PADS PCB Design Solutions

The standard in desktop PCB design

PCB Flow

D A T A S H E E T

PADS is a complete, integrated and scalable PCB design solution.

Overview

PADS, Mentor Graphics' worldwide leading desktop PCB design solution, enables individuals and small teams to develop PCBs within a highly productive and easy-to-use environment. Integrated and scalable, PADS allows individual engineers and designers to accomplish a wide breadth and depth of core PCB development tasks, including schematic entry, analog design, signal and power integrity, thermal analysis, and PCB layout-to-manufacturing preparation.

PADS offers a low cost of entry, yet delivers high performance that exceeds other desktop PCB design solutions on the market. Long a part of the Mentor Graphics PCB lineup, PADS has benefitted from continuous, solid development and global distribution, making it the most popular desktop PCB software package in the world. And, as a Mentor Graphics PCB solution, PADS provides a clear and connected path to an enterprise flow if your requirements grow.

Major product benefits

- Proven, reliable PCB design technology
- Powerful, yet easy-to-use
- Scalable to grow as your requirements grow
- Advanced capabilities to tackle complex design problems with accuracy and ease
- Offers capabilities for high-speed, thermal, and power integrity analysis, analog and RF design, FPGA to PCB optimization, manufacturing prep, and more

Mentor Graphics®

Are PADS PCB Design Solutions for You?

- Have your current tools "run out of gas," driving you to explore new options?
- Do demanding design challenges and tight time-to-market demands conflict with strict budget constraints?
- Is cost-of-ownership a primary factor in your buying decision?
- Do you want the shortest learning curve possible and user-experience that doesn't divert you from focusing on your design?
- Do you do it all – concept, layout, and analysis?
- Are you looking for a plug-and-play solution?

PADS PCB Design Solutions

Mentor Graphics leads the PCB market in providing scalable design solutions that meet or exceed your requirements. Whether you are a single designer, part of a small group, or an independent group within a larger company, PADS PCB design solutions offer what you need, when you need it, at an affordable cost.

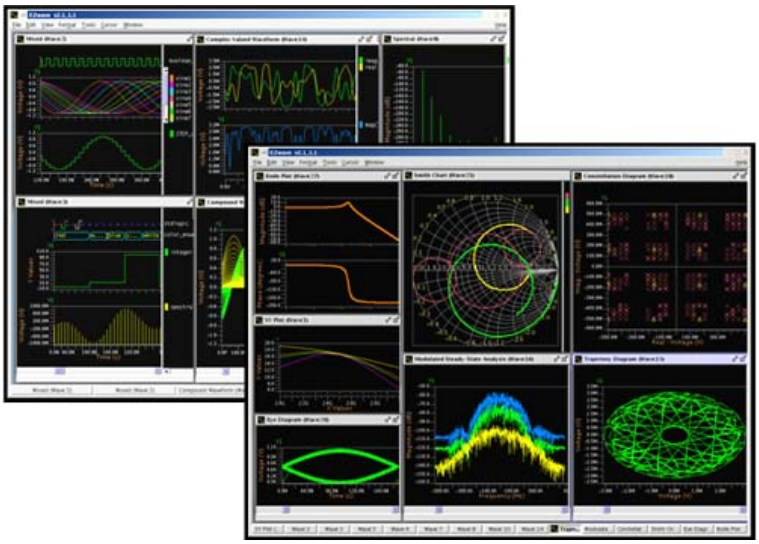
System Design

The PADS flow delivers the most robust system design capture and definition functionality available, including intuitive project and design navigation, unlimited hierarchical support, design reuse, advanced design attribute and rules management, full forward/back annotation including design rules, cross-probing with layout and routing, and a direct schematic-to-signal-integrity analysis link.

Analog Analysis

HyperLynx Analog with EZwave is a board-level simulation analysis and verification environment that is integrated into Mentor Graphics' DxDesigner board-design environment. Using a single schematic to drive both the simulation and PCB applications effectively illuminates costly and error-prone schematic re-entry, therefore significantly shortening the overall development cycle.

