Overview

Introduction

SATA 7200 rpm drives are our standard high bandwidth hard drive storage options; most workstation models are also available with high performance 10K rpm rotation speeds. Storage capacities for the 7200 rpm drives range up to a massive 3.0TB.

Most of the 7200 rpm HDDs are 3.5" drives. The one exception is the new 500GB SATA 7200 rpm SED drive which is 2.5" form factor. The 10K rpm drives are SFF (Small Form Factor, 2.5") drives (available bare and in 3.5" frames); the appropriate choice depends on drive bay availability in a chassis.

SATA 10K Performance

The SATA 10K family of drives are high performance drives. They offer sustained data transfers to and from the drive up 200MB/s, as compared with SATA 7200 rpm drives which offer sustained data transfers up to 130MB/s. In addition, the Reliability performance is rated at MTBF of 2,000K hours, vs 600-750K hours for SATA 7200 rpm drives.

SMART technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables intelligent manageability or management software to generate a fault alert. While the legacy versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has prompted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.
Smart IV is also known as IOEDC: I/O Error Detection Code.

Restrictions on Hazardous Substances (RoHS)

RoHS is a European Union directive that requires OEM manufacturers' compliance. The directive assures that hazardous substances are not contained within electronic equipment. Those substances include lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers. Hewlett-Packard is committed to adhering to this directive.

Native Command Queuing

NCQ, or Native Command Queuing, is a capability of modern SATA drives. NCQ is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), that allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. It requires support from the host system BIOS, controller, and driver in order to be useful. However NCQ-capable drives are compatible with host systems that do not include the support; the NCQ and FPDMA features are simply not used on those systems.

Self Encrypting Drive (SED) support

The Trusted Computing feature set which has been developed by the Trusted Computing Group (TCG) is supported. Specifically, the Opal Security Subsystem class (SSC) is supported. This feature allows the HDD to do the following:

- Deploy Storage Device and Take Ownership: the HDD is integrated into its target system and ownership transferred by setting or changing the Storage Device's owner credential.
- Activate or Enroll Storage Device: LBA ranges are configured and data encryption and access control credentials (re)generated and/or set on the Storage Device. Access control is configured for LBA range unlocking.

Overview

- Lock and Unlock Storage Device: unlocking of one or more LBA ranges by the host and locking of those ranges under host control via either an explicit lock or implicit lock triggered by a reset event. MBR shadowing provides a mechanism to boot into a secure pre-boot authentication environment to handle device unlocking.
- Repurpose and End-of-Life: erasure of data within one or more LBA ranges and reset of locking credential(s) for Storage Device repurposing or decommissioning.

GB = 1 billion bytes. Actual available capacity is less.

Most of our platforms support SED HDD and SED SSD. Additional platforms will support this technology in the coming months. Check specific platforms for availability.

Performance

SATA Hard Drives use the SATA III interface running at up to 6 Gb/s. Actual sustained transfer rates are lower due to command protocol and SATA bus management overhead.

Models

250GB SATA 10K rpm SFF HDD	B8X18AA
500GB SATA 10K rpm SFF HDD	B8X19AA
1TB SATA 10K rpm SFF HDD	B8X20AA
250GB SATA 7200 rpm 6Gb/s 3.5" HDD	LQ034AA
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	LQ036AA
1TB SATA 7200 rpm 6Gb/s 3.5" HDD	LQ037AA
2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	QB576AA
3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	QF298AA
500GB SATA 7.2K SED SFF HDD	D8N29AA
160GB SATA 10K rpm SFF HDD	FX618AA
300GB SATA 10K rpm SFF HDD	FX619AA
600GB SATA 10K rpm SFF HDD	XQ245AA

Compatibility

Most SATA Hard Drives are compatible with all of the current HP Z-series Workstations (check the individual workstation QuickSpecs for current hard drive compatibility information).

The 3.0TB SATA HDD is compatible with the new platforms, and also as attached to the LSI9260 Controller Card. The 3.0TB capacity will not be realized if the drive is attached to the onboard SATA controller for Z400, Z600, and Z800.

When ordering drives as After Market Options for use in an optical bay, order an appropriate bracket as follows:

- HP Z-series Workstations
  - 3.5" drive bracket for HP Z400, Z600 and Z800, HP Optical Bay HDD Mounting Bracket-BLK-for WKS, HP Part Number NQ099AA
  - 2.5" (SFF) bracket for Z600 and Z800, HP 2.5in HDD 2:1 Optical Bay Bracket, HP Part Number FX615AA
- HP xw4600 or xw6600 Workstation: 3.5" drive bracket, HP Optical Bay HDD Mounting Bracket, HP Part Number DY659AA.

Not all hard drive models are available in all regions.

Service and Support

Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.

Technical Specifications

Hard Drives	**250GB SATA 10K rpm SFF HDD**	**Capacity**	250GB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Cache	Adaptive	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.2ms (typical)
			Average	3.6ms
			Full Stroke	9.0ms (typical)
		Rotational Speed	10K rpm	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	500GB SATA 10K rpm SFF HDD	**Capacity**	500GB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Cache	Adaptive	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.2ms (typical)
			Average	3.6ms
			Full Stroke	9.0ms (typical)
		Rotational Speed	10K rpm	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	1TB SATA 10K rpm SFF HDD	**Capacity**	1TB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
		Buffer	64MB	

Technical Specifications

	Cache	Adaptive	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.2ms (typical)
		Average	3.6ms
		Full Stroke	9.0ms (typical)
	Rotational Speed	10K rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	250 GB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	500GB	
	Height	0.6 in; 1.53 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	16MB	
	Cache	Segmentable	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications

1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1 Terabyte (1000 GB)	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
	Cache	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	2TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
	Cache	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	3.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 6.0 Gb/s	
	Buffer	64MB	

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.6 ms
		Average	11 ms
		Full-Stroke	Not specified
	Rotational Speed	7200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
500GB SATA 7.2K SED SFF HDD	**Capacity**	500GB	
	Height	0.275 in; 0.7 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1 ms
		Average	4.2 ms
		Full-Stroke	25 ms (typical)
	Rotational Speed	7,200 rpm	
	Operating Temperature	32° to 140° F (0° to 60° C)	
160GB SATA 10K rpm SFF HDD	**Capacity**	160,041,885,696 bytes	
	Height	0.6 in; 1.53 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Cache	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full-Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
300GB SATA 10K rpm SFF HDD	**Capacity**	300,069,052,416 bytes	
	Height	0.6 in; 1.53 cm	

Technical Specifications

	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Cache	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full-Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	586,072,368	
	Operating Temperature	41° to 131° F (5° to 55° C)	
600GB SATA 10K rpm SFF HDD	**Capacity**	600GB	
	Height	0.6 in; 1.53 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (3.0Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	32 MB	
	Cache	Segmentable	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
		Average	3.6 ms
		Full-Stroke	9.0 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	1,172,123,568	
	Operating Temperature	41° to 131° F (5° to 55° C)	