NPS: Hardware Monitoring System

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NPS Hardware Monitoring LabVIEW Code

Using LabVIEW software, I wrote code and created user interfaces for monitoring NPS hardware. In February, I completed the software portion for monitoring the two NPS chillers, one for the crystal array and one for the electronics zone.

Each chiller has its own tab on the user interface. Each tab indicates the model number of the chiller, its values for supply temperature, pressure, and flow, and a graph of each value type. The expert tab is for choosing to use random numbers or sensor values to run the software. Figure 1 is a screenshot of the user interface for the crystal zone chiller.
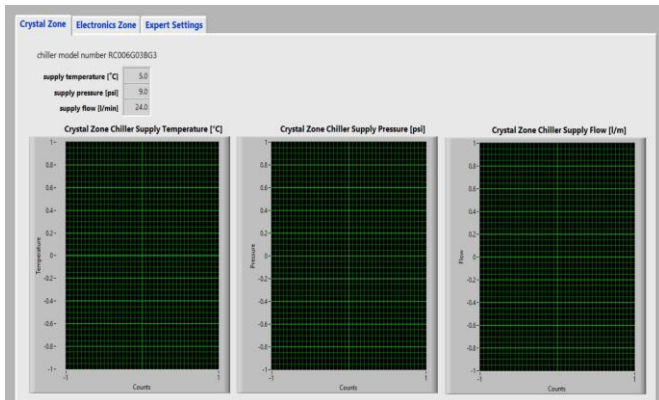

FIG. 1. LabVIEW user interface for the NPS crystal zone chiller, which will display supply temperature, pressure and flow.

A problem was encountered. Initially, the software would only run one loop for generating random numbers and displaying them. After debugging, I discovered that the stop icon for the chiller tab loop was wired to a different stop button. Once wired correctly, the loop, thus number generation and display, ran correctly until manually stopped.

- **Developing hardware monitoring system for operations safety**

- **Designed and developed user interface to monitor two chillers**

- **Developed nine drivers to set and read back chiller values**

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I began a second LabVIEW project of writing NPS chiller drivers, which will be used to set and read back from the chillers. Nine drivers were written and a program to test them. Figure 2 is a screenshot of the user interface of the driver to read the chiller status. Chiller, a.k.a plant, temperature, the set temperature, and pressure are given. LEDs light green if various items are on. The response box shows the actual string from the chiller, used for debugging. Communication error turns red if the chiller is not responding.
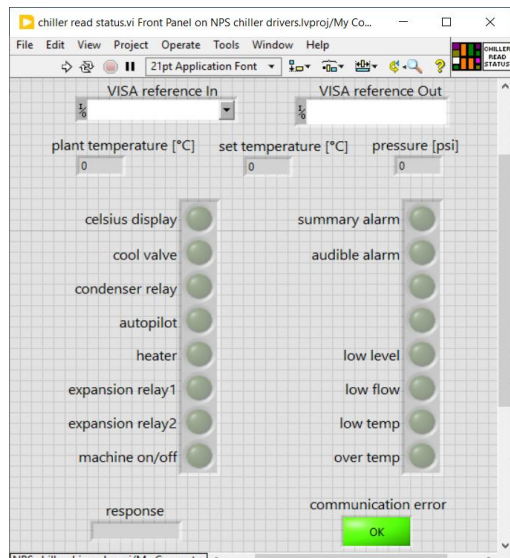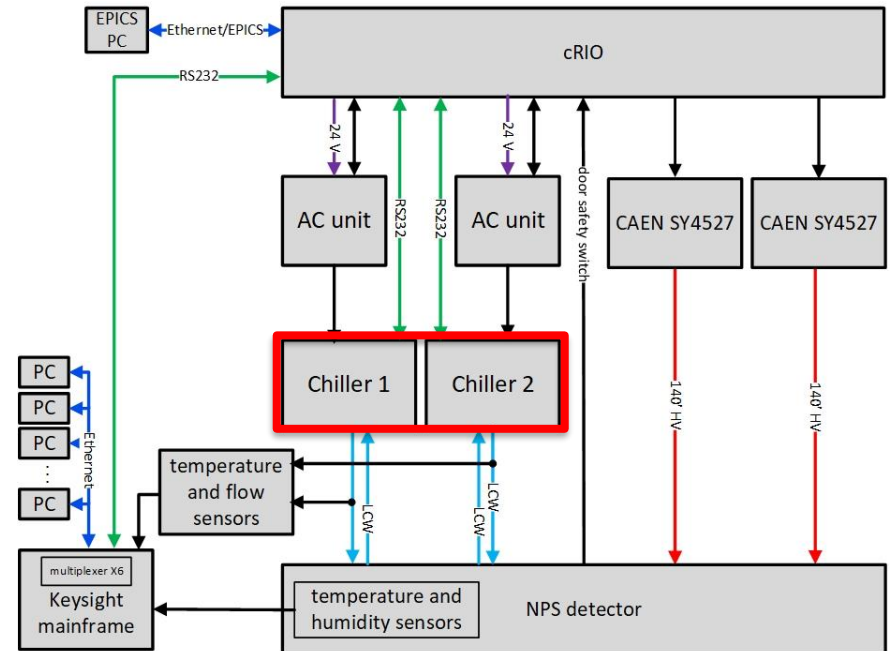

FIG. 2. LabVIEW user interface for the software to read a chiller status.

NPS Hardware Interlock System
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System diagram of monitoring and interlock system

A significant problem in writing the drivers was trying to understand the chiller manual command instructions. A second problem is that the drivers cannot be tested until a chiller is connected to a test computer.

In the upcoming month, I plan to test the chiller drivers, after a chiller is connected to a test computer. I will also begin working on the Phoebus NPS hardware monitoring user interface.