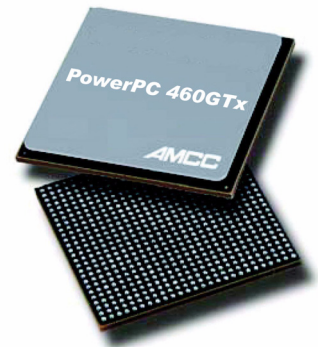


# AMCC

## PowerPC™ 460GTx

### Embedded Processor

*With speeds of up to 1.4GHz, the PowerPC 460GTx embedded processor offers a powerful mix of high bandwidth, design flexibility and robust features. With two PCI Express interfaces, an on-chip DDR2 SDRAM controller, network encryption engine, and a rich peripheral mix, the PowerPC 460GTx embedded processor is ideally suited for network and wireless infrastructure, and general purpose control plane applications.*



## PowerPC™

### Benefits

- Delivers 800MHz to 1.4GHz performance for embedded I/O processor designs
- 512KB L2 cache, may also be used as on-chip SRAM
- High-speed Processor Local Bus (PLB) with 2-way crossbar, supports 12.8 GB/s peak bandwidth
- Two Gen 2 PCI Express interfaces
- 32/64-bit SDRAM memory controller, supporting memory speeds up to DDR2-800
- Four 10/100/1000 Ethernet MACs
- On-chip encryption engine
- Offers low power dissipation and small form factor for high-density and power-conscious applications

### Superscalar PowerPC Core

To enhance overall throughput, the PowerPC superscalar core incorporates a 7-stage pipeline and executes up to two instructions per cycle. Its large 32KB data cache and 32KB instruction cache are 64-way set-associative. For additional system performance, the PowerPC core includes dynamic branch prediction and 24 digital signal processing (DSP) instructions, as well as non-blocking caches that can be managed in either write-through or write-back mode.

### High Performance Memory Support

The PowerPC 460GTx incorporates a high-performance DDR memory controller supporting DDR2 memory devices. The memory interface can operate at an effective rate of DDR800, for a maximum bandwidth of 6.4 GB/s. The interface can be configured for 64-bit or 32-bit memory implementations. Optional ECC. Industry standard DIMMS and discrete devices are supported for up to 16 GB of memory. For greater efficiency, the memory controller provides parallel paths from each of the three PLB slave segments and memory.

### On-chip Memory

The PowerPC 460GTx offers 32 KB of on-chip memory. It can be used to store boot code, security keys, or other user-specific functions.

### Gen 2 PCI Express Interfaces

The PowerPC 460GTx offers two independent PCI Express interfaces compliant with PCI Express base specification 2.0 (5 GB/s per lane). The two interfaces have 4 lanes each and can be configured as x4 or x1 ports, or be combined as an 8-lane PCI-E port. Both of the interfaces can be configured as either root or end point ports.

### Ethernet Ports, TCP/IP Acceleration, and QoS

For network connectivity options, the PowerPC 460GTx offers two integrated 10/100/1000 Ethernet ports with TCP/IP Acceleration Assist, QoS, and Jumbo Frame support. Two additional 10/100/1000 Ethernet ports are also provided, for a total of four. All four are configurable as RGMII or optionally as two GMII interfaces.

### Turbo Security Engine

The PowerPC 460GTx delivers advanced security capabilities with the Turbo Security Engine. This security engine attaches directly to the PLB bus for the fastest possible throughput between the PPC464 processor, memory, and the security engine itself. The Turbo Security engine supports DES, 3DES, AES, ARC-4 encryption, MD-5, SHA-1 and SHA-2 (SHA-256, SHA-384, SHA-512) hashing. The security engine includes a pseudo random number generator as well as header and trailer protocol processor. The engine also incorporates an on-chip true random number generator and a public key accelerator. The algorithms are compliant with FIPS-140-2 and ANSI X9.17 Annex C.

### High-Bandwidth Bus Architecture

For high bandwidth transactions, the PowerPC 460GTx uses two independent buses. The primary bus is a coreConnect 128-bit processor local bus (PLB), with a two-way crossbar configuration. It provides separate 128-bit read and 128-bit write data buses for each of the two ways. The four 128-bit data buses may operate concurrently, providing up to 12.8 GB/s of peak on-chip bandwidth. The secondary bus is a 128-bit bus with separate 128-bit read and 128-bit write data buses. These two 128-bit data buses may also operate concurrently, providing additional up to 6.4 GB/s of peak bandwidth. The aggregate on-chip bus bandwidth is 19.2 GB/s. The SDRAM is attached to three PLB slave ways to provide optimal access to memory from any other peripheral/core. Lower bandwidth I/O devices are supported by the on-chip peripheral bus (OPB).

### External Bus Interface

To accommodate connectivity with other devices, the PowerPC 460GTx offers a 32-bit bus supporting up to four ROM, EPROM, SRAM, flash memory or slave peripheral I/O devices and speeds up to 100 MHz. The 4-Channel DMA is also supported.

### Standard Peripherals

Two IIC controllers operate at 100/400 KHz. Both support master mode with multi-master and reset and target mode, and one supports serial boot ROM. The peripheral set also includes two UARTs, up to 32 general-purpose I/Os (GPIO) and general-purpose timers.

