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Microcontroller based heart rate meter

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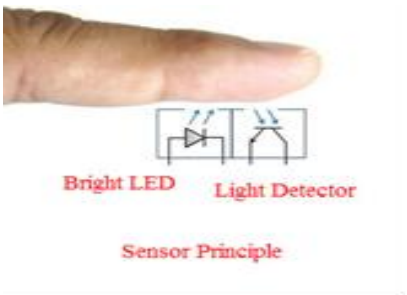
Abstract —*The process of a low cost and portable microcontroller based heart rate counting system for monitoring heart condition that can be implemented with off-the-shelf components. The raw heart rate signals were collected from finger using TX-RX (Infrared Transmitter & Receiver pair) module which was amplified in order to convert them to an observable scale. The proposed system is applicable for clinic, community, medical treatment, sports health care and other medical purposes.*

Keywords- *Microcontroller 8051 , Common Anode 7-Segment Display, Micro C PRO For 8051 , Infrared Transmitter & Receiver pair.*

I. INTRODUCTION

Heart rate is the number of heartbeats per unit, typically expressed as beats per minute. Heart rate can vary as the body's need to absorb oxygen and excrete carbon dioxide changes during exercise or sleep. The measurement of heart rate is used by medical professionals to assist in the diagnosis and tracking of medical conditions. It is also used by individuals, such as athletes, who are interested in monitoring their heart rate to acquire maximum efficiency. The wave interval is the inverse of the heart rate 0.



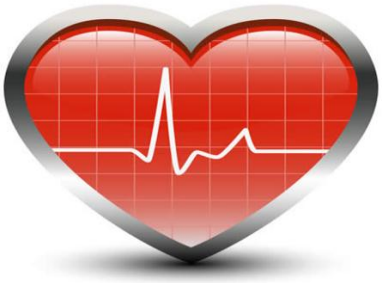


Figure1. Visual Representation of Electrocardiogram signal

Changes in lifestyle and unhealthy eating habits have resulted in a dramatic increase in incidents of heart and vascular diseases. Furthermore, heart problems are being increasingly diagnosed on younger patients. Worldwide, Coronary heart disease is now the leading cause of death 0. Thus, any improvements in the diagnosis and treatment tools are welcomed by the medical community. In a clinical environment, heart rate is measured under controlled conditions like blood measurement, heart beat measurement, and Electrocardiogram 0. However, there is a great need that patients are able to measure the heart rate in the home environment as well 0. A heart rate monitor is a simple device that takes a sample of the heartbeat signal and computes the bpm so that the information can easily be used to track heart conditions. The HRM devices employ electrical and optical methods as means of detecting and acquiring heart signals.
Heartbeat sensor provides a simple way to study the function of the heart which can be measured based on the principle of psycho-physiological signal used as a stimulus for the virtual- reality system. The amount of the blood in the finger changes with respect to time.
A small very bright LED through the ear and measures the light that gets transmitted to the Light Dependent Resistor. The amplified signal gets inverted and filtered, in the Circuit. In order to calculate the heart rate based on the blood flow to the fingertip, a heart-rate sensor is assembled with the help of LM358 OP-AMP for monitoring the heartbeat.

II. LITERATURE SURVEY

This paper describes about the design of simple heart rate monitor system based on microcontroller 8051.board which displays the output on a LCD display and simultaneously transmits the data to a smart phone via Bluetooth Photo

plethysmography (PPG) is used to measure heart rate of the human body. Plethysmograph an instrument mainly used to determine and register the variations in blood volume or blood flow in the body which occur with every beat of the heart An alert system for detecting heart beat rate with integrated GSM modem is proposed. The heart beat rate is detected using a band consisting of LDR and LED and finger is placed inside the band.
GSM module is used to communicate this data to the doctor or the patient's relatives via SMS.

