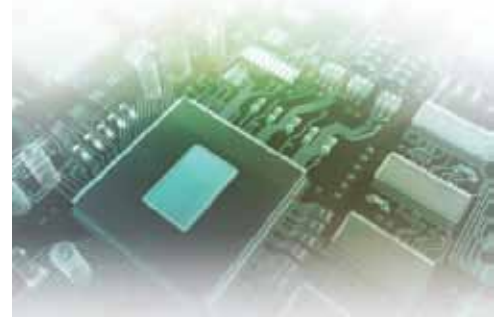


**Realize Your Product Promise™**

**ANSYS®**

**DesignerSI**

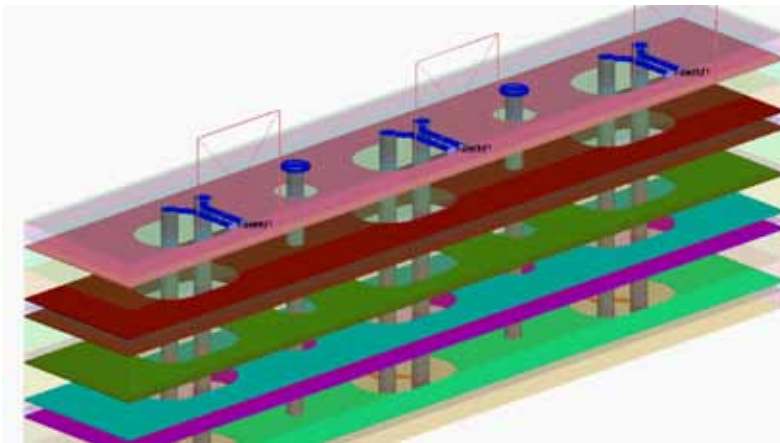


## Choose the integrated circuit, system and EM field simulation tool that sets the standard for accuracy.

DesignerSI delivers easy signal-integrity, power-integrity and EMI analysis to shorten the design cycle.

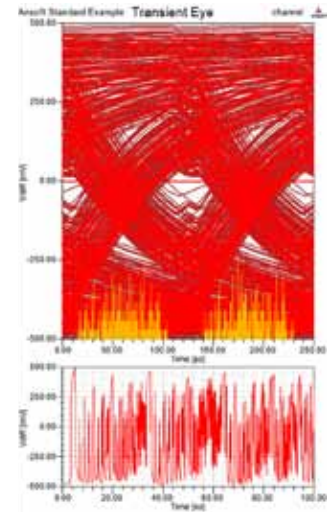
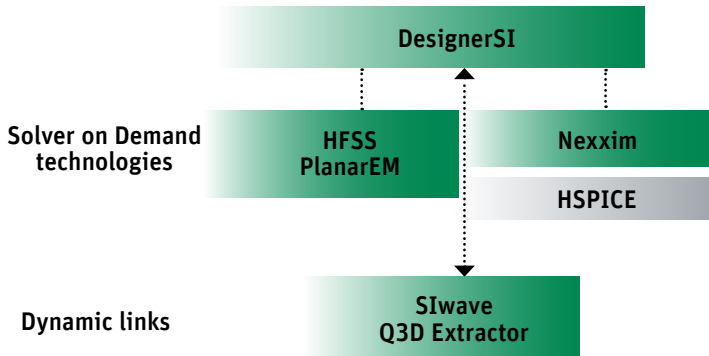
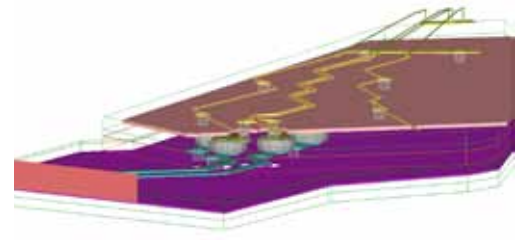
ANSYS DesignerSI™ is a platform of specialized simulation engines and capabilities specifically created for engineers designing various signaling architectures, including XAUI, XFI, Serial ATA, PCI Express, HDMI and DDRx. Our easy-to-use design platform integrates rigorous and highly accurate electromagnetic analysis with circuit and system simulation techniques for the design of gigabit communication channels and memory applications.

Engineers use DesignerSI to leverage multiple signal-integrity simulation methods such as traditional transient, fast convolution, statistical and IBIS-AMI analyses in a single user interface. You can combine these with sophisticated optimization algorithms, intuitive design of experiments (DoE) methods and real-time tuning capabilities. Efficient and fast post-processing for key signal-integrity metrics, such as time-domain reflectometry (TDR), bit-error rate (BER), timing analysis and eye diagrams, are also included.



