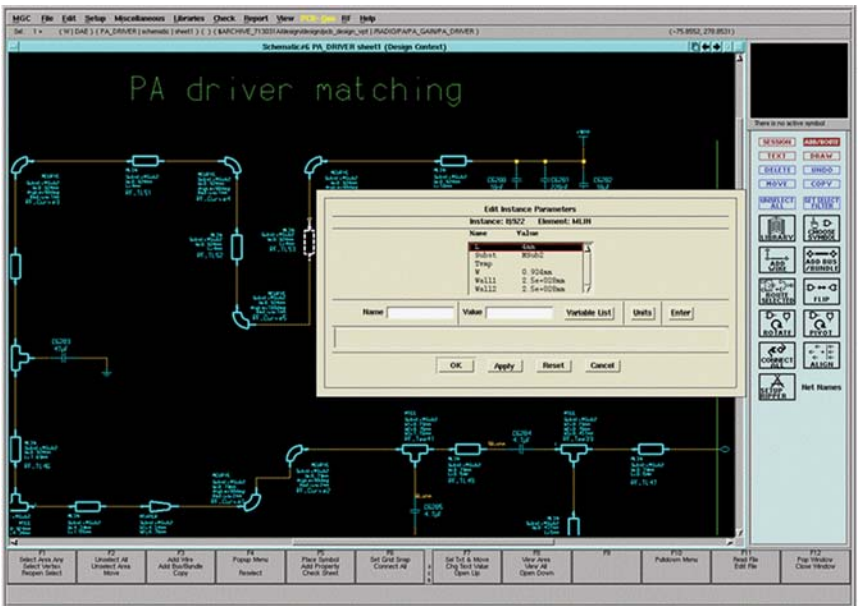
RF Design Solution

Design RF, Analog, and Digital Circuits on the Same PCB

D A T A S H E E T



With the RF Design Solution, RF shapes are defined and placed in the schematic.

Major product benefits

- Cuts number of design cycles
- Dramatically cut cycle time for system level RF Design
- Local RF library supports variety of commonly used RF elements for microstrip, stripline and multilayer RF designs
- Local system level design database
- Dynamic link to Agilent and AWR tools: no manual interface
- Instant simulation access from schematic or layout any time during design with dynamic link
- Circuit netlist sent from schematic or layout over the dynamic link for faster simulation
- Simulate any design object by sending EM simulation data to the Agilent or AWR tool
- Re-use RF circuits in other designs
- RF design in Xtreme PCB enables concurrent RF design
- Available in both the Board Station XE and Expedition Enterprise design flows

Overview

Many of today's product designs consist of multiple complex RF modules combined with high-speed digital and analog circuitry in tight proximity on the same board. It's common for up to 75% of the total cycle time to be spent on RF circuits of a system-level design. The complexity of systemlevel designs continues to increase and many existing RF tools keep adding to the cycle time when used to address modern RF design challenges. Previously, when the RF circuit was designed in a dedicated RF tool, the circuit had to be translated. Often schematic, layout and libraries were translated separately, and keeping them in sync was a constant struggle.

RF and System Design Integration

RF circuits can now be designed directly in Mentor or be transferred to Mentor from Agilent and AWR tools using the dynamic link. No more schematic "black boxes"; true RF schematics in system-level design. To fully support RF designs, Board Station XE and Expedition Enterprise have been designed to understand RF, not just translate the design. For example: addition of parametric circuit elements equivalent to commonly used RF elements. The library is synchronized with the circuit-simulation model counterpart in the RF simulation environment to ensure that their behavior is identical.

Simulation

Schematic entry and RF circuit layout can be started in the Mentor or Agilent/AWR environment; the dynamic link gives maximum flexibility. The simulation, tuning, and optimization capabilities of the RF simulation environment are supplied by the RF simulator. The dynamic link transfers the complete RF circuit intent to the RF simulator. This is done by transferring only what the RF simulator needs for a successful simulation, not the entire circuit. Error prone translation processes are eliminated.

