



OVL Checkers Manager User's Guide

Including Support for ModelSim DE/SE and Questa® SIM

Software Version 10.2c

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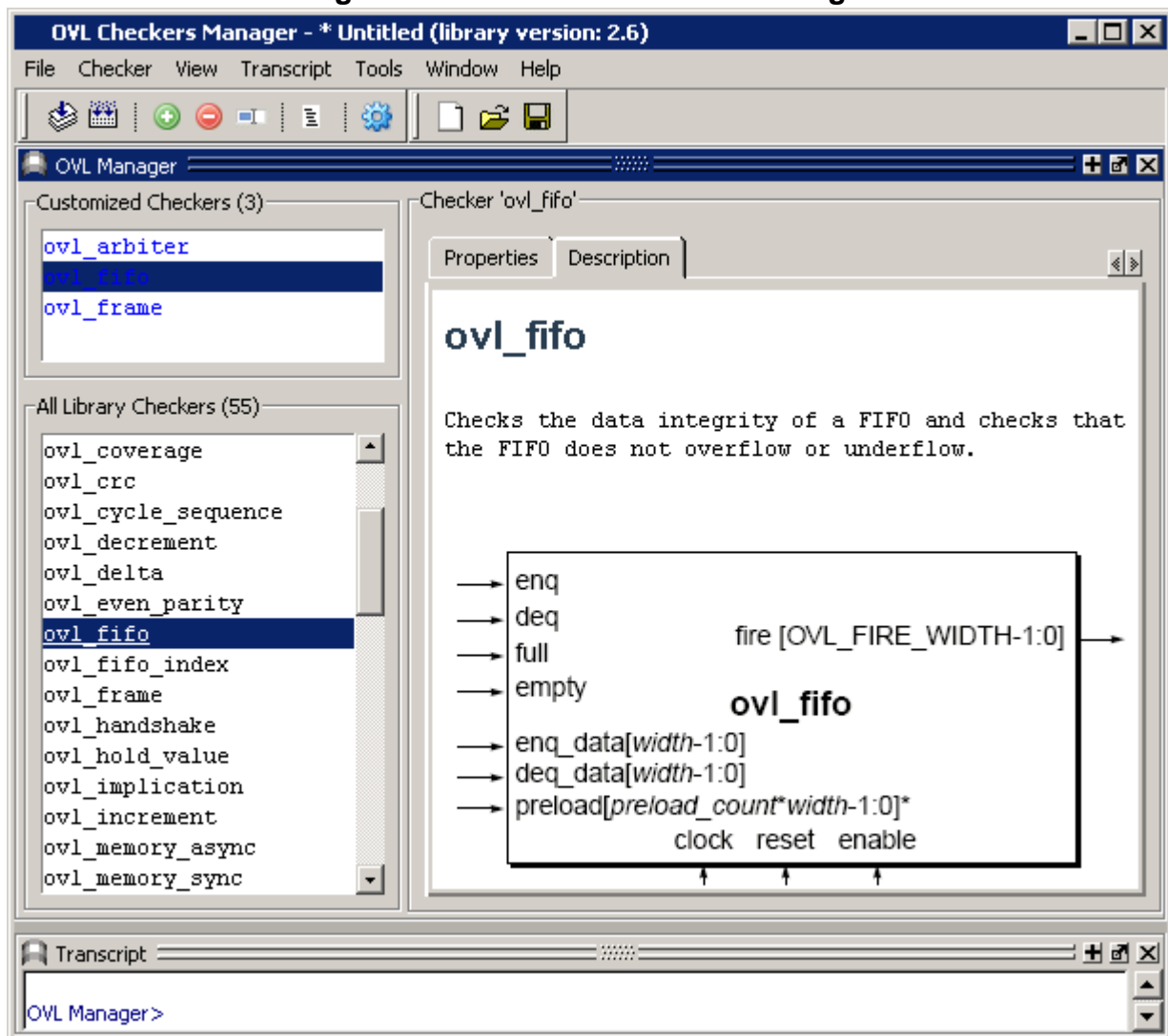
Chapter 1

OVL Checkers Manager Basic Operation

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 (Figure 1-1) for accessing, customizing, and compiling OVL assertion checkers for SVA, Verilog, PSL (Verilog), and VHDL.

Figure 1-1. The OVL Checkers Manager



Usage Flow for the OVL Checkers Manager

The recommended usage flow for using the OVL Checkers Manager is described by the following steps:

1. Invoke the OVL Checkers Manager.

The OVL Checkers Manager can be invoked from a UNIX/Linux shell or from a Windows directory.

- UNIX/Linux — Access the Questa install directory then type **vovl** at prompt.
- Windows — Open the win32 or win64 directory the Questa installation directory and double-click **vovl.exe**.

The OVL Checkers Manager currently supports only version 2.6 of the Open Verification Library.

2. Select an implementation language.

The Global Properties dialog (Figure 1-2) allows you to select an implementation language for the OVL checkers in your design.

Open the Global Properties dialog with either of the following methods:


