Netlist Viewer User's Guide

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Getting Started with NetlistViewer

Starting NetlistViewer

NetlistViewer is available from Designer main window. It can only be started after your design has been compiled.

To start NetlistViewer from Designer, click NetlistViewer, <u>as shown in Figure 1-1</u>.

If you have not compiled your design, Designer prompts you to perform the compilation process.

Figure 1-1. NetlistViewer Button

NetlistViewer reads your netlist design and generates a clearly laid out schematic view. Axcelerator and ProAsic family designs are displayed in the MultiView Navigator. All other designs are displayed in NetlistViewer <u>as shown in Figure 1-2</u>.

Using the MultiView Navigator is described in <u>Getting Started with MultiView Navigator</u>.
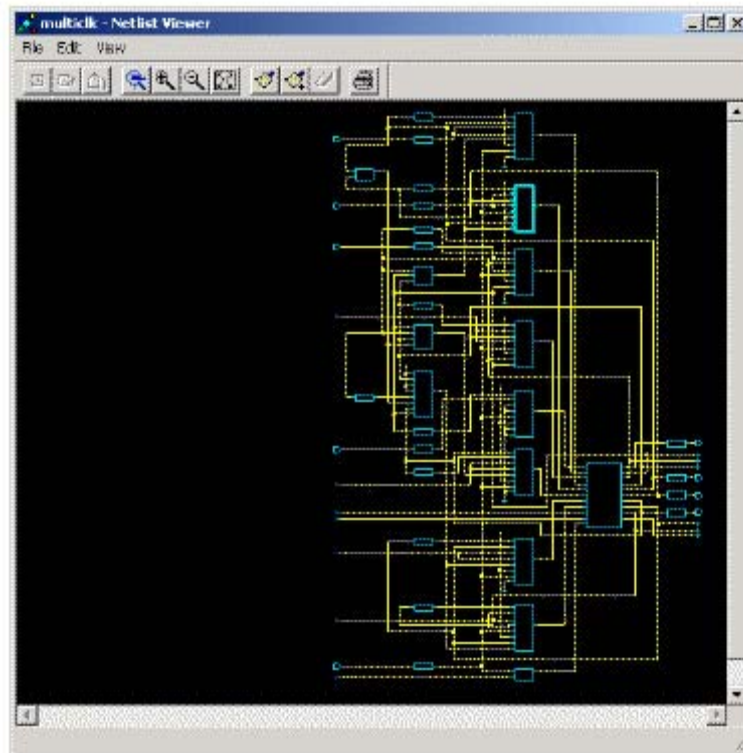
Figure 1-2. NetlistViewer

NetlistViewer

NetlistViewer, as shown in Figure 1-3, consists of three windows: the Schematic View, Hierarchy View, and Search View windows. The NetlistViewer also contains a menu bar, toolbar, and status bar. Each of these items is described below.
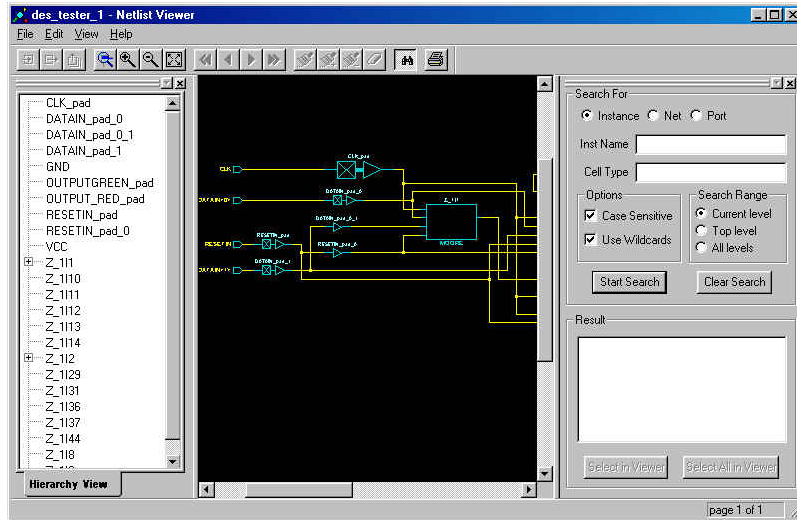
Figure 1-3. The NetlistViewer With All Windows Open

Schematic View

The Schematic View window displays a graphical representation of the netlist.

Design Hierarchy View

The Design Hierarchy View provides easy navigation through the design hierarchy and gives a compact hierarchy overview.

To view the Design Hierarchy View Window:

From the **View** menu, click **Hierarchy**. The hierarchy window opens. This window is sizable and dockable.
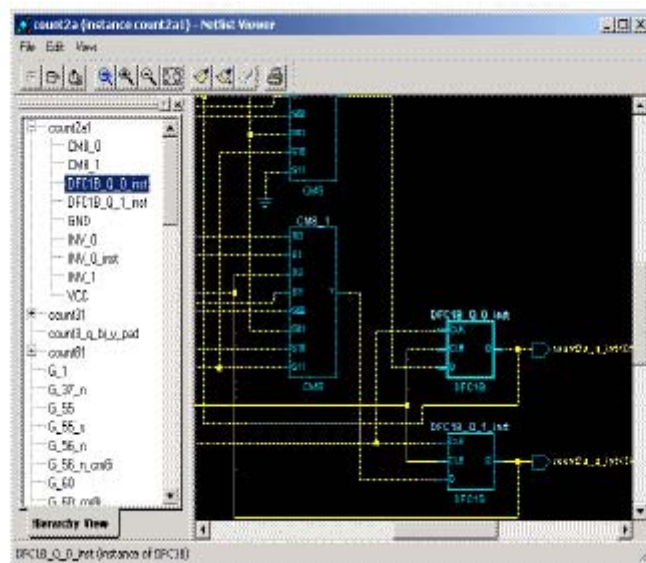
Figure 1-4. Hierarchy View Window

Search View

Use the Search window to search for instances, nets, and ports. For information on using the search view see <u>"Search View" on page 14</u>.

To open the Search View window:

From the **View** menu, click **Search Tool**. The Search View window opens to the right of the Schematic View window, <u>as shown in Figure 1-5</u>.
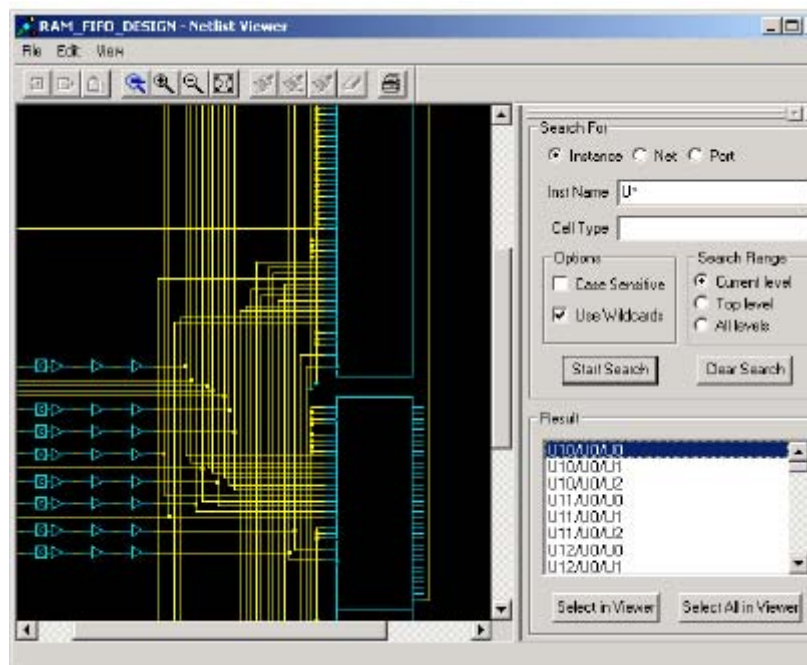
Figure 1-5. Search View Window

The Search View window is sizable and dockable.

Navigation

You can navigate in the logical view of the design in two directions:

Vertical

You can navigate vertically if you have a hierarchical design.

Use the **Push** and **Pop** commands, from the **Schematic** menu and the toolbar, to move through the hierarchical design. The **Push** command allows you to go one level deeper in the design

hierarchy. **Pop** is the reverse action, your view rises up one level. Note that these commands are available in standalone NetlistViewer, not in MultiView Navigator.

Right-click anywhere in the NetlistViewer to open a right-click menu. This provides shortcuts to **Push** and **Pop** functions.

The menu and toolbar also include a **Top** command that brings you back to the top level of the design hierarchy.

All three commands can be accessed through keyboard shortcuts:

> CTRL-P for **Push**
> CTRL-O for **Pop**
> CTRL-T for **Top**

Horizontal

Large designs might not fit in the window. When this occurs, NetlistViewer applies page splitting.

Netlists that continue on another page are terminated by special symbols.

Denotes that the netlist continues on the next page

Denotes that the netlist continues on the previous page

To follow the netlist, double-click the symbol.

For more information, refer to "Navigating Through Your Netlist".

