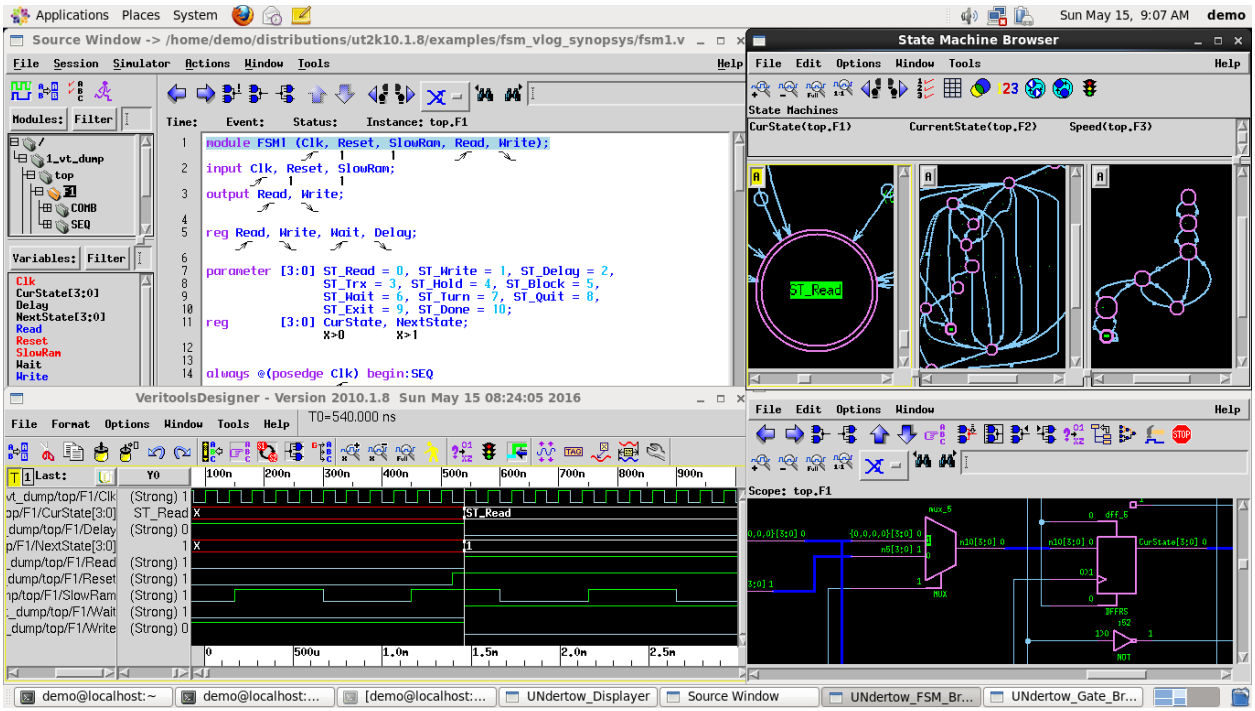
VeritoolsDesigner

Tutorial for VeritoolsDesigner, for Verilog, SystemVerilog and VHDL



Tutorial for Verilog, SystemVerilog and VHDL

VeritoolsDesigner Source Code Debugger

To run the VeritoolsDesigner, do the following steps:

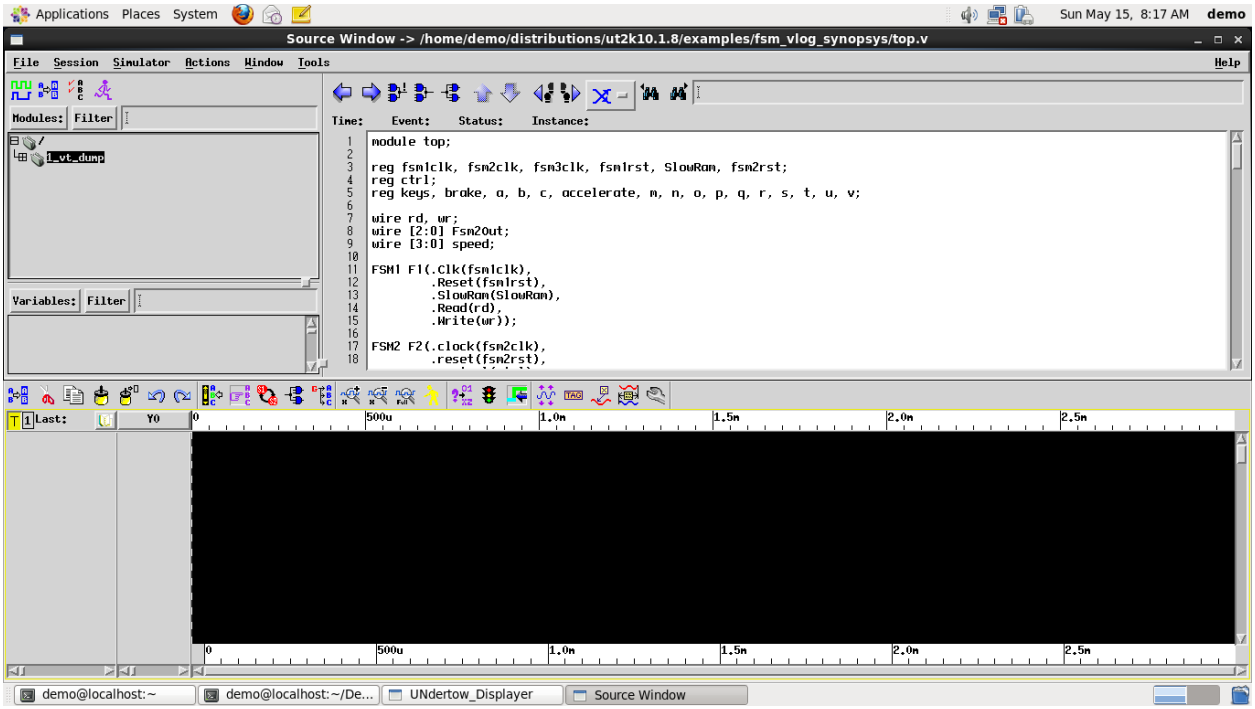
```
% cd /flexlm and launch License Manager
% Run lmgrd for VeritoolsDesigner license
% cd /(disti dir)/examples/fsm_vlog_synopsys
% run_ut_batch
```

(Script contains: ut –iv –f source –sigfile vt.dump ....)

"-f source" means the source file is directory containing a number of Verilog or VHDL files.

"-sigfile vt.dump" means the file was created using the Veritools pli, vpi or vhpi, linked into the user's simulator.

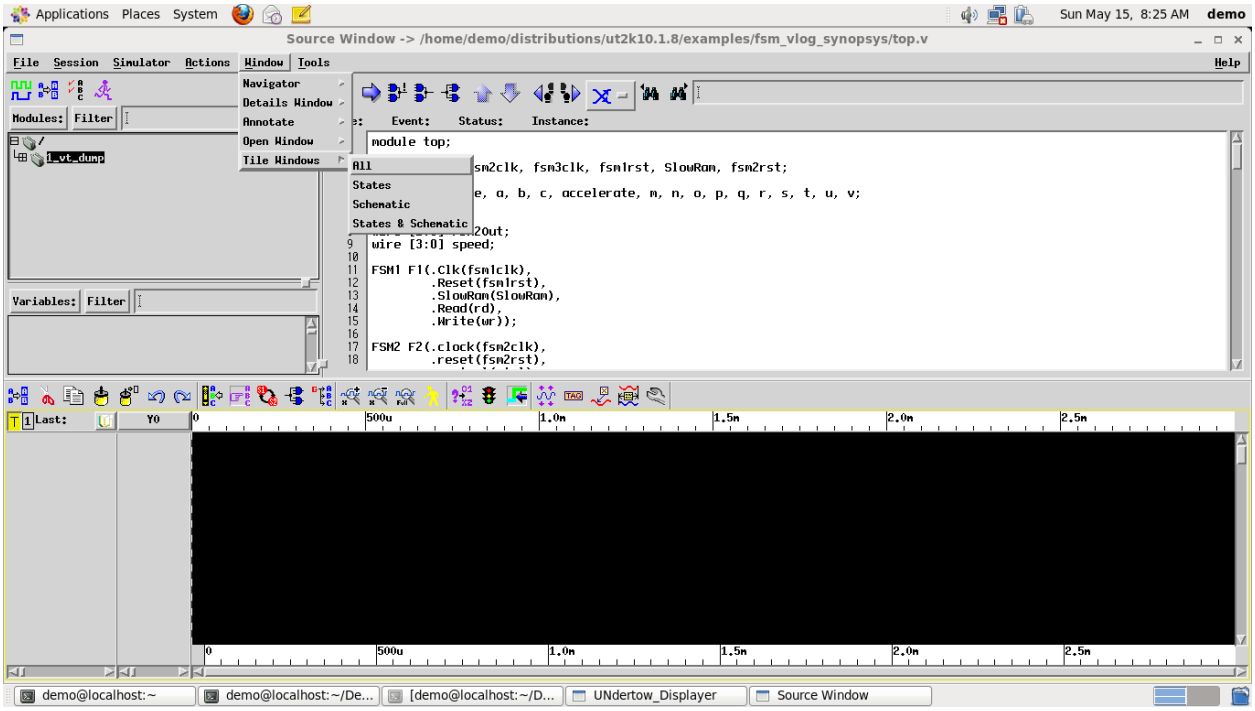
The initial screen is shown below:

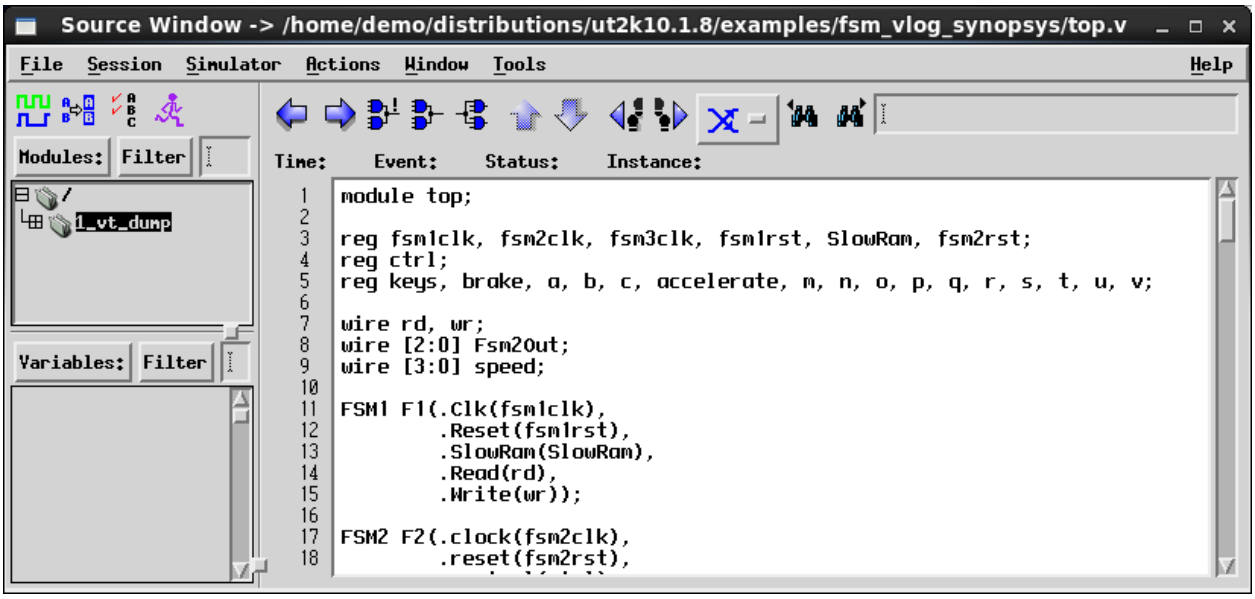


The top two windows are the source code window on the right, and the hierarchy window on the left. The bottom window is the waveform view (empty).

The hierarchy window at top left, includes the design hierarchy (upper portion) and the signal list below (empty).

