Overview

HPE D6000 Disk Enclosure

Finding it difficult to keep up with the growth in unstructured data? Looking for a cost-effective high capacity storage option?
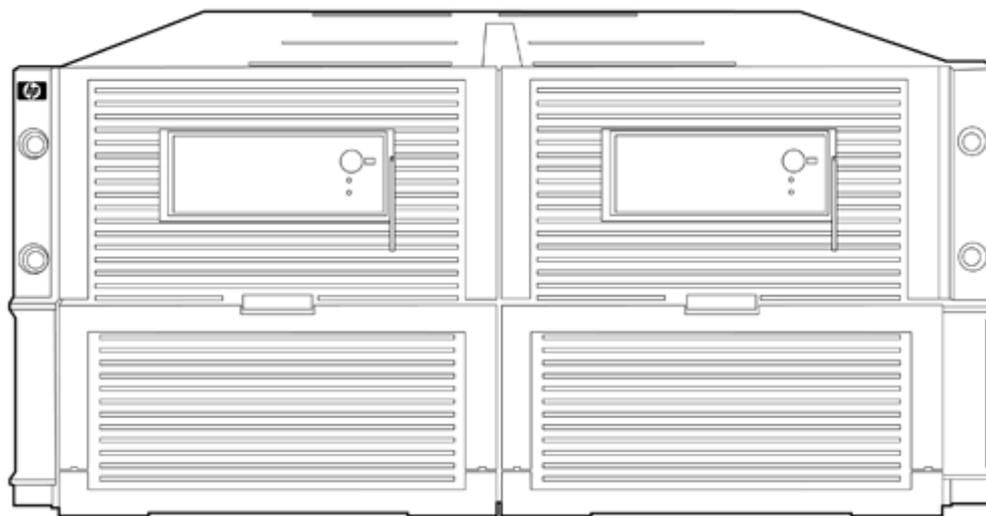
With the new 6 Gb/s SAS HPE D6000 Disk Enclosure, HPE extends and redefines direct-attached storage for BladeSystem servers, combining the simplicity and cost effectiveness of direct-attached storage without sacrificing flexibility or performance. The D6000 can also be directly connected to selected ProLiant Gen8 servers using the Smart Array P421, P431, P441, P822 and P841 Controllers using a standard 2M SAS cable; Single and Dual Domain (P822, P841) environments The HPE D6000 also supports the HPE H221, H222 and the H241 Host Bus Adapters (HBA)

Use the D6000 as part of a straight-forward in-rack 6 Gb/s SAS implementation that delivers high-density, low-cost external zoned direct attach storage for HPE BladeSystem servers. Easily configure storage on the fly with easy to use management software.
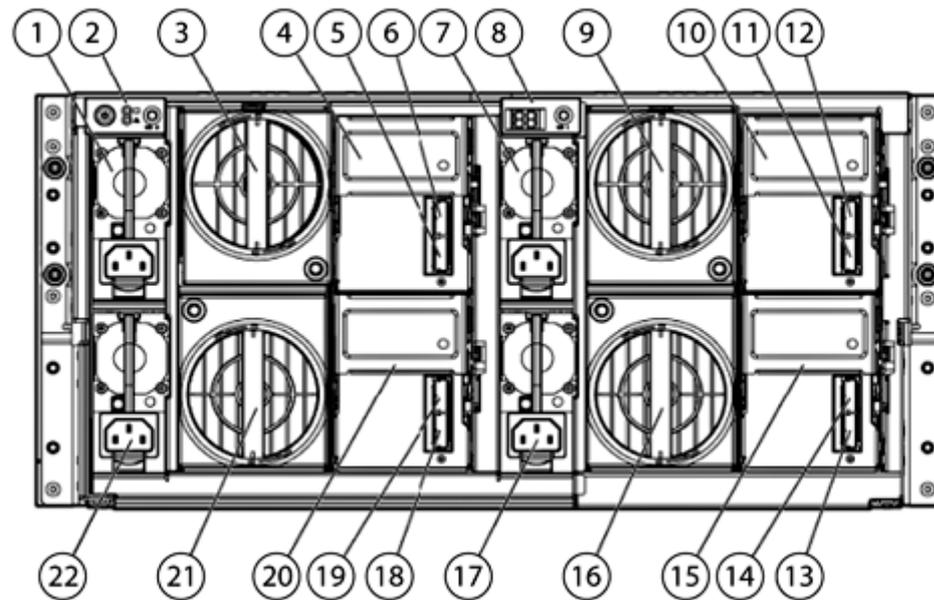
Up to six D6000 storage devices can be supported off a single BladeSystem enclosure for up to 1260 TB of capacity. End-to-end 6 Gb/s SAS connectivity enables a high performance storage solution using a HPE Smart Array P721m, P731m or the P741m controller, 6 Gb/s SAS BL switches, and the D6000. 6 Gb/s host connectivity enables higher performance, eases configuration/deployment and broadens supported features of a D6000 using HPE Smart Array P721m, P731m or the P741m controller and 6 Gb/s SAS BL switches.

