WIRELESS ECG MONITORING SYSTEM

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ABSTRACT - *Now a days in wireless communication network it is possible to transmit biomedical signal through wireless technology. As population increases diseases also increases so demand of ECG monitoring is required. To monitoring heart activity the ECG signal is used. Our system is divided into three subsystems 1.ECG Acquisition 2.Processing in ARM7 3.GSM.This is real time system. In this project we will design for monitoring of ECG data using ARM7 LPC2148 and GSM module .Here first data is acquired using ARM7 which is further sent wirelessly using GSM. The device will be economical. It will be helpful for the patient and doctor for easy Monitoring. It will be less complex as compared to other technology. Less Power is required for its operation and control of the device. This device is used in Hospital, Military, Homecare Unit, and Sports Training.*

KEY WORDS: ARM based monitoring system, wireless ECG detection, GSM Module.

1. INTRODUCTION

The Electronics technologies are entered in the day to day life. People are more conscious about their health because of very fast life so there is need for hospitals and diagnosis center .Heart disease is major problem to threaten human life. Our system is important role in prevention of heart diseases. Patient requires continuous monitoring and this requires no. of nurse keeping all these aspect we have developed "Wireless ECG monitoring system". In critical health conditions, a real time health monitoring system of patient based on GSM is designed and developed in this project. This finds vast application in the remote places where the people are out of reach from the experienced doctors. Patient Monitoring Systems play a vital role in the monitoring of patients in ICU and other in-patient wards in hospitals, providing continuous data acquisitions, analysis, amplification and display of the patient's vital functions. Currently there are number of health monitoring systems available for patients. All these systems works mainly when there is any emergency occurs. This information is transmitted wirelessly to the doctor through GSM technique. The sensors measure the information and transmit it through GSM Modem and cell phones works on the same frequency.

2. SYSTEM DESIGN ARCHITECTURE

The block diagram of this system is as shown in the figure 1.The hardware system consist of ECG acquisition, ARM7 processor and GSM module. In this system, ECG signal are acquired using 3 lead ECG electrodes .This signal are given to ARM7 processor for amplification and filtration. By using UART0 the signal is transmit and receive through GSM. The requirements of the system are

1) Hardware requirement
    - Power supply
    - ARM7
    - ECG module
    - GSM
    - UART

2) Software requirement
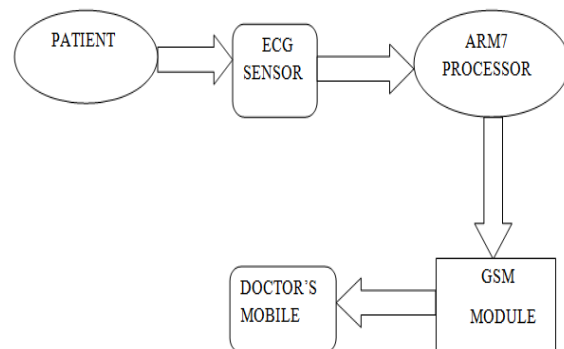   - Keil μVision4
    - Flash Magic

Block Diagram:

Figure 1. System block diagram
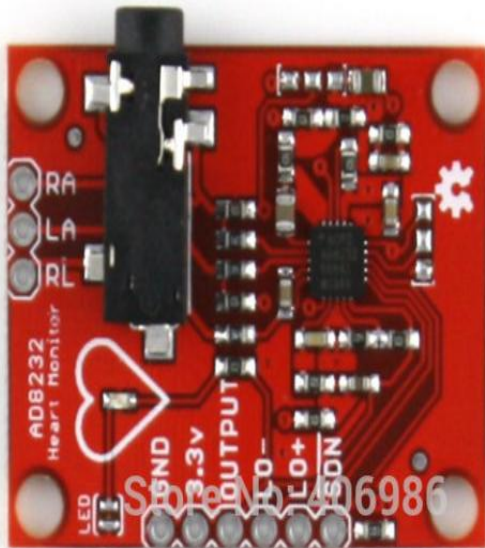
2.1 Hardware:

2.1.1 ECG module:

Figure 2. ECG module

A technique of recording bioelectric currents generated by the heart. ECG measures electrical activity of the heart .It determine patients heart condition.ECG signal detected by electrode attached to the skin. Records the heart's electrical activity i.e. Heart beat rate, Heart beat rhythm &Heart strength and timing. ECG is used for detecting and amplifying the tiny potential changes on the skin.

This is detected as tiny rises and falls in the voltage between two electrodes placed either side of the heart.

- Why ECG is used?
- ➢ To check how well medicines are working and what are the different effects on heart.
- ➢ To check the health of the heart when other diseases or conditions are present.
- ➢ If the patient has had a heart attack or evidence of a previous heart attack.
- ➢ To observe the effects of medicines used for coronary heart disease
- ➢ If there are too some minerals in the blood.
- ➢ To diagnose poor blood flow to the heart, heart attack and abnormalities of the heart.

2.1.2 ARM 7 processor:

Figure 3. ARM7

ARM 7 bus width is 32 bit and it reduces the power consumption. ECG signal are processed by the processor .The signal is applied to ADC0 for the filtrations .The output of ADC0 is a 10 bit data. The ARM is a general purpose32 bit microcontroller high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, The ARM is a general purpose 32 bit microcontroller high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) Principles.

2.1.3 GSM MODULE:

Figure 4.GSM

GSM (Global System for Mobile communication or Groupe Speciale Mobile) communications, initiated by the European Commission, is the second generation mobile cellular system aimed at developing .GSM is the world's most popular 2G technology. It was developed to solve the fragmentation problems of the first cellular system in Europe.GSM promised a wide range of network services through the use of ISDN. It also specifies digital modulation and network level architectures and services.

GSM is classified in two types

1 .Teleservices: They include standard mobile telephony and mobile-originated traffic.

2. Data Services: They include computer to computer communication and packet-switched traffic.

2.2 software Design:

The program is written under the Keil μVision4 which after successful implementation then generate hex output.
Hex output file is dumped in IC by using flash magic.

3. CONCLUSION

The designs describe system architecture of wireless ECG monitoring system. The real time monitoring system for wirelessly located by using ARM7LPC2148 as core processor. Since real time ECG is wirelessly transmitted and received.

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