To bring in the State Diagram and Schematic windows, select the **Window** pull-down menu, click **Tile Windows**, then **States & Schematic:**

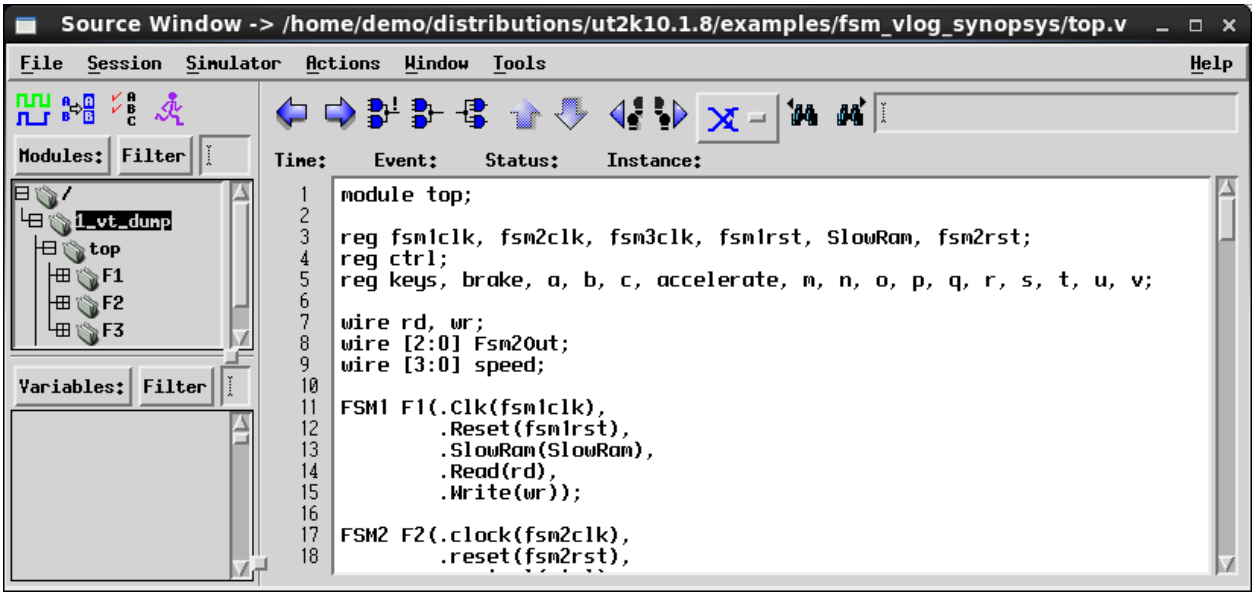




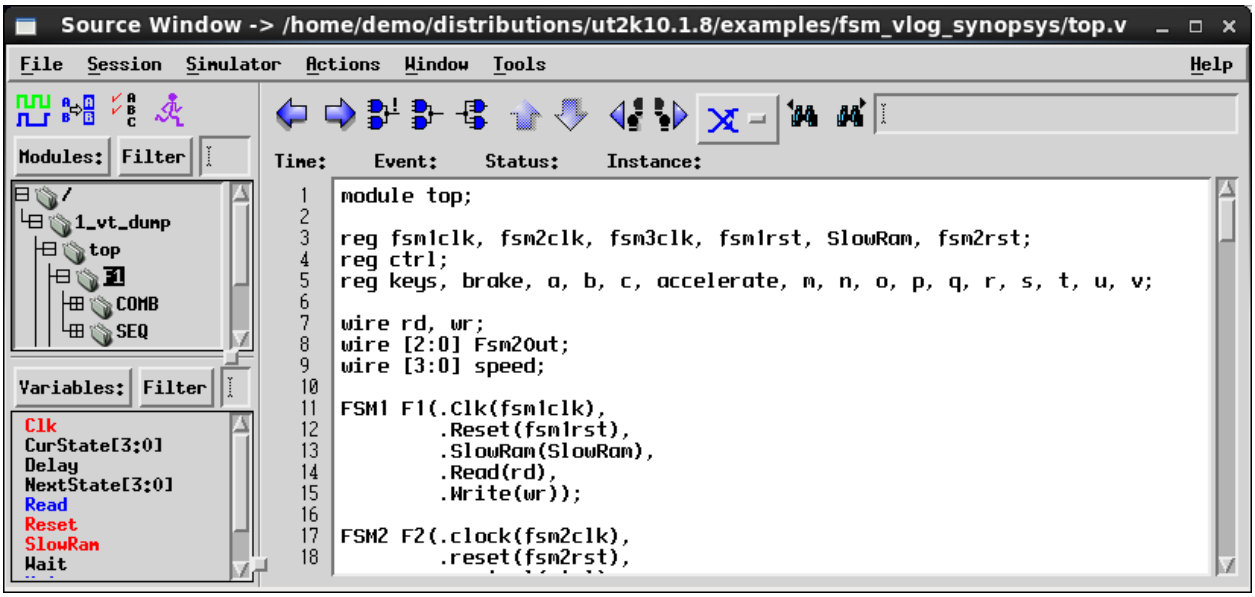
To expand the design hierarchy, select the plus-sign left of the name:

"**+** 1_vt_dump."

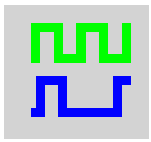
The **+** sign turns into a **–** (minus) sign, and opens up the hierarchy immediately below this level:



To select signals in a module, select the name of the module. This changes the name to reverse video (black background). Note the "**F1**" level below:

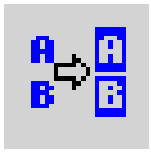


Note internal signals in this "F1" module are shown in **Black**, inputs in **Red**, and outputs in **Blue**. Just below the menu bar, at the top left of the window (below File) are two icons that control the waveform window. By selecting the **Display** icon toggles the icon down:

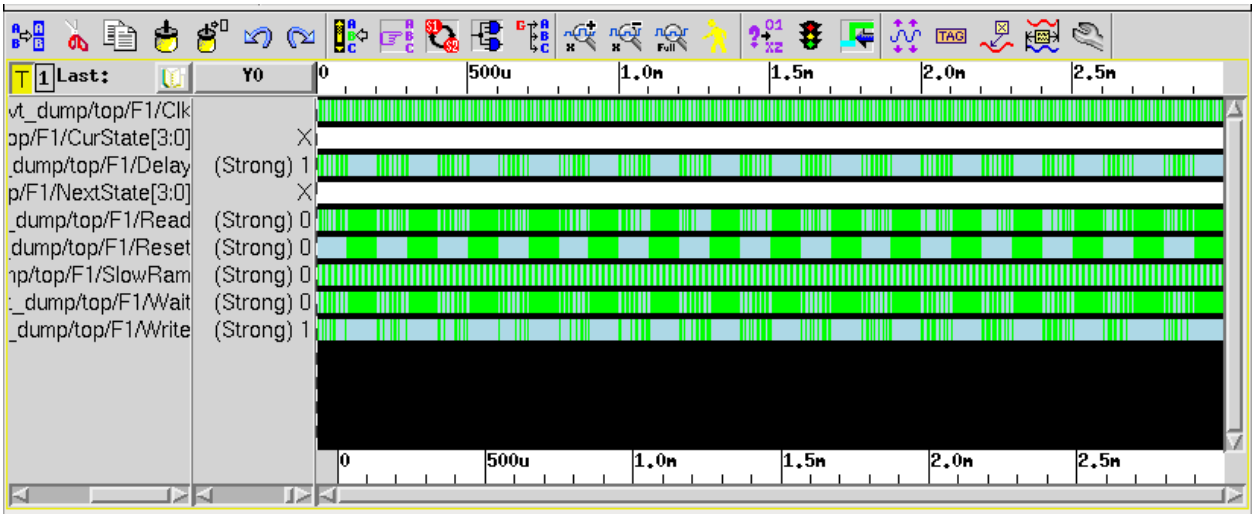


Once toggled down, waveforms names selected in the waveform selection list, are automatically displayed in the waveform display window.

Selecting the **Select All** icon:



will display all the signals at this hierarchy level, as shown in the signal selector window:

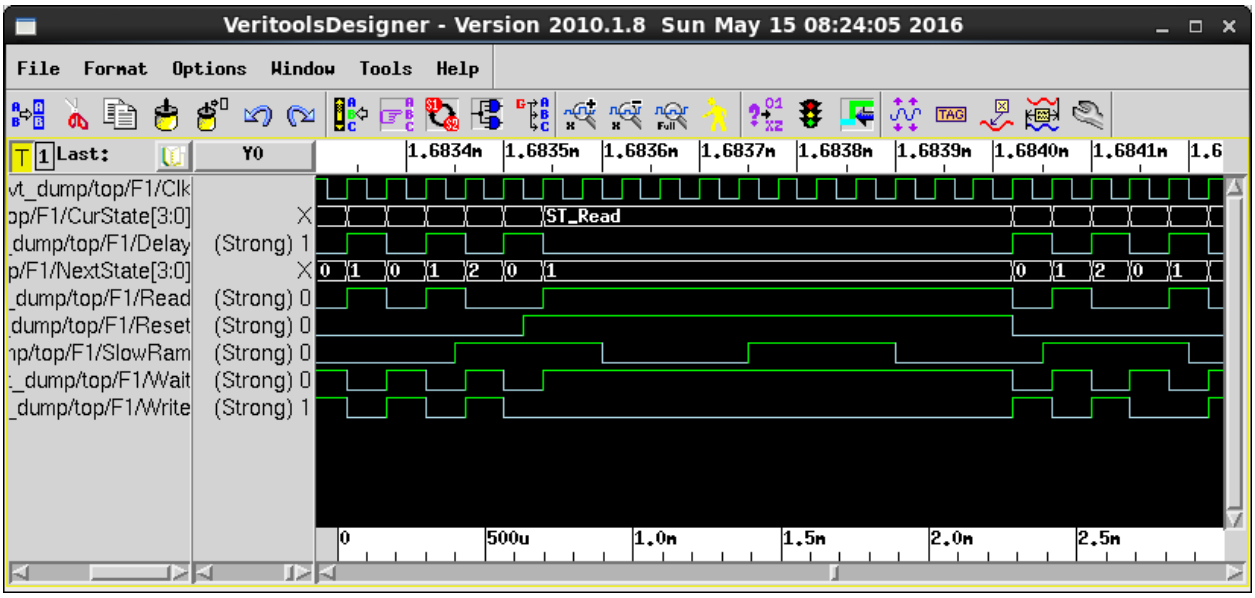


To zoom in to the waveform display to see more detail, do one of the following:

a) Press the right mouse button and slide on the waveform screen, in the area you want expanded.

b) Or press the right button down, and slide in the lower timescale area (white background with black numbers).

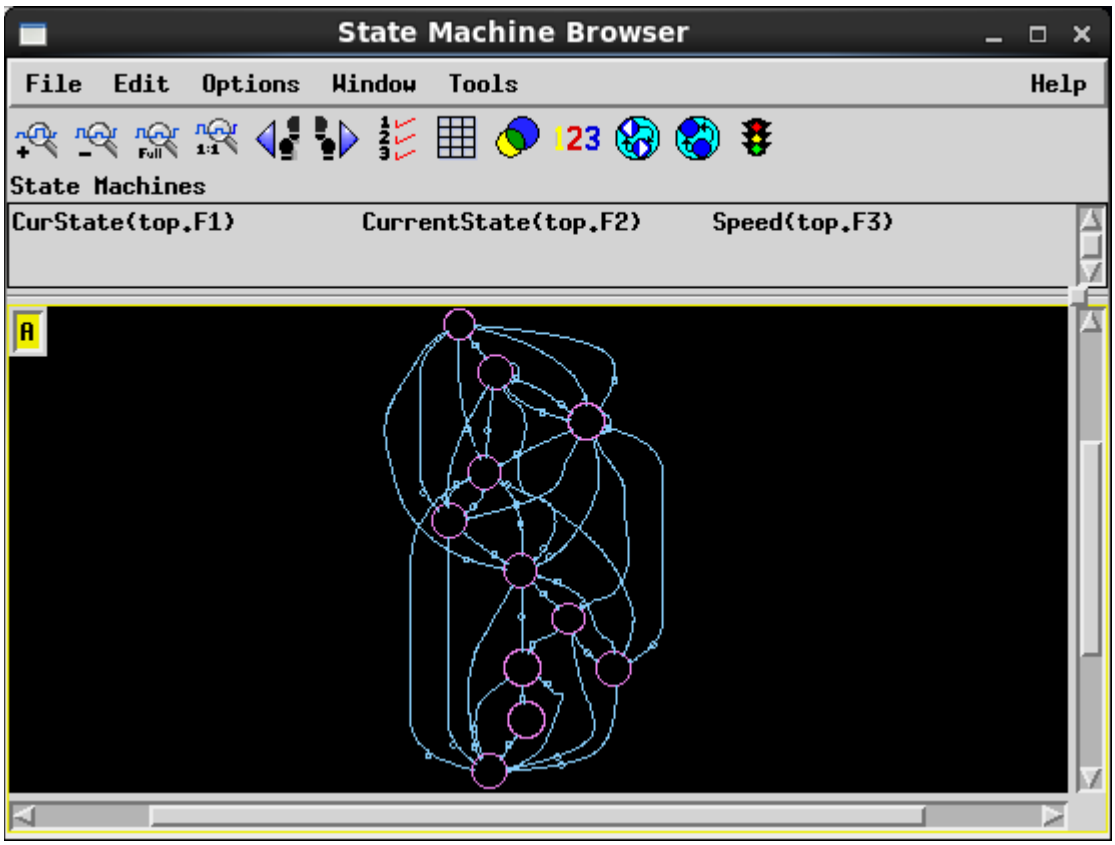
c) Or within the lower timescale area (white background with black numbers) press the left button to define the left timescale point, press the left button again to define the right timescale point, then press the right button to display the waveforms between these two points.



