بسم الله الرحمن الرحيم

SUDAN UNIVERISTY OF SCIENCE & TECHNOLOGY

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BIOMEDICAL ENGINEERING DEPARTMENT

DIGITAL T-SHIRT

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Abstract

changing in heart rate and body temperature are primary indicators of abnormality functions and health conditions for human.

This project introduced design and implement integrated circuit to measure and monitor heart rate and body temperature continuously using microcontroller which programmed by bascom language , then wireless technique called ASK communicate data between sender MCU and receiver MCU, and LCD used to display human conditions.

The project was applied to measure some conditions and gave satisfied results.

المستخلص

إن التغير في ضربات القلب ودرجة حرارة الجسم هي مؤشرات أوليه للاختلال في الوظائف الطبيعية والأوضاع الصحية.

قدم هذا المشروع تصميم وتنفيذ الدوائر المتكاملة لقياس ورصد معدل ضربات القلب ودرجه حرارة جسم الإنسان بشكل مستمر وذلك باستخدام مايكروكنترولر الذي تمت برمجته باللغة باسكوم ،تم استخدام تقنيه للإرسال اللاسلكي لإرسال البيانات بين المتحكمات وشاشة العرض وذلك لعرض الحالة الصحية.
وقد تم تطبيق المشروع لقياس بعض الحالات وأعطى نتائج مرضيه.

List of figures

Figure	Title	Page
4.1	Block diagram of integrated circuit	10
4.2	An integrated Circuit	12
4.3	flow chart shows the software algorithm of temperature sensing	13
4.4	Block Diagram Of Heart Rate Circuit	14
4.5	flow chart show the software algorithm for measuring controlling a aand ɔlaying heart rate	16
5.1	Curve for thermometer vs. LM35 measurement	18
5.2	Curve for conventional vs. optical sensor measurement	20

List of tables

Table	Title	Page
4.1	show LCD connected with microcontroller	17
5.1	Body Temperature Monitored in Degrees Celsius	18
5.2	Heart Rate Monitored in beats per minute	19

List of abbreviations

Abbreviations	Terms
ASK	Amplitude Shift Keying
LCD	Liquid Crystal Display
MCU	Central Unit
BPM	Beat Per Minute
IR	Infrared
IRRx	Infrared Receiver
IRTx	Infrared Transmitter
CPU	Central Processor Unit
ALU	Arithmetic And Logic Unit
RAM	Random Access Memory
ROM	Read Only Memory
CISC	Complex Instruction Set Computing
NTC	Negative Temperature Coefficient
ECG	Electrocardiogram
GND	Ground
ADC	Analog To Digital Converter
OPAMP	Operational Amplifier

Table of Contents

الآية	I
Dedication	II
Acknowledgment	III
Abstract	IV
المستخلص	V
List of figures	VI
List of tables	VII
List of abbreviations	VIII
Contents	IX
CHAPTER ONE **INTRODUCTION**	
1.1 Introduction	1
1.2 problem statement	1
1.3 Objectives	1
1.3.1 General Objective	1
1.3.2 Specific Objectives	2
1.4 Methodology	2
1.5 Thesis layout	2
CHAPTER TWO **THEORETICAL BACKGROUND**	

2.1 Body Temperature	3
2.1.1 Temperature sensor	3
2.2 Heart rate	4
2.3 Microcontroller	5
2.3.1 Comparing Microprocessors and Microcontrollers	6
2.3.2 Atmel AVR	6
2.3.2.1 Advantage of Atmel AVR	6
2.3.2.2 disadvantage of Atmel AVR	7
2.3.3 Group of Atmel AVR	7
CHAPTER THREE **LITERATURE REVIEW**	
CHAPTER FOUR **METHODOLOGY**	
4.1 Design	10
4.2 Implementation	12
4.2.1 Temperature circuit	12
4.2.2 Heart Rate Circuit	14
4.2.3 Microcontroller	17
4.2.4 ASK module	17
4.2.5 LCD	17
CHAPTER FIVE **RESULTS DISCUSSIONS**	
CHAPTER SIX **CONCLUSION AND RECOMMENDATIONS**	
6.1 Conclusion	21

6.2 Recommendations	22
REFERENCES	23
APPENDIX	24

1.1 Introduction

During the last years an increasing demand for smart non-invasive devices capable to detect vital signs while the subject is free to continue with his/her everyday activities (at work, at home or in a clinical environment).

Vital signs are measurements of the body's most basic functions. The four main vital signs routinely monitored by medical professionals and health care providers include the following: Body temperature, Pulse rate, Respiration rate (rate of breathing) and Blood pressure. Vital signs are useful in detecting or monitoring medical problems and measured in a medical setting, at home, at the site of a medical emergency, or elsewhere.

Continuous monitoring aids in detecting changes in health condition in post-operative hospitalized patients. A post-operational patient monitoring system for detecting deterioration in post-operative hospitalized patients [1].

1.2 Problem Statement

Since changing in heart rate and body temperature are primary indicators of abnormality functions and health conditions for human .Moreover ,infants can die in their “sleep” because of sudden rises in the vital signs.

Therefore, it is important to provide a simple, portable device which measures and as indicators of health status.

1.3 Objectives

1.3.1 General Objectives

To design a digital t-shirt that monitors body temperature and heart rate.

1.3.2 Specific Objectives

The specific objectives for this project are to:

1) Establish a home-based measurement system for continuously monitor biological signals, namely, body temperature and heart rate.
2) Capture real-time physiological data, leading to better and early diagnosis.
3) Transmit and receive data by wireless communication.

1.4 Methodology

The thesis methodology is based on the patients monitor, a suitable sensors was used to measure heart rate and body temperature, the signal detected by sensors and transmit to microcontroller to be processed and analyzed, then wireless technique called ASK communicate data between sender MCU and receiver MCU, and LCD used to display human conditions.

1.5 Thesis layout

This project includes six chapters. **Chapter one** contain the general idea of the project .**Chapter two** contains the theoretical background**.** Literature was reviewed in **chapter three**. The project methodology explained in **chapter four**. **Chapter five** includes the result analysis and discussion .**Chapter six** deals with the conclusion and recommendation of the project.