LabVIEW™ Custom Controls, Indicators, and Type Definitions

Introduction

This application note explains how to create, edit, and use custom controls and indicators, type definitions, and strict type definitions.

Use custom controls and indicators to extend the available set of front panel objects. You can create custom user interface components for your application that vary cosmetically from built-in LabVIEW controls and indicators. You can save a custom control or indicator you created in a directory or VI library and use the custom control or indicator on other front panels. You also can create an icon for the custom control or indicator and add it to the **Controls** palette.

Use type definitions and strict type definitions to link all the instances of a custom control or indicator to a saved custom control or indicator file. You can make changes to all instances of the custom control or indicator by editing only the saved custom control or indicator file, which is valuable if you use the same custom control or indicator in several VIs.

Using the Control Editor Window

Use the Control Editor window to customize controls and indicators. For example, you can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.

You can display the Control Editor window in the following ways:

- Right-click a control or indicator on the front panel and select **Advanced»Customize** from the shortcut menu.
- Use the Positioning tool to select a control or indicator on the front panel and select **Edit»Customize Control**.
- Use the **New** dialog box. Complete the following steps to display the Control Editor window from the **New** dialog box.

1. Select **File»New** to display the **New** dialog box.
2. Select **Custom Control** under the **Other Document Types** heading in the **Create new** list of the **New** dialog box.
3. Click the **OK** button to display the Control Editor window.
4. Place a control or indicator in the Control Editor window.

Even though the Control Editor window looks like a front panel, you use it only for customizing a single control or indicator. The Control Editor window does not have a block diagram and cannot run.

The Control Editor window can contain only one control or indicator. However, you can customize an array or cluster control or indicator that contains other controls or indicators. The **Invalid Control** button  appears on the

Control Editor window toolbar while you move controls or indicators in and out of an array or cluster. Click the **Invalid Control** button to display an explanation of the error in the **Error list** window.

The Control Editor window toolbar indicates whether you are in edit mode  or in customize mode  . The Control Editor window opens in edit mode. Click the **Edit Mode** button to change to customize mode. Click the **Customize Mode** button to return to edit mode. You also can switch between modes by selecting **Operate»Change to Customize Mode** or **Operate»Change to Edit Mode**.

Use edit mode to change the size or color of a control or indicator and to select options from its shortcut menu, just as you do in edit mode on a front panel.

Use customize mode to make extensive changes to controls or indicators by changing the individual parts of a control or indicator.

Customize Mode Shortcut Menus

In customize mode, a shortcut menu for each part replaces the shortcut menu for the control or indicator as a whole. Different parts have different shortcut menus. Use the shortcut menus to perform the following operations:

- Customize cosmetic parts, such as objects from the **Decorations** palette added to a custom control or indicator. Refer to the *Adding Cosmetic Parts to Custom Controls and Indicators* section of this document for information about cosmetic parts.
- Customize text parts, such as the name label.
- Customize controls or indicators as parts, such as the numeric control used for the digital display of a slide control. Knobs, meters, and charts also use a numeric control for a digital display. Some controls are more complicated. For example, the graph uses an array of clusters for its cursor display part. Refer to the *Customizing Individual Parts of Controls and Indicators* section of this document for information about controls and indicators used as parts of other controls and indicators.

Creating and Editing Custom Controls and Indicators

You can create a custom control or indicator directly from the front panel or by using the **New** dialog box.

Creating a Custom Control or Indicator from the Front Panel

Complete the following steps to create a custom control or indicator from the front panel.

1. Right-click the control or indicator on the front panel you want to customize and select **Advanced»Customize** from the shortcut menu to display the Control Editor window. You also can use the Positioning tool to select the control or indicator on the front panel you want to customize and select **Edit»Customize Control** to display the Control Editor window. You can customize only one control or indicator at a time.
2. Make the changes you want to the control or indicator. You can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.
3. (Optional) Select **File»Apply Changes** to apply the changes to the control or indicator on the front panel. The **Apply Changes** item is available only after you make changes to the original control or indicator. If you make changes to a control or indicator and try to close the Control Editor window without selecting **File»Apply Changes**, LabVIEW displays a message asking if you want to replace the original control or indicator with the custom control or indicator.
4. Select **File»Save** to save the custom control or indicator so you can use it on other front panels. You can save the custom control or indicator in a directory or in a VI library. If you do not want to save the custom control or indicator for use on other front panels, close the Control Editor window without saving the custom control or indicator.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Creating a Custom Control or Indicator Using the New Dialog Box

Complete the following steps to create a custom control or indicator from the **New** dialog box.

