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OVL Checkers Manager User's Guide

Including Support for ModelSim® DE/SE and Questa® SIM

Software Version 2020.4

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Table of Contents

List of Figures

List of Tables

Chapter 1
OVL Checkers Manager Basic Operations

The Open Verification Library (OVL) provides designers, integrators, and verification engineers with a single, vendor-independent set of assertion checkers that verify specific properties of a design. Using a single, well-defined set of assertion checkers, the OVL makes more advanced verification tools and techniques available for non-expert users.

The Questa OVL Checkers Manager simplifies the verification process further by providing a graphic interface for accessing, customizing, and compiling OVL assertion checkers for SVA, Verilog, PSL (Verilog), and VHDL.

You can find a PDF file of the Open Verification Library Language Reference Manual in:

<*your_install_directory*>\verilog_src\std_ovl\docs

or,

<*your_install_directory*>\vhdl_src\std_ovl\docs

The same directory contains an assertion and an OVL Quick Guide (in pdf format) as well as assertion and OVL timing diagrams.

Recommended Usage Flow for the OVL Checkers Manager

All usage flow actions take place in the OVL Checkers Manager graphic interface. You start by invoking the OVL Checkers Manager graphic interface.

Invoking the OVL Checkers Manager

Invoke the graphic interface for the OVL Checkers Manager from a UNIX/Linux®[1] shell or from a Windows directory.

Procedure

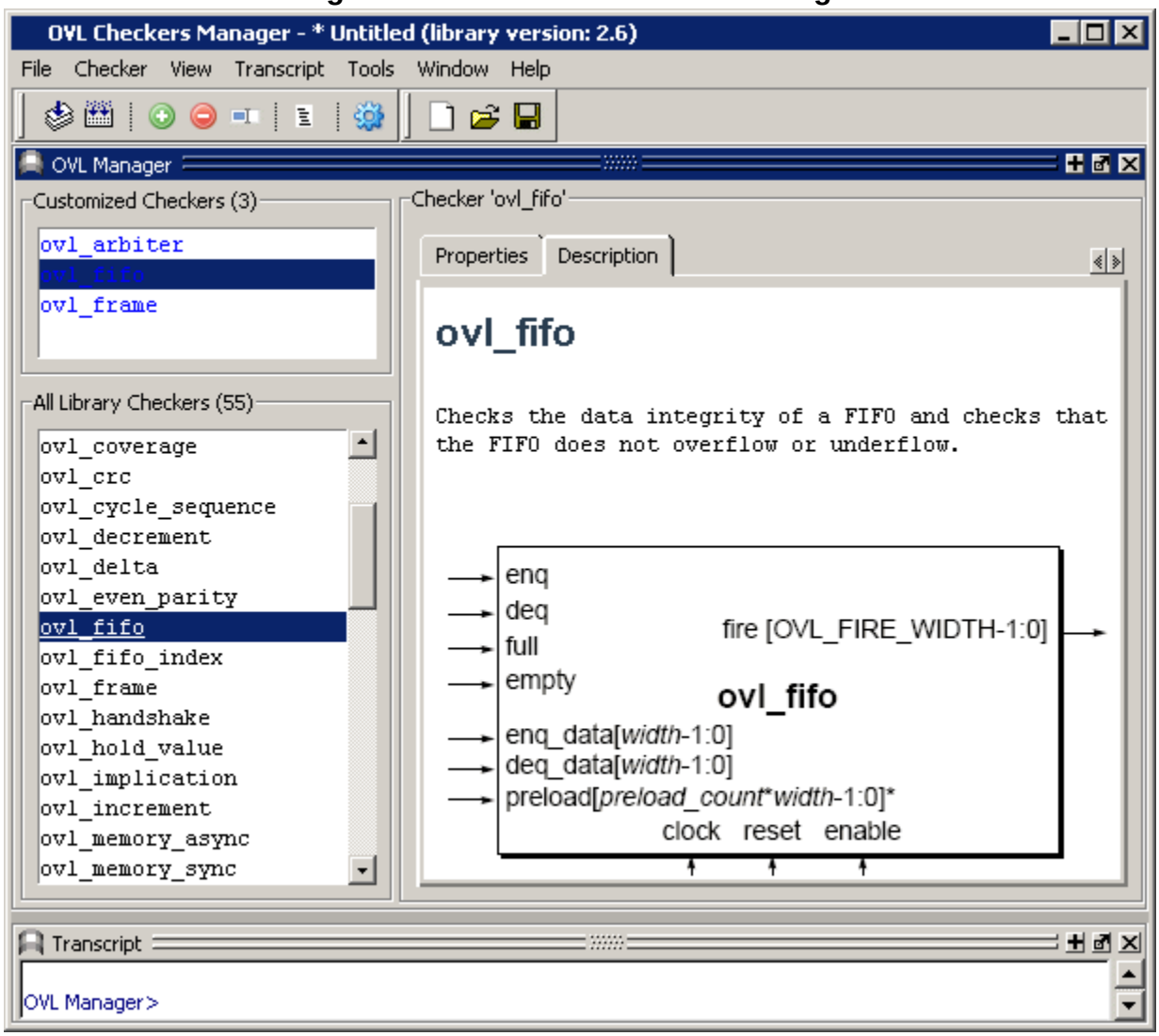
Invoke the OVL Checkers Manager with the action appropriate to your platform.

- Linux — Access the install directory and type “vovl” at the prompt.
- Windows — Open the *win32* or *win64* directory in the install directory and double-click *vovl.exe*.

Either of these actions opens the OVL Checkers Manager graphic interface, as shown in Figure 1-1.

1. Linux® is a registered trademark of Linus Torvalds in the U.S. and other countries.

Figure 1-1. The OVL Checkers Manager



The OVL Checkers Manager currently supports only version 2.8.1 of the Open Verification Library.

Selecting an Implementation Language

The first step you must take after invoking the OVL Checkers Manager's graphic interface is to select an implementation language. The Global Properties dialog box enables you to select an implementation language for the OVL checkers in your design.

