

## ABSTRACT

*Examination of the condition of the heart can be done using an electrocardiograph. Electrocardiogram (ECG) is a medical test to detect heart abnormalities by measuring the electrical activity produced by the heart, when the heart contracts. Therefore, a tool is needed to identify an important part of the initial evaluation of patients suspected of having heart-related problems. This ECG instrumentation consists of: a lead selector in which there is a Wilson Central Terminal circuit, instrumentation amplifier, analog filters consisting of 0.05Hz HPF, 100Hz LPF, and 50Hz notch filter, Arduino Mega 2560, USB module, and an application to display signal (delphi7). The research type is After Only Design, using factory Oscilloscope and Electrocardiograph measuring instruments. The ECG signal is obtained from the phantom which is connected using an ECG cable. The results of the leads are in the form of heart signals and BPM which will be processed on the microcontroller and then the results will be displayed on a PC and can be saved in the form of images and excel. The results of the average ECG measurement using phantom at BPM obtained an error of 0.4167% at 120 BPM and 0.1667 at 240 BPM. The maximum limit in the BPM error tolerance is  $\pm 5\%$ . From the results obtained, it is possible to make a 12-lead ECG covering the bipolar and unipolar leads based on PC with storage.*

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*Keywords: ECG, Heart, Electrocardiograph, BPM, Storage*