1. Select **File»New** to display the **New** dialog box.
2. Select **Custom Control** under the **Other Document Types** heading in the **Create new** list of the **New** dialog box.
3. Click the **OK** button to display the Control Editor window.
4. Place a control or indicator in the Control Editor window.
5. Make the changes you want to the control or indicator. You can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.
6. Select **File»Save** to save the custom control or indicator so you can use it on other front panels. You can save the custom control or indicator in a directory or in a VI library.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Editing a Saved Custom Control or Indicator

Complete the following steps to edit a saved custom control or indicator.

1. Select **File»Open** to display a file dialog box.
2. Navigate to the custom control or indicator you want to edit.
3. Select the custom control or indicator and double-click the custom control or indicator or click the **Open** button to display the custom control or indicator in the Control Editor window.
4. Make the changes you want to the custom control or indicator. You can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.
5. Select **File»Save** to save the custom control or indicator.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Placing Custom Controls and Indicators on Front Panels and Block Diagrams

You can place custom controls and indicators on front panels and block diagrams by dragging them from the Control Editor window or by selecting them on the **Controls** palette or the **Functions** palette. Placing a custom control or indicator on a block diagram creates a constant with the same data type as the custom control or indicator. You also can add custom controls and indicators to the **Controls** and **Functions** palettes. Refer to the *LabVIEW Help* for information about creating and editing custom palette views.

Complete the following steps to select a custom control or indicator on the **Controls** or **Functions** palette and place it on the front panel or block diagram.

1. Click the **Select a Control** icon on the **Controls** palette or the **Select a VI** icon on the **Functions** palette to display a file dialog box.
2. Navigate to the custom control or indicator you want to place.
3. Select the custom control or indicator and double-click the custom control or indicator or click the **Open** button and place the custom control or indicator on the front panel or block diagram.
4. Save the VI with the custom control or indicator in place.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Customizing Individual Parts of Controls and Indicators

Independent Parts of Controls or Indicators

All controls and indicators are built from smaller parts. For example, the following illustration shows the individual parts of a slide control.

