

Exercise 3-1: Property Nodes and Control References

Goal

- Use Property Nodes and control references to change the properties of front panel objects programmatically.

Hardware Setup

(Hardware) In the exercises where we work with Analog Input/Output channels, we use PCI-6221/USB-6212 multifunction I/O device paired with the BNC-2120 shielded connector block. Analog Input 2 should be connected to the Sine/Triangle BNC connector. Analog Input 3 should be connected to the TTL Square Wave BNC connector. The Sine/Triangle waveform switch should be set to Sine.

Scenario

When you acquire data, you want to ensure that the front panel controls remain unchanged during the acquisition. Use references and Property Nodes to programmatically disable the controls to prevent them from being changed while the VI is acquiring data. When the acquisition is complete, re-enable the controls.

Instructions

Part-1 Disable Controls

1. Open `C:\Exercises\LabVIEW Core 2\Property Nodes\Property Nodes.lvproj`.
2. From the **Project Explorer** window, open the Event-Driven State Machine Property Nodes VI.
3. Run the VI and then click the **Acquire** button.
 - Notice that while the acquisition occurs, the controls are still enabled. You can change the values on the controls during the acquisition.
 - Click the **Exit** button.

4. Create control references for each of the front panel controls you want to disable during acquisition. On the front panel, press <Shift> and select all of the following controls and then right-click the selection and select **Create» Reference**.

- **AI Voltage Channel**
- **Sample Rate (Hz)**
- **Samples per channel**
- **Threshold (rms)**
- **AO Voltage Channel**

The image shows a software front panel with several controls. The controls are organized into sections. The first section contains an 'Acquire' button, followed by 'AI Voltage Channel' (a dropdown menu showing 'I₀ PCI-6221/ai0, PCI-'), 'Sample Rate (Hz)' (a numeric field with '1000'), and 'Samples per channel' (a numeric field with '100'). The second section is titled 'Analysis' and contains 'Threshold (rms)' (a numeric field with '1'). The third section is titled 'Generate Stimulus' and contains a toggle switch set to 'Off'. The fourth section contains 'AO Voltage Channel' (a dropdown menu showing 'I₀ PCI-6221/ao1'). Red boxes highlight the following controls: 'AI Voltage Channel', 'Sample Rate (Hz)', 'Samples per channel', 'Threshold (rms)', and 'AO Voltage Channel'.

Acquire

AI Voltage Channel
I₀ PCI-6221/ai0, PCI-

Sample Rate (Hz)
1000

Samples per channel
100

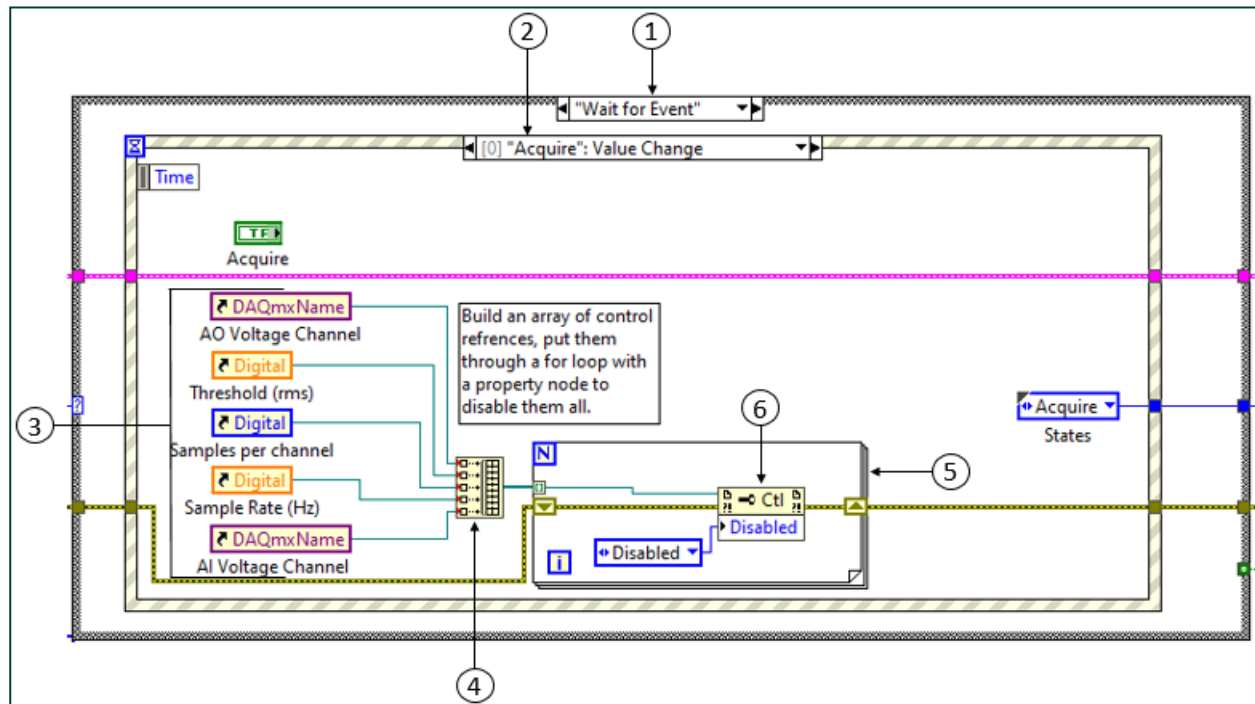
Analysis

Threshold (rms)
1

Generate Stimulus
Off

AO Voltage Channel
I₀ PCI-6221/ao1

- Modify the block diagram as shown in the following figure to disable the controls when the VI is performing an acquisition.



- Select the **Wait for Event** case.
- Select the **"Acquire" – Value Change** event.
- Move all the control references into the **"Acquire" – Value Change** event case.
- Build Array** – Use this function to combine the control references so you can use a single Property Node to disable them during acquisition.
- For Loop** – Wire the array of control references through a For Loop.
- Property Node** – Add a Property Node inside the For Loop, set it to write by right-clicking the **Property Node** and selecting **Change All To Write**. Connect the array of control references and error output to the Property Node. After that, select the **Disabled property** from the drop-down list. Then right-click the Property Node input and select **Create» Constant** and set the enum constant to **Disabled**.
- Make sure the error wire is connected through a shift register on the For Loop.

- Complete block diagram wiring as shown.

Test

- Run the VI and click the **Acquire** button. Notice that the controls are disabled.
- Click **Exit** to stop the VI.
- Run the VI again and notice that the controls are still disabled.

Test

Run the VI and click the **Acquire** button.

Notice that the controls are disabled for the duration of the acquisition and then re-enabled when the acquisition is complete.

End of Exercise 3-1