UNIVERSITY OF LOUISIANA AT LAFAYETTE

MEASUREMENTS AND INSTRUMENTATION

MCHE 357

Lab 5

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Introduction

This lab consisted of using Native Instrument's Lab View software to create a program used in the next lab. This program will be used to take data in from a physical system in the lab and plot the data.

Theory

Lab View is used to simulate real control systems, and consists of many optional devices and operations that can be used in the simulations. In control systems, typically data is read in from sensors and is then sent through different devices and controllers to give a desired output or feedback. Some examples of operations is summing two or more inputs, converting data units, performing FFT analysis, passing signals through filters, and plotting data back to the user if information about a signal is required.

FFT is a computational method which performs a Fourier Transform by using computational tricks to speed up the calculation rather than try to actually solve differential equations. The FFT technique is implemented in order to measure the natural frequency of a system. This is done typically by returning a set of frequencies along with magnitudes that correspond to these frequencies. The frequencies with the highest magnitudes are considered the "dominant" frequencies of a system, and indicate which frequencies the system naturally vibrates with.

Procedure & Analysis

In the program, physical channel inputs were initiated and are set up to take in data from a physical system. The data will be from a photo-resistor to determine the frequency at which a light is flashing on the photo-resistor. A diagram of the program is shown in Figure 1. A view of the software panel is shown in Figure 2. As can be seen, the data will be saved to a file in order to further analyze the data.

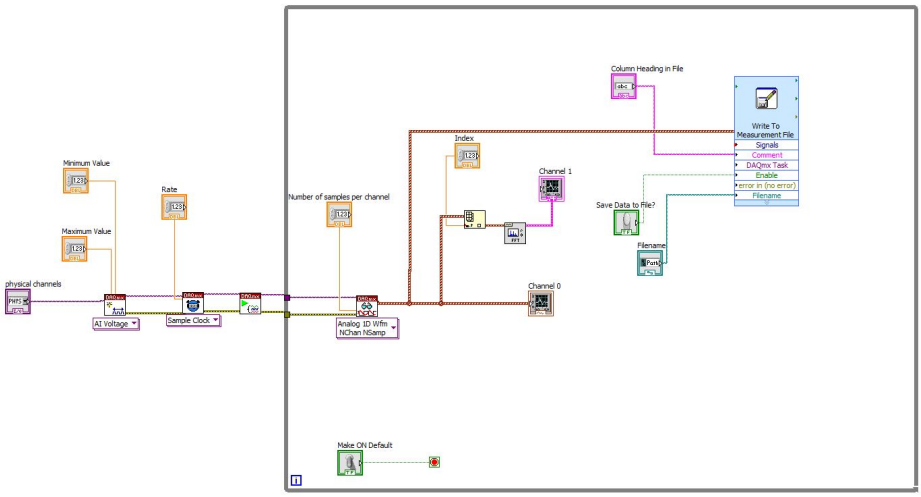

Figure 1: example caption

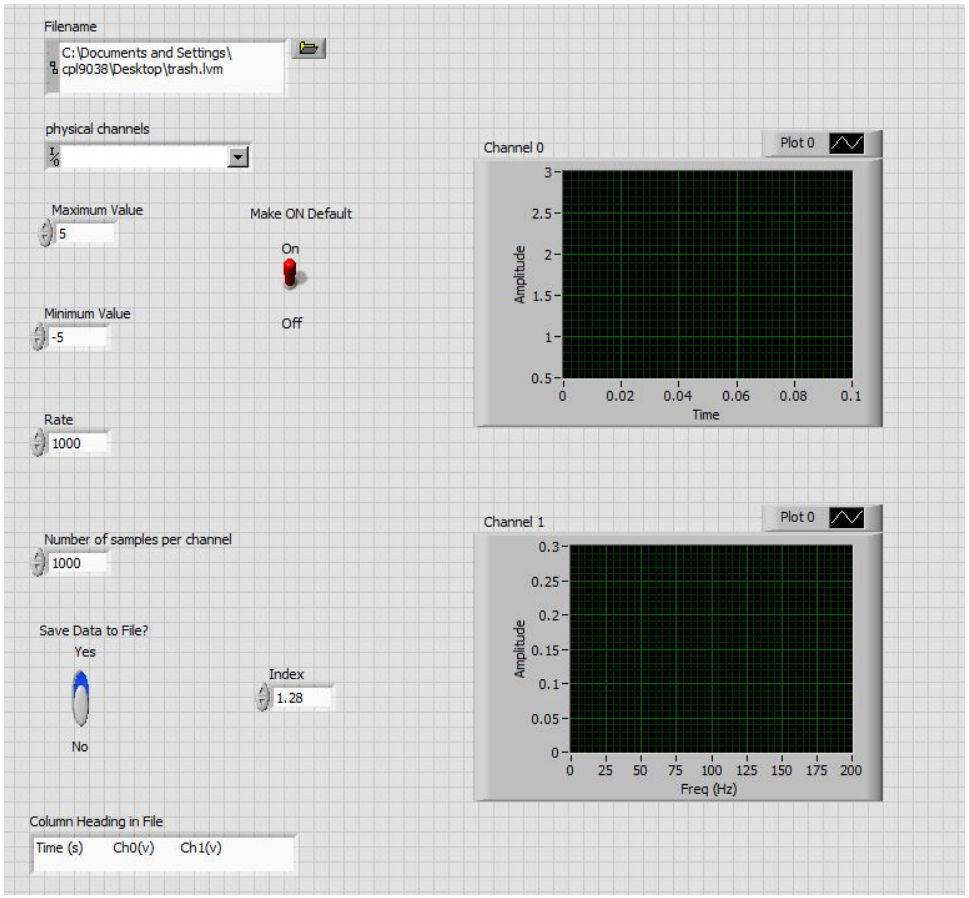

Figure 2: example caption

Conclusion

The exercises conducted in this lab served a learning exercise for Lab View, as well as setting up the program for the next lab. The experience of creating a program to be used with a physical system is beneficial to students, as this is what many engineers do on a daily basis in their careers.