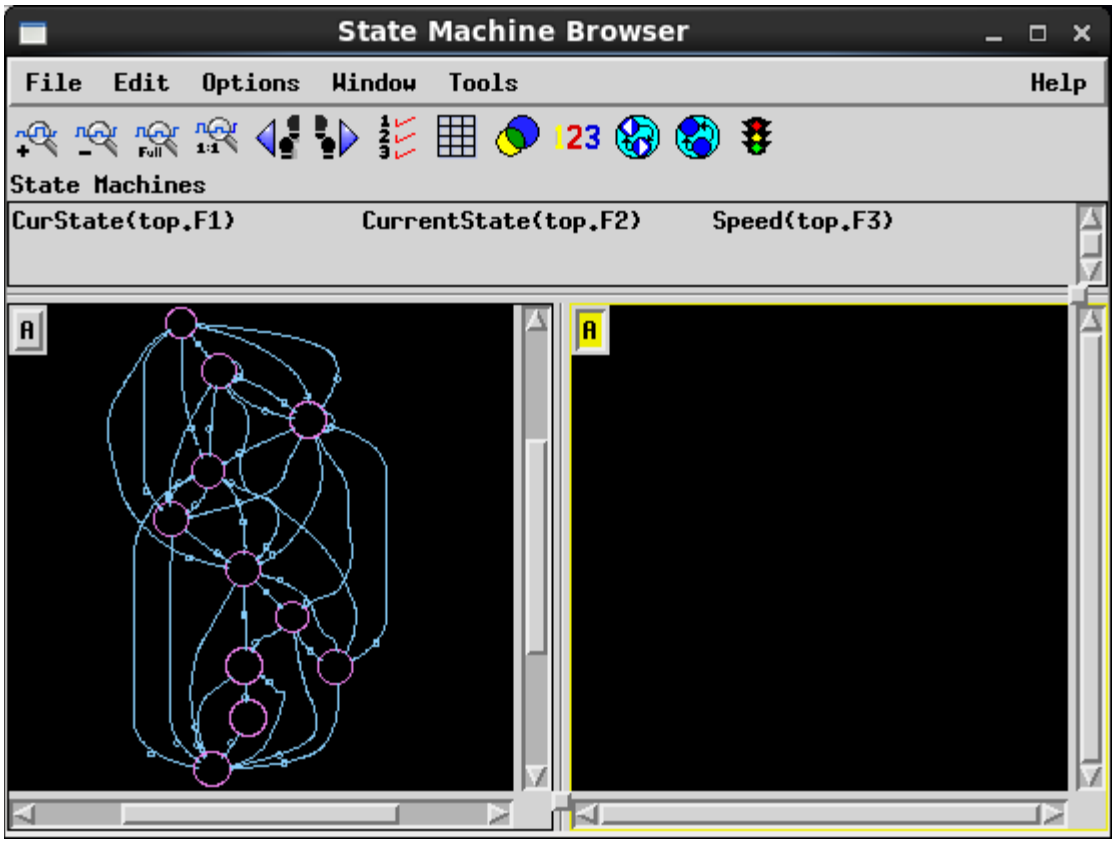
Note you can move the time cursor (just below the lower timescale) by grabbing it with the middle mouse button, and sliding to any point in the time scale.

The upper timescale displays the time of the time cursor in the simulation.

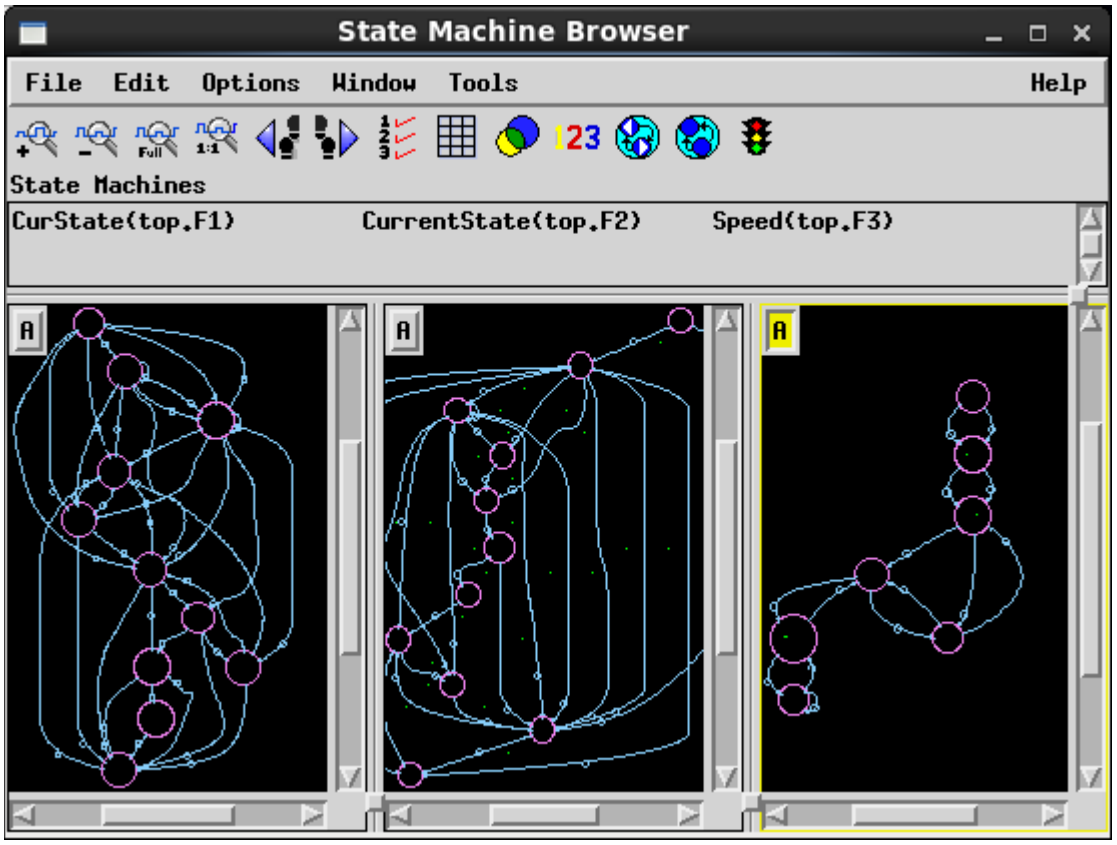
To view a State Machine, select the **State Diagram** from the list of **State Machines**, shown just below the icon bar:



To add more windows to the State Machine window, select Window from the menu items, then select Add Window Horizontal. Note: the active window is indicated by an A (Active) with yellow background. When the user selects a state diagram from the state diagram list, it goes into the active window. All the icons in the icon bar apply only to the active window:

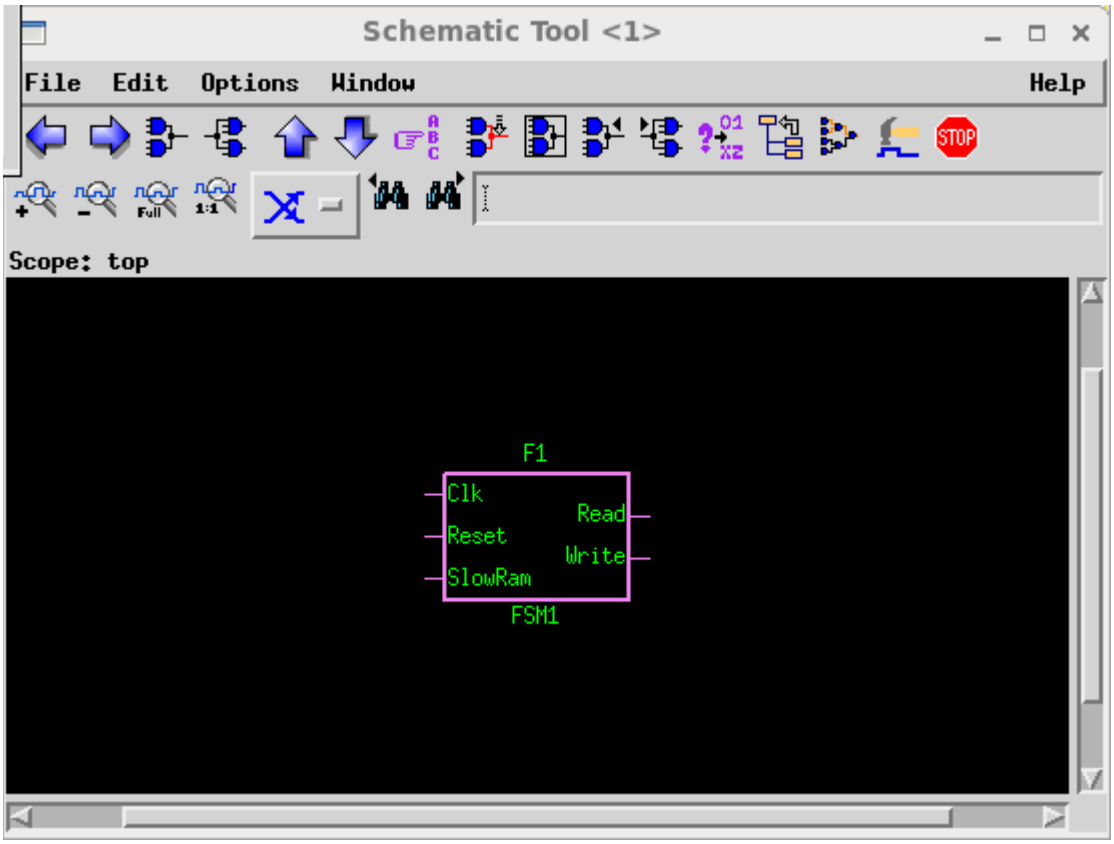


As shown below, the first window (left) shows the F1 State Diagram, the middle the F2 State Diagram, and the right shows the F3 State Diagram. The user can make any State Diagram display window Active (A), simply by selecting it:



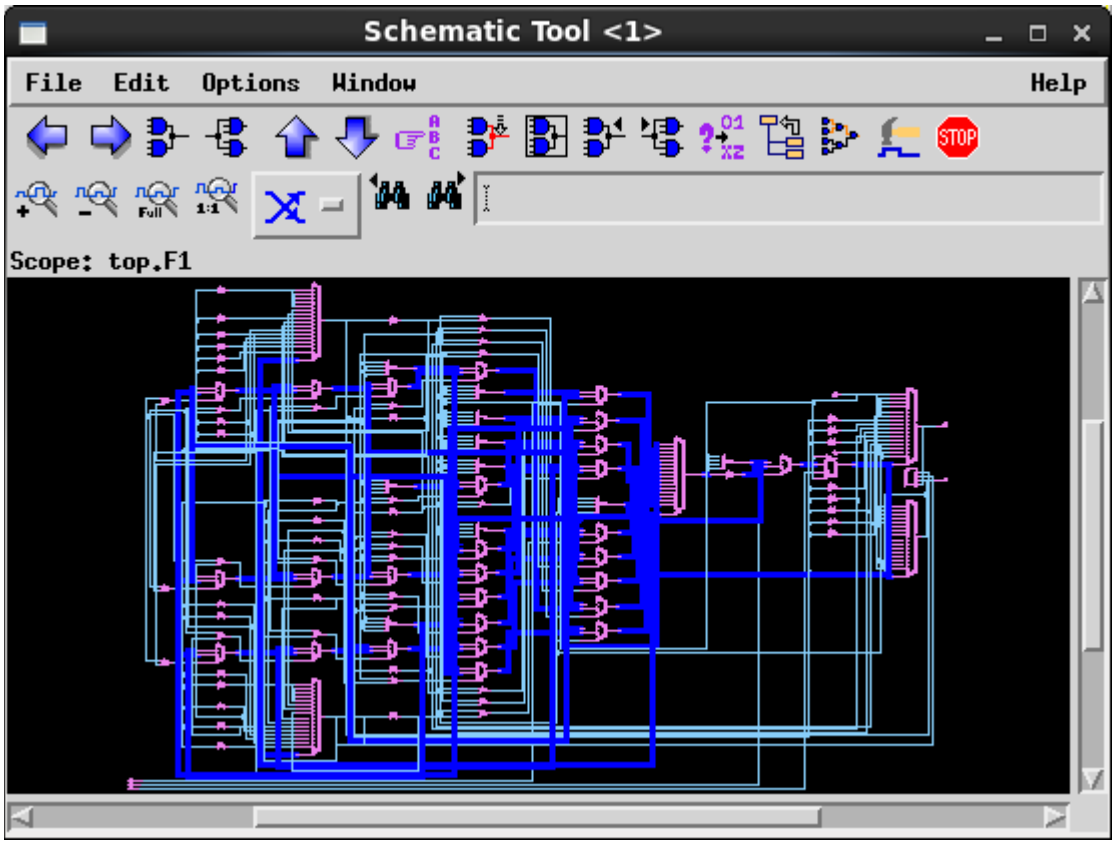
To display a module in the Schematic window, select the module in the design hierarchy window with the right mouse button. The modules are shown in the hierarchy window with the “+” or “-“ sign.

