

Set Plot Names

Goal

Use control references to create a subVI that modifies graph or chart properties.

Scenario

Create a subVI that allows you to assign a list of plot names to a chart or graph. The subVI should resize the plot legend as necessary to display all of the plots.

Design

Inputs and Outputs

Type	Name	Default Value
Control Reference to a GraphChart object	Graph Reference	N/A
1-D Array of Strings Control	Plot Names	Empty Array
Error Cluster Control	Error In	No Error
Error Cluster Indicator	Error Out	No Error

Control References

Both the Waveform Chart and the Waveform Graph are objects in the GraphChart class. To write a subVI that can accept references to both charts and graphs you must use a weakly typed control reference of the GraphChart class. However, this class also contains other charts and graphs, such as the XY Graph. This subVI generates an error if the user wires any type of graph other than a Waveform Chart or a Waveform Graph. You can determine if the user has wired the correct type by using the ClassName property to control a Case structure. If the correct class is wired, use the To More Specific Class function to get a reference to the appropriate subclass. After you have a reference to a WaveformChart or a WaveformGraph you can set the properties to modify plot names.

Properties

Graphs and charts do not have a single property to set all of the plot names. Instead you must use a combination of properties to set each plot name.

In this exercise, use the following properties:

- **ClassName**—This property returns a string indicating the control class of the object that the property is called on. You can access this property for any control.
- **LegAutosize**—This property controls whether the Graph Legend automatically resizes to accommodate the plot names within it. Before modifying the plot names you should set this property to False. Otherwise, the legend may resize in such a way that it is separated from the graph or covers the graph or other controls.
- **LegNumRows**—This property controls the number of rows visible on the Graph Legend. When adding your legend to the front panel, remember to leave room for the legend to expand when you set this property. The legend expands downwards.
- **ActPlot**—Properties affecting a plot act on one plot at a time. This property controls the active plot. Any time a plot property is set or read it applies to the active plot. The plots are numbered sequentially as they are created, starting with zero.
- **Plot.Name**—This property sets the name of the active plot.

Implementation

The files that you need to complete this exercise are here: <NI eLearning>\LV Core 2\Control References\Exercise.

1. Open a blank VI.
2. Save the VI as Set Plot Names.vi in the <Exercise> directory.
3. Create the front panel window.



- ☐ Add a **control refnum** to the front panel window.
- ☐ Name the control refnum Graph Reference.
- ☐ Right-click **Graph Reference** and choose **Select VI Server Class» Generic»GObject»Control»GraphChart»GraphChart** from the shortcut menu.



- ☐ Add an **array** to the front panel window.

- ☐ Name the array Plot Names.
- ☐ Place a **string control** to the empty Plot Names array.
- ☐ Add an **error in** cluster.
- ☐ Add an **error out** cluster.
- ☐ Arrange the controls as shown in Figure1.

abc

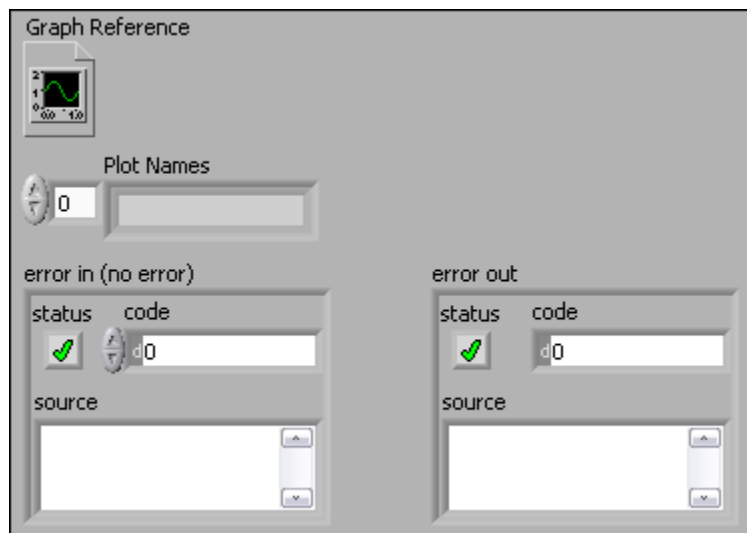


Figure 1. Set Plot Names Front Panel



Tip Because the front panel of this subVI is not displayed to the user, you do not have to put as much effort into making it visually appealing. You should always organize your front panels logically. However, you should not spend too much time on panels that the user does not see.