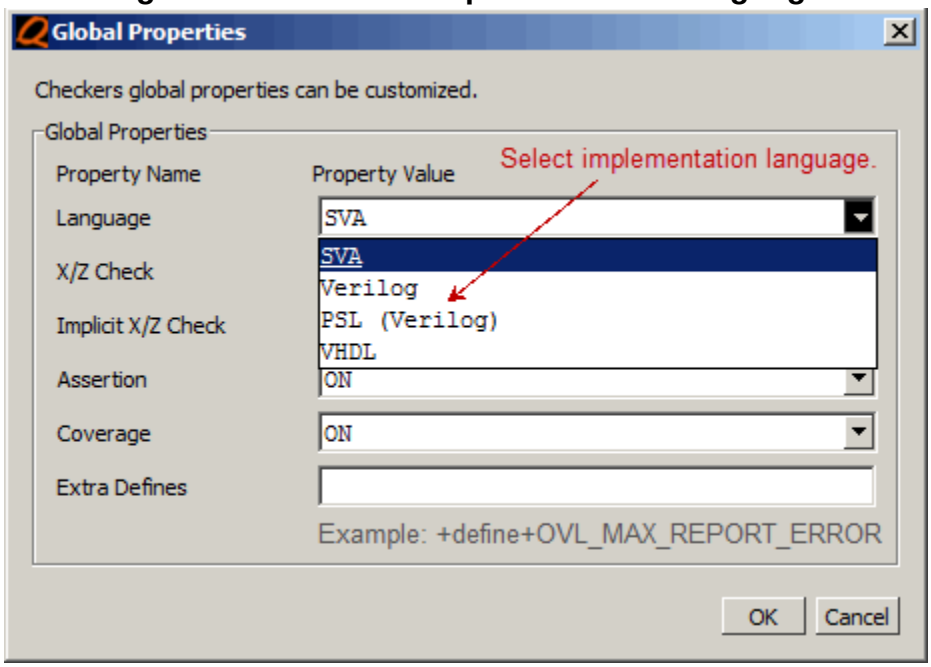
Prerequisites

The OVL Checkers Manager graphic interface must be open and displayed.

Procedure

1. Open the Global Properties dialog box with either of the following methods:
   - Click the **Global Properties** toolbar button. 
   - Select **Checker > Global Properties** from the menus.
2. In the Global Properties dialog box, select an implementation language from the Language pulldown list.

Figure 1-2. Select an Implementation Language



3. Click **OK** to complete the procedure and close the dialog box.

Configuring Library Settings

The Settings dialog box allows you to designate the location of the OVL Core library, where OVL checkers are compiled; the Target library, where customized assertion checkers are compiled; and the storage location for a copy of the customized OVL Wrapper Files.

Prerequisites

The OVL Checkers Manager graphic interface must be open and displayed.

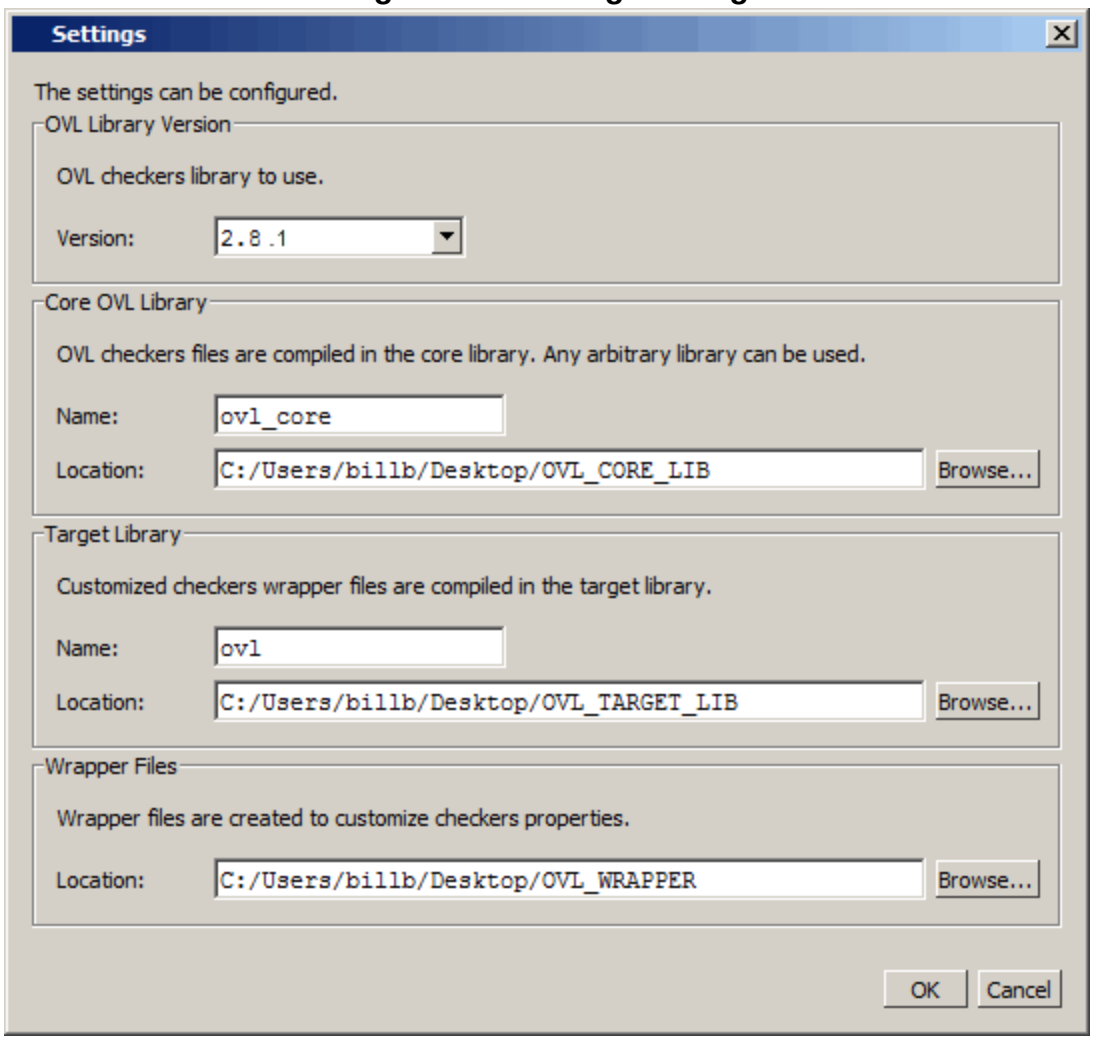
Procedure

1. Open the Settings dialog box with either of the following actions:
   - Click the **Settings** toolbar button. 

- Select **Tools** > **Settings** from the menus.

Either action opens the Settings dialog box (Figure 1-3).

Figure 1-3. Settings Dialog



2. Select which OVL checkers library version to use.
3. Designate locations for the Core OVL Library, the Target Library, and the Wrapper Files.
4. Click **OK** to complete the procedure and configure the library settings.

Results

These settings apply to all customized checkers and are persistent from one invocation of the OVL Checkers Manager to the next.

Adding an Assertion Checker

The OVL Checkers Manager allows you to add any checker in the library to your Customized Checkers list.

Prerequisites

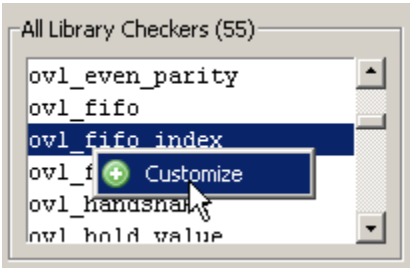
The OVL Checkers Manager graphic interface must be open and displayed.