Menu Commands

File Menu

Print: Prints what is currently displayed in the NetlistViewer.

Print Preview: Prints what is currently displayed in the NetlistViewer to a preview window.

Print Setup: Sets up your printing options.

Close: Closes the NetlistViewer.

Edit Menu

Push: Displays the next lower level in the design hierarchy.

Pop: Displays the next higher level in the design hierarchy.

Top: Displays the top level of the design.

Highlight: Marks the currently selected object by turning it red.

Highlight Append: Highlights the currently selected object, by turning it red, and adds it to a group, which includes that last highlighted object.

Unhighlight: Unmarks the selected object only, returning it to yellow or blue.

Clear Highlight: Clears all marked objects, returning them to yellow or blue.

View Menu

Zoom Window: Allows you to drag out an area to enlarge.

Zoom Fit: Fits design in NetlistViewer.

Zoom In: Magnifies the view by a factor 2 (x2).

Zoom Out: Reduces the view by a factor 2 (x.5).

Redraw: Redraws the screen.

Go to First Page: Takes you to the first page in the design.

Go to Previous Page: Displays the previous page in the Schematic View window.

Go to Next Page: Displays the next page in the Schematic View window.

Go to Last Page: Displays the last page in the Schematic View window.

Pre-optimized Netlist (Axcelerator Family): Displays the pre-optimized netlist in the Schematic View window.

Optimized Netlist (Axcelerator Family): Displays the optimized flattened netlist in the Schematic View window. This is the default view.

Toolbar: Hides or displays the toolbar.

Search Tool: Hides or displays the Search window.

Hierarchy: Hides or displays the Hierarchy window.

Getting Started with Multiview Navigator

Starting MultiView Navigator

MultiView Navigator is available from the Designer main window. It can only be started after your design has been compiled. MultiView Navigator is the user interface for NetlistViewer, ChipPlanner, PinEditor, and I/O Attribute Editor.

To start MultiView Navigator from Designer, click NetlistViewer, <u>as shown in Figure 2-1</u>.

If you have not compiled your design, Designer prompts you to perform the compilation process.

Figure 2-1. NetlistViewer Button

The MultiView Navigator reads your netlist design and generates a clearly laid out schematic view. Axcelerator and ProAsic designs are displayed in the NetlistViewer inside MultiView Navigator, <u>as shown in Figure 2-2</u>. All other designs are displayed in standalone NetlistViewer.
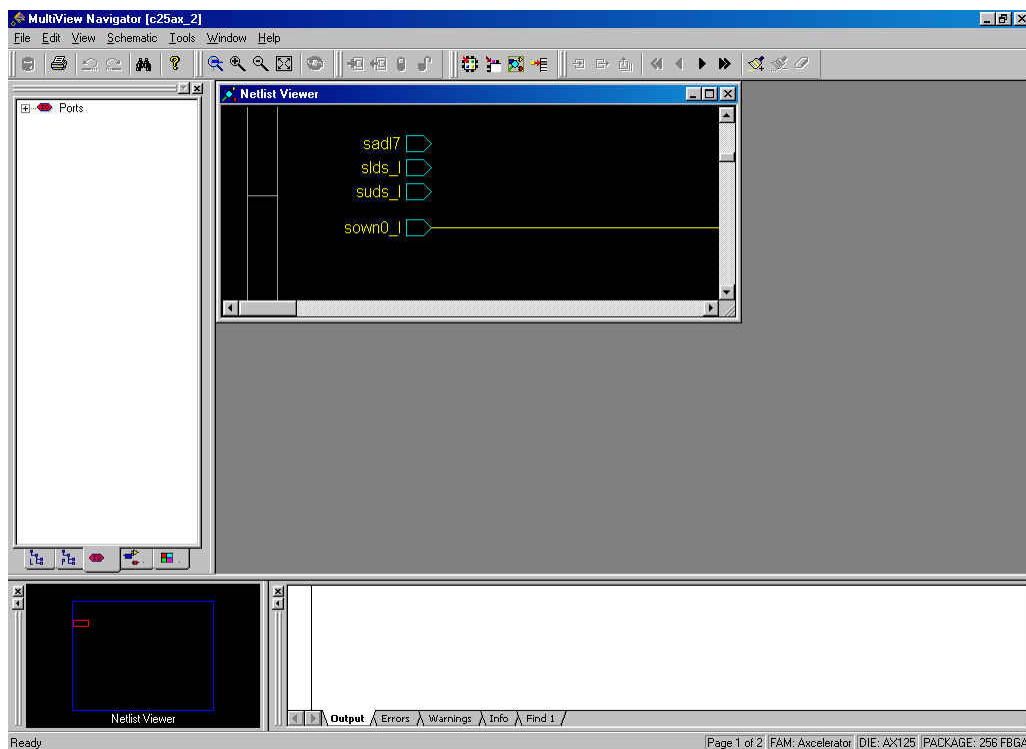

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Figure 2-2. MultiView Navigator

MultiView Navigator

NetlistViewer, embedded in MultiView Navigator, <u>as shown in Figure 2-2</u>, enables you to select a Hierarchical view, Location view, and Information windows.

The Netlist Viewer embedded in MultiView Navigator also contains a menu bar, toolbar, and status bar. These items are described below.

Hierarchy window

The Hierarchy window provides easy navigation through the design hierarchy and gives a compact hierarchy overview. You can chose to view the following types of elements:

> Logical
>
> Physical
>
> Ports
>
> Nets
>
> Regions

NetlistViewer window

The NetlistViewer window displays a graphical representation of the netlist.

Location view

The Location view enables you to change the area displayed in the NetlistViewer window.

To alter the position displayed in the NetlistViewer window:

> In the Location view window, click and drag the display area. The position of the netlist in the NetlistViewer window changes.
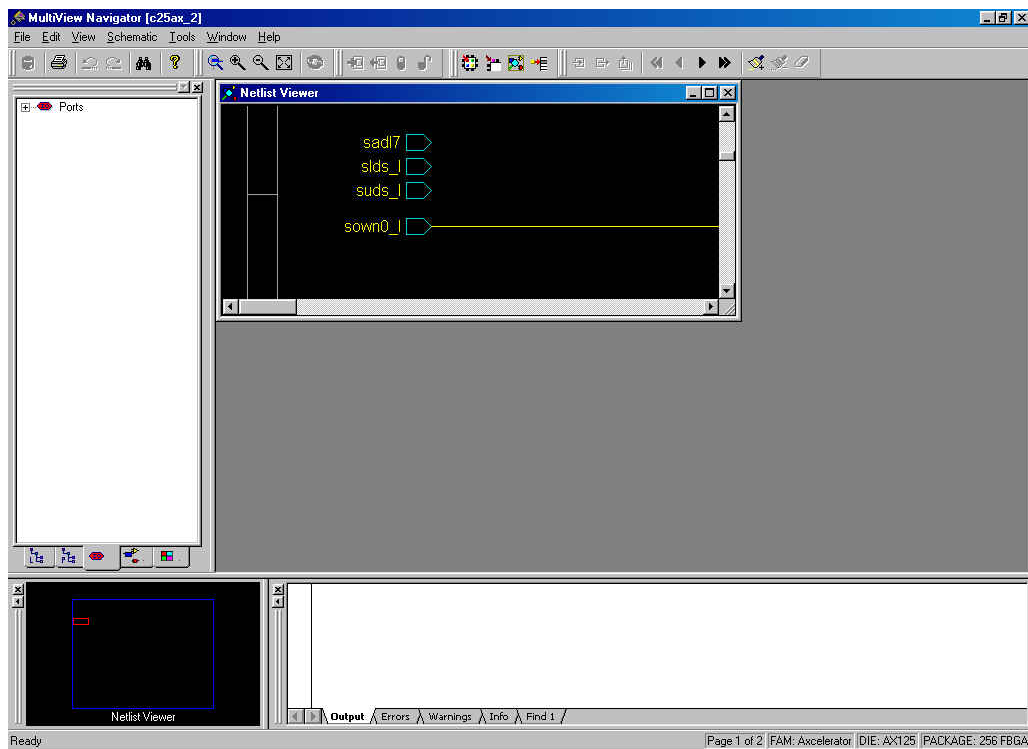
Figure 2-3.   Using the Location view window

Log Window

The Log window displays information about your netlist. This area is also used to display the results of any search that you perform. Click the tabs at the bottom of the window to view the information you require. You can choose from:

> Output
>
> Errors
>
> Warning
>
> Information
>
> Find (Search Results)

Navigation

You can navigate in the logical view of the design in two directions:

Vertical

You can navigate vertically if you have a hierarchical design.

Use the **Push** and **Pop** commands, from the **Schematic** menu and the toolbar, to move through the hierarchical design. The **Push** command allows you to go one level deeper in the design hierarchy. **Pop** is the reverse action, your view rises up one level.

Right-click anywhere in the MultiView Navigator to open a right-click menu. This provides shortcuts to **Push** and **Pop** functions.

The menu and toolbar also include a **Top** command that brings you back to the top level of the design hierarchy.

