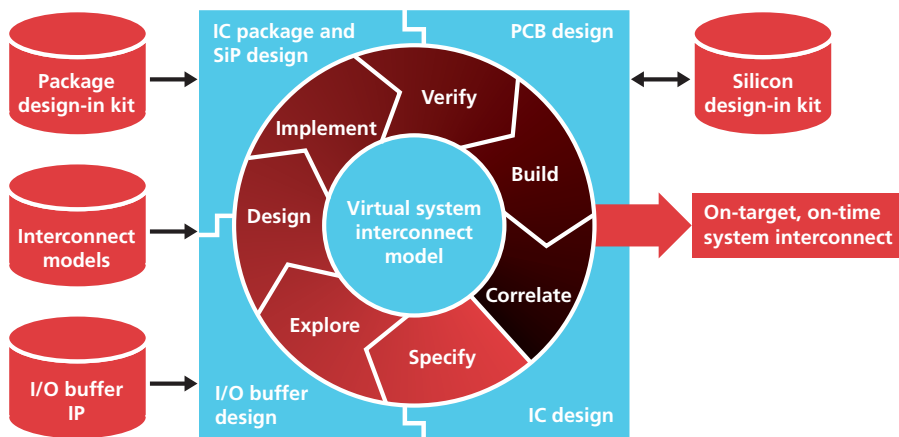


ALLEGRO AMS SIMULATOR

Cadence® Allegro® AMS Simulator provides a full-featured analog and mixed-signal simulation environment to help solve virtually any design challenge—from high-frequency systems to low-power IC designs. Its powerful simulation engine integrates easily with Allegro Design Entry HDL, improves time-to-market performance, and helps to keep operating costs in check.



The Allegro system interconnect design platform

THE ALLEGRO SYSTEM INTERCONNECT DESIGN PLATFORM

The Cadence Allegro system interconnect design platform enables collaborative design of high-performance interconnect across IC, package, and PCB domains. The platform’s unique co-design methodology optimizes system interconnect—between I/O buffers and across ICs, packages, and PCBs—to eliminate hardware re-spins, decrease costs, and reduce design cycles. The constraint-driven Allegro design flow offers advanced capabilities for design capture, signal integrity, and physical implementation. With its associated silicon design-in IP portfolios, IC companies can shorten new device adoption time and systems companies accelerate PCB design cycles for rapid time to profit. Supported by the Cadence Encounter® and Virtuoso® platforms, the Allegro co-design methodology ensures effective design chain collaboration.

ALLEGRO AMS SIMULATOR

Allegro AMS Simulator provides a complete simulation environment for complex designs that contain both analog and digital parts. An interactive, easy-to-use graphical user interface provides complete control over the design process. Availability of resources such as models from many vendors, built-in mathematical functions, and behavioral modeling techniques make for an efficient design process. Advanced analysis features combine to improve design performance, cost-effectiveness, and reliability. Included are: Sensitivity and Monte Carlo analyses, an optimizer with multiple engines, and Smoke (stress) analysis. Allegro AMS Simulator is tightly integrated with Allegro Design Entry HDL and Allegro Design Entry CIS.

