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Galaxy Custom Designer SE

The New Choice in Custom Schematic Editing and Simulation Environment

Overview

Galaxy Custom Designer™ SE is the next-generation choice for schematic entry, enabling users to meet the challenges of today's fast-moving nanometer designs with little or no learning curve. As with all Custom Designer tools, schematic editing tasks are accomplished with fewer clicks, quicker menu access, and less pop-up menu clutter.

Architected from the ground up with maximum productivity in mind, Custom Designer SE enables ultra-fast schematic editing with on-canvas parameter update and display. SE's real-time connectivity with dynamic net highlighting continuously maintains up-to-date design integrity for faster design with fewer errors and less effort.

Extending the Galaxy Design Platform

As semiconductor designs demand more custom and AMS content, custom design teams need new ways to address the challenge of quickly and efficiently integrating into existing digital design flows.

Custom Designer leverages the powerful capabilities of Synopsys' Galaxy™ Implementation Platform to provide a unified solution for custom and digital design teams. Digital teams now have access to a comprehensive AMS block authoring flow with an optimized pipeline that eliminates tedious data exchange and leads to faster design cycle time.

Key Benefits

- Architected for Productivity
  - One unified platform for both cell-based and custom content speeds complex chip design and integration tasks
  - Supports a complete block-authoring flow with parasitic resimulation for high-accuracy results
  - Supports Synopsys' CustomSim™, HSPICE®, Custom WaveView™ and StarRC™ flows for industry sign-off physical verification
  - On-canvas editing of parameters and nets improves capture time
  - Dynamic net highlighting provides fast visual recognition of nets and wires to help eliminate design errors
  - "Smart Connect" advanced wiring technology speeds designers through wiring tasks for faster time to completion
- Simulation and Analysis Environment
  - Supports Synopsys' common simulator use model, simplifying access to the simulator of your choice
  - Combines testbenches, circuits, simulators, setups, measurements, post-simulation processing and analysis into a single environment for fast visualization of results and isolation of problems
  - Organizes simulator options and provides easy visualization of all interdependencies and default settings. The simulation options dialog also provides quick help through option-specific tool tips
  - Cross-probing and back-annotation between the simulation environment, Custom Designer SE, Custom Designer LE and extracted views lets designers quickly select and display the results that matter for quick analysis directly on the schematic or in Custom WaveView

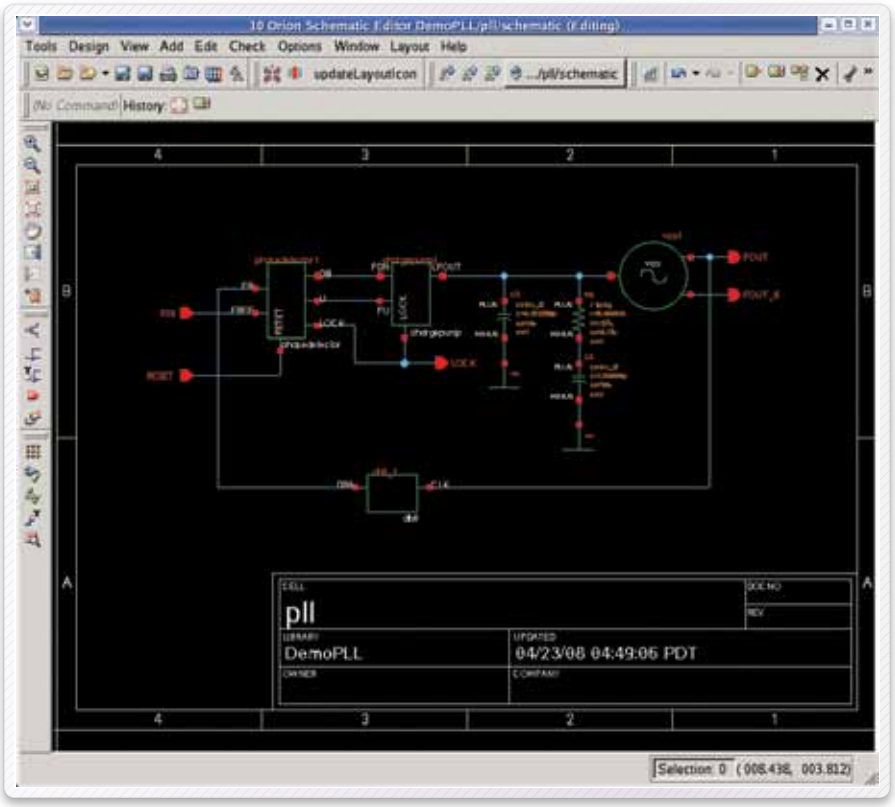

Figure 1: Custom Designer SE's familiar look-and-feel gives a boost to designer productivity out of the box

- Shares all of the Custom Designer tool's advanced infrastructure technology, including the library and hierarchy editors and the job monitor

A Comprehensive and Unified Flow

Custom Designer SE utilizes Synopsys' common simulator use model allowing access to Synopsys' leading AMS simulators, including HSPICE, CustomSim and Custom WaveView.

