EE236: Experiment 4 - Heart Rate Monitor

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1 Aim of the experiment

To make a heart rate monitor on the principle of PPG(photoplethysmogram) using TRCT5000 LED-phototransistor pair and then conditioning the output using op-amps.

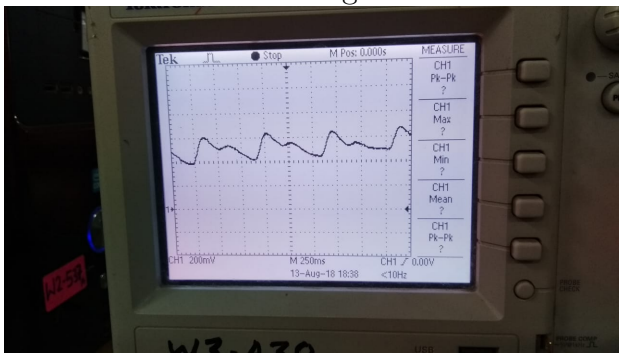
2 Methods

Use TCRT5000, to record the output of PPG. Limit the sensor input using a resistor. Design a band pass filter using an opamp as a high pass filter and a second opamp as a low pass filter and finally amplify the signal and take the output on a DSO. Measure the time of pulse using cursors on DSO.

3 Results

3.1 Observations

We can see that the difference between 2 consecutive systolic nodes is 14 divisions, where 1 division is $250/5 = 50ms$. Hence my heart-rate was $60 * 1000/(14 * 50) = 85.7$ bpm which is consistent with me being nervous at the time.



3.2 Inference

The output of the DSO shows a clean wave with systolic and diastolic peaks and dicrotic notches. The measured heart rate on the DSO matched the heart rate measured using pulses on the wrist.

4 Learning objectives

To combine various devices and to and how such a simple electronic circuits can help us in our day to day life.

5 Quick feedback

5.1 What about this experiment did you find helpful?

The fact that we learned to use TCRT5000 and to implement it in a circuit.

5.2 What about this experiment is still unclear?

The internal working of TCRT5000.