Integrated Communications Processor

MPC8536E PowerQUICC® III Processor

High-performance embedded computing
with advanced energy management

Overview

Revolutionary Evolution

The MPC8536E PowerQUICC® III integrated communications processor is designed to deliver gigahertz-class complex application processing performance with exceptional feature integration and high-speed connectivity for IP network and advanced media processing applications.

It combines a robust e500 processor core, built on Power Architecture® technology, with enhanced peripherals and interconnect technology to balance processor performance with I/O system throughput. Designed to achieve clock speeds up to 1.5 GHz, the MPC8536E processor includes advanced power and energy management features that enable developers to design next-generation embedded Internet media processing applications with energy efficiency levels under the environmental and governmental energy regulatory requirements.

Highlights

High-Speed Connectivity

Freescale's MPC8536E processor is positioned to offer a wide range of high-speed connectivity options. The flexibility of the processor is due to highly integrated speed- and latency-optimized technology. It is a highly scalable processor designed to handle complex, computationally demanding processing tasks with ease. The MPC8536E processor includes enhanced three-speed Ethernet with TCP/UDP/IP offload, direct FIFO mode for ASIC connectivity and support for multiple PCI Express® interface options. It also provides connectivity solutions for interfacing

MPC8536E Block Diagram
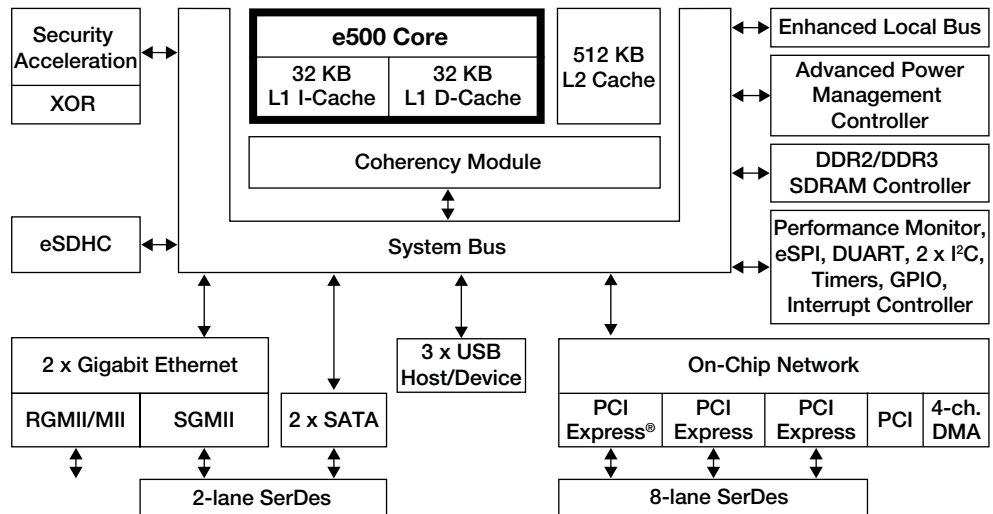
☐ Cores

modern high-speed ASICs. Moreover, the MPC8536E processor features a field-proven, next-generation memory controller and an optional hardware acceleration engine for encryption protocols.

System-Level Cost Savings

The MPC8536E processor's highly integrated architecture is designed to enhance performance and deliver system-level cost savings in a small-board footprint. Key system-level peripherals include dual Gigabit Ethernet, triple USB 2.0, dual SATA, SD/MMC, triple PCI Express, PCI, enhanced local bus, dual I2C, SPI and DUART. Special care was taken to design the MPC8536E processor's pin locations for mounting on low-cost six-layer PCBs. The MPC8536E is a full-featured, high-performance, low-power processor that is designed to support fanless operation for power-sensitive applications.

