

# ModelSim Simulation Tips

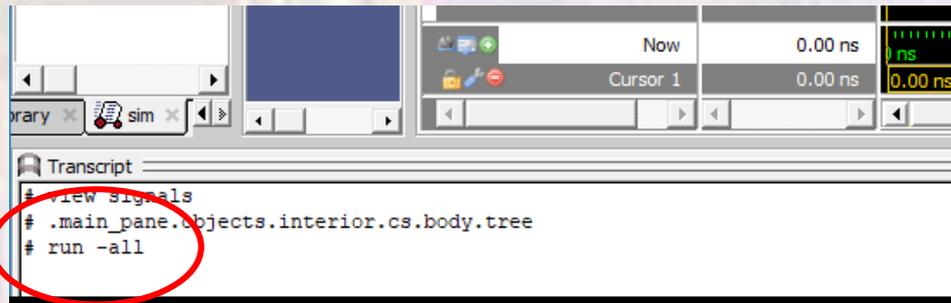
Common - last updated 9/19/19

# ModelSim Tips

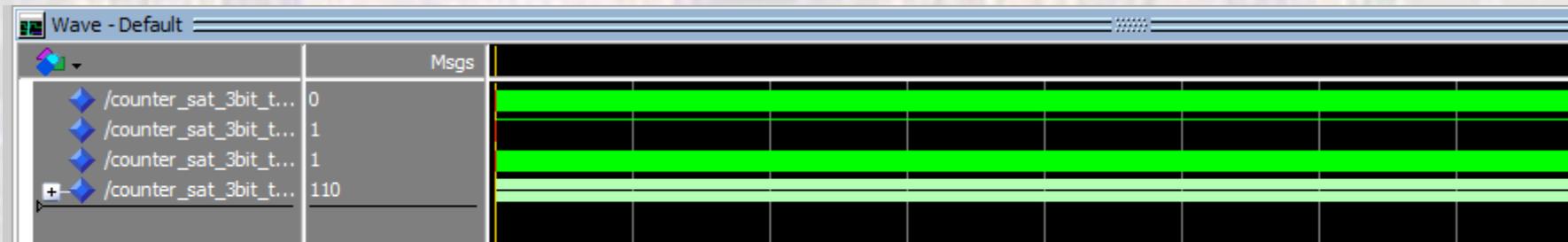
- Simulation “tips”
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# ModelSim Tips

- Simulation Run
  - Your simulation says it's running but it never stops



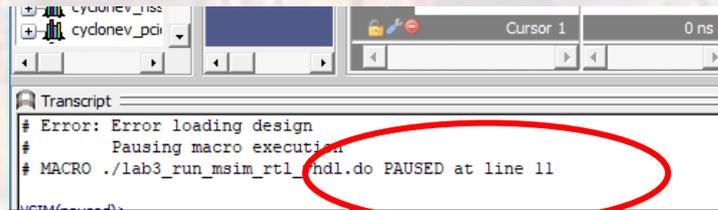
- OR
- You stopped your simulation and the results just look like a solid line



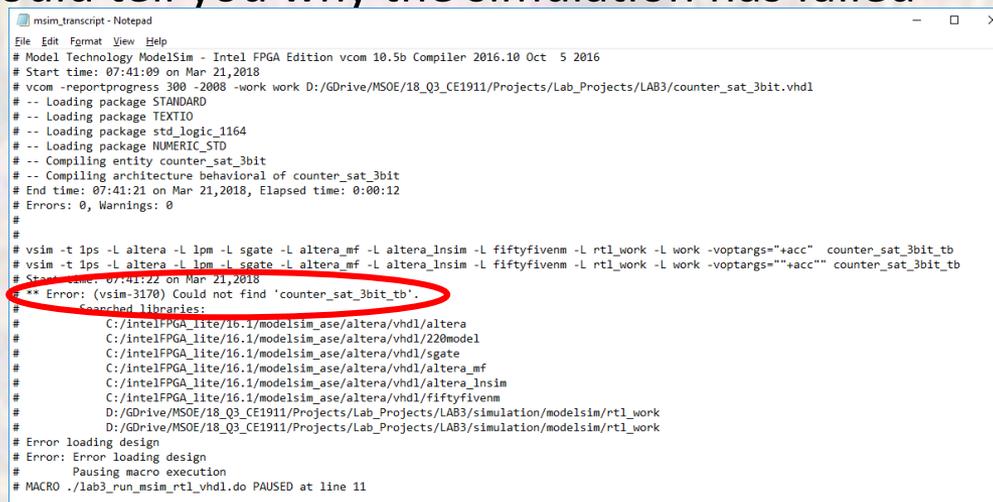
- Issue: You failed to set the simulation time when creating the test bench in [assignments](#) → [settings](#) → [simulation](#)

