

Virtuoso ADE Explorer

Circuit exploration of analog and RF IC designs made easy

Cadence® Virtuoso® ADE Explorer provides a new entry-level design cockpit that is designed to test the circuit during early development, providing support for schematic and specification-driven GUI modes, as well as basic variation analysis such as corners and Monte Carlo statistics. Part of the Virtuoso ADE product suite, Virtuoso ADE Explorer is designed to work independently and with the Virtuoso ADE Assembler and Virtuoso ADE Verifier to provide a cohesive and complete design solution for analog, custom, RF, and mixed-signal ICs.

Introduction to Virtuoso ADE Product Suite

The new Virtuoso ADE product suite enables designers to fully explore, analyze, and verify a design against design goals so that they can maintain design intent throughout the design cycle. As the industry's leading solution for analog simulation control and management, the Virtuoso ADE product suite allows users to flexibly select the product(s) that best support their design goals as they move through the design flow. The Virtuoso ADE Explorer provides a quick entry into the analysis process with easy execution of simulations, including support for running Monte Carlo statistics, corner sweeps, pass/fail analysis, and real-time tuning with the Virtuoso Spectre® Circuit Simulator.

The Virtuoso ADE Assembler extends the Virtuoso ADE Explorer's capabilities across multiple testbenches simultaneously, allowing the user to monitor all aspects of the larger analog block they are creating by enabling easy and direct review of all results and generating specification-comparison sheets and datasheets as needed. The Virtuoso ADE Assembler also contains targeted features for parasitic analysis, design migration

with parameter re-centering, and worst-case corner development to simplify variation analysis tasks. To handle the key challenges of advanced-node or high-sigma designs, the Virtuoso Variation Option enables fast Monte Carlo analysis for FinFETs, high-yield estimation, and yield-improvement flows. Finally, the Virtuoso ADE Assembler and Virtuoso ADE Explorer supply information to

the Virtuoso ADE Verifier, which is designed to match the highest level circuit specifications with individual analysis tests being developed by different users or design sites. Because status is managed in one location, as shown in Figure 1, circuit architects know the complete status of the design at all times.

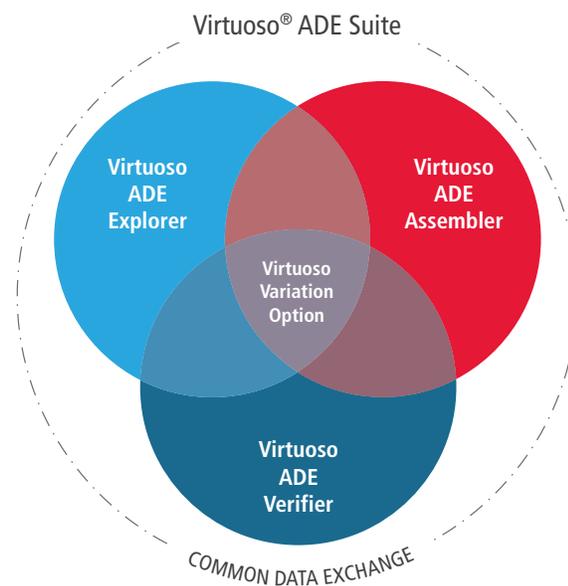


Figure 1: Virtuoso ADE Product Suite

Virtuoso ADE Explorer Overview

Virtuoso ADE Explorer—the entry point to the totally reimaged analog design suite of tools—is more than just a base system, as it is designed to fully test the circuit at the beginning stages of development. Exploration can occur in two modes:

- Schematic mode with new docked waveform probes allows the engineer to stay focused on the task. This mode integrates seamlessly with the Virtuoso Spectre Circuit Simulator to support real-time tuning.
- GUI mode provides a specification-driven environment that allows designers to set measurements and develop datasheets showing the pass/fail status of those measurements during the simulation.

Additionally, the Virtuoso ADE Explorer has a complete set of tools for examining circuit variation, including built-in corners analysis and Monte Carlo statistical analysis. It shares a common data view with the other tools in the suite, so designs naturally progress from single tests, to multiple tests, to significant regression testing, greatly simplifying testing. See Figure 2.