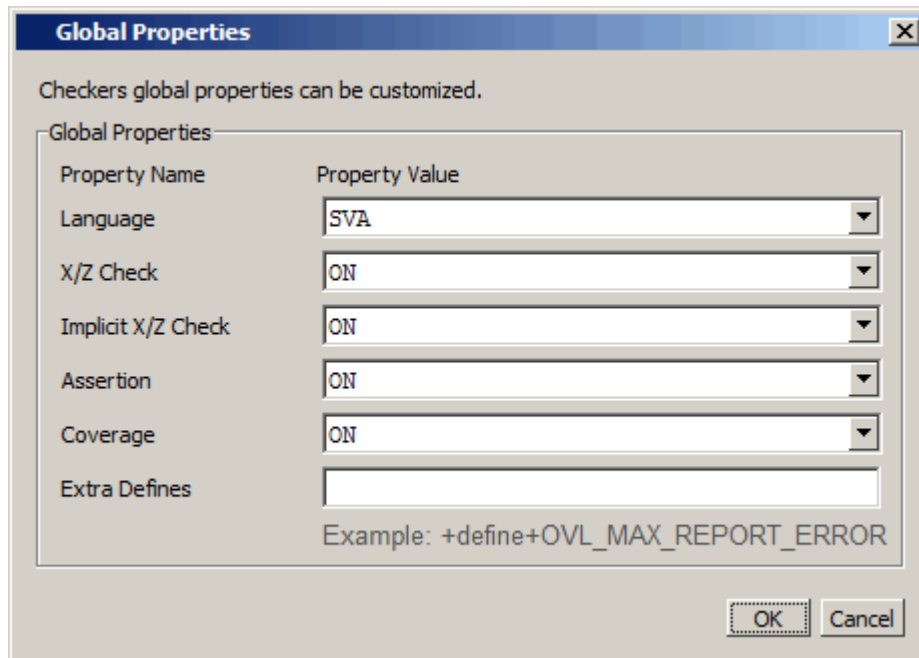
- Click the Global Properties toolbar button. 
- Select **Edit > Global Properties** from the menus.

Figure 1-2. Select an Implementation Language



3. Configure the library settings for customizing assertion checkers.

The Settings dialog (Figure 1-3) allows you to configure the location for the OVL Core library to be compiled, the Target library for customized assertion checkers, and where a copy of the customized OVL Wrapper Files will be stored. You can open the Settings dialog with either of the following actions:


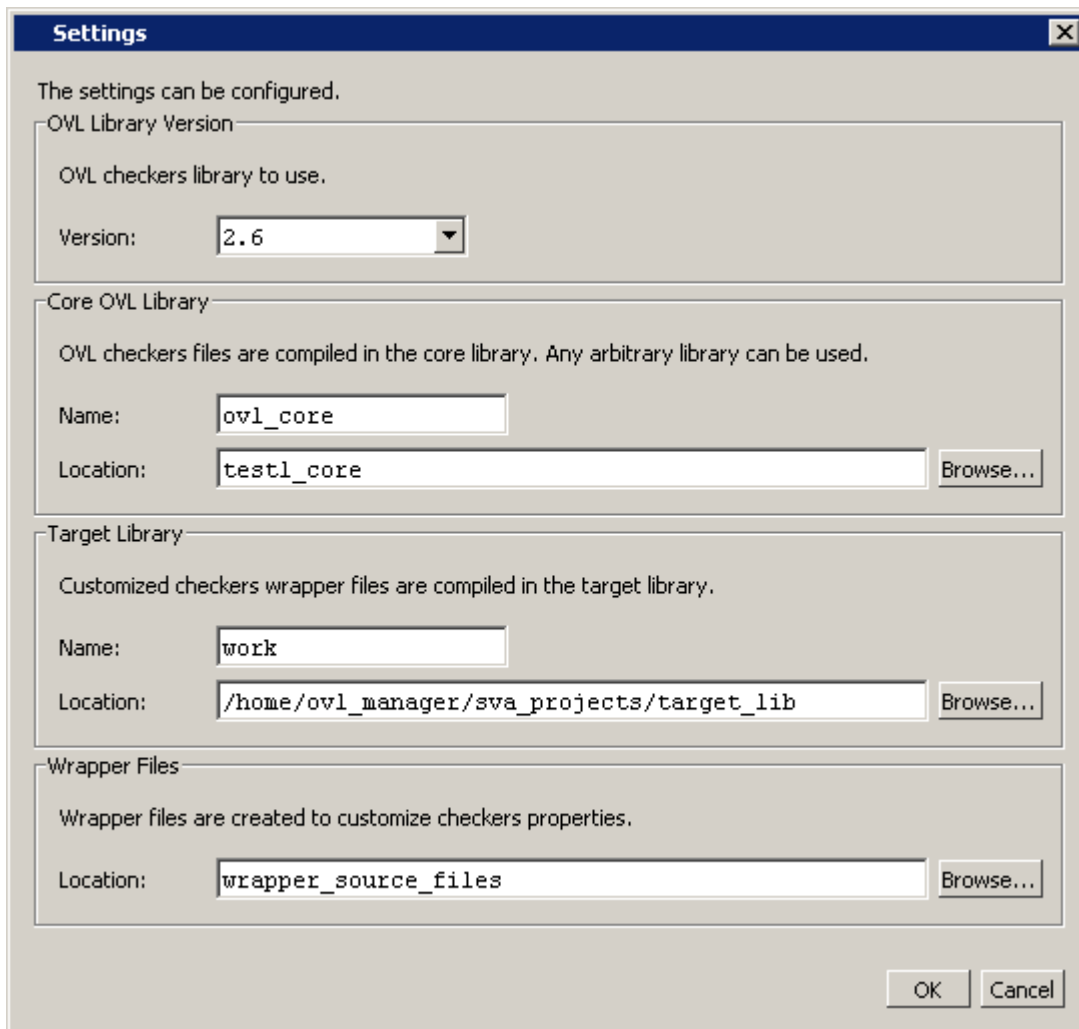
- Click the Settings toolbar button. 
- Select **Tools > Settings** from the menus.

Figure 1-3. Settings Dialog

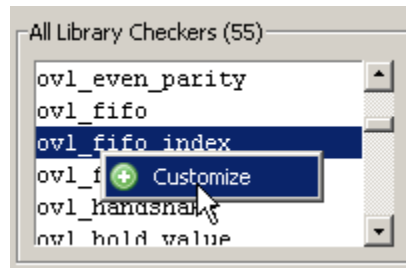


These settings apply to all customized checkers and will be persistent from one invocation of the OVL Checkers Manager to the next.

4. Add an assertion checker to the Customized Checker list.

Right-click any assertion checker from the All Library Checkers list and select “Customize” from the popup menu that appears (Figure 1-4).

Figure 1-4. Right-Click Checker in All Library Checkers List



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

The selected assertion will appear in the Customized Checkers list.

5. Review the description, diagram, and usage model in the Description tab.

The Usage Example shows how input and output ports are connected.

