



# SMART RUGGED

## T5EN | PCIe/NVMe M.2

SMART's RUGGED™ T5EN M.2 2280 PCIe/NVMe Gen3x4 solid state drives (SSDs) deliver high performance, high capacity storage solutions optimized for defense, aerospace and other applications requiring durable, rugged and secure storage.

Powered by a flexible, custom flash controller, T5EN SSDs provide sustained read/write performance to meet the needs of high throughput applications such as flight data recorders and sensor data capture. T5EN SSDs are also well suited for high-reliability telemetry, surveillance, and mission critical applications.

T5EN M.2 SSDs offer up to 3840GB of storage using 3D TLC Nand Flash. They are more reliable, offer superior performance, and require less power and cooling than traditional hard disk drives (HDDs). Conforming to SMART's "true" industrial grade standards, they are superior to typical SSDs and HDDs in terms of ruggedness and environmental resilience.

### Features & Benefits

- Hardware write-protect
- AES-XTS 256-bit encryption automatically protects all data written to the drive
- OPAL 2.0 compliant
- True industrial grade storage solution for "no-compromise" applications
- Advanced flash management for enhanced reliability and durability
- Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) support
- 100% 8 hour burn-in over Temperature (-40°C to +85°C, I-Temp Version)

### Product Family Overview

Capacity	Sequential Performance	Random Performance
480GB to 3840GB	Up to 3200 MB/s Read Up to 1600 MB/s Write	310,000 IOPS Read 245,000 IOPS Write

One gigabyte, or GB, equals one billion bytes when referring to drive capacity. Accessible capacity may vary based on the operating environment and drive formatting



### Applications

- Defense
- Aerospace
- Flight Data Recorders
- Sensor Capture
- Telemetry
- Surveillance

## Specifications

M.2 2280 PCIe/NVMe	
NAND Type	TLC
<b>Compliance</b>	
PCIe	Gen 3 x 4
NCQ:	Up to 32 Queue Depth
<b>Performance</b>	
Sustained	Up to 3,200 MB/s Read Up to 1,600 MB/s Write
Random	Up to 310,000 IOPs Read Up to 245,000 IOPs Write
<b>Capacity</b>	
3D-TLC <sup>1</sup>	480GB, 960GB, 1920GB, 3840GB
pSLC	160GB, 320GB, 640GB, 1280GB
<b>Reliability</b>	
MTBF <sup>2</sup>	> 2M hours, Telcordia 25°C
Data Reliability	1 in 10 <sup>17</sup> bits read
Data Retention	> 10 years @ 25°C
Endurance <sup>3</sup>	TLC: 1,000 Total Drive Writes pSLC: 10,000 Total Drive Writes
Warranty	1 Year
<b>Power</b>	
Input Voltage	3.3V +/- 5%
Idle (typical)	< 2 W
Operational (typical)	< 9.5 W
<b>Environmental</b>	
Operating Shock	50G, (11ms duration, half sine wave)
Vibration	10G(Peak, 10~2000Hz)
Altitude <sup>4</sup>	24,384m [80,000 ft.]
Relative Humidity <sup>4</sup>	5% to 95% non-condensing
Conformal Coating	Optional
Operating Temp	Industrial (-40° C to 85° C)
Storage Temp	-45° C to 90° C
<b>Mechanical</b>	
Length	80mm
Width	22mm
Height	3.6mm
Connector	M.2 M Keyed

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(2) Based on 480GB drive

(3) Under typical conditions

(4) Based on MIL-STD-810G

## Data Security Features

M.2 2280 PCIe/NVMe	
Encryption	AES-XTS 256-bit (FIPS 197 compliant)
Protection	Write-Protect Feature
Elimination	ATA-8 Security Erase DoD NISPOM 5220.22-M DoD NISPOM 5220.22-M-Sup 1 NSA/CSS Manual 130-2 NSA/CSS Manual 9-12 Army AR 380-19 Navy NAVSO P-5239-26 Air Force AFSSI-5020 External trigger

## Ordering Information

Part Number	Density
<b>I-Temp TLC</b>	
HRCN3P3840MI001	3840GB
HRCN3P1920HI001	1920GB
HRCN3P0960HI001	960GB
HRCN3P0480HI001	480GB
<b>I-Temp pSLC</b>	
HRCN3P1280PI001	1280GB
HRCN3P0640JI001	640GB
HRCN3P0320JI001	320GB
HRCN3P0160JI001	160GB

Conformal Coat Option  
Replace "001" with "CC1"



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