I2C Communication

Sixth Laboratory Report for CENG 3331

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Abstract

The goal of this lab was to introduce us to the Arduino boards by constructing an I2C circuit. During this lab, we viewed the output of this circuit by spinning a 3D bunny around using the board and also answered some questions given to us in the lab manual.

Write-Up

Introduction

I2C is short for Inter-Integrated Circuit and is popular for use when you need to communicate between a master device and multiple slave devices. We used the Serial Data and Serial Clock portions of the I2C during this lab, which connected the Adafruit sensor to the Arduino board.

Task 1:

We began our experiment by constructing the I2C circuit using the Arduino board and Adafruit sensor. For the Adafruit sensor, we connected the Vin to the power supply, connected the GND to the ground, connected the SCL pin to the A4 pin, and connected the SDA pin to the A5 pin. This circuit can be seen in the appendices section under Figure 1. Following this, we answered some questions given to us in the lab instructions. For the first question, I2C uses synchronous half-duplex serial communication. For the second question, we were tasked to draw a simple I2C diagram with one master device, one slave device, and two resistors. This diagram can be seen in the appendices under Figure 2. For the third question, the pins for SDA and SCL on the Arduino board are A4 and A5. For the last question, I believe that the I2C uses bus topology because all devices are connected with the SDA and SCL connections.

Task 2:

For task 2, we continued the experiment by downloading several libraries and placing them in the appropriate locations. We tested the sensorapi demo using these libraries. Following this, we answered some questions given to us in the lab instructions. First, the

port number we used was port COM4. Second, the sensor orientation calibration values can be seen in the appendix under Figure 4 and Figure 5.

Task 3:

In this final task, we downloaded a couple more libraries and placed them in the correct locations. We used the circuit we had been building over the last 2 tasks and tested the sensor output of the board with a 3D bunny, which we were able to rotate and view from all around. A screenshot of our test can be seen in the appendix under Figure 3.