Figure 1-5. Description for ovl_fifo_index

ovl_fifo_index

Checks that a FIFO-type structure never overflows or underflows. This checker can be configured to support multiple pushes (FIFO writes) and pops (FIFO reads) during the same clock cycle.

```
graph LR
    subgraph ovl_fifo_index
        direction TB
        push[push[push_width-1:0]]
        pop[pop[pop_width-1:0]]
        fire[fire[OVL_FIRE_WIDTH-1:0]]
    end
    clock((clock))
    reset((reset))
    enable((enable))
    push --> ovl_fifo_index
    pop --> ovl_fifo_index
    ovl_fifo_index --> fire
    clock --> ovl_fifo_index
    reset --> ovl_fifo_index
    enable --> ovl_fifo_index
```

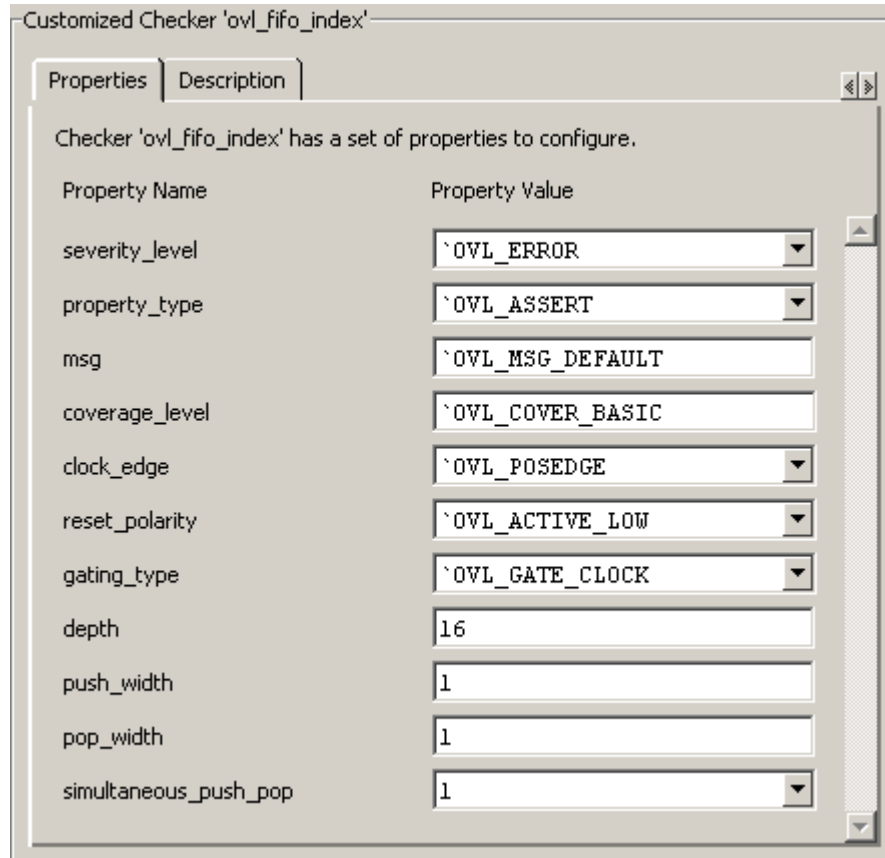
Usage Example

```
ovl_fifo_index u0 (
    .clock(dut_clock),
    .reset(dut_reset),
    .enable(dut_enable),
    .push(dut_push),
    .pop(dut_pop),
    .fire()
);
```

6. Customize the assertion checker in the Properties tab.

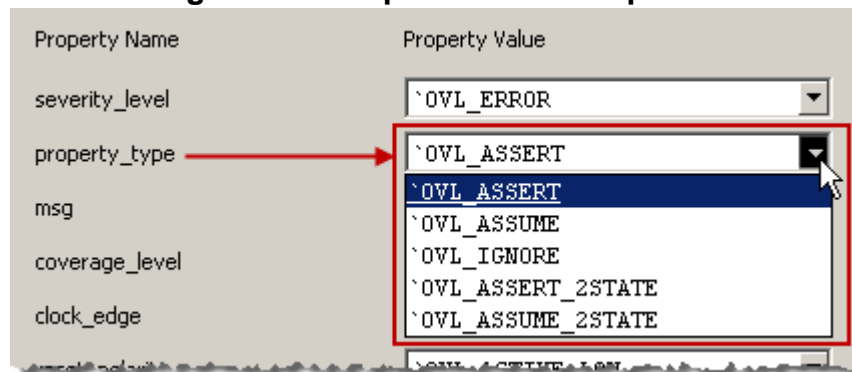
Make sure the assertion checker is selected in the Customized Checkers. You can now use the Properties tab to edit the available properties (Figure 1-6).

Figure 1-6. Edit Properties in the Properties Tab



Some properties can be edited by choosing from a drop-down menu (Figure 1-7).

Figure 1-7. Drop-Down Menu Options



Other property values can be edited 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.

7. Rename the customized assertion checker. (This step is optional.)

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:


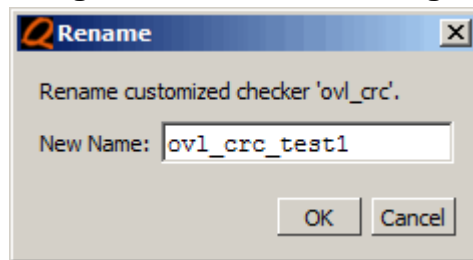
- Select **Checker > Rename** from the menus.
- Click the Rename button in the toolbar. 
- Right-click the selected checker and choose **Rename** from the popup menu.

Figure 1-8. Rename Dialog



8. Compile customized assertion checkers.

You can compile a single checker in the Customized Checkers list by selecting it, then taking any of the following actions:


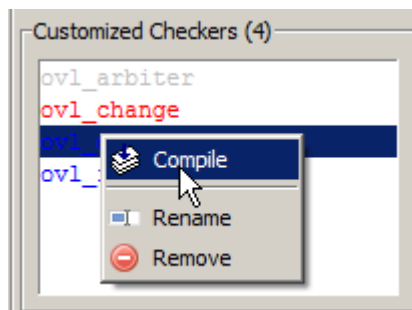

- Select **Checker > Compile** from the menus.
- Click the Compile button in the toolbar. 
- Right-click the selected checker and choose **Compile** from the popup menu.

