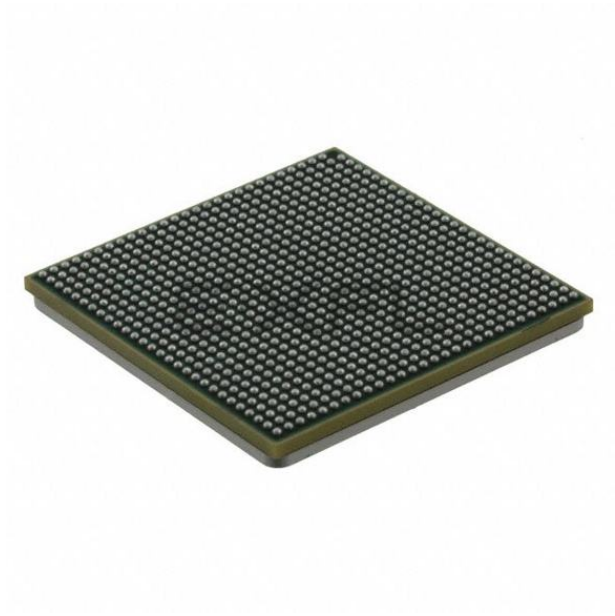


Welcome to E-XFL.COM

Understanding Embedded - Microprocessors

Embedded microprocessors are specialized computing chips designed to perform specific tasks within an embedded system. Unlike general-purpose microprocessors found in personal computers, embedded microprocessors are tailored for dedicated functions within larger systems, offering optimized performance, efficiency, and reliability. These microprocessors are integral to the operation of countless electronic devices, providing the computational power necessary for controlling processes, handling data, and managing communications.

Applications of Embedded - Microprocessors

Embedded microprocessors are utilized across a broad spectrum of applications, making them indispensable in

Details	
Product Status	Obsolete
Core Processor	PowerPC e500
Number of Cores/Bus Width	1 Core, 32-Bit
Speed	1.333GHz
Co-Processors/DSP	Signal Processing; SPE, Security; SEC
RAM Controllers	DDR, DDR2, SDRAM
Graphics Acceleration	No
Display & Interface Controllers	-
Ethernet	10/100/1000Mbps (4)
SATA	-
USB	-
Voltage - I/O	1.8V, 2.5V, 3.3V
Operating Temperature	0°C ~ 105°C (TA)
Security Features	Cryptography, Random Number Generator
Package / Case	783-BBGA, FCBGA
Supplier Device Package	783-FCPBGA (29x29)
Purchase URL	https://www.e-xfl.com/pro/item?MUrl=&PartUrl=mpc8547epxaujc

