UNIVERSITY OF LOUISIANA AT LAFAYETTE

MEASUREMENTS AND INSTRUMENTATION

MCHE 357

Lab 8

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Introduction

This lab consisted of using an Arduino to acquire data from a pressure sensor. The sensor outputs voltages, which the Arduino must interpret and map to a pressure value.

Theory

An Arduino microcontroller can read a signal, or voltage input. Typically, sensors output voltages to the user, not raw data. The sensor will have an indicated voltage that correlates the baseline, or null, measurement. In the case, the baseline measurement is atmospheric pressure. The change in voltage is also mapped to the change in the sensor reading as indicated in the sensor's documentation. This mapping can be used to linearly interpolate and determine the pressure read by the sensor based on the voltage output to the microcontroller.

Procedure & Analysis

The program used in this lab would read the voltage outputted by the pressure sensor and map it to a pressure value in PSI. This value was then displayed on an LCD display as well as written to the serial monitor. The pressure sensor was connected to an air-compressor set at 175 PSI. The measurements taken by the sensor and interpreted by the Arduino board were quite close to the actual value of pressure in the compressor. The physical system for this experiment can be seen in Figure 1 through Figure 3.

Figure 1: Air Compressor

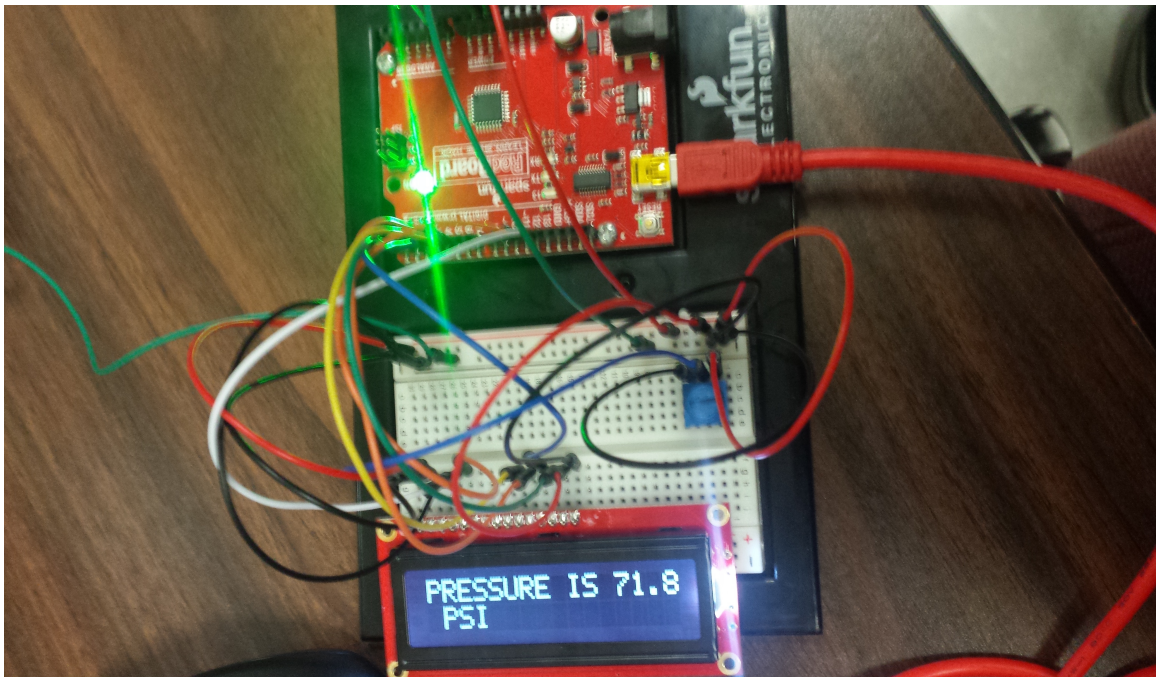

Figure 2: Arduino Setup and LCD Display Pressure Reading

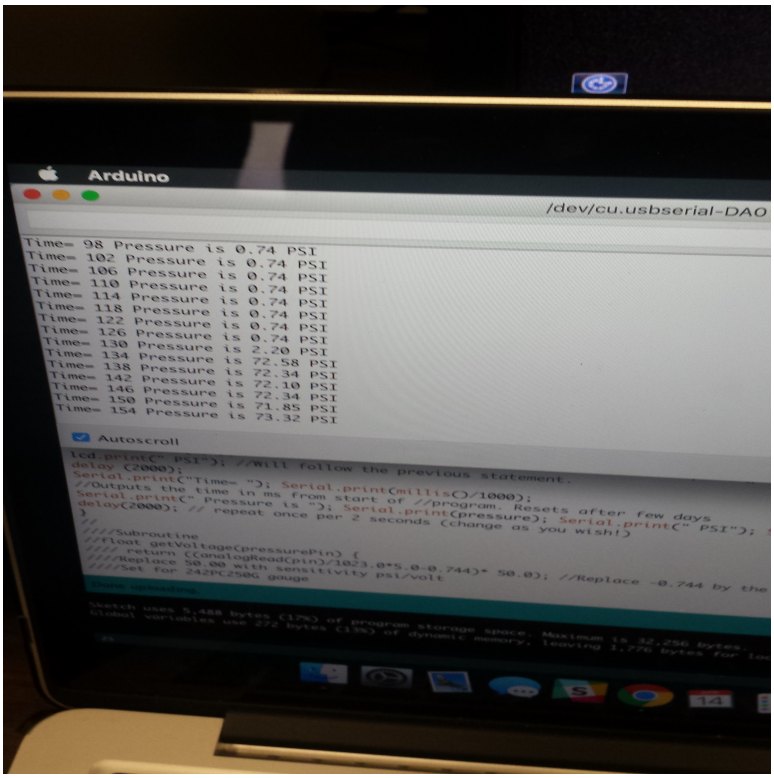

Figure 3: Serial Monitor Pressure Reading

Conclusion

The exercises conducted in this lab demonstrated using an Arduino microcontroller to acquire data. It was shown that reading data from sensors is typically done by mapping the voltage reading from the sensor to a measurement value by using documentation on the specific sensor being used. This is how most measurement systems work, and it is important that students are exposed to using these sensors as they will likely use them in their careers in the industry.