For more information on Blade external SAS storage solutions for HPE BladeSystem, see:
http://www.hp.com/go/directconnect

Overview

1. Power supply 1	9. Fan module 1 (Drawer 1)	17. Power supply 4
2. Power On/UID 2 status panel	10. Primary I/O module (Drawer 1)	18. SAS 1 connector
3. Fan module 1 (Drawer 2)	11. SAS 1 connector	19. SAS 2 connector
4. Primary I/O module (Drawer 2)	12. SAS 2 connector	20. Secondary I/O module (Drawer 2)
5. SAS 1 connector	13. SAS 1 connector	21. Fan module 2 (Drawer 2)
6. SAS 2 connector	14. SAS 2 connector	22. Power supply 2
7. Power supply 3	15. Secondary I/O module (Drawer 1)	
8. UID 1 status pane	16. Fan module 2 (Drawer 1)	

What's New

Adding support for:

- HP D6000 w/35 8TB 12G SAS 7.2K LFF (3.5in) Dual Port MDL HDD 280TB Bundle
- HP D6000 w/70 8TB 12G SAS 7.2K LFF (3.5in) Dual Port MDL HDD 560TB Bundle

Overview

At A Glance

- 5U rackmount form factor
- Supports seventy (70) 3.5" LFF Universal hot pluggable SAS or SAS (Midline) MDL drives
- Two pull-out drive drawers support hot plug large form factor dual-ported SAS or SAS MDL drives in just 5U of rack space (35 hot plug drives per drawer)
- 6 Gb/s front-end SAS connectivity using 6 Gb/s SAS BL switches in the interconnect bays, and HPE Smart Array P721m, P731m or the P741m controllers in each BladeSystem server (**NOTE:** D6000 support requires Blade switch firmware to be 3.0.8.0 or higher)
- The D6000 can also be directly connected to selected ProLiant Gen8 servers using the Smart Array P421, P431, P441, P822 and P841 Controllers using a standard 2M SAS cable; Single and Dual Domain environments. Only P822 or the P841 support Dual Domain. No zoning.
- The D6000 also supports the HPE H221, H222 or the H241 Host Bus Adapters
- Using the Virtual SAS Manager (VSM) in the HPE SAS BL switch, assign or 'zone' D6000 drive bays directly to BladeSystem server bay
- Additional option kit with two dual port I/O modules is added for SAS drives, creating a dual domain environment. A single BladeSystem enclosure supports up to six D6000's externally. 3-0-0 warranty

Deployment Guide

For detailed deployment information, see the HPE direct connect external SAS storage for HPE BladeSystem deployment guide. Select Manuals under Resources for HPE D6000 Disk Enclosure:

http://www.hp.com/go/d6000/manuals

Features and Benefits

Key Features

High density, low cost SAS storage for BladeSystem and ProLiant DL/ML servers	• 70 LFF Universal SAS or SAS MDL drives in 5U • Two pull-out drive drawers support hot plug large form factor dual-ported SAS or SAS MDL drives in just 5U of rack space • Each pull-out drive drawer is supported by a redundant set of hot plug power supplies and redundant hot plug fans. Straight forward SAS architecture provides zoned direct attach storage for BladeSystem servers; just a Smart Array P721m, P731m or the P741m controllers in the Blade server, a dual or single 6 Gb/s SAS BL switches in the chassis connected to an D6000. • Connect directly to selected ProLiant Gen8 servers with the Smart Array P421, P431, P441, P822 or the P841 Controllers using a standard 2M SAS cable; Single and Dual Domain environments. Only P822 and P841 support Dual Domain. No zoning. • HPE HBAs H221, H222 and the H241 are also supported.