Figure 1-9. Right-Click Compile Selection

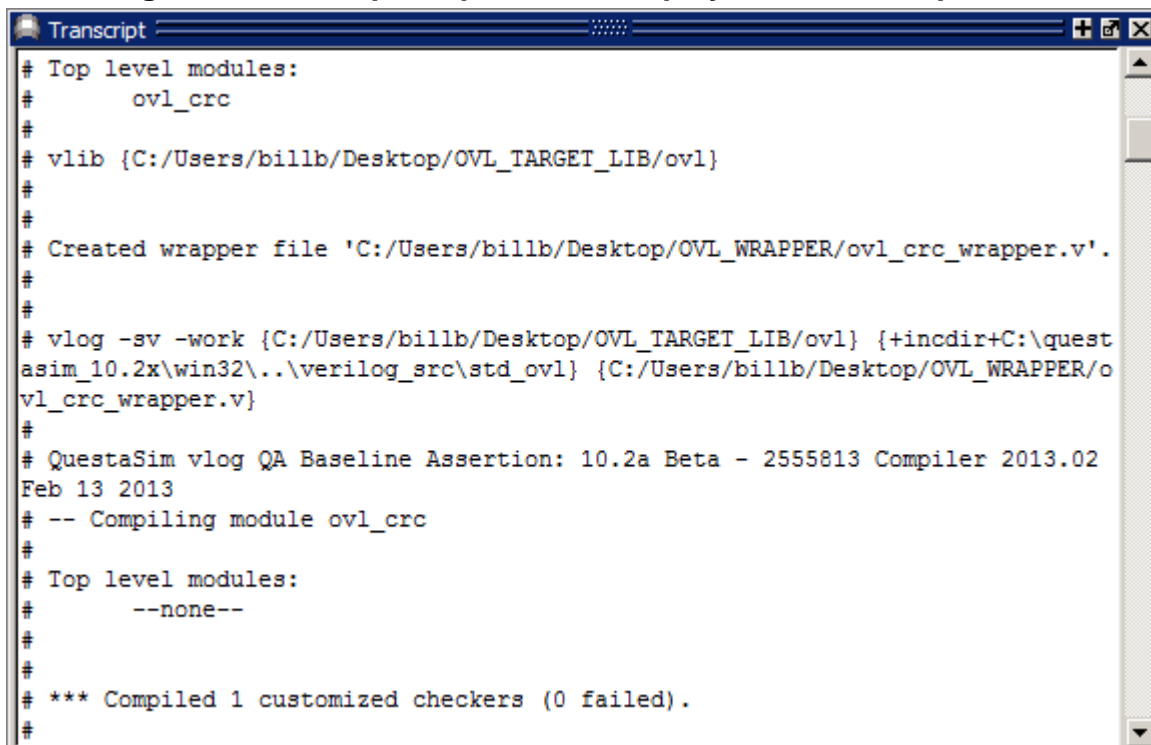


You can compile all assertion checkers in the Customized Checkers list with either of the following:


- Select **Checker > Compile All** from the menus.
- Click the Compile All button in the toolbar. 

The Transcript Window will display the progress of compile operations (Figure 1-10).

Figure 1-10. Compile Operations Displayed in Transcript



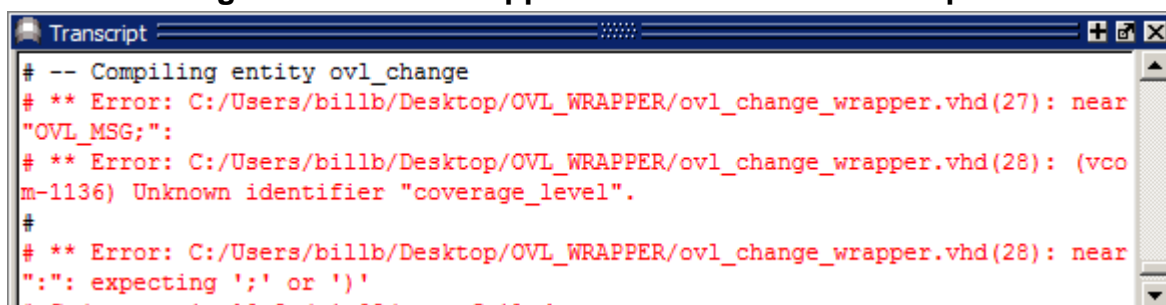
```
Transcript
# Top level modules:
#   ovl_crc
#
# vlib {C:/Users/billb/Desktop/OVL_TARGET_LIB/ovl}
#
# Created wrapper file 'C:/Users/billb/Desktop/OVL_WRAPPER/ovl_crc_wrapper.v'.
#
# vlog -sv -work {C:/Users/billb/Desktop/OVL_TARGET_LIB/ovl} {+incdir+C:\quest
asim_10.2x\win32\..\verilog_src\std_ovl} {C:/Users/billb/Desktop/OVL_WRAPPER/o
vl_crc_wrapper.v}
#
# QuestaSim vlog QA Baseline Assertion: 10.2a Beta - 2555813 Compiler 2013.02
Feb 13 2013
# -- Compiling module ovl_crc
#
# Top level modules:
#   --none--
#
# *** Compiled 1 customized checkers (0 failed).
#
```

9. Save customized assertion checkers to a *.xml* file.
 - Select **File > Save** or **File > Save As** from the menus.
 - Click the **Save** button in the toolbar. 
10. Create an instance of the customized assertion checker(s) in your code and compile the code.

Handling Compile Errors

If a compile operation fails, any compile errors will be displayed in red text in the Transcript window.

