

HFSS Solver on Demand for Cadence

➤ HFSS™ Solver on Demand™ from ANSYS is a new paradigm for RF, SI and digital engineers. This new technology enables users to set up ready-to-solve chip, package or PCB simulations directly from the Cadence® Allegro® Package Designer, Allegro PCB Designer, SiP Digital Layout or Virtuoso® Analog Design Environment. Using this technology Cadence users can create full 3-D HFSS models while working within the familiar Cadence layout tool. All the necessary HFSS set-up steps (geometry and net selection, material properties, excitations and boundary conditions) are completed in Cadence. This design flow allows for quick and easy stackup and geometry modifications, and provides a simple solution set up for complicated 3-D HFSS simulations.

Once a simulation has been set up it is transferred to HFSS via a single click using AnsoftLinks™ and Ansoft Designer® technologies. These products act as a seamless gateway between Cadence and HFSS Solver on Demand. When the simulation is completed, users have access to electromagnetic field and S-parameter data required to accurately simulate chip, package and PCB designs.

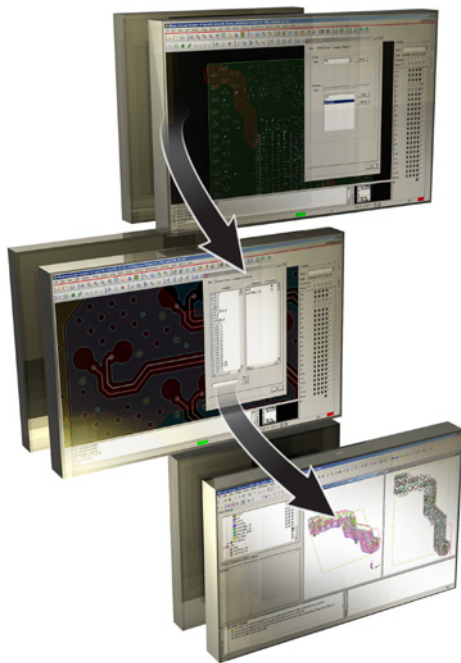
Problem Description:

The creation of fully solvable 3-D models in HFSS can be a time-demanding process for those not familiar with 3-D modeling. This operation includes assigning source locations or excitations. Also required are solution space boundary definitions as well as solution frequency sweep range, among others. Since this set up work needs to be performed in HFSS who want to perform 3-D field simulations must have some knowledge of how to use HFSS.

By applying HFSS Solver on Demand technology, users can perform a direct HFSS setup in a Cadence Allegro, APD, SiP or Virtuoso design that subsequently can be analyzed by HFSS. Engineers specify which regions, or connected regions, are to be analyzed by HFSS by identifying a cutout region in the layout tool. Once the region has been defined, the appropriate nets are automatically selected and excitations (ports) are automatically assigned to the nets or solder balls in the design. A user then sets the solution frequency and sweep range. Once the HFSS setup in Cadence is complete, the engineer clicks to analyze, and HFSS solves the 3-D electromagnetic model. Alternatively, the model created in Cadence can be imported to Ansoft Designer where it can easily be modified if desired, allowing Cadence users the opportunity to take full advantage of additional capabilities including parametric sweeps, optimization, and Full-Wave SPICE™ technology for full-wave, high-bandwidth SPICE model generation.

Users can set up and solve HFSS simulations directly from Cadence software.

Because models are modifiable, HFSS Solver on Demand provides a great advantage to an engineer optimizing a particular section, transition, interconnect or passive component on silicon for a PCB, package or chip. The integrated layout tool for 3-D electromagnetic analysis is preferable for package, PCB and passive structures because it greatly reduces the time needed to make changes to critical structures that are globally defined, such as via pad stacks and material stackups.



Cadence software supported:

- Allegro Package Designer
- Allegro PCB Designer
- SiP Digital Layout
- Virtuoso Analog Design Environment

Since the solution region, nets of interest, excitations (ports) and boundaries are automatically assigned in the Cadence environment, engineers need to have very little, if any, experience with HFSS. This technology provides engineers access to the power of the HFSS 3-D finite element solver while making the model creation be extremely simple and fast. Even engineers who have no knowledge of HFSS or how to properly set up a 3-D electromagnetic field simulation can now obtain simulation results based on an HFSS simulation.

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

- Fully automated HFSS port creation 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
- Air box definition

Users of this integration can utilize a technology control file import. This file will allow the populating of default and/or augmenting analysis and mesh settings using an .xml file. It 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
- Any other desired default conditions

Closing Summary:

HFSS Solver on Demand allows for an automated and simple way for engineers to create 3-D electromagnetic models that will be solved using HFSS. This new functionality allows engineers who are not well versed in electromagnetic modeling and/or HFSS to harness a robust solution of HFSS without needing to be a simulation expert. The entire simulation setup is automated and can be performed while working in various Cadence environments.

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