Procedure

Add an assertion checker to the Customized Checkers list with either of these steps.

- Right-click any assertion checker from the All Library Checkers list and select **Customize** from the popup menu.

Figure 1-4. All Library Checkers Popup Menu



- Or, select any assertion checker in the All Library Checkers list and click the **Customize Library Checker** toolbar button.

You can remove checkers from the Customized Checkers list by selecting a checker in the list and clicking the **Remove CustomizedChecker** toolbar button.

Results

The selected assertion appears in the Customized Checkers list.

Customizing an Assertion Checker

You can use the Properties tab to customize any assertion checker in the OVL library to suit your design.

Prerequisites

The OVL Checkers Manager graphic interface must be open and displayed.

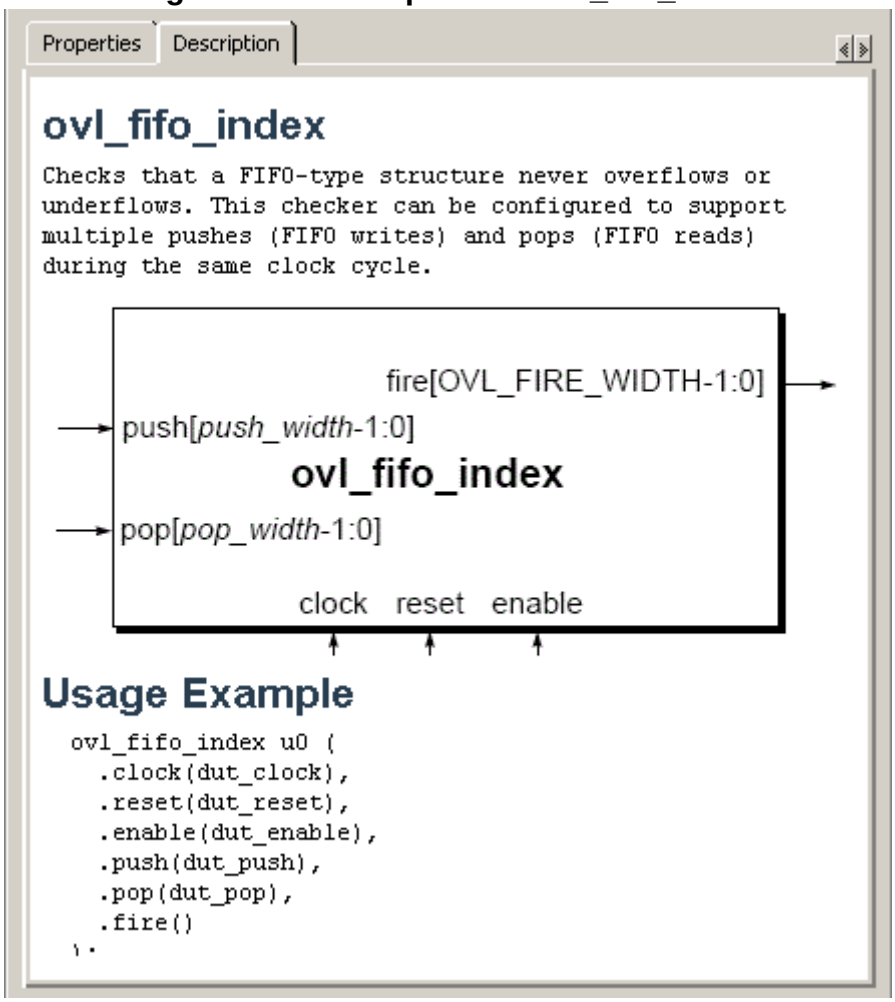
Before customizing an assertion checker, review the description, block diagram, and usage model of the checker in the Description tab of the OVL Checkers Manager. The **Description** tab contains a short description of the assertion checker you have chosen from the All Library

Checkers list. It also includes a block diagram that shows how input and output ports are connected, and a usage example of the checker.

Procedure

1. Select a checker from the All Library Checkers list and click the **Description** tab to display the description, diagram, and usage example (Figure 1-5). In this example, the short description explains that the ovl_fifo_index assertion checker can be customized to support multiple pushes (FIFO writes) and pops (FIFO reads).

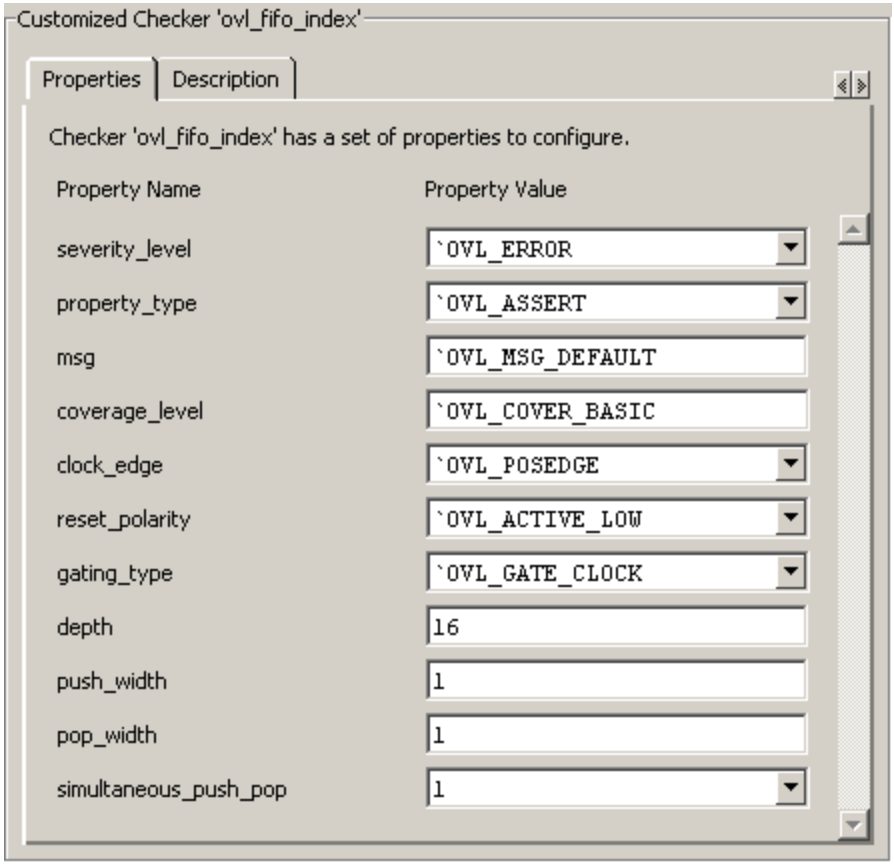
Figure 1-5. Description for ovl_fifo_index



   Now you are ready to use the **Properties** tab to customize an assertion checker.

