ModelSim 5.6

Web: www.model.com

Quick Guide

General Information – Last Updated: 15/February/02

Installation / Environment / Licensing

Documentation
Installation instructions:
www.model.com/support/licensing.asp
Globetrotter FlexLM Doc:
www.globetrotter.com/manual.htm

Web — Download the Latest Release
www.model.com/products/release.asp

Environment Variables (see ModelSim cmd "printenv")

LM_LICENSE_FILE	*Required*	Pathname of *license.dat* file or port@host
DOPATH	Optional	Search path for ".do" files
EDITOR	Optional	Specifies editor for "edit" cmd
MODELSIM	Optional	Pathname of *modelsim.ini* file
MODELSIM_TCL	Optional	List of *modelsim.tcl* files
MODEL_TECH_TCL	Optional	Pathname to Tcl/Tk libraries
MODEL_TECH	*Don't Set*	Used internally by ModelSim
MGC_LOCATION_MAP	Optional	Used as "soft" path to find files
PLIOBJS	Optional	Used to load PLI object files
TMPDIR	Optional	Used by VSIM for temp space

PATH Environment Variable

Unix: Add */<install_dir>/modeltech/bin* to $path
PC: PATH will be updated automatically during install

Starting the License Server

Unix: Copy *license.dat* file to */<install_dir>/modeltech/<platform>/*
Run */<install_dir>/modeltech/<platform>/START_SERVER*
PC: Run */<install_dir>/modeltech/win32/*flexlm.cpl
Use "Setup" and "Control" tabs to configure and start server

Licensing Diagnostics

Unix: Run */<install_dir>/modeltech/<platform>/lmstat -a or lmdiag*
PC: Run */<install_dir>/modeltech/win32/lmutil lmstat -a or lmutil lmdiag* -or-
PC: *Start->Programs->ModelSim->Licensing Wizard*

Invoking ModelSim

Unix: Run */<install_dir>/modeltech/bin/vsim*
PC: *Start->Programs->ModelSim->ModelSim* -or-
PC: Double-click on: *<install_dir>/modeltech/win32/modelsim.exe*

ModelSim Products
www.model.com/products/prodcomp.asp

Quick Guide Notes
Find this document at
www.model.com/support/pdf/qk_guide.pdf
Commands in bold are typed at the ModelSim> or VSIM> prompts

Light blue highlight denotes SE-only features.

Key ModelSim Commands

Commands may be used in the following locations: (Sh)ell, (M)odelSim> prompt, or (V)SIM> prompt. See Command Reference for complete command list and syntax.

vcom	Sh, M, V	VHDL Compiler (see below)
vdel	Sh, M, V	Deletes a design unit from a specific library
vdir	Sh, M, V	Lists the contents of a library
vlib	Sh, M, V	Creates a design library
vlog	Sh, M, V	Verilog Compiler (see below)
vmap	Sh, M, V	Defines or displays library mappings
vsim	Sh, M, V	VHDL and/or Verilog Simulator (see below)
add list / wave	V	Add signals to the List or Wave windows
add log	V	Log signals to *vsim.wlf* file for analysis later
alias	M, V	Create a user defined alias (e.g., *alias h "history"*)
bp, bd	V	Set/Clear a breakpoint (see *Managing Breakpoints* below)
cd	Sh, M, V	Change directory
change	V	Modify a VHDL variable or Verilog register
checkpoint	V	Save the state of you simulation (see *restore*)
compare add	M, V	Compare signals
configure	M, V	Configure List or Wave window attributes
delete	V	Remove HDL item from List or Wave window
do	M, V	Execute a file of commands (e.g., *do macro.do*)
drivers	V	Display current and future value of signal or net drivers
dumplog64	Sh	Dump the contents of the *vsim.wlf* file in a readable form
echo	M, V	Display message (e.g., *echo "Time is $now ns."*)
edit	M, V	Invoke editor specified by the EDITOR env variable
environment	M, V	Display or change current region/signal environment
examine	M, V	Examine one or more HDL items (e.g., *exa /top/clk*)
find	V	Display pathnames of matching HDL items
force	V	Force signals or nets (e.g., *force clk 1 10, 0 20 -r 100*)
history	M, V	List previous commands
noforce	V	Release signals or nets from force commands
notepad	M, V	Simple text editor
printenv	M, V	Display names and values of environment variables
profile on	M, V	Turn on Performance Analyzer
property	V	Change List or Wave signal attributes (color, radix, etc.)
pwd	M, V	Display current path in Main transcript window
radix	M, V	Change the default radix in all windows
report	M, V	returns all control or state variable values
restart	V	Restart the simulator
restore	M, V	Restore the simulation state from a previous *checkpoint*
resume	M, V	Resume macro execution after a pause command
right / left	V	Search in wave window for next transition or -expr
run	V	Advance simulation time (e.g., *run 1000*)
search / next	V	Search specified window for next item matching pattern
seetime	V	Scroll List or Wave window to time (e.g., *seetime wave 500*)
vcd2wlf	Sh	Translate VCD file into WLF file
vcddumpports	M, V	Create a VCD file
vgencomp	Sh	Create VHDL component from compiled Verilog module
view	M, V	Open a ModelSim window and pop it to the top
vmake	Sh	Print a makefile for a library
vsource	V	Display HDL source file in Source window
when	M, V	Perform action on condition (e.g., *when clk=1 {echo clk}*)
where	M, V	Display info about the environment
write	M, V	Records names, window contents, and preferences to a file
↑ ↓	M, V	Toggle thru last commands
!! | !n	M, V	Repeat last command, Repeat nth command
!abc	M, V	Repeat cmd starting "abc"
^abc^xyz	M, V	Replace "abc" in previous command with "xyz"

