PA DS Layout – Meeting Today’s Design Challenges

With shorter market windows, increased revenue expectations, and constant pressure to do more with less, today’s PCB engineering departments need design solutions that deliver both efficiency and value. That means layout tools that are reliable, easy-to-use, and affordable.

PA DS® Layout is the answer. It provides everything needed to complete the toughest designs simply and quickly in a flexible design environment. PA DS Layout is part of a complete and seamless flow for design definition, analysis, planning, and layout. It integrates with and complements all the other PA DS PCB Design Solutions. And PA DS Layout can expand to meet future needs: add-on modules support the creation of design variants, advanced packaging schemes, design-for-test features, and more. The versatile PA DS Layout toolset integrates with Mentor Graphics’ HyperLynx SI & PI, the leading signal integrity and new power integrity solutions respectively; with visECAD for design collaboration; and with CAMCAD, a tool that removes barriers between design and manufacturing.

PA DS Layout can also be used in standalone form, bringing exceptional layout quality to schematics captured with other vendors’ software.
Overview

PADS Layout is a rich, robust PCB editing environment that provides all the functionality needed to efficiently design and route complex PCBs. PADS Layout starts with importing component and netlist information, component attributes, design rules, and net constraints defined in the schematic. A wizard-driven, footprint-creation tool simplifies library component creation and generates accurate land patterns. Component placement is easy and precise, thanks to a combination of manual and automatic tools that allows group placement and component rotation down to a tenth of a degree. PADS Layout also provides a robust set of manual and interactive routing tools. Among these is PADS® Router, the shape-based, any-angle route editor that delivers full control and superior interactive routing in real time. PADS Layout supports complex split/mixed-plane creation, including custom thermal pad and elaborate cutout support. PADS Layout also audits designs for 100% testpoint coverage and performs essential manufacturability checks before designs are sent out to fabrication.

PADS Layout includes automatic and interactive jumper placement, as well as advanced tear drop and pad-filleting controls for high density, single- and double-sided boards. By automating these tedious manual processes, this functionality will help ensure that placements will meet specified design rules and requirements. PADS Layout includes a suite of design for fabrication design rule checks, allowing corrections to be made in the PCB database rather than the fabrication house. A 3D viewer is included to allow 3D visualization of the design. Variants can be created and managed from a single PCB design database.

Lastly, PADS Layout provides a robust set of menu-driven CAM outputs for all popular manufacturing and test equipment.

PADS AutoRouter

PAD AutoRouter ships with every seat of PADS Layout. This powerful, shape-based autorouter combines high completion rates with minimal post-route rework for the highest possible yields. Native any-angle and diagonal routing algorithms accurately and efficiently route high-density designs. Tight integration with PADS Layout ensures that PADS AutoRouter follows design rules and net constraints entered at the schematic or PCB level, minimizing post-route checking.

PADS AutoRouter includes a host of essential features:

- “Push and shove” and “rip-up and retry” technology for batch-routing results that rival interactive routing in design quality and aesthetics
- A combination of pad-entry controls, same-net clearance rules, and copper sharing that can meet fabrication requirements automatically
- Integrated test point routing and post-route auditing to adapt to the existing design-for-test (DFT) process
- True diagonal routing that minimizes trace lengths and design layers
- A context-sensitive, HTML-based Help system

RF Design

Every seat of PADS Layout now has enhanced support for RF and Microwave design. Features include intelligent direct DXF import of complex copper shapes and line geometries into the library editor and/or board editor; via shielding for channel/coplanar waveguide design; auto via fill for any copper shape; and support for chamfered or square corners. Only PADS Layout offers these features as well as via matrixing enhancements and more.

RF design features include via matrix fill for complex copper shapes.
Automation

PADS Layout combines Object Linking and Embedding (OLE), automation methods, and a Visual Basic engine to provide advanced integration and customization. Extended API commands provide direct access to PADS Layout data structures for faster, better communication among design tools.

With PADS Layout, it is possible to:
- Cross-probe between data elements within applications such as Microsoft® Excel®
- Leverage other EDA and OLE-compliant tools to enhance the design process
- Use a Script Wizard to take advantage of automation techniques, even if the user has no programming background

Split-Plane Definition

Split/Mixed-Plane operations provide an interactive and automated method for creating complex embedded planes and routes. The toolset can:
- Automatically check connectivity to multiple split-plane areas, ensuring an electrically correct design
- Maintain all design rules, including net-specific and conditional net rules
- Simplify the separation of embedded planes into multiple plane polygons
- Support embedded traces on internal plane layers
- Support positive and negative plane areas

Autodimensioning

PADS Layout includes robust dimensioning tools that document the PCB form factor automatically. These tools include datum and standard dimensioning, radius, angle, and leader support, as well as user-defined tolerancing.

Online DRC

Design Rule Checks (DRC) enable base- and extended-rules hierarchy, including layer, class, group, pin pair, and conditional rules. Four modes of operation (prevent, warn, explain, allow) let users choose their preferred level of system assistance.

