

PowerPC 603e RISC Microprocessor

200, 220, 225, 233, 240MHz

Highlights

Power Management Unit

- Static low-power design
- Dynamic power management
- Processor:bus clock ratio of half integer increments up to 6:1

Instruction Fetching & Branch Unit

- 6-instruction prefetch queue
- Static branch prediction

Dispatch Unit

- Dispatches 2 instructions per cycle
- 4-stage pipeline: Fetch, Dispatch, Execute, and Complete

Load/Store Unit

- One cycle cache access
- Executes cache and TLB instructions
- Alignment and number denormalization
- Hit under reload instruction

Fixed-Point Execution Unit

- One cycle add, subtract, shift, or rotate
- Hardware multiply and divide
- Thirty-two, 32-bit General Purpose Registers

Floating-Point Execution Unit

- Optimized for single-precision multiply/add
- IEEE-754 standard single-and double-precision floating point arithmetic
- Thirty-two, 64-bit Floating Point Registers

System Unit

- Executes condition register logical, special register transfer, and other system instructions
- Executes integer add/compare instructions

Memory Management Unit

- 52-bit virtual and 32-bit real addressing
- 8 Block Address Translation registers
- 64-entry, 2-way data and instruction TLB
- Fast-trap mechanism for software reload TLB
- Support Big/Little-endian addressing

Cache Unit

- 16K, 32 byte line, 4-way set associative instruction cache
- 16K, 32 byte line, 4-way set associative data cache
- 3-state coherency (MEI)
- Physically tagged and addressed
- Copy-back data cache
- Hardware support for data coherency

Bus Interface Unit

- General purpose interface for a wide range of system configurations
- 32-bit address and selectable 64- or 32-bit data bus
- Powerful diagnostic and test interface through the Common On-Chip Processor (COP) and IEEE 1149.1 (JTAG) interface
- Parity checking on bus
- Fast reset due to Level Sensitive Scan Design (LSSD)

Product Description

The PowerPC 603e™ microprocessor is a 32 bit implementation of the PowerPC™ family of Reduced Instruction Set Computer (RISC) microprocessors. The PowerPC 603e microprocessor is especially suitable for the notebook, mobile and power conscious desktop computing segments. The extremely low typical power consumption of 3.7 watts at 240MHz makes it ideal for battery powered portables while delivering impressive performance of desktop system productivity applications.

The combination of PowerPC Architecture™ and state-of-the-art CMOS manufacturing process technology enable the PowerPC 603e microprocessor to feature a 2.5 volt core logic design as well as delivering 3.3 volts for I/O support.

Enhancements to this generation of the PowerPC 603e microprocessor family include:

- Higher clock frequencies delivering higher levels of performance
- 2x to 6x bus divider ratios, with half step increments, making the PowerPC 603e microprocessor easier to design in
- A performance enhancing feature supporting misaligned little endian accesses for certain operating system environments

Specifications

PID 71-603e

Technology	0.5µm / 0.25 Leff - CMOS technology, five levels of metal
Die Size	75 mm x 10.5 mm (79 mm ²)
Number of Transistors	~ 2.6 million
Performance (est)	5.6 SPECint95, 4.1 SPECfp95 @ 200/66, 1M L2 SDRAM 6.1 SPECint95, 4.5 SPECfp95 @ 220/74, 1M L2 SDRAM 6.3 SPECint95, 4.6 SPECfp95 @ 225/75, 1M L2 SDRAM 6.0 SPECint95, 4.1 SPECfp95 @ 233/66, 1M L2 SDRAM 6.2 SPECint95, 4.2 SPECfp95 @ 240/68, 1M L2 SDRAM
CPU bus Ratio	2X, 2.5X, 3X, 3.5X, 4X, 4.5X, 5X, 5.5X, 6X
Cache size	16k Instruction 16k Data
Signal I/Os	165
Power Supply	3.3V ± 5% I/O 2.5V ± 5% core
Power Dissipation Typ./Max.(est)	3.5/5.0W @ 200MHz 3.7/5.8W @ 240MHz
Temperature Range	0°C to 105°C
Packaging	Ball Grid Array (256 pins) Pin Grid Array (288 pins)
Part Numbers	IBMPPC603e2pr-200 IBMPPC603e2pr-220 IBMPPC603e2pr-225 IBMPPC603e2pr-233 IBMPPC603e2pr-240

p = package type; r = design revision level.



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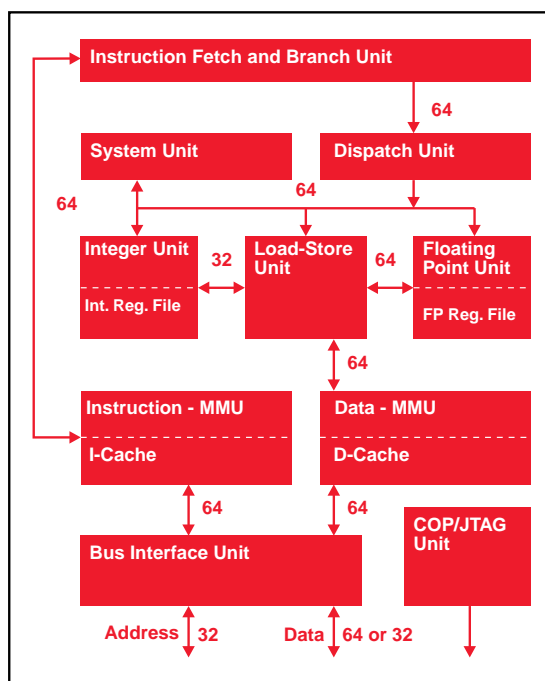
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