4. Switch to the block diagram.
5. Identify the class of the control reference and generate an error if it has an invalid class.
 - ☐ Use the Class Browser to find and drop the ClassName Property Node.
 - Open the Class Browser dialog by selecting **View»Class Browser**.
 - Select **VI Server** for the Object Library.
 - Select **Generic»Generic** for the Class.



- Click the **Search** button to open the Class Browser Search dialog box.

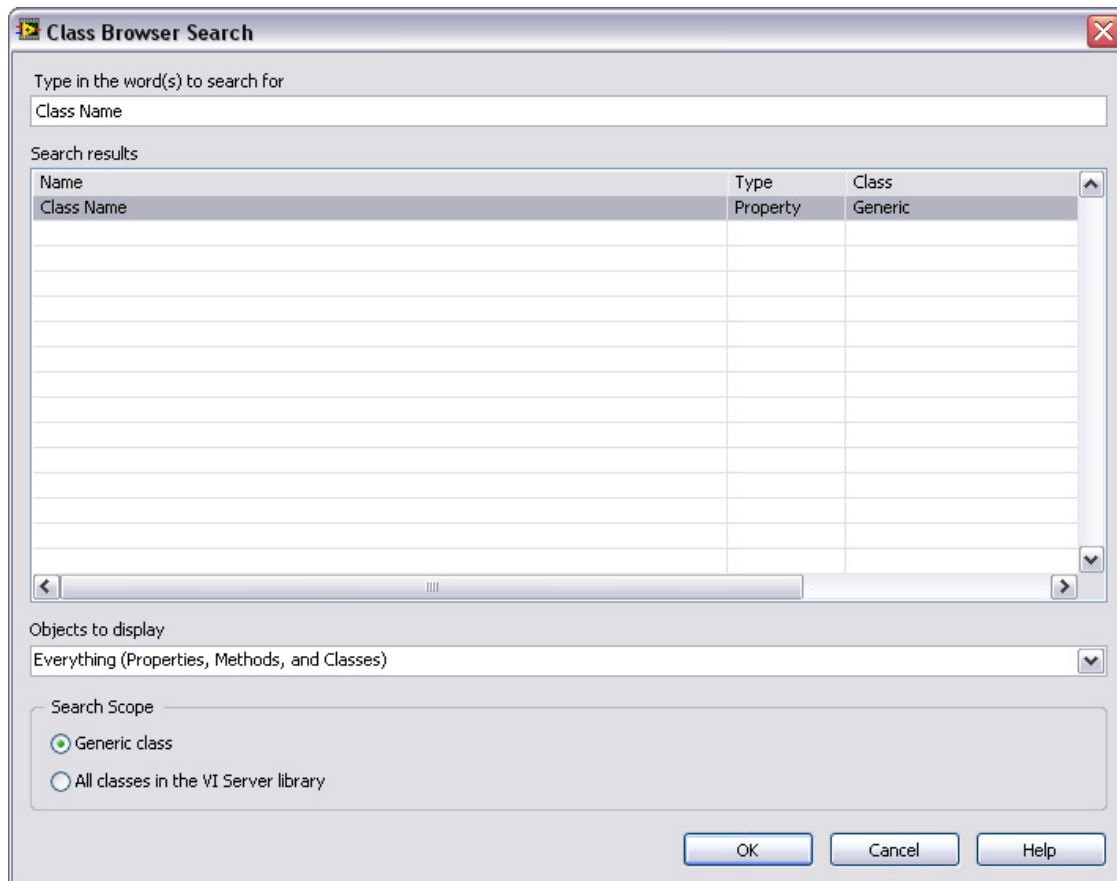


Figure 2. Class Browser Search Dialog

- Type **Class Name** in the search field. **Class Name** should be the only item in the Search results.
- Select **Generic class** in the **Search Scope** section
- Click **OK** to return to the Class Browser dialog box. **Class Name** is highlighted in the Properties and Methods tree.