Advanced Energy-Efficient Modes

Balancing the performance requirements for powerful new networking- and Internet-centric applications, with the increasing concerns over energy consumption, is driving manufacturers to develop intelligent strategies for optimizing performance within specific energy budgets. This is a key challenge for the next generation of embedded systems. The MPC8536E processor implements sophisticated power-saving modes for managing energy consumption in both dynamic and static power modes. These include the traditional nap, doze and sleep plus the new jog (dynamic frequency scaling) and packet-lossless deep sleep. Designers will be able to leverage these modes to efficiently match work accomplished with the correct level of energy consumed.

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Applications

The combination of these features makes the MPC8536E processor an optimal embedded processing solution for Ethernet or PCI Express interworking applications, such as enterprise networking, storage and multifunction printer (MFP) imaging applications. The device is ideal for connecting high-speed DDR memory interfaces and peripherals in high-performance systems. Examples include control plane processing, protocol processing and other compute-intensive applications requiring high-speed communications with a low pin count.

Key Features

- e500 core, built on Power Architecture technology
  - Dual dispatch superscalar, seven-stage pipeline design with out-of-order issue and execution
  - 3450 DMIPS at 1.5 GHz
  - 36-bit physical addressing
- Integrated L1/L2 cache
  - L1 cache—32 KB data cache and 32 KB instruction cache with line-locking support
  - L2 cache—512 KB (8-way set associative), 256/128/64/32 KB can be used as SRAM, L1 and L2 hardware coherency, I/O transactions can be stashed into L2 cache regions

- Enhanced hardware and software debug support
- Optional integrated security engine supporting DES, 3DES, MD-5, SHA-1/2, AES, RSA, RNG, Kasumi F8/F9 and ARC-4 encryption algorithms (indicated by an E in the device number)
- Double-precision embedded scalar and vector floating-point APUs
- 64-/32-bit DDR2/DDR3 memory controller scaling to 667 MHz data rate
- 3 x PCI Express high-speed interconnect interfaces
- 32-bit PCI interface
- Integrated four-channel DMA controller
- On-chip network (OCeaN) switch fabric
- Advanced power management controller
- 2 x I^{2}C
- Dual universal asynchronous receiver/transmitters (DUART)
- eSPI and enhanced local bus
- General-purpose input/output (GPIO)
- Programmable interrupt controller (PIC)
- 2 x Gigabit Ethernet with SGMII support and TCP/UDP/IP offload
- 3 x USB host/device interfaces
- 2 x SATA
- SD/MMC removable card interfaces
- IEEE® 1588 support
- 783-pin FC-PBGA package
- Operating temperature range:
  - 0ºC T$_A$ (ambient temp) to +90ºC T$_J$ (junction temp)
  - 0ºC T$_A$ to +105ºC T$_J$
  - -40ºC T$_A$ to +105ºC T$_J$

Development Support

- MPC8536DS development system
- MPC8536RDK low-cost reference design kit using COM Express module
- MPC8536RD low-cost digital signage media player reference design kit using COM Express module
- CodeWarrior™ V8.8.3
- Linux® BSP
- Wind River VxWorks® RTOS
- MontaVista Linux Professional Edition
- Green Hills Integrity® RTOS
- QNX® Neutrino® RTOS
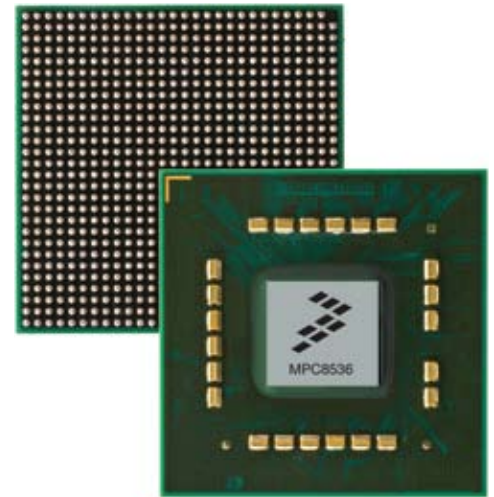
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