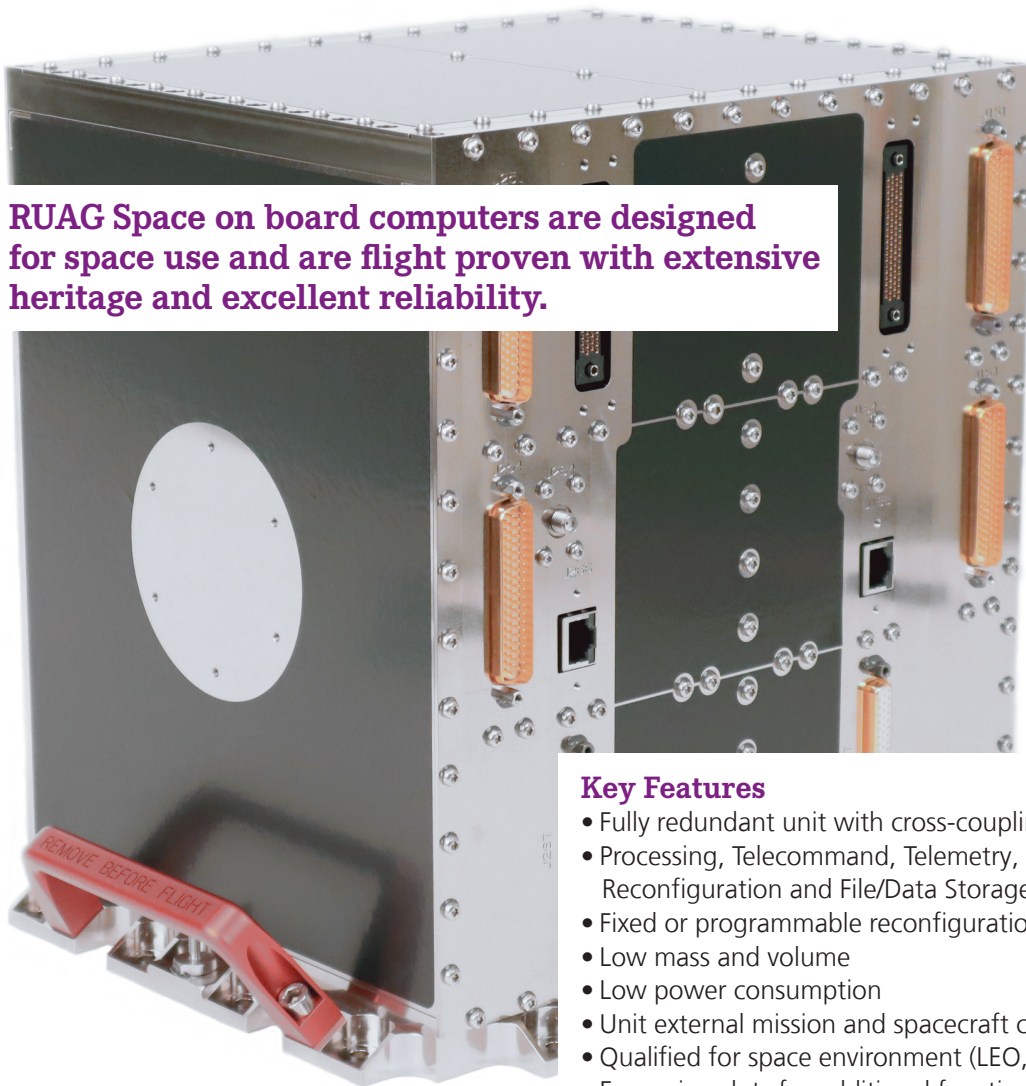


Next Generation On Board Computer

The Next Generation On Board Computer is a fully redundant high reliable on board computer based on the radiation hardened CREOLE ASIC developed by RUAG Space. The CREOLE ASIC is a complete spacecraft on board computer on a chip including a fault tolerant SPARC® V8 processor, communication functions, reconfiguration function and embedded mass memory. The Next Generation On Board Computer is the latest in a family of on board computers that have successfully been powering various LEO, MEO, GEO and interplanetary spacecraft for decades.



RUAG Space on board computers are designed for space use and are flight proven with extensive heritage and excellent reliability.