Three via pairs created in DesignerSI using layout and padstack editors and solved with HFSS Solver on Demand technology

DesignerSI with Solver on Demand® technology delivers the best-in-class design platform for signal- and power-integrity analysis that is based on both electromagnetic and circuit simulation technology. Using Solver on Demand, you can perform electromagnetic simulations on components in a circuit using ANSYS HFSS™, ANSYS PlanarEM or equivalent circuit models from the layout-based interface. When you tie these electromagnetically analyzed components directly to RF or microwave circuits, the entire resulting circuit can be simulated simultaneously in a mixed-circuit, electromagnetic solver simulation. Solver on Demand also allows engineers to choose between our leading-edge Nexxim® circuit solver or HSPICE circuit solver from Synopsys® directly in the user interface. DesignerSI with Solver on Demand delivers the unprecedented accuracy and design flow automation needed to shorten the design cycle and to enable you to realize your product promise.



Cutout of merged package and PCB structure created in DesignerSI. This model was solved with HFSS using the Solver on Demand feature in DesignerSI.

DesignerSI offers two options, each solving a particular industry need.

### DesignerSI

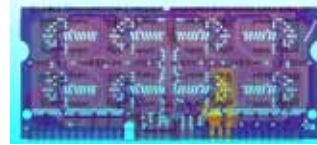
Our fully featured product suite includes a powerful and easy-to-use design management front end that enables best-in-class circuit and electromagnetic field simulation technologies such as HFSS, ANSYS Q3D Extractor® and ANSYS SIwave™. The tool fully integrates and provides easy access to sophisticated schematic capture and layout tools, transmission line modeler (quasi-static) and Nexxim circuit simulation (transient, fast convolution, statistical and IBIS-AMI) for linear and nonlinear circuit simulations.

### DesignerSI Circuit

This option is targeted at engineers who are specifically interested in a transient, fast convolution, statistical and IBIS-AMI circuit simulation solution. DesignerSI Circuit includes the same functionality as DesignerSI but does not incorporate the transmission line modeler.

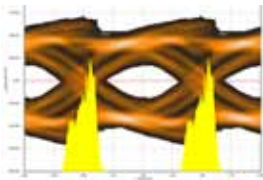
	DesignerSI	DesignerSI Circuit
Integrated schematic and layout	•	•
Linear/DC analysis	•	•
Dynamic links to field solvers	•	•
Transient	•	•
QuickEye™ & VerifEye™	•	•
IBIS-AMI	•	•
Solver on Demand	•	•
2-D extractor	•	

Capabilities available in DesignerSI options



You can customize our DDR3 virtual compliance tools to accommodate user-defined slew rate tables and customized reports. This solution can create design kits for any bus that requires virtual compliance, allowing it to extend to HDMI, USB, PCIe, GDDR, LPDDR and FibreChannel.

## High-capacity circuit simulator, integrated statistical and convolution analysis, and EM field simulation links are ideal for solving high-speed serial channels.



Eye pattern and histogram produced by DesignerSI for high-speed serial channel using QuickEye statistical solver

### Dynamic Links

DesignerSI provides dynamic links to our PCB and IC package design tools, SIwave and Q3D Extractor, enabling you to easily incorporate output directly into the design flow and circuit simulation. Dynamic links provide an easy way to link field solver solutions into the DesignerSI interface and simulation capabilities. Similar to Solver on Demand, output from these solvers can be linked to DesignerSI, but the products cannot be accessed directly from DesignerSI's interface.

### DDR3 Virtual Compliance

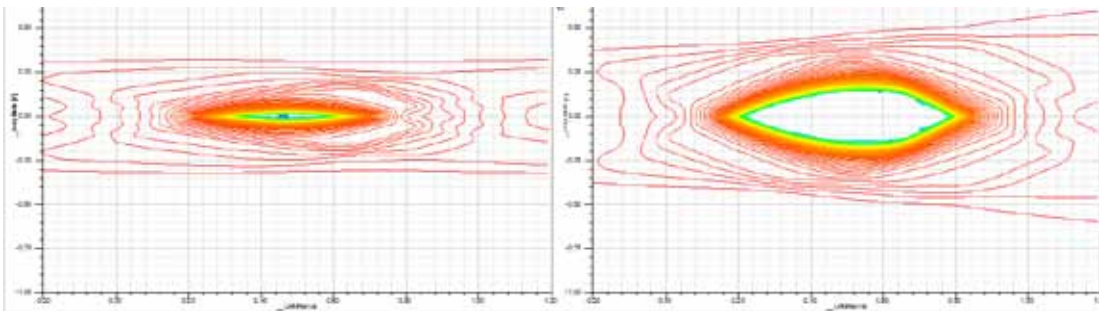
DesignerSI helps you to determine if DDR3 busses pass or fail JEDEC standards. This solution provides pass and fail criteria for key timing metrics, such as DDR3 data setup and hold timings, derated analyses, bit-to-bit skew timing, overshoot, undershoot and more. The virtual compliance solution automatically determines the pass/fail criteria for both the base and the derated specifications on a per-bit transition.

