

ABSTRACT

Electrocardiogram (ECG) or is a graph produced by an electrocardiograph to detect heart abnormalities by measuring the electrical activity produced by the heart. It has been developed by several previous researchers, but it still has some drawbacks, namely there is no data storage for analysis, leads are only limited to Leads I, II and III. The purpose of this research is to make it easier for users to see the condition of the ECG signal and more effective because it utilizes 12 Lead ECG. 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). This study used a pre-experimental method. 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. In measuring the BPM value, the error value is 0.25% for 120 BPM, 0.083% for 180 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 limb and precordial leads based on PC with storage.

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