Benefits

- Easy-to-use and complete cockpit for circuit analysis in a single testbench mode
- Maximum efficiency in the script-driven mode using OCEAN scripting
- Close integration with Virtuoso Schematic Editor for interactive analysis, including real-time tuning using Virtuoso Spectre Circuit Simulator
- Easy design and test parameterization for fast circuit exploration
- Extensive corners analysis built into the cockpit for testing process corners across specifications
- Monte Carlo statistics built into the cockpit to test statistical variance,
- Ability to create a corner from a statistical corner
- Configurable window for optimum display of relevant data

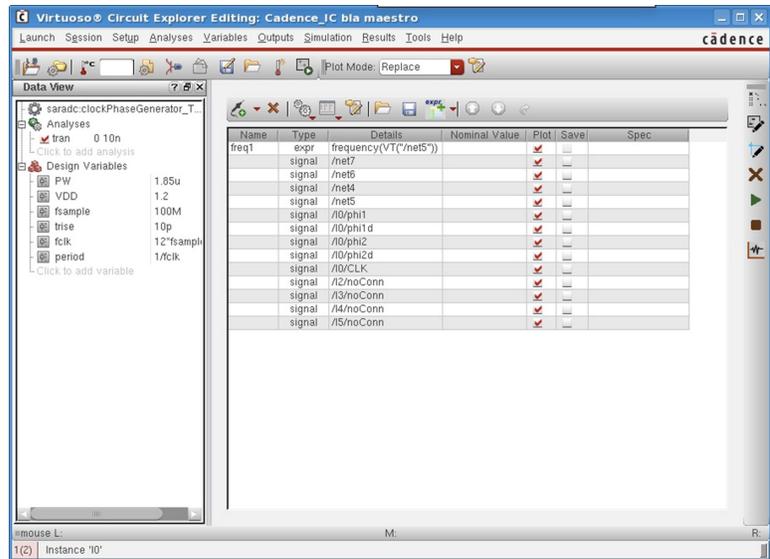


Figure 2: Virtuoso ADE Explorer cockpit

- Integrated Cadence Visualization and Analysis cockpit for exploration of simulation results helps to maintain design intent
- Extract quantifiable results with built-in calculator and extensive list of functions

the new datasheet centric display in the GUI, making it clear which specifications are passing and which are failing. During the earliest stages of design, the schematic mode enables Virtuoso ADE Explorer to easily use real-time tuning and waveform “balloons” that act as probes of your design. By simply changing variables and monitoring the waveform balloons, an engineer can hone into solid values quickly with a minimum of visual intrusion. See Figure 3.

Features

Specification-driven design

Virtuoso ADE Explorer is designed to allow the creation of measurements that can be monitored for a single test configuration. The results are visible in

