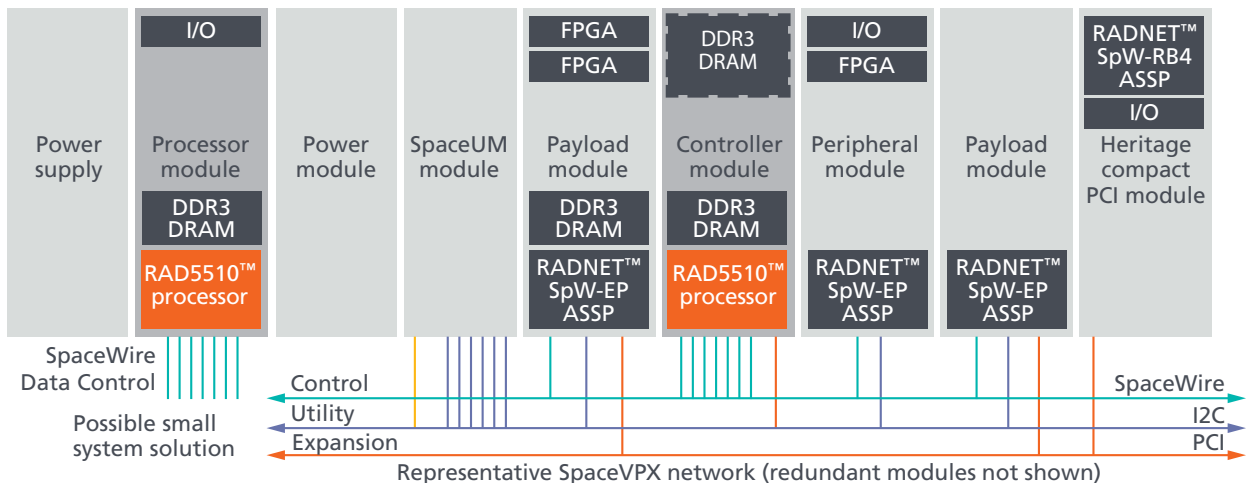
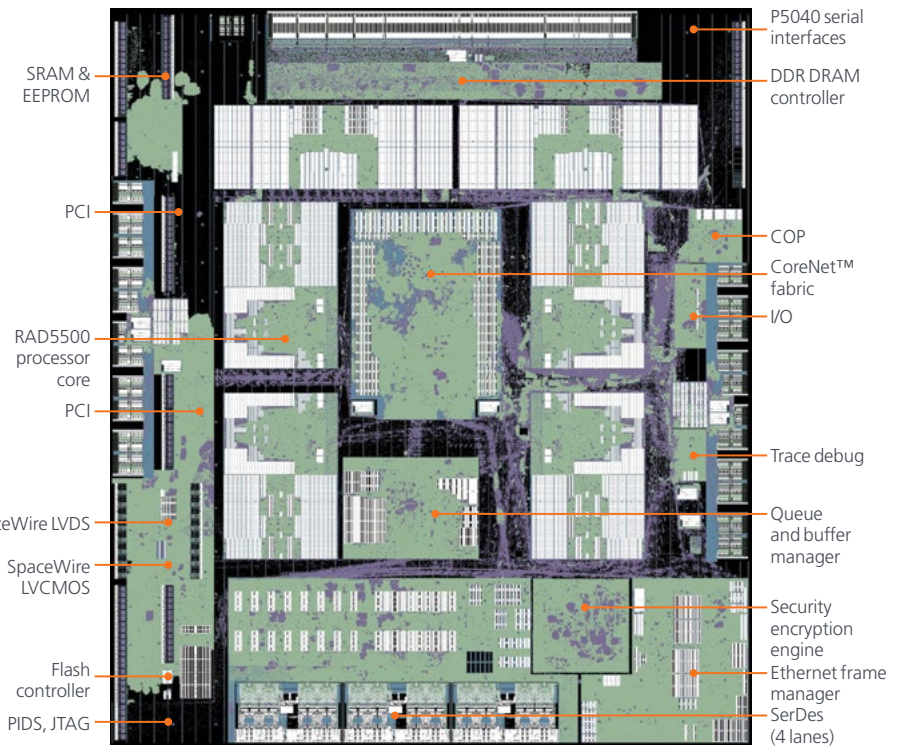


# RAD5510™ single-core system-on-chip Power Architecture® processor

The RAD5510 system-on-chip (SoC) microprocessor is a highly integrated upgrade solution for current RAD750® microprocessor operators, providing advanced capabilities and significantly improved power and performance based on state-of-the-art processing technology.

The RAD5510 SoC microprocessor offers an improved implementation of the Power Architecture processor with a 64-bit extension and portability of heritage software. Memory speed and capacity are both increased due to a DDR2/3 DRAM memory interface, and I/O capability includes both a 32-bit, 33 MHz peripheral component interface (PCI) port and a SpaceWire router.