Or the user can use the middle mouse button to drag the module from the design hierarchy window to the schematic window:

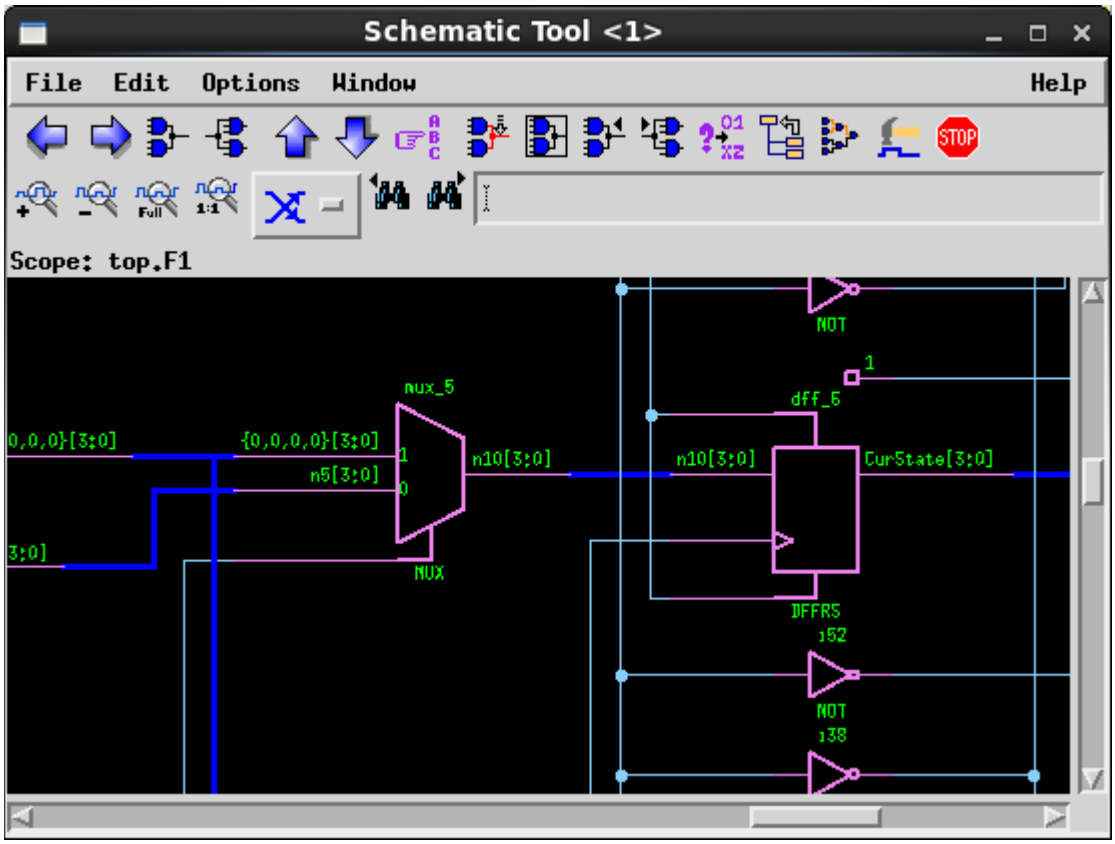


Above is shown the F1 module.

Double clicking inside the module displays the contents of that module:



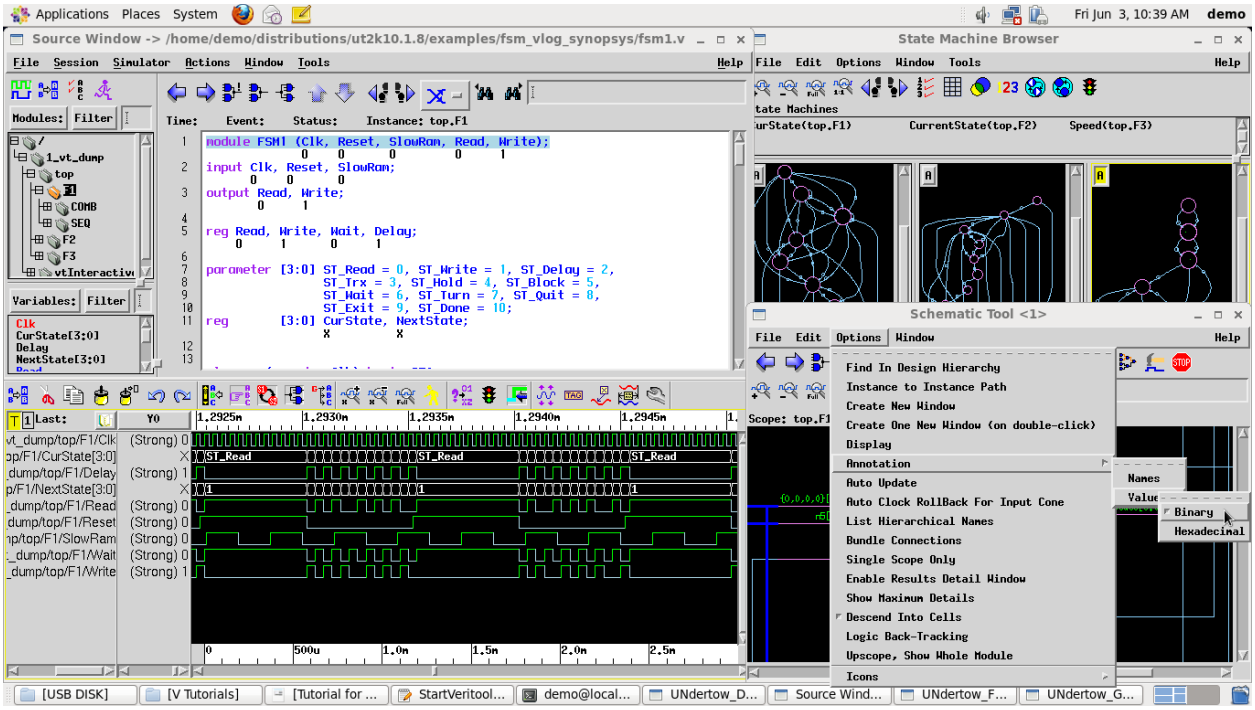
Users can zoom into any part of the schematic, by pressing the right mouse button down, and sliding over the area where they wish to zoom in:



The area displayed above displays the flipflops for the Current State (CurState[3:0]) of the F1 State Machine.

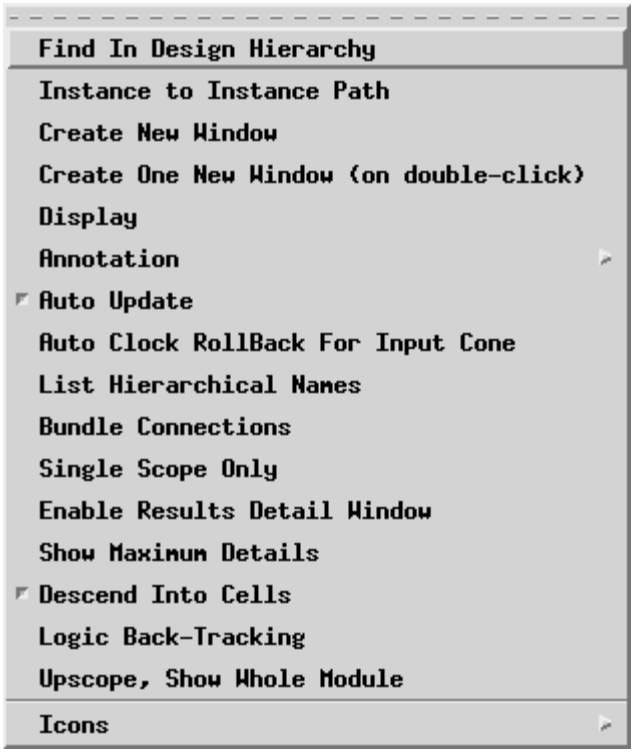
Annotating the Schematic

In order to annotate the schematic with the values from the waveform window, press **Options -> Annotation -> Values -> Binary** and ensure **Values -> Binary** is marked On (a small square on the left).

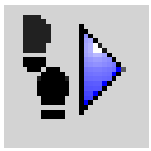


Automatically Updating the Schematic Values

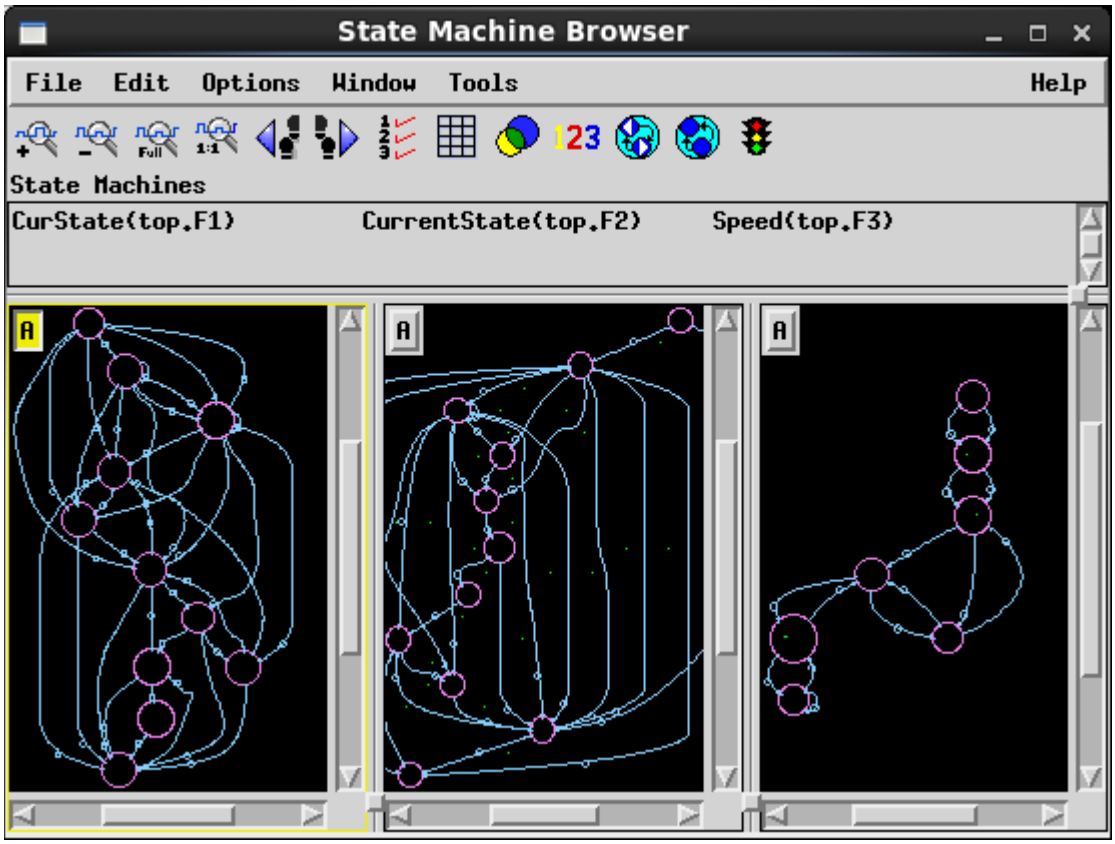
Select Auto Update in the pull down (**Options**) menu, as shown below:



To display dynamic action of a State Machine, select the State Machine, then press the Step Forward icon …

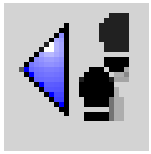


… to step the State Machine forward:

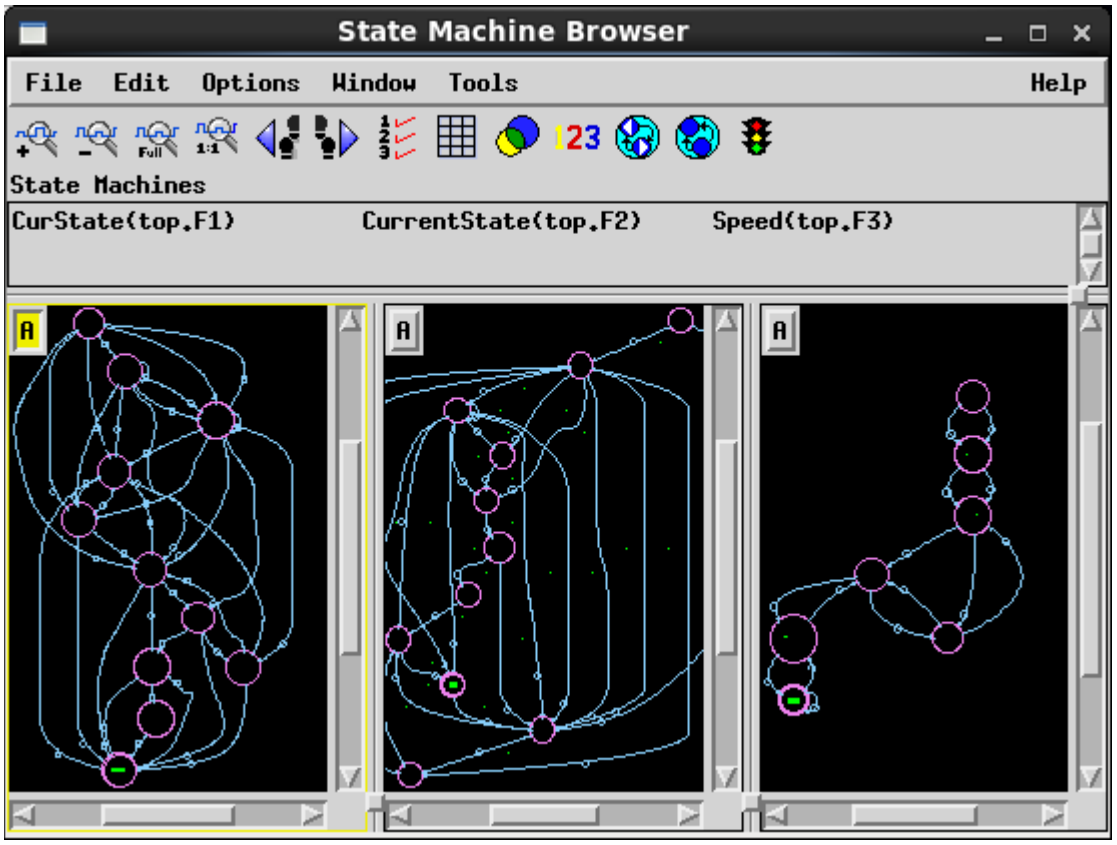


The F1 State Machine is selected, indicated by the A with yellow background.