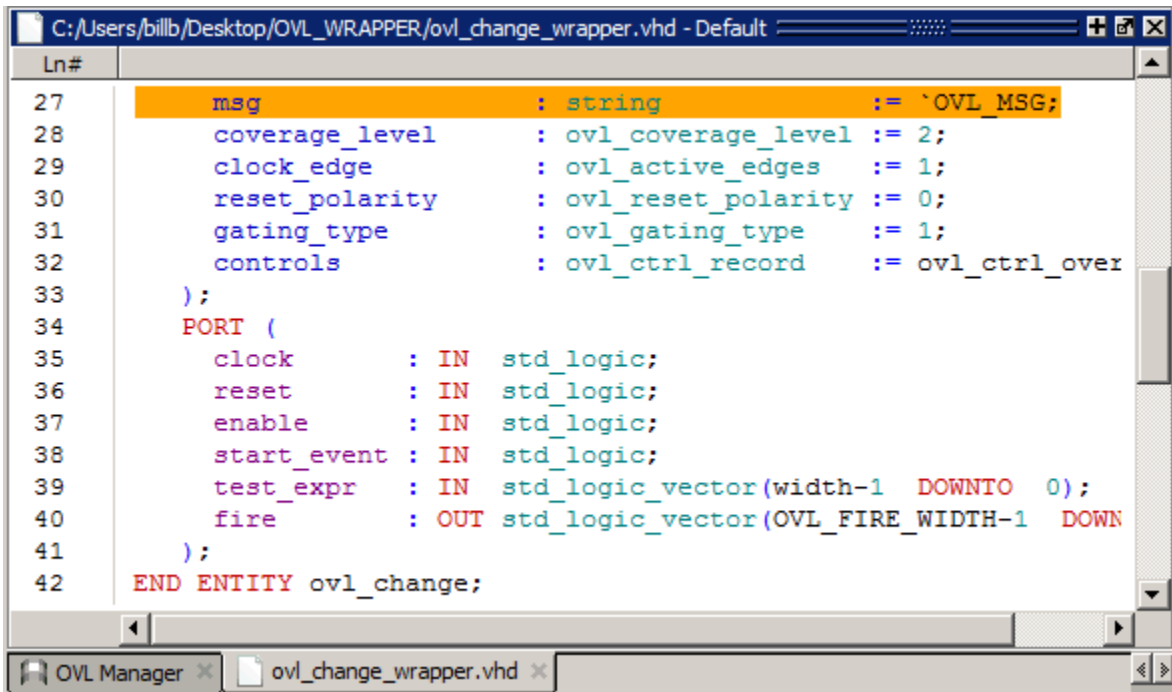
Figure 1-11. Errors Appear in Red Text in Transcript



```
Transcript
# -- Compiling entity ovl_change
# ** Error: C:/Users/billb/Desktop/OVL_WRAPPER/ovl_change_wrapper.vhd(27): near
"OVL_MSG;":
# ** Error: C:/Users/billb/Desktop/OVL_WRAPPER/ovl_change_wrapper.vhd(28): (vco
m-1136) Unknown identifier "coverage_level".
#
# ** Error: C:/Users/billb/Desktop/OVL_WRAPPER/ovl_change_wrapper.vhd(28): near
":": expecting ';' or '!'
```

You can double-click any error text to open a Source Code Editor to the relevant place within your code.

Figure 1-12. Source Code Editor

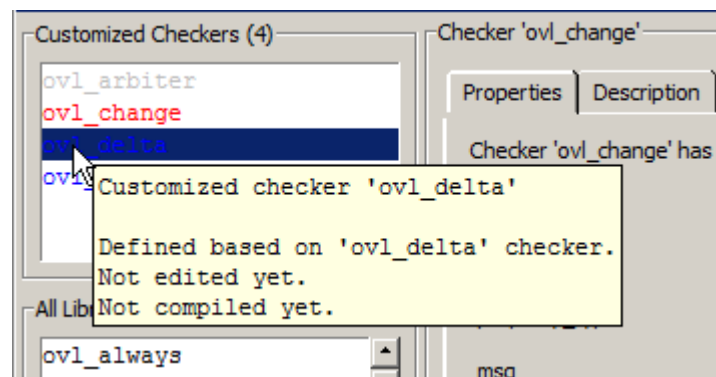


After correcting a bad parameter value that generated the error, you can save the corrected code, and recompile.

Using Tooltips

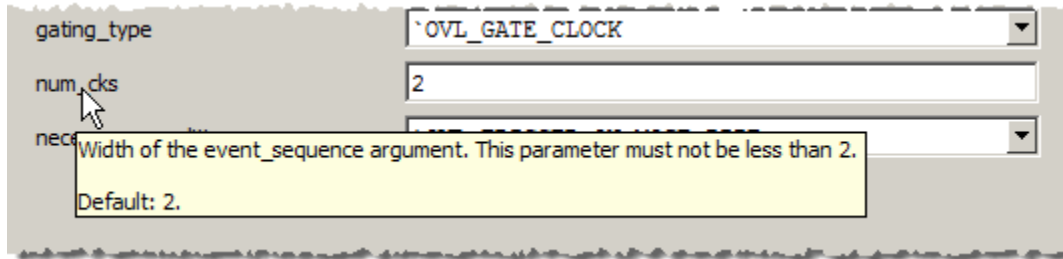
The OVL Checkers Manager provides popup tooltips to display compile status when you hover the mouse cursor over OVL assertions checker names in the All Library Checkers list or the Customized Checkers list (Figure 1-13).

Figure 1-13. 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 1-14).

Figure 1-14. Tooltips for Properties



Related Reading

A PDF file of the Open Verification Library Language Reference Manual can be found in:

`<your_install_directory>\verilog_src\std_ovl\docs`

or,

`<your_install_directory>\vhdl_src\std_ovl\docs`

In the same directory you will find an assertion and an OVL Quick Guide (in pdf format) as well as assertion and OVL timing diagrams.