Using DesignerSI dynamic links with SIwave, you can determine the effect that power and ground bounce have on DDR3 timing measurements. Read and write timing analyses can be performed within a single environment that parameterizes all corner cases with automated reporting.

The DDR3 virtual compliance solution is scalable to any number of DDR3 bytes, ranks, DIMMs and memory banks. You can solve entire DDR3 systems, starting with electromagnetic extraction using ANSYS electromagnetic field solver technologies to the pass/fail timing analyses with automated reporting. Eye diagrams display setup and hold timings; you also can view flight time calculations, TDR plots and automated .csv reports that show pass/fail for the DDR3 memory solution. Reports provide in-depth analysis on a bit-by-bit basis to show failing data lines along with the transitions where they occur.

### Circuit Simulation

Transient analysis from our Nexxim circuit engine provides transistor-level accuracy, robust convergence and large capacity. This allows creation of high-speed channel designs that include driving circuitry (transistor-level, IBIS-based or ideal sources) as well as the channel.



Eye contour plots produced for serial channel using DesignerSI with VerifEye statistical solver. The eye on the left is the unequalized response, while the plot on the right shows the response using feed-forward equalization.

### Integrated Statistical and Convolution Analysis

ANSYS VerifEye is a methodology for eye analysis of serial links. Its statistical methods maintain accuracy while offering major reductions in run time compared to conventional transient methods. Our statistical analysis tool represents the most practical means to test for the low bit-error rates needed by today's multi-Gb/s channel designers.

ANSYS QuickEye is a fast convolution analysis methodology that simulates millions of user-defined bits in a matter of seconds via linear superposition. Using the peak distortion analysis option, QuickEye automatically determines a worst-case bit pattern by identifying the channel-specific pattern that causes maximum channel degradation. QuickEye supports GPUs to maximize computation speed.

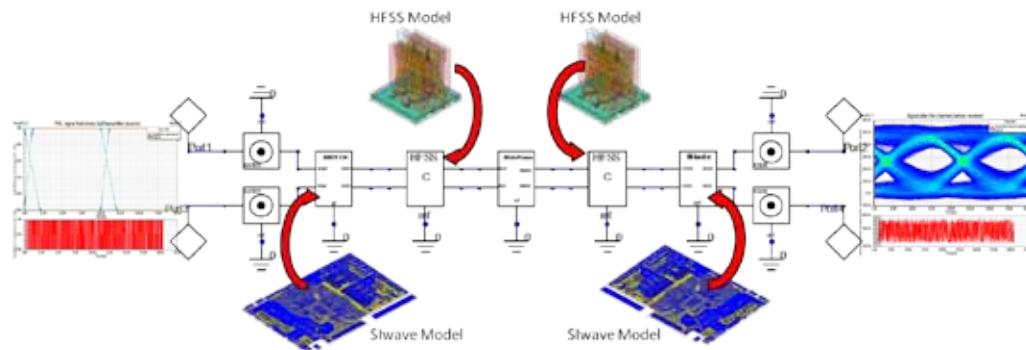
IBIS-AMI (advanced model interconnect) is a fast analysis method, similar to QuickEye or VerifEye, that allows you to incorporate channel equalization along with compiled vendor libraries. Its simulations include transmitter jitter, receiver jitter and DCD. IBIS-AMI analysis supports GPU to speed analysis.

### Transmission Line Modeling

DesignerSI's transmission line modeler is a quasi-static, finite element-based design tool useful for analyzing any type of transmission line. Engineers can quickly extract RLGC parameters, impedance matrices and other critical design parameters to analyze extremely complex transmission line structures.

### Network Data Exploration

The network data explorer within DesignerSI enables quick and easy analysis of SYZ parameters, including passivity checking and mixed-mode analyses. You can view the data in Re/Im, Mag/Phase and dB/Phase. A colored map of all ports represents the average magnitude/phase over all frequencies or at a particular frequency point. Multiple Touchstone® files can be viewed simultaneously, while cell filtering allows you to quickly analyze insertion and return loss. Furthermore, you can simultaneously plot parametric design variations from HFSS and PlanarEM using a neutral model format.



Simulation of high-speed channel in DesignerSI. Dynamic links are used to include results of EM components characterized by HFSS and SIwave.