HyperLynx Analog provides basic simulation capabilities, such as DC, frequency and time-domain analysis, as well as more statistical approaches such as Monte Carlo and multiple sweep analyses. EZwave sets the standard in waveform analysis, with easy-to-use drag 'n' drop features enabling fast waveform viewing, multiple cursor support to sophisticated operations through the waveform calculator and measurement tools. Waveforms from multiple simulation runs can be overlaid to quickly compare result differences. EZwave also offers a range of plotting formats including time-domain, digital, smiths charts, and bode plots.

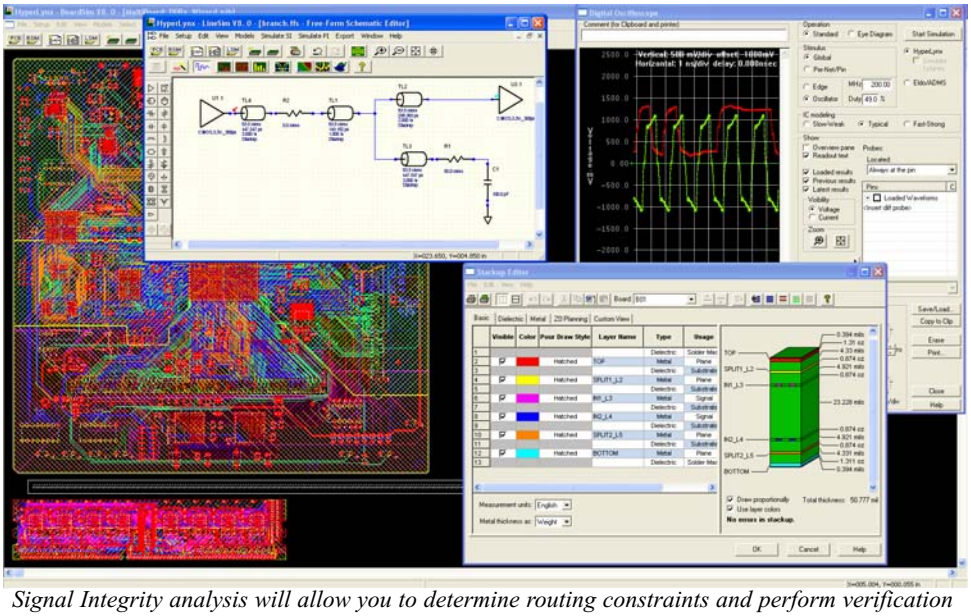


HyperLynx Analog provides a complete simulation environment integrated into the PCB design flow. HyperLynx Analog allows the user to prepare all aspects of simulation for both basic and complex analysis while seamlessly driving the PCB layout design system.

HyperLynx Analog includes thousands of popular proven models, with access to extensive external vendor libraries, the ability to import and convert existing PSpice libraries, and even drag 'n drop symbol generation for automatic symbol creation using commonly found SPICE models.

Signal Integrity Analysis

Signal integrity (SI) analysis is an essential part of modern electronic design. Increasingly-fast edge rates in today's integrated circuits (ICs) cause detrimental high-speed effects, even in PCB designs running at low operating frequencies. As driver ICs switch faster, a growing number of boards suffer from issues such as crosstalk, over/undershoot, ringing, glitching, and timing problems. PADS design solutions offers



Signal Integrity analysis will allow you to determine routing constraints and perform verification of your routed PCB to ensure your design goals are met.

powerful and easy-to-use signal integrity capabilities on the engineers desktop. With pre-layout analysis capabilities for defining routing constraints, to verification of the routed board to ensure your design goals are met, PADS design solutions offer a complete environment for all your signal integrity analysis needs.

