

Development of Keysight Scanning LabVIEW Program for Hall C's NPS Hardware Interlock System

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Development of Keysight Scanning LabVIEW Program for the Hardware Interlock System of Hall C's Neutral Particle Spectrometer

I am developing a scanning program for the Keysight (formerly Agilent) switch/measurement unit (model # 34980A) for use with the Hall C Neutral Particle Spectrometer.

The Keysight scanning program is one of eight subroutines planned for the hardware interlock program. This program will be used to configure multiplexer channels and retrieve sensor values, Fig. 1, to be used by the other subroutines of the hardware interlock program.

The Keysight mainframe has an eight multiplexer capacity; NPS will use six. Each multiplexer has 40, 2-wire sensor channels or 20, 4-wire sensor channels. For NPS, the plan is to have 112 thermocouples across 3 multiplexers, 34, 4-wire RTDs across 2 multiplexers, and 33 sensors that return a DC voltage in the final multiplexer.

- **Developing a LabVIEW program to scan through six multiplexers and read out the channels of Keysight switch/measurement unit**
- **Sensor values are stored as network variables to be shared with other subroutines of the hardware interlock system**

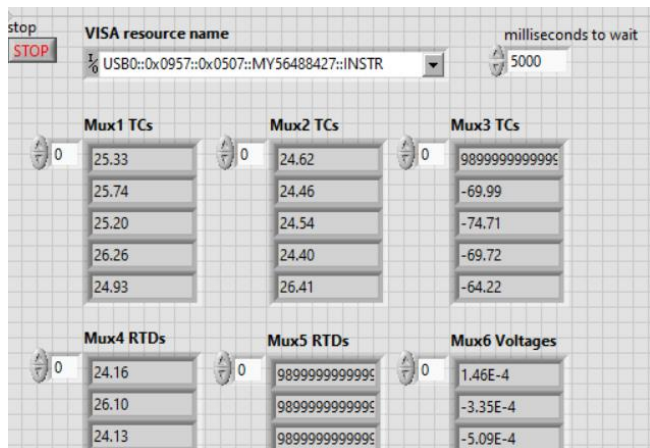


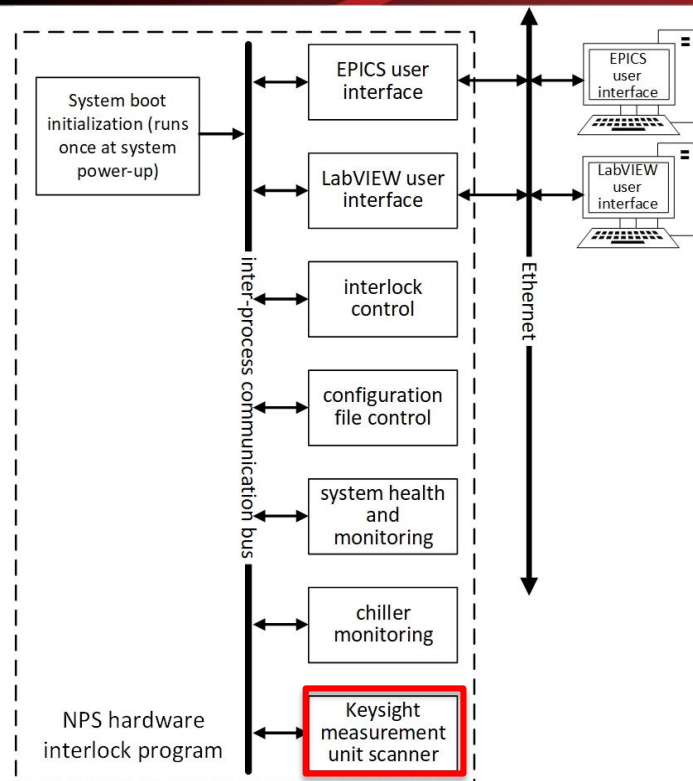
Fig. 1. Screenshot of the Keysight scanning LabVIEW program

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I downloaded Agilent's device driver library for 34980A, developed by a third party, and add it to LabVIEW. I generated scan lists (a comma separated list of each channel of a multiplexer) to be passed to the configure and measure subVIs. I then configured the channels for each multiplexer for the type of sensor to be connected to it.

I added the measure subVI for each channel and pass the scan list to the appropriate subVI. The measure command initiates the retrieval of sensor values for each channel of the scan list. These values are output to an array which is available to each subroutine in the hardware interlock program.

This was all done with the Keysight mainframe connected to a Windows computer via USB. The next step will be to test the program while it is running on the cRIO connected to the Keysight mainframe via a GPIB connection as this is the connection method that will be used in the hall.



NPS Hardware Interlock Program Schematic
3/30/2021
M. A. Antonoli

Schematic of the LabVIEW subroutines for the NPS hardware interlock program.