

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 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 fast schematic editing with on-canvas parameter editing and display. Custom Designer 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 Implementation 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®, and Custom WaveView™ for high-performance, high-capacity circuit simulation
 - Supports Synopsys' Hercules™, IC Validator LVS and StarRC™ flows for industry signoff physical verification
 - On-canvas editing of parameters and nets improves capture time
 - Dynamic net highlighting provides fast visual recognition of connectivity to help eliminate design errors
 - "Smart Connect" advanced wiring technology speeds designers through wiring tasks for faster time-to-completion
 - Device Palette assistant provides quick access to favorite devices to place in your design, including individual parameter settings
 - Transaction History provides sophisticated undo/redo changes on a per-window basis, even after a Save is performed

► 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
- Enables the use of a single common testbench for both pre- and post-parasitic phases of the design
- 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
- Shares all of Custom Designer's advanced infrastructure technology, including the library manager, hierarchy editor, and the job monitor
- Interfaced to industry-leading load balancing solutions that work in conjunction with a unified parametric, corners and statistical analysis capability

A Comprehensive and Unified Flow

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

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

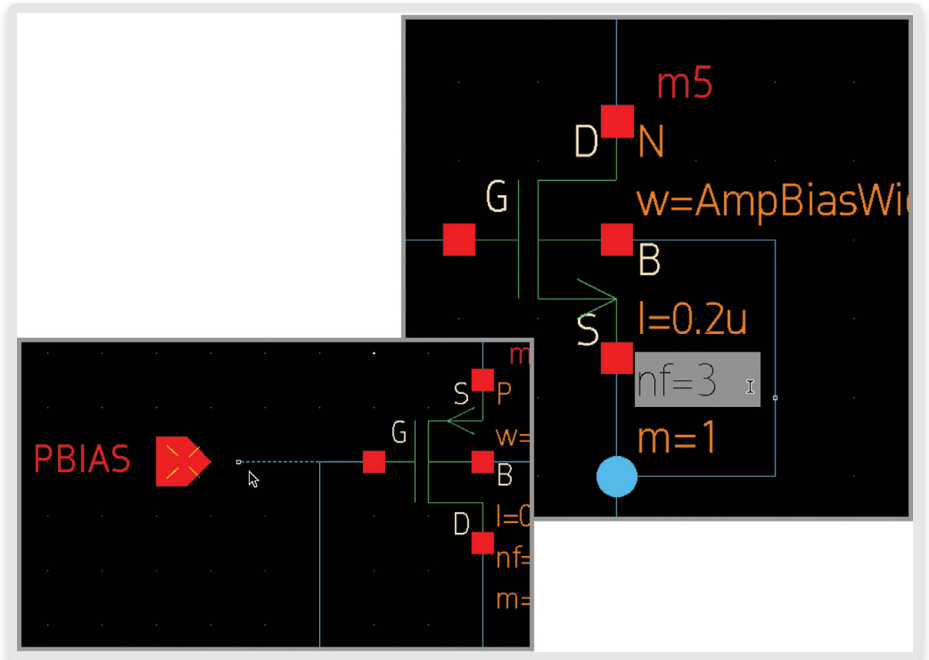


Figure 1: Smart Connect and On-Canvas editing of parameters are just two of the ways Custom Designer SE boost designer efficiency during schematic capture

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. (See Figure 1.)

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. This capability also works with vectored nets.

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 device 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 from the ground up for productivity. 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.

Overview of the Main Console

The main console (Figure 2) provides designers with a high-altitude view of the current design's variables, analyses and outputs and allows them 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.

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 a designers be more productive 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. 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