Build BladeSystem server storage on the fly	• D6000 drive bays are assigned or 'zoned' to individual blade bays using SAS 2.0 zoning capabilities. Use the Virtual SAS Manager (VSM) in the 6 Gb/s SAS BL switch to dynamically assign up to 100 drives to specific BladeSystem servers, without complex configuration or re-cabling. Drives zoned to each server appear as local storage to that server. This allows complete flexibility to reconfigure quickly and easily without moving cables • With zoned direct attached storage capabilities; server administrators can build local storage on the fly according to their configuration requirements. • Quickly deploy and expand capacity by configuring additional drive bays to a P721m, P731m or the P741m Smart Array Controllers without moving a single cable.

HPE reliability	Familiar Smart Array technology of the Smart Array Controllers enables support for RAID levels • Keeps data available and server running while a failed drive is being replaced; two fault tolerance configurations are supported for the internal connections including: • RAID 0 (striping) provides no extra data protection • RAID 1 (mirroring) protects against failure of one drive • RAID 1+0 (mirroring and striping) protects against failure of one drive (and failure of particular multiple drives) • RAID 5 (distributed data guarding) protects against failure of one drive • RAID 6 with ADG (Advanced Data Guarding): This is the highest level of fault tolerance • RAID 50 (RAID 5+0) protects against failure of one drive (and failure of particular multiple drives) • RAID 60 (RAID 6+0) allows administrators to split the RAID 6 storage across multiple external boxes • RAID 1 ADM (Advanced Data Mirroring) allows customers to create mirrored RAID set using 3 identical hard drives

Features and Benefits

Product Technology	SAS	6 Gb/s SAS
	Modular Chassis	5U, 70 Large Form Factor Universal SAS or SAS MDL drive bays
	Drives available	Serial Attached SCSI (SAS) enterprise-class drives designed for high volume 24x7 usage. SAS Midline (MDL) are usually reserved for archival of data as they are both relatively inexpensive and are available in very large capacities. The D6000 can accommodate both SAS and SAS MDL drives within the same enclosure. SAS drive performance can be approximately 30% greater than SAS MDL performance on sequential host IO. SAS performance excels in sequential lower latency response time and random IO per second transaction performance due to higher rpm disk speeds yielding lower seek times.
	Scalability	Up to 70 SAS or SAS MDL 3.5" hot plug hard drives per D6000
		A single BladeSystem enclosure supports up to six D6000's externally.
	RAID	RAID is provided by the Smart Array P721m, P731m, P741m, P421, P431, P441, P822 and the P841 Controllers
	Common Slot Power supplies	Includes four redundant 1200W 12V hot plug power supplies. The D6000 Disk enclosure uses the 1200W Common Slot Power supply. HPE's Common Slot Power supplies meet multiple Energy Efficiency Initiatives: • 1200W, 94%, meets Climate Savers Computing Initiative Platinum level power efficiency requirements for highest rating in the industry • Reduce power usage in data centers by up to 60W per power supply as compared to previous generation power supplies. • The 1200W Common Slot Power supply in the D6000 has Power Discovery capability • 80 Plus and Climate Savers Computing Initiative Platinum and ECOS Consulting 80PLUS PLATINUM **NOTE:** The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 Plus independently tests power supply efficiency and publicly posts the results on 80Plus.org. Optional power supplies can be purchased through power supply option kits (see Power Supply Options for part numbers).
	Fans	Includes four redundant hot plug fan
	Configuration and Management Tools	SAS BL switch for use with BladeSystem servers: Use the Virtual SAS Manager (VSM) to dynamically assign drive bays in the D6000 to each BladeSystem server bay, without complex configuration or re-cabling. This allows complete flexibility to reconfigure quickly and easily without moving cables.

Features and Benefits

		Smart Array Controller: Array Configuration Utility (ACU) provides configuration and management of hard drives, and supports online array capacity expansion, logical drive extension, assignment of online spares and RAID or stripe size migration.
	Management/Health Utilities	Active hardware management using HPE SIM: Manage the array with the highly refined HPE Systems Insight Manager. Smart Components are available to easily update firmware. A convenient Integrated Management Log records hundreds of events and stores them in an easy-to-view format.