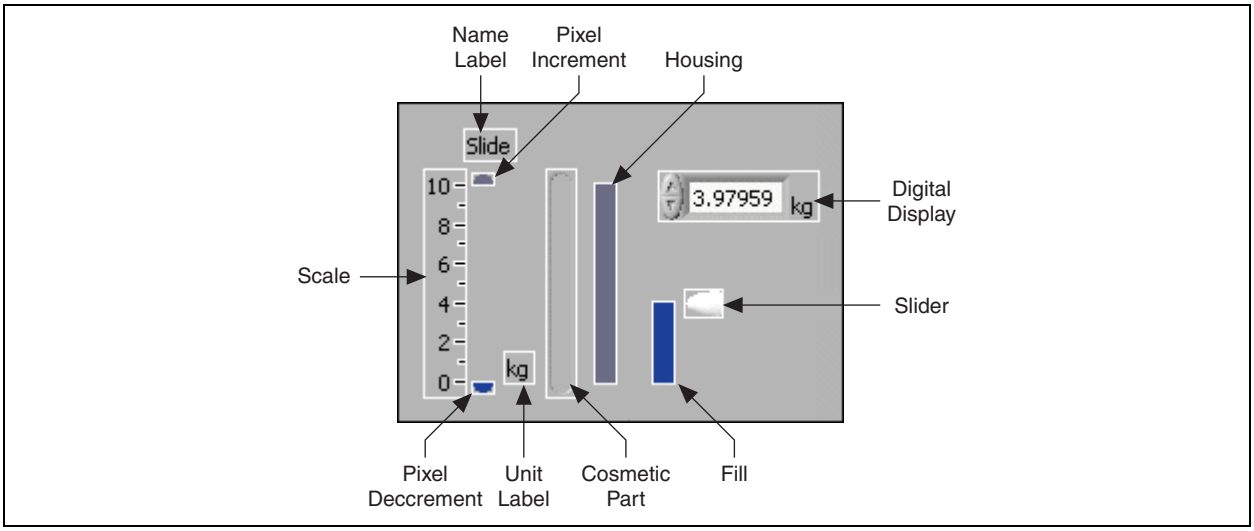

Figure 1. Parts of a Slide Control

When you switch to customize mode in the Control Editor window, the parts of the control or indicator become independent. You can make changes to each part without affecting any other part. Customize mode shows all parts of the control or indicator, including any parts that are hidden in edit mode, such as the name label or the radix on a digital control. Because the parts of the control or indicator are detached from each other, you cannot operate or change the value of the control or indicator while in customize mode.

In customize mode, you can use the Positioning tool to select two or more parts of the control or indicator and rearrange the parts by using the **Align Objects**, **Distribute Objects**, and **Reorder** pull-down menus on the toolbar. Refer to the *LabVIEW Help* for more information about aligning, distributing, and reordering objects.

Control Parts Window

Select **Window»Show Parts Window** to display the **Control Parts** window. Use the **Control Parts** window to size and position the individual parts of a control or indicator. The **Control Parts** window identifies the parts of the control or indicator and shows the exact position and size of each part in pixels.

The **Current Part** section of the **Control Parts** window contains an image and the name of the part you selected in the Control Editor window. Click the **Current Part** display to display and select among all the parts of the control or indicator. Click the **Current Part** increment or decrement arrow to scroll through the parts of the control or indicator.

When you move or resize a part in the Control Editor window, LabVIEW updates the position and size in the **Current Parts** and **Part Position and Dimensions** sections of the **Control Parts** window. You also can enter the position and size values directly in the **Part Position and Dimensions** section to move or resize the part in the Control Editor window, which is useful when you must make two parts exactly the same size or align one part with another. After entering position and size values in the **Part Position and Dimensions** section, press the <Enter> key or click the left mouse button for the changes to take effect.

Customizing Controls and Indicators that Are Parts of Controls and Indicators

A control or indicator can include other controls or indicators as parts. In this section, controls and indicators used as parts of other controls and indicators are referred to as component controls and indicators. For example, the slide control in Figure 1 uses a digital numeric control for the digital display, making the digital numeric control a component control. You can find out if part of a control or indicator is a component control or indicator by trying to move the part on the front panel. You can move a component control or indicator independently of the parent control or indicator.

Often, component controls or indicators also are made up of parts. When you edit the original control or indicator in the Control Editor window, the component control or indicator behaves as a single part. That is, you cannot change or move individual parts of the component control or indicator. However, you can customize the component control or indicator by displaying a second Control Editor window that contains only the component control or indicator. You do not have to place the original Control Editor window in customize mode to display a second Control Editor window unless you are unable to select the component control or indicator in edit mode.

Complete the following steps to customize a component control or indicator in a custom control or indicator.

1. Right-click the control or indicator on the front panel you want to customize and select **Advanced»Customize** from the shortcut menu to display the Control Editor window.
2. Right-click the component control or indicator in the Control Editor window and select **Advanced»Customize** from the shortcut menu to display another Control Editor window that contains only the component control or indicator.
3. Click the **Edit Mode** button to place the new Control Editor window in customize mode.
4. Make the changes you want to the individual parts of the component control or indicator. You can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.
5. (Optional) Select **File»Apply Changes** to apply the changes to the component control or indicator in the original Control Editor window. The **Apply Changes** item is available only after you make changes to the original component control or indicator. If you make changes to a component control or indicator and try to close the Control Editor window without selecting **File»Apply Changes**, LabVIEW displays a message asking if you want to replace the original component control or indicator with the custom component control or indicator.