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Email: support@model.com

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Wave Window

add wave <item> <item>	Wave specific signals/nets
add wave *	Wave signals/nets in scope
add wave -r /*	Wave all signals/nets in design
add wave -label <name> <item>	Wave and rename a signal/net
add wave abus(31:15)	Wave a slice of a bus
view wave	Display wave window
view wave -new	Display additional wave window
write wave	Print wave window to file
<left mouse button>	Select signal / Place cursor
<middle mouse button>	Zoom options
<right mouse button>	Context Menu
<ctrl-f>	Find next item
<tab> (go right)	Search forward for next edge
<shift-tab> (go left)	Search backward for next edge
i or + | o or -	Zoom in | Zoom out
f | l	Zoom full | Zoom Last

vlog

Key Arguments (use –help for full list)

[-compat]	Disable event order optimizations
[-f <filename>]	Pass in arguments from file
[-fast]	Optimize design (see *Performance* below)
[-O5]	Maximum optimization
[-hazards]	Enable run-time hazard checking
[-help]	Display *vlog* syntax help
[-nodebug]	Hide internal variables & structure
[-quiet]	Disable loading messages
[-R <simargs>]	Invoke VSIM after compile
[-refresh]	Regenerate lib to current version
[-version]	Returns vlog version
[-v <library_file>]	Specify Verilog source library
[-work <libname>]	Specify work library
<filename(s)>	Verilog file(s) to be compiled

Examples

vlog top.v

vlog –work mylib –refresh

vcom

Key Arguments (use –help for full list)

[-93] [-87]	Choose VHDL-1993 or 1987
[-check_synthesis]	Turn on synthesis checker
[-debugVA]	Print VITAL opt status
[-O5]	Maximum optimization
[-explicit]	Resolve ambiguous overloads
[-help]	Display *vcom* syntax help
[-f <filename>]	Pass in arguments from file
[-norangecheck]	Disable run time range checks
[-nodebug]	Strip internal names
[-novitalcheck]	Disable VITAL95 checking
[-nowarn <#>]	Disable individual warning msg
[-O0]	Disable optimization
[-quiet]	Disable loading messages
[-refresh]	Regenerate library image
[-version]	Returns vcom version
[-work <libname>]	Specify *work* library
<filename(s)>	VHDL file(s) to be compiled

Examples

vcom MyDesign.vhd

vcom -93 -work /lib/mylib util.vhd

vcom -refresh

Light blue highlight denotes SE-only features.

vsim

Key Arguments (use –help for full list)

[-c]	Run in cmd line mode
[-coverage]	Invoke Code Coverage
[-do "cmd" | <file>]	Run cmd or file at startup
[-elab]	Create elaboration file
[-f <filename>]	Pass in args from file
[-g|G<name=value>]	Set VHDL Generic values
[-hazards]	Enable hazard checking
[-help]	Display vsim syntax help
[-l <logfile>]	Save transcript to log file
[-load_elab]	Simulate an elaboration file
[+notimingchecks]	Disable timing checks
[-quiet]	Disable loading messages
[-restore <filename>]	Restore a simulation
[-sdf{min|typ|max} <region>=<sdffile>]	Apply SDF timing data e.g., sdfmin /top=MySDF.txt
[-sdfnowarn]	Disable SDF warnings
[-t [<mult>]<unit>]	Time resolution
[-version]	Returns vsim version
[-view <filename>]	Log file for VSIM to view
[-wlf <filename>]	Log file to create
[<libname>.<config> | <module> | <entity>[(<arch>)]]	Configuration, Module, or Entity/Arch to simulate