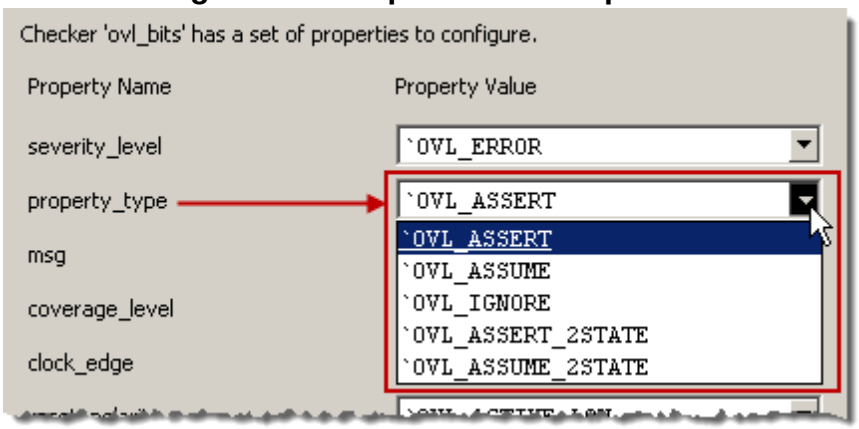
2. Open the **Properties** tab.
3. Add checkers to the Customized Checkers list as described in Adding an Assertion Checker.
4. Select the checker you want to customize from the Customized Checkers list.
5. Select the Properties tab to edit the available properties (Figure 1-6).

Figure 1-6. Edit Properties in the Properties Tab



You can edit some properties by highlighting the current value and typing in a new one. In Figure 1-6, the depth property was changed to from 1 to 16. You can edit other properties by simply choosing from a drop-down list (Figure 1-7).

Figure 1-7. Drop-Down List Options



After editing assertion checker properties you need to rename the checker and compile it.

Renaming a Customized Assertion Checker

You can easily rename customized assertion checkers to make them more identifiable with your project.

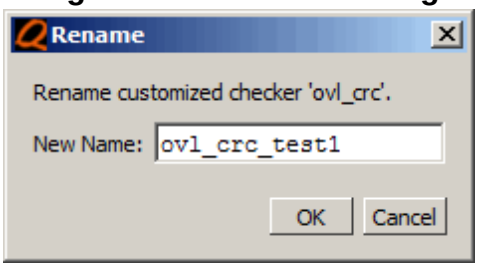
Prerequisites

The OVL Checkers Manager graphic interface must be open and displayed, and an assertion checker must have been added to the Customized Checkers list.

Procedure

1. Click any assertion checker in the Customized Checkers list to select it, then open the Rename dialog (Figure 1-8) with any of the following three actions:
   - Select **Checker** > **Rename** from the menus.
   - Click the **Rename** toolbar button. 
   - Right-click the selected checker and choose **Rename** from the popup menu.

Figure 1-8. Rename Dialog



2. Click **OK** to assign the new name.

Compiling Customized Assertion Checkers

Once you have customized selected assertion checkers from the OVL library and renamed them for your project, the next step is to compile the customized checkers. You can compile a single checker or multiple checkers.

Prerequisites

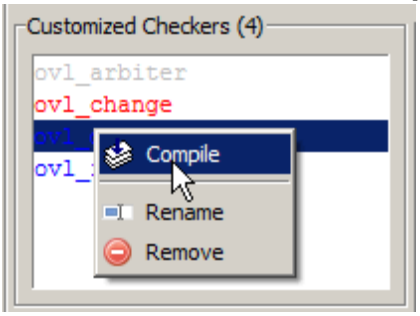
The OVL Checkers Manager graphic interface must be open and displayed, and an assertion checker must have been customized.

Procedure

1. Select the assertion checker you want to compile from the Customized Checkers list.
2. Compile the selected checker by taking one of the following actions:
   - Select **Checker** > **Compile**from the menus.

- Click the **Compile** toolbar button. 
- Right-click the selected checker and choose **Compile** from the popup menu.

Figure 1-9. Customized Checkers Popup Menu



3. To compile all assertion checkers in the Customized Checkers list do either of the following:
   - Select **Checker > Compile All** from the menus.
   - Click the Compile All button in the toolbar. 

Results

The Transcript window displays the progress of compile operations and whether the operations were successful or failed.

Saving Customized Assertion Checkers

The OVL Checkers Manager allows you to save existing library and customized assertion checkers to an *.xml* file.

Prerequisites

The OVL Checkers Manager graphic interface must be open and displayed, and an assertion checker must have been customized.

Procedure

Save your customized assertion checkers to an *.xml* file with either of these two methods.

- Select **File > Save** or **File > Save As** from the menus.
- Click the **Save** button in the toolbar. 

Applying Assertion Checkers to Your Code

After you configure your library settings for customized checkers, customize the checkers you need for your design, and save the customized checkers to an *.xml* file, you can apply the checkers to your code.

Procedure

1. Create an instance of the customized assertion checker(s) in your code.
2. Compile your code.

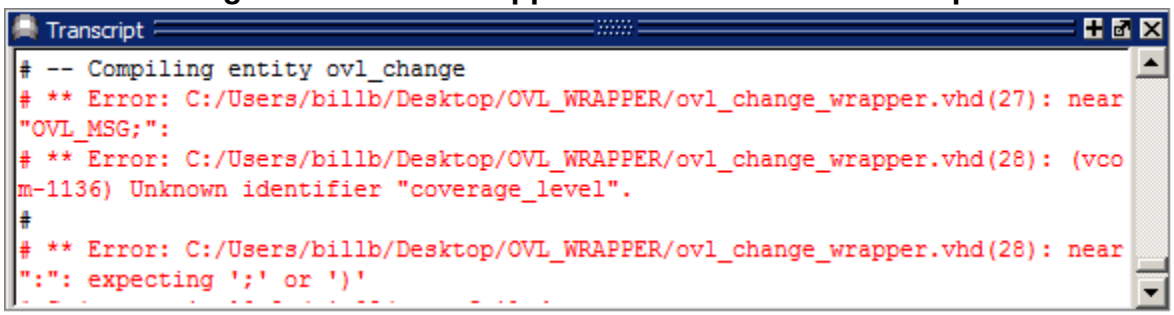
Handling Compile Errors

The OVL Checkers Manager allows you quickly identify and resolve compile errors.

Procedure

1. When a compile operation fails, view the red text in the Transcript window for descriptions of the errors. (Figure 1-10).