You can nest Control Editor windows indefinitely. However, most controls or indicators use other controls or indicators as parts only at the top level. An exception is the graph, which uses complicated controls as parts that in turn use other controls as parts.

If a component control or indicator is visible on the front panel, use the Positioning tool to select the component control or indicator you want to customize. Select **Edit»Customize Control** to display a Control Editor window that contains only the component control or indicator.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Adding Cosmetic Parts to Custom Controls and Indicators

You can use the Control Editor window to add graphics, text, and decorations to a custom control or indicator in either edit mode or customize mode. If you paste a graphic or text from the clipboard, create a label using the Labeling tool, or select a decoration from the **Decorations** palette, the object becomes a new decoration part of the control or indicator and appears with the control or indicator when you place it on a front panel. In the Control Editor window, you can move, resize, change the layering order, or replace the new decoration part. When you use a custom control or indicator on a front panel, you can change the size of any decoration parts you added. However, you cannot move the added decoration parts.

Customize Mode Shortcut Menu Items for Cosmetic Parts

Cosmetic parts can have a single graphic, multiple graphics that display at different times, and multiple graphics that are independent from each other. To customize cosmetic parts, place the Control Editor window in customize mode and right-click the cosmetic part you want to customize. The shortcut menu items available depend on the type of cosmetic part.

Cosmetic Parts with a Single Graphic

The shortcut menu for cosmetic parts with a single graphic contains the following items:

- **Copy to Clipboard** – Places a copy of the graphic of the part on the clipboard. After you copy a shape to the clipboard, right-click a part and select **Import Picture** from the shortcut menu to import the shape into the part.

  When you need simple shapes for customizing cosmetic parts, consider copying the shapes from built-in parts of other controls or indicators instead of creating them in a graphics application. For example, if you need a simple rectangular shape, such as the housing in Figure 1, right-click the housing and select **Copy to Clipboard** from the shortcut menu. Graphics taken from built-in parts or decorations resize better than graphics made in a graphics application. For example, when you resize a rectangle drawn in a graphics application, the rectangle grows uniformly, enlarging its area and making its border thicker. When you resize a rectangle copied from a part of a built-in control or indicator, the rectangle keeps the same thin border.

  Parts copied from a built-in control or indicator have a similar appearance on color monitors and on black-and-white monitors. In addition, you can use the Coloring tool to add color to graphics you copy from built-in parts and decorations. You cannot change the color of a graphic you import from another source because the color is part of the definition of the graphic.
- **Import Picture** – Replaces the current graphic of a cosmetic part with the graphic currently on the clipboard. For example, you can import graphics of an open and closed valve for a Boolean switch. If the clipboard does not contain a graphic, the **Import Picture** item is not available.
- **Import at Same Size** – Replaces the current graphic and keeps the original size of the part, shrinking or enlarging the clipboard graphic to fit. If the clipboard does not contain a graphic, the **Import at Same Size** item is not available.
- **Revert** – Restores a part to its original appearance without changing the position of the part. If you display the Control Editor window for a front panel control or indicator and make changes to a part, selecting **Revert** from the shortcut menu changes the part back to the way it looks on the front panel. If you open a custom control or indicator file in the Control Editor window, the **Revert** item is not available.
- **Original Size** – Restores the graphic of a part to its original size, which is useful for graphics you import from other applications and then resize. Some graphics imported from other applications do not look as good as the original when you resize them. You might want to restore the imported graphic to its original size to improve the appearance of the graphic. If you do not import a graphic, the **Original Size** item is not available.

Cosmetic Parts with Multiple Dependent Graphics

Some cosmetic parts have multiple dependent graphics that display at different times. The different graphics are the same size and use the same colors. When you move or resize the current graphic of the cosmetic part, its other graphics also move the same amount or change size proportionally. For example, a Boolean switch has four different graphics. The first graphic shows the FALSE state. The second graphic shows the TRUE state. The third graphic shows the Switch When Released state, which is the TRUE to FALSE transition state. The fourth graphic shows the Latch When Released state, which is the FALSE to TRUE transition state. When the Boolean control is in the Switch When Released state or the Latch When Released state, the value of the Boolean control does not change until you release the mouse button. Between the time you click the mouse button and the time you release the mouse button, the Boolean control shows the third or fourth graphic as a transition state. Refer to the *LabVIEW Help* for information about setting the mechanical action of Boolean controls.