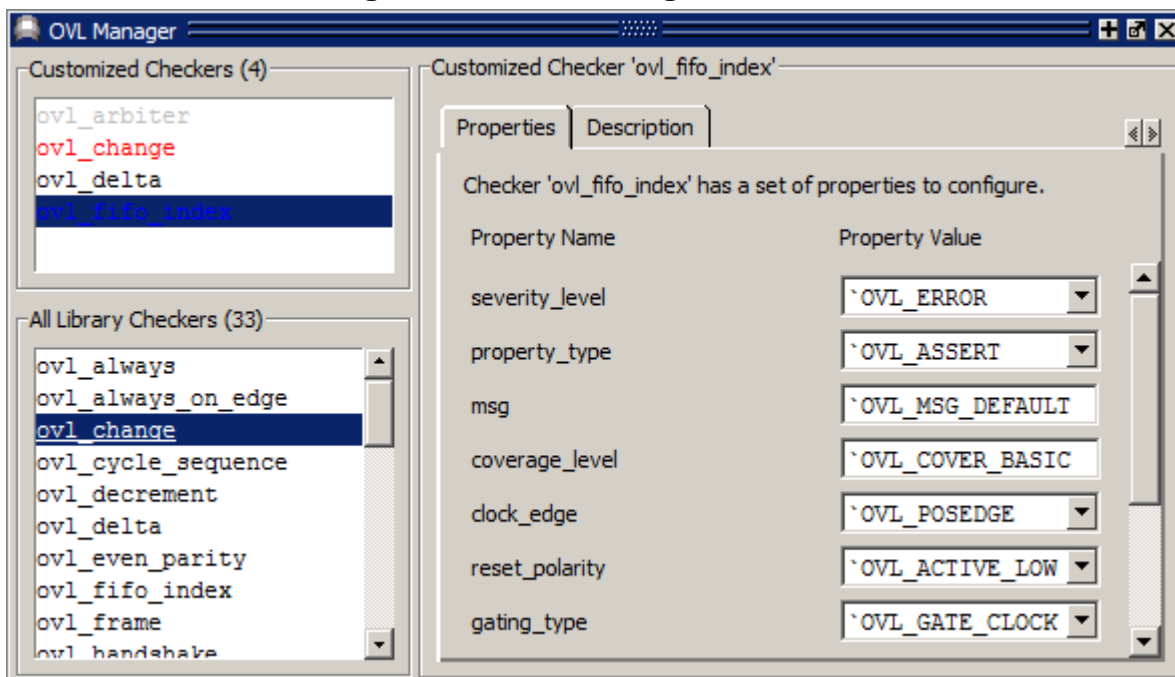
Chapter 2 Graphical User Interface (GUI)

The OVL Checkers Manager GUI is composed of two windows — an OVL Manager window (Figure 2-1) and a Transcript window.

The OVL Manager window includes:

- [All Library Checkers List](#) — displays a list of all available OVL Checkers for the selected language.
- [Customized Checkers List](#) — displays a list of Customized Checkers created from the standard OVL assertion checkers.
- [Properties Workspace](#) — displays a workspace where checker properties can be edited to create customized assertion checkers.
- [Description Tab](#) — displays a description of the OVL checker which includes the datasheet model and a usage example.

Figure 2-1. OVL Manager Window



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

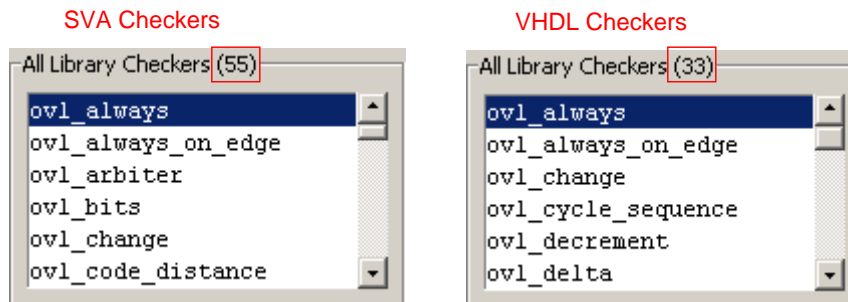
The GUI also contains toolbars and menus for operating the OVL Checkers Manager and customizing assertion checkers.

OVL Manager Window


All Library Checkers List

The All Library Checkers list contains all OVL checkers available in Version 2.6 of the OVL software for the selected implementation language. The number of checkers available for each language is indicated in parenthesis. For example, 55 OVL checkers are available for SVA implementations and 33 are available for VHDL (Figure 2-2).

Figure 2-2. Library Checkers List

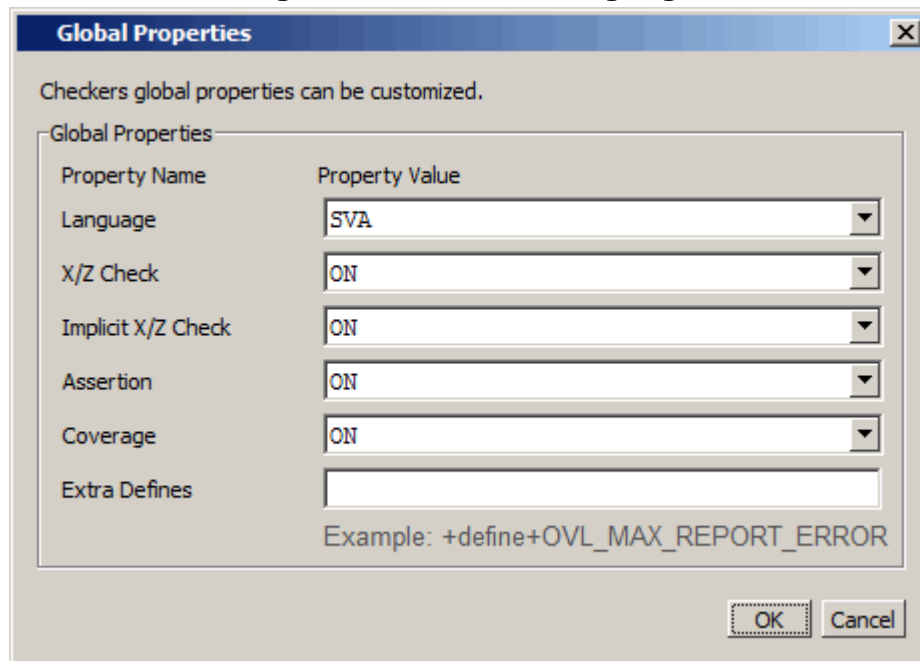


The implementation language is selected in the Global Properties dialog, which is invoked by either of the following actions:

- Click the Global Properties button in the toolbar. 
- Select **Edit > Global Properties** from the menus.