Horizontal

Large designs might not fit in the window. When this occurs, MultiView Navigator applies page splitting. Page splitting is optional; de-select **Allow Page Splitting** in the **Schematic** menu to turn it off.

Netlists that continue on another page are terminated by special symbols.

Denotes that the netlist continues on the next page

Denotes that the netlist continues on the previous page

To follow the netlist, double-click on the symbol.

For more information, refer to .

Toolbar

The toolbars listed below are for the MultiView Navigator interface running NetlistViewer:

Standard

View

Logic

Highlight

Edit

Schematic

Menu Commands

The menu commands below are for the MultiView Navigator interface running NetlistViewer.
 Standalone NetlistViewer commands vary slightly from those listed below.

File Menu

Commit: Commits your changes to the design.

Print: Prints what is currently displayed in the MultiView Navigator.

Print Preview: Prints what is currently displayed in the MultiView Navigator to a preview window.

Exit: Closes the MultiView Navigator.

Edit Menu

Undo: Reverses your last action.

Redo: Performs your last action again.

Cut: Deletes your current selection and copies it to the clipboard.

Copy: Copies your current selection to the clipboard.

Paste: Copies the contents of the clipboard to your design.

Select All: Selects all elements in your design.

Find: Opens the Find window.

Highlight: Highlights or Unhighlights your current selection.

Highlight Color: Enables you to change the color used to highlight entities.

View Menu

Zoom In: Magnifies the view by a factor of 2 (x2).

Zoom Out: Reduces the view by a factor of 2 (x.5).

Zoom Window: Enables you to drag out an area to enlarge.

Zoom Fit: Fits design in MultiView Navigator.

Redraw: Redraws the screen.

Toolbars: Enables you to show or hide the toolbars.

Windows: Enables you to show or hide windows.

Display Settings: Enables you to change the display settings.

Schematic Menu

Push: Displays the next lower level in the design hierarchy.

Pop: Displays the next higher level in the design hierarchy.

Top: Displays the top level of the design.

Go to First Page: Takes you to the first page in the design.

Go to Previous Page: Displays the previous page in the Schematic View window.

Go to Next Page: Displays the next page in the Schematic View window.

Go to Last Page: Displays the last page in the Schematic View window.

Follow Net Into: Enables you to follow your design through its various levels.

Go to Net Driver: Enables you to jump to the Net Driver

Select All Children in other Views: Enables you to select all the children of the current selected entity.

Allow Page Splitting: Enables or disables page splitting in your view.

Show Pre-optimized Netlist: Displays the pre-optimized netlist in the Schematic View window.

Show Optimized Netlist: Displays the optimized flattened netlist in the Schematic View window. This is the default view.

Tools Menu

ChipPlanner: Launches ChipPlanner.

PinEditor: Launches PinEditor.

NetlistViewer: Displays your design in NetlistViewer.

I/O Attribute Editor: Launches the I/O attribute editor.

I/O Bank Settings: Enables you to change I/O bank settings.

Window Menu

New Window: Displays a new window.

Close Window: Closes the active window.

Cascade: Displays the windows in cascaded format.

Tile Horizontally: Displays the windows in horizontal tile format.

Tile Vertically: Displays the windows in vertical tile format.

Arrange Icons: Re-arranges the icons on your screen.

Using NetlistViewer

Viewing Your Netlist

The NetlistViewer window displays your netlist in a graphical manner, assisting you in debugging your netlist.

To view your netlist using NetlistViewer:

Start NetlistViewer. Click **NetlistViewer** in the Design Flow window. The NetlistViewer starts and displays your netlist in either MultiView Navigator (as shown below) or in standalone NetlistViewer.
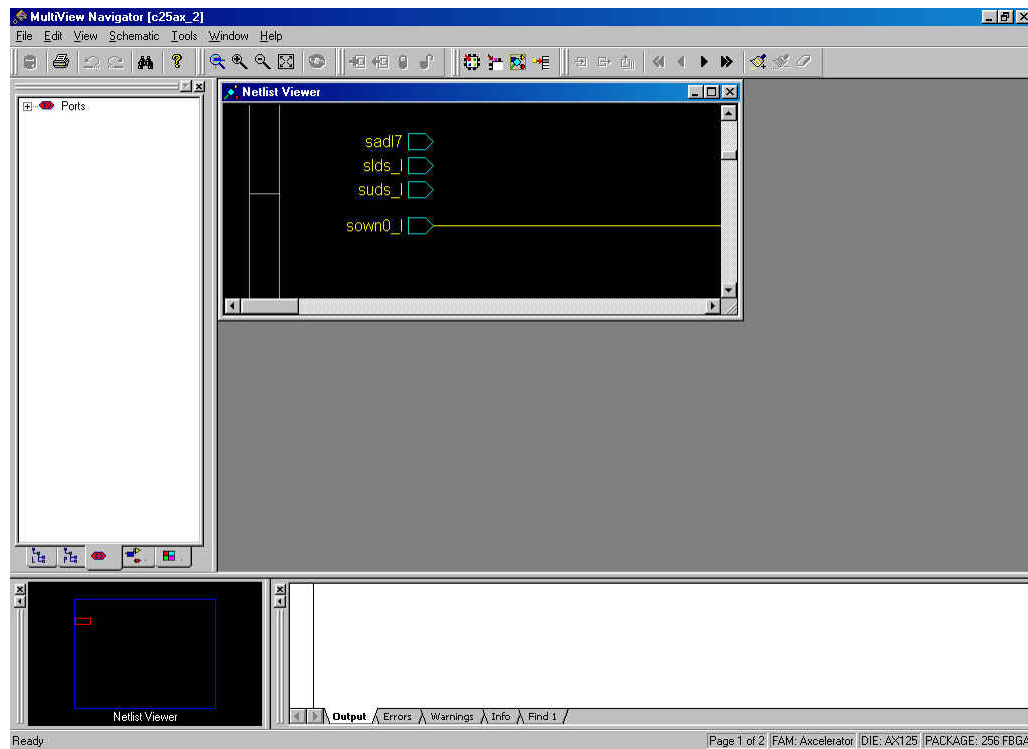

Figure 3-1. NetlistViewer

Netlist Viewer in MultiView Navigator

If your device supports Netlist Viewer in MVN (Axcelerator or Flash devices), you can choose to view the optimized flattened netlist or the pre-optimized hierarchical netlist.

The optimized flattened netlist is a non-hierarchical view. Use the optimized flattened netlist when cross-probing with other tools, such as PinEditor or Timer.

The pre-optimized netlist is the original netlist, as passed to the Designer software. The hierarchical structure is useful for navigating. When using the pre-optimized netlist for cross-probing, some items might not appear.

To switch between the different views, from the Schematic menu, click **Show Pre-optimized Netlist** or **Show Optimized Netlist**.

Navigating Through Your Netlist

You can navigate in the logical view of the design vertically and horizontally. This section describes both options.

Vertical Navigation

Navigate vertically through your hierarchical design by using the **Push**, **Pop**, and **Top** commands. These commands are available from the **Schematic** menu, the right-click menu, and the toolbar. They can also be accessed through keyboard shortcuts:

> CTRL-P for **Push**
>
> CTRL-O for **Pop**
>
> CTRL-T for **Top**

To go one level deeper in a design:

1. Select an instance.

2. From the **Edit** menu, click **Push,** or from the right-click menu select **Push instance <name>**

To rise one level higher in a design:

> From the **Edit** menu, click **Pop**.

To rise to the top level:

> From the **Edit** menu, click **Top**.

Horizontal Navigation

When large designs do not fit in the Schematic View window, MultiView Navigator applies page splitting.

To navigate to the next page in a design do one of the following:

1. From the **Schematic** Menu, click **Go to Next Page**

2. Click the **Next Page** button in the toolbar

To navigate to the previous page:

1. From the **Schematic** Menu, click **Go to Previous Page**

2. Click the **Previous Page** button in the toolbar

To navigate to the first page:

1. From the **Schematic** menu, click **Go to First Page**

2. Click the **First Page** toolbar button
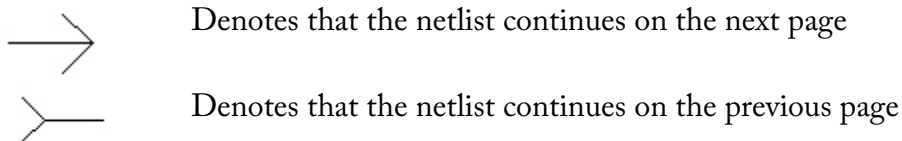
To navigate to the last page:

1. From the **Schematic** menu, click **Go to Last Page**

2. Click the **Last Page** toolbar button

Following Nets

Following a net might take you to the next page in a schematic, or several pages away.

To follow a net:

In the Schematic View window, click a net that continues before or after the page being viewed. Nets that continue on a following page or pervious page are terminated by the symbols shown below.