The shortcut menu for cosmetic parts with multiple dependent graphics contains all the items available for cosmetic parts with a single graphic plus the **Picture Item** item. Selecting **Picture Item** from the shortcut menu displays all the

graphics that belong to a cosmetic part. The current graphic item has a dark border around it. When you import a graphic, you change only the current graphic item. To import a graphic for one of the other graphic items, right-click the part, select **Picture Item** from the shortcut menu, select the graphic item, and import the new graphic.

Cosmetic Parts with Multiple Independent Graphics

A cosmetic part with more than one graphic can have graphics of different sizes that each use different colors. For example, the slide uses two graphics of different sizes to show which slider is active on a multivalue slide. The shortcut menu for cosmetic parts with multiple independent graphics contains all the items available for cosmetic parts with single graphics and multiple dependent graphics plus the **Independent Sizes** item. Select **Independent Sizes** from the shortcut menu to place a checkmark next to it so you can move and resize each graphic individually without changing the other graphics of the cosmetic part.

Text Parts

A text part is a graphic with text, such as a label. The shortcut menu for a text part contains all the items available for cosmetic parts with a single graphic and the items available for text elements on a front panel in edit mode. The **Control Parts** window shows only the background graphic for the text part, not the text itself. You can customize the background graphic but not the text.

Edit Mode Option for Boolean Controls and Indicators

Unlike other controls and indicators, into which you can import graphics only when the Control Editor window is in customize mode, you can import graphics into Boolean controls and indicators when the Control Editor window is in edit mode. When the Control Editor window is in edit mode and you right-click a Boolean control or indicator, the shortcut menu that appears contains all the items available for Boolean controls and indicators on a front panel in edit mode plus the **Import Picture** item.

Importing Graphics into a Boolean Control or Indicator with the Control Editor Window in Edit Mode

Complete the following steps to import graphics into a Boolean control or indicator with the Control Editor window in edit mode.

1. Right-click the Boolean control or indicator on the front panel you want to customize and select **Advanced»Customize** from the shortcut menu to display the Control Editor window. The Control Editor window opens in edit mode.
2. Select **Edit»Import Picture from File** to display a file dialog box.
3. Navigate to the graphic you want to import.
4. Select the graphic and double-click the graphic or click the **Open** button to place the graphic on the clipboard.
5. Right-click the Boolean control or indicator, select **Import Picture** from the shortcut menu, and select among the following items:
   - **False** – Applies the imported graphic to the FALSE state of the Boolean control or indicator. The imported graphic appears only when the control or indicator is in the FALSE state.
   - **True** – Applies the imported graphic to the TRUE state of the Boolean control or indicator. The imported graphic appears only when the control or indicator is in the TRUE state.
   - **Decal** – Applies the imported graphic to all states of the Boolean control or indicator. The graphic remains visible regardless of the state of the Boolean control or indicator.

   LabVIEW imports the graphic into the normal state and into the corresponding transition state.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Importing Graphics into a Boolean Control or Indicator with the Control Editor Window in Customize Mode

Complete the following steps to import graphics into a Boolean control or indicator with the Control Editor window in customize mode.

1. Right-click the Boolean control or indicator on the front panel you want to customize and select **Advanced»Customize** from the shortcut menu to display the Control Editor window.
2. Click the **Edit Mode** button to place the Control Editor window in customize mode.
3. Select **Edit»Import Picture from File** to display a file dialog box.
4. Navigate to the graphic you want to import.
5. Select the graphic and double-click the graphic or click the **Open** button to place the graphic on the clipboard.
6. Right-click the Boolean control or indicator, select **Picture Item** from the shortcut menu, and select among the following items to apply the graphic to a state of the Boolean control or indicator:
   - The first selection applies the graphic to the FALSE state.
   - The second selection applies the graphic to the TRUE state.
   - The third selection applies the graphic to the Switch When Released state, which is the TRUE to FALSE transition state.
   - The fourth selection applies the graphic to the Latch When Released state, which is the FALSE to TRUE transition state.
7. Right-click the Boolean control or indicator and select **Import Picture** from the shortcut menu to replace the selected part of the Boolean control or indicator with the graphic on the clipboard. You also can right-click the Boolean control or indicator and select **Import at Same Size** from the shortcut menu to import the graphic at the same size as the selected part of the Boolean control or indicator.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Caveats and Recommendations when Creating Custom Controls and Indicators

