

Group number: 19

Project title: Portable Nutrient Data Collection System - Phase II

Client &/Advisor: Dr. Qiao & Dr. Qeu

Team Members/Role:

Ben Theisen - Group Leader

Michael Rupert - Webmaster

Zakk Belloma - Key Concept Holder

Ben Engebrecht - Communication Leader

Logan Boas - Communication Leader #2

Ryan Young - Key Concept Holder #2

o Weekly Summary

- ❖ This week, we discussed possible communication options with our advisor, Dr. Qiao. We have been experimenting with several serial bluetooth modules, as well as implementing an Android app to send commands/receive data from our spectrometer for analysis. At the end of the week, the breakout connector that we have been waiting for to test serial communication has arrived, so we will be using that to begin implementing our design this week. We determined that a constant voltage is not needed for the spectrometer to receive output, so we are redesigning the voltage booster to be smaller.

o Past week accomplishments

- ❖ Researched options for integrating a database into current Android app to store data from the spectrometer readings for future reference - Micheal
- ❖ Put finishing touches on project plan, updated app to support Bluetooth module communication between the Raspberry Pi and the Android device, this will allow for control of the spectrometer through the app - Ben T
- ❖ Researched and updated the Android app to support the HC-06 in order to display the output data from the spectrometer - Zakk
- ❖ Completed the preparations necessary to be able to use the breakout board in the spectrometer. Tested serial code on Raspberry Pi - Ben E
- ❖ Verified previous design for voltage booster and started designing an improved model that provides a better output voltage than before - Logan
- ❖ Tested code with the pi4j library to ensure that the rs232 present on the Raspberry Pi will work for our project - Ryan

o Individual contributions

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Michael Rupert	Researched options for local/cloud databases for Android app. Experimented with serial bluetooth connection.	4	26
Ben Theisen	Put finishing touches on the Project Plan before submitting. Worked on sending data from the app to the bluetooth module.	5	28
Zakk Belloma	Researched how to pair bluetooth devices over android, I also attempted to implement this as well. This needs to be done to communicate with HC-06 bluetooth module so we can gather data from the spectrometer to display on the app	5	25
Ben Engebrecht	Preparations for breadboard arrival completed, beginning testing of serial communications	5	24
Logan Boas	Verified needed parts for converter. Then was told to change design, so researched different boosting techniques, and started finding the needed parts.	5	24
Ryan Young	Created mock up code to do initial testing on new break outboard using pi4j library. Researched rs232 communication more.	5	29

o Comments and extended discussion

- The breakout connector that we have been waiting on has finally arrived.
- The code written for serial communication still can now be tested.

o Plan for coming week

- Meet with advisor on Thursday -All
- Start Design Document - All
- Further experimentation with bluetooth and android app -Zakk, Ben T
- Research master - slave relationship in bluetooth - Zakk, Ben T
- Research spectrometer commands to begin programming spectrometer control into the app - Ben T
- Work on extracting data from the spectrometer - Ben E, Ryan
- Finish designing the more compact voltage booster and possibly order the needed parts - Logan B
- Implement local/cloud database in Android app for storing spectrometer data - Michael R

o What we learned this week

- ❖ We learned that the voltage of the spectrometer and the voltage of our communication circuit may differ, so that is something that we have to take into account. - Michael
- ❖ We learned about debugging serial communication, and the difficulties of using a serial module over USB. - Ben T, Michael
- ❖ The pi4j library contains code to allow us to do what we need for this project. RS 232 communication is a little finicky, so we probably will need to use either a USB Bluetooth adapter or a USB to serial adapter in order to communicate via Bluetooth rather than implement a serial interface through the plain GPIO pins -Ben E, Ryan

o Summary of weekly advisor meeting (if applicable/optional)

Decided on using raspberry pi zero as the microcontroller for our system. Going through process to get one on order. Discussed prototyping code for serial communication from the spectrometer. We were still waiting on the breakout board for the spectrometer at that time. Went over bluetooth module, showed our advisor the app we have begun to create. Also discussed with one of the grad students how they are getting data from the spectrometer using

the voltage booster method. Currently, they are taking a video of the spectrometer software and screen capturing the frame with the desired data. Further discussion with our advisor ended with the decision that we do not need a sustained voltage from the voltage booster, but rather that we can have an instantaneous voltage and extract the correct data from a small amount of data captured before and after the voltage burst.