PCB Layout

As the standard in desktop PCB layout tools, PADS offers unparalleled price-performance for the layout and design of complex circuit boards, including high-speed applications and RF circuits. PADS offers advanced design rules with real-time design rule checking, bi-directional cross-probing, RF design functionality, split-plane generation, auto-dimensioning, direct DXF import into both the board and part library editors, advanced fabrication verification tools, and 3D viewing.

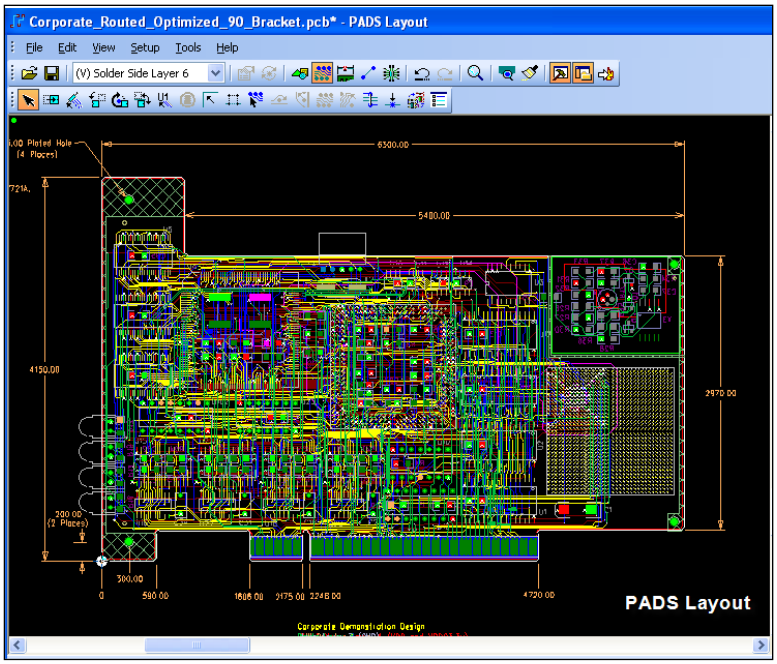
Also available are assembly variant functions, test coverage auditing, physical design reuse module, chip-on-board / advanced packaging, and an IDF link to third-party CAD/CAM tools.

Interactive / Autorouting

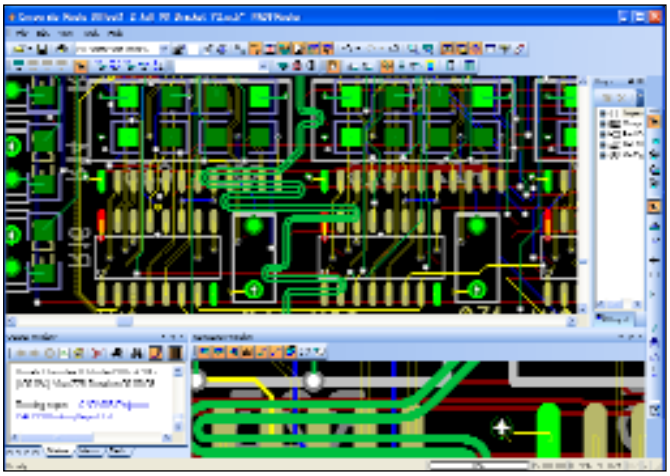
Many designers of high-speed and/or dense designs require exacting manual control of critical signal traces, but could also use the speed and built-in intelligence of an auto router. The router provides both advanced interactive routing and sophisticated autorouting for high-speed applications.

Whether interactively routing with orthogonal, diagonal, or any-angle styles, or differential pair routing with unique rule assignment or trace length requirements, the router provides exacting control. Intuitive graphical monitoring tools provide real-time feedback for correct-by-construction methodology. Proven routing algorithms enable robust design rules and advanced design constraints to be applied between objects or groups of objects such as components, layers, nets, and vias.

The advanced autorouter simplifies routing operations most suited for an autorouter, including fanout and routing, by individual components or groups of components.



