

Product Brief

Intel® IXP420 Network Processor
Embedded Computing



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Product Overview

The Intel® IXP420 network processor is a single-chip integrated processor that meets the needs of high-performance, cost-sensitive applications including home gateways, small office/home office (SOHO) routers, wireless access points, industrial control, networked imaging and other networked embedded applications.

The network processor feature set integrates an Intel XScale® processor, high-performance PCI interface, USB controller and two 10/100 Ethernet MACs. It enables cost-effective implementations that extend the processing power, low-power consumption and flexibility into targeted market segments.

Product Highlights

- Member of the Intel® IXP4XX product line of network processors, designed for residential, small-to-medium enterprise (SME) and networked embedded applications
- Intel XScale processor provides headroom for customer-defined applications
- Intel® Infrastructure DSP Solution on Intel XScale processor supports two to four voice channels and reduces system cost
- Two integrated 10/100 Base-T Ethernet MACs with Media Independent Interface (MII) for design flexibility and cost-effective wire-speed performance
- 33/66 MHz PCI v2.2 host and option interface for glueless connection of up to four devices
- SDRAM controller supports from 8 to 256 Mbytes of SDRAM memory
- Average consumption of 1.5W to a maximum of 1.9W
- USB version 1.1 device controller
- Two high-speed UARTs can be configured to support speed from 1200 baud to 921 Kbaud each
- Sixteen GPIO pins
- 16-bit configurable expansion bus allows easy glueless connection to peripheral devices
- 266, 400 and 533 MHz commercial temperature (0°C to 70°C)
- 266 MHz extended temperature (-40°C to +85°C)

Common Intel® IXP420 Product Line Architecture for Application Flexibility

The Intel IXP4XX product line of network processors has a unique distributed processing architecture that speeds development for a range of applications. Each one combines a high-performance Intel XScale processor with additional Network Processor Engines (NPEs) to achieve wire-speed packet processing performance.

The Intel processor and NPEs run their instruction streams in parallel. The processor is fully compatible with the ARM® V5T Thumb instructions set and V5E DSP extensions. Designed on Intel's 0.18-micron process technology, it delivers a high MIPS/power consumption ratio and provides ample processing headroom for value-added software features.

The two NPEs in the Intel IXP420 network processor complement the Intel XScale processor for many computationally intensive data plane operations. These tasks include IP header inspection and modification, packet filtering, packet error checking, checksum computation and flag insertion and removal. NPE architecture includes an ALU, self-contained internal data memory and an extensive list of I/O interfaces, together with hardware acceleration elements. These elements, associated with an NPE, target a set of networking applications. Each element increases the speed of a specific networking task that would otherwise take many MIPS to complete by a standalone RISC processor.

Both Ethernet NPE A and Ethernet NPE B include an MII interface. Either NPE is capable of handling 100 Mbps full-duplex Ethernet packet filtering. The extensive hardware capabilities of the NPEs are under the control of microcoded algorithms that are accessed via application programming interfaces (APIs) released as a software library with the processor. Customer applications configure and interact with the NPEs through the high-performance API layer running on the Intel XScale processor. Sample "codelets" demonstrate how to use each service or function provided by the Intel XScale processor library and the underlying hardware.

Highly-integrated Data Functionality and LAN/WAN Capabilities

On-chip integration of data functions saves the cost of implementing separate devices. In addition to the two 10/100 Base-T Ethernet MACs with a MII interface and simultaneous full duplex operation, the processor integrates an SDRAM controller and peripheral functions including an interrupt controller, GPIO port, UARTs, watchdog timer and general-purpose timers. The processor includes a USB version 1.1 -device controller, while the PCI 2.2 host and option interface provides the flexibility to directly connect devices, including 802.11x chips, PCMCIA controllers and cable MAC/PHYS.

Tools, Applications and Operating Systems Support Rapid Development

Intel XScale technology includes a broad range of development tools and applications, together with support for multiple operating systems. The Intel IXP420 network processor currently supports Wind River* VxWorks* and the standard Linux* kernel. Associated third-party products are available for the IXP4XX product line including Wind River* Workbench for VxWorks and the MontaVista* Linux Professional Edition. Multiple third-party vendors also provide application stacks and advanced development environment support.

To help speed time-to-market and reduce development costs, developers have a wide choice of Intel XScale technology-based tools. The Intel IXP420 network processor may be controlled during debug through a JTAG

interface to the processor. The Macraigor* Raven*, Wind River Systems visionPROBE*/visionICE*, EPI* MAJIC* and other JTAG ICE systems plug into the JTAG interface through a 20-pin connector.

