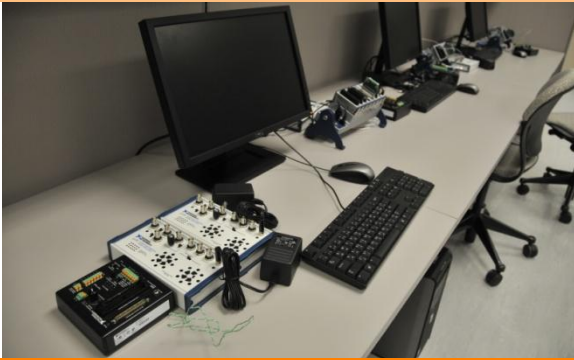


Data Acquisition Laboratory



In this lab, students become familiar with the LabVIEW and DAQ system environment. They learn how to take measurements using computer-based instrumentation and understand the flow of data through acquisition, analysis and presentation. Through the use of virtual instrumentation to acquire the voltages/currents from devices such as sensors, etc., students also learn how to interface measurement devices with both the computer and the physical world.

When data is collected from an instrument it passes through three stages. At the lowest level a sensor detects a physical phenomenon and sends it back via a signal to the PC. There, a device known as a Data Acquisition (DAQ) card takes the signal and converts it into digital data that can be processed by the computer. After the data has been collected, steps can be taken to make an analysis and a meaningful conclusion can be drawn. LabVIEW provides the order and structure for these steps to occur.

Experiments

- Introduction to LabVIEW and Data Acquisition
- Triggering using the DAQ Assistant
- Analog Input
 - Sampling Rate & Aliasing
 - Continuous Acquisition & Logging
- Signal Conditioning
 - Temperature Measurement
 - Resistance & Strain Measurement
- Signal Processing: DAQ Digital IIR Filtering
- Analog Output
 - Single Point Generation
 - Triggered Continuous Tone Generation
- Digital Input/Output
 - Digital Read & Write
 - Clocked Digital Output
- Pulse Train Generation & Frequency Measurement
- Synchronous Analog Input & Output

Major Equipment

- Data acquisition system NI cDAQ 9178
 - C series modules:
- PXI platform NI-PXIe-1082
 - Controller: NI-PXIe-8133 embedded controller
- NI Sound and Vibration signal simulator
- NI DAQ signal accessory

