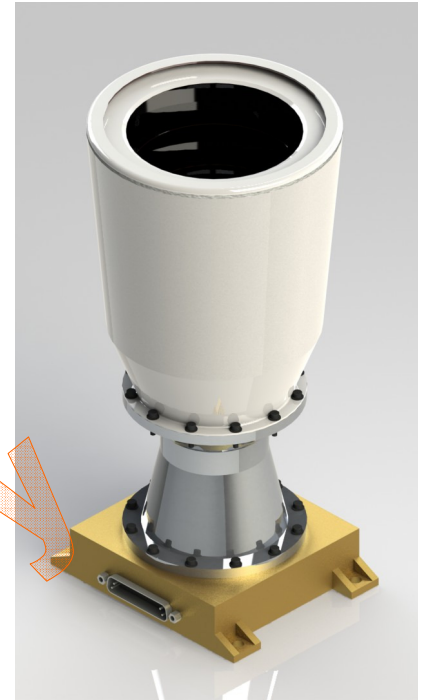


Space Radiation Hardened Star Tracker

Space Micro's μ Star™ is a space radiation hardened, high precision, agile star tracker for use in satellite attitude determination. Its miniaturization and robustness make it ideal for both GEO and LEO orbits as well as long duration/high reliability missions. The μ Star™ features an optical assembly that is based on legacy systems demonstrated to survive severe environments. The optics are integrated with Space Micro's state-of-the-art radiation hardened space computer and power supply, with an image processing "Star Camera" option, to deliver a complete high performance, low power star tracking solution. The μ Star™ flight demonstrated software was flown by Draper Labs on HETE-2 and ISC on TacSat-2. This proven software provides high accuracy, rate estimates, accounts for degradation, and hardened to spurious signals and upsets. These features make the μ Star™ the most advanced Star Tracker on the market.

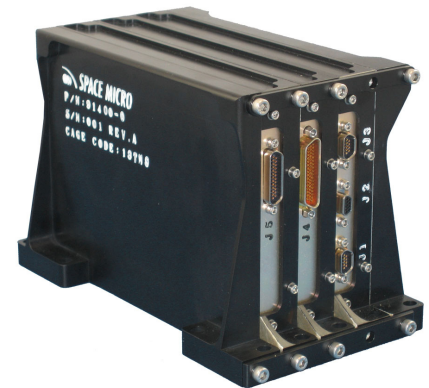


Features for Space

- Radiation Hardened for Space Applications
- Integrated Camera and Processing
- Miniaturized Electronics
- APS CMOS Based FPA
- High Speed, Optimized, and Radiation Hardened Digital Signal Processor-Based Computer
- Dedicated Hardware/Software Integration
- Full Kalman Filtering

Applications

- Satellite Navigation & Guidance
- GEO and LEO Satellite Orbits
- Nano- and Small Satellites Requiring Low Power
- Long Duration/High Reliability Missions



