

## Design and Implementation of Real Time Embedded Tele- Health Monitoring System

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### **Abstract:**

*Presently a day's human services industry is to give better health awareness to individuals at whatever time and anyplace on the planet in a more monetary and patient inviting way. In the present paper the physiological parameters, for example, ECG, Pulse rate and Temperature are acquired, transformed utilizing ARM7 LPC 2148 processor. If any crucial parameter goes out of ordinary range then caution SMS will be sent to Doctor Mobile. This framework is using ease part to transmit ECG information to doctors for observing, determination and patients care at an essentially minimal effort, paying little mind to quiet's area.*

### **1. INTRODUCTION**

The gadgets innovation has entered in all parts of normal life, and the restorative field is not special case for that. The requirement for very much prepared clinics and symptomatic focuses is expanding step by step as the individuals are getting to be more cognizant about their wellbeing issues. In biomedical fields unique units are utilized, for example, emergency unit coronary consideration unit. These units are intended to offer the benefit of the low Nurse – Patient proportion and amassing of the gear and the assets required; to deal with basically sick or genuinely harmed units. The restorative world today confronts two fundamental issues concerning patient checking, firstly the need of human services suppliers present bedside the patient and furthermore the patient is confined to informal lodging to expansive machines. Keeping in mind the end goal to accomplish better

quality patient care, the above referred to issues must be understood. As the innovations are propelling it has ended up plausible to outline to Home based basic sign observing framework to show, record and transmit signals from human body to whatever other area. Framework is relied upon to screen persistent under basic care all the more advantageously and precisely for diagnosing which can be interfaced with PC to bring it under a system framework broadly for the specialist to screen the understanding's condition sitting in his own particular office without being physical.

### **II.OVERVIEW**

Tele health monitoring is originated from home health care system which is the by-product of Oxford HealthCare came in existence since 1974[1]. However, it becomes popular in last few decades. Tele health monitoring can be divided into three main groups viz

- Acquisition and transmission- It includes acquisition of physiological data of patient, storing and processing it in an electronic device specifically memory devices and microcontroller and transmitting the signal whenever needed. It does not need synchronization between medical staff and the patient. It is mainly used for dermatological treatment.
- Distant monitoring- It includes synchronized transmission of physiological data to the health centre. It is used mainly in the cases of patient suffering from cardiovascular diseases.

- Two-way communication services- It includes telephonic conversation or video conferencing of patient with medical personnel.

### III.SYSTEM ARCHITECTURE

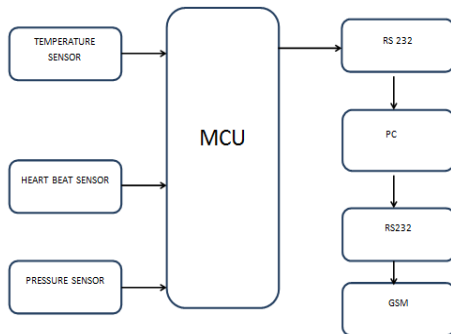


Fig1: Block diagram

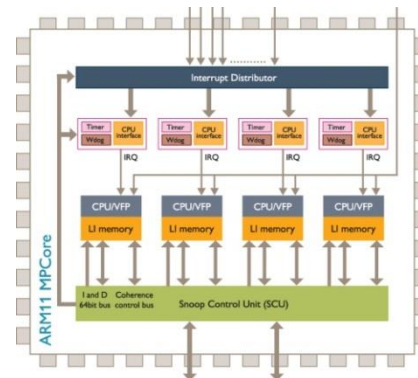
The system architecture of Tele health monitoring system is as shown in Fig.1 The Tele health monitoring system works under following steps- firstly it takes the physiological data of the patient using sensor nodes deployed on or implanted on the surface body the patient. The physiological parameter includes, body temperature, blood pressure etc. secondly, as the parameter of the body signal is weak and low frequency signals so when these physiological signals are captured as electrical signal it is corrupted by high strength low frequency noise is eliminated using filters and then it is amplified to increase its strength. Thirdly, it is modulated to transfer to a high frequency signal suitable for wireless communication. Lastly, it is demodulated and monitored remotely at the other end

