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Filtering VCD Files

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Abstract

Value Change Dump (vcd) files are used to record waveform information.

- They are used to provide stimulus to a simulation or to record results of a simulation run.

- They can be used to compare simulation results or to help generate test vectors.

- The files can be very big.

Editing or manipulating vcd files can be tricky. The eightolives' Workspaces Desktop tool can help.
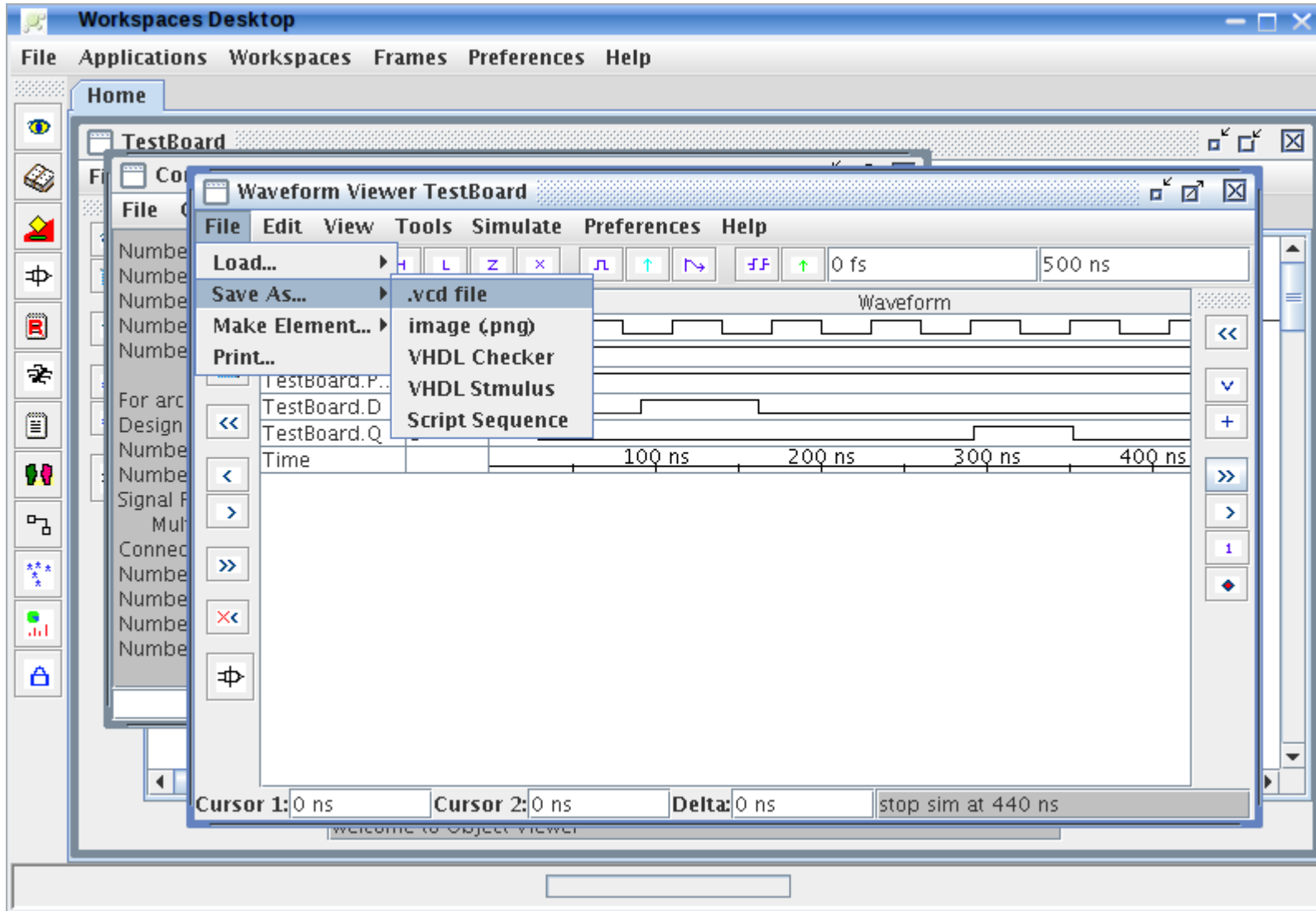
Getting a VCD File

- A VCD file that captures signal waveforms can be exported from most simulators

- For example, in Mentor Graphics' Modesim you can enter commands or run a "do file" to capture the data

```
onerror {resume}
onbreak {resume}
vcd dumpports -file TestVectors/temp.vcd /testbench_mim_module/TOP/U1/*
run -all
vcd off
quit
```

This is a simple script example.

The last term in the vcd command line is vsim's path to the component which contain the ports of the DUT
In this case, testbench_mim_module is the name of the testbench, TOP is the instance name of the shell in the testbench, and U1 is the instance name of the module in the shell

In Workspaces Desktop.. Save As .vcd

VCD File Format

```
$comment
  Value Change Dump Removed Signal null - version 1 - W. Kaupinis 10/9/05
$end
$comment
  Value Change Dump Filter - version 1 - W. Kaupinis 10/9/05
$end
$comment
    File created using the following command:
    vcd file TestVectors/temp.vcd -dumpports
$end
$date
    Mon Nov 13 12:40:27 2006
$end
$version
    dumpports ModelSim Version 5.8c
$end
$timescale
    1ps
$end
$scope module testbench_mim_module $end
$scope module top $end
$scope module u1 $end


$var port 1 <0 a0 $end
$var port 1 <1 a1 $end
$var port 1 <2 a2 $end
$var port 1 <3 a3 $end
$var port 1 <4 a4 $end
$var port 1 <92 wr_n $end
$upscope
 $end

$upscope
 $end

$upscope
 $end

$enddefinitions
 $end
```

