Sudan University of Science &Technology

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Design of Electronic Thermo-stethoscope

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Abstract

The stethoscope is an acoustic medical device for listening to internal sounds in human body. One problem with acoustic stethoscopes is that the sound level is extremely low.

The thermometer is medical device used to measuring body temperature, one problem is that the traditional thermometer has re-usability constraint, less convenient measurement and has mercury environmental hazards.

This project is an attempt to build an electronic thermo-stethoscope that is used to measure the heart beat and body temperature, heart signals are amplified and filtered in desired frequency band then fed to microcontroller with the body temperature to process them and displayed on LCD. The circuit is designed tested and improved.

المستخلص

سماعة الطبيب هي جهاز طبي للاستماع إلي الأصوات الداخلية في جسم الإنسان ، المشكله التي تواجه السماعات الصوتيه هي انخفاض مستوى الصوت .

مقياس الحرارة هو جهاز طبي يستخدم لقياس درجة حرارة الجسم، المشكلة التي تواجه مقياس الحراره التقليدي هي أن له قيود اعاده استخدام ،وهو قياس غير مريح وله مخاطر بيئيه .

هذا المشروع هو محاولة لبناء سماعة طبيب الكترونية حراريه تستخدم لقياس نبض القلب ودرجة حرارة الجسم، وتتضخم إشارات القلب وتتم تصفيتها في نطاق التردد المطلوب ثم توصل للمتحكم مع اشاره درجة حرارة الجسم لمعالجه الاشارتين وعرضهما في صوره رقميه على الشاشه.

تم تصميم الدائره،اختبارها وتحسينها .

Abbreviations

LCD (Liquid crystal display (

K-ohm (Kilo ohm (

S/N ratio (Signal to noise ratio (

dB (decibel (

R (resistance (

C (capacitor (

F (frequency (

M-ohm (mega ohm (

nF (nano farad (

Hz (hertz (

µF (micro farad (

C (centigrade (

mV (milli volt (

GND (ground (

DC (direct current (

M-Hz (mega hertz (

I/O (input / output (

ADC (analog to digital converter(

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CHAPTER ONE

1. Introduction

1.1 general over view:

The stethoscope is an important diagnostic tool for the analysis of heart sounds which are normally produced by various mechanical activities of the heart during the heart cycle. [1]

Temperature plays important role in the analysis of patient or subject's health condition. The doctors always need to measure the patient's temperature during any medical checkup. So it is necessary to send the information about the patient body temperature to the doctor for proper diagnosis of the patients .

Thermometers are used in medicine to take the core body temperature of patients.

1.2 Statement of the problem:

Using of acoustical stethoscope is not efficient; because of the limitations of the human's ear sensitively especially that heart sounds have low frequency and low intensity and the sounds of surrounding environment like noise that cause the doctors difficulties in getting the accurate result. Acoustical stethoscope makes the evaluation of cases differs between physicians. Traditional thermometers have re-usability constraint, less convenient measurement and have mercury environmental hazards.

1.3 Objectives:

The main objective of our project is to observe and take the values of the heart rate and body temperature to process it by microcontroller to provide a numerical display for a heart rate and body temperature in LCD in minimal time and maximum accuracy.

1.4 Methodology:

An electric condenser microphone senses the heart sounds and converting them into electrical signals, the signals is amplified, filtered in desired frequency band and converted into digital form.

LM35 temperature sensor sense the body temperature and converting them into electrical signals.

Heart sounds and body temperature signals are then connected to the microcontroller at mega16 to process it and then display the heart rate and body temperature in 16*2 LCD.

1.5 Layout of thesis:

- Chapter one consists of brief introduction and general overview.
- Chapter two consists of theoretical foundation and literature review.
- Chapter three consists of methodology.
- Chapter four consists of results and discussion.
- Chapter five consists of conclusion and recommendations.