The following list describes some of the caveats and recommendations to consider when you create custom controls and indicators:

- Graphics you create on one platform look slightly different when you load them on another platform. For example, a graphic with an irregular shape on a transparent background might have a solid white background on another platform. Refer to the *Picture Differences* section of the *Porting and Localizing LabVIEW VIs* Application Note for more information about differences among platforms.
- Customizing a control or indicator in the Control Editor window changes only the appearance of the control or indicator, not the behavior of the control or indicator. You cannot use the Control Editor window to change the way a control or indicator displays data. You also cannot use the Control Editor window to change the way a control or indicator behaves when you edit it, such as when you resize it. For example, when you make a ring control taller, the increment and decrement arrows also increase in height. If you move the increment and decrement arrows so they are side by side at the bottom of a ring control, the buttons become taller when the ring control becomes taller.
- Custom controls or indicators often look correct but occasionally behave oddly. If you like the appearance of a custom control or indicator but are not pleased with its irregular editing behavior, use a strict type definition. Refer to the *Type Definitions and Strict Type Definitions* section of this document for information about strict type definitions.

Linking Custom Controls and Indicators to a Saved Custom Control or Indicator File

When you place a custom control or indicator in a VI, no connection exists between the custom control or indicator you saved and the instance of the custom control or indicator in the VI. Each instance of a custom control or indicator is a separate, independent copy. Therefore, changes you make to a custom control or indicator file do not affect VIs already using that custom control or indicator. If you want to link instances of a custom control or indicator to the custom control or indicator file, save the custom control or indicator as a type definition or a strict type definition. All instances of a type definition or a strict type definition link to the original file from which you created them.

When you save a custom control or indicator as a type definition or strict type definition, any data type changes you make to the type definition or strict type definition affect all instances of the type definition or strict type definition in all the VIs that use it. Also, cosmetic changes you make to a strict type definition affect all instances of the strict type definition. Refer to the *Type Definitions and Strict Type Definitions* section of this document for more information about type definitions and strict type definitions.

Type Definitions and Strict Type Definitions

Use type definitions and strict type definitions to link all the instances of a custom control or indicator to a saved custom control or indicator file. You can make changes to all instances of the custom control or indicator by editing only the saved custom control or indicator file, which is valuable if you use the same custom control or indicator in several VIs.

Type Definitions

Type definitions identify the correct data type for each instance of a custom control or indicator. When the data type of a type definition changes, all instances of the type definition automatically update. In other words, the data type of the instances of the type definition change in each VI where the type definition is used. However, because type definitions identify only the data type, only the values that are part of the data type update. For example, on numeric controls, the data range is not part of the data type. Therefore, type definitions for numeric controls do not define the data range for the instances of the type definitions. Also, because the item names in ring controls do not define the data type, changes to ring control item names in a type definition do not change the item names in instances of the type definition. However, if you change the item names in the type definition for an enumerated type control, the instances update because the item names are part of the data type. An instance of a type definition can have its own unique label, description, default value, size, color, or style of control or indicator, such as a knob instead of a slide.

If you change the data type in a type definition, LabVIEW converts the old default value in instances of the type definition to the new data type, if possible. LabVIEW cannot preserve the instance default value if the data type changes to an incompatible type, such as replacing a numeric control or indicator with a string control or indicator. When the data type of a type definition changes to a data type incompatible with the previous type definition, LabVIEW sets the default value of instances to the default value for the new data type. For example, if you change a type definition from a numeric to a string type, LabVIEW replaces any default values associated with the old numeric data type with empty strings.