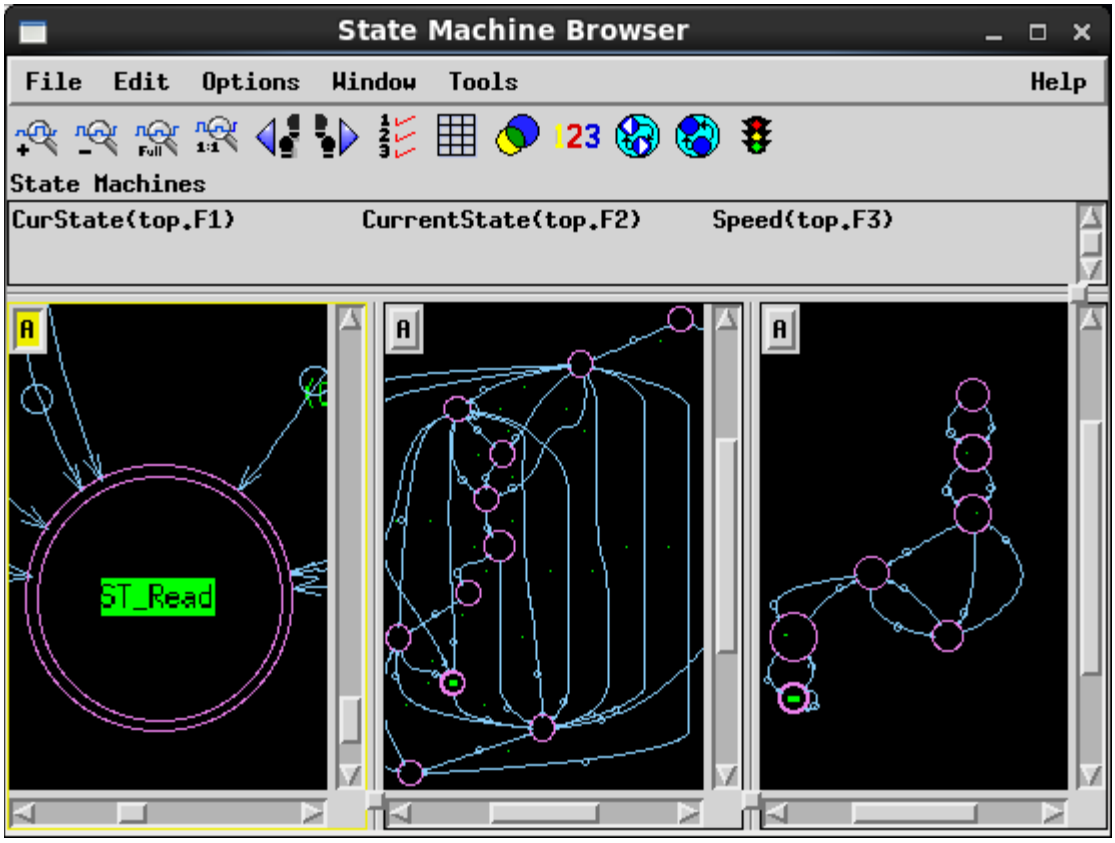
Below, we have clicked **Step Forward**, and the current state is shown as the highlighted bubble. Every time you step the state machine it steps forward one state, or backwards if you press **Step Backwards …**



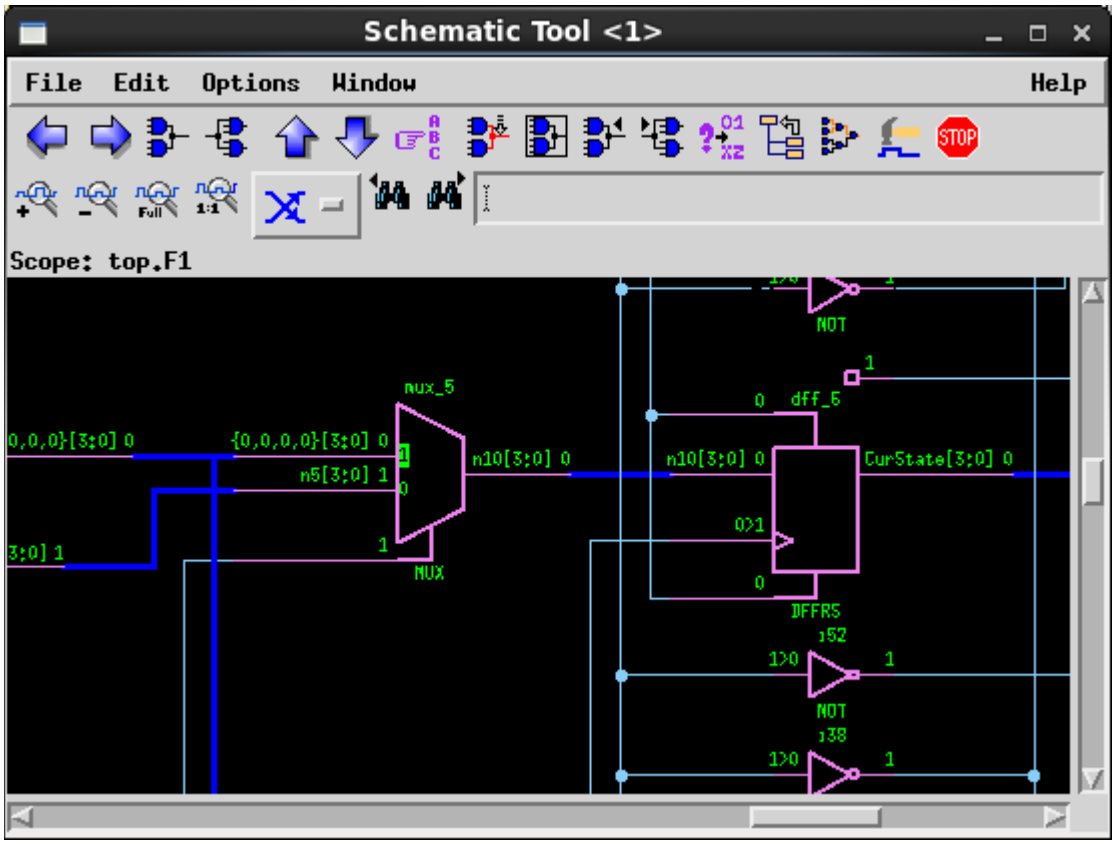
… and highlights the current state:



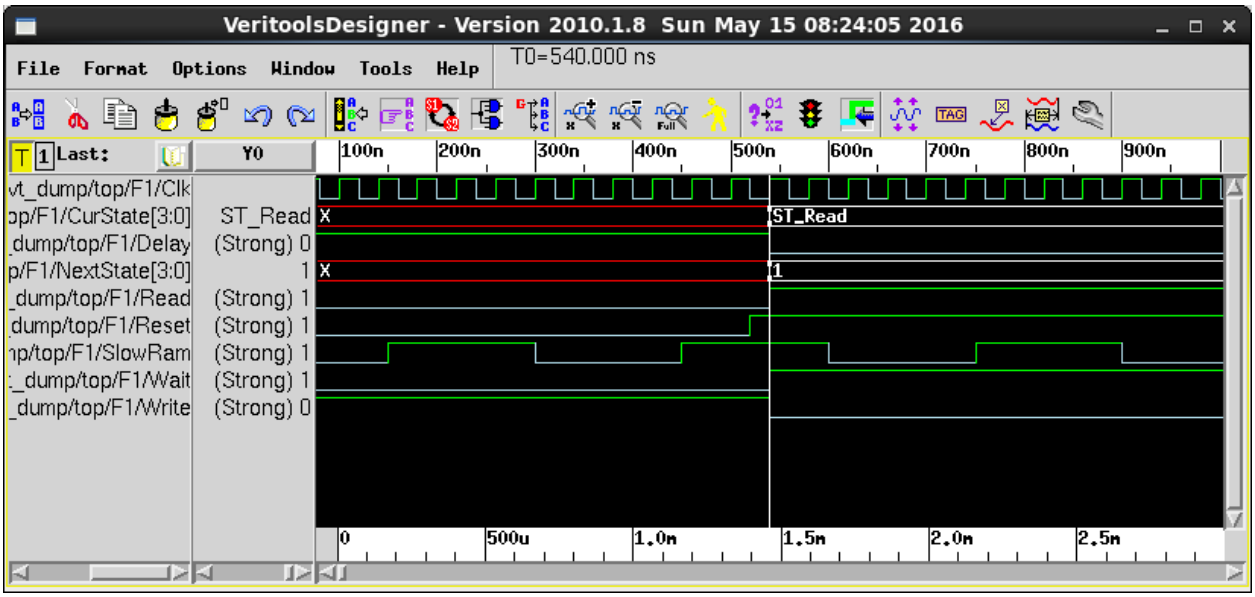
To see more definition in the State Diagram, users can zoom in using the right mouse button. Press the right button down, and slide over the area where you want more detail. Note, when you step the active state diagram, it will always move the current state to where it is visible in the State Diagram window:



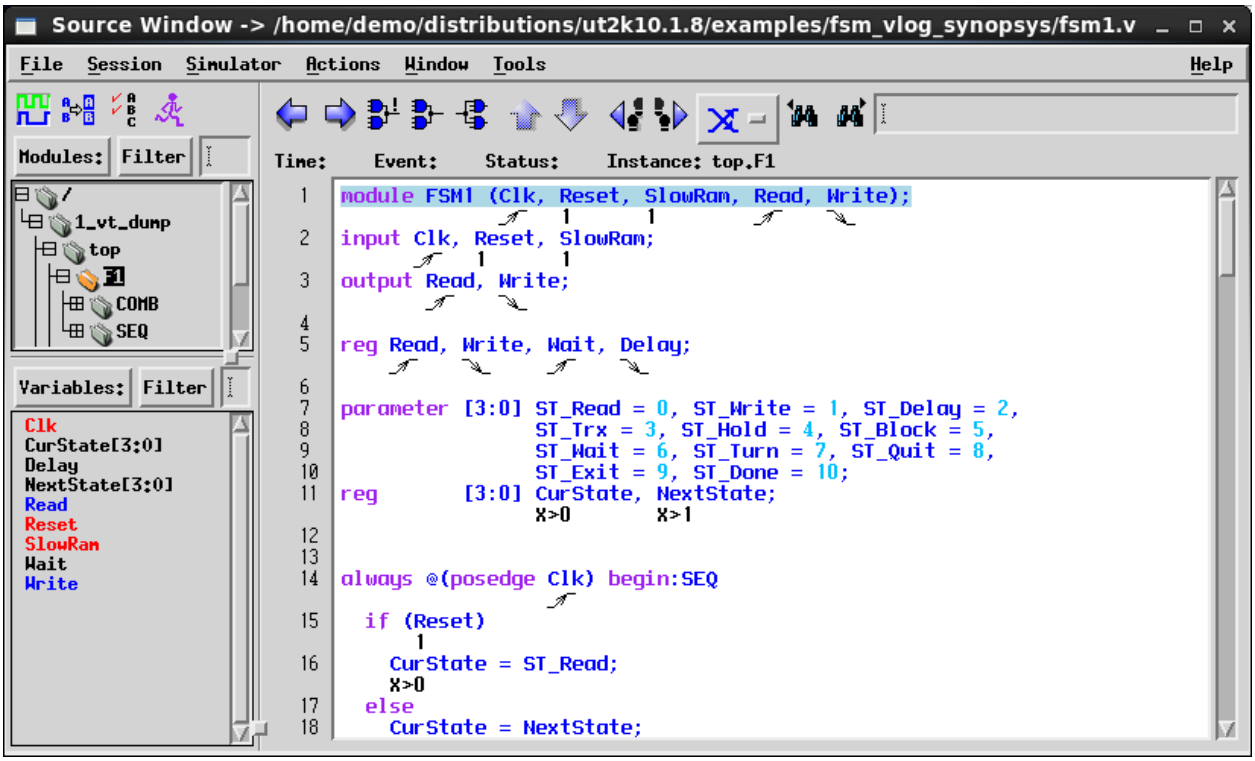
Note once the schematic window is set up with **annotation** and **auto update**, the schematic window values will automatically track the State Diagram:



