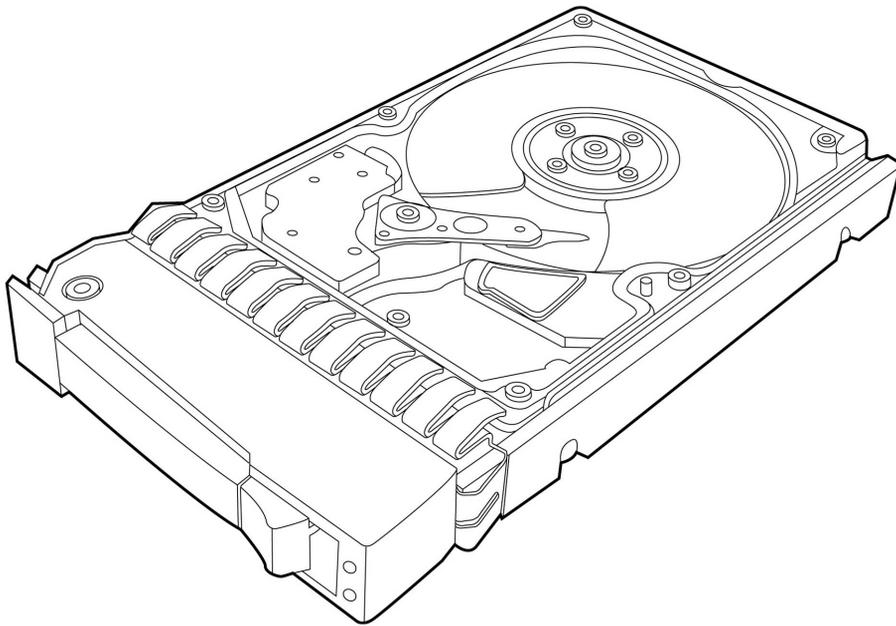# QuickSpecs

Overview

Serial Attached SCSI (SAS) provides a superior storage solution. With some storage requirements escalating and others becoming more complex, factors such as flexibility, performance, increased reliability, greater density, security, scalability and accessibility are more critical than ever. Today's organizations consist of different kinds of environments. Enterprise data centers must be online 24X7, fulfill requests from numerous users simultaneously, and allow for constant growth and expansion while in operation. Other customer environments require high capacity storage and high data availability for low I/O environments. HP's portfolio of SAS drives meets all these demands.

What's New

HP introduces the first 3.5 inch drives in the portfolio with the 6Gb/s SAS interface. With 6Gb/s SAS components in the storage subsystem, system bandwidth is double that of traditional 3Gb/s SAS systems. This higher throughput means fewer I/O bottlenecks for storage-intensive environments such as video streaming, virtualization, and backups.

The newest drives in the HP portfolio are listed below.

- HP 300GB 6G SAS 15K LFF (3.5inch) DP ENT HDD
- HP 300GB 6G SAS 15K LFF (3.5inch) NHP DP ENT HDD
- HP 450GB 6G SAS 15K LFF (3.5inch) DP ENT HDD
- HP 450GB 6G SAS 15K LFF (3.5inch) NHP DP ENT HDD
- HP 600GB 6G SAS 15K LFF (3.5inch) DP ENT HDD
- HP 600GB 6G SAS 15K LFF (3.5inch) NHP DP ENT HDD

Overview

Models

SAS Hot Plug SFF Enterprise (ENT) Drives

HP 300GB 6G SAS 10K SFF DP ENT HDD	507127-B21
HP 300GB 3G SAS 10K SFF DP ENT HDD	492620-B21
HP 146GB 6G SAS 15K SFF DP ENT HDD	512547-B21
HP 146GB 3G SAS 15K SFF DP ENT HDD	504062-B21
HP 146GB 6G SAS 10K SFF DP ENT HDD	507125-B21
HP 146GB 3G SAS 10K SFF DP ENT HDD	418367-B21
HP 72GB 6G SAS 15K SFF DP ENT HDD	512545-B21
HP 72GB 3G SAS 15K SFF DP ENT HDD	418371-B21
HP 72GB 3G SAS 10K SFF DP ENT HDD	384842-B21