You can prevent an individual instance of a type definition from automatically updating when the data type of the type definition changes by right-clicking the instance of the type definition and selecting **Auto-Update from Type Def.** from the shortcut menu to remove the checkmark next to it. Refer to the *Preventing an Instance of a Type Definition from Automatically Updating* section of this document for more information about preventing an instance of a type definition from automatically updating.

Strict Type Definitions

A strict type definition forces everything about an instance to be identical to the strict type definition, except the label, description, and default value. As with type definitions, the data type of a strict type definition remains the same everywhere you use the strict type definition. Strict type definitions also define other values, such as range checking on numeric controls and the item names in ring controls. The only VI Server properties available for strict type definitions are those that affect the appearance of the control or indicator, such as Visible, Disabled, Key Focus, Blinking, Position, and Bounds.

You cannot prevent an instance of a strict type definition from automatically updating unless you remove the link between the instance and the strict type definition. Refer to the *Removing the Link between an Instance and a Type Definition or Strict Type Definition* section of this document for information about removing the link between an instance and a strict type definition.

Creating and Editing Type Definitions and Strict Type Definitions

Use the Control Editor window to create and edit type definitions and strict type definitions. You use the same techniques to customize type definitions and strict type definitions that you use to customize other controls and indicators.

Creating Type Definitions and Strict Type Definitions

Complete the following steps to create a type definition or a strict type definition.

1. Right-click the control or indicator on the front panel you want to customize and select **Advanced»Customize** from the shortcut menu to display the Control Editor window.
2. Select **Type Def.** or **Strict Type Def.** from the **Type Def. Status** pull-down menu.
3. Make the changes you want to the control or indicator. You can change the size, color, and relative position of the elements of a control or indicator and import images into the control or indicator.
4. (Optional) Select **File»Apply Changes** to apply the changes to the control or indicator on the front panel. The **Apply Changes** item is available only after you make changes to the original control or indicator. If you make changes to a control or indicator and try to close the Control Editor window without selecting **File»Apply Changes**, LabVIEW displays a message asking if you want to replace the original control or indicator with the custom control or indicator.
5. Select **File»Save** to save the custom control or indicator as a type definition or a strict type definition. You can save the type definition or strict type definition in a directory or in a VI library.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Editing Saved Type Definitions and Saved Strict Type Definitions

Complete the following steps to edit a saved type definition or a saved strict type definition.

1. Select **File»Open** to display a file dialog box.
2. Navigate to the type definition or strict type definition you want to edit.
3. Select the type definition or strict type definition and double-click the type definition or strict type definition or click the **Open** button to display the type definition or strict type definition in the Control Editor window.
4. Make the changes you want to the type definition or strict type definition. Only changes to the data type of a type definition affect instances of the type definition. Almost any change you make to a strict type definition, such as changing the data type, making cosmetic changes, or changing item names in a ring control, affects all instances of the strict type definition.
5. Select **File»Save** to save the type definition or strict type definition.

Note When you change the data type of a type definition or make almost any change to a strict type definition while a front panel using an instance of the type definition or strict type definition is open, the instance of the type definition or strict type definition does not automatically update. Select **File»Apply Changes** to immediately apply the changes to the instances of the type definition or strict type definition on open front panels.

Refer to the *LabVIEW Help* for the most recent version of these instructions.

Preventing an Instance of a Type Definition from Automatically Updating

You can prevent an individual instance of a type definition from automatically updating when the data type of the type definition changes by right-clicking the instance and selecting **Auto-Update from Type Def.** from the shortcut menu to remove the checkmark next to it. Removing the checkmark from the **Auto-Update from Type Def.** item prevents the instance from automatically updating when the data type of the type definition changes but preserves the link between the instance and the type definition. You can remove the link between an instance and a type definition by right-clicking the instance and selecting **Disconnect from Type Def.** from the shortcut menu.

Note You cannot prevent an instance of a strict type definition from automatically updating unless you remove the link between the instance and the strict type definition. Refer to the *Removing the Link between an Instance and a Type Definition or Strict Type Definition* section of this document for information about removing the link between an instance and a strict type definition.

