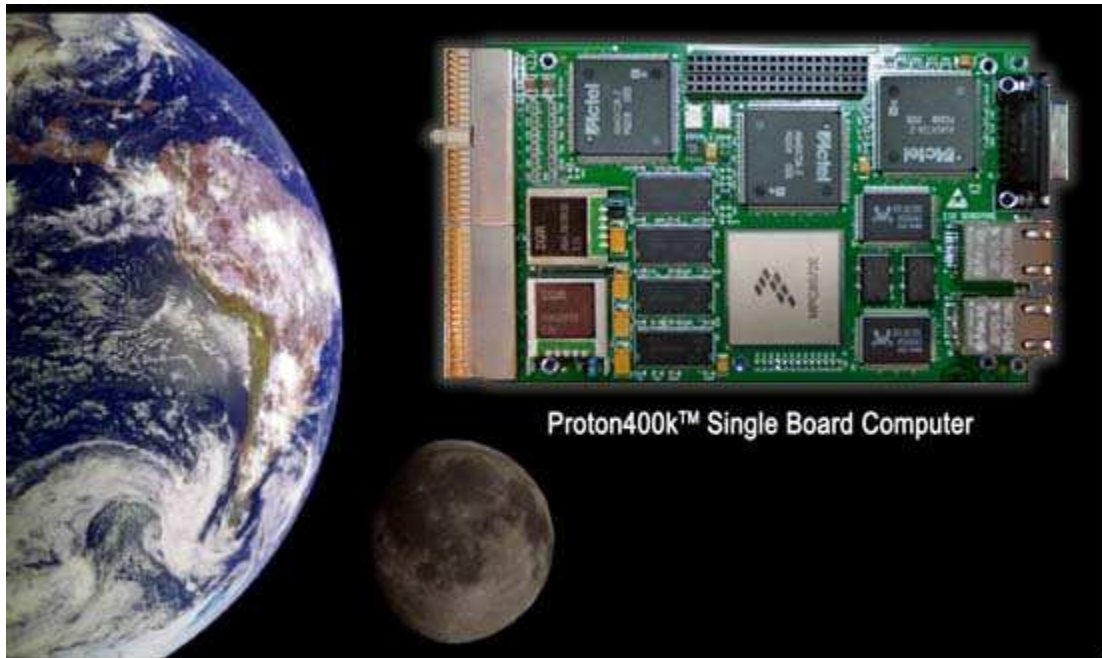


Proton400k™ Single Board Computer



Dual-Core PowerPC Radiation Hardened Computer

High-performance processing. Low Power. Radiation Hardened. Our solutions continue to narrow the gap between state-of-the-art commercial and radiation-hardened computing. Space Micro's industry leading solutions for single event and total dose radiation effects provide extraordinary performance benefits by removing the barriers associated with using commercial processors in space. The Proton400k™ radiation hardened single board computer uses a dual core PowerPC processor, along with Space Micro's radiation effects mitigation techniques, to provide a fully space-qualified computing platform which sets a new standard of performance.

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Proton400k™ Single Board Computer

The Proton400k™ computing platform is a high performance radiation hardened processing solution that meets the challenges of the space environment. By utilizing Space Micro's patent pending radiation hardening technologies, Freescale's advanced 90 nm dual-core microprocessor in the Proton400k™ provides a combination of performance, power, and radiation hardening that leads the industry. Space Micro, using its patent-pending Time-Triple Modular Redundancy™ (TTMR™) and Hardened Core (H-Core™) technologies, has proven to solve the SEU/SEFI issues often seen in CPUs.

FEATURES

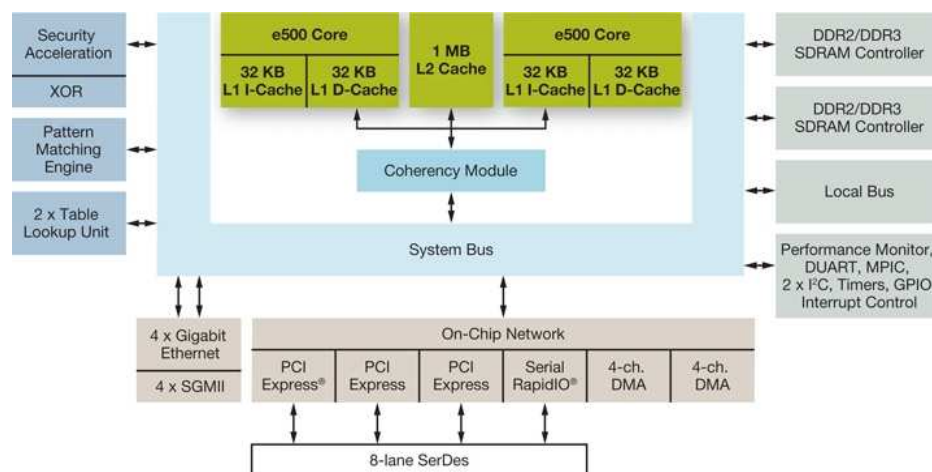
- 1.5 GHz, 64-bit (per core) dual core processor with 36-bit physical addressing and 7,200 raw MIPS
- Integer, Floating-Point, and VMX units
- 3,600 MIPS at 1E-4 errors/day SEU rate
- >100 krad (Si) total dose tolerance
- Single Event Latchup (SEL) Immunity >70 LET (MeV/mg/cm²)
- 32 KByte instruction cache/core
- 32 Kbyte data cache/core
- 1 MB L2 cache
- 128 to 512 MB SDRAM with EDAC
- 4 to 8 Gbits radiation hardened flash
- Power: 15 - 28 watts (depending upon peripherals, speed)
- Compact PCI (cPCI) 3U or 6U form factor