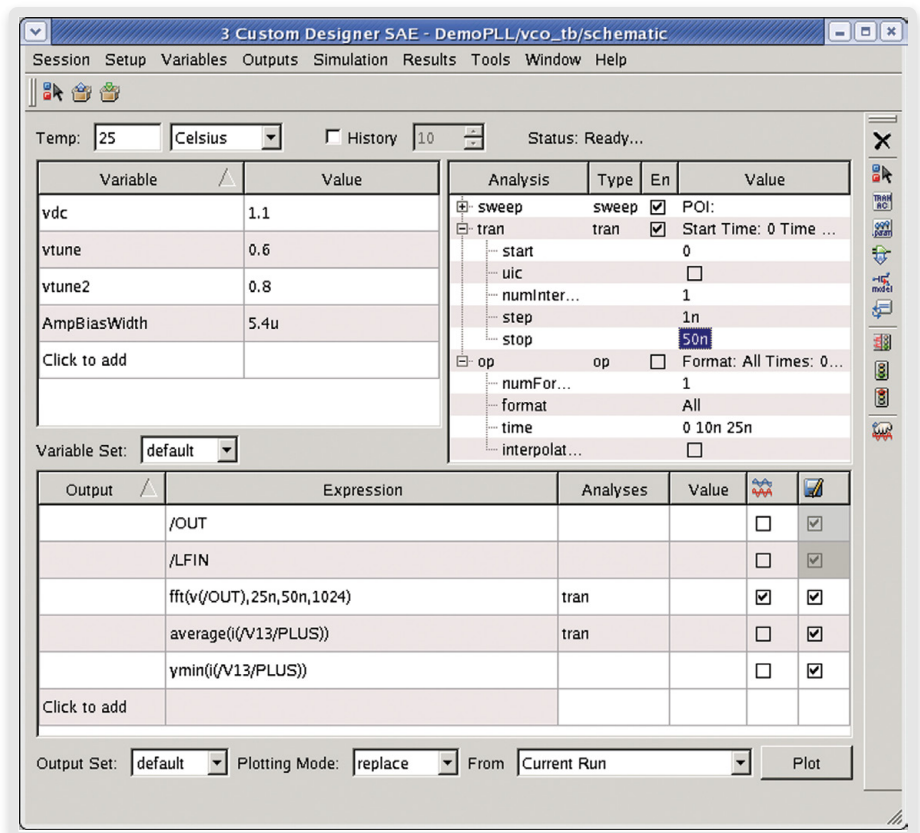


Figure 2: Custom Designer Simulation and Analysis Environment main console provides the top-level view of variables, analyses and measurements

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.

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 (See Figure 3).

Following a simulation, the Results Analyzer toolbox lets users quickly craft both common and complex measurements and display the results in Synopsys CustomExplorer™ or Custom WaveView. 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.

Regression Scripting

When designers complete their initial work in the environment, the system can generate regression scripts 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, regression scripts can also be modified and used in batch runs to accommodate changes in process libraries and other conditions.

Unified Parametric, Corners and Monte Carlo Analysis

Custom Designer SE's simulation environment provides a unified mechanism for Parametric, Corners and Monte Carlo analyses that simplify the setup, launch and recovery of the thousands of individual simulations required to understand the behavior of a design.

Displayed in the analyses section of the main console, the Parametric Analyses dialog adds nested sweep commands as needed and manages any interdependencies to ensure the simulation results are correct.

The Corners dialogs allow the user to set up sets of parameter values and model libraries and organize them into distinct sections prior to simulation. Combined with Custom Designer SE's Distributed Processing feature, the Corners tool can launch, recover and summarize the results of simulations for a thorough understanding of the effect of process corners, temperatures or other variables on your design.

The Monte Carlo capability helps reduce the volume of simulations by providing statistical analyses across process variability. The Monte Carlo capability is also tightly integrated with HSPICE's variability analysis capability

