PowerPC 405EP
Embedded Processor

With speeds of up to 333MHz and two on-chip Ethernet interfaces, the PowerPC 405EP processor provides a flexible, low cost solution for developers of wireless LAN access points, edge routers, broadband modems and other wired and wireless networking devices. A rich feature set — including an on-chip SDRAM controller and PCI interface — and extremely low power consumption make this processor an ideal choice for high-density designs where connectivity is at a premium.

The PowerPC 405 Core
The PowerPC 405 core has been optimized for system on a chip designs requiring solid performance, low cost and low power consumption. Performance is enhanced through the use of separate instruction and data cache units. A 5-stage pipeline further boosts performance by offering single cycle execution of most instructions, including loads and stores.

Dual Bus Architecture
The PowerPC 405EP offers two on-chip buses: a processor local bus (PLB) and an on-chip peripheral bus (OPB). High-speed peripherals, like the PCI bus or memory controller connect directly to the core through the high-bandwidth, 64-bit PLB. Less demanding devices are served by the 32-bit OPB. An external bus controller supports ROM, EPROM, SRAM Flash and slave peripheral devices.

Memory Support
A 4-Kbyte on-chip SRAM stores critical code and data, and provides single-cycle access for faster processing in data-intensive router and switch applications. An on-chip SDRAM controller provides access to up to 512 Mbytes of external memory, and enhances performance with separate read and write buffers.

PCI Support
The PowerPC 405EP offers a 32-bit PCI interface that is PCI V2.2 compatible. An internal PCI arbiter supports three off-chip PCI masters as well as one internal master.

Ethernet Interface
Two 10/100 Ethernet MACs are supported on-chip, making this an ideal processor for 802.11 A/B wireless access points, broadband modems, or other applications requiring dual Ethernet connections. A “Packet Reject” external interface and five counters are also included to enhance network management.

Benefits
- Delivers 133 MHz to 333 MHz performance (CPU)
- Two on-chip 10/100 Ethernet MACs
- “Packet Reject” external interface and counters enhance network management
- On-chip SRAM for faster processing in data-intensive applications
- On-chip SDRAM controller supports up to 512 Mbytes of memory
- On-chip PCI bus interface
- Small package and extremely low power consumption for high-density applications

Standard Peripherals
The PowerPC 405EP offers an array of on-chip standard peripherals. Two serial ports are provided as well as an IIC serial EEPROM controller. Up to 32 general-purpose I/Os further enhance functionality.

PowerPC Partners Ecosystem
AMCC’s embedded PowerPC processors are supported by an extensive ecosystem of products and services from a wide range of leading suppliers. AMCC’s PowerPC Partners program includes industry-standard providers of:
- Embedded operating systems
- Hardware and software development tools
- Embedded software products and services
- Board-level products
- System design services
- Technical training

For full details of the products and services available through the PowerPC Partners program, or to browse support available for a specific processor, visit: http://www.amcc.com/Embedded/Partners

AMCC also provides an evaluation kit for this PowerPC processor, including an optimized evaluation board as well as sample applications and other software.
PowerPC 405EP

Features
- Speed (frequency): 133 MHz to 333 MHz
- Performance: 1.52 DMIPS/MHz (506 DMIPS @ 333 MHz peak)
- On-chip SDRAM Controller with separate 32-byte read and 128-byte write buffers
- Supports up to 512 Mbytes of memory
- External bus controller supporting ROM, EPROM, SRAM Flash, and slave peripheral I/O devices; 8- or 16-bit addressable bus width support with 16-bit interface
- DMA controller with four independent channels supports transfers between SDRAM, PCI, internal UARTs and devices on the external peripheral bus
- 32-bit PCI V2.2 compatible PCI interface with synchronous operation and internal PCI arbiter supporting three PCI off-chip masters and one internal master; supports external arbitration
- On-chip Ethernet support with two 10/100 MACs; includes dedicated memory access layer controller and “Packet Reject” external interface
- Five general-purpose timers in addition to the built-in 405 core timer facilities
- Two serial ports
- IIC serial EEPROM controller
- Up to 32 general-purpose I/Os
- Interrupt controller including up to 13 external interrupts
- JTAG support in processor core
- RoHS compliant versions available (lead-free)

For more information, please visit [http://www.amcc.com](http://www.amcc.com).

Specifications

| Technology | 0.18 µm (0.13 µm L_eff) |
| Performance (estimated) | 202 Dhrystone 2.1 MIPS @ 133 MHz  |
| | 304 Dhrystone 2.1 MIPS @ 200 MHz  |
| | 404 Dhrystone 2.1 MIPS @ 266 MHz  |
| | 506 Dhrystone 2.1 MIPS @ 333 MHz  |

| Frequency |
| 133/133/66/66 MHz  | 200/100/66/50 MHz  |
| 266/133/66/66 MHz  | 333/111/66/66 MHz  |
| 133/133/66/66 MHz  | 200/100/66/50 MHz  |

Typical Power Dissipation
- 0.72 W @ 266 MHz
- 0.76 W @ 333 MHz

Case Temperature Range
- -40° C to +85° C

Power Supply
- 1.8 V (logic), 3.3 V (I/O), supports 5 V I/Os

Signal I/Os
- 248

Packaging
- 385-Ball, 31 mm x 31 mm, E-PBGA

For technical support, please call 1-800-840-6055 or 858-535-6517, or email support@amcc.com. AMCC reserves the right to make changes to its products, its datasheets, or related documentation, without notice and warrants its products solely pursuant to its terms and conditions of sale, only to substantially comply with the latest available datasheet. Please consult AMCC’s Terms and Conditions of Sale for its warranties and other terms, conditions and limitations. AMCC may discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information is current. AMCC does not assume any liability arising out of the application or use of any product or circuit described herein, neither does it convey any license under its patent rights nor the rights of others. AMCC reserves the right to ship devices of higher grade in place of those of lower grade. AMCC SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. AMCC is a registered trademark of Applied Micro Circuits Corporation. PowerPC and the PowerPC logo are registered trademarks of IBM Corporation. All other trademarks are the property of their respective holders. Copyright © 2006 Applied Micro Circuits Corporation. All Rights Reserved.