# ModelSim Tips

- Simulation Run
  - Your simulation fails for some reason



- Go to your project directory/simulation/modelsim and open the file msim\_transcript in notepad
  - It should tell you why the simulation has failed



# ModelSim Tips

- Extending the time of a simulation
  - You setup your testbench and ran the simulation (it took a long time to run)
  - You need to run the simulation for a little longer (or a lot)
  - You could stop the simulation, modify the testbench simulation time parameter and restart

OR

- In ModelSim

**Simulate** -> **Runtime Options...** -> **Default Run**

set the default run to the desired simulation extension, e.g. **1000 ns**

**Simulate** -> **Run** -> **Run 100**

hitting **Run 100** will run the simulation again, and again, and ... each time extending the desired amount of time

# ModelSim Tips

- Adding internal signals to the simulation
  - You setup your testbench and ran the simulation
  - Something is not working and you need to see an internal signal to figure out what is happening
  - You could stop the simulation, add I/Os to the design to see the internal signals, elaborate and re-run the simulation

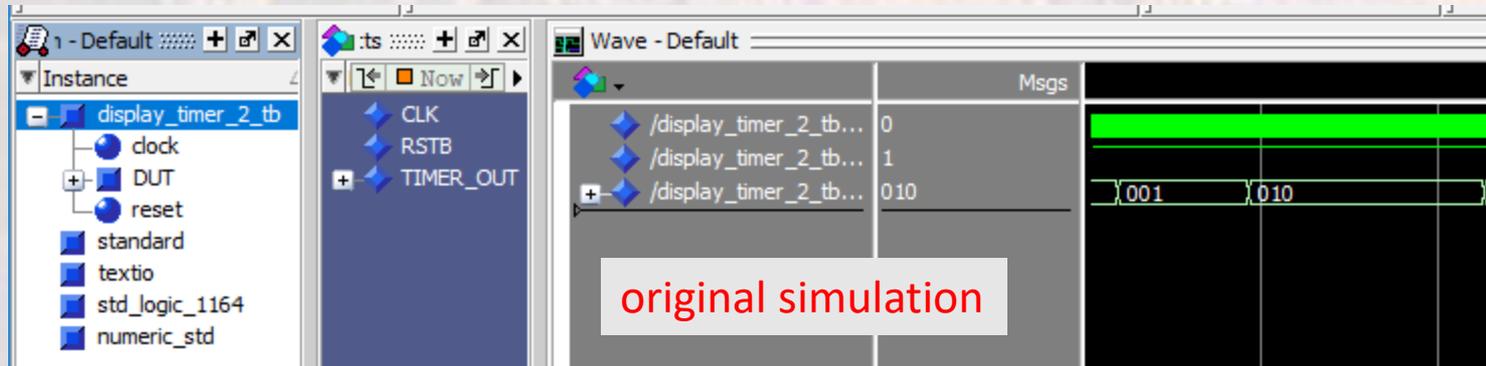
OR

Cont'd

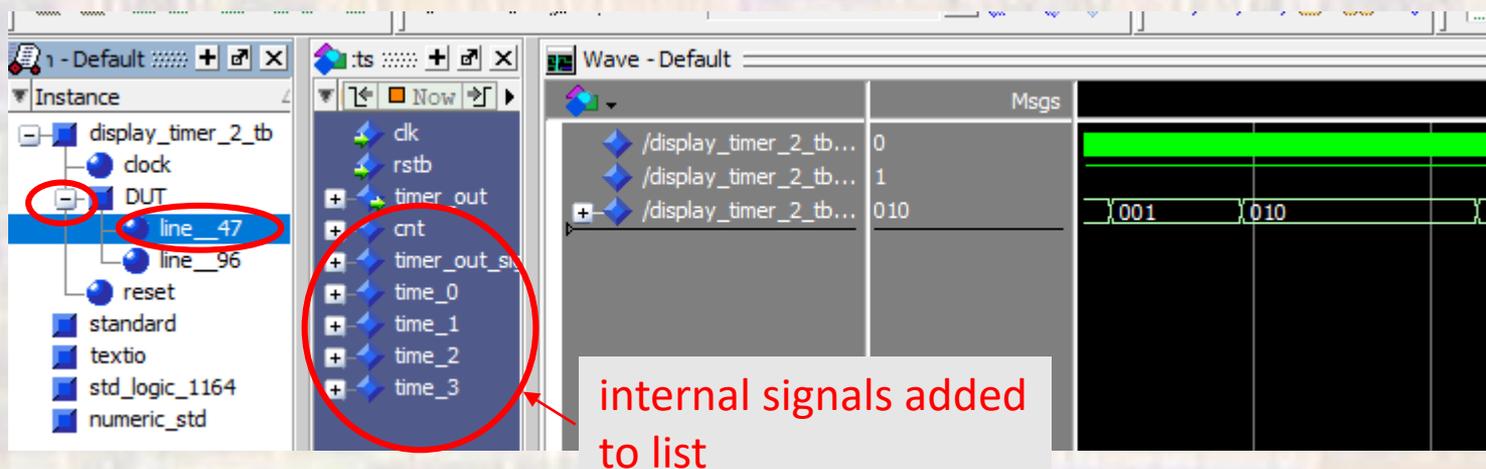


# ModelSim Tips

- Adding internal signals to the simulation



expand the DUT and select one of the lines

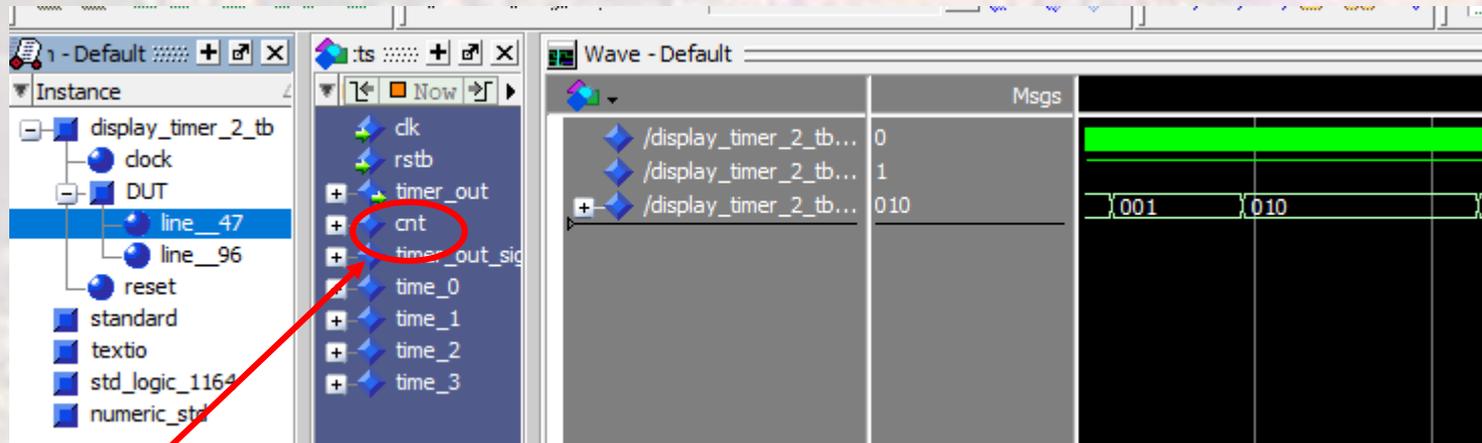


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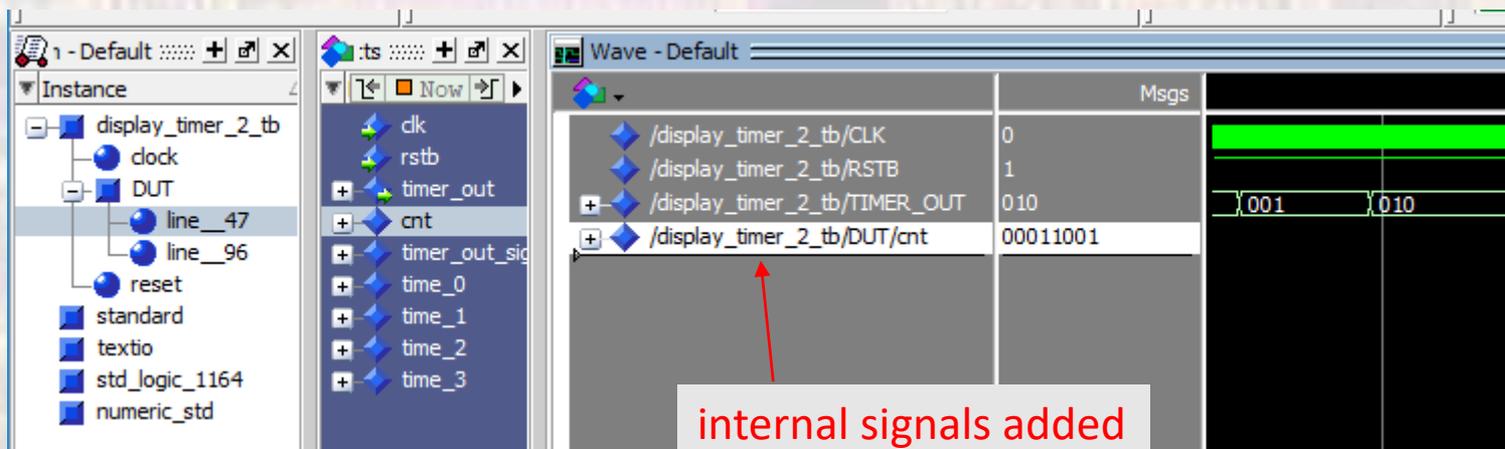


# ModelSim Tips

- Adding internal signals to the simulation



right click on the signal you want to add and select **Add Wave**



Cont'd



# ModelSim Tips

- Adding internal signals to the simulation

simulate -> restart

click OK

Simulate -> Runtime Options... -> Default Run

set the default run to the desired simulation time, e.g. 3000 ns

Simulate -> Run -> Run 100

hitting Run 100 will run the simulation again with the new signal added

The screenshot shows the ModelSim interface. On the left, the Instance tree shows a hierarchy for 'display\_timer\_2\_tb' with signals like 'clock', 'DUT', 'line\_47', 'line\_96', and 'reset'. The Wave window on the right shows a list of signals: '/display\_timer\_2\_tb/CLK' (0), '/display\_timer\_2\_tb/RSTB' (1), '/display\_timer\_2\_tb/TIMER\_OUT' (000), and '/display\_timer\_2\_tb/DUT/cnt' (00100010). A red arrow points to a new signal added to the simulation, which is highlighted in red in the Wave window. A text box at the bottom of the screenshot reads 'new signal added to new simulation'.

# ModelSim Tips

- Save your waveform format to reuse
  - Add any signals
  - Choose Radix, ...