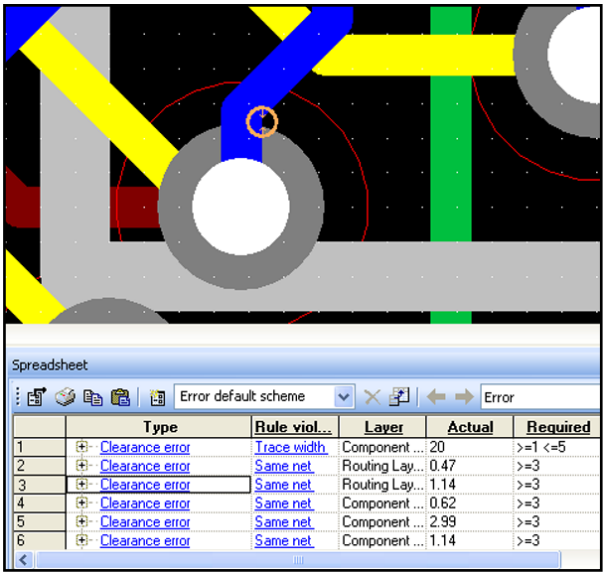
The PADS Layout solution combines ease of use with great value and broad technology, making it ideal for complex PCB designs.



Interactive and automatic routing get the job done quickly, complying to Clearance and High Speed Rules. Whether routing interactively or automatically, all design rules, including high-speed rules, will be maintained.

Verification

Pre-route analysis ensures use of the optimum rules strategy, while post-route analysis maximizes manufacturing yields. The design for test routing routine performs automatic testpoint insertion as part of the normal routing pass, for optimum test point placement. Rules can be set for component pad entry and via placement under SMD pads, and checked using state-of-the-art post-route audits and design verification.

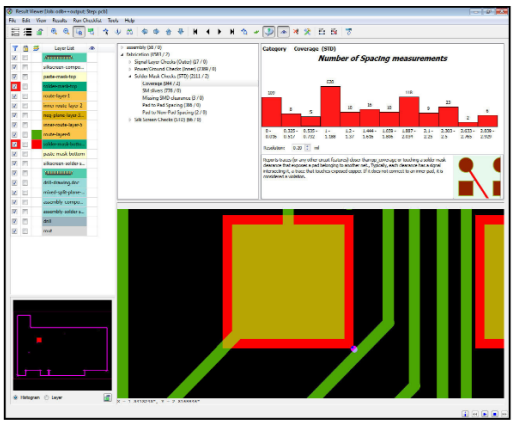


The spreadsheet view pans to individual high-speed, clearance, and manufacturing errors with clear explanations.

Design for Manufacturing Analysis

DFM Analysis enables PCB design teams to validate that a design is prepared for manufacturing directly within the PADS environment. Regardless of the complexity of their designs, design teams are continuously challenged with getting products into volume production to reach the market quickly. Manufacturers alone cannot identify all production obstacles; PCB designers must play an earlier role in validating the layout of a design by considering key aspects of fabrication and assembly that directly impact manufacturability.

The DFM Analysis incorporates more than 100 of the most valuable fabrication and assembly related analyses. Examples of issues identified by DFM Analysis include resist slivers, unintended copper exposed by soldermask, and testpoint-to-testpoint spacing, all of which delay production. Identifying and solving these issues early in layout, and long before manufacturing, saves costs and brings the product to market much quicker. Catching DFM issues at the design stage is critical because at each successive step of the production process, the cost of rectifying a problem increases tenfold over the previous step. DFM Analysis identifies these manufacturing issues and works seamlessly to take you directly to the design location within PADS Layout.