Family Information

Supported Servers	HPE BladeSystem Servers (For supported servers, refer to the QuickSpecs below)
	P721m: http://h18000.www1.hp.com/products/QuickSpecs/14404_div/14404_div.html
	P731m: http://h18000.www1.hp.com/products/QuickSpecs/14626_div/14626_div.pdf
	P741m: http://www8.hp.com/us/en/products/iss-controllers/product-detail.html?oid=7797736#!tab=features
	HPE ProLiant Gen8/Gen9 DL and ML servers that support HPE Smart Array Controllers P421, P431, P441, P822, P841 and the H221/H222/H241 HBAs (For supported servers, refer to the QuickSpecs listed below)
	P421: http://h18000.www1.hp.com/products/QuickSpecs/14229_div/14229_div.html
	P431: http://h18000.www1.hp.com/products/QuickSpecs/14625_div/14625_div.pdf
	P441: HPE Smart Array P441 Controller (QuickSpecs/c04346300.pdf)
	P822: http://h18004.www1.hp.com/products/QuickSpecs/14341_div/14341_div.html
	P841: http://www8.hp.com/us/en/products/iss-controllers/product detail.html?oid=6995463#!tab=features
	H221: http://h18004.www1.hp.com/products/QuickSpecs/14222_div/14222_div.html
	H222: http://h18004.www1.hp.com/products/QuickSpecs/14337_div/14337_div.pdf
	H241: HPE H241 Smart Host Bus Adapter (QuickSpecs/c04375840.pdf)

Supported OS	HPE ProLiant Servers
	NOTE: For information on supported Operating Systems, see the following Smart Array QuickSpecs:
	P421: http://h18000.www1.hp.com/products/QuickSpecs/14229_div/14229_div.html
	P431: http://h18000.www1.hp.com/products/QuickSpecs/14625_div/14625_div.pdf
	P441: HPE Smart Array P441 Controller (QuickSpecs/c04346300.pdf)
	P822: http://h18004.www1.hp.com/products/QuickSpecs/14341_div/14341_div.html
	P841: http://www8.hp.com/us/en/products/iss-controllers/product detail.html?oid=6995463#!tab=features
	H221: http://h18004.www1.hp.com/products/QuickSpecs/14222_div/14222_div.html
	H222: http://h18004.www1.hp.com/products/QuickSpecs/14337_div/14337_div.pdf
	H241: HPE H241 Smart Host Bus Adapter (QuickSpecs/c04375840.pdf)
	HPE BladeSystem Servers
	NOTE: For Information on Supported Operating Systems, see the following Smart Array QuickSpecs:
	P721m: http://h18000.www1.hp.com/products/QuickSpecs/14404_div/14404_div.html
	P731m: http://h18000.www1.hp.com/products/QuickSpecs/14626_div/14626_div.pdf
	P741m: http://www8.hp.com/us/en/products/iss-controllers/product-detail.html?oid=7797736#!tab=features

Service and Support, HPE Care Pack, and Warranty Information

Warranty	3-0-0 warranty Three-year parts exchange, next business day delivery **NOTE:** The warranties of the hard drive options purchased for the D6000 are different for SAS hard drives versus SAS Midline (MDL) hard drives. SAS hard drive options have a three year warranty and SAS MDL hard drive options have a one year warranty.

Warranty Upgrade Options	• Response - Upgrade on-site response from next business day to same day 4-hour response or 6 Hour Call To Repair • Coverage - Extend hours of coverage from next business day to 9 hours x 5 days to 24 hours x 7 days • Duration Select duration of coverage for a period of 1, 3, 4 or 5 years