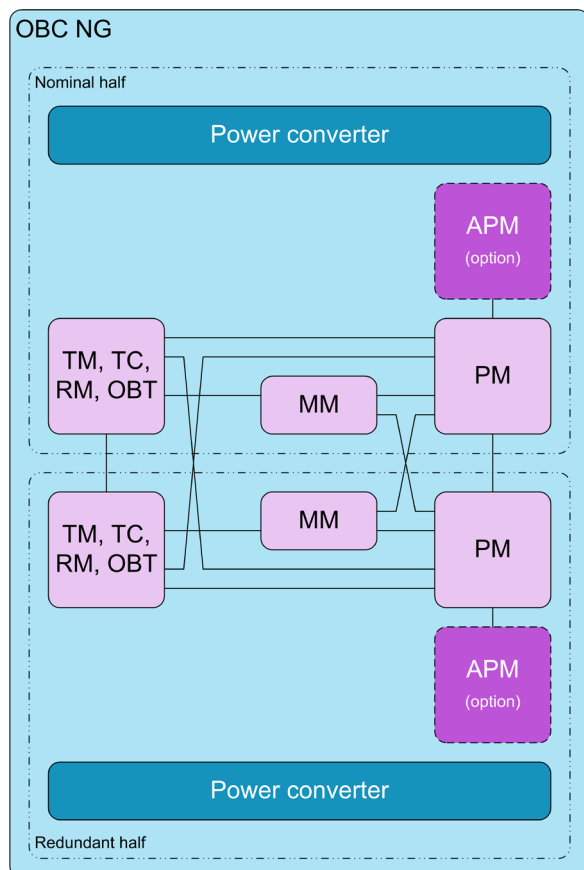
Key Features

- Fully redundant unit with cross-coupling between vital functions
- Processing, Telecommand, Telemetry, On-Board Time, Reconfiguration and File/Data Storage functions in one unit
- Fixed or programmable reconfiguration sequences
- Low mass and volume
- Low power consumption
- Unit external mission and spacecraft configuration
- Qualified for space environment (LEO, MEO, GEO, inter-planetary)
- Expansion slots for additional functions such as GNSS receiver and additional mass memory

Options

- Non-redundant unit for small spacecraft applications
- Resizing from zero to eight expansion slots
- GNSS receiver
- Payload mass memory
- Additional Application Software Processor – several options
- TC AES Authentication and Decryption with 256-bit keys
- TM AES Encryption with 256-bit keys

Block Diagram



Processing Function

- SPARC V8 LEON FT
- 110 DMIPS @ 87.5 MHz
- 32 Kbytes instruction cache
- 16 Kbytes data cache
- 512 MiB processing memory
- 32 KiB Boot PROM
- 8 MiB SW Image Storage
- Gigabit Ethernet Debug Link
- Real-Time Processor Trace Dump
- Hardware Driver Software

Interfaces

- 2 x 7 SpaceWire interfaces
- 2 x 2 Control Area Network (CAN) buses
- 2 x 2 Redundant MIL-STD-1553B buses
- 2 x 2 Pulse Per Second (PPS) inputs
- 2 x 16 Synchronisation Pulse outputs
- 2 x 8 Alarm inputs
- 2 x 3 Separation Strap inputs
- 2 x 4 TM serial outputs up to 20 Mbps
- 2 x 2 TC serial inputs up to 2048 kbps
- 2 x 30 Essential TM status inputs
- 2 x 128 Pulse Command outputs
- External USO input (optional)
- Primary power supply: 28V, 50V or 100V

Software and Development Environment

- Eclipse integrated software development environment
- GNU cross compiler (GCC) suite
- Boot Software and Hardware Driver Software
- RTEMS operating system Board Support Package
- LEON Tools utilizing the advanced on-chip Debug Support Unit
 - o LEONmon allowing source code level debugging using gdb and eclipse
 - o xLoader for loading non-volatile SW image storage
 - o BackTracker for software execution history analysis
 - o Trace for real-time software execution trace dump
 - o Inspector for real-time non-intrusive inspection of target
 - o Shell for scripting of common tasks or tests
 - o Broker management for LEON Tools and target management

Budgets

| | |
|--------------------|---------------------|
| Unit Size | 208 x 242 x 278 mm |
| Mass | 6.5 kg |
| Power Consumption | < 23 W |
| Reliability | 0.99 |
| In-Orbit Life Time | up to 20 years |
| Processing memory | 512 MiB w EDAC |
| File/Data storage | 2 x 374 Gbit w EDAC |

Heritage

- >2900 failure free equipment years in orbit
- >300 Launcher On-Board Computers
- >120 Satellite Data Handling Systems
- EDRS-C, MTG, ExoMars Rover, Hispasat 36W-1, SARah, Electra, Euclid, JUICE

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