## File -> Save Format

Will default to something like

.../project/simulation/modelsim/wave.do

you can make as many .do files as you wish

- To reload

## File -> Load -> Macro File

Point to your desired .do files

Note: you will get duplicates of your original signals

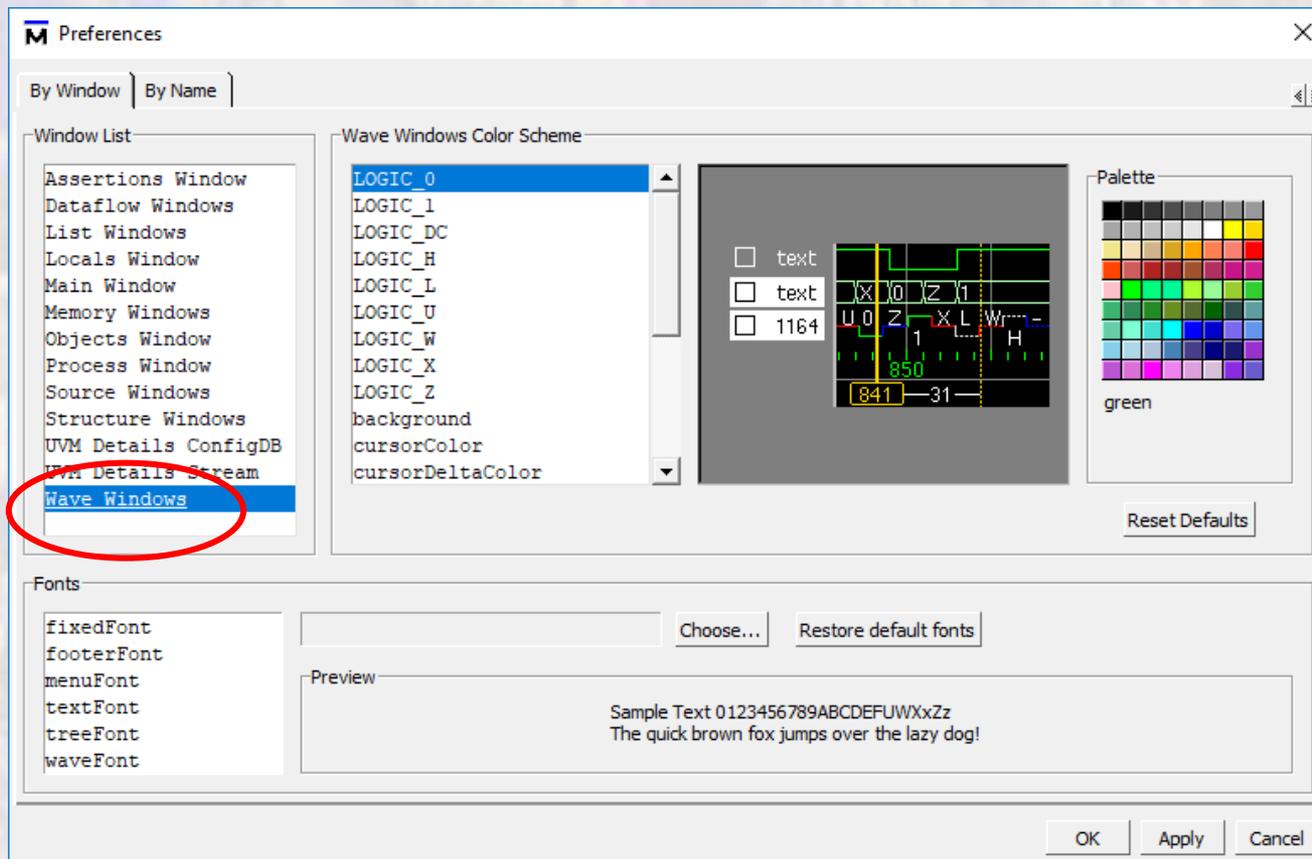
# ModelSim Tips

- Changing your VHDL file or testbench without restarting Modelsim
  - Make any changes to your testbench
    - No need to run Analyze and Elaborate
  - Make any changes to your VHDL
    - Be sure to rerun Analyze and Elaborate
- In Modelsim (already open)
  - Files -> Load -> Macro File
    - select `Project-name_run_msim_rtl_vhdl.do`
  - Your original simulation will rerun using the new files

Note: You will have to reload any wave changes you made

# ModelSim Tips

- Can I change the way waveforms look (colors)
  - Tools -> Edit Preferences -> Wave Windows



# ModelSim Tips

- Can I change the way waveforms look (colors)
  - Default Colors

The screenshot displays the ModelSim - INTEL FPGA STARTER EDITION 10.5b interface. The main window shows a simulation of a divider circuit. The design tree on the left lists components like 'divider\_long\_tb', 'DUT', 'clock', 'reset', 'run', 'standard', 'textio', 'std\_logic\_1164', 'numeric\_std', and 'math\_real'. The objects list shows parameters such as 'NUMBITS', 'CLK', 'RSTB', 'START', 'DIVIDEND', 'DIVISOR', 'READY', and 'DONE'. The waveform viewer shows signals for 'divider\_long\_tb/CLK', 'divider\_long\_tb/RSTB', 'divider\_long\_tb/ST...', 'divider\_long\_tb/DI...', 'divider\_long\_tb/DI...', 'divider\_long\_tb/RE...', 'divider\_long\_tb/D...', 'divider\_long\_tb/Q...', and 'divider\_long\_tb/RE...'. The waveform shows digital signals over time, with a cursor at 0.00 ns. The transcript window at the bottom shows the following commands:

```
# add wave *
# view structure
# .main_pane.structure.interior.cs.body.struct
# view signals
# .main_pane.objects.interior.cs.body.tree
# run 1000 ns
VSIM 2>
```

The status bar at the bottom indicates 'Now: 1 us Delta: 2' and 'sim:/divider\_long\_tb'.

# ModelSim Tips

- Can I change the way waveforms look (colors)
  - waveformBackground → white  
(scroll down in Wave windows color screen)
  - Logic0, Logic1, Text, Time → black
  - Vector → red