Service and Support	Services to accelerate time to results HPE Storage Services bring you a rich portfolio of consulting and support services designed to add value to our core storage products and solutions. We have the know-how and experience to put storage technology to work for you. We work closely with you as your strategic partner, leveraging our full services portfolio to make sure that everything works to optimize your enterprise. Choose from services aligned to our storage product offerings and lifecycle. From mission-critical onsite services to innovative web-based remote support, you choose the precise level of attention and support your business demands.
Discover, plan, and design	Choose from a rich portfolio of services to make the most of HPE D6000 Disk Enclosures (Rockford - PL LL)), so you can efficiently and affordably consolidate, manage, and extract value from unstructured data. HPE Services can help you discover needs and create a plan for simplifying the environment, reducing risk, and maximizing your storage investments HPE Storage Efficiency Analysis - The HPE Storage Efficiency Analysis provides customers with a view of their storage infrastructure and operating environment; highlighting recommendations for improvements. The report provides extensive insight about the existing storage environment, opportunities for efficiency gains, asset aging and replacement through interaction with key decision makers https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA3-6727ENW.pdf HPE Storage Impact Analysis (SIA): The HPE Storage Impact Analysis service provides a 2-4 week discovery engagement with executive summary presentation. The goal of this service is to help provide customers guidance on storage related issues and develop remediation plans. https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA4-1174ENW.pdf

Service and Support, HPE Care Pack, and Warranty Information

	HPE Storage Modernization Service: The HPE Storage Modernization service is a 4-6 week service that defines the customers envisioned target storage environment based on a proven solution design methodology. Hewlett Packard Enterprise architects will quickly perform tool-assisted automatic discovery and facilitate a two-day strategy workshop with all key stakeholders involved in the storage infrastructure initiative https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA3-4620ENW.pdf
Deploy and integrate	We can help you configure, set up, and efficiently use your HPE D6000 Disk Enclosures (Rockford - PL LL)), as well as help migrate data, improve capacity utilization, and establish information management standards used across backup, replication, and archiving needs.

HPE MSA/P2000 Family Disk Array Installation and Startup Service - Implement right from the start, as HPE experts install, test, and configure your hardware and software onsite. We deliver a tailored storage deployment properly integrated into your environment.
Basic hardware installation only for D6000 Modular Disk System

HPE Storage Data Migration Services - End-to-end data migration service providing seamless discovery, assessment, planning, and design, completely customizable to your organization's storage area network or network attached storage environment and using innovative software to help you migrate to HPE storage quickly and efficiently. https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA3-0774ENW.pdf

HPE Storage and Data Residency Service - Strategic augmentation of your current environment with HPE resources who become your trusted advisor to provide answers that are right for your storage and backup environment. https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA3-9481ENW.pdf

HPE Proactive Select - A flexible way to purchase services to fit your environment with an extensive menu of HPE Proactive Select event and technical services, such as onsite firmware upgrades, health checks, assessments, and education. https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA2-3842ENW.pdf |
| Operate and support | Choose the right support to maximize uptime, free up your resources, and achieve improved value-as you get the most out of the existing IT assets while accelerating time-to-revenue.

HPE Proactive Care 24x7 - Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center Specialists plus firmware and software management and best practice advice https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE Proactive Care Personalized Support - An option-if you have HPE Proactive Care-to bring increased personalization of the Proactive Care support experience through the assignment of an Account Service Manager (ASM) who provides IT best practice advice to help address IT issues and projects. https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA4-3446ENW.pdf |

Service and Support, HPE Care Pack, and Warranty Information

HPE Foundation Care 24x7 Service - HPE Foundation Care 24x7 connects you to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HPE Care Pack Service.

HPE Education Services - Comprehensive training for new, as well as experienced, storage administrators designed to expand your skills and keep you up to speed with the latest storage and virtualization technology from HPE Storage.
http://education.hp.com/curr-storsan.htm

Optimized Care - Delivers the highest levels of performance and stability through deployment and proactive management practices	Choose from three levels of operate and support care HPE Proactive Care 24x7-Plus, 20 credits per year Additional options -HPE Proactive Care Personalized Support (once per Proactive Care support new environment), an additional day of HPE Personalized Support, and 10 additional HPE Proactive Select credits per year
Standard Care - maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support	HPE Proactive Care 24x7-Plus, 10 credits per year Additional options -HPE Proactive Care Personalized Support (once per Proactive Care support new environment), an additional day of HPE Personalized Support, and 10 additional HPE Proactive Select credits per year
Basic Care - Minimum recommended support	HPE Foundation Care 24x7 Service - Plus, 10 credits per year Additional options - 10 HPE Proactive Select credits per year
Remote Support Automation	HPE Automation provides 24x7 coverage, proactive problem prevention, accurate problem diagnosis and faster problem resolution, as well as interactive support portals and tools. This is an integral, and cost-free, part of your HPE support relationship and we are continually investing in additional cutting-edge capabilities to make it better.
For more information	http://www.hp.com/services/storage To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner HPE Care Pack Services are sold by HPE and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Care Pack Services at: http://www.hp.com/go/lookuptool

