

# MPC8610

## Integrated host processor

Freescall's MPC8610 processor is engineered to deliver breakthrough performance, connectivity and integration for embedded applications that process or display graphical images, such as kiosks, robotics, in-vehicle infotainment, cockpit displays, single-board computers and multi-function printers and scanners.

The MPC8610's strength is its integration—the high-performance e600 core, built on Power Architecture™ technology, combined with the PowerQUICC® system-on-chip (SoC) platform and an LCD controller. With e600 core performance and integrated northbridge and southbridge functionality, this single chip replaces what could take up to four chips using other solutions. Moving all core-to-peripheral connections inside the device greatly reduces the number of high-speed parallel buses to be routed on the circuit board. This translates into smaller boards with fewer layers and higher processing density.

The MPC8610 features a high-performance, superscalar e600 core operating between 667 MHz and 1333 MHz. Its smaller 256 KB backside L2 cache saves power and cost for target applications that typically don't need the full 1 MB cache available in other e600-based devices. The core also includes the AltiVec® 128-bit vector processing engine which EEMBC benchmarks show to give a 3 to 10 times performance increase for applications such as:

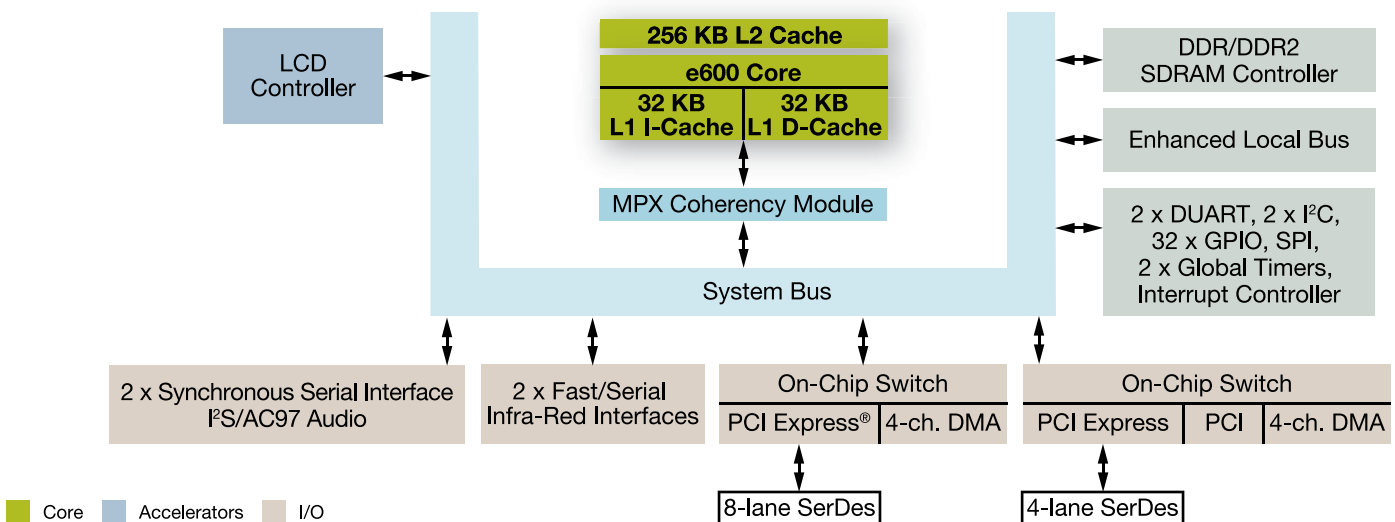
- MP3/AAC audio encoding/decoding acceleration
- MPEG-2/4 H.264 movie encoding/decoding acceleration
- 3-D geometry, processing acceleration
- Filter processing acceleration (image/voice recognition)

Because MPC8610 peripherals are derived from the field-proven PowerQUICC family of processors, and the e600 core is essentially the same processor as that used

in Freescall's high-performance MPC744x and MPC864x families, software applications written for those devices should port easily to the MPC8610. This is valuable for customers who want to reuse software in applications that require slightly less performance, lower power consumption and lower system cost.

A significant advantage of the MPC8610 is the fully integrated MPX bus that can run three times faster than an external MPX bus in previous generation devices. With MPX bus speed proportional to memory bandwidth, and inversely related to memory latency, this integrated bus relieves system bottlenecks for applications limited by either condition. In addition, the MPC8610 features an integrated memory controller designed to support either DDR or DDR2 memories, increasing bandwidth and capacity while reducing latency. The memory controller supports error correcting codes to ensure data integrity, a basic requirement for any application that needs reliability.