This opens the Global Properties dialog where you can select your implementation language from a drop-down list in the Language field (Figure 2-3).

Figure 2-3. Select a Language

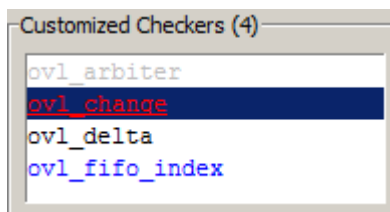



Customized Checkers List

The Customized Checkers list contains the OVL checkers that have been added from the All Library Checkers list. Four colors are used for the checker names in this list to indicate the compiled status of the checker (Figure 2-4):

- **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 2-4. Colors Indicate Compiled Status



You can add checkers 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. 

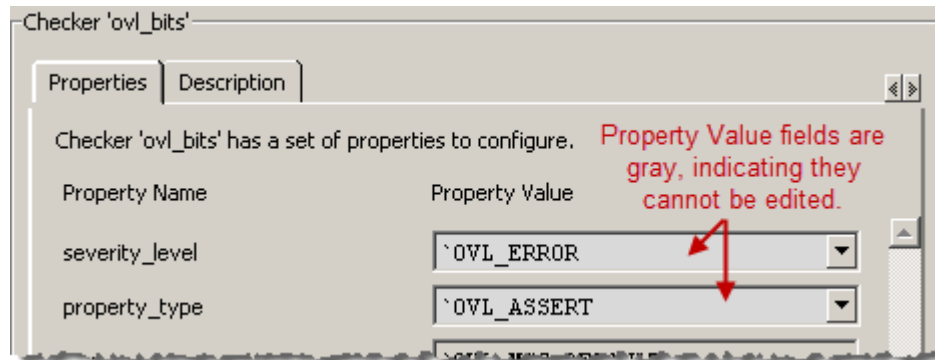
You can remove checkers from the Customized Checkers list by selecting a checker in the list and clicking the **Remove Customized Checker** button in the toolbar. 

Properties Workspace

The Properties tab allows you to customize OVL assertion checkers to meet your specifications.
Properties Tab

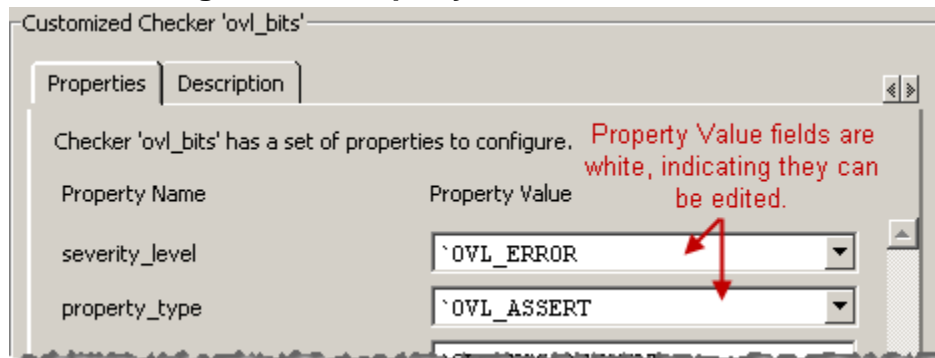
The Properties tab displays the properties of the selected OVL assertion checker. When an assertion checker is selected in the **All Library Checkers** list the Property Value fields in the Properties tab are grayed out and the values cannot be edited (Figure 2-5).

Figure 2-5. Property Value Cannot Be Edited



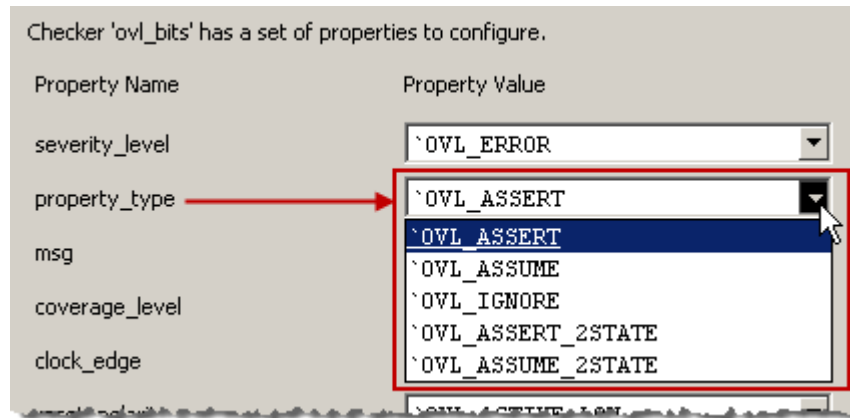
When an assertion checker is selected in the **Customized Checkers** list the Property Value fields are white and the property values can be edited to create a customized checker (Figure 2-6).


Figure 2-6. Property Value Can Be Edited



Some property values can be edited by simply selecting a different value from a drop-down menu of options (Figure 2-7).

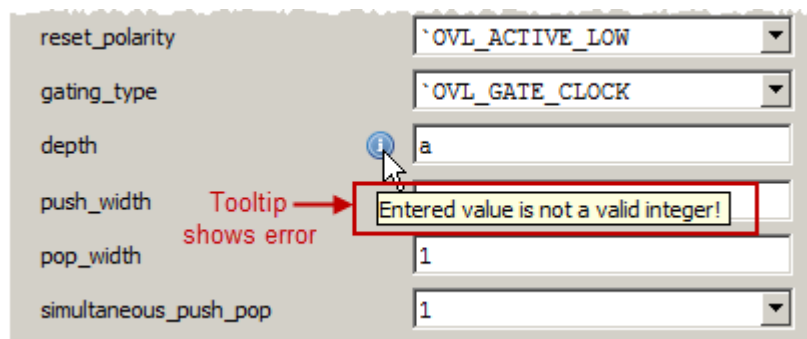
Figure 2-7. Drop-Down Menu Options for Properties



Other property values can be edited by highlighting the current value and typing in a new one. If you enter an incorrect value for a property, an Information icon appears immediately next to the value field. 