Examples

vsim top

vsim -lib mywork top -do commands.do

Files

modelsim.ini	System Initialization or Project file; stores library locations, simulator resolution, paths, etc.
modelsim.tcl	Window sizes, positions, colors, etc.; user Tcl/Tk code
startup.do	Default name of macro executed after design is loaded; See "startup=" line in modelsim.ini
transcript	Default filename that ModelSim transcript window activity is saved to
vsim.wlf	Default name of simulation log file saved by VSIM

modelsim.ini

Copy modelsim.ini to current directory

Execute vmap -c

Loading order (stops after finding first file)

1. $MODELSIM environment variable
2. Current directory if $MODELSIM is not set
3. In */<install_dir>/modeltech/<platform>* directory
4. In */<install_dir>/modeltech* directory

For Detailed Information see:

ModelSim User's Manual "ModelSim Variables"

modelsim.tcl

Loading order

Always loads: */<install_dir>/modeltech/tcl/vsim/pref.tcl*

Loads the first found from:

1. $MODELSIM_TCL if it exists (":" separated list) (all files in list are loaded)
2. Current directory *./modelsim.tcl*
3. *$HOME/modelsim.tcl*

Managing Breakpoints

bp	Sets a breakpoint; without arg shows all bps
bd	Deletes a breakpoint
disablebp	Turn off all breakpoints
enablebp	Turns all breakpoints on
onbreak	Define what to do when a breakpoint is hit during a macro (e.g., onbreak {resume})
when	Perform actions under certain conditions

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Tcl/Tk

Environment Variable

MODELSIM_TCL

Online Documentation

Help->Tcl Help
Help->Tcl Syntax
Help->Tcl Man Pages
Help->Technotes->MTI_Widgets

Language Syntax

command arg1 arg2 arg3 ...

Language Syntax: Command

set <var> <value>
expr <math expression>
exec <ShellCommand>
info <option> <procedure name>
winfo <option> <window name>

Language Syntax: Procedures

```
proc name {arglist} {body}
        proc diag {a b} {
        set c [expr sqrt($a*$a + $b
        return $c
        }
```

Language Syntax: Conditionals

```
if {boolean} {bodytrue} else {bodyfalse}
        if {$now < 10000} {echo $now}
```

Language Syntax: Loops

while *{boolean} {body}*
foreach loopVar {valuelist} {cmdBody}
for {initial} {test} {final} {body}

Poking around in ModelSim Tcl/Tk

info	Get info on a Tcl construct
info xx	Find out the args to *info*
winfo	Get info on Tk widgets
winfo xx	Find out args to *winfo*
winfo children .	Return the sub-widgets to ModelSim

Examples

```
#Print the string length of "Hello, World!"
    set len [string length "Hello, World!" ]
    echo "Hello, World! is $len characters long!"
#Create a button in the wave window that does something
    apply_button_adder  wave controls right  red  white  SayHi  {echo hi}
#Display the Tcl/Tk source code to apply_button_adder
    info body apply_button_adder
#Set the right mouse button to execute "drivers" on selected signal
    bind .signals.tree <Button-3> {
    set signalnum [.signals.tree index anchor]
        set signalline [.signals.tree get2 $signalnum]
        set signalname [lindex $signalline 0]
        echo [drivers $signalname]
        }
```

Performance

Key arguments to vlog

[-fast]	Optimize design
[+opt]	Optimize previously compiled design
[+acc=[<spec>]+[<module>]]	Enable design object visibility
[+nocheckALL]	Increase -fast optimizations

Key arguments to vsim

[-elab]	Create elaboration file
[-load_elab]	Simulate elaboration file

Signal Spy

init_signal_driver	Drive hierarchical signal
init_signal_spy	Read hierarchical signal
signal_force	Force hierarchical signal
signal_release	Release hierarchical signal

More Info . . .

PDFs (see docs/pdf sub-directory)

Start Here	*se_start.pdf* or *pe_start.pdf*
User's Manual	*se_man.pdf* or *pe_man.pdf*
Command Reference	*se_cmds.pdf* or *pe_cmds.pdf*
ModelSim Tutorial	*se_tutor.pdf* or *pe_tutor.pdf*
FLI Reference	*fli.pdf*

Technical Notes

www.model.com/support/technotes.asp
See *<install_dir>/modeltech/docs/technotes*

Company Periodical

ModelUser (req via modeluser@model.com)

ModelSim Help Pulldown

Help > Release Notes
Help > Tcl Man Pages

Training

www.model.com/training/default.asp

Email Notification of New Versions

www.model.com/support/register_news_list.asp

Support

Model Technology Customers

www.model.com/support/default.asp

Model Technology Customers in Europe

www.model.com/contact_us.asp

Mentor Graphics Customers

support_net@mentor.com
1-800-547-4303

Mentor Graphics Customers outside North America

www.mentor.com/supportnet/support_offices.html

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