Denotes that the netlist continues on the next page

Denotes that the netlist continues on the previous page

In the example below, clicking the symbol next to sclk3m57_0 takes you to the page where the net continues.
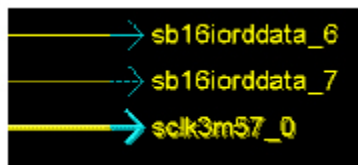
Figure 3-2. Symbol for a Continuing Net

In the example below, clicking the symbol next to sclk3m57_0 takes you to the page where the net came from.
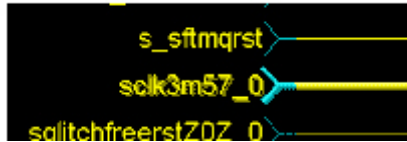
Figure 3-3. Symbol for Previous Net

You can also navigate to the next or previous pages by selecting Go To Next Page or Go To Previous Page on the Schematic Menu.

Using the Hierarchy Window - NetlistViewer in MultiView Navigator

The Hierarchy window provides easy navigation through the design hierarchy and gives a compact hierarchy overview. When you select an instance in the Hierarchy window it is highlighted in the NetlistViewer window. MultiView Navigator enables you to view the following elements; Logical, Physical, Ports, Nets and Regions. Choose the type you want to view by clicking on the tabs at the bottom of the window.

To view the Hierarchy window:

1. From the **View** menu, click **Windows** and **Hierarchy Window**. The Hierarchy Window opens.

2. Select the type of element you want to view by clicking on one of the tabs at the bottom of the window.

3. Select an instance name in the hierarchy. The instance is located and highlighted in the NetlistViewer,as shown below. All parents are also selected. Since any item selected in one window is selected in all, selecting an instance in the NetlistViewer locates and selects the instance in the Hierarchy window.
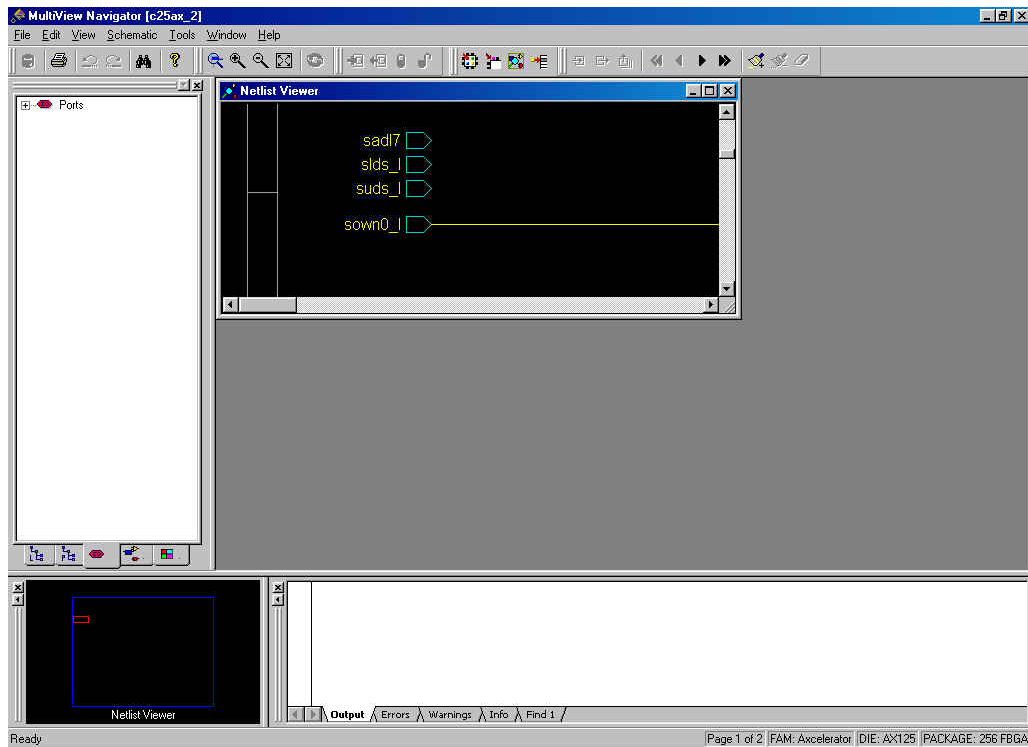
Figure 3-4. Hierarchy View Window

Highlighting Objects

Highlight objects or groups of objects for easy reference. Highlighted objects are displayed in red by default but you can change this color.

To highlight an object:

1. Select the object in the NetlistViewer.

2. From the **Edit** menu, click **Highlight** or click the **Highlight** button in the toolbar. The object changes from yellow or blue, to red, <u>as shown in Figure 3-5</u>.
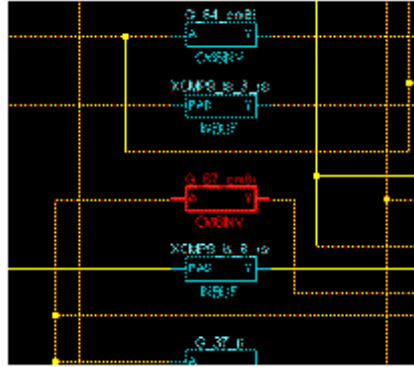
Figure 3-5. Highlighted Object

To highlight a group of objects:

1. Select an object in NetlistViewer.

2. Select another object to add to the group. Select multiple objects by holding down the
   SHIFT key while selecting.

3. From the **Edit** menu, click **Highlight** or click the **Highlight** toolbar button.
   This can be useful for tracing a net, as shown in Figure 3-6.
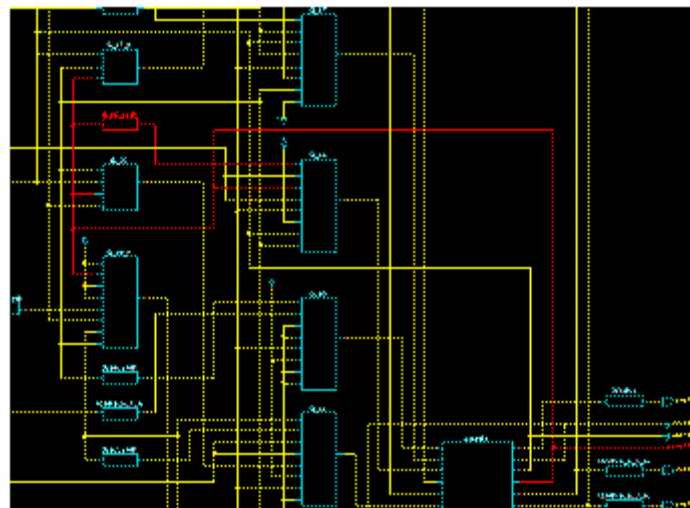
Figure 3-6. Highlighting Groups

To unhighlight an object or group of objects:

1. Select the highlighted object, or group of objects. To select a group, hold the **SHIFT** key
   while selecting objects with your mouse.

2. From **Edit** menu, click **Unhighlight,** or click the **Unhighlight** toolbar button.

To change the highlight color:

1. From the **Edit** menu, click **Highlight Color.**

2. Select the color your require.

3. Click **OK.**

Searching

This section describes how to search using NetlistViewer embedded in MultiView Navigator. The search procedure for standalone NetlistViewer varies slightly from the one described here.

Searching for objects can shorten your debug time. Use the Find window to search for instances, nets, and ports.

To search for an instance, net or port:

1. From the **Edit** menu, click **Find**. The Find Window opens, as shown in Figure 3-7.
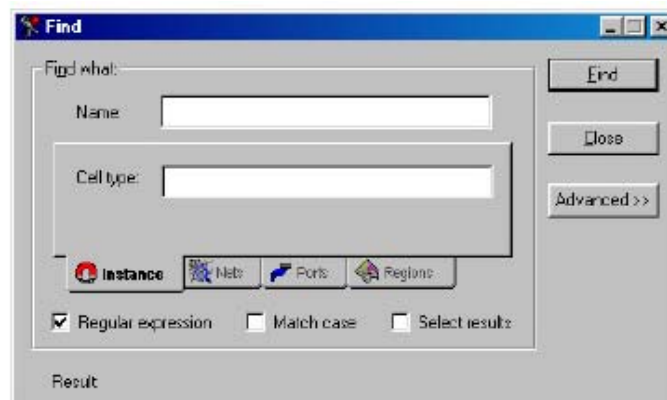
Figure 3-7. Searching

2. Select **Instance**, **Nets**, **Ports** or **Regions** tab in the Find what area.
   Type the text you are looking for in the **Name** area. You can refine your search by specifying a **Cell** type (on the Instance tab), a **Fanout** value (on the Nets tab), a **Port** type (on the Ports tab) or a **Region** type (on the Regions tab).

The **Name** and **Cell type** fields accept regular expressions. Wildcards in regular expression include:

? matches any single character

* matches any string

[ ] matches any single character among those listed between brackets

[A-Z] matches any single character in range A-Z

[Z-A] matches any single character in range A-Z

/ is the level-bordering symbol. "A/B" designates "object B, which is part of instance A". Note that the level-bordering symbol cannot be put between brackets in a regular expression.

3. Select search options.

   Click the **Regular expression** if you want to search using a regular expression. Click **Match Case** if you want the search to only return items with the exact characters specified. Click **Select results** if you want to automatically select items that match your search criteria.