### IV. HARDWARE MODULES:

#### A. ARM(LPC2148):

The LPC2148 microcontrollers are focused around a 16-bit or 32-bit ARM7TDMI-S CPU with constant imitating and implanted follow help, which consolidate microcontroller with inserted high velocity streak memory extending. A 128-bit wide memory interface and one of a kind quickening agent building design empower 32-bit code execution at the most extreme

clock rate. For discriminating code size applications, the option 16-bit Thumb mode decreases code by more than 30 percent with negligible execution punishment. Because of their little size and low power utilization, LPC2148 are perfect for applications where scaling down is a key prerequisite, for example, access control and purpose-of-offer



#### B. Temperature Sensor:

The LM35 sensor series are integrated-circuit temperature sensors, whose output voltage is linearly comparative to the Celsius temperature. The LM35 arrangement are exactness incorporated circuit Lm35 temperature sensors, whose yield voltage is directly corresponding to the Celsius temperature. The LM35 sensor consequently has leverage over straight temperature sensors adjusted in ° Kelvin, as the client is not needed to subtract an extensive steady voltage from its yield to get advantageous Centigrade scaling.

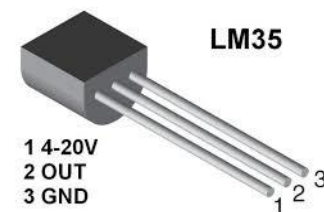


Fig 2: Temperature sensor

#### C. Blood Pressure Sensor:

The PS-2207 Blood Pressure Sensor uses an oscillometric method to calculate the systolic and diastolic blood pressure of a subject. This is the most common method for automated blood pressure measurements because the method is non-invasive and

simpler to automate than the traditional auscultatory method, which typically requires a carefully trained practitioner to give accurate results. Both the auscultatory and oscillometric methods of blood pressure measurement are accepted by the American Association of Critical Care Nurses; however, the oscillometric method may give slightly different results between different measurement systems of blood pressure sensors due to differences in the algorithms used to determine the systolic and diastolic pressures from the oscillometric envelope.

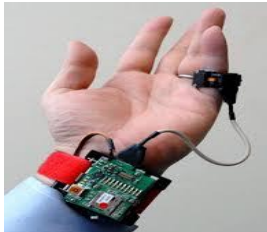


Fig 3 :Blood pressure sensor

#### D.GSM Module

Global System for Mobile communications (GSM) is the almost popular wireless standard for mobile phones in the world. GSM module allows transmission of Short message service (SMS) in TEXT mode and PDU mode. The proposed design uses SIM 300 GSM module in text mode. This design uses SIM300 GSM M module that provide 900/1800/1900MHz Tri-band for VOICE, SMS, DATA, and FAX. This module operates on AT command over TTL interface. AT command is an abbreviation for Attention command that is recognized by GSM Module. This abbreviation is always used to start a command line to be send from TE (Terminal Equipment) to TA (Terminal Adaptor).



Fig 4: GSM Module.

#### V.RESULTS



Fig 5: monitoring the heart beat

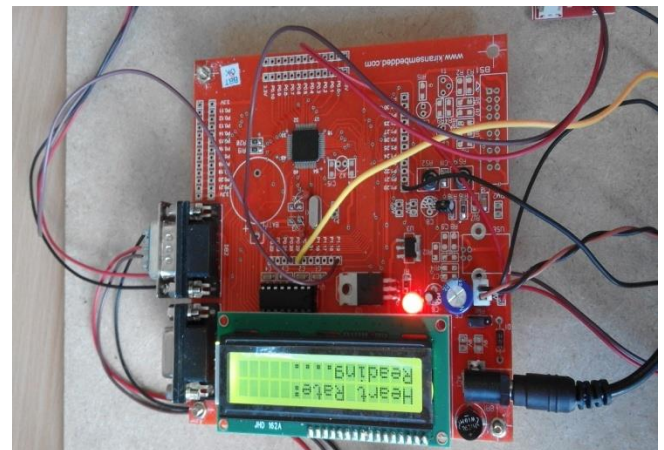


Fig 6: heart rate displayed on LCD

#### VI. CONCLUSION AND FUTURE WORK

As observed from above graphs, practically GSM wireless technology becomes inaccurate for weak physiological signal transmission over ranges beyond 10meters. It gives good estimation within 1 meter, it acquires small noise beyond 1meter but within the range one room where it is monitored, its strength decreases beyond acceptance level outside the range of a room and it gets almost completely corrupted by noise when signal is taken while patient is moving. So to overcome the drawback of short range signal transmission using GSM module is used in the next step.

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