Configuration Information

Step 1: D6000 Disk Enclosure

Model	Model Description	Part Number
D6000	HPE D6000 Dual I/O Module Disk Enclosure	QQ695A
	NOTE: Base model for SAS and SAS Midline (MDL) drives. Add QQ696A when using dual-ported SAS drives to create a dual domain environment. **NOTE:** Includes four hot plug power supplies for n+2 redundancy and four hot plug fans for n+1 redundancy. **NOTE:** Includes two right angle and two left angle power cords.	
	HPE D6000 Disk Enclosure Dual I/O Module Kit	QQ696A
	NOTE: Add QQ696A option kit to QQ695A when using dual-ported SAS drives to create a dual domain environment.	
	HPE D6000 w/35 2TB 6G SAS 7.2K LFF Dual port MDL HDD 70TB Bundle	QQ697A
	NOTE: Includes D6000 with (35) 2TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans	
	HPE D6000 w/70 2TB 6G SAS 7.2K LFF Dual port MDL HDD 140TB Bundle	QQ698A
	NOTE: Includes D6000 with (70) 2TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans	
	HPE D6000 w/35 3TB 6G SAS 7.2K LFF Dual port MDL HDD 105TB Bundle	QQ699A
	NOTE: Includes D6000 with (70) 3TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans	
	HPE D6000 w/70 3TB 6G SAS 7.2K LFF Dual port MDL HDD 210TB Bundle	QQ700A
	NOTE: Includes D6000 with (70) 3TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans.	
	HPE D6000 w/35 4TB 6G SAS 7.2K LFF Dual Port MDL HDD 140TB Bundle	E7W30A
	NOTE: Includes D6000 with (35) 4TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans.	
	HPE D6000 w/70 4TB 6G SAS 7.2K LFF Dual Port MDL HDD 280TB Bundle	E7W31A
	NOTE: Includes D6000 with (70) 4TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans.	

Configuration Information

HPE D6000 w/35 8TB 12G SAS 7.2K LFF (3.5in) Dual Port MDL HDD 280TB Bundle **NOTE:** Includes D6000 with (35) 8TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans.		M0T58A
HPE D6000 w/70 8TB 12G SAS 7.2K LFF (3.5in) Dual Port MDL HDD 560TB Bundle **NOTE:** Includes D6000 with (70) 8TB LFF Midline SAS drives, (4) dual port I/O modules, redundant power supplies and redundant fans.		M0T59A

Step 2: Choose Supported Options

		Part Number
HPE Smart Array P721m controller	HPE Smart Array P721m/2GB FBWC 6Gb 4-ports Ext Mezzanine SAS Controller	650072-B21
HPE Smart Array P731m controller	HPE Smart Array P731m/2GB FBWC 6Gb 4-ports Ext Mezzanine SAS Controller	698535-B21
HPE Smart Array P741m controller	HPE Smart Array P741m/2GB FBWC 12Gb 4-ports Ext Mezzanine SAS Controller	762782-B21
HPE Smart Array P421 controller	HPE Smart Array P421/1GB FBWC 6Gb 2-ports Ext SAS Controller	631673-B21
	HPE Smart Array P421/2GB FBWC 6Gb 2-ports Ext SAS Controller	631674-B21
HPE Smart Array P431 controller	HPE Smart Array P431/2GB FBWC 12Gb 2-ports Ext SAS Controller	698531-B21
	HPE Smart Array P431/4GB FBWC 12Gb 2-ports Ext SAS Controller	698532-B21
HPE Smart Array P441 controller	HPE Smart Array P441/4GB FBWC 12Gb 2-ports Ext SAS Controller	726825-B21
HPE Smart Array P841 controller	HPE Smart Array P841/4GB FBWC 12Gb 4-ports Ext SAS Controller	762903-B21
HPE Smart Array P822 controller	HPE Smart Array P822/2GB FBWC 6Gb 2-ports-Int/4-ports Ext SAS Controller	615418-B21
HPE Host Bus Adapters (HBAs)	HPE H221 PCIe 3.0 SAS Host Bus Adapter	729552-B21
	HPE H222 Host Bus Adapter	650926-B21
	HPE H241 12Gb 2-ports Ext Smart Host Bus Adapter	726911-B21
HPE 6 Gb/s SAS BL Switch	HPE 6Gb SAS Switch Single Pack for HPE BladeSystem c-Class	BK763A
	HPE 6Gb SAS Switch Dual Pack for HPE BladeSystem c-Class	BK764A