SAS Non-Hot Plug SFF Enterprise (ENT) Drives

HP 300GB 6G SAS 10K SFF DP NHP ENT HDD	537809-B21
HP 146GB 6G SAS 10K SFF DP NHP ENT HDD	537807-B21
HP 72GB 6G SAS 15K SFF DP NHP ENT HDD	537805-B21

SAS Hot Plug 3.5" Enterprise (ENT) Drives

HP 600GB 6G SAS 15K 3.5" DP ENT HDD	516828-B21
HP 450GB 6G SAS 15K 3.5" DP ENT HDD	516816-B21
HP 450GB 3G SAS 15K 3.5" DP ENT HDD	454232-B21
HP 400GB 3G SAS 10K 3.5" DP ENT HDD	459508-B21
HP 300GB 6G SAS 15K 3.5" DP ENT HDD	516814-B21
HP 300GB 3G SAS 15K 3.5" DP ENT HDD	416127-B21
HP 146GB 3G SAS 15K 3.5" DP ENT HDD	384854-B21
HP 72GB 3G SAS 15K 3.5" DP ENT HDD	384852-B21

SAS Non-Hot Plug 3.5" Enterprise (ENT) Drives

HP 600GB 3G SAS 15K NHP 3.5" DP ENT HDD	516830-B21
HP 450GB 6G SAS 15K NHP 3.5" DP ENT HDD	516826-B21
HP 450GB 3G SAS 15K NHP 3.5" DP ENT HDD	454234-B21
HP 400GB 3G SAS 10K NHP 3.5" DP ENT HDD	508232-B21
HP 300GB 6G SAS 15K NHP 3.5" DP ENT HDD	516824-B21
HP 300GB 3G SAS 15K NHP 3.5" DP ENT HDD	417950-B21
HP 146GB 3G SAS 15K NHP 3.5" DP ENT HDD	417855-B21

SAS Hot Plug SFF Midline (MDL) Drives

HP 500GB 6G SAS 7.2K SFF DP MDL HDD	507610-B21

SAS Hot Plug 3.5" Midline (MDL) Drives

HP 1TB 3G SAS 7.2K 3.5" DP MDL HDD	461137-B21
HP 750GB 3G SAS 7.2K 3.5" DP MDL HDD	461135-B21

Standard Features

What is SAS?	Serial Attached SCSI (SAS) is the evolution of the SCSI interface. SAS Enterprise drives satisfy the enterprise data center requirement of scalability, performance, reliability and manageability, while providing an enterprise storage infrastructure for both enterprise SAS drives and SATA disk drives. SAS Midline drives provide the lowest dollars per gigabyte and economical reliability and performance. The SAS interface is compatible with SATA devices. This compatibility provides users with unprecedented choices for server and storage subsystem deployment
Drive Quality and Performance	Today's distributed enterprise is seeing larger, more complex applications, an increase of mission-critical data moving to the server, increasing demand for transaction processing and critical server consolidation. In this environment, storage has become a critical component of the information system, significantly defining both the systems reliability and performance. This is why HP drives undergo an intense qualification process that eliminates firmware and O/S incompatibilities. All drive firmware is specific to our drives and is designed to maximize both functionality and compatibility. All drives are proven to perform in the HP systems for which they were designed.
	While selecting the drives in our Enterprise portfolio, only those drives whose performance is suitable for an enterprise environment are selected through the HP qualification process and are labeled "best-in-class." All our Enterprise drives are proven to be reliable and tuned for optimum performance in the HP equipment for which they were designed. The drives in our Midline portfolio undergo a similar qualification process to ensure that you get the economical reliability and performance you need for your low workload (less than 40% I/O) environments.
Performance	Only those drives whose performance is suitable for an enterprise environment are selected through the HP qualification process and are labeled "best-in-class." All our drives are proven to be reliable and tuned for optimum performance in the HP equipment for which they were designed.
Pre-Failure Alert	When used in conjunction with a SMART Array Controller and Systems Insight Manager, the SMART capable firmware in HP hard drives enables extensive fault prediction capabilities. If potential problems develop in one of the drives, the Smart Array Controller, Systems Insight Manager and/or SMART hard disk drive lets you know in advance so you can have the drive replaced, before it fails, under warranty. NOTE: All drives are protected by a Pre-Failure Alert when used with a HP Smart Array controller and Systems Insight Manager, allowing hard drives to be replaced before failure under warranty. In addition, all drives are covered by a one or three-year limited on-site warranty period for the system in which they are installed. The drive warranty is automatically uplifted when used in a server or MSA for which a Care Pack is purchased. Please see the Support Services section below for additional services.
Integration	Many issues customers have with third party drives are "simple" integration issues. When buying from another supplier, there is no guarantee that a drive has been correctly set for proper operation with ProLiant servers and storage systems. These incompatibilities can create problems in configuration, can rob your system of performance, or at their worst, can cause you to lose data. HP hard drives are specifically designed and tested for flawless operation in your HP equipment. The integration of hard drives in HP systems means that cables, SCSI ID settings, termination, hot plug drive trays and firmware are right for your ProLiant server or storage system.