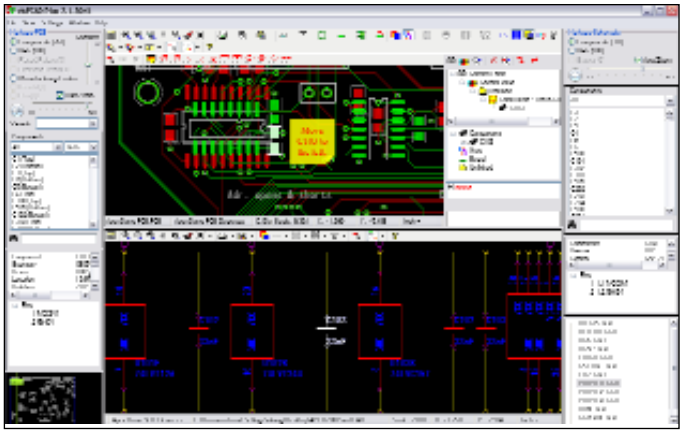


DFM Analysis within the PADS flow identifies manufacturing issues.

Viewing and Collaboration

Through its integration with visECAD™, Mentor's advanced collaboration and viewing platform, PADS users are able to easily provide design information for others to view, perform design reviews upon, and add mark-ups and feedback.

PADS includes a data interface that provides visECAD with the complete set of design data necessary to effectively view, inspect, and collaborate on a product design – for both the schematic and layout. To complete the review process, the collaboration data created during the design review is fed back into PADS, where the designer is able to review the feedback, make any necessary adjustments or changes, and document the action taken back into the design review data; ensuring that a complete record of accepted and rejected changes is maintained and available for future review.



Schematic and layout files are crosslinked in visECAD with markup annotations that have been added during a design review.

This capability is unique to PADS; offering users major improvements in the way that design review data is presented, acted upon, and ultimately dispositioned – all of which improve a designers' effectiveness and ability to reduce overall design cycle times.

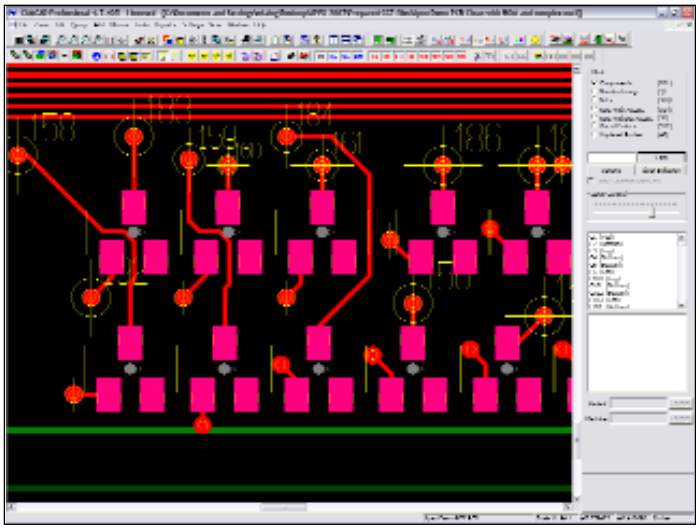
visECAD also offers several additional options that create additional value for the users. There are options for custom reporting, where users can create detailed custom reports of any data contained within the design; design comparison, where users can perform detailed design comparisons graphically, electrically, and/or of data attributes – using any combination of layout and schematic data; and finally, DRC Review, where users can review and collaborate on the disposition of DRC data in the CCZ file.

Test and Assembly Analysis

PADS users can perform advanced Design for Test (DFT) and Design for Assembly (DFA) analysis, based upon actual manufacturing rules, at any point during the layout process.

PADS' integration with Mentor's CAMCAD Manufacturing Flow provides PADS users the unique ability to rapidly perform both DFT and DFA and obtain actionable results to use as they progress the product through the design process. With this capability, designers can check the design and validate it against manufacturing constraints as a part of the design process, catching potential manufacturing problems even before the manufacturing organization reviews the design. This helps accelerate product launch cycle time through increased productivity for both the design and manufacturing teams.