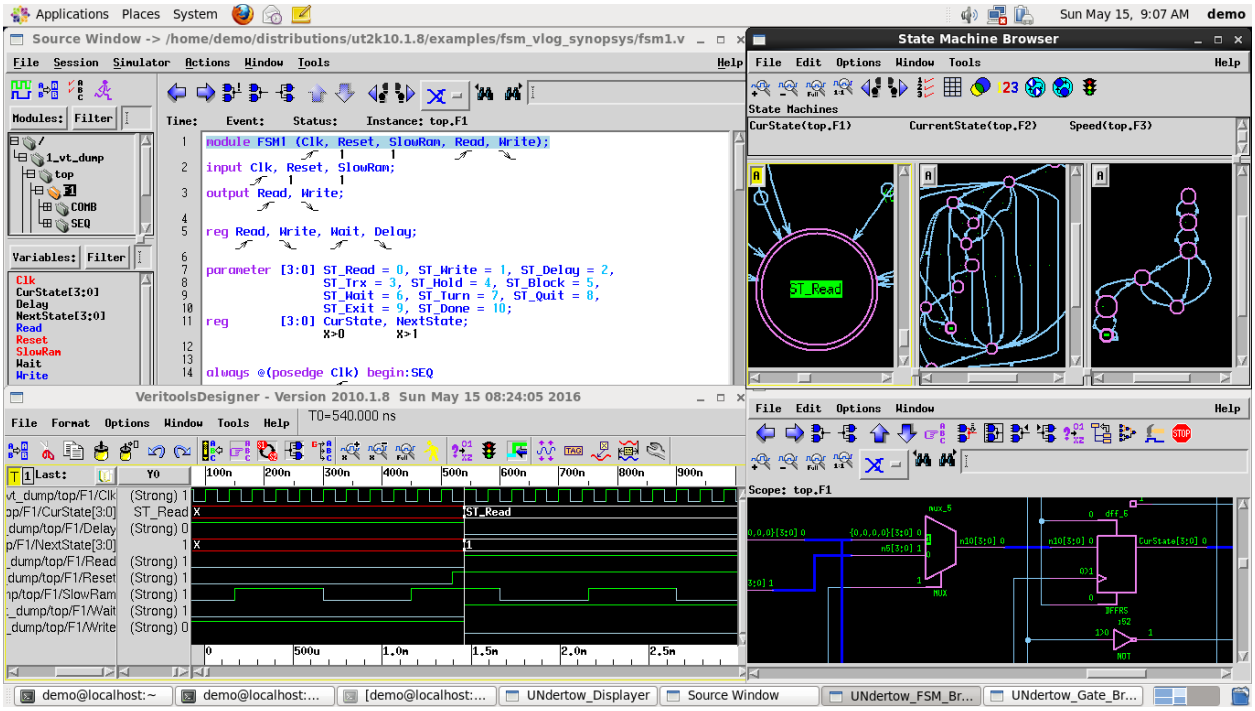
Also note the current state will be shown in the waveform window and the T0 cursor in this window will automatically track the current state shown in the active state diagram window:



In addition, you can drag (middle mouse) the current state from the active state diagram window to the source code window, to see where this transition takes place in the source code:



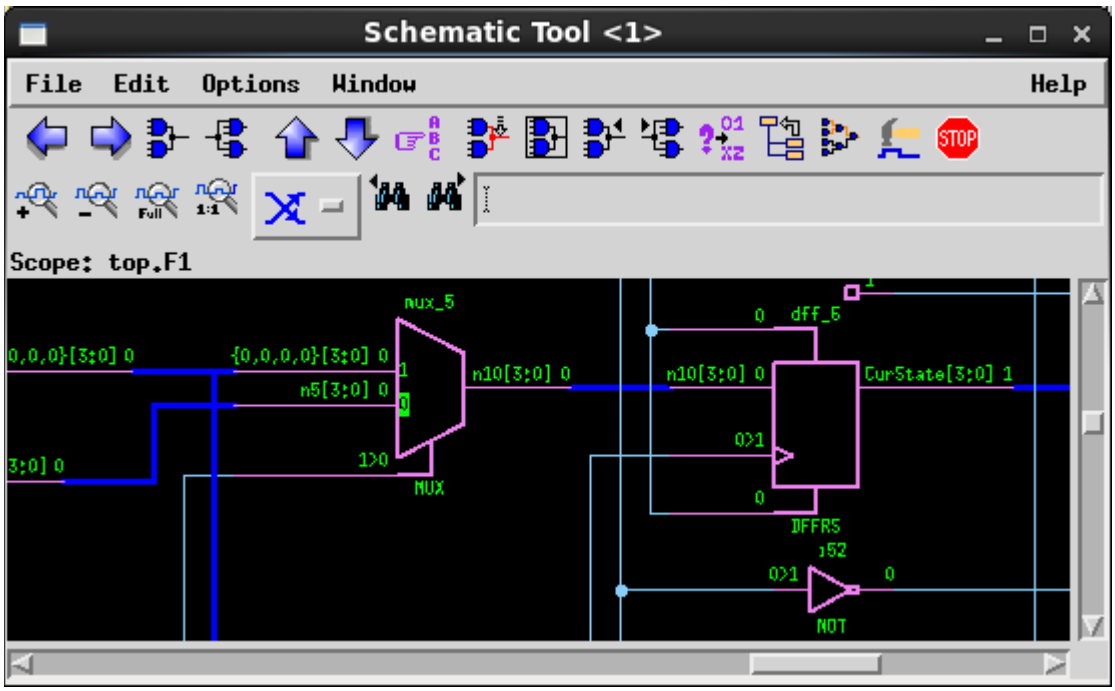
Shown below are the State Diagram window, the Schematic window, the Waveform window and the Source Code window, illustrating all these windows are synchronized in time:



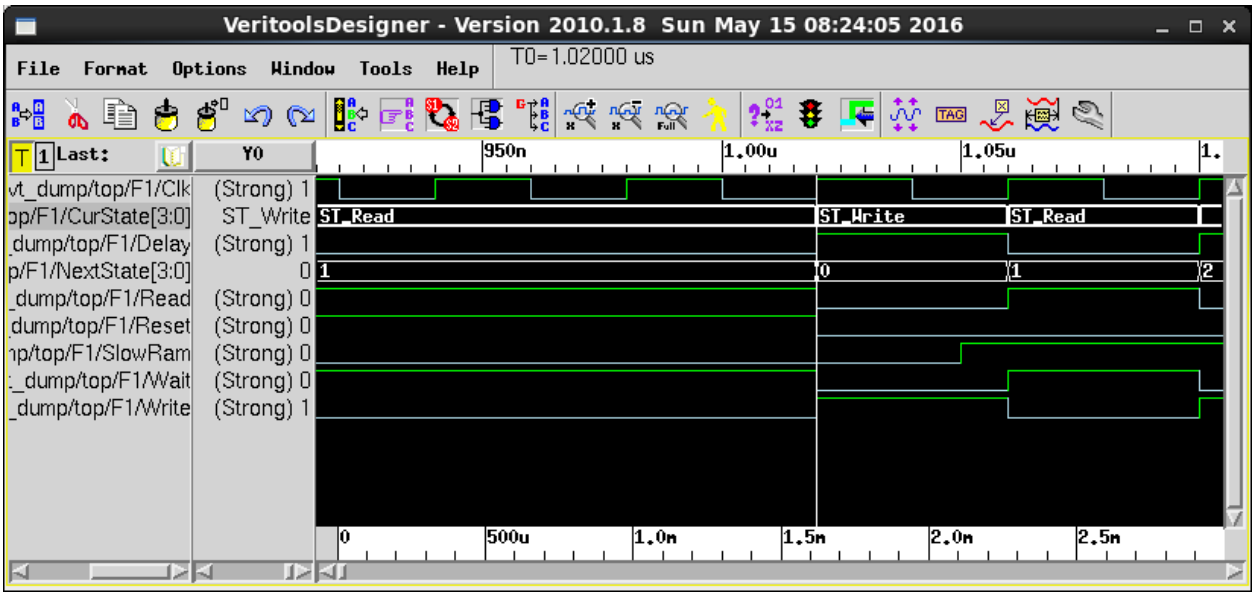
Note you can drag signals from the signal selector, or from the signal list in the waveform window, to the schematic window. Or, drag the signals from the schematic window to the source code window, or to the signal list area in the waveform window.

Expand All Drivers locates exactly where these signals are assigned. Users can also drag the signal name from the signal name list in the waveform window, or double-click the signal name, to find out where the signal has been assigned. If there is more than one assignment, a detail window appears below the source code window.

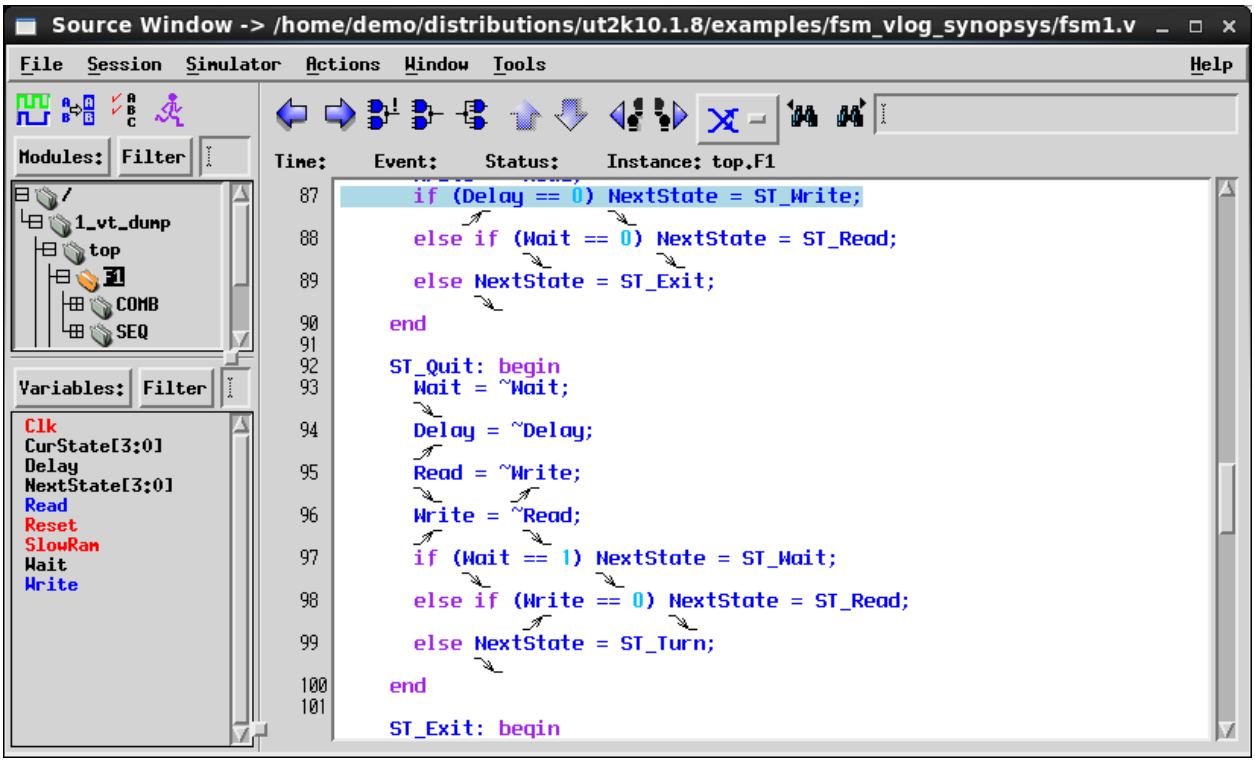
Going from Read to Write, CurrentState (CurState[3:0]) changes from 0 to 1, as shown below:



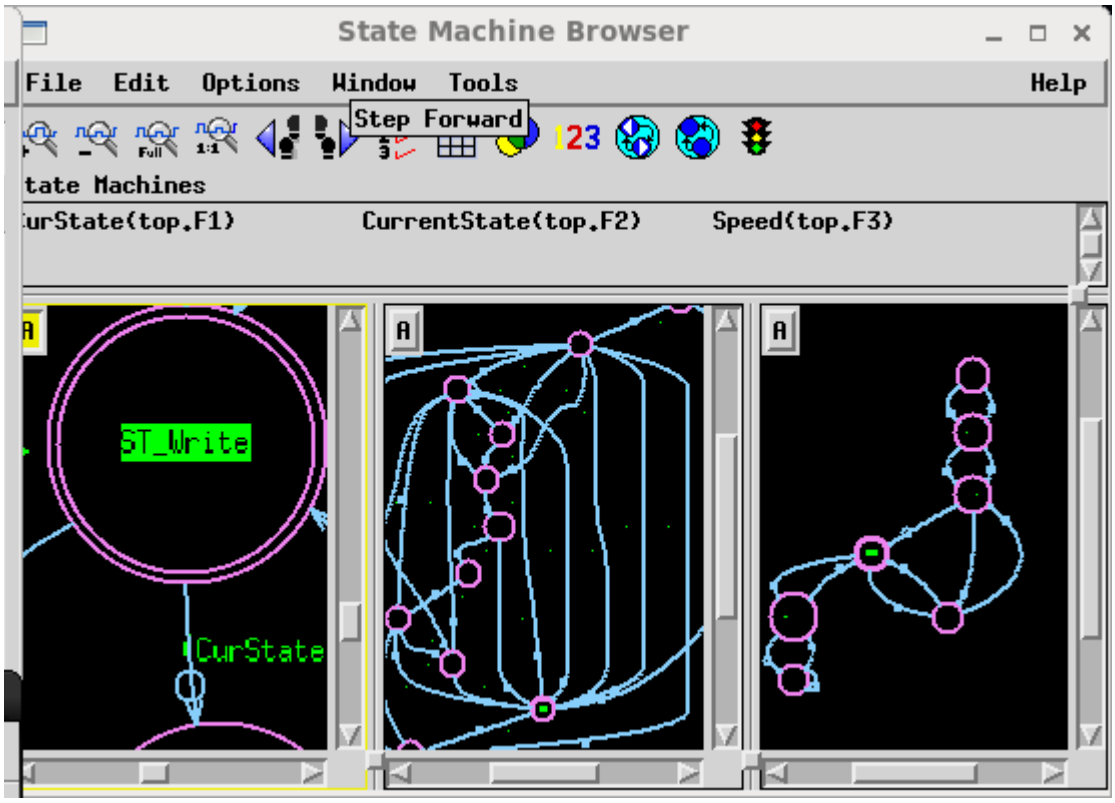
Stepping the State Diagram from Read to Write Cycle is shown in the WaveForm window below, which is in sync with the schematic window (previous page). When stepping the state diagram, the T0 cursor will be positioned automatically at the beginning of the state:



