

ABSTRACT

As we know, the heart is one of the most vital organs for humans, abnormalities of the heart can be at risk of death. Therefore we need a tool that is able to detect abnormalities of the heart so that the heart disease patients can seek treatment early. Electrocardiograph (ECG) is one means of recording the electrical activity of the heart to detect heart health conditions.

In this final project was the design and implementation of an ECG system consisting of three bipolar leads and three unipolar extremity leads can show ECG output signal on someone's heart. ECG signals from electrodes attached to specific body parts in the form of an electrical signal with a small amplitude. The signal enter into the multiplexer for selecting the chosen leads to be issued on the output side of the multiplexer. Because of the small amplitude ECG signals need to be corroborated with instrumentation amplifier circuit. After that, the signal has been amplified enter into the filter so the noise contained in the signal can be reduced or even eliminated. Because the signal is processed in the microcontroller then the signal amplified again and then that signal filtered, so the signal is passed to the block of signal system in pure digital form (free of noise). Then, the signals that have been filtered raising back into the higher voltage level and the results of that signal can be displayed on the oscilloscope screen.

From the result of design and implementation of this ECG system, it was found that tool can be run well and able to display the form of a quite appropriate ECG signal on the oscilloscope screen. On low pass filter at 40 Hz cut-off frequency value, can we saw in the amplitude value is -3 dB at a frequency of 43 Hz. From the measurement results obtained on strengthening operational of non-inverting gain an average of 103.05 times. Low pass filter at 20 Hz cut-off frequency, the value of cut-off frequency can be seen in amplitude value is -3 dB is in a frequency of 22 Hz. Amplifier design and the filter is quite accordance with the output. The output signal from EKG derived electrodes had affixed directly is quite consistent with the results of EKG signal from simulator.

Keywords: EKG, bipolar Lead, unipolar extremity lead