

# Patient Health Wireless Monitoring System

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**Abstract:** We propose a Simple Wireless transmission System using common approach Sensor Platform called The wireless based Patient Sensor platform Monitoring system, in this paper presents the development of a microcontroller based system for wireless heartbeat and temperature monitoring using RF module. In India many patients are dying because of heart attacks and reason behind that they are not getting timely and proper help. The proposed platform architecture offers flexibility, easy customization for different vital parameter collecting and sending. To give them timely and proper help first we want to continuous monitoring of patient health. The fixed monitoring system can be used only when the patient is on bed and this system are huge and only available in the hospitals in ICU. Care of critically ill patients, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be applied. This paper is based on monitoring of remote patients, after he is discharged from hospital. I have designed and developed a reliable, energy efficient remote patient monitoring system. It is able to send parameters of patient in real time. It enables the doctors to monitor patient's parameters (temp, heartbeat) in real time. Here the parameters of patient are measured continuously (temp, heartbeat) and wirelessly transmitted using RF module.

**Keywords:** Sensors, RF module, microprocessor, BPM-Beat per minute, LCD – liquid crystal display, IR- infrared, ADC- analog to digital converter.

## 1. INTRODUCTION

The proposed system is developed for home & ICU (and any other place) use by patients that are in a critical condition & need to be constant or periodically monitored by clinician or family. In any critical condition parameters are send to the doctor or any family member. So that we can easily save many lives by providing them quick services.

Normally it is difficult to keep in track on abnormalities in heartbeat count for patient itself manually. The average heartbeat per minute for 25-year old ranges between 140-170 BPM while for a 60-year old it is typically between 115-140 BPM and body temperature is 37 C or 98.6 F. Patients are not well versed with manual treatment which doctors normally use for tracking the count of heartbeat. So there must be some device which would help patient to keep track on their health by themselves. There are various instruments available in market to keep track on internal body changes. But there are many limitations regarding their maintenance due their heavy cost, size of instruments, and mobility of patients.

To overcome these limitations a device use to keep track on heartbeat count of patients should be easy to use, portable, light weighted, small size etc so that it give freedom of mobility for patient. The devices which can be carried everywhere to keep track on patient's health for continuous monitoring. This device that is a heartbeat sensor would help them to keep track on heartbeat counts of a patient and check for any abnormalities (if any). If any varied change takes place it is notified. This notification would help to take an appropriate action at an instance of a time through doctors discussion. This would save patients from the future health problem which would arise in future.. This would also help patient's concern doctor to take an appropriate action at proper time with fast discussion.

The analog to digital converter carries out the process of the analog to digital conversion using IC. The microcontroller constantly monitors the output of the A/D

Converter, comparing current data samples against stored samples. Once a heart attack is detected and confirmed, relevant data such as the time of occurrence will be collected, and a signal is sent to LCD of doctor.