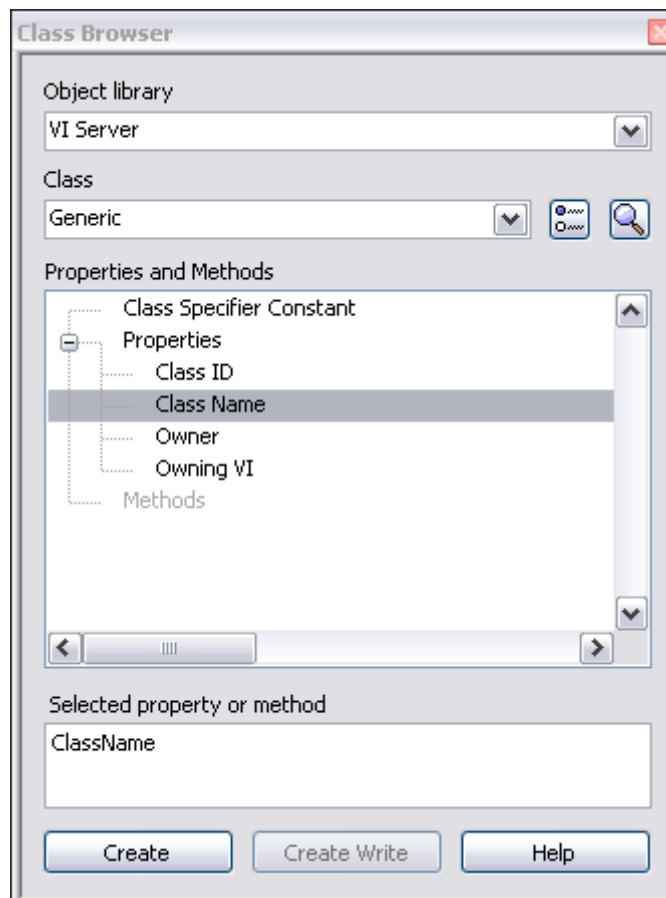


Figure 3. Class Browser Dialog Box

- Click the **Create** button and then move your mouse to an empty area on the block diagram. Click on the block diagram to drop the **ClassName** Property Node.
 - Close the Class Browser dialog box.
- ☐ Wire Graph Reference to the **reference** input of the Property Node.

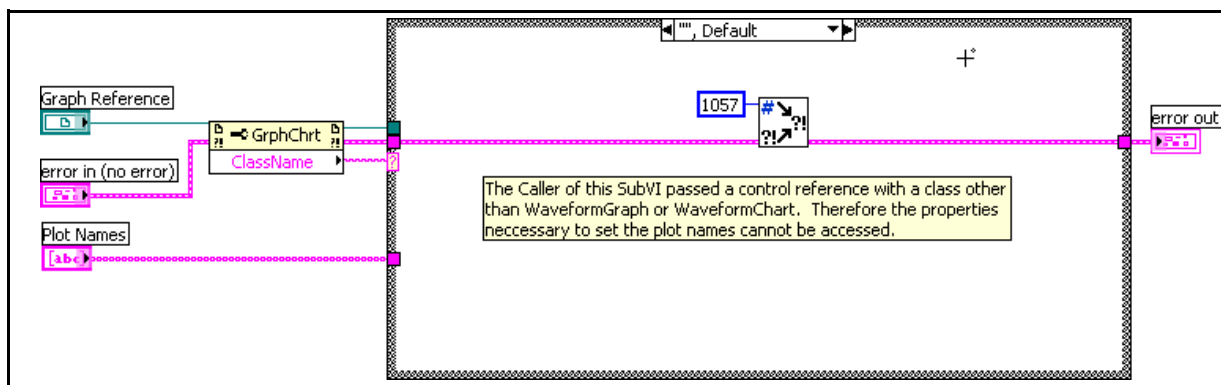


Figure 4. Default Case



- ☐ Add a **Case structure** to the block diagram, as shown in Figure 4.
- ☐ Wire the **ClassName** output of the Property Node to the case selector of the Case structure.
- ☐ Switch to the **False** case of the Case structure.
- ☐ Delete the `False` text in the case name so that the case name resembles Figure 4.