Standard Features

Support Matrix   Please see the following URL for the latest list of supported servers and enclosures:
http://www.hpproliantoptions.com/

Service and Support, HP Care Pack, and Warranty Information

Support Services

Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 ours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call-To-Repair.
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials, and VMWare-based IT solutions helping to deliver high level of application availability. Response times ranging from 30 minutes for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

NOTE: For more information on HP Care Pack services, contact any of our worldwide sales offices or resellers or visit our worldwide Web site on the internet at: http://www.hp.com/hps/carepack
NOTE: For more complete information on HP Services offerings, customers and resellers, please visit us at: http://www.hp.com/hps
NOTE: Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

QuickSpecs

Technical Specifications

SAS Hot Plug SFF Enterprise (ENT) Drives

Application	SAS Enterprise drives are intended for servers and storage solutions with mission critical and high work load intensive applications where 24/7 duty cycles are a requirement, such as database applications and high transaction level applications.

Warranty	SAS Enterprise hard drives have a 3 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate	The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

HP 300GB 6G SAS 10K SFF DP ENT HDD 507127-B21	300GB 6G 10K			
		Capacity	300,000,000,000	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	7.45 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 300GB 3G SAS 10K SFF DP ENT HDD 492620-B21	300GB 3G 10K	Capacity	300,000,000,000	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	7.45 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 146GB 6G SAS 15K SFF DP ENT HDD 512547-B21	146GB 6G 15K	Capacity	146,815,737,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.14 ms
			Average	2.58 ms
			Full-Stroke	4.85 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

QuickSpecs

Technical Specifications

HP 146GB 3G SAS 15K SFF DP ENT HDD 504062-B21	146GB 3G 15K			
		Capacity	146,815,737,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.14 ms
			Average	2.58 ms
			Full-Stroke	4.85 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 146GB 6G SAS 10K SFF DP ENT HDD 507125-B21	146GB 6G 10K			
		Capacity	146,815,737,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	7.48 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 146GB 3G SAS 10K SFF DP ENT HDD 418367-B21	146GB 3G 10K	Capacity	146,815,737,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.60 ms
			Average	4.1 ms
			Full-Stroke	8.0 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 72GB 6G SAS 15K SFF DP ENT HDD 512545-B21	72GB 6G 15K	Capacity	73,407,865,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.14 ms
			Average	2.58 ms
			Full-Stroke	4.85ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	143,374,738
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 72GB 3G SAS 15K SFF DP ENT HDD 418371-B21	72GB 3G 15K	Capacity	73,407,865,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	3.0 ms
			Full-Stroke	7.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	143,374,738
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 72GB 3G SAS 10K SFF DP ENT HDD 384842-B21	72GB 3G 10K	Capacity	73,407,865,856	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	8.1 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	143,374,738
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

SAS Non-Hot Plug SFF Enterprise (ENT) Drives

Application   SAS Enterprise drives are intended for servers and storage solutions with mission critical and high work load intensive applications where 24/7 duty cycles are a requirement, such as database applications and high transaction level applications.

