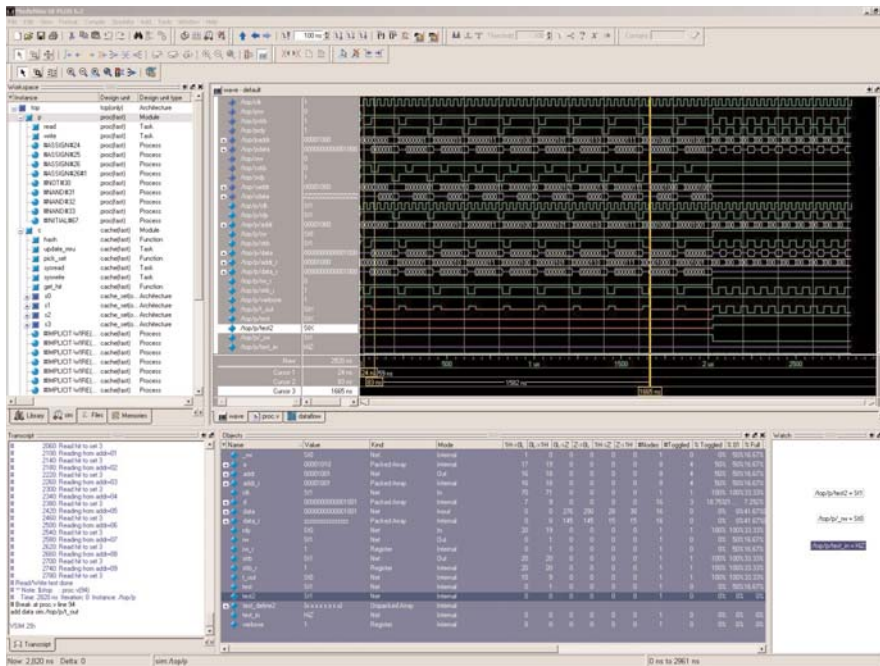


# ModelSim SE

## D A T A S H E E T



ModelSim SE is the Mentor Graphics UNIX, Linux, and Windows-based simulation environment, combining high performance with the most advanced debug capabilities in the industry.

## High-Performance Simulation Environment

ModelSim® SE combines high performance and high capacity with the most advanced code coverage and debugging capabilities in the industry. ModelSim SE offers unmatched flexibility by supporting 32 and 64 bit UNIX and Linux and 32 bit Windows®-based platforms.

Model Technology™ was the first to put the award-winning single kernel simulator (SKS) technology in the hands of engineers, enabling transparent mixing of VHDL, Verilog, and SystemC in one design, using a common, intuitive graphical interface for development and debug at any level, regardless of the language.

The combination of industry-leading performance and capacity with the best integrated debug and analysis environment make ModelSim SE the simulator of choice for both ASIC and FPGA design. The best standards and platform support in the industry make it easy to adopt in the majority of process and tool flows.

### Major product features:

- Industry-leading RTL and gate-level optimizations
- Optimized native compiled architecture
- Native support of VHDL and Verilog; SystemC optional
- Powerful, intuitive GUI speeds debug and analysis of all languages
- SystemVerilog for design
- Profiler shows both memory and CPU usage
- Advanced integrated code coverage
- Customizable and open architecture through C and Tcl/Tk interfaces
- Integrated JobSpy for simulation farm support
- Support for 32 and 64 bit UNIX and Linux and 32 bit Windows-based platforms

## Tri-Lingual Simulator with Integrated C Debugger

The ModelSim SKS is a unified kernel that provides a true, native mixed-language environment for Verilog 95, 2001, 2005; VHDL 87, 93, 2000; SystemVerilog 2005 for design; and SystemC 1666 2005. There is no learning curve with ModelSim's SystemC option, since SystemC code is debugged the same way as HDL code. The powerful debug environment incorporates a built-in C debugger. Elimination of the FLI/PLI bottleneck provides both easy migration between HDL and SystemC and excellent performance. The SystemC Verification Library is also fully supported. With native support for SystemC, ModelSim offers the only authentic tri-lingual verification environment for today's complex designs.

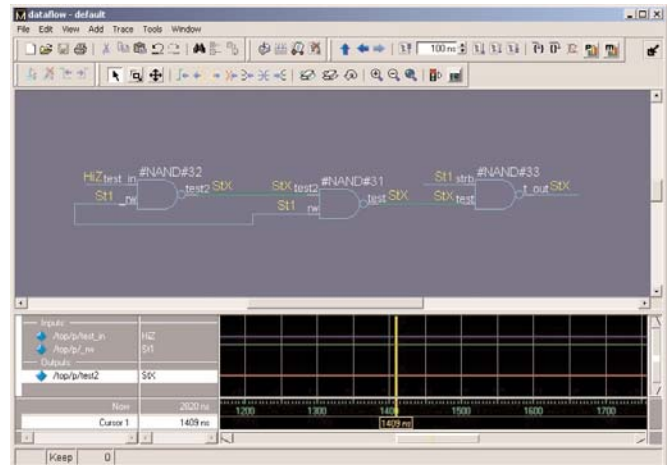
## A More Intelligent GUI

An intelligently engineered GUI makes efficient use of desktop real estate. Although the default arrangement of interactive graphical elements (windows, toolbars, menus, etc.) makes viewing and accessing the many powerful capabilities intuitive, the flexibility of the ModelSim GUI allows users to easily customize it to their preferences. The result is a feature-rich GUI that is easy to use and quickly mastered.