During simulation and debug, Custom Designer SE provides quick access to any simulator through simple pull-down menus.

During physical verification, the native integration between Custom Designer SE, Custom Designer LE and StarRC provides a complete round-trip parasitic resimulation flow complete with back-annotation. The comprehensive flow ensures the highest-possible accuracy in parasitics extracted from the physical design.

Productivity is Key

Custom Designer SE's "Smart Connect" wiring technology drastically improves the user experience during the tedious task of wiring schematics. "Smart Connect" boosts productivity during wire routing with a simple but powerful combination of mouse-click and keystroke actions that quickly identifies and automatically connects to the closest allowable wiring points. "Smart Connect" technology ensures that during the wiring phase all connections are made as quickly as possible without cumbersome user interaction and tedious mouse alignment and complex commands.

Custom Designer SE's dynamic net highlighting instantly shows the user all wires in the circuit with the same net name. Instant visual feedback of the connectivity helps designers avoid the most obvious mistakes.

Custom Designer SE's on-canvas editing capability allows designers to quickly change parameter values, pin labels, net and instances names directly on the canvas by simply pointing at the object and hitting the return key. In addition, all value changes in Custom Designer SE automatically trigger library callbacks when editing parameter values (even during scripting), eliminating tapeout-killing design synchronization problems.

Simulation and Analysis Environment

The complex task of analyzing, verifying and debugging today's tough AMS and custom designs requires state-of-the-art tools that are architected for productivity from the ground up. Custom Designer's simulation and analysis environment provides designers with the latest tools and techniques for creating and managing the thousands of circuit simulations that occur during the AMS circuit development cycle.

Shipped from the factory pretested with the latest versions of Synopsys' HSPICE and CustomSim circuit simulation solutions and with industry-leading Custom WaveView, the simulation environment provides a fast track to finished designs ready for chip assembly.

Overview of the Main Console

The main console (Figure 1) provides the designer with a high-altitude view of the current designs variables, analyses and outputs and allows designers to focus on the design, not on the details of simulator syntax.

Features that increase designer productivity include an "edit-in-place" capability allowing users to work directly with the values in the main console. Specific dialogs can also be used for setup and detailed control of the entries in the console.

Users can also run multiple environment consoles from a single Custom Designer session, allowing side-by-side comparisons of results from different version of a design or different designs.

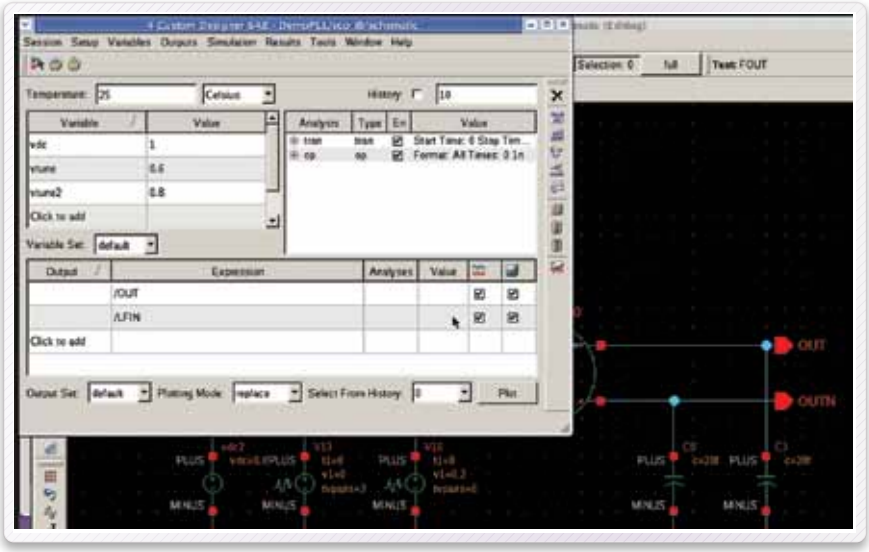

Figure 2: The main SAE console brings together variables, analyses and outputs in one easy-to-manage dialog and provides and instant view of the tests in progress

The environment supports a rich, user-extensible waveform expression language that is common with Custom WaveView. This allows users to create complex expressions that are independent from the simulator in use and apply them to ideal or extracted designs without change.

The analyses section of the main console shows the various simulations that will be conducted. The environment helps designer be more productivity by hiding the details of simulation syntax in favor of easy-to-use, simulator-specific dialogs. All available analyses and their options are clearly presented to the user and can be recalled and modified as needed.