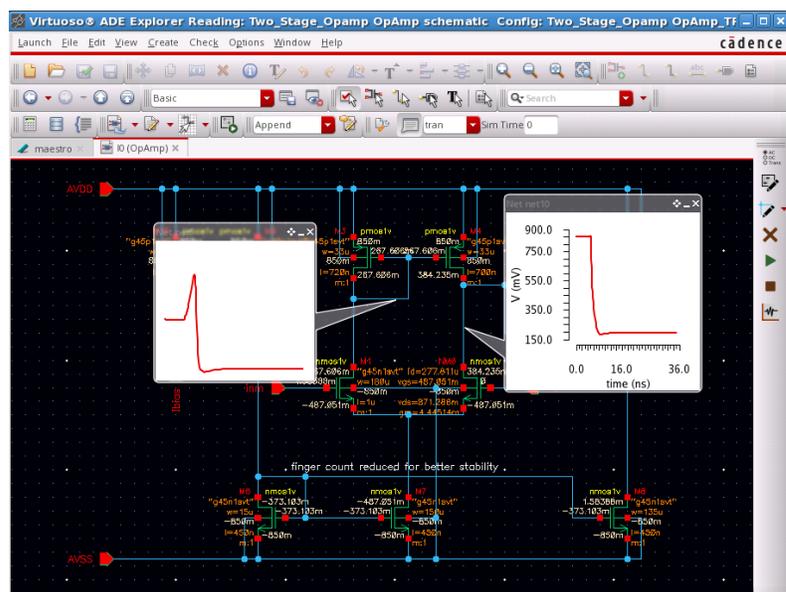


Figure 3: Schematic centric use-model showing waveform balloons

The balloons can also be configured to show operating point information, DC node voltages, transient current values, etc. When small, they show the engineer the shape of the curve. Any probe can be stretched into a full Virtuoso Visualization and Analysis waveform window when further detailed exploration of the curve is needed. No need to re-plot, the information is already in the window.

Variation design built-in

The Virtuoso ADE Explorer supports both corners analysis and Monte Carlo statistical analysis, as well as sensitivity and reliability analysis, to allow engineers to use these advanced techniques at the beginning of their design work. When these types of analyses are engaged, the GUI is able to display the information in a coherent way, allowing the engineer to get a complete sense of the circuit status under various operating conditions or over process corners.

Specifications

Interactive simulation control

- Specification-driven environment
- Schematic-based environment with live waveform balloons for easy waveform probing
- Support for Virtuoso Spectre Circuit Simulator checks and asserts capability
- Design exploration with sweeps, corners, and Monte Carlo analysis across a single test
- Real-time tuning for Virtuoso Spectre Circuit Simulator to facilitate centering operation and S-parameter analysis
- Set-up pane easily shows state of the test parameters in an easy-to-read tree structure
- Integration with Cadence Virtuoso Multi-Mode Simulation
- Datasheet filtering assists in finding trouble spots
- Quick overview window of test results against target specification

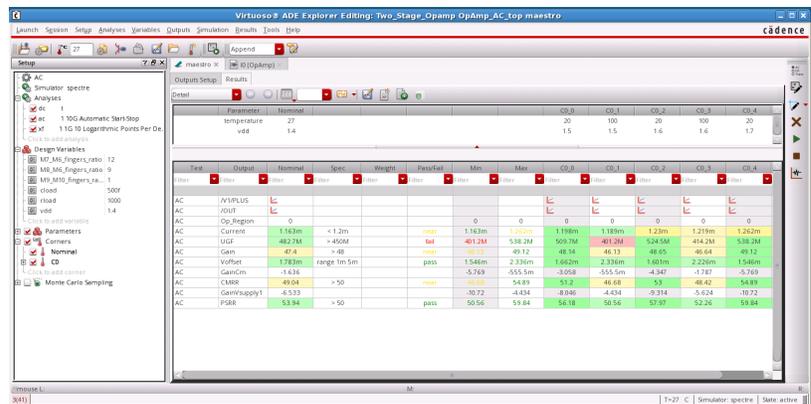


Figure 4: GUI-centric use-model showing corners and pass/fail status

- Cross-probing and annotation to schematics and layout
- Shared data repository with Virtuoso ADE Assembler

Built-in variation analyses

- Monte Carlo analysis
- Corner analysis
- Corner creation from statistical samples
- Sensitivity analysis
- Reliability analysis

Waveform display

- Supports multiple y-axes, strip plots, and Smith charts
- Built-in waveform calculator
- Independent sub-window displays
- Horizontal and vertical measurement markers
- Independent pan and zoom capability
- User-defined labels and titles
- Color and line style controls
- Signal browser
- Color-coordinated cross-probing to schematics

Distributed processing

- Distribution of multiple simulations
- Efficient use of computer farms

- Built-in basic load balancing and interface to other load-balancing tools
- Job monitoring and controlling functions

- Graphical user interfaces for set-up and viewing status

Cadence Services and Support

- Cadence application engineers can answer your technical questions by telephone, email, or Internet—they can also provide technical assistance and custom training
- Cadence certified instructors teach more than 70 courses and bring their real-world experience into the classroom
- More than 25 Internet Learning Series (iLS) online courses allow you the flexibility of training at your own computer via the Internet
- Cadence Online Support gives you 24x7 online access to a knowledgebase of the latest solutions, technical documentation, software downloads, and more
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