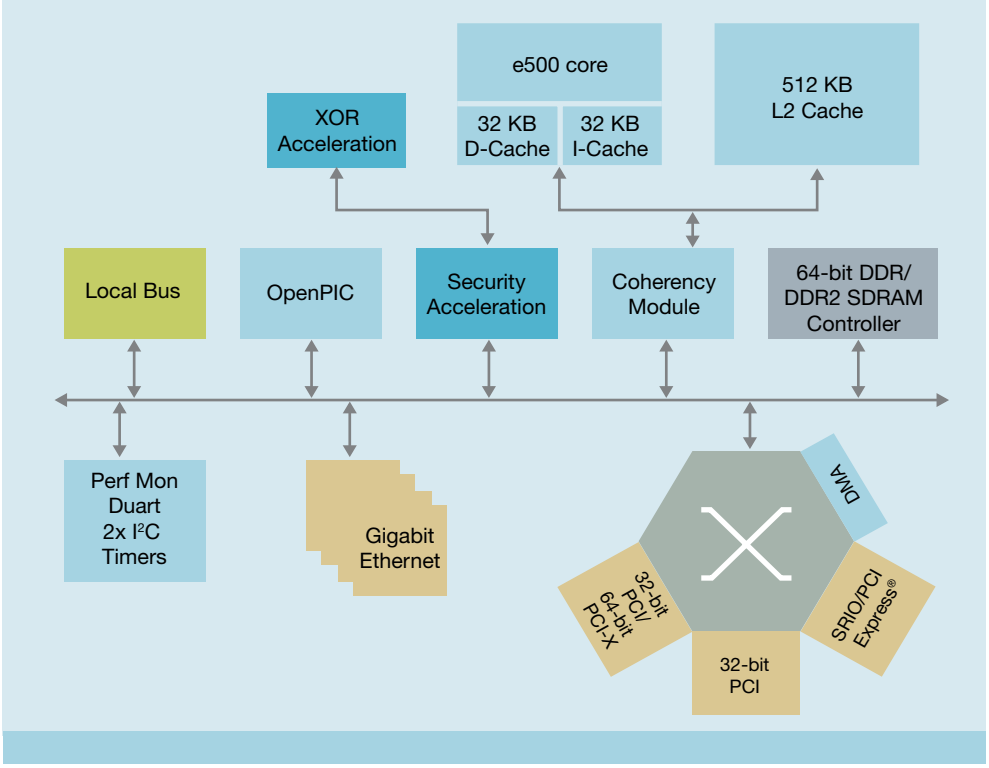
MPC8548E PowerQUICC™ III Processor Family

Key Features

The MPC8548E networking/telecom processor features an embedded e500 core, targeting up to a 1.5 GHz core operation, an integrated security engine, 64-bit DDR/ DDR2 controller scaling up to 667 MHz data rate, dual 32-bit PCI or 64-bit PCI-X, 4-bit serial RapidIO® fabric technology and 4-bit PCI Express® (or single 8-bit PCI Express 1.0a), local bus I/O interfaces and four Gigabit Ethernet interfaces. The combination of these features makes this device an optimal communications processing solution for Ethernet-only or RapidIO interworking applications, such as enterprise networking, telecom transmission and switching and 3G wireless base stations. The security engine includes Kasumi algorithm acceleration, making the MPC8548E an ideal choice for enhancing security protocol processing in 2.5G and 3G wireless network infrastructure. This device's integrated security also includes XOR acceleration, which enhances system performance by offloading the compute-intensive parity check in small-medium business enterprise and redundant array of inexpensive disk storage applications.

The MPC8548E device is the first integrated communications processor to comply with the Serial RapidIO interconnect specification, Revision 1.2, from the RapidIO Trade Association. The RapidIO serial fabric interface is ideal for connecting MPC8548 processors and peripherals in high-performance distributed systems. Examples include control plane processing, protocol processing and other compute-intensive applications requiring high-speed, peer-level communications with a low pin count, such as those found in AdvancedTCA® platforms.

MPC8548/E Block Diagram



The PowerQUICC™ III RapidIO ecosystem is more than 50 members strong and includes industry-leading embedded vendors who provide host processors, DSPs, communications processors, backplane interfaces, switches, systems, tools, operating systems and services. The 90 nm PowerQUICC III family includes the MPC8548E, MPC8547E, MPC8545E and MPC8543E.

The MPC8547 is targeted toward storage markets, the MPC8545 includes features for printing and imaging markets and the MPC8543 is targeted at general purpose data plane processing requirements—rounding out the product family.

freescale semiconductor

High-Speed Connectivity

Freescale's MPC8548E processor offers a wide range of high-speed connectivity options, including enhanced Triple Speed Ethernet, serial RapidIO interconnect technology and PCI Express. Support for these high-speed interfaces enables scalable connectivity to network processors and/or ASICs in the data plane while the PowerQUICC III handles complex, computationally demanding control plane processing tasks. These processors also feature next-generation double data rate (DDR2) memory controllers, enhanced Gigabit Ethernet support, double precision floating point and integrated security engines that support the Kasumi algorithm needed for 3G wireless security. In addition, support is provided for exclusive OR (XOR) acceleration needed for parity in storage applications.