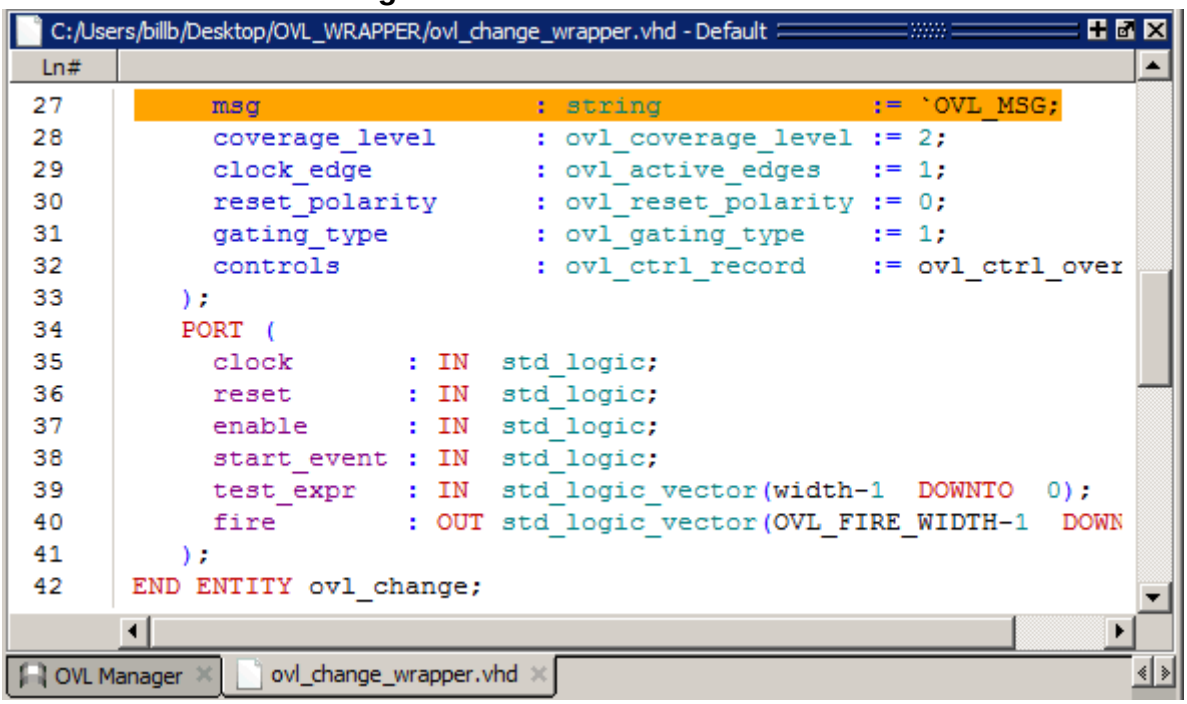
Figure 1-10. Errors Appear in Red Text in Transcript



2. Double-click any error text in the Transcript to open a Source Code Editor to find the source of the compile error.

   For example, the first error shown in the Transcript window, above, is in line 27 of the ovl_change_wrapper.vhd file. If we double-click that error in the Transcript, a Source Code Editor will open and line 27 will be highlighted, as shown in Figure 1-11.

Figure 1-11. Source Code Editor



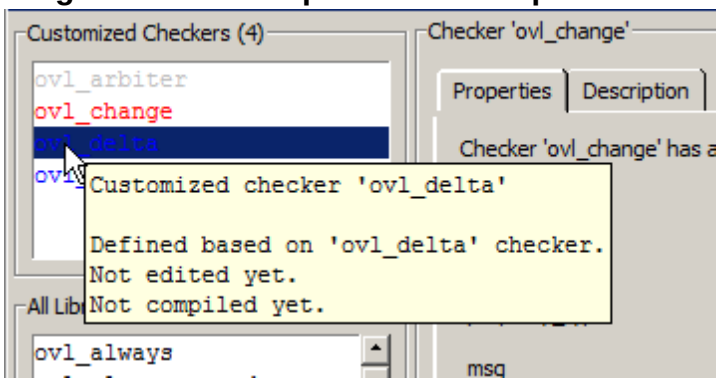
3. Correct the coding error.
4. Save the corrected code.
5. Recompile the code.

Tooltips

The OVL Checkers Manager provides popup tooltips to display compile status.

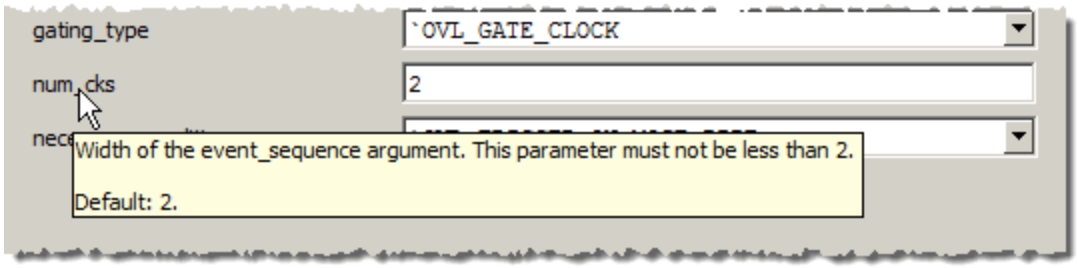
When you hover the mouse cursor over OVL assertions checker names in the All Library Checkers list or the Customized Checkers list (Figure 1-12), a popup tooltip displays.

Figure 1-12. Tooltips Reveal Compile Status



You can also hover the mouse over any property name in the Properties tab to reveal information about a specific property (Figure 1-13).

Figure 1-13. Tooltips for Properties



Chapter 2
OVL Checkers Manager GUI Reference

The OVL Checkers Manager GUI is composed of two windows — an OVL Manager window and a Transcript window. The OVL Manager window allows you to define and apply assertion checkers to your code. The Transcript window displays commands that are invoked and messages that occur as you work with the OVL Manager. The GUI also contains toolbars and menus for operating the OVL Checkers Manager and customizing assertion checkers.

OVL Manager Window

The OVL Manager window is the work space for selecting assertion checkers from the OVL library, viewing a description and usage example of the selected checker, and customizing a checker for your design flow.

