

TRRUST-Stor® 6U VPX SRIO SpaceDrive

Radiation-Tolerant Twin Port 18 G-bit/s 480 GB Solid State Drive

Models *RH6480NM2S-000112-01 (EDU)*
RH6480NM2S-000112-02 (FLT)

- Innovative Mercury SpaceDrive NAND controller
- 6U VPX form-factor
- Radiation-tolerant solid state storage
- 480 GB large geometry SLC NAND
- Very strong ECC corrects multiple failed NAND devices



Mercury's TRRUST-Stor series of radiation-tolerant solid state drives represent the world's first commercially available, customizable SpaceDrives precision-engineered for the harshest operating environments on earth and beyond. Although designed for space applications, this series of compact, high reliability drives are perfect for applications with potential for radiation exposure, including high-altitude aircraft, airborne weapons, and mission-critical ground computing systems.

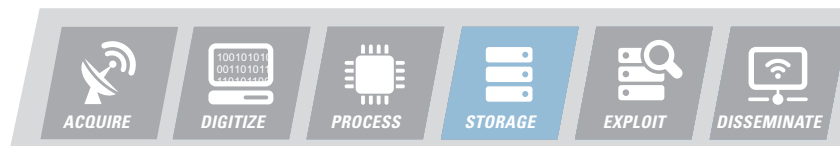
The TRRUST-Stor RH6480 is a feature derivation of the popular 440 GB 6U SpaceDrive featuring stronger ECC and twice the RW performance. Like all Mercury SpaceDrives, the RH6480 pairs Mercury's proprietary Horizontal Error Correction (HEC) with large geometry industrial-grade Single-Level Cell (SLC) NAND flash memory to create one of the world's most reliable storage devices. Designed for fault-tolerance with multiple failed NAND flash devices, the RH6480 offers long-term data integrity for applications where device repair or replacement might not be possible. Recognizing that no two mission requirements are identical, power consumption, ECC, capacity and spare devices are tunable against performance to create the perfect set of features as required by each unique mission.

Standard Features

- 6U VPX form factor
- Twin 4-Lane SRIO interface
- Performance:
 - 8-Lane SRIO (@ 3.125 Gb/s) as two 4-Lane ports, Port0, Port1
 - 2300 MB/s SRIO (18.4 Gbits/sec)
 - Time to fill entire SpaceDrive (470 GB): 3.4 minutes
 - Options for lower power, lower speed operation

- Radiation-tolerant design:
 - RTG4-based NAND processor/controller
 - Configuration upsets immunity to LET > 103 MeV.cm²/mg
 - Single-event latch-up (SEL) immunity to LET > 103 MeV.cm²/mg
 - Registers SEU rate < 10-12 errors/bit-day (GEO Solar Min)
 - Single-Event Transient (SET) upset rate < 10-8 errors/bit-day (GEO Solar Min)
 - Total ionizing dose (TID) > 100 Krad
 - NAND flash: Micron M73A die. TID > 30K rad (packaged as PEMs)
 - All other devices: Radiation tolerant by design to >100K rad
- VPX connectors:
 - Guide block key is adjustable and ships in the 0° position
 - Smiths KVPX Series
 - 500 mate/unmated cycles
 - TE connectivity MultiGig RT 2-R Series
 - 500 mate/unmated cycles
- Operating modes: Linear and Host Addressable
 - Linear Mode: Sequential data recording (Data recorder mode)
 - Host Addressable: Random RW to 1751 UltraBlocks (268 MB each)
 - Random sector read operations: At any time, both modes.
- Capacity to host:
 - 480 GB guaranteed constant across entire life
- Error correction:
 - Mercury proprietary Horizontal Reed Solomon algorithm
 - Fully corrects 5 host data bytes in every 16 host data bytes
 - Significantly extends NAND endurance and lifespan
- Bad block table: Supports field upgrades
- Mercury proprietary defect mitigation
 - Mitigates all factory defects
 - Mitigates all bad blocks discovered during burn-in.
- NAND endurance:
 - Minimum 60,000 drive over writes
 - Up to 20 drive over-writes/day for 7 years
 - TBW: 28 PB minimum
- Minimum 6 month retention at EOL
- Option for Dual Hosts running 1X speed (1160 MB/s)

Mercury Systems is a leading commercial provider of secure sensor and safety-critical processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.