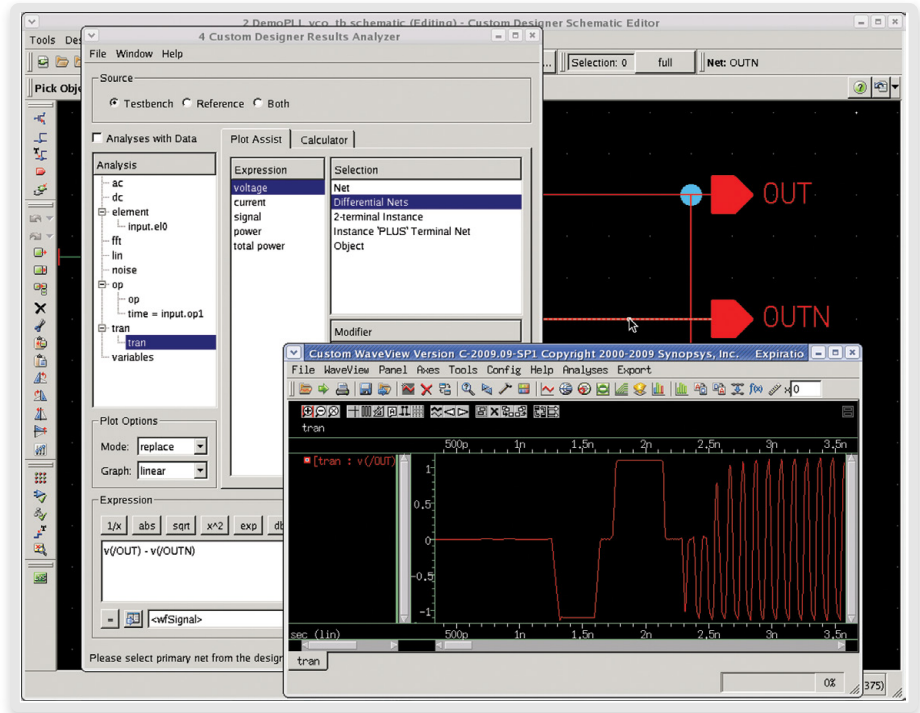


Figure 3: The Result Analyzer provides quick access to commonly used analyses that improve designer productivity

to maximize throughput and improve accuracy. (See Figure 4.)

Built-in Distributed Processing Support

Custom Designer SE's simulation and analysis environment is designed to take maximized advantage of compute farm resources and simulator licenses. Shipped with native support for Platform Computing™ LSF and Sun Microsystems® Sun Grid Engine grid management products, Custom Designer SE allow users to launch and recover distributed jobs and manage the returning results. This capability can be used to maximize simulation throughput for Corners, Monte Carlo and Parametric analyses prior to further analysis in the environment. Additionally, Custom Designer SE provides an open application programming interface (API) allowing easy integration of proprietary grid management software.

These three capabilities work together to provide flexibility and allow the designer to perform Corners around a Parametric

Sweep, Sweeps in a Monte Carlo loop or other nested analyses as required.

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 Netlist that ships with open-source code, allowing for quick implementation of custom netlist formats. The netlist supports the Component Description Format (CDF) parameters, including PEL/SEL expressions, CDF netlistInfo 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 cellview, improving the designer's recall of the editing steps.

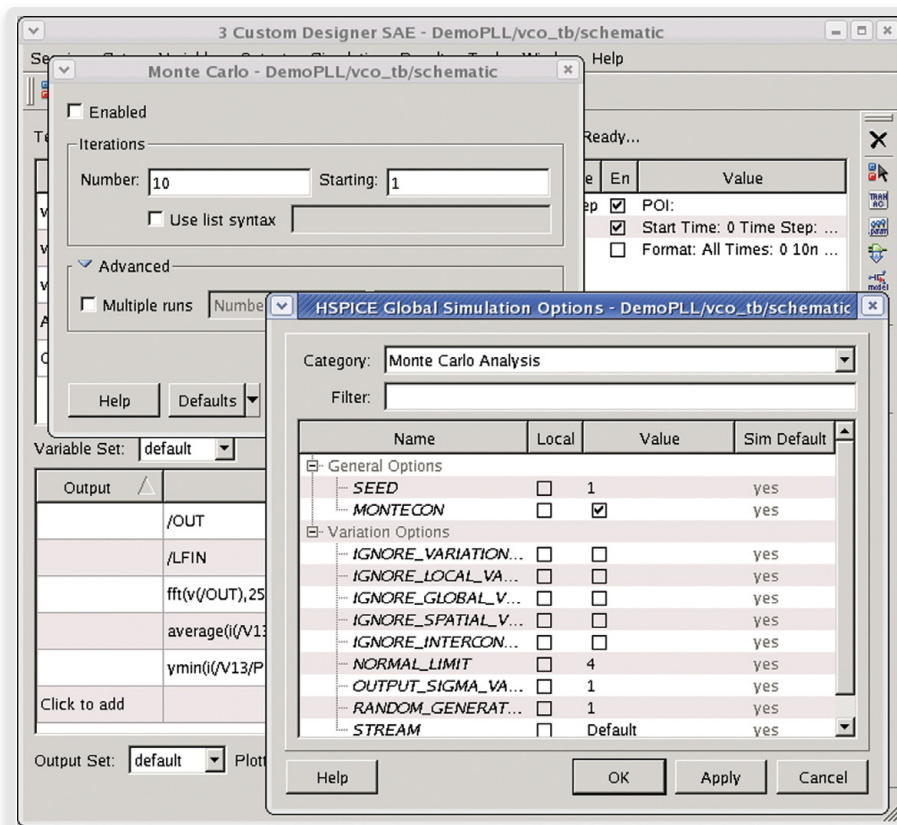


Figure 4: Custom Designer's Monte Carlo analysis provides graphical setup for all simulation options

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 10 and 11 (AS, ES, WS)