

# M4 & M4P SATA SSD

SMART Modular Technologies' M4 and M4P 2.5" SATA solid state drives (SSD) combine high performance, superior reliability and data security into a single ruggedized design, making them the ideal solutions for ground and air defense, industrial automation, transportation, medical and telecommunication applications.

The M4 SSD delivers 500MB/s sequential read and 260MB/s sequential write speeds, up to 60,000 random read IOPS and up to 55,000 random write IOPS. Capacities of 240, 480, 960GB are available using cost effective multi-level cell (MLC) NAND Flash.

The M4P SSD delivers 525MB/s sequential read and 500MB/s sequential write speeds, up to 70,000 random read IOPS and up to 50,000 random write IOPS. The M4P is optimized for high altitude applications.

The SMART M4 and M4P SSDs are designed to meet the needs of applications where temperature tolerances are as important as high performance and reliability. A robust set of diagnostic information is provided through SSD-specific S.M.A.R.T attributes which can be used to monitor the health of the drives.

The M4 and M4P feature two HW-based erase triggers, one on each end of the drives. In addition, the SATA connect has 30 micro inches of gold plating for a more reliable connection. The M4 and M4P are also available with staking, conformal coating, specialty firmware and extended burn in, if needed.

## Data Security

The M4 and M4P automatically protect all data written with AES 256-bit encryption. Also included is the Security Erase feature per the ATA-8 specification whereby the encryption key will be deleted in less than one second. The M4 and M4P both feature the write-protect feature.

## Features

- ▶ **High Random and Sequential I/O Performance**
- ▶ **Cost-Effective MLC Flash**
- ▶ **Ruggedized Enclosure (Shock, Vibration)**
- ▶ **Thermal Sensor**
- ▶ **Static and Dynamic Wear Leveling**
- ▶ **Firmware Updatable**
- ▶ **Low Power Management**
- ▶ **Ideal for High and Low Temperature Applications**
- ▶ **TCG/Opal 2.0 Compliant (M4)**
- ▶ **AES 256-bit Encryption to automatically Protect all Data Written to the Drive**

## M4 SATA Product Family

Capacity	Sustained Performance	Random Performance
240GB, 480GB, 960GB	500MB/s Read 260MB/s Write	60,000 IOPS Read 55,000 IOPS Write

## M4P SATA Product Family

Capacity	Sustained Performance	Random Performance
240GB, 480GB, 960GB, 1920GB	525MB/s Read 500MB/s Write	70,000 IOPS Read 50,000 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.



## M4 & M4P SATA Specifications

	M4 2.5" SATA	M4P 2.5" SATA
<b>Performance</b>		
Burst	600MB/s	600MB/s
Sequential	500MB/s Read, 260MB/s Write <sup>1</sup>	525MB/s Read, 500MB/s Write <sup>1</sup>
Random	IOPS Read 60,000 <sup>1</sup> IOPS Write 55,000 <sup>1</sup>	IOPS Read 70,000 <sup>1</sup> IOPS Write 50,000 <sup>1</sup>
Interface	SATA 6 Gb/s	SATA 6 Gb/s
<b>Capacity</b>		
MLC	240GB, 480GB, 960GB <sup>2</sup>	240GB, 480GB, 960GB, 1920GB <sup>2</sup>
<b>Reliability</b>		
MTBF	3M hours	>2M hours
Error Correction	66 bits per 1KB	120 bits per 2048 bytes
Power Loss Protection	pFail	pFail
Endurance	1,200 total drive writes <sup>3</sup>	2,100 total drive writes <sup>3</sup>
Data Retention	1 year at 55°C	10 years at 40°C
Warranty	1 Year	1 Year
<b>Data Security</b>		
Encryption	AES 256-bit	AES 256-bit
Elimination	ATA-8 Security Erase	ATA-8 Security Erase
<b>Power</b>		
Input Voltage	5 V +/- 5%	5 V +/- 5%
Idle (typ)	490 mA	390 mA
Active Read/Write (typ)	604/953 mA	640/1,080 mA
<b>Environmental</b>		
Operating Temperature	-40°C to 85°C	-40°C to 85°C
Storage Temperature	-55°C to 95°C	-55°C to 95°C
Operating Shock	50 g half-sine, 11 ms, 3 shocks along each axis	50 g half-sine, 11 ms, 3 shocks along each axis
Operating Vibration	16.4 g rms, 15-2,000Hz	16.4 g rms, 10-2,000Hz
Relative Humidity	5%-95% non-condensing	5%-95% non-condensing
Altitude	24,384m (80,000 ft)	24,384m (80,000 ft)
<b>Mechanical</b>		
Length	100.45mm	100.45mm
Width	69.85mm	69.85mm
Height	7.0mm	7.0mm

(1) Based on 240GB Drive

(2) 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

(3) Under typical conditions

## M4 SATA Ordering Information

Part Number	Capacity
HRAA2S0240EI001	240GB
HRAA2S0480EI001	480GB
HRAA2S0960EI001	960GB

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.

## M4P SATA Ordering Information

Part Number	Capacity
HRBA2X0240EI001	240GB
HRBA2X0480EI001	480GB
HRBA2X0960EI001	960GB
HRBA2X1920EI001	1920GB

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.

## Contact information

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