Attributes Of The OVL Manager Window

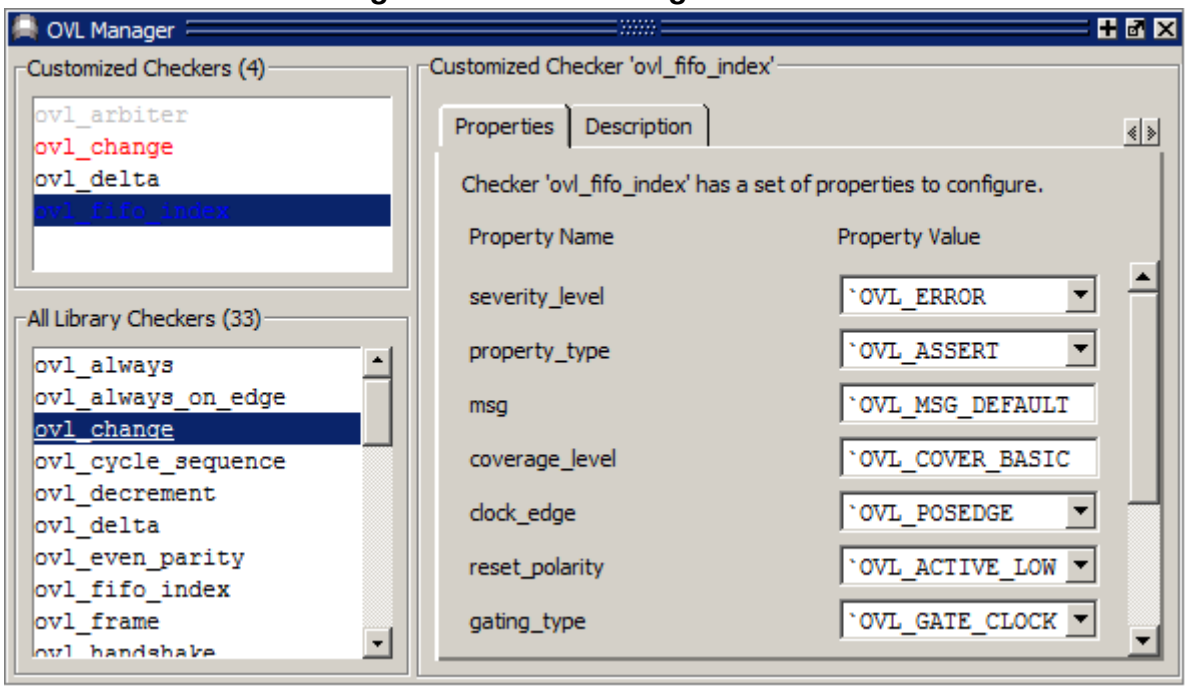
To access: Displayed upon invocation; see “Invoking the OVL Checkers Manager” on page 10.

The OVL Manager window contains two list boxes. One displays a list of “Customized Checkers,” the other displays a list of “All Library Checkers.” It also contains two tabs; a **Properties** tab and a **Description** tab.

Description

These attributes are shown in the OVL Manager Window.

Figure 2-1. OVL Manager Window



- **Customized Checkers list box** — Displays a list of Customized Checkers created from the standard OVL assertion checkers.
- **All Library Checkers list box** — Displays a list of all available OVL Checkers for the selected language.
- **Properties tab** — Displays a workspace where you can edit checker properties to create customized assertion checkers.
- **Description tab** — Displays a description of the OVL checker which includes the data sheet model and a usage example.

Objects

Customized Checkers List Box

The Customized Checkers list box contains the OVL checkers that have been added from the All Library Checkers list box. The compile status of each checker in this list is indicated by its color (Figure 2-2), as follows:

- **Light Gray**

  Indicates when the checker is not supported for the selected language.

- **Red**

  Indicates a checker that failed to compile and an error is reported in the transcript.

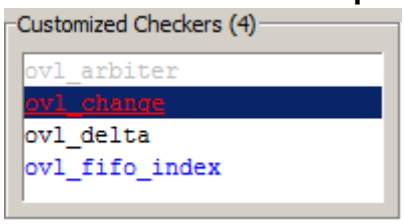
- **Black**

  Indicates a checker that compiled successfully.

- **Blue**

  Indicates a checker that is uncompiled.

Figure 2-2. Colors Indicate Compiled Status

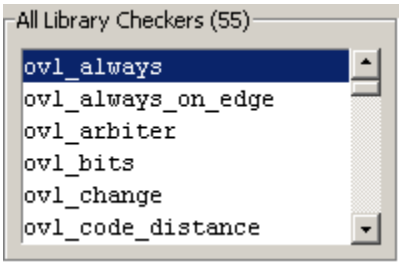


You can select checkers to add to the Customized Checkers list by selecting a checker from the All Library Checkers list, then clicking the **Customize Library Checker** button in the toolbar.

All Library Checkers List Box

The All Library Checkers list box contains all OVL checkers available in Version 2.8.1 of the OVL software for the selected implementation language. (See, “Selecting an Implementation Language” on page 11.) The number of checkers available for each language is indicated in parenthesis.

In the example shown below, 55 OVL checkers are available for SVA implementations (as indicated by the number in parentheses following the heading). The OVL checkers available number shows up after the heading in VHDL implementations in the same way..



Related Topics

OVL Manager Window – Properties Tab

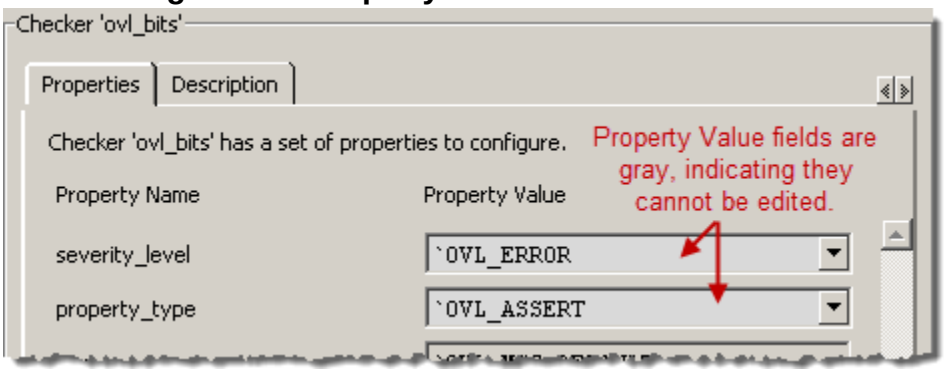
OVL Manager Window – Description Tab

OVL Manager Window – Properties Tab

The **Properties** tab displays the properties of the selected OVL assertion checker.

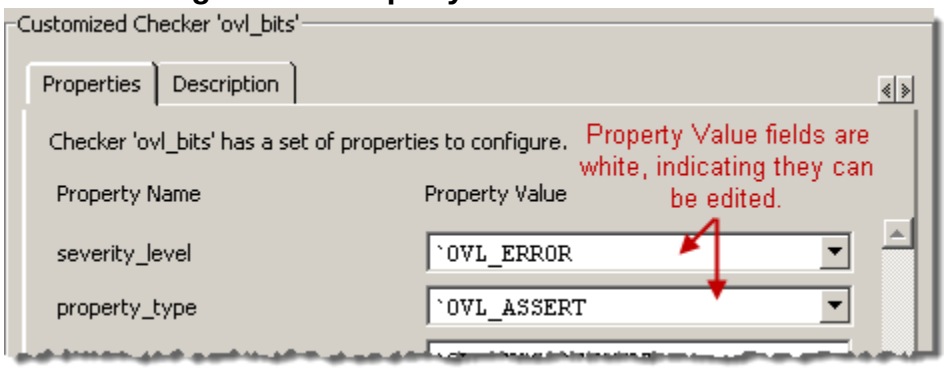
When you select an assertion checker in the All Library Checkers list box the Property Value fields in the **Properties** tab are gray, and you cannot select or edit the values (Figure 2-3).

