

ANSYS HFSS integration with Cadence



ANSYS® HFSS™ for 3-D Layout enables seamless integration with Cadence® and delivers a new paradigm for RF, SI and digital engineers. This functionality, built on Solver on Demand Technology™, enables users to set up ready-to-solve chip, package or board simulations all while working within the Cadence Allegro®, APD, SiP or Virtuoso® environments. Using this functionality, a user can create full 3-D HFSS models while working within his own familiar Cadence environment. The easy-to-use capability is especially ideal for engineers who are not familiar with 3-D electromagnetic modeling but require the rigor, accuracy and reliability that HFSS provides. All the necessary HFSS setup steps (geometry, material properties, port setup and boundary conditions) are easily and quickly applied in the Cadence interface.

Products

Cadence Design Systems

Allegro PCB Designer

Allegro Package Designer

SiP Layout

Virtuoso Layout Suite

ANSYS Cadence Integration

ANSYS HFSS

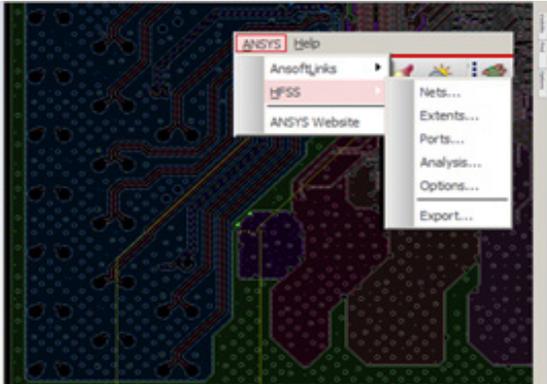
Keywords

ECAD, Layout Editor, HFSS, HFSS Solver on Demand, Cadence, APD, Allegro, SiP, Virtuoso

Description

The creation of fully solvable 3-D models in HFSS can be a time-demanding process involving a number of manual steps, including exporting and importing layouts as well as manually assigning ports and boundaries. ANSYS has streamlined much of this activity with the general-purpose ANSYS HFSS 3-D layout capability. It enables engineers to create fully solvable HFSS models directly within the Cadence layout environment.

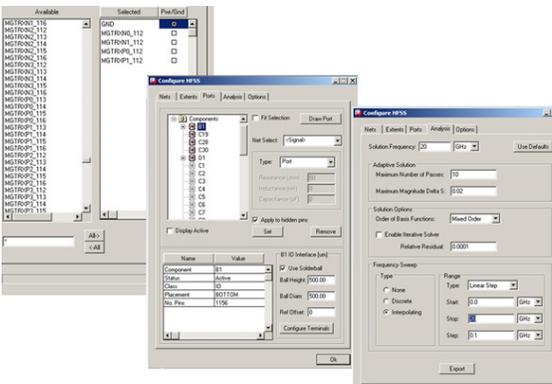
Functionality includes single-click assignment of excitations, automated solution space boundary definitions, and simple creation of solution frequencies and frequency sweep. All tasks are contained within the Cadence environment; users do not need to have experience using HFSS.



Cadence APD ANSYS link menu with model setup step selection

By using HFSS 3-D layout to integrate with Cadence, an engineer can easily perform a direct setup of a Allegro, APD, SiP or Virtuoso layout design that can then be analyzed with HFSS. Users simply specify which regions, or connected regions, are to be solved by HFSS by specifying a cutout region in the layout tool. Once the region has been defined, the appropriate nets are selected and ports are automatically assigned to the nets or solder balls in the design. To complete the setup, the user specifies the solution frequency and sweep range.

Once setup in Cadence is complete, the 3-D electromagnetic model is solved by the trusted and highly accurate HFSS finite element electromagnetic solver. Since the solution region, nets of interest, excitation ports, and boundaries are automatically created and/or assigned in the Cadence environment, engineers do not need to be familiar with 3-D modeling.