### 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™ 460GTx

### Features

- CPU Speed (frequency): 800MHz to 1.4GHz
- Performance: 2.0 DMIPS/MHz (2800 DMIPS @ 1.4GHz peak)
- 32 KB -I/32 KB D L1 caches, and 512 KB L2/SRAM with parity protection
- 32/64-bit DDR II SDRAM Controller, for up to DDR800 operation
- Two Gen 2 PCI Express interfaces, with four lanes configurable as two x4, or x1, or they can be combined as an 8-lane PCI-E; compliant with PCI Express base specification 2.0; 5.0 Gb/s full duplex per lane; all ports configurable as root or end point
- High bandwidth DMA engine
- External bus control (EBC) Interface (up to 100 MHz) with 29-bit address bus, 32-bit data bus supporting up to four ROM, RAM, EPROM, flash memory, or peripheral devices.
- Turbo Security Engine with IPsec/SSL hardware acceleration
  - DES, 3DES, AES, ARC-4 encryption, MD-5, SHA-1 and SHA-2 (SHA-256, SHA-384, SHA-512) hashing.
  - True random number generator and a public key accelerator.
- NAND Flash controller, which supports one to four banks of NAND Flash memory devices; direct interfacing to discrete NAND Flash devices (up to four devices) and Smart-Media Card socket (22-pins); 4 MB to 256 MB device sizes supported; boot-from-NAND supported
- 4-channel DMA -available for internal use and 2 channels for external use; scatter/gather capability
- (4) Ethernet 10/100/1000-Mbit/s full duplex MACs, with Quality of Service (QoS) support
  - IPv4 and IPv6 Internet protocols
  - Jumbo Frames
  - Four ports RGMII, RTBI, or optional two ports GMII interfaces
  - CRC32 error detection and checking
  - TCP/IP and iSCSI Acceleration Hardware support
  - DMA capability by means of memory access layer (MAL)
- Two serial ports (16750-compliant UARTs) with 64-byte FIFOs
- Two IIC controllers
- Up to 32 General Purpose I/Os (GPIO)
- General purpose timers
- Universal Programmable Interrupt Controller supports 16 external interrupt sources and 101 internal sources
- Support for JTAG board testing, JTAG debuggers, and 4XX instruction trace

For more information on the product features, visit our Web site at: <http://www.amcc.com>

### Specifications

#### Technology

- 90 nm CMOS

#### Performance (est.)

- 2800 Dhrystone MIPS @ 1400 MHz

#### Memory

- 64-bit width: up to 6.4 GB/s (DDR800)

#### PCI Express

- Two 4-lane @ 5.0 Gb/s per lane/direction (can be combined as one 8-lane PCI-E)

#### Typical Power Dissipation

- 6 - 10W @ 1000 MHz (estimated, depending on configuration)

#### Case Temperature Range

- 0° C to +95° C (case temperature)

#### Power Supply

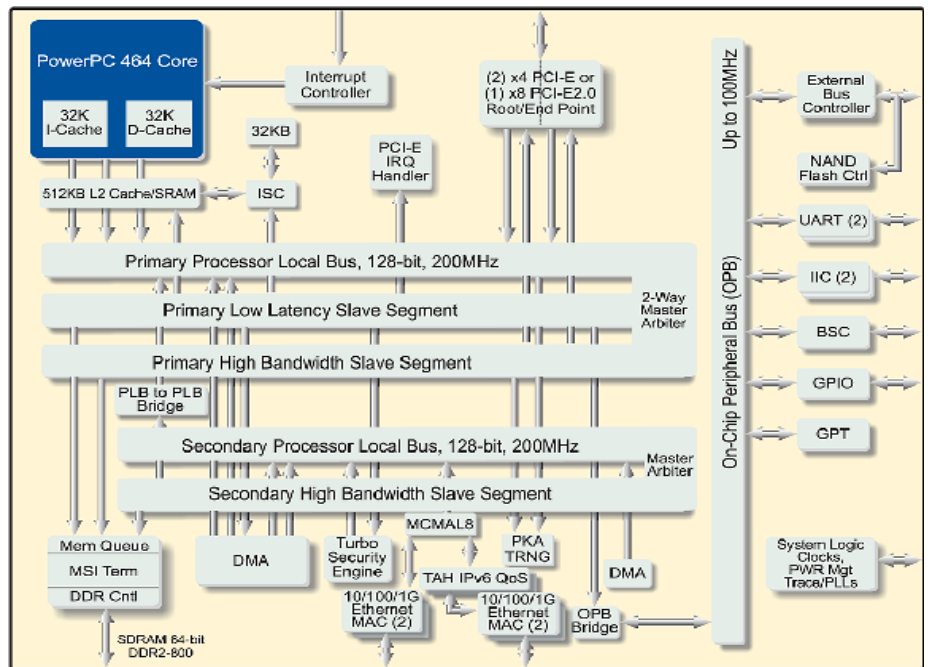
- 1.225 V (logic), 1.8V (SDRAM), 3.3 V (peripherals), 2.5 V (Ethernet, other I/O)

#### Signal I/Os

- 435

#### Packaging

- 783 FC-PBGA, 29mm x 29mm with 1.0mm pad pitch



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