MPC8548E Technical Specifications

- Embedded e500 core, initial offerings up to 1.33 GHz, targeting up to 1.5 GHz
  - Dual dispatch superscalar, seven-stage pipeline design with out-of-order issue and execution
  - 3065 MIPS at 1333 MHz (estimated Dhrystone 2.1)
    - 36-bit physical addressing
- Enhanced hardware and software debug support
- Double-precision embedded scalar and vector floating-point APUs
- Memory management unit (MMU)
- Integrated L1/L2 cache
  - L1 cache—32 KB data and 32 KB instruction cache with line-locking support
  - L2 cache—512 KB (8-way set associative); 512 KB/256 KB/128 KB/64 KB can be used as SRAM
  - L1 and L2 hardware coherency
  - L2 configurable as SRAM, cache and I/O transactions can be stashed into L2 cache regions
- Integrated DDR memory controller with full ECC support, supporting:
  - 200 MHz clock rate (400 MHz data rate), 64-bit, 2.5V/2.6V I/O, DDR SDRAM
  - 333 MHz clock rate (up to 667 MHz data rate) DDR2 SDRAM
- Integrated security engine supporting DES, 3DES, MD-5, SHA-1/2, AES, RSA, RNG, Kasumi F8/F9 and ARC-4 encryption algorithms
- Four on-chip triple-speed Ethernet controllers (GMACs) supporting 10 and 100 Mbps, and 1 Gbps Ethernet/ IEEE® 802.3 networks with MII, RMII, GMII, RGMII, RTBI and TBI physical interfaces
  - TCP/IP checksum acceleration
  - Advanced QoS features
- General-purpose I/O (GPIO)
- Serial RapidIO and PCI Express high-speed interconnect interfaces, supporting:
  - Single x8 PCI Express, or
  - Single x4 PCI Express and single 4x serial RapidIO
- On-chip network (OCeaN) switch fabric
- Multiple PCI interface support
  - 64-bit PCI 2.2 bus controller (up to 66 MHz, 3.3V I/O)
  - 64-bit PCI-X bus controller (up to 133 MHz, 3.3V I/O), or
  - Flexibility to configure two 32-bit PCI controllers
- 166 MHz, 32-bit, 3.3V I/O, local bus with memory controller
- Integrated four-channel DMA controller
- Dual I^2C and Dual Universal Asynchronous Receiver/Transmitter (DUART) support
- Programmable interrupt controller (PIC)
- IEEE 1149.1 JTAG test access port
- 1.2V core voltage with 3.3V and 2.5V I/O
- 783-pin FC-BGA package

MPC854X Product Comparison

	MPC8548E	MPC8547E	MPC8545E	MPC8543E
L2 cache	512 KB	512 KB	512 KB	256 KB
64-bit DDR2 support	Yes	Yes	Yes	Yes
Support for battery-backed DDR	Yes	Yes	-	-
PCI/PCI-X	Single 64-bit PCI/PCI-X or dual 32-bit PCI	64-bit PCI/PCI-X	Single 64-bit PCI/PCI-X or dual 32-bit PCI	32-bit PCI
Enhanced three-speed Ethernet Controller (eTSECs)	4	4	2	2
High-speed interconnects	x8/x4/x2/x1 PCI Express® 4x/1x serial RapidIO® and x4/x2/x1 PCI Express	x4/x2/x1 PCI Express	x4/x2/x1 PCI Express	4x/1x Serial RapidIO x4/x2/x1 PCI Express
Double-precision floating-point APU	Yes	Yes	Yes	Yes
Integrated security engine	Yes	Yes	Yes	Yes
XOR acceleration	Yes	Yes	-	-

Learn More: For current information about Freescale products and documentation, please visit **www.freescale.com**.

Document Number: MPC8548PQIIIFS
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