## 2. PROPOSED SYSTEM

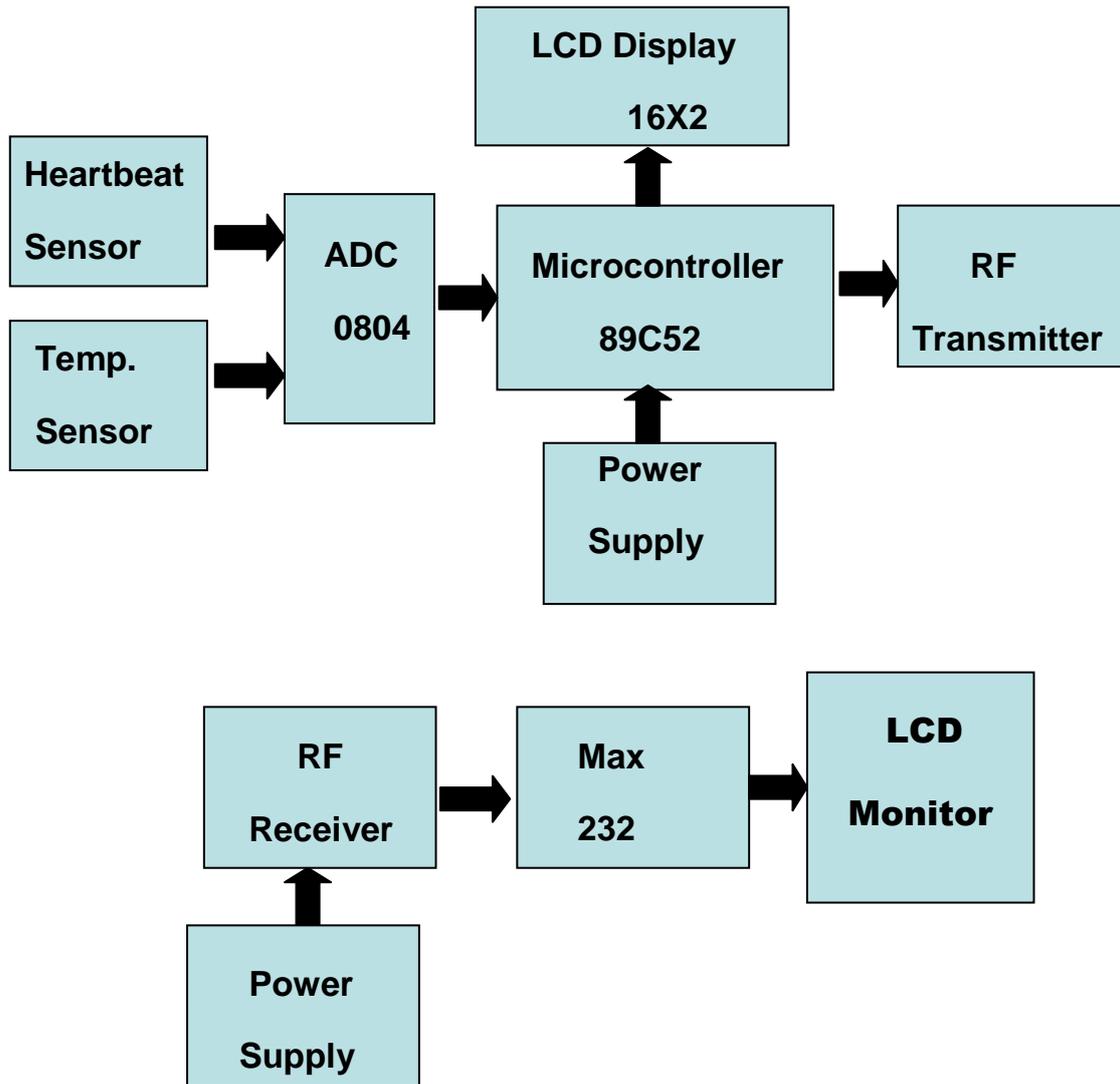
The system which we proposed to develop shown in figure, would not only help in monitoring the patient . Such a system would constantly monitor important body parameters like temperature, heartbeat and would compare it against a predetermined value set.

In-home and nursing-home pervasive networks may assist residents and their caregivers by providing continuous medical monitoring, memory enhancement, control of home appliances, medical data access, and emergency communication. Researchers in computer, networking, and medical fields are working to make the broad vision of smart healthcare possible. The area of wireless sensor networks for medical applications there are three main research directions: power consumption optimization, security method development for medical data transmission, management of the wireless sensor networks.

Wireless physiological data monitoring system uses a radio channel to send real time vital sign data from wearable biomedical sensor devices to a coordinator. Patients can wear wireless devices that sense.

### 2.1 Heart Beat Sensor

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it to measure BPM. When the heart beat detector is working, the beat LED flashes with each heart beat. This digital output can be connected to Microcontroller directly to measure the Beats per Minute rate (BPM). It works on the principle of light modulation by blood flow through finger at A heart rate monitor is a personal monitoring device which allows one to measure his or her heart rate in real time or record the heart rate.



Proposed system Block Diagram

A custom heart rate sensor was designed to read the patient's beats per minute. The designed sensor is very small and inexpensive. The technique used to measure the heart rate is based on near-infrared spectroscopy, this involves using light in the wavelength of 700–900 nm to measure blood volume.

