ABSTRACT

"Measurement of heart rate is rapid heart rate measurement process per unit time and is usually made in units of beats per minute or beats per minute (bpm). For adults, a normal heart rate in the normal state between 60-100 per minute. We can measure heart rate in the wrist and neck, by putting our finger (eg, the wrist) and calculate the time intervals (eg, 15-20 seconds), multiply the results obtained in four, so he found the number of how our heart rate in bpm[4]." Photoplestymograph (PPG) is an instrument that can be used to determine or detect any changes in the volume of an organ in a certain time interval. Through every wave peak PPG output signal of the heartbeat which means we are able to observe the performance of the heart.

In this thesis, i will design an ATMega8 microcontroller-based system using optical sensors to measure changes in blood volume at the tip of each ear to the heartbeat. Optical sensor used is infrared light-emitting-diode (IR LED) and a phototransistor, coupled to each other face - the face. IR diode sensors transmit infrared light to the ear where the sensor is clamped on the ears, and the phototransistor receive a portion of the light that is reflected back. Terpantulkan light intensity depending on the amount of blood volume at the end of the earlobe. So, every little of heart beats change much whether or not the reflection of infrared rays that can be detected by a phototransistor. With appropriate signal conditioning, small changes in amplitodo of reflected light can be converted into a signal. This data is then processed by a microcontroller to measure heart rate.

The result of this final project is a system that able to measure heart rate with accuracy about 90% with less computation time for six seconds and portability.

Keywords : ***Heart rate counters, photoplethysmography, Microcontroller ATMega8***