Mentor Graphics®

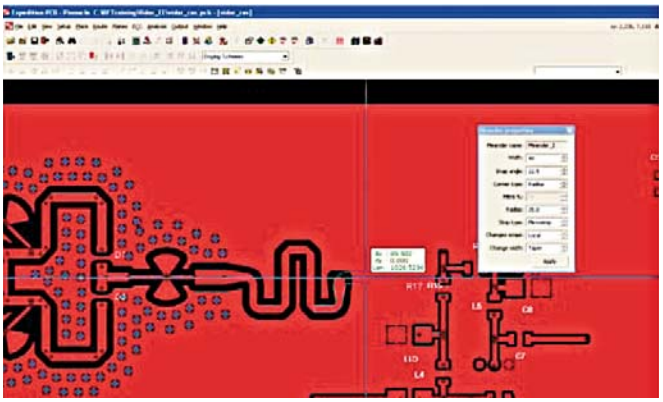
Simulating the RF section of a real PCB has been difficult, and often included cumbersome translations of non-intelligent layout data, such as GDSII or Gerber. This new methodology transfers layout data over the dynamic link and includes arbitrary metal shapes, cutouts and external connections. The dynamic link supports simultaneous connections to different RF simulation tools. On large, complex RF circuits, the simulation can be distributed to multiple computing platforms to reduce simulation time.

RF Layout Features

To further reduce design time, a large number of layout features have been added to the RF Design Tool. New RF layout features have been added to the RF Toolkit, which is a modeless and RF-centric environment of XE/Expedition. By keeping RF specific functions separated, the layout tool learning curve is minimized.

Stitchvias

Adding ground vias to shield RF circuits has been time consuming. Now, large number of vias can be added in seconds. Vias can be grouped to allow easy movement or deletion. Vias are added based on user-provided rules.

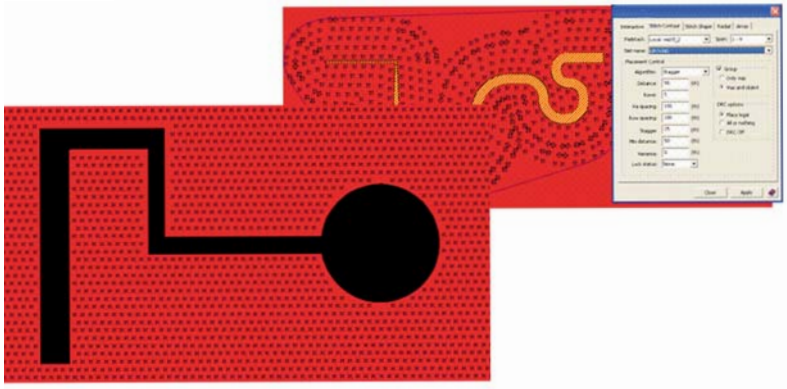


Meanders can be added at any time

Clearance, including the z-axis clearance, can be defined globally for circuit or for individual elements of the circuit.

Meanders

Meanders can be added at any time in layout and allow connection between elements in a controlled manner. The meander is an RF shape in the context that is supports sophisticated clearance rules. The meander can be broken down into elements and be simulated in a circuit simulation. The meander can also be sent over the dynamic link as layout data for EM simulation.



Quickly add any number of ground vias.

Clearance Rules

RF designs often have very restrictive clearance requirements. A sophisticated graphical interface allows the user to control clearance in all directions of RF elements. The clearance can be controlled on the layer where the circuit is placed, and also on adjacent layers using z-axis clearance.

Auto Arrangement

The auto arranger can handle partial selections from a RF circuit or arrange the full circuit. RF shapes connect to each other at a natural angle but can be micromanaged by the user using a user friendly GUI.

RF Groups

RF circuits can be grouped to ensure that the circuit stays intact on the main system board. A circuit can also be divided into subgroups for partial simulations or to protect parts of the circuit. Non-RF objects like highspeed traces, plane shapes or cutouts can be added into RF groups to be included in real PC-board simulations.

Note: Dynamic link integration requires additional software from Agilent or AWR.

To learn more, call Mentor Graphics or visit our web site at www.mentor.com/pcb.

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