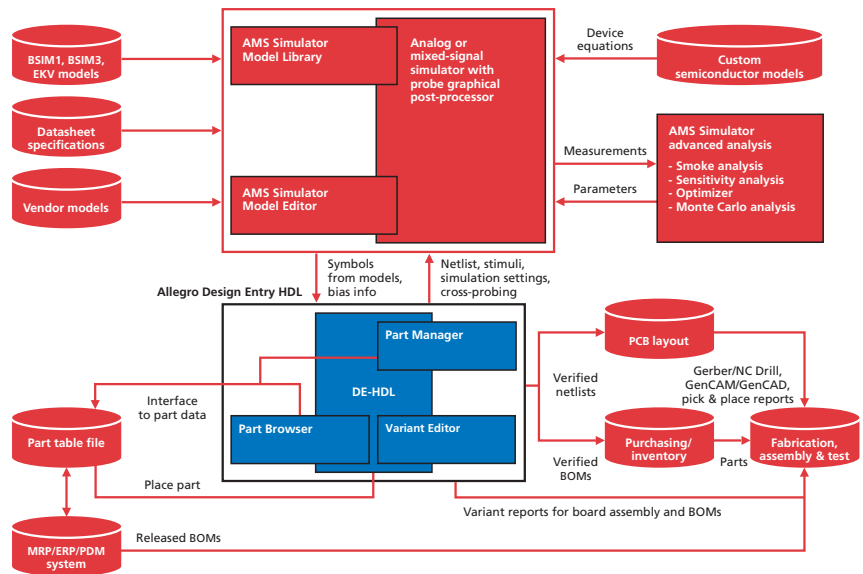
BENEFITS

- Improve simulation times, reliability, and convergence on larger designs
- Improve speed without loss of accuracy via integrated analog and event-driven digital simulations
- Explore circuit behavior using basic DC, AC, noise, and transient analyses
- Select from a library of more than 18,000 analog and mixed-signal models
- Automatically identify analog and digital signals and apply A-to-D and D-to-A interfaces
- Explore design relationships with "what if" scenarios before committing to hardware
- Maximize circuit performance automatically
- Identify and simulate functional blocks of complex circuitry using mathematical expressions and functions and behavioral devices
- Prevent board failures by determining which components are overstressed using Smoke analysis and by observing component yields using Monte Carlo

FEATURES

DESIGN ENTRY AND EDITING

Select from a library of more than 18,000 symbols and models for



simulation to design with Allegro Design Entry HDL or Allegro Design Entry CIS. Allegro Design Entry HDL is fully integrated with Allegro AMS Simulator, including one-button simulation and cross-probing.

STIMULUS CREATION

Access built-in functions that can be described parametrically or draw piecewise linear (PWL) signals freehand with the mouse to create any shape stimulus. Create digital stimuli for signals, clocks, buses; click-and-drag to introduce and move transitions.

CIRCUIT SIMULATION

Users can easily set up and run simulations, and then cross-probe simulation results from Allegro Design Entry CIS. Support for multiple simulation profiles enables users to recall and run different simulations on the same schematic. Simulation bias results can be viewed directly on the schematic including node voltages, device power calculations, and pin and subcircuit current.

MIXED ANALOG/DIGITAL SIMULATION

Integrated analog and event-driven digital simulations improve speed without loss of accuracy. A single graphical waveform analyzer displays mixed analog and digital simulation results on the same time axis. Digital functions support five logic levels and

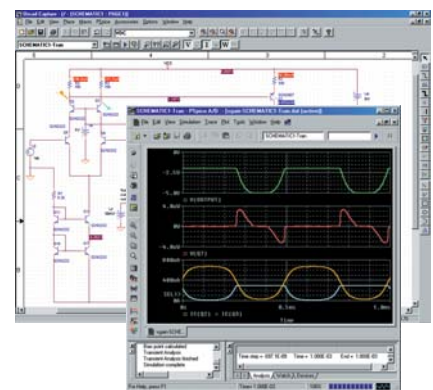
64 strengths, load-dependent delays, and hazard/race checking. Allegro AMS Simulator also features propagation modeling for digital gates and constraint checking (such as set up and hold timing).

ANALOG ANALYSIS

Explore circuit behavior using DC, AC, noise, transient, parameter sweeps, Monte Carlo, and DC sensitivity analyses. Allegro AMS Simulator includes an interactive simulation controller and two simulation solvers.

GRAPHICAL RESULTS AND DATA DISPLAY

Probe Windows allow users to choose from an expanded set of mathematical functions to apply to simulation output variables. Designers can create plot window templates and use them



Allegro AMS Simulator provides a complete simulation environment, including simulation, waveform analysis with cross-probing, and bias results displayed on the schematic

to easily make complex measurements by simply placing markers directly on the desired pins, nets, and parts in the schematic. It also enables users to measure performance characteristics of a circuit using built-in measurement functions and creation of custom measurements. For data display, additional capabilities allow plotting of both real and complex functions of circuit voltage, current, and power consumption, including Bodé plots for gain and phase margin and derivatives for small-signal characteristics.