Reference Platform for Faster Time-to-Market

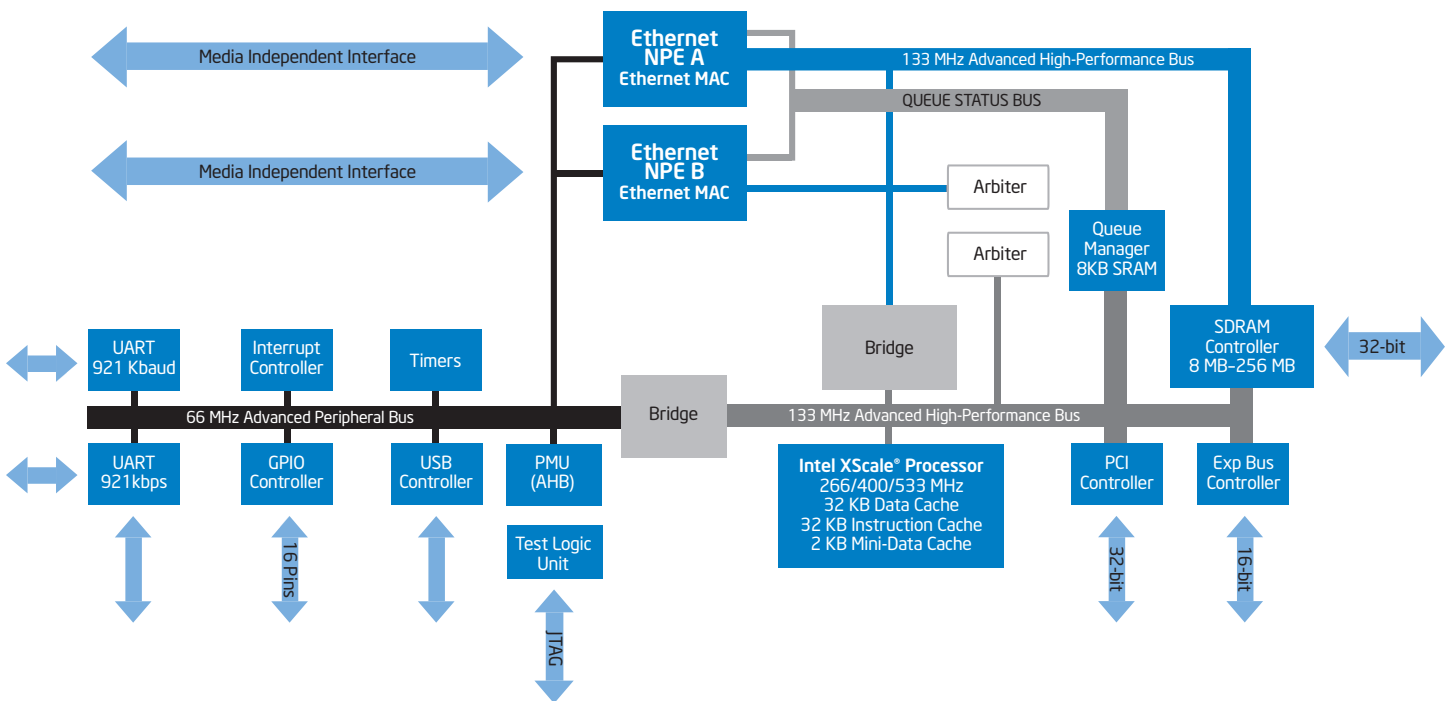
The Intel® IXP425 Network Gateway Reference Platform is a multi-service gateway, turn-key solution, allowing developers to adopt and modify platform design and quickly develop a desired solution, thus significantly reducing time-to-market. It also demonstrates the scalability and processing power of the Intel IXP425 network processor in supporting a wide range of residential gateway applications. Pin compatibility among members of the Intel IXP4XX product line further reduces hardware design complexity.

The reference platform includes the Intel IXP425 network processor at 533 MHz, SDRAM memory, flash, a four-port Ethernet switch for LAN, an additional Ethernet port for WAN, four telephone line interfaces, a mini-PCI interface to connect to a 802.11 WLAN, an ADSL mezzanine card interface, two USB 2.0 host ports and power-regulator devices.

Intel Advantage

Intel is a leading supplier of communications building blocks, adding value at many levels of integration. Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Communications Alliance (intel.com/go/ica), Intel helps developers cost-effectively meet design challenges and shorten time-to-market.

Figure 1. Intel® IXP420 Network Processor



Intel Access

Intel® Network Processors Home page	intel.com/go/networkprocessors
Developer's Site	developer.intel.com
Intel in Communications	intel.com/communications
General Information Hotline	(800) 628-8686 or (916) 356-3104 5 a.m. to 5 p.m. PST
Intel® Literature Center	(800) 548-4725 7 a.m. to 7 p.m. CST (U.S. and Canada) International locations please contact your local sales office.
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