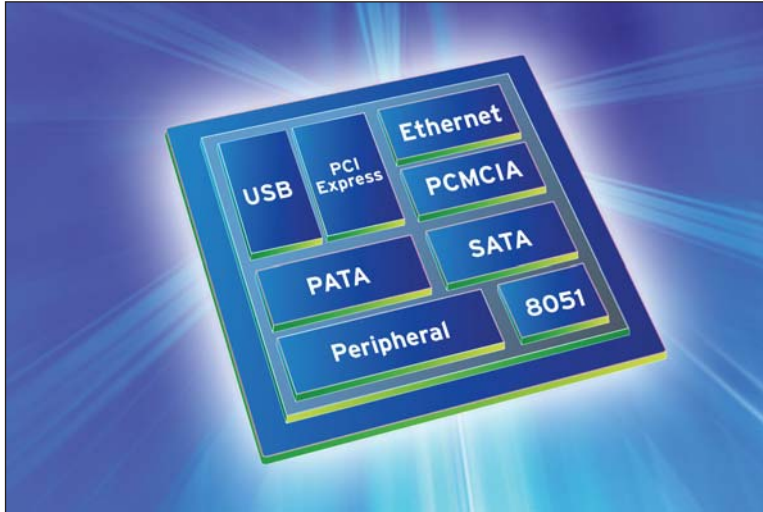


# Mentor Graphics

## Intellectual Property (IP) Product Family

D A T A S H E E T



*Today's marketplace requires the rapid development of differentiated products. Silicon-proven, ready-to-use IP from Mentor Graphics allows project teams to concentrate on the unique functionality of a design and helps teams get the finished product to market sooner.*

### System Complexity Is Driving the Need for High Quality IP

As system-on-chip (SoC) designs evolve, system complexity drives the need for proven and reliable IP. With bigger and more complex systems, engineers are challenged with more design tasks per chip. Often, teams do not have the time to create every component within a system, or possess the design expertise necessary to address all the domains found in today's complex designs. Adding to this complexity, design teams must now push beyond the block level – and verify and validate that the entire system performs to specification.

And the arrival of platform-based design methodologies and widespread acceptance of embedded processors only increases the demand for standards-based IP.

For these reasons, externally developed, pre-verified, and fully validated IP is now a viable alternative to IP developed in-house. Third party IP not only shortens design time – *getting your product to market sooner* – but also reduces risk during development, lowers overall system design costs, and achieves a higher level of design productivity. Further, utilizing third party IP allows engineers to focus on the more application-intensive and differentiating aspects of the design.

### Standards-based IP from Mentor Graphics

Mentor Graphics® offers a variety of standards-based IP cores that are rigorously tested and validated to provide design teams with the most reliable cores in the industry. Mentor's IP portfolio ranges from simple SoC building blocks, such as communication interfaces and microcontrollers, to complete integrated solutions for Ethernet, USB, PCI Express and Storage applications.

### Key features:

- **Digital IP:** Large portfolio of Ethernet, USB, PCI Express, and Storage interfaces available in Verilog RTL source code
- **Mixed-Signal IP:** Hard macro cores for embedded USB and SATA PHY applications available
- **Subsystem IP:** USB subsystem is an industry first
- High emphasis on quality, verification, and certification
- Single IP license agreement covers all IP cores
- Robust set of deliverables to facilitate ease of use
- Comprehensive documentation
- Award-winning worldwide support network

### Upcoming mixed-signal IP releases:

- SATA - Q3 '07
- PCI Express PHY - Q4 '07)

### Business models and support:

- **Fee per use:** license is granted to create a single production design. A new fee is payable for reuse of IP according to a sliding scale.
- **Term unlimited use:** IP is licensed for a one-time fee, which grants unlimited use of the IP core for a predetermined time, usually three years.
- **Support:** One year of hotline support and product updates are included in the price of the first use of each IP core.

## Ethernet

The Ethernet standard is utilized from home and office connectivity, to high-speed networking system applications such as routers, switches, and broadband gateways. Mentor has been at the forefront of Ethernet standards since 1995, and offers the most widely licensed and most extensive selection of Ethernet IP cores today.

- Available products:
  - **10-Gigabit Platform:** Ultra-high 10 Gb/s transport suitable for backbone and Metropolitan Area Network (MAN) needs with support for XGMII, XAUI, and 10-GBase-R PCS
  - **10/100/1000 Platform:** Provides integrated 10/100/1G MAC support with optional RMII, SMII, RGMII, and SGMII
  - **10/100 Platform:** Typical data transport required for home and office for 10 Mb/s and 100 Mb/s support with optional RMII and SMII

## Universal Serial Bus (USB)

USB is a commonly deployed digital wired interface on PCs, printers, digital cameras, PDAs, and other digital consumer electronic products. Mentor offers a fully functional USB platform and is the leading provider of USB On-The-Go (OTG) technology.