## Leverage DesignerSI capabilities with popular ECAD tools and the comprehensive ANSYS suite for a flexible analysis process.



ANSYS DesignerSI and related electromagnetics tools are one part of our suite that delivers cutting-edge functionality — depth, breadth, a plethora of advanced capabilities and integrated multiphysics — providing confidence that your simulation results reflect real-world outcomes. The comprehensive range of solutions provides access to virtually any field of engineering simulation that a design process requires. Organizations around the world trust ANSYS to help them realize their product promises.



### Design Management and Geometry Import

DesignerSI comprises flexible, easy-to-use schematic capture, layout editing and sophisticated data visualization tools that are powered by the Nexxim high-capacity circuit engine. The powerful design management features allow DesignerSI to manage various solver technologies and import ECAD data from popular layout tools such as Cadence®, Mentor Graphics®, Zuken™ and Altium as well as ODB++ manufacturing databases. These features allow you to combine S-parameters, W-elements, HSPICE, Spectre and IBIS models directly as schematic components, leading to a seamless integration with behavioral, circuit and GHz-accurate interconnect models in a unified schematic.

### Design Exploration

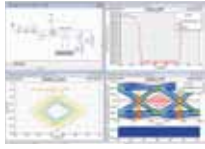
DesignerSI links with ANSYS DesignXplorer™ to help in performing statistical yield analysis as well as design of experiment studies for six sigma analysis.

### Systems-Level Integration

DesignerSI forms an integral part of a system solution that involves circuits and components. It serves as the environment for combining various physics-based solutions and circuit solutions into a larger system-level simulation.

## ANSYS DesignerSI

### Design Management



Manage circuit/electromagnetic field simulation data, ECAD geometry, statistical analysis and optimization in a single, easy-to-use interface

### Circuit Simulation



High-capacity circuit simulation with Nexxim; integrates with Synopsys HSPICE via Solver on Demand technology

### EM Field Simulation



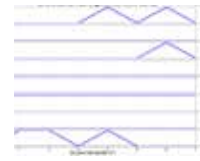
Directly integrates with and provides dynamic links to ANSYS electromagnetic field simulators for high-fidelity models that lead to accurate signal- and power-integrity and EMI analysis

### Transmission Line Modeler



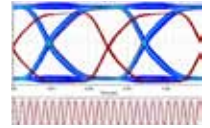
Extract RLCG parameters from complex transmission lines

### Virtual Compliance



Pass/fail criteria for key timing metrics

### Statistical and Convolution Analysis



Statistical and convolution analysis capability for accurate bit-error rate and eye patterns

## Pre-Processing

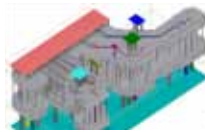
## Simulation

## Post-Processing

## Archive

## Other ANSYS Engineering Simulation Capabilities

### ECAD



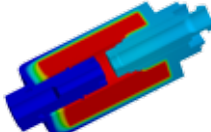
The ANSYS suite provides modeling and geometry creation functions as well as tools for importing ECAD data from various sources. In addition, we collaborate with leading ECAD developers to ensure an efficient workflow.

### Integration



ANSYS Workbench is the framework for the industry's broadest and deepest suite of advanced engineering simulation technology. It delivers unprecedented productivity, enabling Simulation-Driven Product Development™.

### Multiphysics



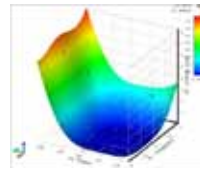
To help ensure a successful product, R&D teams must accurately predict how complex products will behave in a real-world environment. The ANSYS suite captures the interaction of multiple physics: structural, fluid dynamics, electro-mechanics and systems interactions. A single, unified platform harnesses the core physics and enables their interoperability.

### HPC



High-performance computing enables creation of large, high-fidelity models that yield accurate and detailed insight. ANSYS offers scalable solutions and partners with hardware vendors to ensure that you get the power and speed you need.

### Design Optimization



Good design starts with identifying the relationship between performance and design variables. ANSYS DesignXplorer enables engineers to perform design of experiments (DOE) analyses, investigate response surfaces and analyze input constraints in pursuit of optimal design candidates.

### Data Management



ANSYS EKM™ addresses critical issues associated with simulation data, including backup and archival, traceability and audit trail, process automation, collaboration and capture of engineering expertise, and IP protection.

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ANSYS is dedicated exclusively to developing engineering simulation software that fosters rapid and innovative product design. Our technology enables you to predict with confidence that your product will thrive in the real world. For more than 40 years, customers in the most demanding markets have trusted our solutions to help ensure the integrity of their products and drive business success through innovation.

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