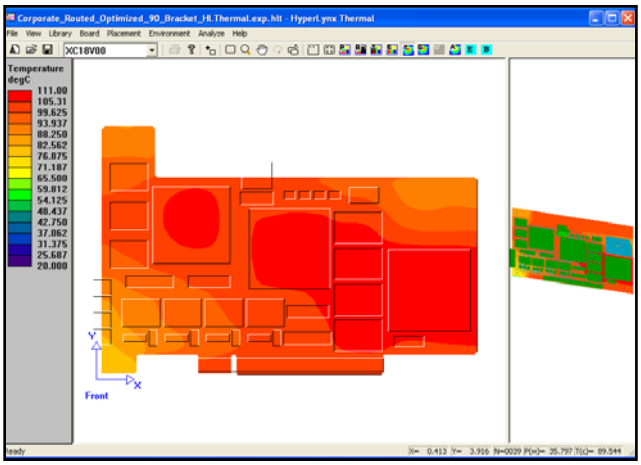
What makes this solution easy to use and elegant is that the manufacturing team provides the test plan for the DFT analysis and the rule script for the DFA analysis. This approach captures and uses manufacturing expertise during the design process without requiring the design engineers to have any manufacturing experience. In addition to the DFT and DFA analysis capabilities available within CAMCAD, there are extensive capabilities to view, augment, and generate manufacturing data outputs directly from the PADS design data.



Test probes have been added during analysis of the PADS Layout data in CAMCAD.

Thermal Analysis

HyperLynx Thermal allows engineers and PCB designers to analyze board-level thermal problems on placed, partially routed, or fully routed PCB designs from all popular PCB layout environments. Temperature profiles, gradients, and excess temperature maps enable designers to resolve board and component overheating early in the design process.



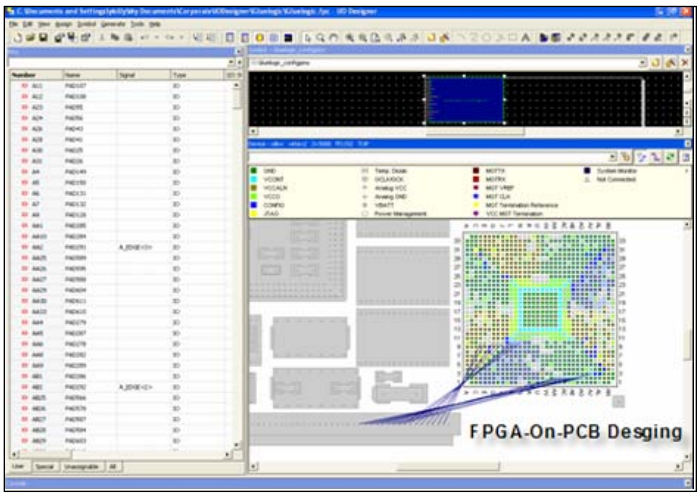
HyperLynx Thermal provides a very easy-to-use solution for understanding and resolving thermal issues on your PCB.

FPGA Design

The PADS flow can be integrated with Mentor Graphics' industry-leading FPGA tools to provide HDL-level design definition support for SystemC, Verilog, VHDL and SystemVerilog, an integrated verification and debug environment, advanced synthesis, and full interfacing to popular place-and-route tools.

FPGA-On-PCB Design

Complex, high pin count FPGA designs typically involve a team. FPGA, schematic and PCB designers can come together in a single tool to solve the board-level problem of optimizing FPGA I/O assignments, and auto symbol generation of very large FPGA pin count devices.



Simplify and automate the concurrent design of an FPGA and PCB.

Configurations

PADS solutions are available in scalable bundles and full front-to-back suites, designed to fit every need and budget.

Optional add-ons include ODBC-compliant component information management, advanced variant management, and intelligent data management functionality.

Platform and Operating Systems

- Windows 7 (32-bit and 64-bit)
- Windows XP SP3 (32-bit)
- Hardware platform: PC
- Memory requirements: 1 GB RAM
- Disk space requirements: Installation 3 GB

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