A message viewer enables simulation messages to be logged to the ModelSim WLF results file as well as the standard transcript file. The GUI's organizational and filtering capabilities help filter through the normal noise of any simulation run in order to focus on serious potential problems or on the causes of simulation failures.

Many ModelSim debug and analysis capabilities may be employed post-simulation on saved results as well as during live simulation runs. For example, the coverage viewer will analyze and annotate source with code coverage results, including FSM state and transition, statement, expression, branch, and toggle coverage. Signal values can be annotated in the source window as well as viewed in the waveform viewer.

The memory window allows flexible viewing and changing of memories. VHDL, SystemC, and Verilog memories are auto-extracted in the GUI, allowing powerful search, fill, load, and save functionality. The



*ModelSim SE native support of SystemVerilog design constructs enables high-level design modeling and debug.*

memory window allows pre-loading of memories with specific values or randomly generated values, saving the time-consuming step of initializing sections of the simulation merely to load memories. All functions are available via the command line, allowing them to be used in scripting.

## SystemVerilog for Design

ModelSim SE fully supports the SystemVerilog design constructs, providing new capabilities that aid in modeling at higher levels of abstraction. Some of the most significant design productivity features include:

- Interfaces
- Enumerated, structures, unions, and user-defined types
- Assignment and increment/decrement operators
- Enhanced procedural blocks: *always\_comb*, *always\_ff*, and *always\_latch*
- Jump statements
- Dynamic arrays
- Associative arrays
- Default task and function arguments and named argument association
- Direct programming interface (DPI)
- Implicit port connections: *.\** and *.name*
- Packages and global declaration

ModelSim's native support of SystemVerilog also includes a fully integrated debug environment.

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## Graphical Usage Profiler

The profiler provides an interactive graphical representation of both memory and CPU usage on a per instance basis. It shows which part of the design is consuming resources (CPU cycles or memory), allowing engineers to more quickly find problem areas in their code. The memory allocation profiler provides insight into how much memory different parts of the design are consuming. Memory usage profiling can be tracked during both elaboration and simulation.

## Advanced Code Coverage

ModelSim's advanced code coverage capabilities are integrated into the tool. Integrated code coverage provides the highest performance with the greatest ease of use. ModelSim coverage metrics provide instance-based results for all supported metric types. All coverage information is now stored in the Unified Coverage Database (UCDB). The UCDB is used to collect and manage all coverage information in one highly efficient database. Coverage utilities that analyze code coverage data, such as merging and test ranking, are available. A coverage viewer eliminates the need to load and have active a simulation in order to review code coverage results. The coverage types now supported include:

- Statement coverage: measures the number of statements executed during a run
- Branch coverage: measures the expressions and case statements that affect the control flow of the HDL execution
- Condition coverage: breaks down the condition on the branch into elements that make the result true or false
- Expression coverage: same as condition coverage but covers concurrent signal assignments instead of branch decisions
- Enhanced toggle coverage: in default mode, counts low-to-high and high-to-low transitions; in extended mode, counts transitions to and from X
- Finite State Machine: state and state transition coverage

## JobSpy

With integrated support of standard load sharing software, JobSpy provides the ability to easily manage and interact with simulation batch jobs. The JobSpy interface allows you to select any submitted batch job, monitor its status, or submit commands; such as, save a snapshot of a waveform, query simulation time, or suspend the job. This can be accomplished with the easy-to-use graphical interface or via the command line interface.

## High Performance

ModelSim is an industry-leading performance and capacity solution. ModelSim's high-performance global optimization mode, known as *vopt*, engages very aggressive compile and simulation optimization algorithms of Verilog and VHDL. The *vopt* performance mode can improve Verilog and mixed VHDL/Verilog RTL simulation performance by up to 10X versus an unoptimized mode. The *vopt* flow can also improve gate-level performance by up to 4X and capacity by over 2X. ModelSim's optional native SystemC integration delivers high performance and unmatched SystemC debug capabilities, including transaction viewing.

## Complete Product Support and Maintenance

Model Technology provides the highest level of support in the industry through its unique Engineer of the Week approach. Customers receive support from the engineers who design the ModelSim products. A standard annual maintenance contract provides technical support, maintenance releases, the Informant email newsletter, and access to on-line support and technical services.

*For additional details on ModelSim's advanced code coverage capabilities, refer to the Code Coverage datasheet and application note at [www.model.com](http://www.model.com).*

**Visit our web site at [www.model.com](http://www.model.com) for the latest product news.**

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