THE DEVELOPMENT OF HEART RATE MONITOR USING FINGER DETECTOR

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In the name of ALLAH

Most Gracious Most Merciful

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ABSTRACT

This paper presents the development of heart rate monitoring using finger detector. The portable hardware consists of circuit design for heart rate is developed as a medical tool to measure the cardiovascular pulse wave that is found throughout the human body. An ordinary infrared LED / photodetector can sense this rhythmic change as small as but detectable variation in skin contrast. When gently held against the skin (too much pressure will flatten the surface capillaries and suppress the pulsation effect), some of the radiation from LED, reflects back into photodetector. Photodetector produces an analogue pulse for every 1% change in skin reflectance. This logarithmic relationship is constant over many orders of magnitude of photodetector. Consequently, reliable circuit operation is possible despite wide variations n skin contrast and light level. Oscilloscope is used to monitor the heart rate signal.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Measuring heart and pulse rates in living subjects has become a valuable tool in physical exercise and health monitoring. A pulse rate is measured by counting the rate of pulsation of a subject's artery. Individuals who want to increase their endurance or performance may wish to exercise while maintaining target heart rates. Conversely, subjects with a history of heart disease or other heart related condition should avoid exceeding a certain heart or pulse rate to reduce unnecessary strain on their heart. The heart rate and pulse rate of a subject are related. Heart rate may be defined as the number of heart contractions over a specific time period, usually defined in beats per minute (BPM). A pulse is defined as the rhythmical dilation of a vessel produced by the increased volume of blood forced through the vessel by the contraction of the heart. Since heart contractions normally produce a volume of blood that can be measured as a pulse, heart rate and pulse rate are ideally the same. However, a pulse rate may differ from the heart rate during irregular heart beats or premature heart beats. In this case, a heart contraction may not force enough blood through a blood vessel to be measured as a pulse.

Usually heart rate calculated as the number of contractions (heart beats) of the heart in one minute and expressed as "beats per minute" (bpm).Normally the heart beats between 60-100 times per minute. When resting, the adult human heart beats at about 70 bpm (males) and 75 bpm (females), but this rate varies between people. However, the reference range is nominally between 60 bpm (if less termed bradycardia) and 100 bpm (if greater, termed tachycardia). Resting heart rates can be significantly lower in athletes. The infant/neonatal rate of heartbeat is around 130-150 bpm, the toddler's