Design for Fabrication

PADS Layout includes built-in design-rule checks (DFF Audit) that enable design verification and correction of errors prior to fabrication. The fabrication house receives quality layouts at the outset, avoiding re-spins and costly production delays. Importantly, this lowers the risk of errors being corrected at the fab house and not back-annotated into the original design. Using PADS DFF features, designers can:
- Identify and correct issues that could cause fabrication problems, without leaving the PADS Layout environment
- Check for acid traps, copper slivers, solder mask slivers, traces in a soldermask opening, detect silkscreen over pads, and more

Assembly Variants

PADS Layout makes it easy to create design variants from a single PADS database.

Analog Design

A built-in analog toolkit enables automatic and interactive jumper capabilities and advanced teardrop and pad-filleting controls for high-density, single- and double-sided boards. By automating typically tedious, manual processes, the analog toolkit saves time and helps ensure that placements will meet design rules and requirements.
**DxDesigner Link**

Provides push-button integration between PADS Layout and DxDesigner™, allowing designers to:

- Pass netlists and attributes bi-directionally for seamless schematic-to-layout design synchronization.
- Cross-probe between schematic and layout for intuitive component placement and easy identification of critical nets during design reviews.

**CAM Outputs**

The PCB Editor provides CAM utilities to output DirectCAM, drill data, Gerber, and other standard data-exchange formats.

**Expanded Capabilities**

An array of options is available to increase the design system efficiency. Many of these modules are included in standard configurations of PADS Layout.

**Physical Design Reuse** — The Physical Design Reuse (PDR) option supports the creation, saving, and placement of physical reuse elements independent of the schematic source. By allowing reuse of existing, proven circuits, PDR significantly reduces design time. Users can:

- Save completely-routed circuits as reuse elements in a PDR library.
- Easily replicate reuse elements to support multi-channel designs, whether the design is newly created or taken from the PDR library.
- Use intelligent, element-building technology to create a clone of the initial reuse element and position it on the cursor for placement.

**High-speed Routing** — Two options enable routing of length-constrained nets. PADS Router HSD routes high-speed nets interactively, while PADS AutoRouter HSD offers a superset of capabilities that permits both interactive and automatic high-speed routing.

- Interactively and/or automatically routes complex, length-constrained traces easily and quickly.
- Makes intelligent routing choices on the fly. The handy “Trace Length Monitor” makes real-time graphical information available instantly.
- Handles min/max, matched length, and differential-pair traces in real time.

**Design For Test** — DFT Audit provides two key functions:

- **Testpoint Assignment** — By enabling the testpoint function in PADS AutoRouter DFT Audit inserts testpoints during normal route passes, converting existing vias and pads to test points, or adding necessary test points based on your rules. PADS AutoRouter and even be instructed to perform iterative passes with decreasing pad sizes, thus maximizing point coverage.
- **Testpoint Report** — at any time, a comprehensive test point coverage report can be generated for design review.
Critical Place & Route (CPR) — Defines, verifies, and enforces essential pre-placement and pre-layout design rules.

Database Viewer — Streamlines communication by sharing PCB design data with the entire design team.

Advanced Rule Set (ARS) — Extends the hierarchy of base design rules to include layer, class, group, pin pair, conditional, and differential-pair rule settings. Measures and verifies signal requirements for high-speed layout based on signal routing and board stack-up. ARS is required for PADS Router HSD and PADS AutoRouter HSD.

IDF Link — Allows 2D physical information to pass via an IDF file to and from PADS Layout and mechanical engineering tools such as Pro/ENGINEER® and SolidWorks.

Chip-On-Board (COB)/Advanced Packaging Toolkits — die on substrate design operations using tools such as the die wizard, route wizard, die-flag wizard, wire bond wizard, and advanced post-design report generation.

Platforms and Operating Systems

Windows® XP (Service Pack 2) and Vista on Intel-based systems

Memory Requirements:
- Windows Vista Ultimate or Business Editions:
  - 2GB memory or higher;
- Windows XP Professional (SP2):
  - 1GB memory or higher

PC Hardware
- Pentium IV 2+GHz recommended, minimum.
- High-speed CPU is recommended.
- Three-button mouse or mouse with scroll wheel recommended.
- Minimum display 1024 x 768, 256 colors.

Summary

Dynamic electronic design environments demand PCB design systems that offer strong technology, reliability, and minimal ramp-up time at an affordable price. PADS solutions deliver just that, with easy-to-use, integrated PCB design systems that include design definition, front-end simulation, PCB layout, and signal integrity analysis. PADS Layout is one of the flagship products in Mentor Graphics’ line of PADS PCB Design Solutions.

PADS Layout combines ease-of-use with great value and broad technology. These attributes have made PADS Layout the market standard for Windows-based design of complex printed circuit boards.