Application Datasheet

Microwave Office for PCBs

Not long ago, state-of-the-art microwave integrated circuit (IC) design was all about the chip and printed circuit boards (PCBs) were an afterthought. Today it’s a far different story. The complexity of modern wireless devices has created more complex PCBs that require greater emphasis on getting the RF circuitry right. Microwave Office for PCB design fulfills this need and helps to fully support mitigating signal integrity issues throughout the PCB design flow.

Features at a Glance

- APLAC harmonic balance technology, as well as transient-assisted harmonic balance, multi-rate harmonic balance, and transient/time-domain solvers (optional)
- PCB links to third-party tools for post-layout verification
- ACE automatic circuit extraction technology for interconnect modeling
- EM Socket interface for integration with third-party electromagnetic (EM) tools
- AXIEM 3D planar EM analysis (optional)
- Analyst™ 3D finite element method (FEM) analysis for tapered vias, edge-effects, and much more (optional)
The Microwave Office PCB Design Flow Features and Advantage

Extensible: The powerful suite of layout-driven schematic elements makes it easy to adaptively model your RF signal path, creating a schematic with the RF-critical elements and then using the same schematic in a layout-driven mode. Microwave Office automatically resizes junction and discontinuity models as you tune, optimize, or re-route your circuits, without changing the schematic. Even if your schematics are simply components and wires, iNet technology lets you design a classical PCB schematic, delaying interconnect design and analysis until you get to the layout.

ACE: Automated circuit extraction technology is the only interconnect analysis tool that can convert even the most complex PCBs into the RF and microwave netlist, including every crossover, via, and multi-layer coupled-line model. ACE uses method-of-moments (MoM) and FEM solvers on the densest parts of your design for improved accuracy, focusing less on lines that are less important. Using the coupling radius discriminator in ACE, you can isolate the handful of couplings that are limiting your board’s performance.

AXIEM: 3D planar EM simulator has transformed RF and microwave design by making EM analysis a design diagnostic utility that can be used early in the design process rather than only as a back-end post-verification tool. AXIEM is specifically tailored for 3D high-frequency planar components and delivers exceptionally accurate EM co-simulation that is fast and efficient, regardless of the density of the design. If your PCB has an integrated antenna, AXIEM can handle that too.

EM Socket: This interface is unique technology developed by NI AWR that supports integration with a variety of EM point tools (planar and full 3D) for fast, accurate, and efficient EM analysis, whether through NI AWR software’s EMSight, AXIEM, or Analyst™ technologies or third-party tools from vendors like ANSYS, CST, and Sonnet.

EXTRACT: Within Microwave Office, the extract flow makes life easier by enabling the schematic to control EM and circuit extraction; there is no need to go to the layout and launch EM as a separate step from the schematic. In addition, the resulting high port-count S-parameter file does not need to be manually placed back into the schematic. That means there are no errors when integrating EM back into the circuit and system simulations.

iNet: Accommodate wires on the schematic that are routed through many layers with auto via insertion capability that determines how to terminate the route on the pins to which they are connected. In addition, a built-in connectivity checker lets you know about missed or unfinished routes.

PCB compatibility: For a host of file formats, you now have ready access to the tools that you deem best for the task at hand. Starting from PCB physical design that’s in layout form, NI AWR software supports standard PCB formats such as DXF, Gerber, and ODB++, which in turn opens the door for plug-n-play compatibility with Altium, Cadence, Intercept, Mentor Graphics, Zuken, and more.

The NI AWR Design Environment encompasses all of the tools and technologies necessary to realize today’s high-frequency components, circuits, and systems. Microwave Office software is a key product within this portfolio that enables circuit-level design.