon. The following future enhancement can be done in the existing project in future.

- The following measurement can be done in future: Blood pressure, Oxygen saturation and Galvanic-Skin resistance, Anemia.
- Using GPS the exact location of the patient can be detected so that help can be provided in case of emergency from nearest hospital.

8. REFERENCES

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