Offering an enhanced technology extension for current RAD750® microprocessor users, this advanced microprocessor is built around a RAD5500™ 32/64-bit Power Architecture processor core with two levels of on-die cache, parallel PCI interface, 16-port SpaceWire router, and gigabit Ethernet support.



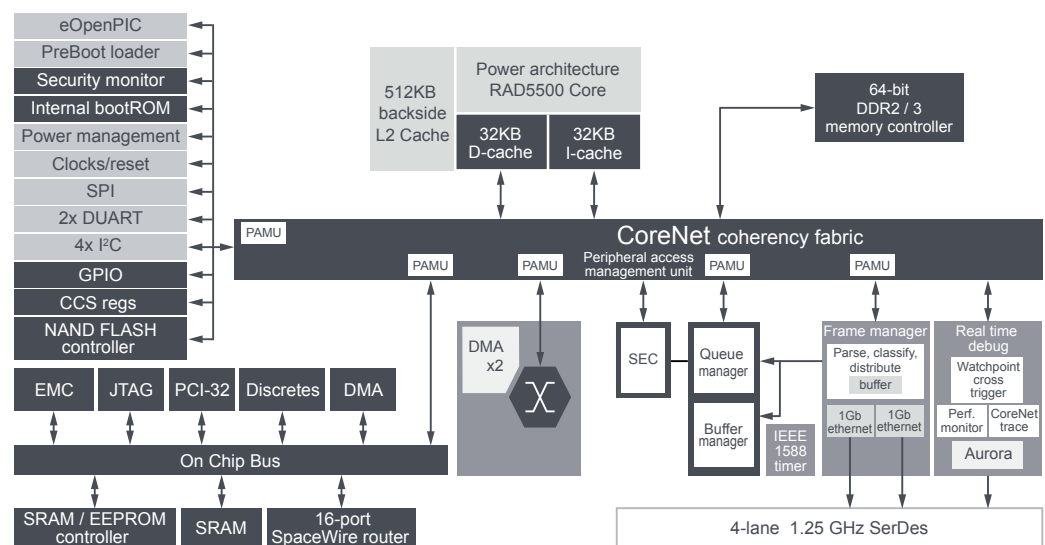
## Key features and benefits

- Controller module performs a combined data and control switch function across the SpaceWire control plane
- Processor throughput of up to 1.4 giga operations per second (GOPS)/0.9 GFLOPS and a memory bandwidth of up to 51 Gb/s offers superior efficiency
- Support for the gigabit Ethernet interfaces provide direct connection to a local area network
- Reduced size, weight, and power based on the QorIQ® architecture enables compatibility with current RAD750 microprocessors with enhanced capabilities
- 64-bit core increases performance, supporting direct addressability to 64GB of memory, improving double precision floating point performance, and achieving 3.0 Dhrystone MIPS (DMIPS)/MHz
- Dual levels of cache memory minimizes access to main memory, maximizing effective throughput
- Data Path Acceleration Architecture (DPAA) offloads functions from the processor core to further improve its effectiveness
- Trust architecture infrastructure provides secure boot, integrity code testing, data encryption, and partitioning of the system, enabling secure operation
- 16-port router supports space-specific SpaceWire serial protocol, eliminating the need for a separate router

## Specifications

<b>Technology</b>	Radiation-hardened by design RH45® circuit library Trusted foundry 45nm silicon-on-insulator (SOI) process 1752-pin, 45mm ceramic column grid array package
<b>Temperature</b>	Operating at -55 to +125 degrees Celsius
<b>Radiation-hardness</b>	Total ionizing dose: 1 Mrad (Si) Single event upset (SEU): SRAMs: <2E-9 upsets/bit-day, prior to the integrated ECC correction SEU: Flip-flops: 8E-14 upsets/bit-day Latch-up immune
<b>Power Supply</b>	0.95 V +/- 5 percent core 1.5 or 1.8 V +/- 5 percent SerDes and double data rate (DDR) I/O 1.8 V, 2.5 V, and/or 3.3 V I/O (user programmable)
<b>Power dissipation</b>	11.5 watts at 95 degrees Celsius and +5 percent voltage All interfaces operational
<b>Interfaces</b>	16 SpaceWire links with embedded router Two gigabit Ethernet serial links Four inter-integrated circuit (I2C) interfaces Serial peripheral interface (SPI) 32-bit parallel PCI Two dual UARTs (four simple or two advanced)
<b>Input and output</b>	
<b>Memory</b>	DDR2/3 DRAM interface NAND flash controller SRAM/EEPROM controller SRAM/EEPROM controller
<b>Test and debug</b>	Aurora protocol SerDes trace/debug JTAG master and slave interfaces

## Hardware block diagram



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Cleared for open publication on 00/00



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CS-17-A05-06