Header information

Node Information

Value Changes

```
#0

$dumpports

pN 6 6 <0
pN 6 6 <1
pN 6 6 <2
pN 6 6 <3
pN 6 6 <4
pN 6 6 <5
pN 6 6 <6
pN 6 6 <84
pN 6 6 <90
pN 6 6 <92
$end

#50000
pU 0 6 <92
pf 0 0 <90
pf 0 0 <84
pf 0 0 <18
#1950000
pD 6 0 <28
pU 0 6 <27
$vcdclose

#1960000

$end
```

```
pValue 0_strength 1_strength node_id

D, L  low
U, H high
N, X unknown
Z, T tri-state
D, l low (two or more drivers active)
U, h high (two or more drivers active)
0, low both input and output are active 0
1, high both input and output are 1
?, unknown
F three state
A unknown input 0 output 1
a unknown input 0 output X
B unknown input 1 output 0
b unknown input 1 output X
C unknown input X output 0
c unknown input X output 1
f unknown input and output three-state
```

```
Strength
0       highz
1       Small
2       Medium
3       Weak
4       Large
5       Pull
6       Strong
7       supply
```
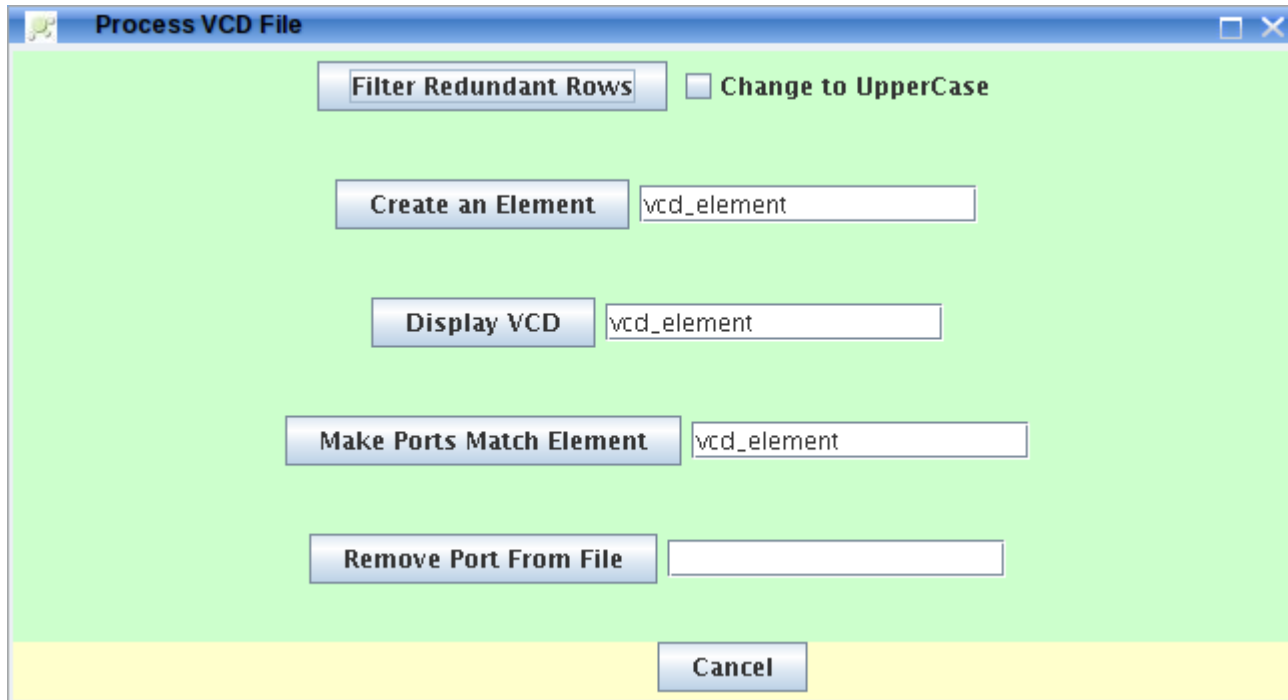
VCD file format is defined in IEEE Std 1364-2001

Things you might want to do...

- Filter redundant information

  - This can significantly reduce file size

- Remove a signal from the file

- Create a design Element with vcd signal names

- Create a vcd file that contains a subset of signals

Open the .vcd file in Workspaces Desktop

Select the task you wish to perform

What the commands do

- **Filter Redundant Rows** will prompt you for the "save as" file name and summarize results in right window of DesignTool.

- **Create an Element** adds a new Element in DesignTool (default name is "vcd_element")

  - You can delete ports if you want to edit them out

- **Make Ports Match Element** extracts a vcd file consisting only of those ports in the referenced Element (default is "vcd_element")

- **Remove Port From File** deletes a single port and its data from a vcd file

Hints

- Always save edited vcd files with different names so you don't overwrite your source data

For more information

- Refer to MentorGraphics documentation on use of Modelsim

- IEEE Std 1364-2001

- Check the tutorials at:
  http://www.eightolives.com/tutorials.htm

  - Workspaces Desktop Tool Overview

- Read the Workspaces Desktop Users Manual