The Default case of the Case structure is selected if the class of the control reference does not match one of the other cases. In this case, if the default case executes, then the control reference passed to this subVI is not a WaveformGraph or a WaveformChart. Remember for a Case structure, the case selector label is case sensitive.



- ☐ Add an **Error Cluster From Error Code VI** to the Case structure.
- ☐ Right-click the **error code** input of the Error Cluster From Error Code VI and select **Create»Constant** from the shortcut menu.
- ☐ Enter 1057 in the constant.
Error code 1057 corresponds to the message **Object cannot be typecast to the specified type**. This is the appropriate error to generate if the caller of the subVI passes a control reference of the wrong class.
- ☐ Wire the block diagram as shown in Figure 4.

6. Handle the WaveformGraph references.

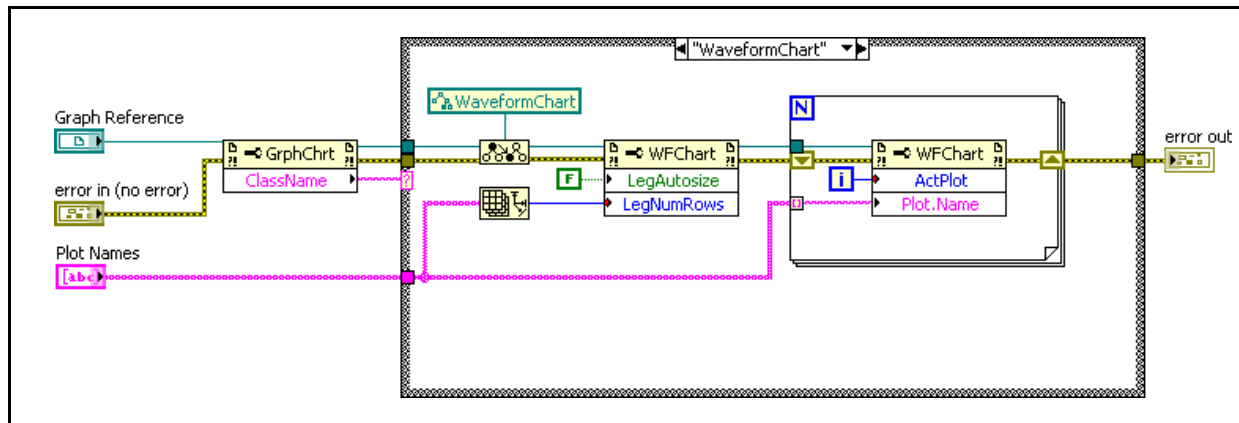


Figure 5. WaveformGraph Case

- ☐ Switch to the **True** case of the Case structure.
- ☐ Change the **True** text in the case name to **WaveformGraph** so that the case name resembles Figure 5.



Caution The text entered the case selector label must exactly match the input string, including spaces and case. For this example, enter **WaveformGraph**.



- ☐ Add a **To More Specific Class** function to the Case structure.
- ☐ Right-click the **target class** input of the To More Specific Class function and select **Create»Constant** from the shortcut menu.
- ☐ Click the constant you created in the previous step and select the **Generic»GObject»Control»GraphChart»WaveformGraph»WaveformGraph** class.
- ☐ Use the Class Browser window to find and drop the Legend: Autosize Property Node inside the Case structure.
 - Object library: **VI Server**
 - Class: **Generic»Generic**
 - Select **All classes in the VI Server library** in the **Search Scope** section
 - Search string: **Legend: Autosize**

- Select the **Legend: Autosize** entry with class type of **WaveformGraph**
- ☐ Wire the **specific class reference** output of the To More Specific Class function to the **reference** input of the Property Node.
- ☐ Expand the Property Node to display two properties.
- ☐ Click the second property in the Property Node and select **Legend»Number of Rows**.
- ☐ Right-click the Property Node and select **Change All To Write** from the shortcut menu.
- ☐ Right-click the **LegAutosize** property and select **Create»Constant** from the shortcut menu. Verify that the value of the constant is **False**.