4. Click **Find**. The located objects, if any, appear in the Result pane.

5. Select one or several objects in the Result pane to locate them in the **Netlist Viewer** window.

Storing Search Results

MultiView Navigator enables you to store your search results.

To dictate how your results are stored:

1. Click **Advanced** in the Find window.

   The Find window expands to display the advanced options as follows:
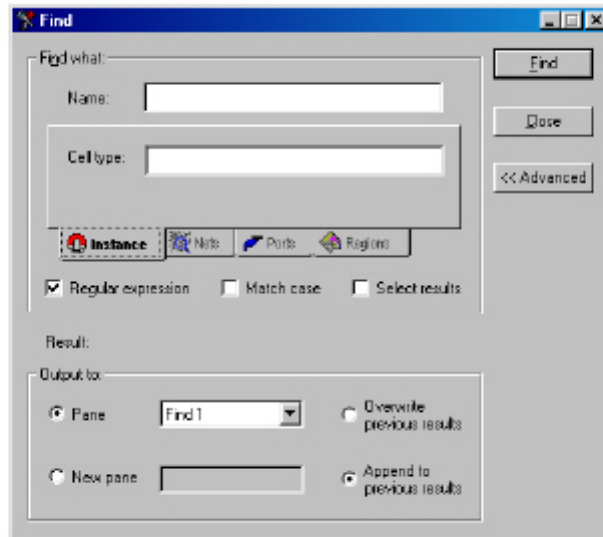
Figure 3-8. Find Window Showing Advanced Options

2. Click the **Pane** radio button to select the pane into which your results will be stored or click **New pane** and enter a name for your new pane.

3. Click the **Overwrite previous results** radio button if you want to overwrite any existing results or click the **Append to previous results** radio button if you want to append your results to any existing results.

Using NetlistViewer with ChipEditor/ChipPlanner

If both the NetlistViewer and ChipEditor/ChipPlanner are open, items selected in either tool are selected and highlighted in the other. For more details about ChipEditor, please refer to the ChipEditor Online Help. For more details about ChipPlanner, please refer to the ChipPlanner Online Help.

The procedure described here is for tools embedded in MultiView Navigator. Cross-probing with standalone NetlistViewer is supported in ChipEditor; the procedure varies slightly for standalone tools.

To use NetlistViewer with ChipPlanner:

1. Start NetlistViewer. Click on **NetlistViewer** in Designer's Design Flow window.

NetlistViewer starts, displaying your netlist, as shown in Figure 3-9.
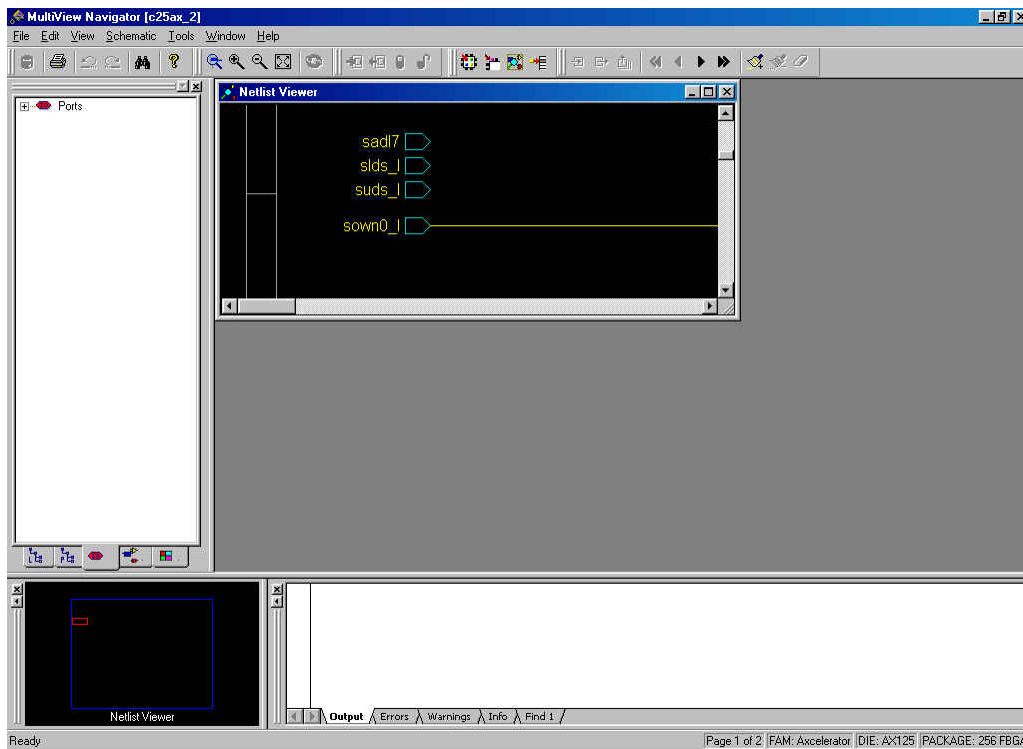
Figure 3-9. NetlistViewer in the MultiView Navigator

2. Start ChipPlanner.

    ChipPlanner opens in a separate window in the MultiView Navigator and displays the
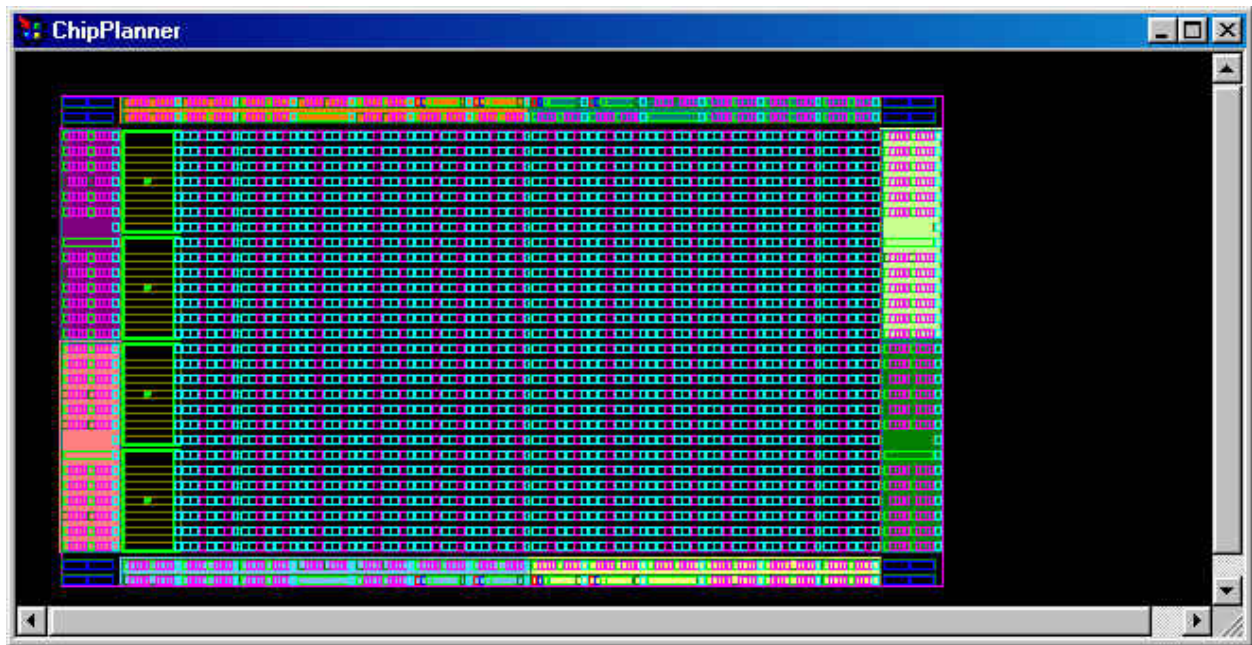   logic and I/O modules on the device, as shown in Figure 3-10.

Figure 3-10. ChipPlanner Window

3. Select a macro or instance in the ChipPlanner or NetlistViewer. The item is selected in the other tool, as shown in Figure 3-11.
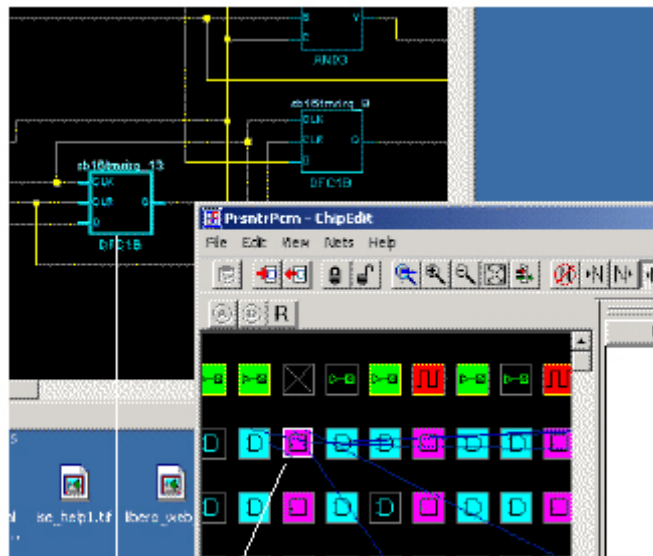

Figure 3-11. Item Selected in Both ChipPlanner and NetlistViewer

Using NetlistViewer with Timer

Use the NetlistViewer with Timer to view and trace entire paths. For more detailed information about Timer, please refer to the Timer Online Help.