MPC8610 Block Diagram



## MPC8610 Processor Highlights

CPU Speeds (internal)	<ul style="list-style-type: none"> <li>• 667, 800, 1000, 1066 and 1333 MHz</li> </ul>
MPX Bus (integrated)	<ul style="list-style-type: none"> <li>• 333, 400 and 533 MHz</li> </ul>
Maximum Power (preliminary)	<ul style="list-style-type: none"> <li>• 12 watts at 667 MHz and 15 watts at 1066 MHz</li> </ul>
L1 Cache (integrated)	<ul style="list-style-type: none"> <li>• 32 KB instruction and 32 KB data with parity protection</li> </ul>
L2 Cache (integrated)	<ul style="list-style-type: none"> <li>• 256 KB backside cache with optional ECC</li> </ul>
Core Execution Units	<ul style="list-style-type: none"> <li>• Integer (4), double precision floating-point, AltiVec® (4), branch, load/store</li> </ul>
LCD Controller	<ul style="list-style-type: none"> <li>• Drives TTL display with real-time blending of up to three planes</li> <li>• Maximum display resolution SXGA 1280 × 1024 with 60 Hz refresh</li> <li>• Display color depth up to 24 bits per pixel (bpp)</li> </ul>
Audio Interface	<ul style="list-style-type: none"> <li>• Two synchronous serial interface (SSI) controllers for I<sup>2</sup>S or AC97 audio inputs/outputs</li> </ul>
PCI Express® Interface	<ul style="list-style-type: none"> <li>• One 1x/2x/4x/8x and one 1x/2x/4x serial (2.5 Gbaud/lane)</li> </ul>
PCI Interface	<ul style="list-style-type: none"> <li>• PCI 2.2, 32-bit, 33 MHz and 66 MHz</li> </ul>
Memory Controller	<ul style="list-style-type: none"> <li>• DDR/DDR2 SDRAM with ECC (333, 400 and 533 MHz data rates)</li> </ul>
DMA Controller	<ul style="list-style-type: none"> <li>• Two four-channel controllers</li> </ul>
Enhanced Local Bus	<ul style="list-style-type: none"> <li>• 32-bit multiplexed address/data for ROM, NAND or NOR flash (8- or 16-bit data for NAND flash)</li> <li>• Non-multiplexed 32-bit data / 26-bit address for ROM, NAND or NOR flash (8- or 16-bit data for NAND flash)</li> </ul>
Other Interfaces	<ul style="list-style-type: none"> <li>• Two I<sup>2</sup>C controllers</li> <li>• Two dual universal asynchronous receiver/transmitters (DUARTs)</li> <li>• Two Fast Infra-Red interfaces (FIRI)</li> <li>• Serial peripheral interface (SPI) supporting 4- through 16- or 32-bit characters</li> <li>• Up to 32 general-purpose input/output (GPIO) ports</li> </ul>
Other Functions	<ul style="list-style-type: none"> <li>• One programmable interrupt controller (PIC)</li> <li>• Two global timer modules and a watchdog timer facility</li> </ul>
Package	<ul style="list-style-type: none"> <li>• 29 x 29 mm, 783-pin, flip chip plastic ball grid array (PBGA)</li> </ul>
Process Technology	<ul style="list-style-type: none"> <li>• 90 nm silicon-on-insulator (SOI)</li> </ul>
Operating Temperature Range	<ul style="list-style-type: none"> <li>• -40°C to +105°C junction temperature (Tj)</li> </ul>
Availability	<ul style="list-style-type: none"> <li>• Samples and evaluation boards now</li> <li>• Production mid 2008</li> </ul>

The MPC8610 processor provides extensive application flexibility.

**Example 1:** A kiosk uses MPC8610 to drive the interactive touch-panel display and audio outputs, recognize a facial or fingerprint image and communicate across PCI-connected Ethernet ports to send and receive data from a remote database.

**Example 2:** An aircraft uses MPC8610 to drive a Primary Flight Display (PFD), Multi-Functional Display (MFD) and Electronic Flight Instrument Systems (EFIS).

**Example 3:** A mobile robot uses MPC8610 to process camera inputs to determine its location and navigate in a room or outdoors.



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