

Quartus II Software Questions & Answers

Following are the most frequently asked questions about the new features in Altera's Quartus® II design software.

PowerPlay Power Analysis & Optimization Technology

- 1. Q. What is the PowerPlay suite of power analysis and optimization tools?**
A. The PowerPlay suite of tools will allow designers to: 1) analyze the power consumption of their Altera® CPLD, FPGA or structured ASIC designs; 2) perform automated control and optimization of this power consumption.
- 2. Q. What specific power analysis tools are included with the PowerPlay suite?**
A. There are two PowerPlay analysis tools: 1) the PowerPlay Early Power Estimator spreadsheet; and 2) the PowerPlay Analyzer tool. The PowerPlay Early Estimator spreadsheet is available on www.altera.com, and works hand-in-hand with the Quartus II version 4.2 software to provide power consumption estimates early in the design cycle, often while a designer's power budget is being determined. Once a project has begun, a designer can begin using the PowerPlay Analyzer tool within the Quartus II software, which will offer increasing levels of estimation accuracy.
- 3. Q. At what stage of a design should a designer use the PowerPlay Early Estimator spreadsheet and the PowerPlay Analyzer tool?**
A. Altera recommends that a designer use the PowerPlay Early Estimator spreadsheet during early design stages, when a designer has only limited information regarding his design, and needs rough estimates of power consumption.

Altera recommends that a designer use the PowerPlay Analyzer tool during design implementation stages to refine power estimations. The PowerPlay Analyzer tool offers improved accuracy over the PowerPlay Early Estimator spreadsheet since it examines actual device resource usage, place-and-route information, and information on activity rates of individual design nodes. A designer can also add in functional simulation vectors or timing simulation vectors to further improve estimation accuracy.

- 4. Q. What are the main differences between the new Quartus II software PowerPlay Analyzer tool and the simulation-based power estimation feature included in previous versions of Quartus II software?**
A. The main differences can be summarized as follows:

 - **Simulation Data Input Requirements** – Unlike the simulation-based power estimation feature which always required simulation vector inputs, the new PowerPlay Analyzer tool provides static and dynamic power

consumption estimates with or without this data, saving designers significant time.

- **Third Party Simulation Flows** – The new PowerPlay Analyzer tool can directly process third-party simulation data in the form of industry-standard vector change description (.vcd) format files. In addition, the tool provides faster run times by no longer requiring users to re-run simulations with the Quartus II simulator.
- **Power Models** – The power models underlying the PowerPlay Analyzer tool and the Early Power Estimator spreadsheet employ SPICE-based simulations and extensive device characterization data. The models also include advanced filtering capabilities to remove spurious glitch effects.
- **Cooling Solution** – The new PowerPlay Analyzer tool includes an interface to enter cooling system details, which are utilized in power estimate calculations.
- **Confidence Level Reporting** – The PowerPlay Analyzer tool can generate power estimations from a varying set of input data, whether it is a limited set from a new design, or a rich set from late in the design cycle. An important new feature of the power estimation report indicates the confidence level in the estimation accuracy, which will be relative to the amount of data provided.

5. Q. Which third-party simulators can be used with the PowerPlay Analyzer tool?

A. The Quartus II software PowerPlay Analyzer tool accepts .vcd simulation data from Cadence NC-Sim, Mentor Graphics® ModelSim®, and Synopsys VCS simulation software.

6. Q. When will PowerPlay Power Optimization features be available?

A. The Power Analyzer features introduced in version 4.2 provide the necessary infrastructure for power-driven design optimization. These features will be introduced in 2005.

General

7. Q. What is Altera's Quartus II design software?

A. Altera's Quartus II design software is the industry's first and only design tool to offer a unified design flow for the development of FPGAs, CPLDs, and structured ASICs. With the industry's most advanced features, Quartus II design software accelerates performance, boosts functionality, and easily addresses potential design delays such as late-arriving, post-place-and-route design changes.