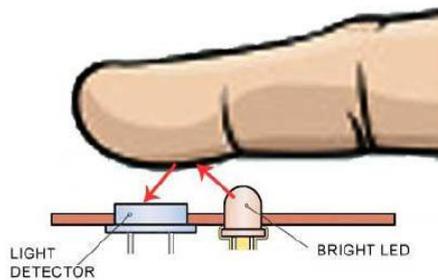


Figure.1 Heart Beat Sensor with finger

## 2.2 Temperature Sensor LM35

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require

any external calibration or trimming to provide typical accuracies of  $\pm 1/4^\circ\text{C}$  at room temperature and  $\pm 3/4^\circ\text{C}$  over a full  $-55$  to  $+150^\circ\text{C}$  temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only  $60\ \mu\text{A}$  from its supply, it has very low self-heating, less than  $0.1^\circ\text{C}$  in still air. The LM35 is rated to operate over a  $-55^\circ$  to  $+150^\circ\text{C}$  temperature range.

## 2.3 Microcontroller 89S52

AT89S52 Microcontroller development effort resulted in the 8051 architecture, which was first introduced in 1980 and has gone on to be arguably the most popular micro controller architecture available. The 8051 is a very complete micro controller with a large amount of built in control store (ROM & EPROM) and RAM, enhanced I/O ports, and the ability to access external memory. The maximum clock frequency with an 8051 micro controller can execute instructions is 20MHZ. Microcontroller is a true computer on chip. The design incorporates all of the features found in a microprocessor: CPU, ALU, PC, SP and registers. It also has the other features needed to, make

complete computer: ROM, RAM, parallel I/O, serial I/O, counters and a clock circuit. The 89C51 /89C52/ 89C54/ 89C58 contains a non-volatile FLASH program memory that is parallel programmable. For devices that are serial programmable (In-System Programmable (ISP) and In-Application Programmable (IAP) with a boot loader) All three families are Single-Chip 8-bit Microcontrollers manufactured in advanced CMOS process and are Derivatives of the 80S51 microcontroller family.

## 2.4 LCD Display

The Model JHD 162A Series LCD is the typical standard HD44780 type of LCD with 16 characters x 2 row LCD module. Since this project the Heart Rate, temperature, adds and contact no to display; therefore, a LCD module is necessary. It is called Liquid Crystal Display. There is a use of 16x2 characters LCD. This will be connected to microcontroller. The job of LCD will be to display all the system generated messages coming from the controller. LCD will provide interactive user interface.

## 2.5 RF Module

RF modem can be used for applications that need two way wireless data transmission. It features adjustable data rate and reliable transmission distance. The communication protocol is self controlled and completely transparent to user interface. The module can be embedded to your current design so that wireless communication can be set up easily.

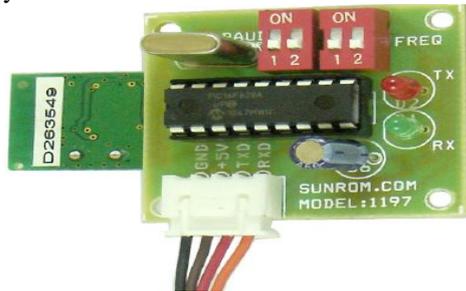


Figure.2 RF module

## 2.6 ADC

It contains analog switches sequenced by successive approximation logic. All of the package pin outs are shown and the major logic control paths are drawn in heavier weight lines. The differential analog voltage input has good common mode-rejection and permits offsetting the analog zero-input voltage value. Moreover, the input reference voltage can be adjusted to allow encoding small analog voltage span to the full 8-bits resolution. To ensure start-up under all possible conditions, an external WR pulse is required during the first power-up cycle.

## 2.7 Serial Communication Medium (RS 232)

RS-232 chip is used to interfacing of microcontroller to PC. RS-232 is low power dual driver/receiver featuring an onboard DC to DC converter eliminating the need for +/-12V power supplies. The drivers' slew rate is set internally and receiver feature internal noise filtering, eliminating the need for external slew rate and filter capacitors. The device is designed to interface data terminal equipment (DTE) with data circuit –terminating equipment (DCE). The driver inputs and receiver outputs are TTL and CMOS compatible.

## 3. CONCLUSION

The project provides low-cost solution to enhance the remote monitoring capability of existing health care system by using RF module wireless standard. It uses two sensors such as IR Pulse rate & Body temperature. The sensors are operated and vital information is transmitted to the microcontroller. The system can be installed for testing the health parameters of patient's in their home for health care monitoring and the wireless sensor network can operate up to 30 meters. Wireless technology is emerging as a significant element of next generation healthcare services. Portable and easy to use. Prevention is better than cure. "To get rich never your risk your health. For it is the truth that health is the wealth of wealth." **Richard Baker**

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## BIOGRAPHIES



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