Warranty   SAS Enterprise hard drives have a 3 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate   The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

HP 300GB 6G SAS 10K SFF DP NHP ENT HDD 537809-B21	300GB 6G 10K			
		Capacity	300,000,000,000	
		Height	0.591 in (15.00 mm)	
		Width	2.750 in (69.85 mm)	
		Depth	3.937 in (100.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	7.45 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 146GB 6G SAS 10K SFF DP NHP ENT HDD 537807-B21	146GB 6G 10K			
		Capacity	146,815,737,856	
		Height	0.591 in (15.00 mm)	
		Width	2.750 in (69.85 mm)	
		Depth	3.937 in (100.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.20 ms
			Average	4.0 ms
			Full-Stroke	7.48 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 72GB 6G SAS 15K SFF DP NHP ENT HDD 537805-B21	72GB 6G 15K			
		Capacity	73,407,865,856	
		Height	0.591 in (15.00 mm)	
		Width	2.750 in (69.85 mm)	
		Depth	3.937 in (100.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.14 ms
			Average	2.58 ms
			Full-Stroke	4.85 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	143,374,738
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

QuickSpecs

HP SAS Enterprise and SAS Midline Hard Drives

Technical Specifications

SAS Hot Plug 3.5" Enterprise (ENT) Drives

Application	SAS Enterprise drives are intended for servers and storage solutions with mission critical and high work load intensive applications where 24/7 duty cycles are a requirement, such as database applications and high transaction level applications.

Warranty	SAS Enterprise hard drives have a 3 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate	The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

HP 600GB 6G SAS 15K 3.5" DP ENT HDD
516828-B21

600GB 6G 15K

Capacity	600,127,266,816	
Height	1.04 in (26.4 mm)	
Width	4.36 in (110.7 mm)	
Depth	7.43 in (188.7 mm)	
Interface	SAS	
Transfer Rate Synchronous (Maximum)	6Gb/sec	
Seek Time (typical reads, including settling)	Single Track	0.2ms
	Average	3.5ms
	Full-Stroke	6.8ms
	Rotational Speed	15,000rpm
Physical Configuration	Bytes/Sector	512
	Logical Blocks	1,172,123,568
Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

DA - 12244   Worldwide — Version 21 — September 14, 2009   Page 13

Technical Specifications

HP 450GB 6G SAS 15K 3.5" DP ENT HDD 516816-B21	450GB 6G 15K	Capacity	450,098,159,616	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.5ms
			Full-Stroke	6.8ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	879,097,968
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 450GB 3G SAS 15K 3.5" DP ENT HDD 454232-B21	450GB 3G 15K	Capacity	450,098,159,616	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.44ms
			Average	3.6ms
			Full-Stroke	6.6ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	879,097,968
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 400GB 3G SAS 10K 3.5" DP ENT HDD 459508-B21	400GB 3G 10K	Capacity	400,000,000,000	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.35ms
			Average	3.9ms
			Full-Stroke	6.8ms
			Rotational Speed	10,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	781,250,000
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 300GB 6G SAS 15K 3.5" DP ENT HDD 516814-B21	300GB 6G 15K	Capacity	300,000,000,000	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.5ms
			Full-Stroke	6.8ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 300GB 3G SAS 15K 3.5" DP ENT HDD 416127-B21	300GB 3G 15K	Capacity	300,000,000,000	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.57 ms
			Average	3.6 ms
			Full-Stroke	11.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 146GB 3G SAS 15K 3.5" DP ENT HDD 384854-B21	146GB 3G 15K	Capacity	146,815,737,856	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.57 ms
			Average	3.5 ms
			Full-Stroke	9.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 72GB 3G SAS 15K 3.5" DP ENT HDD 384852-B21	72GB 3G 15K			
		Capacity	73,407,865,856	
		Height	1.04 in (26.4 mm)	
		Width	4.36 in (110.7 mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3 Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.57 ms
			Average	3.5 ms
			Full-Stroke	9.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	143,374,738
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

SAS Non-Hot Plug 3.5" Enterprise (ENT) Drives

Application   SAS Enterprise drives are intended for servers and storage solutions with mission critical and high work load intensive applications where 24/7 duty cycles are a requirement, such as database applications and high transaction level applications.