8. Q. What are the most important new features and enhancements included in version 4.2 of the Quartus II software?

A. Quartus II version 4.2 software includes the new PowerPlay tools as well as several new features to support advanced FPGA, CPLD, and structured ASIC design. New features include:

- **PowerPlay Technology** – Altera introduces the first tool in the PowerPlay suite, the PowerPlay Analyzer. The PowerPlay Analyzer estimates design power consumption from design concept through design implementation.
- **New Implementation & Timing Analysis Features** – New features analyze and control clock skew and data skew, allow designers to model clock jitter, and enable better analysis and optimization of register control signals.
- **Early Timing Estimate Fitter Option** – Improves design iteration time by providing a rough preliminary timing estimate for a design in only a fraction of the time of a full compilation.
- **Soft LVDS Megafunction** – Simplifies implementing LVDS communication using the Cyclone™ FPGA series.
- **SOPC Builder Multi-Clock Domain Support** – Enables effortless integration of systems with components operating in multiple clock domains.
- **SOPC Builder Component Editor** – More efficient support for integrating customer user logic into SOPC Builder systems.
- **RTL-to-Gates Formal Verification Support for Cadence Conformal LEC** - Quartus II software now includes support for register transfer level (RTL)-to-gates functional equivalency comparisons in addition to gates-to-gates transformation equivalency comparisons.
- **Operating System Support Updates** – Includes support for Microsoft Windows XP service pack 2 and Sun Microsystems Solaris 9 operating system.

9. Q. How can a designer learn more about Quartus II software features and supported design flows?

A. Altera provides various avenues for designers to receive Quartus II technical information and training:

- **Quartus II Online Demonstrations** – Demonstrations that provide the easiest way to learn about the latest Quartus II software features and design flows
- **Quartus II Tutorials** – Tutorials included in the Quartus II software and Quartus II Web Edition software
- **Introduction to Quartus II Manual** – Overview of Quartus II software features and design flows
- **Quartus II Handbook** – Detailed instructions on using Quartus II software features and design flows
- **Quartus II Instructor-Led Training Classes** – Instructor-led and free online training classes to learn about Quartus II features and design flows

10. Q. How does the Quartus II software and device performance compare to competing solutions?

A. Recent benchmark and analysis data proves that Altera's Quartus II software delivers the highest performance across the full range of FPGA and CPLD

designs, when compared to Xilinx. For details, refer to www.altera.com/alterazone.

11. Q. What is an Altera software subscription?

A. Altera's software subscription program simplifies the process of obtaining Altera design software by consolidating development software products and maintenance charges into one annual subscription. The annual subscription for the Altera design software is \$2,000 for a node-locked personal computer (PC) license; subscriptions are also available to support other operating systems. Subscriptions include the subscription edition of the Quartus II design software (which includes the SOPC Builder system generation and integration tool), an Altera edition of the Mentor Graphics ModelSim simulation software, MegaCore® intellectual property (IP) Library CD including OpenCore® Plus editions of all Altera MegaCore design-ready IP functions, Nios® II Embedded Processor Evaluation Edition CD, and 12 months of software upgrades.

12. Q. What is the difference between Quartus II Web Edition software and the Quartus II software included in subscription products?

A. Quartus II Web Edition software includes most of the features included in the Quartus II software subscription edition and everything customers need to design for Altera's latest CPLD and low-cost FPGA families. Quartus II Web Edition also includes support for entry-level members of Altera's high-density FPGA families.

The Quartus II subscription edition includes everything in the Quartus II Web Edition software plus:

- Support for Altera's high-density FPGAs
- Support for HardCopy® series of structured ASICs
- ModelSim-Altera simulation software
- Additional productivity features including the LogicLock™ block-based design flow, RTL viewer, and technology map viewer tools.

13. Q. Is the Quartus II software included in Altera development kits different than the Quartus II software included in Altera software subscriptions?

A. The software is identical in performance and functionality; the only difference is in the length of the license term: Altera subscriptions offer access to upgrades for one year, and perpetual software use. Development kit versions include access to upgrades along with software use for one year only.

14. Q. What are the MegaCore IP Library CD and the Nios II Processor Evaluation Edition CD, now included in Quartus II software subscriptions?

A. The MegaCore IP Library CD includes OpenCore Plus editions of all Altera MegaCore design-ready IP functions. The Nios II Processor Evaluation Edition CD includes an OpenCore Plus version of the Nios II processor, and the Nios II integrated development environment (IDE) C/C++ development environment for the Nios II processor. OpenCore Plus technology supports IP evaluation in third-

party simulators and in hardware before purchasing any IP licenses.

15. Q. Quartus II software version 4.2 is available for which operating systems (OSs)?

A. Version 4.2 of the Quartus II software is available for Windows XP (including service pack 2), Windows 2000, Windows NT, Solaris 8 and 9, Red Hat Linux 7.3, 8.0, and Enterprise 3.0 WS, and HP-UX 11.0.