



FEATURES:

MICROPROCESSOR FEATURES:

- Low Power Implementation of the PowerPC Reduced Instruction Set Computer (RISC)
- Workstation-level performance in a low-power design
- Software- and bus-compatible PC with the PowerPC 604e, PowerPC 740, and PowerPC 750 microprocessor families
- Five independent execution units
- Executes multiple instructions in parallel
- Pipelined instructions
- Simple instructions with rapid execution times
- Three power-saving modes: doze, nap, and sleep
- Dynamic power management
- Separate MMUs for instructions and data
- Supports burst, split, and pipelined transactions
- IEEE 1149.1 (JTAG)/COP Test Interface

BOARD FEATURES:

- Total Dose Radiation to 100 Krad (Si) (most orbits)
- 233 MHz clock speed
- 280 MIPS
- Triple Modular Redundancy
 - $SEL_{TH} > 80 \text{ MeV/mg/cm}^2$
 - SEU 3E-6 unrecoverable errors/day
 - 100% SEU detection
 - $< 1 \text{ ms}$ SEU recovery
- Temperature Range: -50°C to 80°C
- Power Dissipation:
 - 16 W at 250 MIPS
 - 9 W at 125 MIPS

DESCRIPTION:

Space Electronics' SB603Ex3 Single Board Computer (SBC) is a radiation-tolerant advanced CPU board based on Motorola's microprocessor and is specifically designed for satellite and space applications. Using Motorola's PowerPC 603e microprocessor as the core element, the SB603Ex3 is able to deliver operational clock speeds up to 233 MHz utilizing full 32-bit bus architecture. Key 603e features include a RISC integer core, branch processing unit, floating point processing unit, integer processing unit, separate MMUs for instructions and data, power management unit and JTAG test interface. Key SB603Ex3 board features include high-speed cache memory, large data and program operating systems and excellent radiation tolerance. The SB603Ex3 is designed to meet 6U VME electrical and mechanical specifications.

One of the most important features of the SB603Ex3 system is its radiation performance. Given the severe environments encountered in most space missions, consideration to total dose and single event effects is paramount. The SB603Ex3 combines many of SEI's unique and patented radiation improvement technologies (in its integrated circuits) with system-architecture single event upset design enhancements to create a single board computer (SBC) with the highest performance levels of any commercially available space grade SBC. To meet the total ionizing dose levels, the SB603Ex3 uses SEI's Rad-Pak® technology combined with careful selection of the ICs. Single event latchup issues are eliminated by IC selection and SEI's Latchup Protection Technology (LPT™). The most difficult element to mitigate, single event upset, is improved by board-level design techniques, memory EDAC and software, or removed through a redundant PPC603e processor and software (the SB603Ex3 option). The memory single event upset rate is improved by error detection and correction (EDAC). To minimize the SEU rate of the processor, software and/or redundant hardware can be incorporated.