Configuration Information

Step 2b - SAS Cable

Model Description	
Cables to be used for connecting the D6000 with the HPE Smart Array P222 & P421 Controllers	
HPE External Mini SAS 1m Cable ALL	407337-B21
HPE External Mini SAS 4m Cable*	432238-B21
Cables to be used for connecting D6000 with the HPE Smart Array P431, P441, P841 (HD connector)	
HPE 1.0m External Mini SAS High Density to Mini SAS Cable*	716189-B21
HPE 2.0m External Mini SAS High Density to Mini SAS Cable*	716191-B21

* #0D1 will appear after this part number on your sales order if factory integration is indicated.

Step 3 - D6000 Drive Options

3.5" SAS Midline (MDL) Drives

<u>12G</u>

HPE 8TB 12G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	793701-B21

<u>6GB</u>

HPE 6TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	782669-B21
HPE 4TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	693689-B21
HPE 3TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	625031-B21
HPE 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507616-B21
HPE 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21

3.5" SAS Drives

<u>12G</u>

HPE 300GB 12G SAS 15K rpm LFF (3.5-inch) CC Enterprise 3yr Warranty Hard Drive	737390-B21
HPE 450GB 12G SAS 15K rpm LFF (3.5-inch) CC Enterprise 3yr Warranty Hard Drive	737392-B21
HPE 600GB 12G SAS 15K rpm LFF (3.5-inch) CC Enterprise 3yr Warranty Hard Drive	737396-B21

<u>6G</u>

HPE 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21
HPE 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
HPE 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21

Configuration Information

Step 4: Choose Rack Options

Choose HPE Rack 10000 series Cabinets for the D6000
The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

http://h18004.www1.hp.com/products/servers/proliantstorage/racks/10000series/index.html

NOTE: An D6000 fully loaded with drives weighs 320lbs.

NOTE: Hewlett Packard Enterprise has not tested or validated the D6000 with any third-party racks. Before installing the D6000 in a third-party rack, be sure to properly scope the limitations of the rack. Before proceeding with the installation, consider the following:

- You must fully understand the static and dynamic load carrying capacity of the rack and be sure that it can accommodate the weight of the D6000.
- If the D6000 is not sitting atop a Blade c-Class enclosure or another D6000 or MDS600 in a 3rd party rack , then install a 1U tray (part no 501037-B21) beneath the D6000 to ensure proper support
- Be sure sufficient clearance exists for cabling, installation and removal of the enclosure, actuation of the rack doors, and full articulation of the drive drawers

NOTE: Please note that while configured as CTO, a maximum of four D6000 is supported in a 42u standard rack (AF002A) and five in a 42u deep rack (AF092A). The 47U deep rack (AF094A) will also be limited to a maximum of five D6000 for CTO config. But additional D6000 can still be ordered as BTOs. Customers can then install them into racks at the customer site for a maximum of six D6000 per rack. The quantity of D6000 units supported in a rack is dependent upon the other components configured in the rack relative to the rack weight limit.

Technical Specifications

D6000	INPUT POWER (per power supply)	Rated Line Voltage	90 to 132 VAC 180 to 264 VAC
		Rated Input Frequency	47 to 63 Hz
		Rated Input Current	10A (at 100 VAC), 7.8A (at 200VAC)
		Rated Input Power	@ 100VAC, 70 drives x 2TB-7.2K = 1043.7W @ 100VAC, 70 drives x 600GB-15K = 1601.9W
	TEMPERATURE AND HUMIDITY RANGES	Operating Temperature	50° to 95° F (10° to 35° C) **NOTE:** Maximum Rated 10°C per/hr (50°F/hr)
		Storage Temperature	-22° to 140° F (-30° to 60° C) **NOTE:** Maximum Rated 20°C/hr (68°F/hr)
		Operating Humidity	10% to 90% relative humidity (Rh), 28° C (82.4° F) maximum wet bulb temperature, non-condensing
		Non-Operating Humidity	5% to 95% relative humidity (Rh), 38.7° C (101.66° F) maximum wet bulb temperature, non-condensing
	PHYSICAL	Length	89.12 cm
		Width	44.7 cm (17.6 in)
		Height	22.1 cm (8.7 in)
		Chassis	72.58 kg (160 lb) with no hard drives installed
		Weight	145 kg (320 lb) with hard drives installed

