The 6U 160 CompactPCI SpaceWire evaluation board represents our first generation of SpaceWire solutions. This cost-effective prototyping board uses our custom SpaceWire radiation-hardened, ASIC to implement a four-port SpaceWire card with onboard memory. It provides complete router capability among the four ports, along with two user-end-point ports.

The SpaceWire evaluation board can be stand alone or can be integrated with other CompactPCI boards, such as the 3U RAD750® single-board computer. In either case the board-processing function can easily be extended by taking advantage of the onboard embedded microcontroller. C programming tools facilitate embedded micro-controller application development and debugging. A VxWorks device driver also is available for RAD750® applications.

Development was sponsored by NASA’s Glenn Research Center and Goddard Space Flight Center, and included joint-ASIC development with NASA Goddard.
Four-port SpaceWire 6U CPCI evaluation board

Router capabilities
Routing among the four external ports and the two local ports is accomplished with a non-blocking crossbar switch. A “round robin” arbitration algorithm ensures fairness in traffic management. An integrated routing table can be fully configured via the four external ports or locally via the CompactPCI interface.

Not just a router
The SpaceWire evaluation board also provides two user-end-point ports. These are supported by an embedded micro-controller that can be used to manage data movement or support upper-layer protocols. A memory subsystem is also provided for local data storage. A CompactPCI interface provides the means to connect with other system components.

Key features
- Standard product
  - BAE Systems #8421831-1
  - Direct memory access (DMA) controller
  - Embedded microcontroller
  - 50-MHz oscillator
  - External oscillator input
  - 3.3V operation
  - 2.5V regulator on board
- SpaceWire interface
  - 250 MHz
  - Compliant-standard four ports (external)
  - Two DMA-controlled internal ports
  - Path and logical address support
  - Fully configurable router
  - Router and link status
  - Transaction layer support
- Memory interface
  - 256 kB electrically erasable, programmable, read-only memory (EEPROM)
  - 8 MB BAE Systems SRAM
  - Error correction code
    - None
    - Parity
    - Single-error correct, double-error detect
- PCI bus interface
  - 32-bit 33 MHz +3.3V PCI bus peripheral
  - Discretes
- Test interfaces
  - Universal asynchronous receiver transmitter
    - Joint Test Action Group
    - Discretes
- Packaging
  - 6U-160 CompactPCI