

## ABSTRAK

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RANCANG BANGUN CARDIAC MONITOR TAMPIL LCD TFT BERBASIS MIKROKONTROLER ARDUINO (PARAMETER ECG)

xviii + 62 Halaman + 16 Tabel + 4 Lampiran

Penelitian ini bertujuan untuk merancang dan mengimplementasikan alat pemantau jantung (*Cardiac Monitor*) berbasis mikrokontroler arduino yang mampu menampilkan tiga parameter, yaitu sinyal ECG *Lead II*, PCG, dan *Carotid Pulse* pada layar LCD TFT. Sistem ini dikembangkan untuk memberikan kemudahan dalam memonitoring aktivitas jantung secara *real-time*. Metode penelitian meliputi perancangan rangkaian elektronik Elektrokardiogram, pengolahan sinyal menggunakan *filter* analog dan *Amplifier*, serta pemrograman mikrokontroler untuk menampilkan sinyal ECG *Lead II* pada LCD. Hasil pengambilan data 1 dengan ECG *Simulator* sebagai pembanding sebanyak 5 kali pada pengaturan BPM 30 didapatkan nilai *Error* sebesar 0,24%. Hasil pengambilan data 2 dengan ECG *Simulator* pada pengaturan BPM 60 diperoleh nilai *Error* sebesar 0,24%. Hasil pengambilan data 3 dengan ECG *Simulator* pada pengaturan BPM 80 diperoleh nilai kesalahan sebesar 0,2%. Hasil pengambilan data 4 dengan ECG *Simulator* pada pengaturan BPM 100 diperoleh nilai kesalahan sebesar 0%. Hasil pengambilan data 5 dengan ECG *Simulator* pada pengaturan BPM 100 diperoleh nilai *Error* sebesar 0,48%. Berdasarkan penelitian yang telah dilakukan, didapatkan beberapa poin penting dari hasil penelitian yaitu membuat rangkaian ECG dengan sadapan *Lead II* pada pasien dengan elektroda ECG terpasang pada pasien dengan posisi sadapan *Lead II* yang terhubung dengan rangkaian penguat Instrumen, HPF, LPF, *notch filter*, *non-inverting*, dan *adder*. Membuat rangkaian ECG dengan mikrokontroler Arduino Mega 2560 dengan pemrograman untuk menampilkan sinyal dan nilai BPM ECG *Lead II* pada LCD. Melakukan pengujian dengan *Simulator* ECG dan 6 orang responden yang menghasilkan sinyal yang sesuai dengan alat pembanding.

Kata Kunci: *Cardiac Monitor*, Elektrokardiogram, LCD TFT, Mikrokontroler Arduino

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## ABSTRACT

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*DESIGN OF A CARDIAC MONITOR WITH TFT LCD DISPLAY BASED ON ARDUINO MICROCONTROLLER (ECG PARAMETER)*

*xviii + 62 Pages + 16 Table + 4 Appendices*

*This research aimed to design and implement a cardiac monitoring device (Cardiac Monitor) based on Arduino microcontroller that is able to display three parameters, namely electrocardiogram signals, phonocardiograms, and carotid pulses on a TFT LCD screen. This system was developed to provide convenience in monitoring heart activity in real-time. The research method includes designing an Electrocardiogram electronic circuit, signal processing using analog filters and Amplifiers, and programming the microcontroller to display the ECG Lead II signal on the LCD. From the data collection results, the following findings were obtained: In the first trial using the ECG Simulator set at 30 BPM and measured five times, the system produced an error rate of 0.24%. In the second trial, with the ECG Simulator set to 60 BPM, the error remained consistent at 0.24%. During the third test at a setting of 80 BPM, the error rate slightly decreased to 0.2%. Meanwhile, the fourth trial at 100 BPM resulted in zero error, indicating a precise match between the simulator and the system output. However, in the fifth test, also conducted at 100 BPM, an error of 0.48% was observed. Based on the conducted research, several key findings were identified: The study successfully produced an ECG circuit using a Lead II configuration. Electrodes were placed on the subject following the Lead II standard, and the signal pathway was connected sequentially to the Instrumentation Amplifier, High-Pass Filter, Low-Pass Filter, Notch Filter, Non-Inverting Amplifier, and Adder circuits, allowing for accurate amplification, filtering, and signal stabilization throughout the system. Making an ECG circuit with an Arduino Mega 2560 microcontroller with programming to display signals and bpm ECG on the LCD. Conducting tests with ECG Simulator and 6 respondents who produced signals that matched the comparison tool.*

*Keywords: Cardiac Monitor, Electrocardiogram, TFT LCD, Arduino Microcontroller*

*References: 21 Journals (2008-2024)*