

RINGKASAN

Telah dilakukan penelitian tentang rancang bangun alat monitoring denyut nadi berbasis mikrokontroler IC ATmega 328P dan *Logger Data* yang terdiri dari proses perancangan, perakitan dan pengujian alat monitoring denyut nadi. Tujuannya yaitu untuk menghasilkan alat deteksi denyut nadi yang bisa mengukur secara real time dan mampu melakukan *logger* serta memiliki karakteristik pengukuran. Alat monitoring denyut nadi terdiri dari 5 komponen utama yaitu mikrokontroler IC 328P, *Pulse Sensor*, modul MICRO SD, LCD OLED, dan modul RTC (*Realtime Clock*). Dalam penelitian ini alat deteksi detak nadi dikontrol melalui IC ATmega328P.IC. Mikro ini berfungsi sebagai pengontrol kinerja sensor dan *equipment* lain untuk menunjang proses deteksi detak jantung. Prinsip kerja dari alat ini yaitu *pulse sensor* akan pendeteksian melalui perubahan *volume* darah pada jaringan kulit. Kemudian sensor memonitor nilai perubahan *volume* melalui refleksi cahaya yang melewati jaringan kulit. Perbedaan nilai intensitas cahaya yang disebabkan oleh fluktuasi darah pada jaringan kulit memberikan informasi mengenai sistem kardiovaskular, khususnya denyut nadi. Hasil pembacaan sensor akan diproses oleh IC ATmega 328P. Data yang telah di proses akan di tampilkan melalui LCD OLED dan di simpan pada MicroSD bersamaan dengan data tanggal dan waktu yang di dapat melalui modul RTC. Serangkaian pengujian dilakukan untuk melihat kinerja dari komponen dan program yang telah di integrasikan. Hasil pengujian pada uji banding menunjukkan *error* sebesar 1.10% dengan selisih nilai standar deviasi 1.63 antara alat standar dan alat rancangan. Pada uji sensitivitas, alat yang di rancang telah mampu melakukan pengukuran pada kedua pergelangan tangan. Dan pada uji aktivitas di dapatkan hasil linearitas yang baik dengan nilai regresi 0.992. Ketiga pengujian yang telah di lakukan menunjukkan bahwa alat monitoring denyut nadi yang dirancang memiliki performa mendekati alat standar.

SUMMARY

Research has been carried out on the design of a pulse monitoring device based on an ATmega 328P IC microcontroller and a Data Logger which consists of the process of designing, assembling and testing a pulse monitoring device. The goal is to produce a pulse detection device that can measure in real time and is capable of logging and has measurement characteristics. The pulse monitoring tool consists of 5 main components, namely the IC 328P microcontroller, Pulse Sensor, MICRO SD module, LCD OLED, and RTC (Realtime Clock) module. In this study, the pulse detection device was controlled through the ATmega328P.IC IC. This micro functions as a controller for the performance of sensors and other equipment to support the heart rate detection process. The working principle of this tool is that the pulse sensor detects changes in blood volume in the skin tissue. Then the sensor monitors the value of the volume change through the reflection of light that passes through the skin tissue. The difference in the value of light intensity caused by fluctuations in blood in the skin tissue provides information about the cardiovascular system, especially pulse rate. Sensor readings will be processed by IC ATmega 328P. The processed data will be displayed via the OLED LCD and stored on the MicroSD along with the date and time data obtained through the RTC module. A series of tests are carried out to see the performance of the components and programs that have been integrated. The test results on the comparative test show an error of 1.10% with a difference of 1.63 standard deviation value between the standard tool and the design tool. In the sensitivity test, the designed tool has been able to take measurements on both wrists. And on the activity test, the results of good linearity were obtained with a regression value of 0.992. The three tests that have been carried out show that the designed pulse monitoring tool has a performance close to the standard tool.