Figure 2-3. Property Value Cannot Be Edited



When you select an assertion checker in the Customized Checkers list box the Property Value fields are white, and you can select and edit the property values to create a customized checker (Figure 2-4).

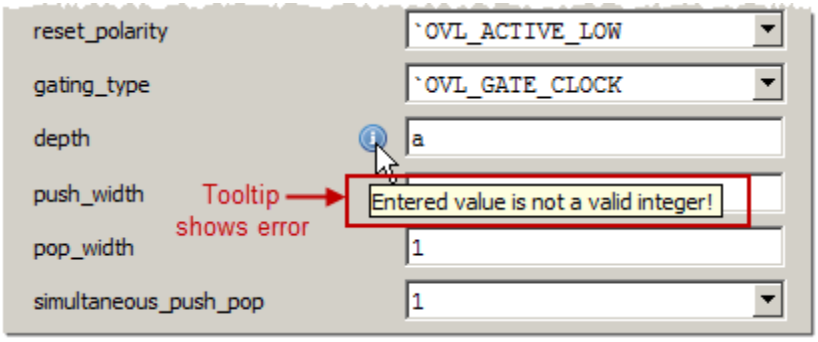
Figure 2-4. Property Value Can Be Edited



If you enter an incorrect value for a property, an Information icon appears next to the value field. 

If you hover the mouse cursor over the Information icon a tooltip appears, as shown in Figure 2-5, indicating the error.

Figure 2-5. Information Icon Tooltip

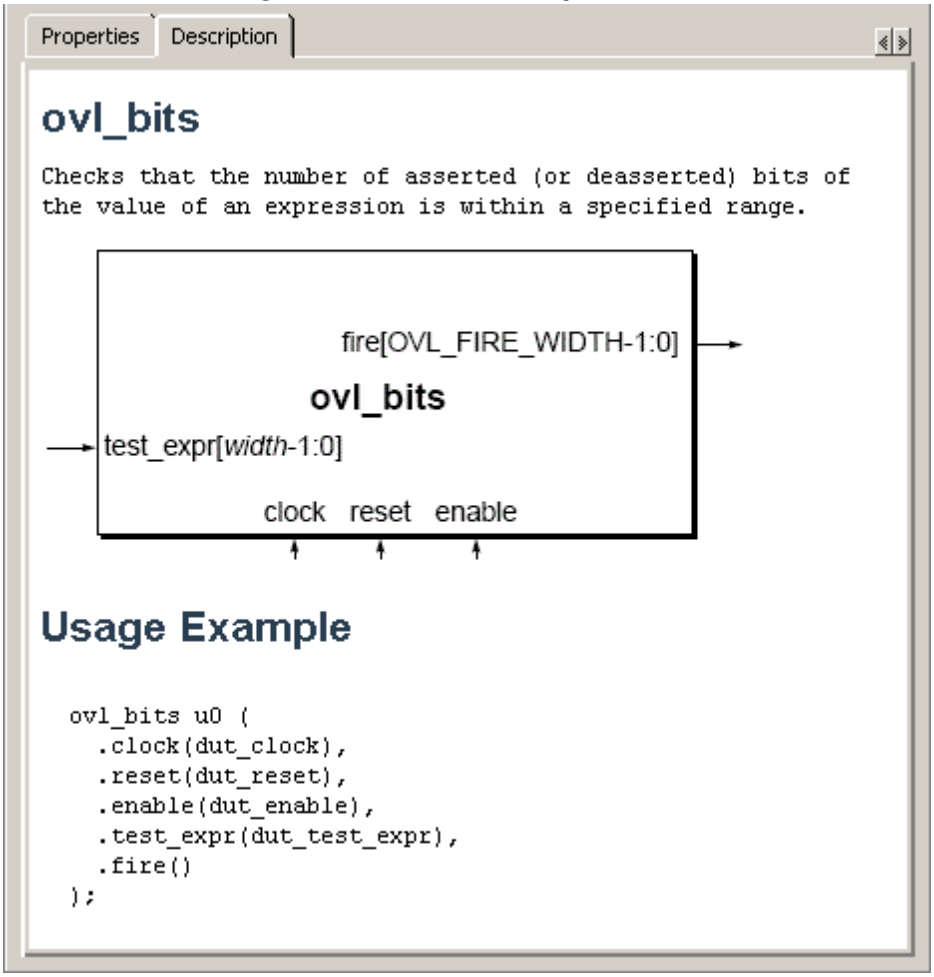


OVL Manager Window – Description Tab

The **Description** tab allows you to view the data sheet model of the selected assertion checker, as presented in the OVL Language Reference Manual (LRM).

The **Description** tab also includes a usage example (Figure 2-6). Neither the data sheet nor the usage example can be edited.

Figure 2-6. The Description Tab

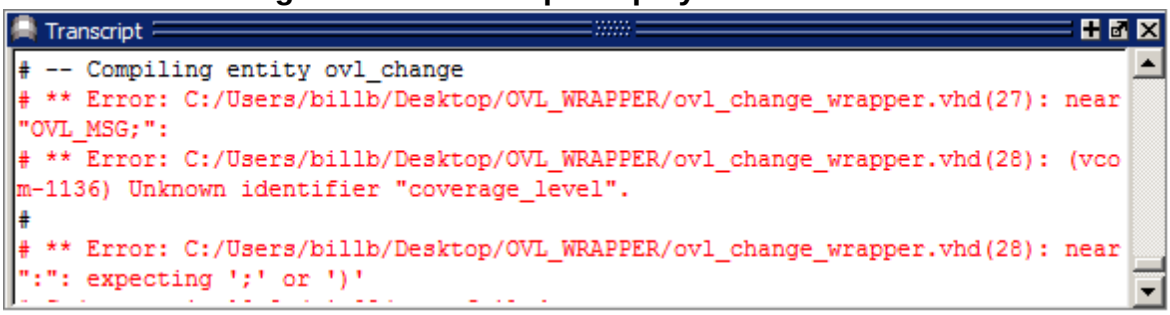


Transcript Window

The Transcript window displays commands that are invoked and messages that occur as you work with the OVL Manager window.

Errors appear in red type (Figure 2-7).

Figure 2-7. Transcript Displays Errors in Red



Toolbars

Two toolbars are available with the OVL Checkers Manager – a Standard toolbar and a Checker toolbar.

