

SMARTRUGGED[™] 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 3480GB and the M.2 up to 1920GB. 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

Product Family Overview

Capacity	Sequential Performance	Random Performance
480GB to 3840GB	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



- . .
- Aerospace

Defense

- Flight Data Recorders
- Sensor Capture
- Telemetry
- Surveillance

Specifications

Cic Gen 3 x 4		U.2 PCle/NVMe
Cite Gen 3 x 4 Cite Up to 32 Queue Depth	IAND Type	TLC
CQ: Up to 32 Queue Depth erformance equential	Compliance	
### Comparison of Control of Cont	PCIe	Gen 3 x 4
Up to 3,200 MB/s Read	NCQ:	Up to 32 Queue Depth
Up to 1,600 MB/s Write	Performance	
Up to 245,000 IOPs Write apacity	Sequential	
D-TLC¹ U.2: 480GB, 1920GB, 3840GB M.2 TLC: 480GB, 960GB, 1920GB BLC U.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB Beliability TBF² > 2M hours, Telcordia 25°C ata Reliability 1 in 10¹¹² bits read ata Retention > 10 years @ 25°C TLC: 625 Total Drive Writes pSLC: 6,250 Total Drive Writes pSLC: 6,250 Total Drive Writes darranty 1 Year Dut Voltage U.2: 12.0V +/- 5% M.2: 3.3V ± 5% Ile (typical) 4 1.5 W 5 0	Random	
M.2 TLC: 480GB, 960GB, 1920GB U.2: 160GB, 320GB, 640GB, 1280GE M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 160GB, 320GB, 640GB M.2: 100 GB, 320GB, 40GB M.2: 100 GB, 320GB M.2: 100 GB, 320GB M.2: 10	Capacity	
eliability TBF² > 2M hours, Telcordia 25°C ata Reliability ata Retention > 10 years @ 25°C Indurance³ TLC: 625 Total Drive Writes pSLC: 6,250 Total Drive Writes I Year Ower U.2: 12.0V +/- 5% M.2: 3.3V ± 5% Ile (typical) < 1.5 W perational (typical) < 9.0 W Invironmental perating Shock 50G, (11ms duration, half sine wave) ibration 10G(Peak, 10~2000Hz) Ititude 24,384m [80,000 ft.] elative Humidity 5% to 95% non-condensing onformal Coating Optional perating Temp Industrial (-40° C to 85° C) torage Temp -55° C to 90° C echanical ength 100mm fidth 69.85mm eight 7mm	3D-TLC ¹	
TBF2	pSLC	U.2: 160GB, 320GB, 640GB, 1280GB M.2: 160GB, 320GB, 640GB
ata Reliability ata Retention > 10 years @ 25°C TLC: 625 Total Drive Writes pSLC: 6,250 Total Drive Writes PSLC: 6,250 Total Drive Writes atarranty 1 Year U.2: 12.0V +/- 5% M.2: 3.3V ± 5% Ile (typical) Perational (typical) Invironmental Perating Shock Indicate Shock Indicat	Reliability	
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TLC: 625 Total Drive Writes pSLC: 6,250 Total Drive Writes pSLC: 6,250 Total Drive Writes Varranty 1 Year Dut Voltage Le (typical) Perational (typical) Perating Shock Sog, (11ms duration, half sine wave) Perating Shock Sog, (11ms duration, half sine wave)	Data Reliability	1 in 10 ¹⁷ bits read
pSLC: 6,250 Total Drive Writes /arranty 1 Year put Voltage U.2: 12.0V +/- 5% M.2: 3.3V ± 5% le (typical)	Data Retention	> 10 years @ 25°C
put Voltage U.2: 12.0V +/- 5% M.2: 3.3V ± 5% le (typical) < 1.5 W	Endurance ³	
put Voltage U.2: 12.0V +/- 5% M.2: 3.3V ± 5% le (typical) < 1.5 W	Warranty	1 Year
put Voltage M.2: 3.3V ± 5% le (typical) < 1.5 W	Power	
M.2: 3.3V ± 5% le (typical) < 1.5 W	Innut Voltage	U.2: 12.0V +/- 5%
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ength 100mm fidth 69.85mm eight 7mm	Storage Temp	-55° C to 90° C
ridth 69.85mm eight 7mm	Mechanical	
eight 7mm	_ength	100mm
	Width	69.85mm
onnector U.2	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

Data Security Features

	U.2 PCIe/NVMe
Encryption	AES-XTS 256-bit (FIPS 197 compliant)
	ATA-8 Security Erase
	DoD NISPOM 5220.22-M
	DoD NISPOM 5220.22-M-Sup 1
	NSA/CSS Manual 130-2
limination	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	
HRCN7P3840HI001*	3840GB
HRCN7P1920HI001*	1920GB
HRCN7P0960HI001*	960GB
HRCN7P0480HI001*	480GB
I-Temp pSLC	
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	
HRCN3P1920HI001*	1920GB
HRCN3P0960HI001*	960GB
HRCN3P0480HI001*	480GB
I-Temp pSLC	
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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⁽³⁾ Under typical conditions