SOFTWARE DEVELOPMENT KIT (SDK)

- GNU-based tool chain support, with multiple operating system options:
 - Linux Board Support Package (BSP)
 - VxWorks/Integrity Board Support Package

MULTIPLE I/O OPTIONS

- PCI Express x1x2x4x8, 2.0 GB/s per lane
- SpaceWire (NASA core)
- 230 Kbps UART with RS-422
- 16 general purpose I/O pins
- 32 bit, 33 MHz PCI int /ext (v 2.2) bus
- 3 multi-channel buffered serial ports (SPI)
- 2 Inter-Integrated Circuit (I2C) buses w/ multi-master & slave interface



Freescale© PowerPC Dual Core

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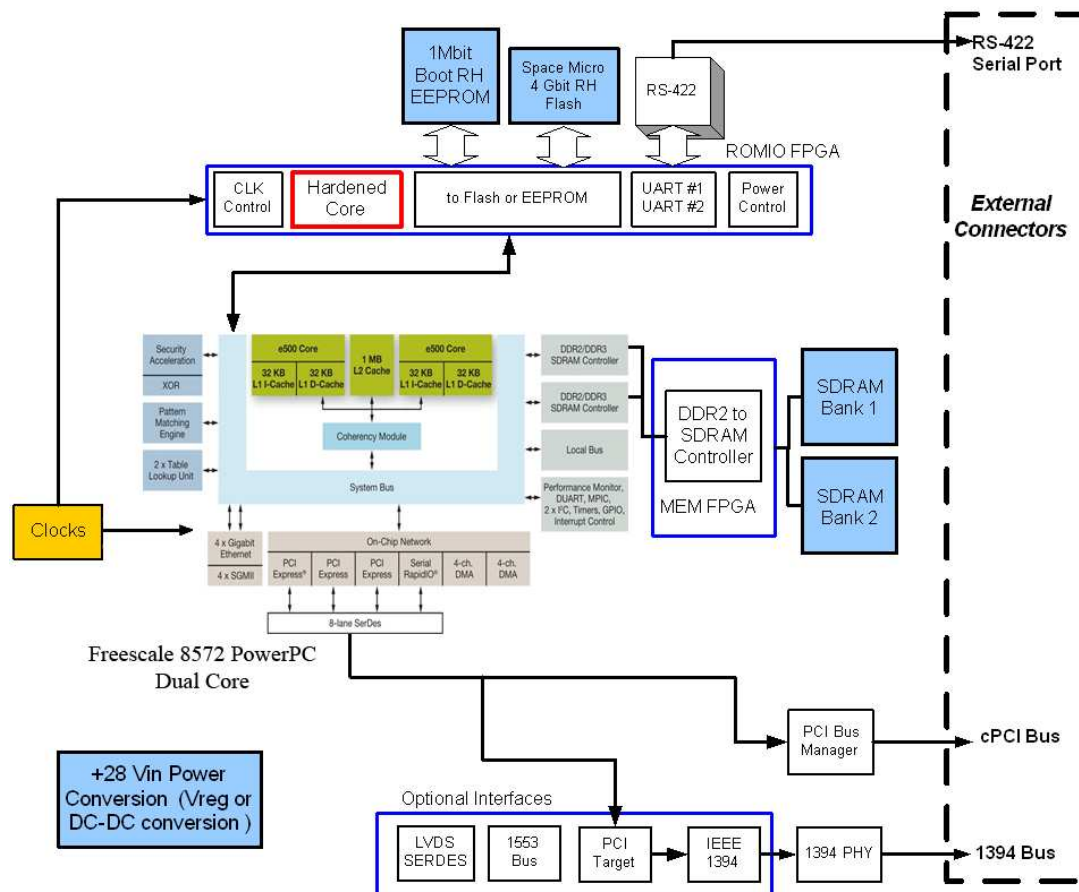
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Proton400k™ Single Board Computer

The Proton400k™ computer platform is based upon our earlier Proton100k™ and Proton200k™ computers. Earlier Proton computer designs have space flight heritage, having successfully flown on Air Force missions. The Proton400k™ is designed to accommodate the full variety of different applications desired by satellite and launch systems. Its architecture is modular, allowing for different memory and communication bus options. Memory sizes can be adjusted for different applications and communication busses can be added (or subtracted) from the core Proton400k™ design.



Proton400k™ Block Diagram

Contact Space Micro for application specific configurations or further details.

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