

ABSTRACT

Heart is the most vital organ for human's life. The abnormality on the heart can cause death. When some abnormalities happen on that part it can cause the blood flow to not work properly, and so there is a tool needed to detect that abnormality that is called Electrocardiograph. Electrocardiograph is a recording tool used to record the electricity activity of the heart in order to detect someone's heart condition. The electric signal produced by the Electrocardiograph (ECG) commonly known as a time-domain signal written on a recording paper called electrocardiogram.

On this final project, the researcher is designing a lead precordial ECG system that can show the output analog signal of ECG on the oscilloscope screen. The ECG signal comes from the simulator and the electrodes that is stuck on specific body parts with low amplitudes. And then the signal is inserted to the selector circuit to select the specific lead so then the output will come on the output side of the selector. The low amplitude then is strengthened with a bracer circuit instrumentation INA118 by ten times. The strengthened signal then enters the filter so the noise inside the signal can be reduced or even erased entirely. The filtered signal then be braced again using the operational non-inverting bracer by 100 times to get the ECG signal that is able to be processed with a microcontroller. The strengthened signal is then going through the filtering process again so get a better ECG signal, noise-free. The wanted signal must be all-positive, so the signal's tension level then is raised higher using the level shifter circuit.

The result from the design and implementation of the ECG system is the system can produce the analog output signal from the precordial leads to the oscilloscope screen. On the first LPF shows the value of -3 dB on the cutoff frequency of 39 hz. On the second LPF shows the value of -3 dB on the cut off frequency of 22 Hz. The average value of the operational strengthening from the process is 102,186 times. The test of the ECG output signal shows that the testing of the ECG output signal from every block with the input come from simulator and electrode which in every block shows a a changing process with the form of the ECG signal close to the real form of the original signal.

Keywords: ECG precordial leads, electrodes, simulator