SMART **RUGGED**™

T5EN | PCIe/NVMe U.2 and M.2

SMART's RUGGED™ T5EN U.2 and 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 U.2 SSDs provide capacities up to 7680GB and the M.2 up to 3840GB. Both have pSLC options 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). Contains pFail protection.

Features & Benefits

- 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)
- SafeDATA™ technology is a standard feature that safeguards the integrity, functionality and data of the SSD in the event of sudden power loss

Applications

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

Product Family Overview

Capacity	Sequential Performance	Random Performance
960GB to 7680GB	Up to 3200 MB/s Read	310,000 IOPS Read
	Up to 1600 MB/s Write	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.

Specifications

	U.2 PCIe/NVMe
NAND Type	TLC
Compliance	
PCIe	Gen 3 x 4
NCQ:	Up to 32 Queue Depth
Performance	
Sequential	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
Capacity	
3D-TLC[1]	U.2: 960GB, 1920GB, 3840GB, 7680GB M.2 TLC: 480GB, 960GB, 1920GB, 3840GB
pSLC	U.2: 320GB, 640GB, 1280GB, 2560GB M.2: 160GB, 320GB, 640GB, 1280GB
Reliability	
MTBF[2]	> 2M hours, Telcordia 25°C
Data Reliability	1 in 10^{17} bits read
Data Retention	> 10 years @ 25°C
Endurance[3]	TLC: 625 Total Drive Writes pSLC: 6,250 Total Drive Writes
Warranty	1 Year
Power	
Input Voltage	U.2: 12.0V +/- 5% M.2: 3.3V ± 5%
Idle (typical)	< 1.5 W
Operational (typical)	< 9.0 W
Environmental	
Operating Shock	50G, (11ms duration, half sine wave)
Vibration	10G(Peak, 10~2000Hz)
Altitude[4]	24,384m [80,000 ft.]
Relative Humidity[4]	5% to 95% non-condensing
Conformal Coating	Optional
Operating Temp	Industrial (-40° C to 85° C)[5, 6]
Storage Temp	-55° C to 90° C
Mechanical	
Length	100mm
Width	69.85mm
Height	7mm
Connector	U.2

(1) 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
(2) Based on 480GB drive
(3) Under typical conditions
(4) Based on MIL-STD-810G
(5) 7680GB TLC and 2560GB pSLC models may have limitations in certain cross-temp applications
(6) The operating environment for U.2: 7680 GB TLC, 2560 GB pSLC models is limited to -20°C – 85°

Data Security Features

	U.2 PCIe/NVMe
Encryption	AES-XTS 256-bit (FIPS 197 compliant)
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

U.2 Ordering Information

Part Number	Density
I-Temp TLC	
HRCN7P7680ME001*[5]	7680GB
HRCN7P3840HI001*	3840GB
HRCN7P1920HI001*	1920GB
HRCN7P0960HI001*	960GB
HRCN7P0480HI001*	480GB
I-Temp pSLC	
HRCN7P2560PE001*[5]	2560GB
HRCN7P1280JI001*	1280GB
HRCN7P0640JI001*	640GB
HRCN7P0320JI001*	320GB
HRCN7P0160JI001*	160GB

*Conformal Coat Option Replace "001" with "CC1"

M.2 2280 Ordering Information

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

*Conformal Coat Option Replace "001" with "CC1"

For more information, please visit: **www.smartm.com**

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