Figure 2-8. Standard Toolbar

Table 2-1. Standard Toolbar Buttons

Button	Name	Menu Shortcuts	Description
	New	**File** > **New**	Opens a new OVL Checker Manager
	Open	**File** > **Open**	Opens the last library where you have saved OVL assertion checkers
	Save	**File** > **Save**	Saves the selected OVL assertion checker to the library you designate

Figure 2-9. Checker Toolbar

Table 2-2. Checker Toolbar Buttons

Button	Name	Menu Shortcuts	Description
	Compile	**Checker** > **Compile**	Compile the selected assertion checker in the Customized Checkers list
	Compile All	**Checker** > **Compile All**	Compile all assertion checkers in the Customized Checkers list
	Customize Library Checker	**Checker** > **Customize**	Add the selected assertion checker (in the All Library Checkers list) to the Customized Checkers list
	Remove Customized Checker	**Checker** > **Remove**	Remove the selected assertion checker from the Customized Checkers list
	Rename Customized Checker	**Checker** > **Rename**	Rename the selected assertion checker in the Customized Checkers list
	Global Properties	**Checker** > **Global Properties**	Opens the Global Properties dialog

Table 2-2. Checker Toolbar Buttons (cont.)

Button	Name	Menu Shortcuts	Description
	Settings	**Tools > Settings**	Opens the Settings dialog where you can configure OVL Core, Target, and Wrapper Files libraries

Menus

To access: Menus appear automatically in the OVL Manager window.

The OVL Checkers Manager contains a number of menus to aid in customizing and compiling OVL assertion checkers.

File Menu

Table 2-3. File Menu — Item Description

Menu Item	Description
New	Open new OVL Checkers Manager
Open	Opens the last library where you have saved OVL assertion checkers.
Save Save as	Saves the selected OVL assertion checker to the library you designate
Close Window	Close the current active window
Quit	Quit the application

Checker Menu

Table 2-4. Checker Menu — Item Description

Menu Item	Description
Compile	Compile selected assertion checker in Customized Checkers list
Compile All	Compile all assertion checkers in Customized Checkers list
Customize	Add the selected assertion checker (in the All Library Checkers list) to the Customized Checkers list
Remove	Remove the selected assertion checker from the Customized Checkers list
Rename	Rename the selected assertion checker in the Customized Checker list

Table 2-4. Checker Menu — Item Description (cont.)

Menu Item	Description
Global Properties	Open the Global Properties dialog

View Menu

Table 2-5. View Menu — Item Description

Menu Item	Description
OVL Manager	Displays the OVL Manager section of the OVL Checkers Manager GUI
Transcript	Displays the Transcript in the OVL Checkers Manager GUI

Transcript Menu

Table 2-6. Transcript Menu — Item Description

Menu Item	Description
Adjust Font Scaling	Displays the Adjust Scaling dialog box, which allows you to adjust how fonts appear for your display environment. Directions are available in the dialog box.
Transcript File	Allows you to change the default name used when saving the transcript file. The saved transcript file will contain all the text in the current transcript file.
Command History	Allows you to change the default name used when saving command history information. This file is saved at the same time as the transcript file.
Save File	Allows you to change the default name used when selecting **File > Save As**.
Saved Lines	Allows you to change how many lines of text are saved in the transcript window. Setting this value to zero (0) saves all lines.
Line Prefix	Allows you to change the character(s) that precedes the lines in the transcript.
Update Rate	Allows you to change the length of time (in ms) between transcript refreshes.
OVL Checkers Manager Prompt	Allows you to change the string used for the command line prompt.
VSIM Prompt	Allows you to change the string used for the simulation prompt.
Paused Prompt	Allows you to change the string used for when the simulation is paused.

Tools Menu

Table 2-7. Tools Menu — Item Description

Menu Item	Description
Settings	Open the Settings dialog where you can configure the OVL Core, Target, and Wrapper Files libraries.

Window Menu

Table 2-8. Window Menu — Item Description

Menu Item	Description
Cascade Tile Horizontally Tile Vertically	Arrange all undocked windows. These options do not impact any docked windows.
Icon Children Icon All Deicon All	Minimize (Icon) or Maximize (Deicon) undocked windows. These options do not impact any docked windows.
Keyboard Shortcuts	Opens the Keyboard Shortcuts dialog box where you may create Keyboard Shortcuts.
Add Toolbar Button	Add a button to the toolbar frame.
window name	Make the selected window active.
Windows	Display the Windows dialog box, which allows you to activate, close or undock the selected window(s).

Help Menu

Table 2-9. Help Menu — Item Description

Menu Item	Description
About	Display OVL Checkers Manager application information.
Command Completion	Toggles the command completion dropdown box in the transcript window. When you start typing a command at the Transcript prompt, a dropdown box appears which lists the available commands matching what has been typed so far. You may use the Up and Down arrow keys or the mouse to select the desired command. When a unique command has been entered, the command usage is presented in the drop down box.

Table 2-9. Help Menu — Item Description (cont.)

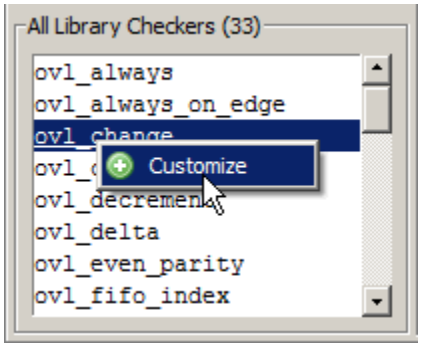
Menu Item	Description
User Manual	Open the PDF version of the User's Manual.
Tcl Help	Open the Tcl command reference (man pages) in Windows help format.
Tcl Syntax	Open the Tcl syntax documentation in your web browser.
Tcl Man pages	Open the Tcl/Tk manual in your web browser.

Right-Click Menus

Click the right mouse button on a library checker or a customized checker to open a context menu. You can then invoke a related operation.

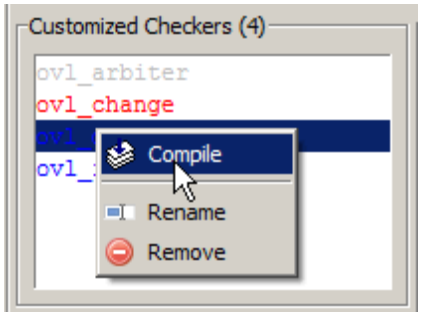
When you right-click a checker in the All Library Checkers list the Customize selection allows you to add it to the Customize Checkers list (Figure 2-10).

Figure 2-10. Right-Click Menu in the All Library Checkers List



The right-click menu in the Customized Checkers list gives you the option to Compile, Rename, or Remove the selected assertion checker (Figure 2-11).

Figure 2-11. Right-Click Menu in the Customized Checkers List



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