Warranty   SAS Enterprise hard drives have a 3 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate   The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

Technical Specifications

HP 600GB 6G SAS 15K NHP 3.5" DP ENT HDD 516830-B21	600GB 6G 15K			
		Capacity	600,127,266,816	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.5ms
			Full-Stroke	6.8ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	1,172,123,568
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 450GB 6G SAS 15K NHP 3.5" DP ENT HDD 516826-B21	450GB 6G 15K			
		Capacity	450,098,159,616	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.5ms
			Full-Stroke	6.8ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	879,097,968
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 450GB 3G SAS 15K NHP 3.5" DP ENT HDD 454234-B21	450GB 3G 15K	Capacity	450,098,159,616	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.44ms
			Average	3.6ms
			Full-Stroke	6.6ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	879,097,968
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 400GB 3G SAS 10K NHP 3.5" DP ENT HDD 508232-B21	400GB 3G 10K	Capacity	400,000,000,000	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.35ms
			Average	3.9ms
			Full-Stroke	6.8ms
			Rotational Speed	10,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	781,250,000
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 300GB 6G SAS 15K NHP 3.5" DP ENT HDD 516824-B21	300GB 6G 15K	Capacity	300,000,000,000	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.5ms
			Full-Stroke	6.8ms
			Rotational Speed	10,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 300GB 3G SAS 15K NHP 3.5" DP ENT HDD 417950-B21	300GB 3G 15K	Capacity	300,000,000,000	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.44ms
			Average	3.6ms
			Full-Stroke	8.0ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

HP 146GB 3G SAS 15K NHP 3.5" DP ENT HDD 417855-B21	146GB 3G 15K	Capacity	146,815,737,856	
		Height	1.028 in (26.1 mm)	
		Width	4.0 in (101.6 mm)	
		Depth	5.787 in (147.0 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.2ms
			Average	3.4ms
			Full-Stroke	6.43ms
			Rotational Speed	15,000rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

SAS Hot Plug SFF Midline (MDL) Drives

Application SAS Midline drives are intended for servers and storage solutions where high capacities are required. These drives have moderately-priced reliability and performance for non mission critical, low workload applications, such as disk backup, archival, and reference applications.

Warranty SAS Midline hard drives have a 1 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

Technical Specifications

500GB 6G SAS 7.2K 2.5in DP MDL HDD 507610-B21	500GB 6G 7.2K			
		Capacity	500,107,862,016	
		Height	0.63 in (16.0 mm)	
		Width	3.1 in (78.7 mm)	
		Depth	5.45 in (138.4 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	6Gb/s	
		Seek Time (typical reads, including settling)	Single Track	0.5 ms
			Average	8.2ms
			Full-Stroke	17.55 ms
			Rotational Speed	7,200 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	976,773,168
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

SAS Hot Plug 3.5" Midline (MDL) Drives

Application   SAS Midline drives are intended for servers and storage solutions where high capacities are required. These drives have moderately-priced reliability and performance for non mission critical, low workload applications, such as disk backup, archival, and reference applications.

Warranty   SAS Midline hard drives have a 1 year limited warranty regardless of the warranty period for the system in which they are installed.

Transfer rate   The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

Technical Specifications

HP 1TB 3G SAS 7.2K 3.5" DP MDL HDD 461137-B21	1TB 3G 7.2K	Capacity	1,000,204,886,016	
		Height	1.04 in (26.4mm)	
		Width	436 in (110.7mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	7.4 ms
			Full-Stroke	14.3 ms
			Rotational Speed	7,200 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	1,953,525,168
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

HP 750GB 3G SAS 7.2K 3.5" DP MDL HDD 461135-B21	750GB 3G 7.2K	Capacity	750,156,374,016	
		Height	1.04 in (26.4mm)	
		Width	436 in (110.7mm)	
		Depth	7.43 in (188.7 mm)	
		Interface	SAS	
		Transfer Rate Synchronous (Maximum)	3Gb/sec	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	7.4 ms
			Full-Stroke	14.3 ms
			Rotational Speed	7,200 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	1,465,149,168
		Operating Temperature (System Inlet Air Temperature)	50° to 95° F (10° to 35° C)	

Technical Specifications

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
		The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.