The analyses section of the main console also hosts the environment's ability to perform complex parametric simulations. The parametric analysis dialog adds sweep commands as needed and manages any interdependencies to ensure the simulation results are correct.

Another key part of the environment is the outputs section, which collects and manages the volumes of data that can be produced by complex AMS simulations. Each line in the outputs section is a measurement that can be chosen from a schematic or text view cross-probe or constructed with the Results Analyzer.

All entries made in the output section also cause the environment to emit the required simulation instructions for saving all of the data needed to display the answer. After simulation, scalar data results will be automatically displayed in the table while vector data will automatically be displayed in Custom WaveView where they can be subjected to further analysis.

To increase productivity, the main console also supports "edit-in-place" capability that allows designers to change values directly in the field.

Improved Productivity with the Results Analyzer

The Results Analyzer is a powerful toolbox that can dramatically improve user productivity for a variety of common measurements and calculations (Figure 2).

Following a simulation, the Results Analyzer toolbox lets users quickly craft both common and complex measurements and display the results in CustomExplorer™. For instance, the Result Analyzer's pallet of tools lets users quickly select a predefined measurement of the voltage of differential nets with a simple click on the two nets. The appropriate simulation waveforms are retrieved and the equation is calculated and displayed in Custom WaveView.

Other tools include common functions like finding the total power in a signal or displaying an eye diagram. The Results Analyzer also provides the expression it used to derive its results. These expressions can be copied to other scripts or sessions or can be used directly in the waveform calculator or Custom WaveView.

Verification Scripting

When designers complete their initial work in the environment, the system can generate verification script that can be run in the background to replay the session's measurements. This capability improves designer throughput and productivity as it allows work on other designs and does not occupy the user's environment.

Based in Tcl, verification scripts can also be modified and used in batch regression-style runs to accommodate changes in process libraries and other conditions.

True AMS Analysis with Text View Support

The environment allows designers to mix any combination of schematic, text or extracted views to build an accurate model of their design. The language-sensitive text editor works with Verilog and Verilog-A, allowing users to probe through the hierarchy pushing into schematics, text or extracted views as defined by Custom Designer's hierarchy editor. The same configuration controls the final netlists that are sent to the simulators, eliminating confusion about what was actually simulated.

The environment supports SPICE on Top, Verilog on Top and any mix in between.

Open, Interoperable and Extensible Environment

Based on Si2's OpenAccess database and extensible through industry-standard Tcl scripting language, Custom Designer's open environment allows CAD groups to quickly add new tools to the environment.

Custom Designer's open infrastructure is a shift in the EDA industry, offering unfettered access to design data. With no proprietary languages, databases or extensions, Custom Designer offers CAD groups deep visibility into the system's design infrastructure, enabling high-performance application integration and development, including access to in-memory data and runtime objects.

Custom Designer also provides the ability to develop consistent user interfaces across all Custom Designer tools by providing access to standard components like menus and toolbar icons.

Custom Designer's open simulation environment includes a Programmable Netlister that ships with open-source code, allowing for quick implementation of custom netlist formats. The netlister supports the Component Definition Format (CDF) parameters, including PEL/AEL expressions, CDF "simInfo" and physical extracted view netlisting.

Powerful Capabilities Shared Across Custom Designer

Powerful new GUI technologies provide the entire Custom Designer system with a unique set of capabilities that are shared across all components.

Custom Designer has extensive context-sensitive menu support throughout the tool and shares the same use model used in all user subsystems.

Custom Designer's property editor allows for single or mass editing of property values across selected instances. Tabbed views simplify editing of different device types and "As-Is" technology clearly indicates mismatches in values.

Custom Designer's "Transaction History" is a sophisticated undo/redo system that records all data creation and manipulation commands during an editing session for schematics and layout. Recallable at any time, this history is also unique to each different cell view, improving the designer's recall of the editing steps.

All Custom Designer commands are logged in a log file (.log and .tcl) and can be replayed in the tool. This can be beneficial when creating macros for any task that needs to be repeated.

Icons for recently used commands appear on the history toolbar. Re-invoking previously used commands is easy. Custom Designer also supports standard and user-definable bind-key sets, allowing you to customize the system to meet your unique design style.

Custom Designer boasts a single job monitor that logs all batch and interactive jobs launched from any native Custom Designer tool or any other tool integrated into the environment. Job status is saved across different sessions.

Platform Support

- X86 for 32- and 64-bit
- Red Hat Enterprise Linux version 4 and 5 (AS, ES, WS)
- SUSE Linux 9.0 and 10.0 and 5 (AS, ES, WS) 9.0 and 10.0

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