- ☐ Add an **Array Size** function to the Case structure.
 - ☐ Add a **For Loop** to the Case structure.
7. Add a Property Node to the For Loop.
- ☐ Use the Class Browser window to find and drop the Active Plot Property Node inside the For Loop.
 - Object library: **VI Server**
 - Class: **Generic»Generic**
 - Select **All classes in the VI Server library** in the Search Scope section
 - Search string: `Active Plot`
 - Select the **Active Plot** entry with class type of **WaveformGraph**
 - ☐ Wire the **reference out** output of the second Property Node through the border of the For Loop to the **reference** input of the third Property Node.
 - ☐ Expand the third Property Node to display two properties.
 - ☐ Click the second property in the Property Node and select **Plot»Plot Name** from the list.

- ☐ Right-click the third Property Node and select **Change All To Write** from the shortcut menu.
- ☐ Wire the block diagram as shown in Figure 5. Use shift registers when wiring the error wires through the For Loop. Confirm that auto indexing is enabled on the Plot Names tunnel on the For Loop.

8. Handle WaveformChart references.

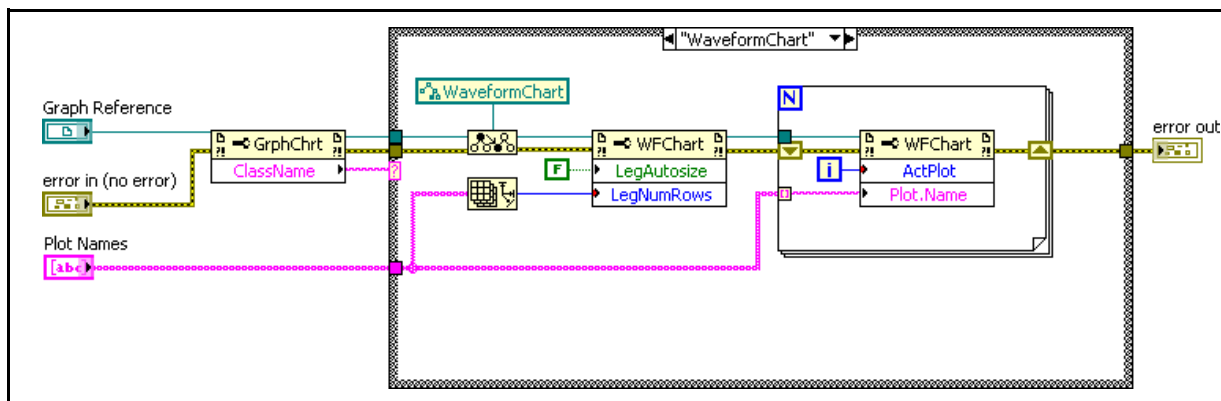


Figure 6. WaveformChart Case

- ☐ Right-click the border of the Case structure and select **Duplicate Case** from the shortcut menu.
- ☐ Enter `WaveformChart` in the case name.



Caution The text entered in the case selector label must exactly match the input string, including spaces and case. For this example, enter `WaveformChart`.

- ☐ Click the WaveformGraph reference constant and select **Generic»GObject»Control»GraphChart»WaveformChart**.



Note When you change the class of a control reference, all Property Nodes and Invoke Nodes using the reference become invalid because the properties refer to a class that does not match the reference. Notice that all the property names change to black when you change the class reference and that the run arrow is broken. Leave the broken wires alone, because the wires reconnect as you reselect the properties.

- ☐ Click each of the four properties and select the correct property again. The four properties are **Legend»Autosize**, **Legend»Number of Rows**, **Active Plot**, and **Plot»Plot Name**. The resulting block diagram appears as shown in Figure 6.