Other features:

- HotSwap devices (On-The-Fly failing device replacement)
- 512K MRAM reserved for OS File Allocation Table

Reliability:

- Single 5V supply
- Rad-Tolerant components (by design)
- Microprocessor-free design
- State machine driven, no software
- Automatic block retirement
- Abrupt power interruption protection
- Corruption free design
- UBER: Better than 1E-19
- Full Drive Erase: < 30 seconds

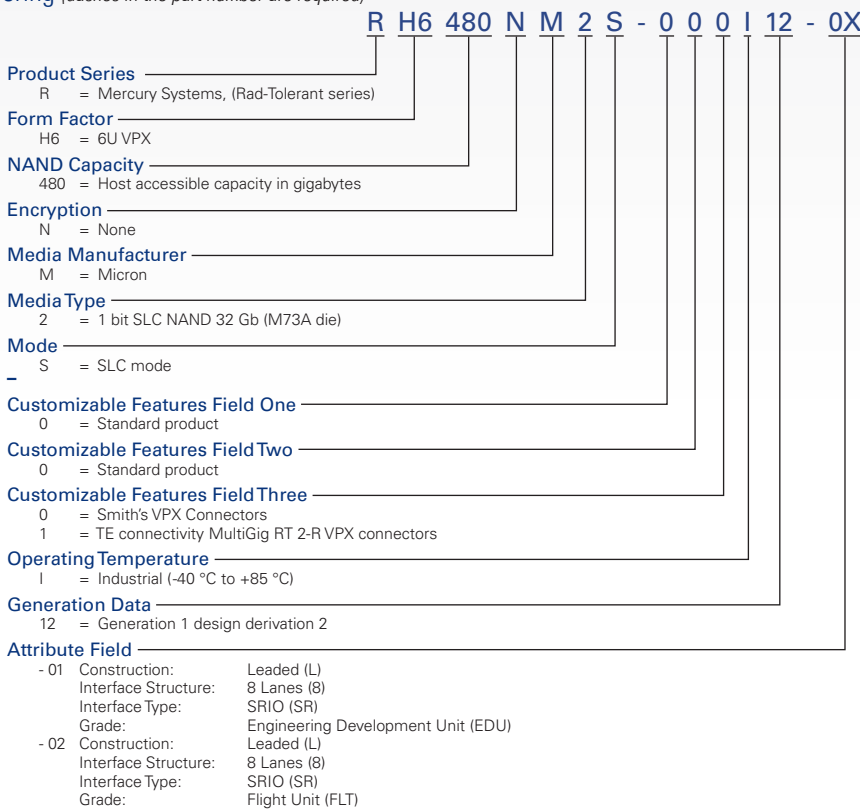
- Status data:
 - All voltages, 3 temperature sensors
 - Spare blocks remaining, Total Bytes written
 - Erase cycle count, ECC errors, hot swap assignment
 - Over 50 status values
- 100% dynamic burn-in
- Ruggedized construction and assembly
- Rail temperature: -40 °C to +71 °C
- Storage temperature: -55 °C to +105 °C
 - Operation or storage at temperatures above 85 °C reduces data retention time
- Vibration: 3 axis
 - 20 Hz-2000 Hz, 1 hr/axis, 16 Grms
 - 20 Hz-2000 Hz, 1 min/axis 22 Grms
- Shock: (3+, 3- per axis) 18 total
 - 50 Hz 25g, 100Hz 100g, 1300 Hz 4500g, 10000Hz 4500g
- Weight (Preliminary): < 3.5 lbs (TBD)

- Power: 5V (up to 25W)
- BOM, schematics and design document available on request

Applications include:

- Low Earth Orbit Satellites (LEO); Contact Mercury for other orbit solutions
- Missiles
- Launch vehicles
- Scientific payloads
- Terrestrial applications with radiation exposure

Part Numbering (dashes in the part number are required)



Download our Secure SSD Tech Brief



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Example part Number: RH6480NM2S-000I12-01 (EDU)

Need More Help? Need a Variant of This Product?

Contact Mercury's Secure SSD application engineering team at secure.ssd@mrchy.com

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