Appendix

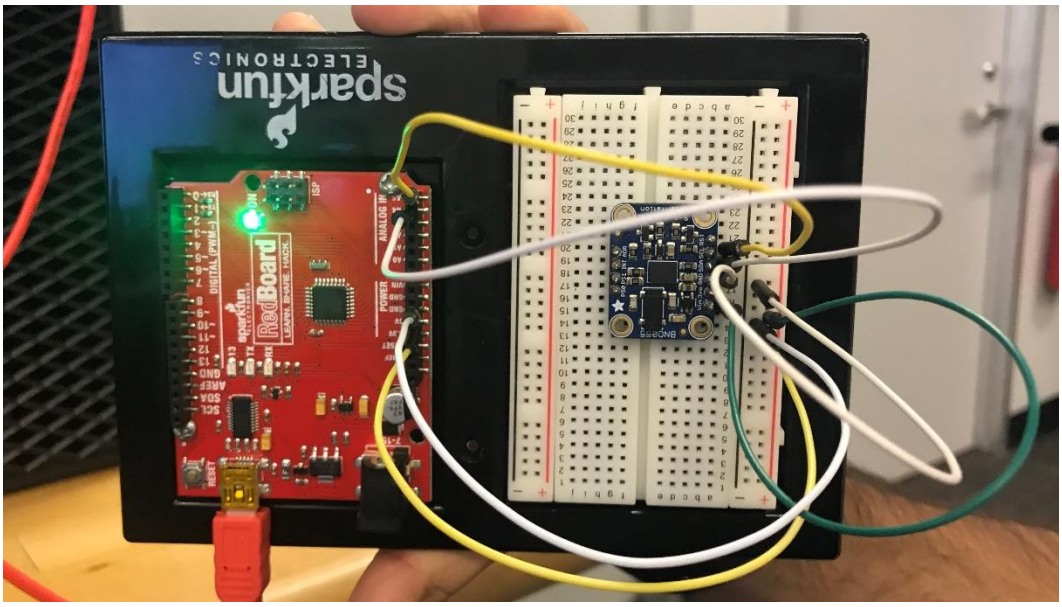

Fig. 1. Circuit Diagram Task 1

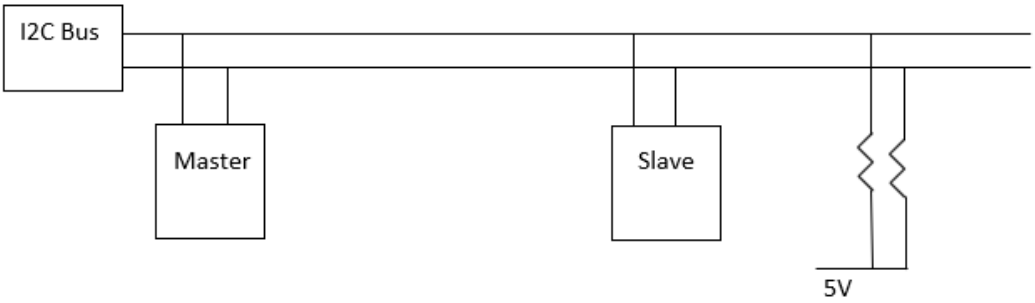

Fig. 2. Simple I2C diagram

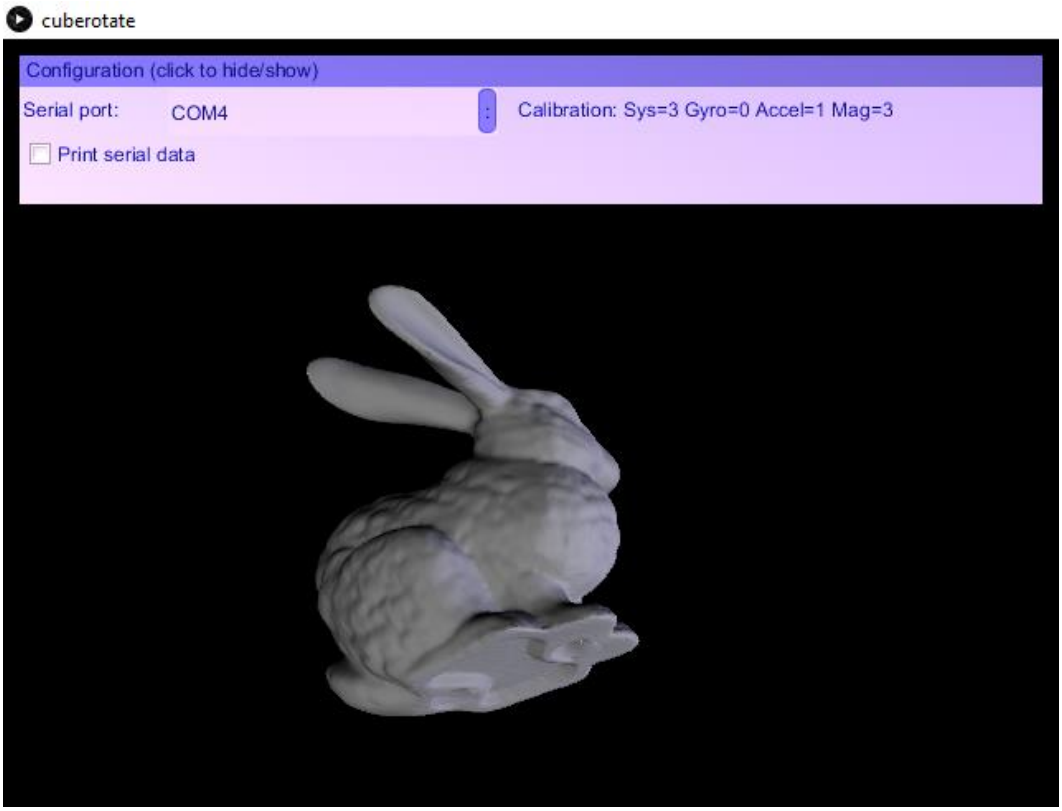

Fig. 3. Bunny 3D simulation

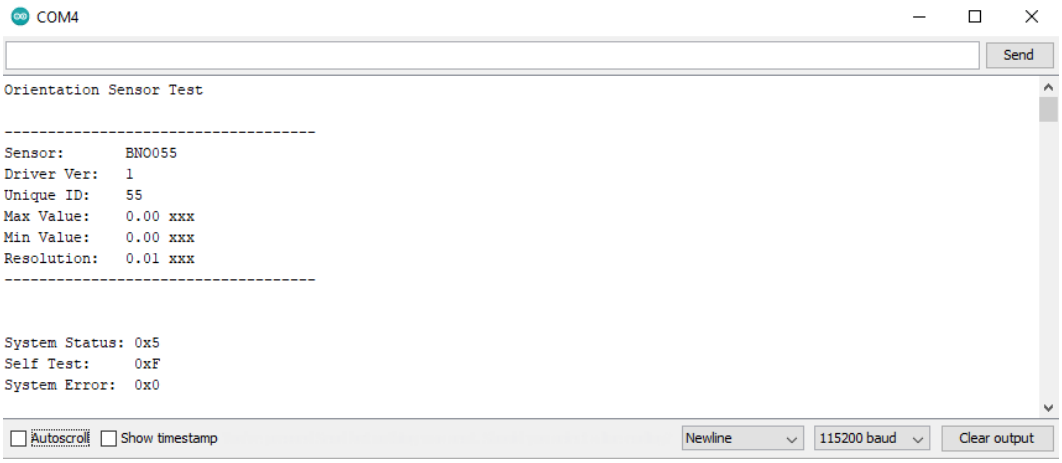

Fig. 4. Sensor Orientation Calibration Values 1

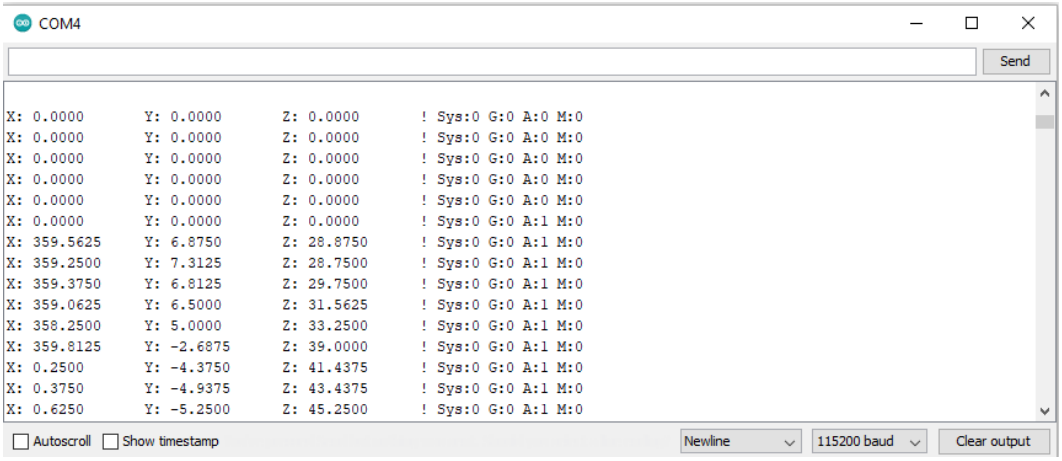

Fig. 5. Sensor Orientation Calibration Values 2

Conclusion

In conclusion, this lab was a perfect introduction to the Arduino boards. We were able to successfully get our 3D bunny simulation to work in tandem with the board, which allowed us to rotate the model on the screen.