If you disable automatic updating for an instance of a type definition and change the data type of the instance, the instance appears dimmed, and the **Run** button appears broken. To enable the instance, right-click the instance and select **Update from Type Def.** or **Disconnect from Type Def.** from the shortcut menu. Selecting **Update from Type Def.** changes the data type of the instance to the data type of the type definition. **Disconnect from Type Def.** permanently removes the link between the instance and the type definition. Refer to the *Removing the Link Between an Instance and a Type Definition or Strict Type Definition* section of this document for more information about removing the link between an instance and a type definition.

When you change the data type of a type definition, all instances of that type definition that have automatic updating disabled appear dimmed when you open saved VIs containing the instances. Also, the **Run** button of the VI is broken. To enable the instance, right-click the instance and select **Update from Type Def.** or **Disconnect from Type Def.** from the shortcut menu.

Removing the Link between an Instance and a Type Definition or Strict Type Definition

You can permanently remove the link between an instance of a type definition or a strict type definition and the type definition or strict type definition by right-clicking the instance and selecting **Disconnect from Type Def.** from the shortcut menu. Disconnecting from the type definition or strict type definition removes the restrictions on the data type of the instance, making the instance an ordinary control or indicator.

Reestablishing the Link to a Type Definition or Strict Type Definition

If you want to reestablish the link between a control or indicator and a type definition or strict type definition, you must replace the control or indicator with an instance of the type definition or strict type definition. To do so, right-click the control or indicator, select **Replace** from the shortcut menu, and navigate to the type definition or strict type definition.

Unavailable Type Definitions and Strict Type Definitions

For each instance of a type definition or strict type definition, the VI containing the instance maintains a connection to the file where you saved the type definition or strict type definition. For a VI that contains an instance of a type definition or strict type definition to run, the VI must have available to it the file that contains the type definition or strict type definition. If you open a VI and LabVIEW cannot find a type definition or strict type definition the VI needs, LabVIEW disables the instances of that type definition or strict type definition in the VI, and the **Run** button appears broken. To allow the VI to run, find and open the correct type definition or strict type definition. You also can right-click the disabled instance and select **Disconnect From Type Def.** from the shortcut menu to permanently remove the link between the instance and the type definition or strict type definition.

Using Type Definitions and Strict Type Definitions

You place type definitions and strict type definitions on the front panel or block diagram the same way you place any custom control or indicator on the front panel or block diagram. Refer to the *Placing Custom Controls and Indicators on Front Panels and Block Diagrams* section of this document for information about placing custom controls and indicators, including type definitions and strict type definitions, on front panels and block diagrams.

Using Type Definitions and Strict Type Definitions on Front Panels

When you right-click an instance of a type definition or a strict type definition, the shortcut menu includes type definition options. You can open the type definition or strict type definition from the front panel by right-clicking the instance and selecting **Open Type Def.** from the shortcut menu.

Using Cluster Type Definitions and Cluster Strict Type Definitions

If you place an instance of a cluster type definition or cluster strict type definition on a front panel, use the Bundle By Name function and the Unbundle By Name function on the block diagram to access the elements of the cluster. Unlike the Bundle function and the Unbundle function, which reference cluster elements by cluster order, the Bundle By Name function and the Unbundle By Name function reference elements of the cluster by name. Therefore, reordering the elements or adding new elements to the cluster type definition or cluster strict type definition does not break the VI.

If you delete an element from the cluster type definition or cluster strict type definition wired to the Bundle by Name function or the Unbundle By Name function, you must change the block diagram because the reference to the missing element becomes invalid. Invalid names in the Bundle by Name function and the Unbundle by Name function appear black. Click the Bundle by Name function or the Unbundle By Name function to display a list of valid names from which to select.

Using Type Definitions and Strict Type Definitions on Block Diagrams

If you place an instance of a type definition or strict type definition on a block diagram, it appears as a constant, not as a front panel terminal. Changes you make to type definitions and strict type definitions affect instances placed on block diagrams as constants in the same way the changes affect front panel instances.