Space Micro Inc

SM- μ Star-100-XX

10237 Flanders Court
San Diego, CA 92121
www.spacemicro.com

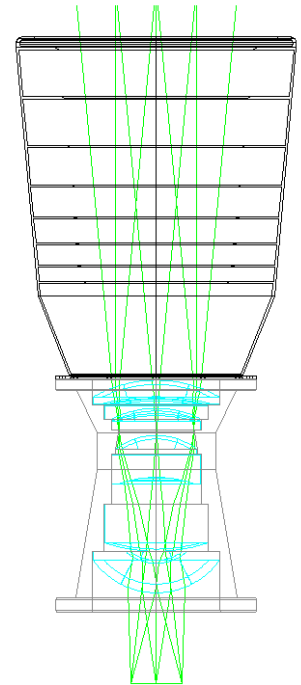
Phone: 858-332-0700
Fax: 858-332-0709



Space Radiation Hardened Star Tracker

Hardware Specifications

| | |
|-------------------------------------|---|
| Total Instrument Mass (with baffle) | <2 kg |
| Aperture Diameter | 54 mm |
| Optical Assembly w/Baffle | 1.1 kg |
| Processing Assembly | 820 g |
| Average Power | <8 W |
| Field of View | 11 deg |
| Accuracy | Better than 1 arcsec (1σ) |
| Update Rate | >10 Hz |
| On-orbit Lifetime | 15 years |
| Sensitivity | mv 7 @ 50 ms |
| Sensor Interface | RS-422 (options: 1553B, Space Wire, etc.) |
| Acquisition Time (Lost in Space) | <1 seconds |
| Slew Tolerance | >5 deg/sec |
| Earth/Sun Exclusion | 30 deg (from bore sight) |



Radiation Tolerance

| | |
|----------------------------|--|
| Total Ionizing Dose (TID) | > 100 and 300 krad (Si) (option) |
| Single Event Latchup (SEL) | > 80 MeV/mg/cm ² |
| Single Event Upset (SEU) | < 10 ⁻³ errors/system-day |
| Neutrons | > 2x10 ¹² n/cm ² |

Software Features:

- Star Identification Based on Pyramid Code
- Flown by Draper Labs on HETE-2 and ISC on TacSat-2
- Integrated Systematic Error Correction Allows for High Accuracy
- Real-Time On-orbit Calibration Accounts for Degradation
- Extended Kalman Filter Produces Attitude and Rate Estimates
- Less Sensitive to Spurious Signals and Upsets

Space Radiation Hardened Star Tracker

Supporting Electronics

The μ Star™ features proven, high-performance, radiation hardened supporting electronics to ensure accurate, reliable functionality in the harsh space environment. These electronics can be integrated into a single unit, or remotely mounted elsewhere on the spacecraft.

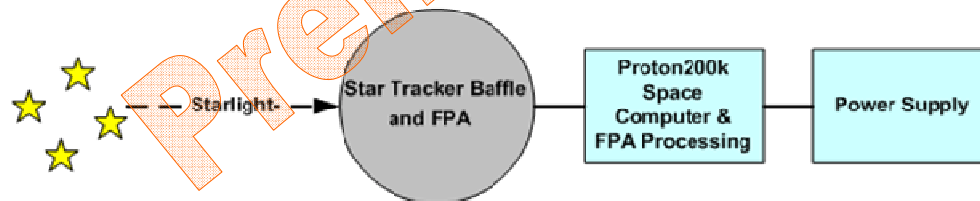
Proton200k™ Radiation Hardened Space Computer

The Proton200k™ space computer is flight-proven, high speed, and radiation hardened to provide extraordinary performance benefits by removing the barriers associated with commercial processors offerings.

- Qualified Space Computer for onboard data processing and C&DH
- 1.8 GFLOPS @ 300 MHz Floating Point, 900 MFLOPS @ 300 MHz with SEU mitigated to 1E-4 errors/day

Power Supply

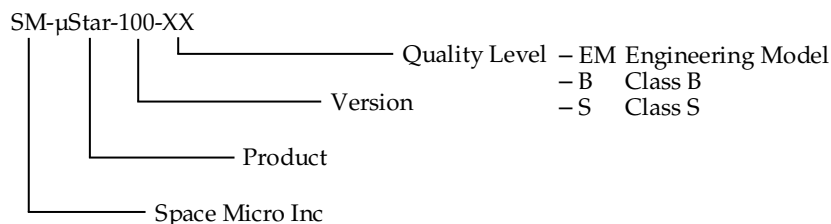
- 3 isolated DC-DC converters
- Powered by external 28V spacecraft power (other voltages available by request)
- Produces 3.3V, 5V, and $\pm 12V$ for PCI-104
- EMI filtering



MDE1300 Star Tracker Components

μ Star™ Components

Ordering Options:



Please contact Space Micro Inc for application specific configurations or further details.