III. IMPLEMENTATION

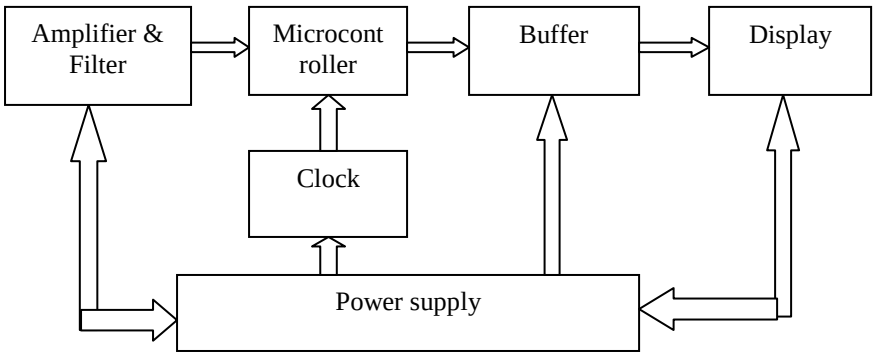


Figure 2. Block diagram of proposed system

1. Microcontroller:-
The AT89C2051 is a low voltage, high performance CMOS 8-bit microcomputer with 2k bytes of flash programmable & erasable read-only memory (PEROM).

2. IC LM358 (Operational Amplifier):-
This devices consist of to independent, high-gain, frequency-compensated operational amplifier design to operate from a single supply or split supply over a wide range of voltage The large voltage gain is 100dB.

3.LTS 542 (Common Anode 7-segment Display):-
In Common anode 7-segment of the anode pins are tied together ,meaning they are common.

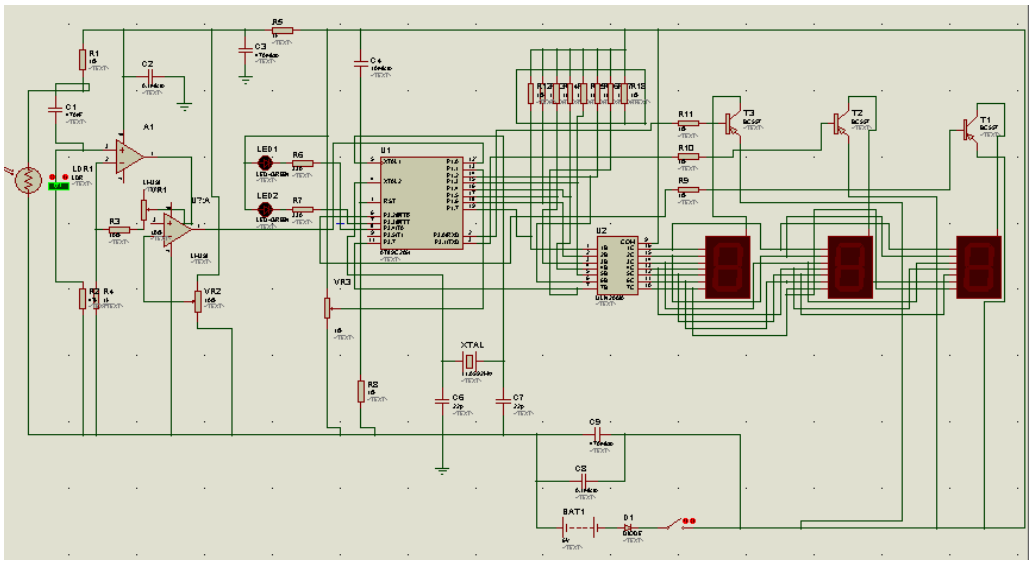


Figure 3. Circuit diagram of heart rate meter

IV. ADVANTAGES & DISADVANTAGES

Portable
Low power consumption
Easy to use
Less precise
Requires a light source

V. APPLICATION

Heart rate monitoring in the fitness center. For Athletes In rural areas where medical facilities are limited.

VI. CONCLUSION & FUTURE SCOPE

Patient physical state is based on wireless transceiver module technology. It can be taken by patient and keep the Patient moment intact because it is miniature and portable .The system can monitor and record the physical states and moment parameters real time, and the provide auxiliary means for the correct diagnosis of doctor. With intelligent transceiver module , the sign of acute disease for patient can be found early, and then the patient can be helped in time, the sudden death of patient can be avoided. The wireless transceiver module technology can be suited for short distance communication, and the transmission distance is limited only about 10 meters, and then It can be suitable for in- patient monitoring. The system is important to be applied to patient care**.**Storing a heart rate in memory. Connecting with e-mail send to alert message. Including other bio-medical signals like breathing rate along with heart rate.

VII. RESULT

The Health care industry is responding to the increasing popularity and availability of technological innovations, such as tablets and Smartphone. Utilizing Smartphone and employing it in the field of health care and medicine is helpful as it simplifies the operation of medical devices to enable lightly trained individuals whether patients or medical practitioners to reliably collect medical data for diagnosis and prognosis.

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