- Available products:
  - **USB 2.0 OTG:** Extends the USB 2.0 standard for portable devices
  - **USB 2.0 Hi/Full-Speed:** Function controller for USB devices
  - **USB Software Stack:** OS and CPU independent with small footprint
  - **USB 2.0 Hi-Speed PHY:** Optimized for low power consumption, minimal die area, with optional charge pump. SMIC 130nm process
  - **USB 2.0 Subsystem IP:** Includes a combination of silicon-proven hardware and software IP, fully integrated and verified

## Storage

The storage market has extended into promising new areas to include popular devices such as MP3 players and portable video devices. The Serial ATA (SATA) market is expanding to accommodate high bandwidth functionality needed to transfer large files quickly. Mentor is the early leader in storage IP, offering more products than any other IP provider.

- Available products: (Device and Host Controllers)
  - **SATA:** Next-generation, high-speed storage connectivity technology
  - **SATA PHY:** Provides PHY layer functionality for a SATA interface operating at 3Gbps or 1.5Gbps. Targeted for TSMC 130nm LV (1.2V/3.3V) process
  - **Parallel ATA (PATA):** Lower speed storage connectivity technology for cost-sensitive applications
  - **PCMCIA:** Standard interface for small form-factor peripherals
- Facilitates innovation of next-generation storage for devices such as set-top boxes, personal video recorders, and game consoles
- Performance ranges from 33 to 300 Mb/s for both Host and Devices

## PCI Express (PCIe)

PCIe is the newest generation interconnect that reflects an industry trend to replace legacy shared parallel buses with high-speed, point-to-point serial buses. PCIe enables faster and more scalable transmission rates with reduced complexity and costs, keeping pace with both processor and I/O advances.

- Available products:
  - **PCIe 1.1 x1, x2, x4, x8, and x16 Controllers:** Can be configured for Root, Endpoint, Switch, or Dual (Endpoint/Root) mode
  - **PCIe to AMBA 3 AXI Bridge**
  - **PCIe to AMBA 2 AHB Bridge**

## Standards compliance

Mentor Graphics actively supports key industry standards and protocols for successful IP integration. Mentor has significant involvement in the following standards bodies: IEEE-Ethernet 802.3, USB-IF, PCI-SIG, ASI SIG, and SATA-IO .

## Product interoperability

Mentor's successful involvement in a variety of EDA technologies allows IP customers to take full advantage of other Mentor technologies when the need arises. Integrating related Mentor technologies, such as embedded software, 0-In® checkers and monitors, and hardware emulation offers IP customers a more seamless and cost-effective path to product success and enables them to efficiently address the ever-changing dynamics of the industry.

## A rich set of deliverables

Mentor offers a full range of deliverables which include:

- RTL source code in Verilog
- Stand-alone testbench
- Synthesis and test scripts
- Documentation: specification, user manual, application notes, and release notes (when applicable)
- GDSII layout and layer map (mixed-signal only)
- Place-and-route views i.e., .lib, .lef (mixed-signal only)

## World-class support

Mentor Graphics is the only EDA company to receive the exclusive STAR (Software Technical Assistance Recognition) life-time achievement award – *five times*. Mentor's award-winning customer support division works closely with customers across the globe and is dedicated to working with IP customers throughout the entire design cycle.

Visit our web site at [www.mentor.com/ip](http://www.mentor.com/ip) for the latest product news.

© 2007 Mentor Graphics Corporation. All Rights Reserved.

Mentor Graphics and 0-In are registered trademarks of Mentor Graphics Corporation. All other trademarks mentioned in this document are trademarks of their respective owners.

**Corporate Headquarters**  
Mentor Graphics Corporation  
8005 S.W. Boeckman Road  
Wilsonville, Oregon 97070 USA  
Phone: 503.685.7000  
Fax: 503.685.1204  
**Sales and Product Information**  
Phone: 800.547.3000

**Silicon Valley**  
Mentor Graphics Corporation  
1001 Ridder Park Drive  
San Jose, California 95131 USA  
Phone: 408.436.1500  
Fax: 408.436.1501  
**North American Support Center**  
Phone: 800.547.4303

**Europe**  
Mentor Graphics  
Deutschland GmbH  
Arnulfstrasse 201  
80634 Munich  
Germany  
Phone: +49.89.57096.0  
Fax: +49.89.57096.400

**Pacific Rim**  
Mentor Graphics (Taiwan)  
Room 1001, 10F,  
International Trade Building  
No. 333, Section 1, Keelung Road  
Taipei, Taiwan, ROC  
Phone: 886.2.87252000  
Fax: 886.2.27576027

**Japan**  
Mentor Graphics Japan Co., Ltd.  
Gotenyama Garden  
7-35, Kita-Shinagawa 4-chome  
Shinagawa-Ku, Tokyo 140 0001  
Japan  
Phone: 81.3.5488.3033  
Fax: 81.3.5488.3004

