

ISIM Lab No. 6 Report: Concerning Blood Pressure

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In this lab, I filtered and amplified signal from a blood-pressure cuff to detect the pulse and blood-pressure of the subject. I did not use the blood-pressure cuff on myself because I have a history of feeling faint when my blood-pressure is measured at the doctor's office, and as I was feeling very sick and nauseous when I was doing this lab, I decided not to take the risk.

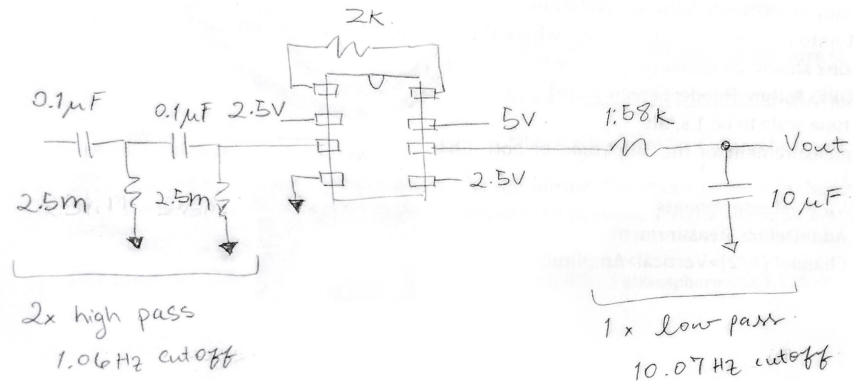


Figure 1: This is the circuit diagram I used to amplify and filter the the recorded output from the blood-pressure cuff. The resistor and capacitor values shown were the ones used in my final tests.

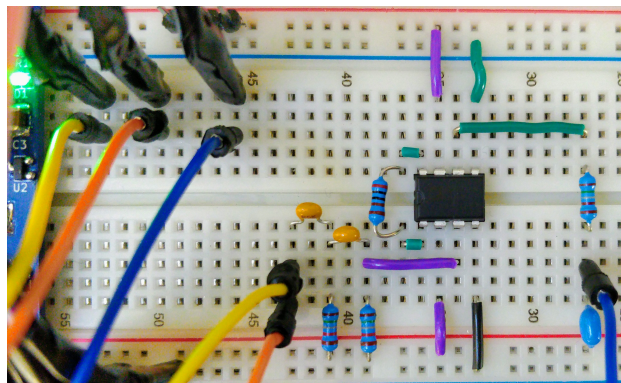


Figure 2: This is what my breadboard looked after following the diagram in Figure 1.

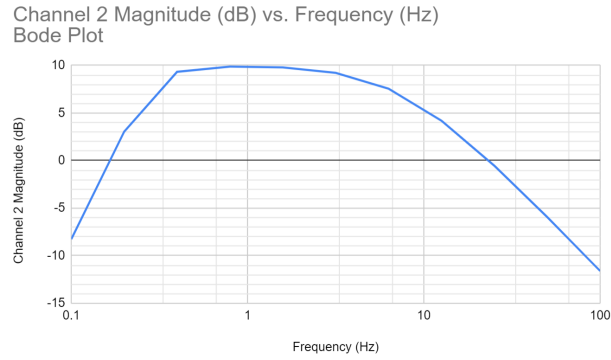
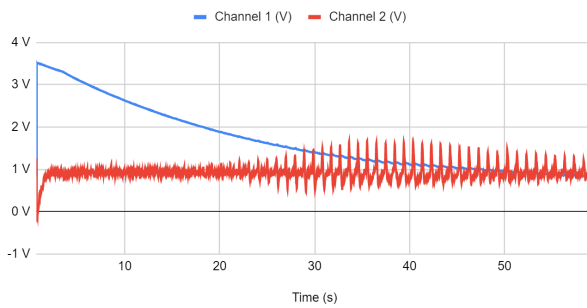


Figure 3: This bode plot confirms that I generally filtered out the frequencies I meant to in order to leave only frequencies between 1 and 10 Hz.

Raw (Ch1) and Filtered (Ch2) Data From Blood Pressure Cuff in Volts



Raw (Ch1) and Filtered (Ch2) Data From Blood Pressure Cuff Translated to mmHg

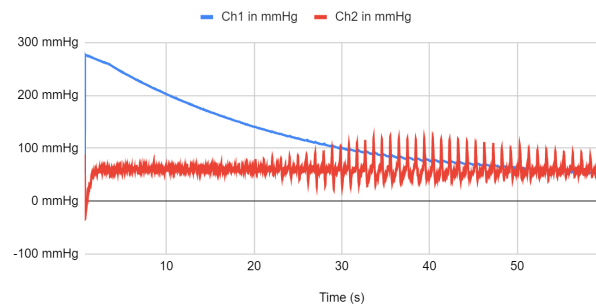
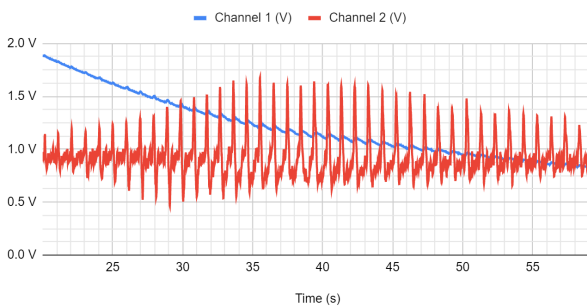


Figure 4: Channel 1 (blue) shows the original input signal from W1 of the Analog Discovery displaying the sample input data. Channel 2 (red) shows the filtered and amplified output measured from the blue wire on the right in the picture (Figure 2) and the point labeled V_{out} in the diagram (Figure 1). I translated the same data from Volts into mmHg via the equation given by the manufacturer for the graph on the right.

Raw (Ch1) and Filtered (Ch2) Data From Blood Pressure Cuff in Volts around pulse maximization point



Raw (Ch1) and Filtered (Ch2) Data From Blood Pressure Cuff Translated to mmHg around pulse maximization point

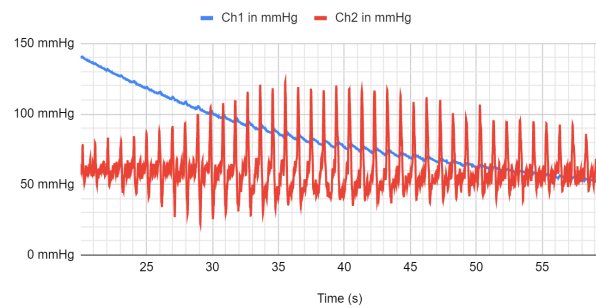


Figure 5: These two graphs are the same as those in Figure 4 except that they are zoomed in on the point at the maximum pulse, telling us where to measure the average blood pressure. The pulse maximizes around 35 seconds, where the pressure measured in the cuff is around 84mmHg. This is a reasonable blood pressure for a human, so we can conclude that while my circuit may not be up to medical standards, the system seems to work reasonably well.