MODELS

Allegro AMS Simulator includes a large variety of accurate internal models—which typically include temperature effects—that add flexibility to simulations. Allegro AMS Simulator is available with R, L, C, and bipolar transistors plus:

- Built-in IGBTs
- Seven MOSFET models, including industry-standard BSIM3v3.2 and the new EKV 2.6 model
- Five GaAsFET models, including Parker-Skellern and TriQuint TOM-2, TOM-3 models
- Nonlinear magnetic models complete with saturation and hysteresis
- Transmission line models that incorporate delay, reflection, loss, dispersion, and crosstalk
- Digital primitives, including bi-directional transfer gates with analog I/O models
- Two battery models, which allow accurate simulation of the discharge cycle and operating conditions

A Device Equations Developer's Kit (DEDK) allows implementation of new internal model equations that can be used with Allegro AMS Simulator.

MODEL LIBRARY

Users can select from more than 18,000 analog and mixed-signal models of devices made in North America, Japan, and Europe. Also included are more than 4,500 parameterized models for BJTs, JFETs, MOSFETs, IGBTs, SCRs, magnetic cores and toroids, power diodes and bridges, operational amplifiers,

optocouplers, regulators, PWM controllers, multipliers, timers, and sample-and-holds.

ALLEGRO AMS SIMULATOR MODEL EDITOR

Allegro AMS Simulator makes it easy to extract a model of a supported device type—simply enter the required data from the device's datasheet.

BEHAVIORAL MODELING

Functional blocks are described using mathematical expressions and functions. Allegro AMS Simulator allows designers to leverage a full set of mathematical operators, nonlinear functions, and filters. Circuit behavior can be defined in the time or frequency domain, by formula (including Laplace transforms), or by look-up tables. Error and warning messages can be specified in different conditions. Easily select parameters, which have been passed to subcircuits in a hierarchy and insert them into transfer functions. New behavioral capabilities include mathematical functions like $\ln(x)$, $\exp(x)$, and \sqrt{x} .

MAGNETIC PARTS EDITOR

The Magnetic Parts Editor helps designers overcome issues involved in manually designing transformers. Users can design magnetic transformers and DC inductors, and generate simulation models for transformers and inductors that can then be used in Allegro AMS Simulator simulatable circuits. It also allows designers to generate data required for manufacturing the transformers or inductors. The manufacturer's report that is generated by MagDesigner after the completion of the design process contains the complete data required by a vendor to develop the transformer for commercial use.

ENCRYPTION

The Encryption feature allows models to be encrypted using 56-bit DES algorithm.

ADVANCED ANALYSIS CAPABILITIES

Using the Allegro AMS Simulator advanced analysis capabilities, designers can automatically maximize the performance of circuits. Four important capabilities—sensitivity analysis, optimization, Smoke (stress analysis), and Monte Carlo (yield analysis)—enable engineers to create virtual prototypes of designs and maximize circuit performance automatically. Measurements across multiple simulation profiles can be processed together.

SENSITIVITY

The sensitivity capability identifies which component parameters are critical to the goals of a circuit's performance by examining how each component affects circuit behavior by itself and in comparison to the other components. It allows designers to identify sensitive components and export them to the optimizer to fine-tune circuit behavior.

OPTIMIZER

The optimizer analyzes analog circuits and systems, fine-tuning designs faster than trial-and-error bench testing. It helps find the best component values to meet performance goals and constraints. Designers can employ the optimizer to improve design performance, update designs to meet new specifications, optimize behavioral models for top-down design and model generation, and tune a circuit to match known results in the form of measurements or curves. The optimizer includes four engines: Least Squares Quadratic (LSQ), Modified LSQ, Random, and Discrete.

