

Testing New Keysight Scanning Method for Hall C’s Neutral Particle Spectrometer

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This note presents the test program being developed to remedy the cause of unexpected readback value changes in some sensors of the Neutral Particle spectrometer (NPS).

During the current run of the NPS, some values of crystal temperature sensors had unexpected readback changes—readback values changed to the readback values of adjacent sensors, Fig. 1.

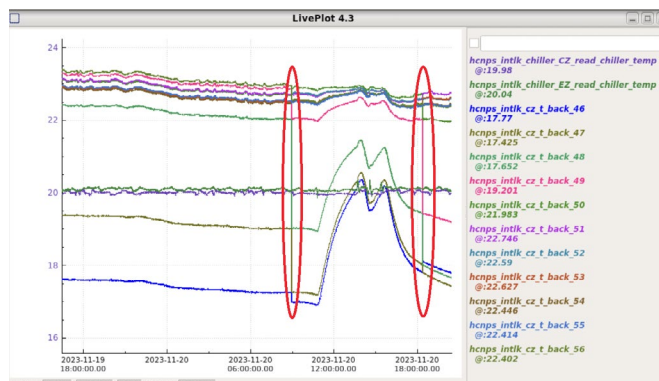


FIG. 1. Screenshot of crystal temperatures.

To remedy this issue, a delay at the end of the loop in the LabVIEW program was added to increase the time between Keysight mainframe scans; however, the issue persisted.

A test program was developed, Fig. 2, with an added delay between the scan of each channel to determine the feasibility of this method and to determine the increase in the execution time of each loop iteration.

The LabVIEW VIs that are used to send commands to and receive responses from the Keysight mainframe, downloaded from Agilent Technologies, require a list of channels that are configured according to the type of sensor connected to the channel. Each type of sensor requires its own VI type. There is a 40-channel limit on the number of channels that can be configured or measured using the same VI.

Agilent also has a VI that changes a delimited list of channels to an array of channels. Using the array of channels as the input to a for-loop, a single-channel-per-loop iteration with a delay between each iteration was configured and used to measure the output of each loop iteration, which was then appended to an array.

To enforce execution order for multiple for-loops, another for-loop for a second channel list was added and connected using the error out connection of the Agilent reading VI in the first for-loop to the error in connection of the Agilent configuring VI of the second for-loop, ensuring the second for-loop will not begin executing until the scan of the first-loop is completed. The output of each loop iteration is appended to an array. The delay time of the first loop is connected to the

wait command in the second loop so that both loops have the same delay for each loop iteration.

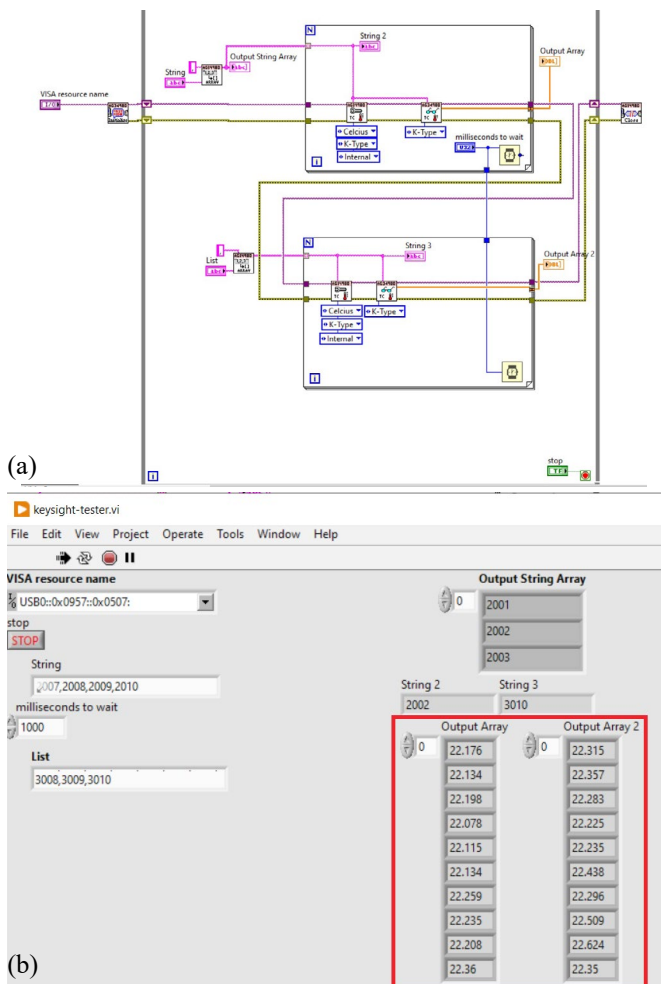


FIG. 2. (a) Screenshot of test program block diagram, (b) front panel. Output of each loop iteration is appended to an array.

The next step is to add more for-loops, combine the output arrays into one large array, and calculate the minimum amount of time that a delay between each channel scan will add to program execution.