If you hover the mouse cursor over the icon a tooltip appears, as shown in [Figure 2-8](#), indicating the error.

Figure 2-8. Information Icon Tooltip



Description Tab

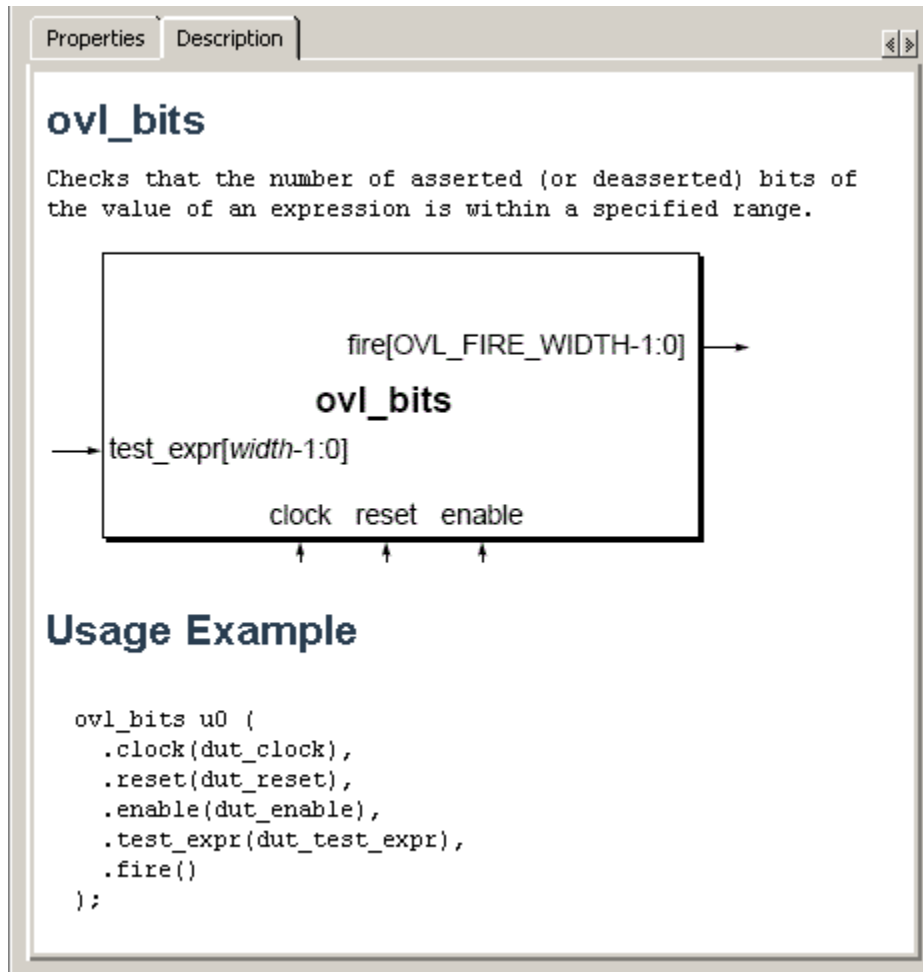
The Description tab ([Figure 2-9](#)) simply allows you to view the data sheet model as presented in the OVL Language Reference Manual (LRM), and a usage example. It cannot be edited. A PDF file of the OVL LRM, version 2.6 can be found in:

`<install_dir>/verilog_src/std_ovl/docs/`

or,

`<install_dir>/vhdl_src/std_ovl/docs/`

Figure 2-9. The Description Tab



Toolbars

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

Figure 2-10. Standard Toolbar



Table 2-1. Standard Toolbar Buttons


Button	Name	Menu Shortcuts	Description
	New	File > New	Opens a new OVL Checker Manager

Table 2-1. Standard Toolbar Buttons (cont.)










Button	Name	Menu Shortcuts	Description
	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 2-11. 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
	Settings	Tools > Settings	Opens the Settings dialog where you can configure OVL Core, Target, and Wrapper Files libraries

Menus

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
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.
Customize Toolbar	Add a button to the toolbar frame.
<i>window name</i>	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.
User Manual	Open the PDF version of the User's Manual.

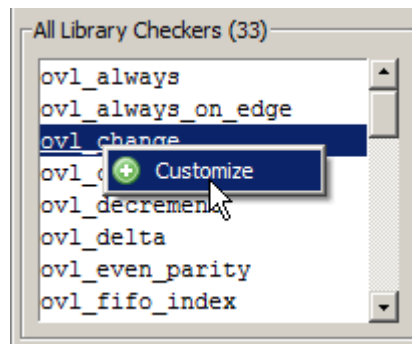
Table 2-9. Help Menu — Item Description (cont.)

Menu Item	Description
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 Menu

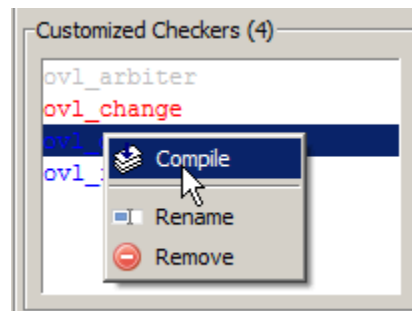
You can click the right-mouse-button on a library checker or a customized checker to invoke a related operation. When you right-click a checker in the All Library Checkers list the Customize selection allows you to add it to the Customize Checkers list ([Figure 2-12](#)).

Figure 2-12. 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 2-13](#)).

Figure 2-13. Right-Click Menu in the Customized Checkers List



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