Tracing Timing Paths

The NetlistViewer with Timer enables you to trace Timing Paths.

To trace paths using NetlistViewer and Timer:

1. Start NetlistViewer. Click on **NetlistViewer** in Designer's Design Flow window.

Note: Your design must be compiled in order to start NetlistViewer. If it is not compiled, Designer prompts you to do so.

NetlistViewer starts, displaying your netlist .
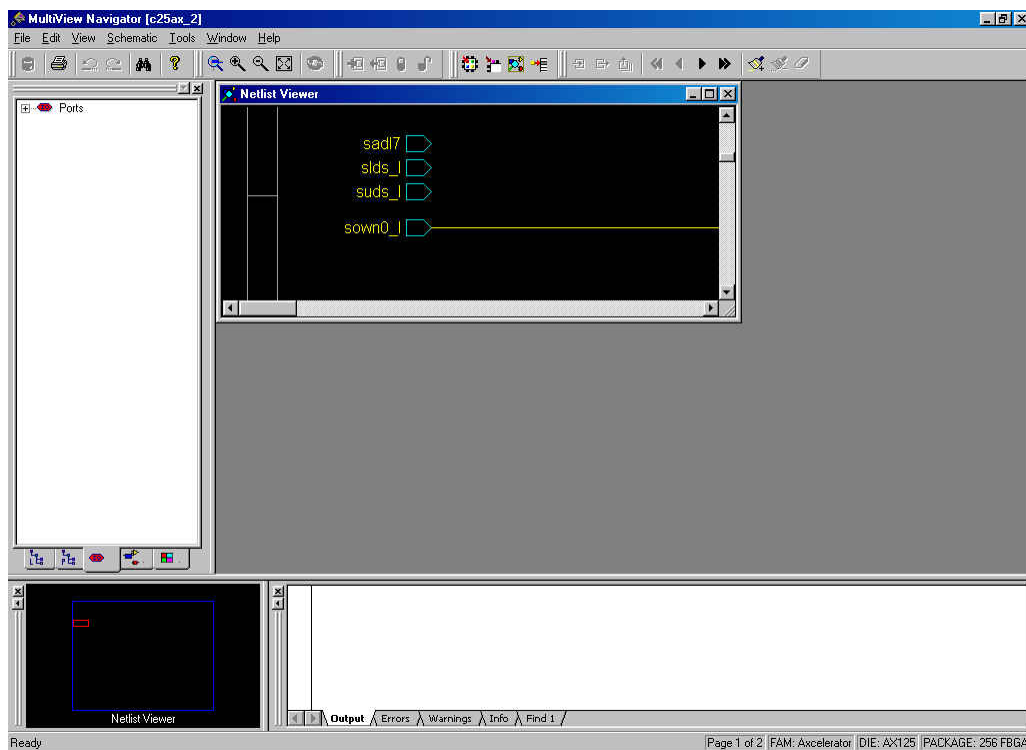
Figure 3-12. NetlistViewer

2. Start Timer. Click **Timer** in Designer Design Flow window.

Timer starts, as shown in Figure 3-13 .
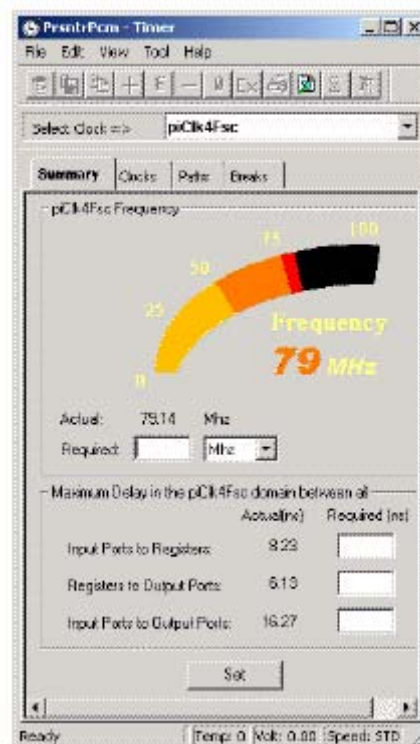
Figure 3-13. Timer Starts

3. Click the Timer **Paths** tab. The **Paths** tab is displayed, as shown in Figure 3-14.
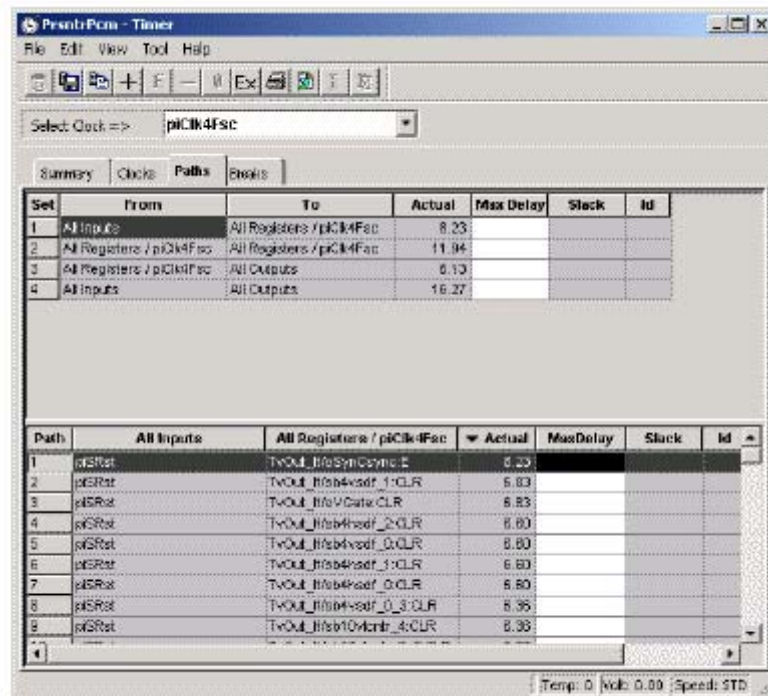
Figure 3-14. Paths Tab

4. Select a path set in the path set table. Paths within that set are displayed below in the path table.

5. Select the path you wish to expand in the lower path set table.

6. Expand the path by double-clicking on the path, or in the **Edit** menu, click **Expand Paths**. The Expanded Paths window opens, as shown in Figure 3-15.
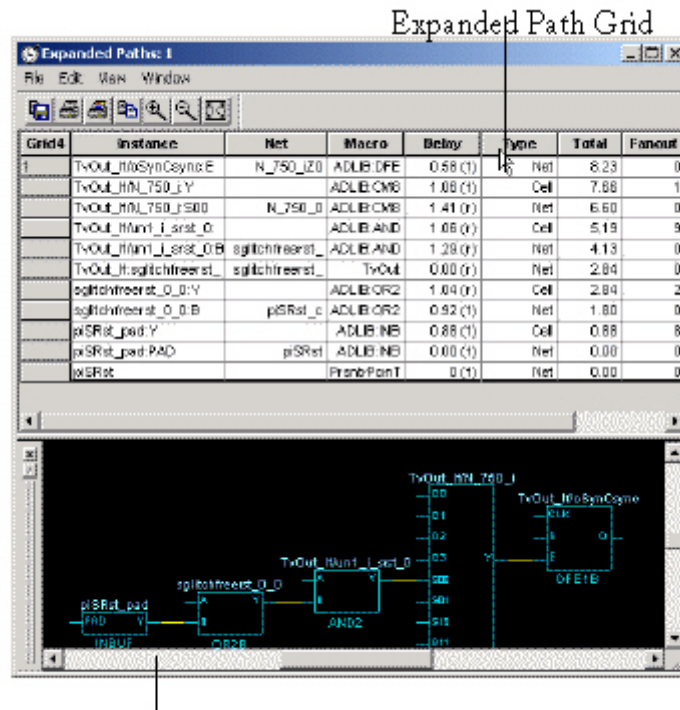
Figure 3-15. Expanded Paths

The Expanded Paths window displays the path in the Expanded Paths grid and a graphical representation of the path in the Graph window.

