

#### Major product benefits:

- Complete ruled-based PCB verification tool
- Verifies proper layout of traces for SI, EMI and other layout rules
- Provides 25 design rules for SI, EMI and power
- Analyzes analog, digital and power domains
- Verifies PCB structures that cannot be simulated
- Highlights the exact PCB structure causing the design rule violations
- Full integration into most major layout tool flows
- Powerful API set allows for implementation of complex DRC rules for both EMI and SI

*Quiet Expert is a fully integrated PCB verification system.*

## EMI and Signal Integrity Verification Problems of Today's PCB

Verification on printed circuit boards (PCB) for correct routing and placement to minimize EMI, signal integrity, power and other routing problems is often done manually. Normally, this process consists of a set of "rules" that the layout of the PCB traces must adhere to. For example, differential pair layout check is a rule for signal integrity and EMI when the differential pair must be routed with the maximum amount of coupling between the pair to insure proper signal function. A designer or verification engineer runs through the set of rules and verifies that every net adheres to these set of rules.

There are many drawbacks to a manual process. The first drawback is time. A manual verification process can require hundreds of man-hours for a single board in a single design iteration. Multiply this by the number of board iterations and the cost of such a process becomes significant. A second drawback is the introduction of human error. Today's PCBs contain unprecedented levels of complexity, with analog, digital, RF and power domains all requiring care in designing the layout. It is not humanly possible to do all the checks required in an accurate fashion since PCBs are simply too complex to ensure any kind of consistent accuracy.

### Rule Based PCB Verification Process

Mentor Graphics® Quiet™ Expert provides companies with a platform to automate the board verification process for EMI, signal and power integrity. Quiet Expert contains a set of 25 design rule checks (DRC) to provide coverage in all these areas. It scans the whole board, using fast scanning technology to find, display and highlight DRC violations. This process reduces the verification from days and weeks into minutes. The advanced scanning engine coupled with today's fast computers make manual verification a thing of the past.

Another advantage of Quiet Expert analysis is the concept of repeatability that allows the same verification process to be used over and over on different designs across different teams all over the world. This allows corporations to setup a system wide, repeatable verification process, ensuring that product quality remains consistent despite different levels of expertise across different locations.

Quiet Expert also introduces a level of verification that is simply not possible in today's manual design process flow. The amount of work required to verify complex return paths, decoupling capacitor positioning and length, via placement and spacing is simply too big for the PCB layout team to handle. But the task is well suited for a tool like Quiet Expert. This added verification can make a big difference in the quality of the product, both with the prototype and the final release.

### Easy Viewing of Results

One of Quiet Expert's most popular features is its ability to pinpoint the exact location of the DRC violation. It is often difficult or impossible to visualize where the problem exists with the naked eye. Quiet Expert solves this problem by highlighting the violation by various methods, depending upon the nature of the violation. For example, markers point to exact points where a signal changes references planes, boxes are drawn around areas of coupling between two nets, and exact segments within nets can be highlighted to show exact paths. A whole array of methods exist to control viewing of violations on the Quiet Expert board viewer, including zoom, highlighting of pins, parts, or nets, drawing circles, markers, boxes, or lines, and dimming all areas except the areas in violation.

In addition Quiet Expert's Results Spreadsheet displays all data of each and every violation. Results can be sorted according to pertinent parameters. Results can also be classified, allowing the user to define a particular violation as "critical" or any one of a number of classifications. Users can also enter their

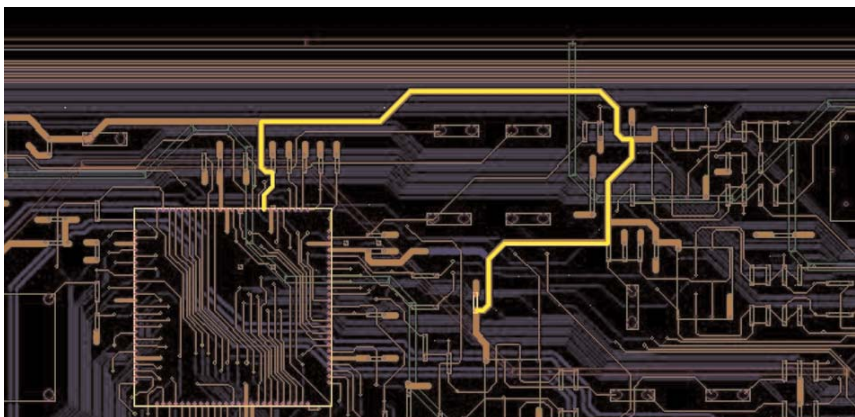
own comments in the results spreadsheet to facilitate communication between different design team members.

### Analysis and Scanning Capabilities

Quiet Expert's analysis capabilities are founded upon principles of expert systems. Expert systems grab the data that is available and according to its internal algorithms or scanning capabilities, reports the problem, its location and advice on fixing the problem. Quiet Experts analysis capabilities allows users to find answers for many complex problems on a PCB, including:

- Do all my power pins have decoupling capacitors associated with them, and are they close enough?
- Do I have any unfiltered I/O signals?
- What nets are predicted to be the highest radiators in my design?
- Which nets do not have clean current return paths?
- Do I have any clock signals coupling to my I/O lines?
- Are all my differential pair signals routed with enough coupling between them.
- Which nets are predicted to have the highest crosstalk noise?
- Do I have nets with unusually long lengths or loop areas?

These are just some of the answers that Quiet Expert provides. In addition, custom rules can also be programmed by the user to search, scan and highlight their own DRCs. Quiet Expert contains a complete set of APIs that can be used to scan boards for a variety of structures and layout patterns, giving the users infinite possibilities in scanning and verification.



### Analyze Your Board

Quiet Expert provides unparalleled capabilities to find most routing problems on your PCB. Contact your Mentor Graphics account sales representative today to discuss setting up a software evaluation and demonstration.

*Quiet Expert can find and highlight incorrectly placed decoupling capacitors.*

Visit our website at [www.mentor.com](http://www.mentor.com)

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