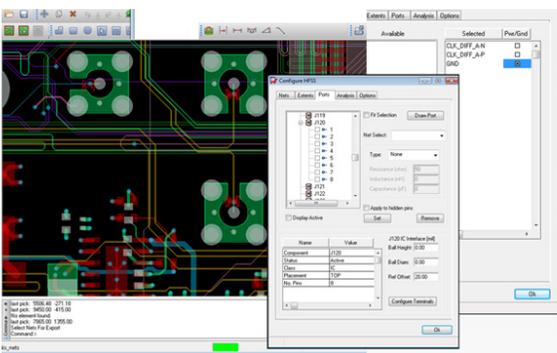


Model setup dialogues in APD

Such integration provides access to the power of the HFSS 3-D finite element solver while making model creation extremely simple and fast. Engineers who have no knowledge of HFSS obtain very accurate electromagnetic field simulations of high-speed differential pairs, via transitions, ball grid array transitions, package-to-PCB transitions, passives on silicon, RF circuits and more. The capability represents a streamlined and highly simplified methodology for solving complex 3-D electromagnetic field simulations.

The following HFSS actions may be set up within Cadence Allegro, APD, SiP and Virtuoso environments.

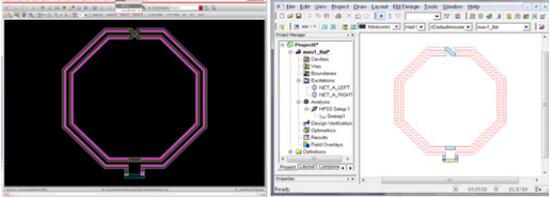
- HFSS port drawing and setup
- Automated clipping of nets including pwr/gnd extents
- Setup of HFSS meshing frequency
- Frequency sweep type (discrete or interpolating) and frequency range setup
- HFSS convergence criteria
- Solver (direct or iterative) and basis function (zero, first, second, or mixed) selection
- Airbox definition



Cadence Allegro ANSYS link with model setup dialogs

Engineers who use this integration can also utilize a technology control file import. This allows populating default and/or augmenting analysis and mesh settings using an .xml file. The file can include custom default settings for:

- Solution frequency
- Order of basis functions
- Lambda refinement
- Converged passes
- Via number of sides
- Set minimum triangles for wave ports
- Other desired default conditions



Initial Virtuoso spiral layout and final 3-D EM model ready for solving in ANSYS HFSS

Summary

The ANSYS HFSS integrated within the Cadence environment provides an automated and simple way for engineers to create 3-D electromagnetic models to be solved using HFSS. The functionality is designed for engineers who are not well versed in electromagnetic modeling or HFSS so that they can harness the robust HFSS solution without knowing how to create an HFSS simulation. The entire simulation setup is automated and can be performed while working in the various Cadence environments.

Authors

Mark Ravenstahl
mark.ravenstahl@ansys.com

Markus Kopp
markus.kopp@ansys.com

ANSYS, Inc.
 Southpointe
 275 Technology Drive
 Canonsburg, PA 15317
 U.S.A.
 724.746.3304
ansysinfo@ansys.com

Toll Free U.S.A./Canada:
 1.866.267.9724
 Toll Free Mexico:
 001.866.267.9724
 Europe:
 44.870.010.4456
eu.sales@ansys.com

ANSYS, Inc. is one of the world's leading engineering simulation software providers. Its technology has enabled customers to predict with accuracy that their product designs will thrive in the real world. The company offers a common platform of fully integrated multiphysics software tools designed to optimize product development processes for a wide range of industries, including aerospace, automotive, civil engineering, consumer products, chemical process, electronics, environmental, healthcare, marine, power, sports and others. Applied to design concept, final-stage testing, validation and trouble-shooting existing designs, software from ANSYS can significantly speed design and development times, reduce costs, and provide insight and understanding into product and process performance. Visit www.ansys.com for more information.