7. Select an instance in the Expanded Paths grid or in the Graph window. The instance is highlighted in the NetlistViewer, as shown in Figure 3-16.
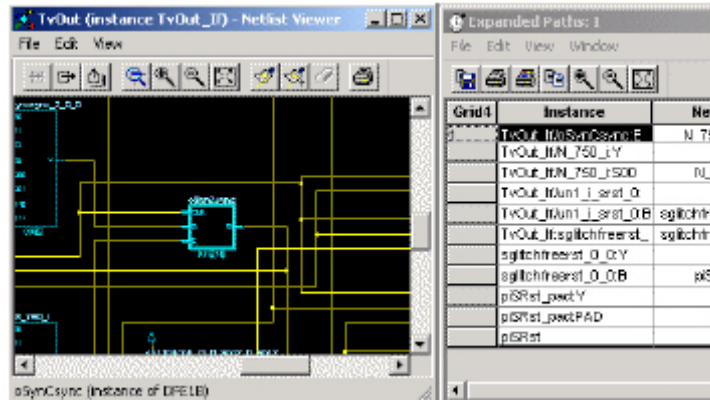
Figure 3-16. Instance in Timer is Highlighted in NetlistViewer

8. Select the first register in the timer path and locate it in the NetlistViewer. Follow the entire path in the NetlistViewer.

Examples

Debugging Simulation Results

The NetlistViewer is useful for debugging your netlist when simulation results are complex or conflicting with design constraints.

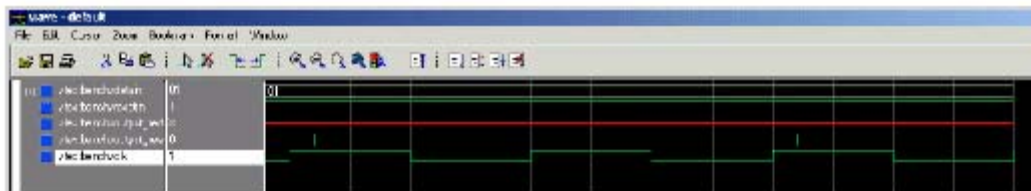In this example, an unknown (red) signal appears as an output when simulation is performed, as shown in Figure 4-1.

Figure 4-1. Investigating Signal Output

In most cases, this occurs when the output of a flip flop is being fed back into the input without a reset, preset, or clear input. The NetlistViewer can help you verify that such a flip flop configuration exists in the design.

Locating and viewing the flip flops:

1. Start the NetlistViewer. Click **NetlistViewer** in the Design Flow window.

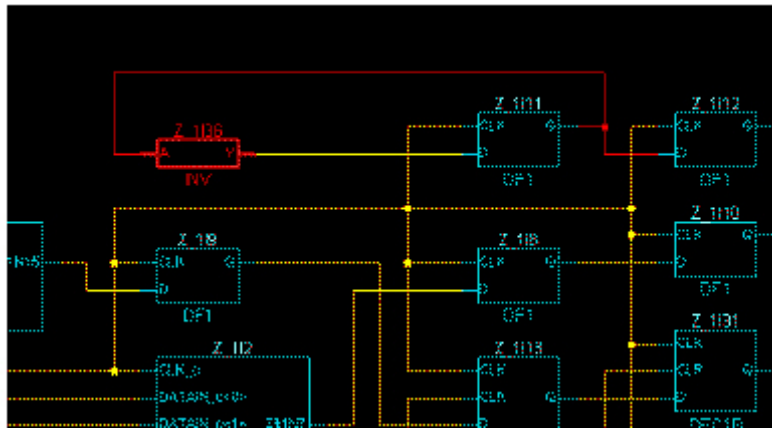2. Zoom to locate the flip flops, as shown in Figure 4-2.

Figure 4-2. Flip Flop Feedback

Identifying Paths

In this example, the NetlistViewer is used with Timer to identify the inputs of combinational gates. For more detailed information about Timer, refer to the Timer Online Help.

To identify these paths:

1. From Designer, start NetlistViewer. Click **NetlistViewer** in the Design Flow window. The NetlistViewer starts and displays your netlist, as shown in Figure 4-3.
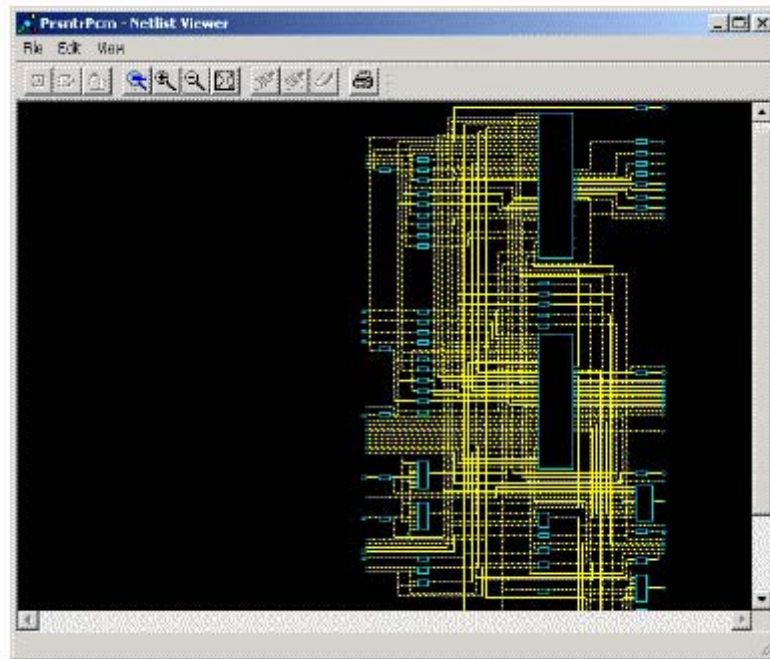
Figure 4-3. Starting NetlistViewer

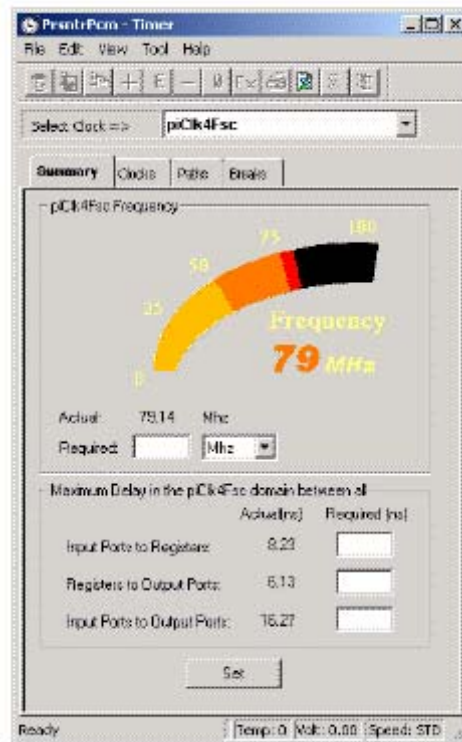2. From Designer, start Timer. Click **Timer** in the Designer Flow Window. Timer starts, as shown in Figure 4-4.

Figure 4-4. Starting Timer

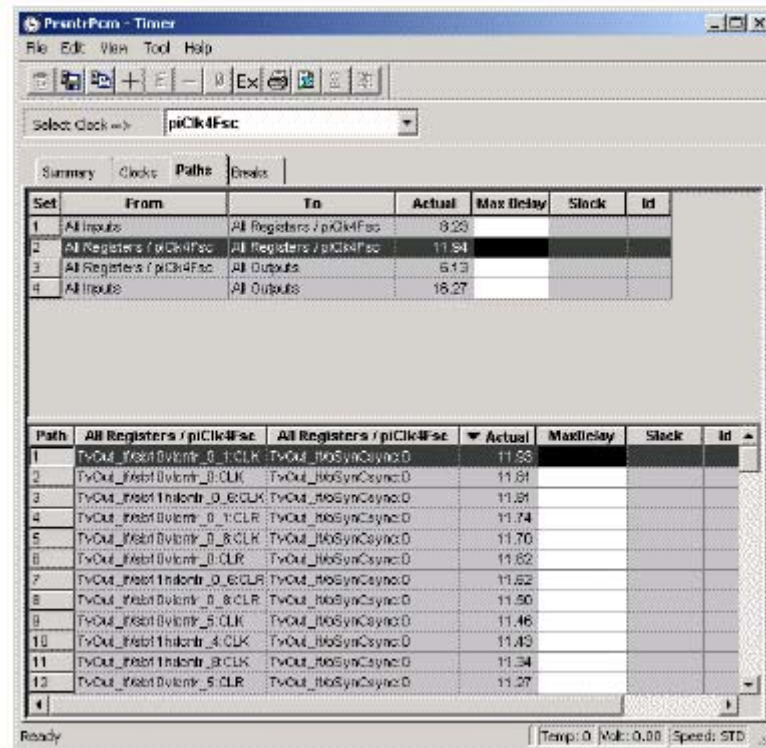3. In Timer, click the **Paths** tab, as shown in Figure 4-5.

Figure 4-5. Timer's Paths Tab

The **Paths** tab displays timing analysis information for four categories of paths, known as "sets," in the upper table. When a set is selected in this upper table, the paths within that set are displayed in the lower table.

4. Select a path set in the upper path set table. The paths within that set are displayed in the lower table.

5. Expand a path. Double-click a path in the lower paths table. The Expanded Paths window opens, as shown in Figure 4-6.
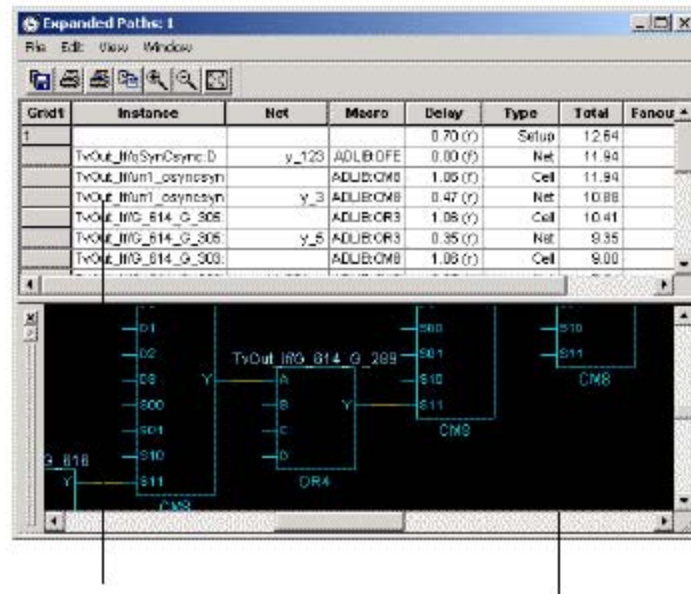
Path's Grid   Chart Window

Figure 4-6. Expanding the Path

The Expanded Paths window displays a path in the Expanded Paths table and a graphical representation of the path in the Graph window.

Notice that the inputs of combinational gates are not displayed in the Graph window, as shown in Figure 4-7.
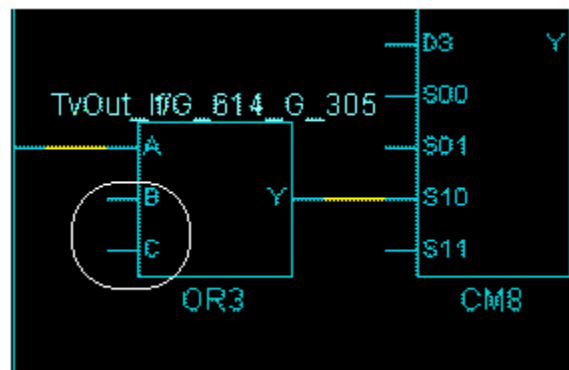

Figure 4-7. Combinational Gates in Timer's Expanded Paths Window

It is useful to know where these paths come from, as they might indicate a false path, which is never encountered in the use of the design and can affect the timing report. It is

very useful to know the interaction of other inputs to these macros with the indicated path because this helps in defining the appropriate paths to get accurate timing reports.

6. Select the macro in the Graph window. The macro is located and selected in the NetlistViewer, as shown in Figure 4-8.
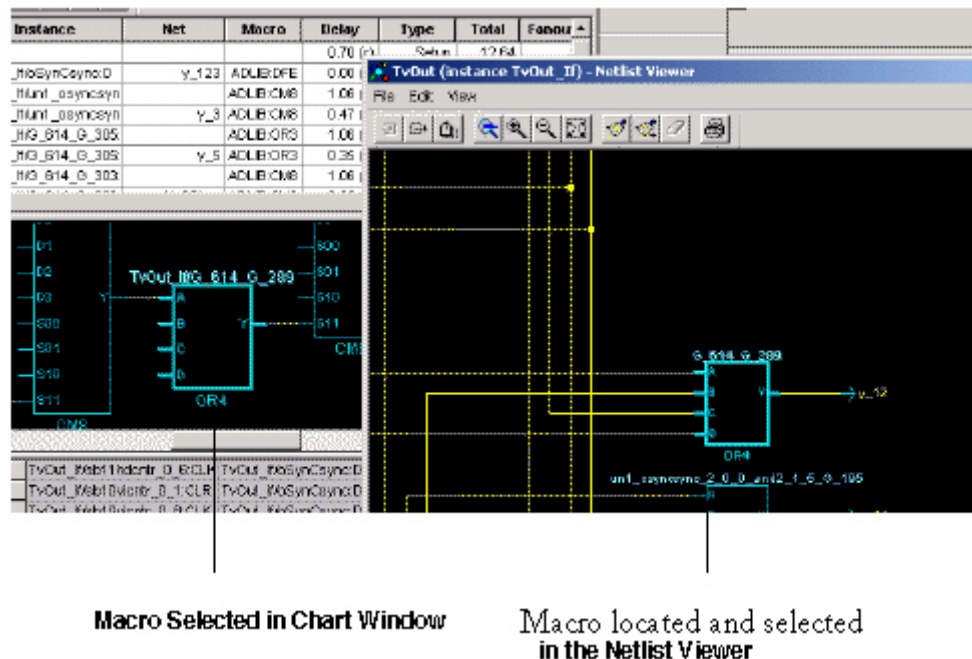

Figure 4-8. Selected Macro is Located and Selected in the NetlistViewer

Using the NetlistViewer, you can now track the other inputs into the path.

Viewing Buffers

NetlistViewer is useful to see buffers inserted by your synthesis tool due to the high fanout number of some signals.

To view inserted buffers:

1. Start NetlistViewer. Click **NetlistViewer** in the Design Flow window. The NetlistViewer starts and displays your netlist, as shown in Figure 5-9.
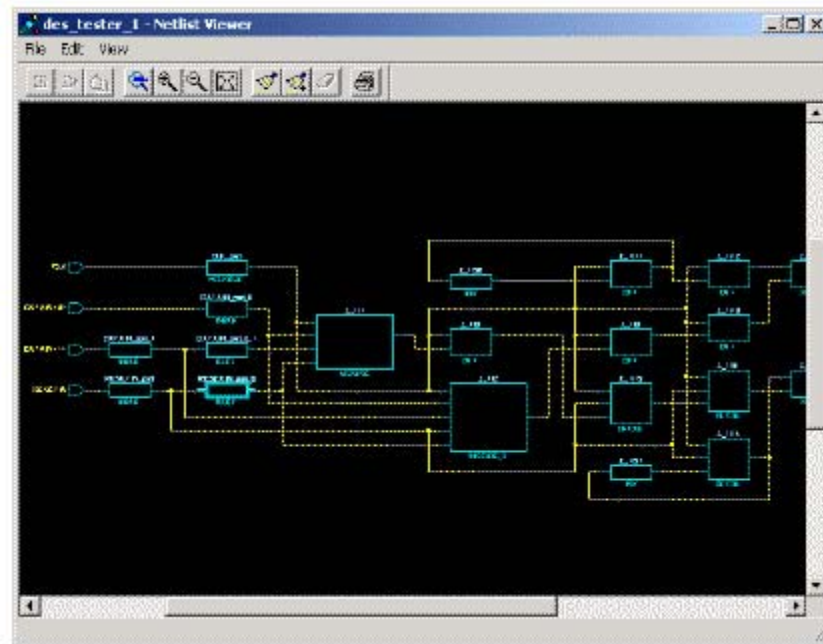
Figure 4-9. NetlistViewer Starts

In this example, since the fanout of DATAIN and RESET inputs of the design exceeds the specified value in the Synplicity synthesis tool, Synplicity inserts 2 buffers in their path to reduce the number of fanout for these signals, as shown in Figure 5-10.
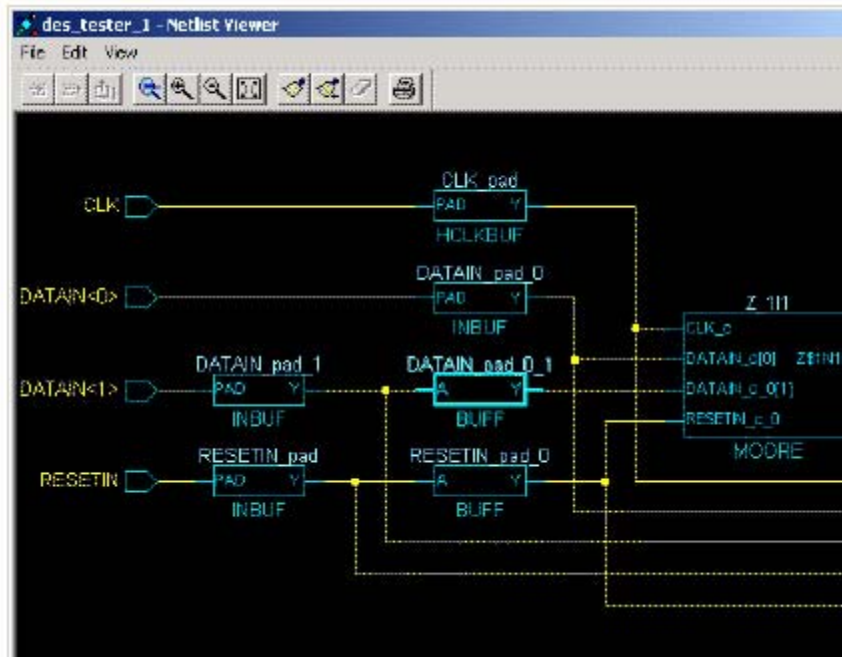
Figure 4-10. Inserted Buffers

Using NetlistViewer, you can track these inserted buffers.