Power Consumption (maximum)	Power consumption at 208VAC		
	Drive Type	Typical	Service Position Maximum (drawers being pulled out causing all fans to go to full speed
	7200 RPM SAS MDL	1035W (3532 Btu/hr)	1470W (5021 Btu/hr)
	10K 400G SAS	940W	1340W
	15K SAS	1280W	1710W

NOTE: Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.
NOTE: Temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft.) to 3048 m (10,000 ft.) is applicable. No direct sunlight allowed. The upper limit may be limited by the type and number of options installed.
NOTE: Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.
NOTE: The "service position maximum" column is the test result with the drawers open.

Technical Specifications

	Upgradeable Firmware	Offline
	Disk Drives and Enclosure Protocol Support	HPE 3.5" SAS and SAS MDL 6 Gb/s

I/O Module	Connector Type	External mini-SAS 4x (SFF8088)
	Number of Ports	Two

Summary of Changes

Date	Version History	Action	Description of Change
05-Aug-2016	From Version 16 to 17	Changed	Changes made to the Overview and Configuration Information Sections
29-Apr-2016	From Version 15 to 16	Changed	Changes made to the Configuration Info and Features and Benefits sections.
28-Sept-2015	From Version 14 to 15	Changed	Added the 3.5" SAS Midline (MDL) Drives 12Gb hard Drives
24-Jul-2015	From Version 13 to 14	Changed	Added the 12Gb Warranty Hard Drive s
17-Jul-2015	From Version 12 to 13	Changed	Changes made to the What´s New and Configuration Information Sections.
27-Mar-2015	From Version 11 to 12	Added	Added support for: ○ HPE Smart Array P841/4GB FBWC 12Gb 4-ports Ext SAS Controller ○ HPE Smart Array P741m/2GB FBWC 12Gb 4-ports Ext Mezzanine SAS Controller
01-Dec-2014	From Version 10 to 11	Changed	Changes were made throughout the QuickSpecs
22-Aug-2014	From Version 9 to 10	Changed	Updated the following: What's new; Configuration Information – Step 2b – SAS Cables – removed 407339-B21 and added 432238-B21, 716189-B21 AND 716191-B21; Step 3 – D6000 Drive Options – added 782669-B21, 737390-B21, 737392-B21, 737396-B21
		Removed	Obs SKU: 650931-B21
09-May-2014	From Version 8 to 9	Changed	Operate and Support and Basic Care were revised.
18-Apr-2014	From Version 7 to 8	Changed	Changes made in the Service and Support section.
11-Apr-2014	From Version 6 to 7	Added	Mentions of HPE Smart Array P431 Controller were added.
09-Dec-2013	From Version 5 to 6	Changed	HPE D6000 w/35 and 75 4TB 6G SAS 7.2K LFF Dual Port MDL HDDs were added to Step 1 in Configuration Information Power Consumption was revised in Technical Specifications
20-Sep-2013	From Version 4 to 5	Changed	Updated the following: Overview; What's new - added support for new Smart Array P731m controller; At A Glance; Key Features; Features and Benefits; Configuration Information - Step 2 - Supported Options - added P731m Controller, H221 HBA and H222 HBA
23-Aug-2013	From Version 3 to 4	Changed	Updated the following: What's new - added support for 4TB SAS LFF drive; Supported OS -

Summary of Changes

			added Microsoft Windows Server 2012; Step 3 - D6000 Drive Options - Added 693689-B21 to the list of 3.5" Midline (MDL) drives; Step 4 - Choose Rack Options - updated note regarding 3rd party rack.
15-Feb-2013	From Version 2 to 3	Changed	Changes were made to the Overview, What's New, At a Glance, Features and Benefits, Family Information and Configuration Information Sections.
18-Jan-2013	From Version 1 to 2	Changed	Changed 2TB to 3TB in the note of Part Number QQ700A.

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