9. Create the icon and connector pane for the subVI. Figure 5-15 shows an example icon and connector pane.

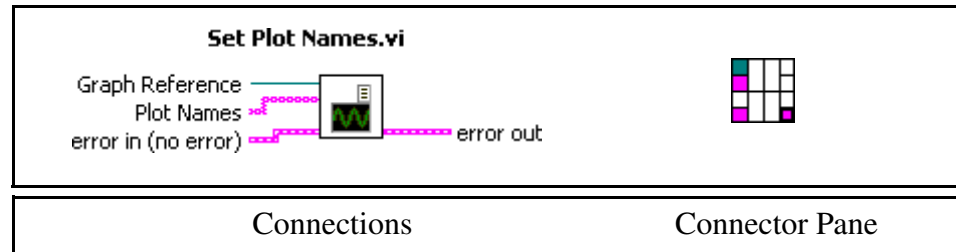


Figure 7. Connector Pane Connections for Set Plot Names VI

- ☐ Switch to the front panel of the VI.
- ☐ Right-click the **connector pane** and select **Patterns** from the shortcut menu to choose a pattern.
- ☐ Wire the connector pane.
- ☐ Right-click the **icon** and select **Edit Icon** from the shortcut menu.
- ☐ Use the tools in the Icon Editor to create an icon.
- ☐ Close the Icon Editor when you are finished.

10. Save the VI

Test

1. Test the VI using a Waveform Graph.

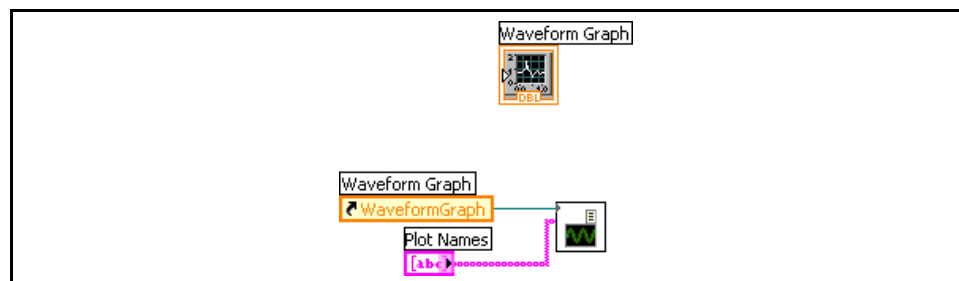


Figure 8. Set Plot Names Test

- ☐ Create a blank VI.
- ☐ Add a **Waveform Graph** to the front panel window.
- ☐ Open the block diagram.



- ☐ Right-click the **Waveform Graph** indicator and select **Create»Reference** from the shortcut menu.
- ☐ Add the **Set Plot Names VI** to the block diagram of the new VI.



Tip If the Set Plot Names VI is open, you can drag the icon from upper right corner of its front panel to the block diagram of the new VI.

- ☐ Wire the WaveformGraph reference to the **Graph Reference** input of the Set Plot Names VI.
 - ☐ Right-click the **Plot Names** input of the Set Plot Names VI and select **Create»Control** from the shortcut menu. The block diagram should resemble Figure 8.
 - ☐ Switch to the front panel window of the new VI.
 - ☐ Type **One** and **Two** as items in the **Plot Names** array.
 - ☐ Move the **Plot Legend** to the right of the graph so that you can expand the legend.
 - ☐ Run the VI. **One** and **Two** appear in the legend.
2. Test the VI using a Waveform Chart.
- ☐ Right-click the **waveform graph** and select **Replace»Graph»Waveform Chart** from the shortcut menu.
 - ☐ Type **Three** as another item in the **Plot Names** array.
 - ☐ Run the VI. **Three** appears in the legend of the chart.
3. Test the VI with an XY Graph.
- ☐ Right-click the **waveform chart** and select **Replace»Graph»XY Graph** from the shortcut menu.
 - ☐ Add **Four** as another item in the **Plot Names** array.
 - ☐ Run the VI. A typecasting error occurs.



Note The error is displayed because the control reference of the XY Graph is not supported in the subVI.

4. Close the VI. You do not need to save the VI used for testing the Set Plot Names VI.

End of Exercise

Notes
