



Design and Implementation of Health Monitoring System by Using RF Communication

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Abstract

Health plays a crucial role in our life. The main aim of this project is to implement the system which keeps on monitoring the patient and saves him in the case of emergency. Wireless communication system is designed and developed for remote patient monitoring. The primary function of this system is to monitor the temperature, heartbeat, pulse rate of a patient's body, and display the same to the doctor through RF communication.

Keywords: ARM, RF Technology, GSM, SENSORS, LCD.

I. Introduction

Health plays a crucial role in our life and check the normal conditions like temperature, heart beat and pressure rate of the patient at home or in hospitals. The system is composed of two parts, which are transmitter (at patient side) and receiver (doctors side). Transmitter side consists of Advanced RISC Machines (ARM LPC2148) with embedded operating system and at receiver side consists of 8051 Microcontroller, RF technology, GSM, LCD.

II. Proposed System

The proposed work of this project is to develop a system can be supplemented with real-time wireless monitoring systems which are designed and implemented through GSM network and able to record and transmit bio-signals of patients. The main aim of this project is to provide a medical monitoring for the patient at any time and to design a patient tracking system using GSM to provide wireless system for monitoring the parameters of patient are as- Body temperature, heartbeat, pressure rate.

III. System Architecture

It is composed of two parts

1) Transmitter side: This side is consists of three types of sensors such as temperature sensor, heartbeat sensor, pressure rate sensor. These sensors are used to measure the signals from the human body such as heart signal, heartbeat, and temperature. After measurement these analog signals are converted into digital signals and compared with the actual signals. If any discrepancy occurs between the measured and actual signals, then it is considered as emergency. The ARM LPC 2148 processor plays an important role in controlling all the devices. It has an inbuilt A/D converter. The ARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power sensitive applications, the ARM7TDM solution provides the low power consumption, small size, and high performance needed in portable, embedded applications.

Heartbeat Sensor(LM 358)

Heart beat sensor is designed to give digital output of heart beat when a finger is placed inside it. This digital output can be connected to ARM directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

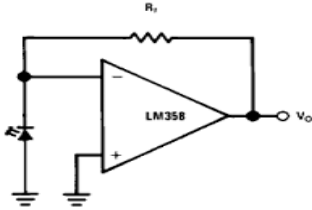


Fig. 4 Circuit Diagram of Heartbeat Sensor

Pressure Rate Sensor

This sensor is basically depends upon the principle of piezo electric effect. The generation of an electric charge in certain non-conducting materials ,such as quartz crystals and ceramics, when they are subjected to mechanical stress(such as pressure or vibration), or the generation of vibrations in such materials when they are subjected to an electric field.

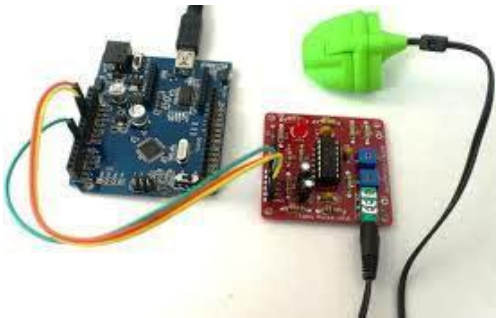


Fig 5 Pressure rate sensor

RF Module

Radio frequency (abbreviated RF) is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications. When an RF current is supplied to an antenna, it gives rise to an electromagnetic field that propagates through space. This field is sometimes called an RF field; in less technical jargon it is a "radio wave." Any RF field has a wavelength that is inversely proportional to the frequency.

GSM Hardware

The core of data communication about this system lies in wireless communication control terminals that uses GSM Modules to transfer long-distance data extensively and reliably. It Support instructions of AT commands. SIM300 can be integrated with a wide range of applications. SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM300 provides GPRS multi-slot class 10 capabilities and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in our application. Therefore, the MCU can connect with GSM modules very expediently through serial interfaces.

Software Design

This includes the coding of ARM7 processor using Embedded c using keil software version4 and flash magic version9 for dumping.

Advantages of proposed system

Provides high level safety to human life. Easy retrieval of data for the cause of incidents. low cost and less complex system for installing and application.

V. Conclusion

From the above project it can be concluded that we able to transmit the data which is sensed from patient to the doctor side by using GSM. It is completely integrated so that is possible to track anytime and anywhere. It has real-time capability. The future works include optimizing the hardware system, ARM9 and 11 used. This system has many advantages such as large capability, wide areas range, low operation costs, effective, strong expandability and easy to use. Upgrading this setup is very easy which makes it open to future a requirement which also makes it more efficient.

VI. Future Enhancement

There is always chance to improve any system as research & development is an endless process. This can be further implemented by a android application and prescription details are directly send to the patient because even one person the values will be different at different interval of time.

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