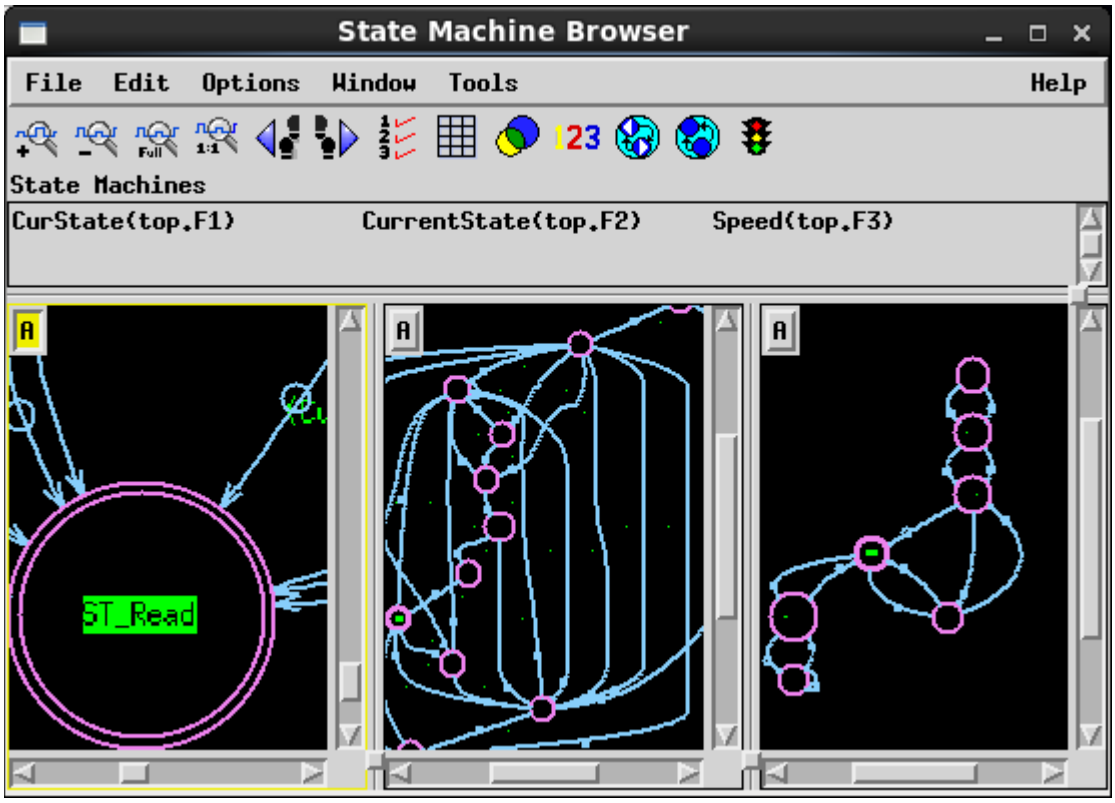
This shows the source code values have been synchronized to the waveform window. Note the downward going arrow in the source code window under “NextState” indicates that NextState has gone from one (1) to zero (0). While this is a vector, leading zeros are eliminated on the source code window:



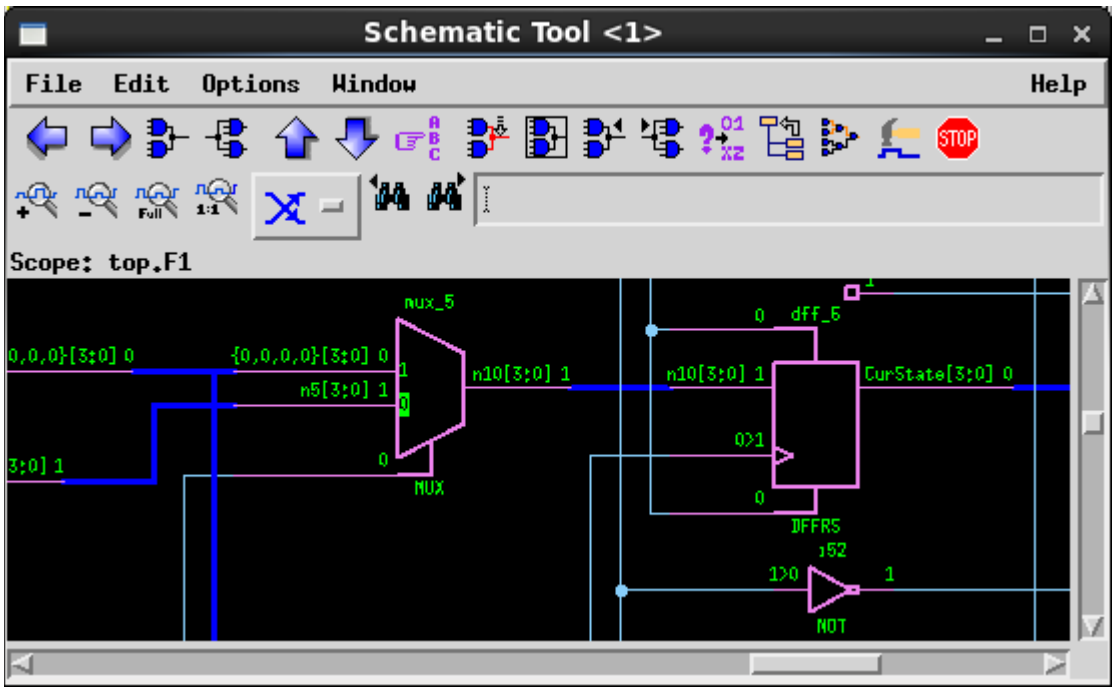
The State Diagram has been stepped from the Read to the Write Cycle:



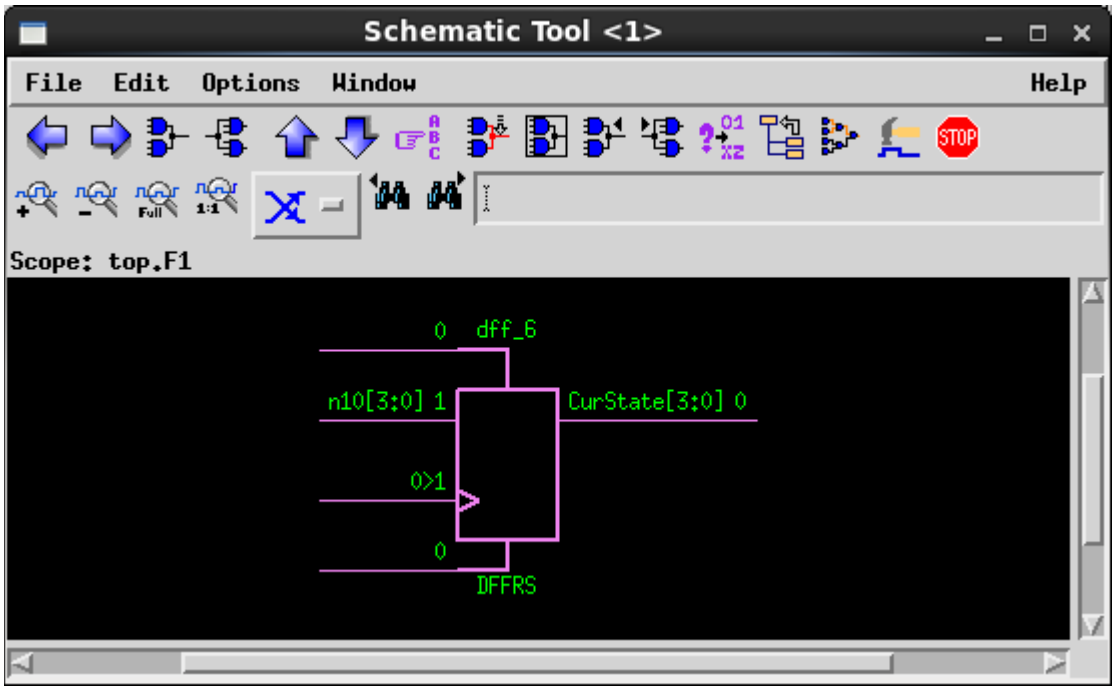
Next, the state diagram was stepped forward to the Read state:



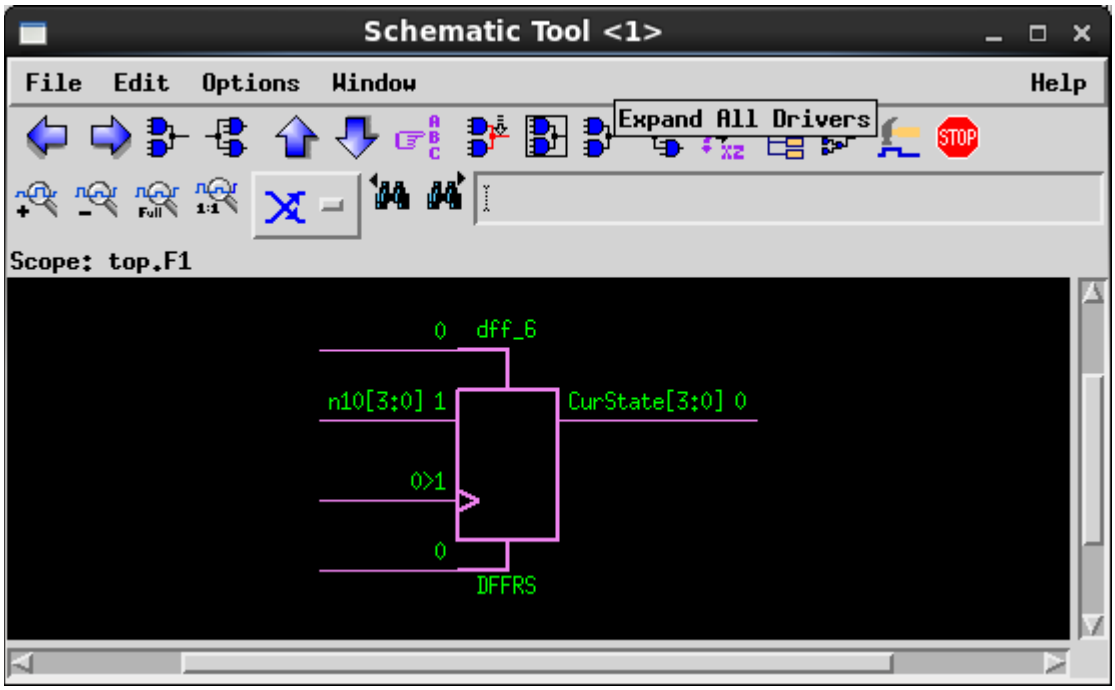
The schematic values will automatically track the state diagram, if Auto Update is toggled on:



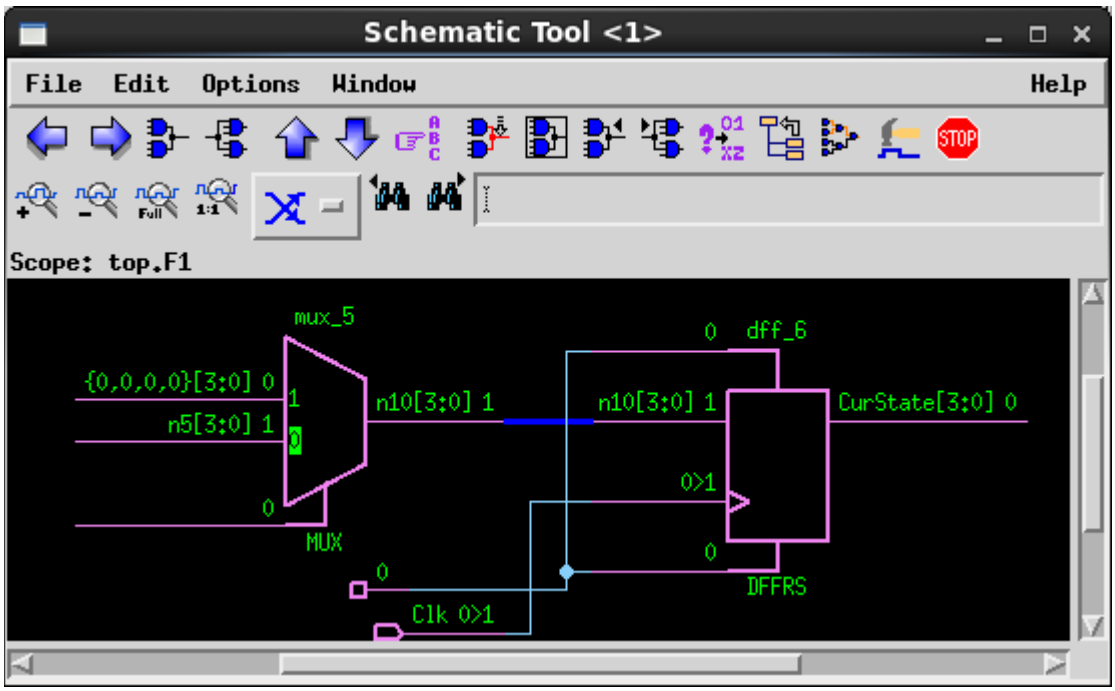
Note, we can isolate the Current State variable, from a schematic window. Pick up the state variable flipflops and drop them on the schematic window. Note: only one flipflop is displayed when it is a vector:



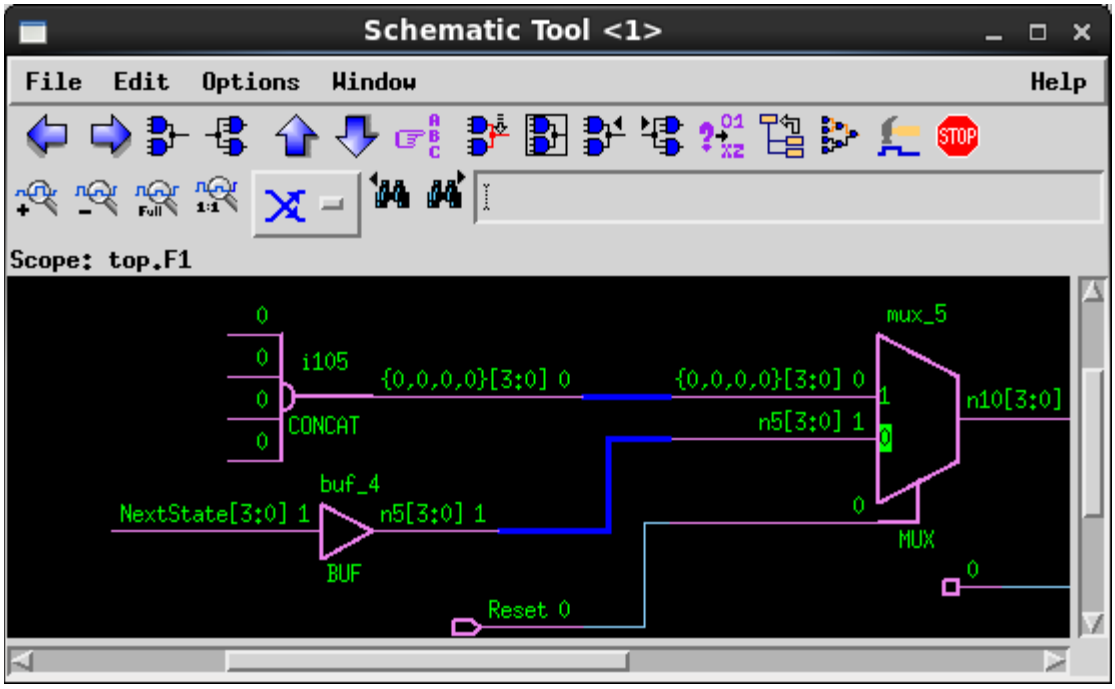
After isolating the **Current State** (CurState[3:0]) variable in the schematic window, you can display the drivers connected to this current state variable, by selecting **Expand All Drivers**:



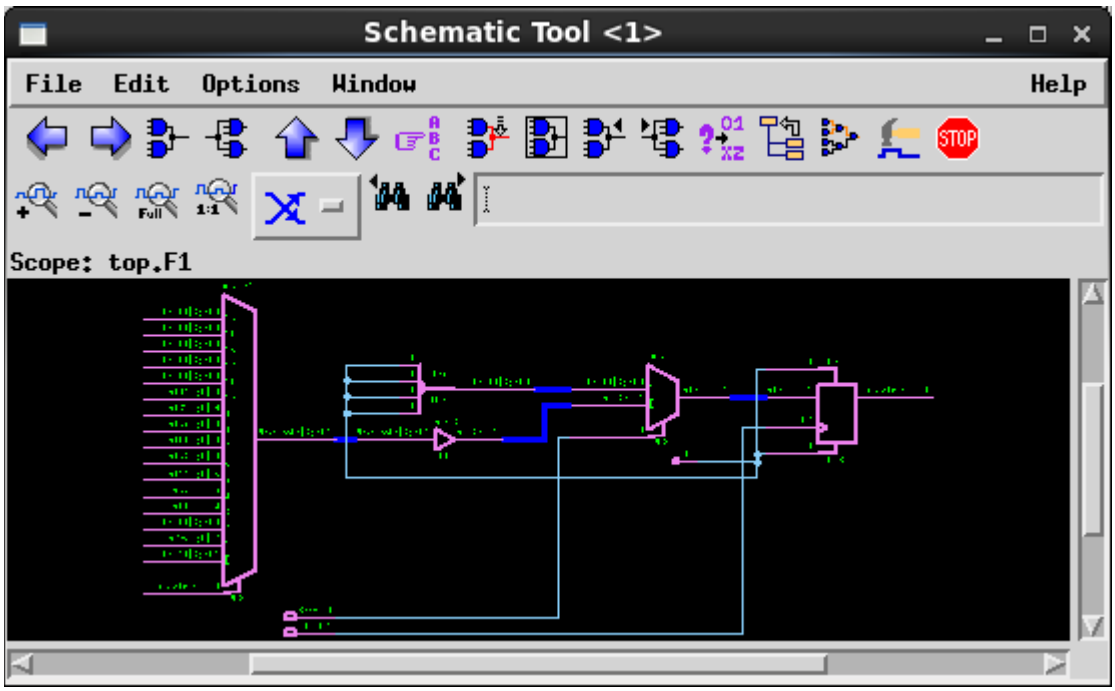
Note the selector on the D input of the **Current State** flipflops is displayed next:



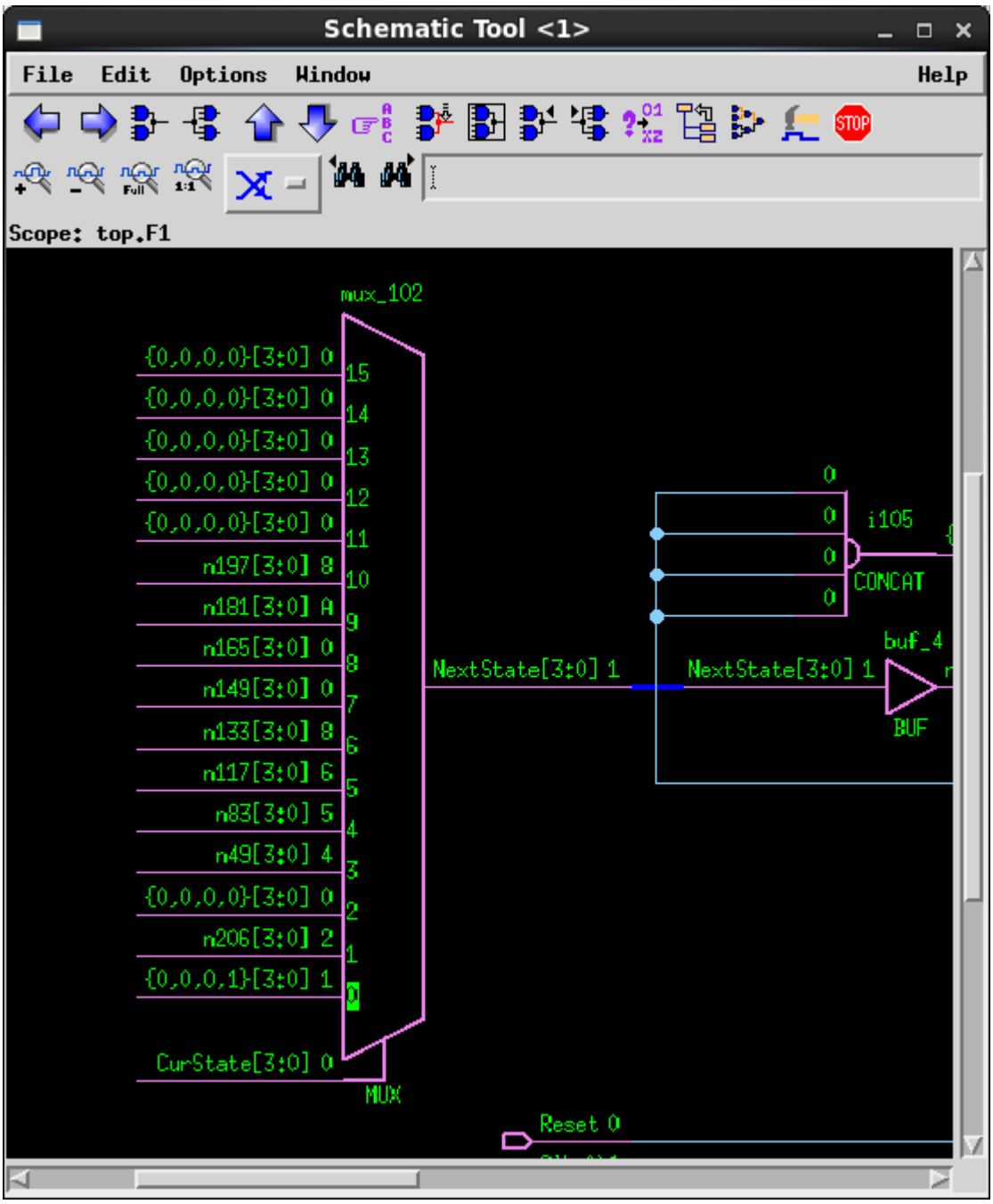
You can expand drivers backwards any number or times. Note, picking up and dropping an element on a schematic window will force the schematic window to stay in a single hierarchy scope. Picking up and dropping a signal into the schematic window will allow the schematic window to display a multi-scope schematic:



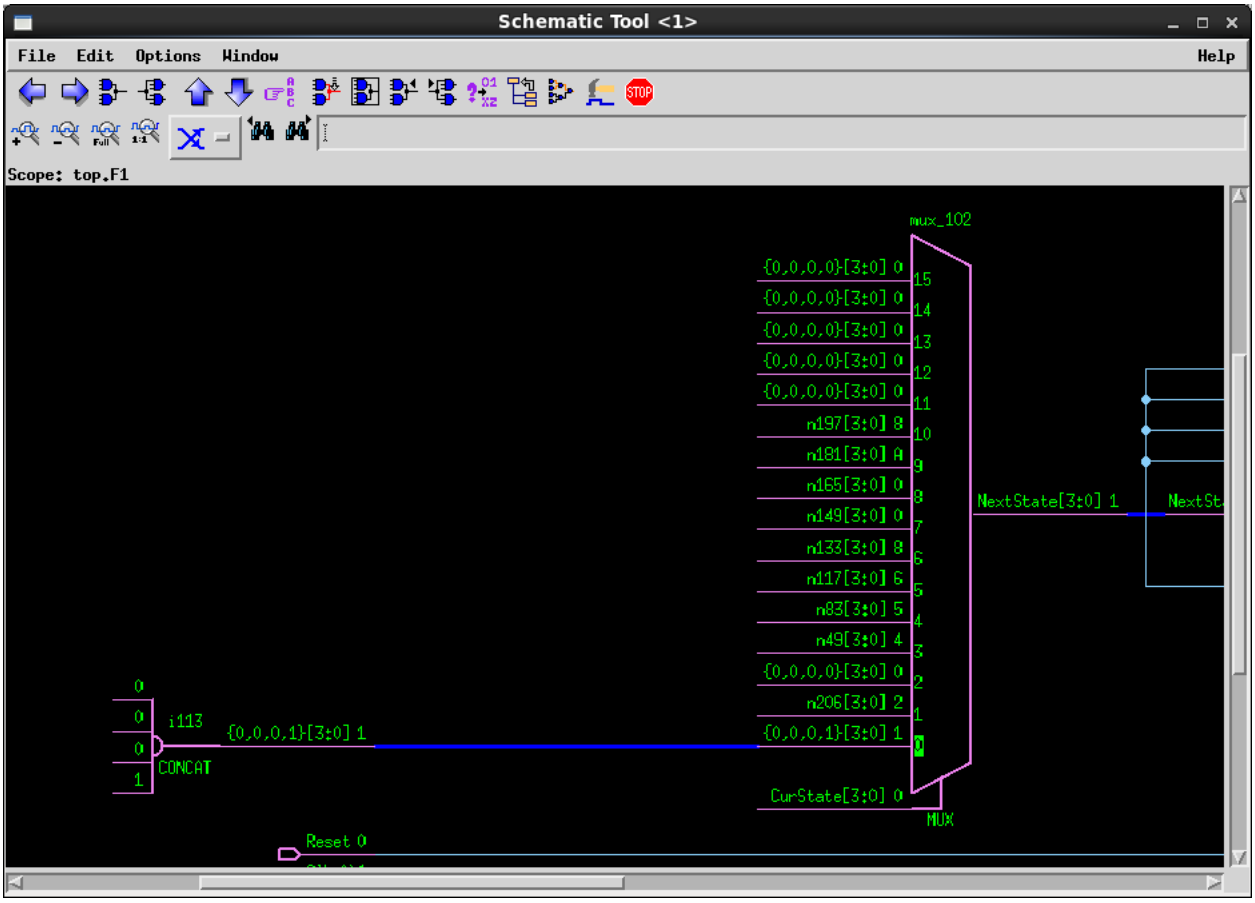
When Expanding Drivers Backwards a number of levels, users can select Full Zoom to display all of the schematic that has been expanded:



At any point, you can zoom into an area on the schematic, by using the right mouse, and sliding over the area you want to zoom in on:



If you double click (left mouse) on a pin, it will expand backward the drivers, just for that pin:



Also note if we continue to expand all drivers backwards, the expansion will stop at the module boundary if you are in single scope mode: