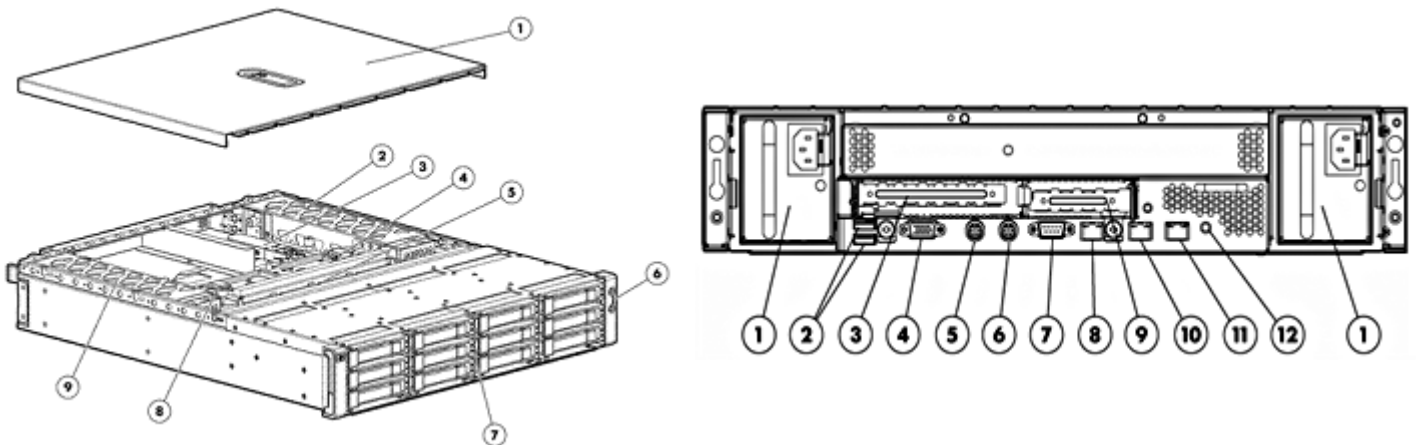


### Overview

The HP ProLiant DL320s Storage Server is a high-density Windows-powered file and print solution that enables customers with small and medium office environments to consolidate multiple direct-attached storage (DAS) installations and management interfaces to a single centralized networked storage device. This solution can also be a way to add high capacity to your network very quickly, or it can be an effective disk-based backup or replication target. It supports multiple file sharing protocols and Windows storage-specific tools that make file share maintenance both easy and powerful. And with optional Microsoft® iSCSI Software Target, you can upgrade to host block-based storage for Exchange, SQL or other applications.

This network storage solution not only aids in consolidation, storage expansion, and cost reduction, but also helps you spend less time deploying and managing file and print services. It comes with Microsoft® Windows Storage Server 2003 Release 2 Operating System pre-installed, and user storage is pre-configured. It's quick to install and it's Windows through-and-through--if you know how to use a Microsoft Management Console (MMC)-based user interface, you already know how to manage it. And the unique Rapid Start-up Wizard streamlines installation even more. Finally, remote management capability at both the system level and at the hardware component level (Integrated Lights-out 2) means you can manage and troubleshoot from anywhere.

The DL320s Storage Server leverages industry-standard components to protect and optimize your hardware investment: it packs twelve disk drives (up to 9TB raw), memory, and I/O into only 2U of rack space; it supports SAS or SATA drives so you can choose your desired level of performance, reliability, and affordability; and it integrates seamlessly into HP ProLiant or StorageWorks environments.



#### Front View:

1. Quick removal access panel
2. Power Supply #1 (575 Watt)
3. HP Smart Array P400/512MB controller with BBWC
4. USB port
5. Non Hot Plug Dual Rotor Fans with N+1 Redundancy
6. Front LED Indicators
7. Twelve (12) LFF SAS or SATA Hard Drives
8. USB
9. Power Supply #2 (575 Watt)

#### Rear View:

1. Power Supply
2. USB Connectors (2)
3. PCI Express x8 expansion slot (full-length; occupied by Smart Array P400/512 MB controller)
4. Video connector
5. Mouse connector
6. Keyboard connector
7. Serial connector
8. Integrated Lights-Out 2 (iLO 2) NIC

### Overview

9. PCI Express x1 expansion slot (low-profile / half-length)
10. NIC controller 1
11. NIC controller 2
12. UID button/LED

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**What is a ProLiant Storage Server?** ProLiant Storage Servers are enhanced Windows-powered file and print server solutions for small or medium business, branch office, workgroup, or data center IT environments. These network storage devices are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes. And since they're Windows-based, network integration is easy, your antivirus and backup applications run right on the box, and management has a familiar look and feel. So you can add storage to your network quickly and spend less time on storage management, then get back to what matters most: running your business.

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### Highlights

HP ProLiant DL320s Storage Servers deliver Enterprise-level features and high performance at entry level affordability. The Dual-Core Intel® processor, up to 9TB storage capacity, and DDR2 Memory enhance this ultra-dense 2U file serving solution for both small Enterprise and SMB customers.

- **Operating System:**
  - Windows Storage Server 2003 Release 2, Standard Edition
- **Processor:**
  - Dual-Core Intel® Xeon® Processor 3070 2.67 GHz
- **Memory:**
  - 1GB (1 x 1GB) standard
- **Storage Controller:**
  - Smart Array P400/512MB Controller (RAID 0/1/5/6) with battery-backed write cache (BBWC)
- **Drive Support:**
  - Twelve 3.5" (Large Form Factor) hot-plug internal bays that support SATA or SAS HDDs
    - 12 x 250GB SATA LFF (3TB SATA model)
    - 12 x 500GB SATA LFF (6TB SATA model)
    - 12 x 750GB SATA LFF (9TB SATA model)
    - 12 x 146GB SAS LFF (1.7TB SAS model)
    - 12 x 300GB SAS LFF (3.6TB SAS model)
  - Rear Slimline CD-RW/DVD-ROM 24X combo drive to support System Restore
- **Network Controller:**
  - Embedded NC324i PCIe Dual Port Gigabit Server Adapter
- **Expansion Slots:**
  - (1) Full length PCI Express x8 slot, x8 connector (occupied by Smart Array P400/512MB controller)
  - (1) Half-length, low-profile PCI Express x1 slot, x8 connector
- **Redundancy:**
  - Hot-plug SAS/SATA hard disk drives
  - Hot plug redundant power supply
  - Fully redundant fans (N+1)
- **Management:**
  - Microsoft Management Console (MMC)-based user interface
  - Remote system management via Remote Desktop or Telnet
  - Remote hardware management via Integrated Lights Out 2 (iLO 2) – Advanced License included

### Overview

- **Form Factor:**
  - Rack (2U), (3.5-inch); Depth 24.5 inches
- **Warranty:**
  - Protected by HP Services and a worldwide network of resellers and service providers. Three-year Next Business Day, on-site limited global warranty (three year parts, one year labor, one year on-site support). Certain restrictions and exclusions apply. SATA hard drives have a one-year warranty.

#### **The fast and easy way to add a file server to your network**

The Windows-powered operating system is pre-installed and user storage is pre-configured, so it's a quick, secure, and easy way to add storage to your network. Go from out-of-the-box to file serving in minutes, not hours.

#### **A single centralized file server platform to manage and protect**

Simplify tasks and lower your total cost of storage ownership by consolidating islands of direct-attached storage to one easy-to-use Windows platform. You can also use a DL320s Storage Server as a high-capacity disk-based backup/replication target.

#### **Multi-protocol file serving**

Support for SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare file protocols means you can deploy in wide range of heterogeneous file serving environments.

#### **Microsoft® Windows-powered operating system pre-installed**

It's Windows! So it integrates seamlessly into your Active Directory and DFS environments, runs your favorite antivirus or backup applications, and if you've used Microsoft Management Console (MMC) before, there's no steep learning curve to worry about because you're already familiar with the user interface.

#### **Intelligent storage management features**

Make more efficient use of storage space using the file de-duplicating Single-instance Storage (SIS) feature and enjoy the benefits of other storage-specific tools like Indexed search, SharePoint® Services support, Quotas, File Screening, Storage Reporting, and Distributed File System (DFS) Replication.

#### **Remote manageability**

You can manage and troubleshoot from anywhere at both the system level (with Remote Desktop or HTTPS) and at the hardware component level (using Integrated Lights-out 2).

#### **HP ProLiant industry-standard hardware**

Relax—your investment is protected because you're not locked into a proprietary platform. The high-density 2U rack mount platform supports twelve internal hard drives for a capacity of up to 9TB (12 x 750GB SATA) and also features redundant power and cooling.

#### **Print server support**

Don't forget that DL320s Storage Server is a Windows print server too, offering consolidation benefits to your Windows print environment.

#### **Microsoft® iSCSI Software Target support**

Upgrade your ProLiant Storage Server to host block-based application storage to further consolidate and lower hardware and administrative costs with optional software (T4433A).

### Standard Features

#### Operating System

Microsoft Windows Storage Server 2003 R2, Standard x86 Edition

- Optimized for File Serving: Up to 20% faster file serving performance than a general-purpose Windows Server 2003 R2 installation on the same hardware.
- HP-enhanced File Server Management Console: Features the familiar look and feel of the Microsoft Management Console (MMC).
- HP Rapid Start-up Wizard: Simplifies and accelerates new device deployment by walking you through basic system settings step-by-step.
- Single-instance Storage (SIS): Recovers up to 35% of disk space by de-duplicating files and reducing the amount of redundant data stored. Identifies identical files, stores a single copy of the file in a central repository, and replaces the files with pointers to the file in the SIS common store.
- Search Enhancements: Indexing Service extracts the information from a set of documents and organizes it in a way that makes it quick and easy to access that information through the Search function for computers running Windows 2000 or Windows XP.
- File Server Resource Manager (FSRM): Provides both on-demand and scheduled reports detailing storage use, allows administrators to create and manage folder and volume quotas, and permits both name-based screening of files and allowing/disallowing file creation on specified folder trees.
- Windows SharePoint® Services: A powerful Web-based team collaboration environment that provides an integrated portfolio of collaboration and communication services designed to connect people, information, processes, and systems.
- Distributed File System (DFS) Management Console: Updated DFS namespace failover, failback and prioritization controls.
- Distributed File System Replication (DFS-R): State-based, multi-master replication engine that supports replication scheduling and bandwidth throttling. DFS-R uses a new compression algorithm that efficiently updates files over limited bandwidth networks by replicating only the changes needed to ensure global file consistency.
- Full support of Volume Shadow Copy Service, which creates point-in-time copies of files and folders at predetermined time intervals that can then be accessed from client computers.
- Unlimited Client Access Licenses (CALs) included
- Microsoft Services for Network File System (NFS)
- Support for multiple file serving protocols, including SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare
- Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN
- Support for any number of SATA or SAS drives and multiple network ports

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#### Processor

Dual-Core Intel® Xeon® Processor 3070 (2.67 GHz, 65 Watts, 1066 FSB)

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#### Cache Memory

4MB (2 x 2MB) Level 2 Cache

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#### Chipset

Intel® 3010 Chipset with 1066MHz FSB

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### Standard Features

<b>Memory</b>	Type	PC2-5300 (667MHz) Unbuffered ECC DDR2 SDRAM Interleaving optional (Enabled when DIMMs populated in pairs)
	Memory Protection	Advanced ECC
	DIMM Sockets	4
	Standard	1 GB (1 x 1 GB)
	Configure-to-Order (CTO) Upgrade Options (available only in select regions)	2 GB (2 x 1 GB), 4 GB (4 x 1 GB)
	Maximum Memory (Limited by O/S)	4 GB

**Network Controller** Embedded NC324i PCIe Dual Port Gigabit Server Adapter

Expansion Slots	Slot Number	Bus Speed	Height	Hot Plug	Pre-installed adapter
PCI-Express Non Hot-Plug Riser	1	PCI Express x8 (x8 connector)	Full	no	Smart Array P400/512MB controller
	2	PCI Express x1 (x8 connector)	Half	no	-

**Storage Controller** HP Smart Array P400/512MB Controller with battery-backed write cache (BBWC)

- RAID 0/1/5 and RAID 6 with Advanced Data Guarding
- x8 2.5G PCIe host interface

<b>Storage</b>	Hard Drives	Internal: <ul style="list-style-type: none"> <li>● 12 x 250GB SATA 7.2K LFF HDDs (3TB SATA model)</li> <li>● 12 x 500GB SATA 7.2K LFF HDDs (6TB SATA model)</li> <li>● 12 x 750GB SATA 7.2K LFF HDDs (9TB SATA model)</li> <li>● 12 x 146GB 3G SAS 15K LFF HDDs (1.7TB SAS model)</li> <li>● 12 x 300GB 3G SAS 15K LFF HDDs (3.6TB SAS model)</li> </ul>
	Optical Drive	Rear Slimline CD-RW/DVD-ROM 24X combo drive

<b>Maximum Storage Capacity (raw)</b>	Internal hot plug LFF SATA	9 TB	12 x 750GB SATA
	Internal hot plug LFF SAS	3.6 TB	3.6 TB
	Internal plus External	45 TB	12 x 750GB LFF SATA int. + 48 x 750GB LFF SATA ext.

### Standard Features

<b>Interfaces</b>	Serial	1
	USB 2.0 Ports	2 internal; 2 rear
		<b>NOTE:</b> Please see the following URL for additional information regarding USB support: <a href="http://h18004.www1.hp.com/products/servers/platforms/usb-support.html">http://h18004.www1.hp.com/products/servers/platforms/usb-support.html</a>
	Graphics	1
	Keyboard	1
	Mouse	1
	Network RJ-45	2
	iLO 2 remote management port	1
	NIC/iLO LED Link/Activity	3
	UID Switch/LED	1

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<b>Graphics</b>	Integrated ATI ES1000 Video Controller with 16 MB SDRAM Video Memory
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<b>Management</b>	<p>Microsoft Management Console (MMC)-based user interface (also accessible via HTTPS)</p> <p>Remote system management via Remote Desktop or Telnet</p> <p>Integrated Lights-Out 2 featuring Integrated Remote Console with KVM over IP performance over shared network access (Advanced License included standard)</p> <ul style="list-style-type: none"><li>● Virtual Text Remote Console</li><li>● Virtual Power Button Control</li><li>● Integrated Remote Console</li><li>● Dedicated &amp; full function shared network connectivity</li><li>● Browser, command line and scripted access</li><li>● Automatic IP Configuration via DHCP/DNS/WINS</li><li>● Industry Standard 128-bit Secure Sockets Layer (SSL) and Secure Shell security (SSH)</li><li>● OS independent hardware health status</li><li>● IML and iLO Event Logging</li><li>● Support for 12 user accounts with customizable access privilege</li><li>● Advanced license: upgrades the iLO 2 processor with comprehensive remote control including Virtual KVM graphical console, virtual media, and enterprise security.</li></ul>
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<b>Form Factor</b>	Rack (2U), (24.5")
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<b>Industry Standard Compliance</b>	ACPI 2.0 PCI 3.0 Compliant PXE Support WOL Support Microsoft® Logo certifications USB 2.0
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### Standard Features

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**Server Power Cords**      Worldwide      Two 10' Highline (IEC-IEC) power cords ship standard

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**Power Supply**      Auto-sensing 575 Watt/12 Volt/1.2A FAN redundant Power Supply, CE Mark Compliant Dual, Auto Ranging input, power factor corrected, 575W, high efficiency, redundant, 12V-47A, 5V-5A output, self cooled power supplies agency rated for worldwide use. Power supply fan controlled externally by enclosure with internal override for thermal protection. Bicolor LED to indicate fault, standby or power good. 3.8 lbs typical.

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**UPS and PDU Power Cord Matrix**      Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units:  
<ftp://ftp.compaq.com/pub/products/servers/ProLiantstorage/power-protection/powercordmatrix.pdf>.

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**System Fans**      4 dual rotor chassis fans standard

### Optional Software

#### Optional Software from HP for Storage Servers

- **Microsoft® iSCSI Software Target** – Powerful iSCSI software target solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. The software adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

For more information: [http://h18006.www1.hp.com/products/storageworks/ms\\_iscsi/index.html](http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html)

- **HP StorageWorks Storage Mirroring Software** – HP StorageWorks Storage Mirroring offers a host-based application that performs remote copy over an IP LAN/WAN. Key features include asynchronous replication that can be scheduled to a fine granular level, Logical Unit Number (LUN), file or byte level. Other features include multiple replication configuration options including peer-to-peer and many-to-one. In addition, Storage Mirroring is a very cost effective disaster recovery alternative from one host to another within a LAN, storage center, or between direct attached storage in metro offices and regional centers. Additional configurations allow replication from small office environments to ensure business continuity without an outside IT staff.

For more information: <http://h18006.www1.hp.com/products/storage/software/sm/index.html>

- **HP Data Protector Software** - HP Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

Data Protector is enabling organizations to reduce costs by automating routine tasks to maximize the effectiveness of the data protection staff. For the price of an entry-level product, it provides the enterprise functionality customers need. Data Protector scales from single server to distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

All ProLiant Storage Servers support using Data Protector as a backup software solution

The ProLiant DL320s Storage Server supports using Data Protector as the backup software solution.

For more information on HP Data Protector:

<http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html>

- **HP StorageWorks File Migration Agent** – HP FMA is an automated solution designed to help simplify Windows-based file, web, and application server administration in small business to enterprise environments. This is accomplished through policy-based file migration and archive to popular storage targets, including HP StorageWorks Reference Information Storage System (RISS), HP StorageWorks File System Extender, and NAS, via Common Internet File System (CIFS).

The following Windows Storage Server features or add-ons are currently NOT supported by HP File Archiving software:

### Optional Software

**NOTE:** Single Instance Storage (SIS) - (NOT SUPPORTED)

**NOTE:** DFS-Replication (DFS-R) - (NOT SUPPORTED)

**NOTE:** File Server Resource Manager (FSRM) - Content Filter, & File Screening - (NOT SUPPORTED)

For more information: <http://h18006.www1.hp.com/products/storage/software/fma/>

- **HP Systems Insight Manager Software** – HP SIM 5.x is the first unified server and storage management platform. Now, from a single management console, administrators can manage their complete HP server and storage environment with a feature rich, extensible and secure management tool set.

HP SIM also serves as a central access point for ProLiant Essentials, Integrity Essentials, and Storage Essentials software options that deliver targeted functionality for these platforms. For more information: <http://h18013.www1.hp.com/products/servers/management/hpsim/index.html>

- **Insight Management Agents** – Allow all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers.
- **HP Storage Essentials NAS Manager Software** – Provides comprehensive Network Attached Storage (NAS) management capabilities for HP ProLiant Storage Server. Visualize your distributed HP NAS solutions and centrally manage their capacity, performance, events, and dependencies to ensure NAS availability and performance and unify SAN and NAS management. For more information on the complete line of HP Storage Essential products go to: <http://www.hp.com/go/storageessentials>

### Service and Support, HP Care Pack, and Warranty Information

**Warranty** The DL320s Storage Server comes with a standard 3-1-1 warranty (3 year parts exchange, 1 year labor and 1 year onsite, next business day response)

**Services Included with the Product** One year of HP Software Support, standard 9x5 business hours (software technical support and software product and documentation updates).

- Service and Support Upgrade options**
- Response - Upgrade on-site response from next business day to same day 4-hours
  - Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
  - Duration - Select duration of coverage for a minimum period of 1 year or multiple years

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased. Specifically HP Care Pack services include

Product number(s)	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
AG650A	HP Software	1 year	Bundled	Bundled
AG651A	Support for Storage, 9 x 5	3 years	n/a	HA106A3 - 87R
AG652A		4 years	n/a	HA106A4 - 87R
AG653A		5 years	n/a	HA106A5 - 87R
AG654A	HP Software Support for Storage, 24 x 7	1 year	n/a	HA107A1 - 87R
		3 years	n/a	HA107A3 - 87R
		4 years	n/a	HA107A4 - 87R
	Support Plus for Storage	5 years	n/a	HA107A5 - 87R
		1 year	UF987E	HA109A1 - 87R
		3 years	UF990E	HA109A3 - 87R
	Support Plus 24 for Storage	4 years	n/a	HA109A4 - 87R
		5 years	n/a	HA109A5 - 87R
		Post Warranty	UF993PE	n/a
	Proactive 24 (P24)	1 year	UF988E	HA110A1 - 87R
		3 years	UF991E	HA110A3 - 87R
		4 years	n/a	HA110A4 - 87R
	6 hour CTR	5 years	n/a	HA110A5 - 87R
		1 year	UF989E	HA105A1 - 87R
		3 years	UF992E	HA105A3 - 87R
	Installation	4 years	n/a	HA105A4 - 87R
		5 years	n/a	HA105A5 - 87R
		n/a	U7986E	HA113A1 - 5D6

### Service and Support, HP Care Pack, and Warranty Information

- |                             |   |
|-----------------------------|---|
| HP Software Support         | <ul style="list-style-type: none"><li>● Connect with HP Response Center engineers via telephone, electronic communication, or FAX for assistance in resolving software implementation or operations problems.</li><li>● HP Services provides corrective support to resolve identifiable and reproducible software product problems, and to help you identify problems that are difficult to reproduce.</li><li>● 9x5 coverage - Service is available during standard business hours, Monday through Friday (excluding holidays).</li></ul>  |
| HP Software Support, 24 x 7 | <ul style="list-style-type: none"><li>● Provides all the benefits of the regular Software Support, plus HP Services engineers are available around the clock 365 days per year.</li></ul>   |
| HP Support Plus             | <ul style="list-style-type: none"><li>● Increases the performance and availability of your IT infrastructure with comprehensive, consistent hardware and software services. HP Services engineers deliver onsite hardware support and over-the-phone software support 13 hours per day, 5 days per week.</li><li>● Encompasses the HP ProLiant Storage Server products, selected multi-vendor hardware and provides trouble-shooting software problems which range from the Storage Server 2003 operating system to the available utilities. In addition, this service makes software updates available to you at substantial savings.</li><li>● Provides recovery and re-configuration assistance of the HP ProLiant Storage Server using the recovery disk and your saved configuration file.</li></ul> |
| HP Support Plus 24          | <ul style="list-style-type: none"><li>● Provides all the benefits of the regular Support Plus Care Pack, plus HP Services engineers are available to deliver onsite hardware and over-the-phone software support around-the-clock 365 days per year.</li></ul>  |
| HP Proactive 24             | <ul style="list-style-type: none"><li>● An integrated hardware and software support solution that combines efficient problem prevention with responsive technical assistance whenever you need it.</li><li>● Improves the effectiveness of technologies across your IT infrastructure, and also, establishes a collaborative relationship between you and HP that strengthens your IT team and gives you rapid access to our expertise as issues arise</li></ul>  |

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|---------------------------|--|
| Software Product Services | <ul style="list-style-type: none"><li>● Standard HP warranty ensures Software media will be free of physical defects for a period of 90 days from delivery.</li><li>● These services are available to upgrade the warranty to (1 or 3) full year of 9 hours by 5 days (or 24x7) software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service.</li></ul> |
|---------------------------|--|
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### Service and Support, HP Care Pack, and Warranty Information

#### Hardware Product Services

- Installation services
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work
- Migration service consulting via statement of work

For additional hardware installation and maintenance information, please refer to the URLs listed below:  
[http://www.hp.com/hps/storage/ns\\_nas.html](http://www.hp.com/hps/storage/ns_nas.html)

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased.

Our Proactive 24 annuity service (with the SAN Module) allows continuous SAN/NAS growth by ensuring that your entire SAN/NAS is safely kept updated with analysis and recommendations on relevant, ongoing firmware (FW) changes and it ensures rapid resolution of complex SAN/NAS issues.

Our SAN Solution Service is a one-time review of your entire SAN/NAS and all the components (applications, HBAs, switches and FW, arrays etc) to ensure that all components are at tested, HP Certified levels. The HP SAN Design/Architecture Service provides as broad and as deep a review and recommendation as needed of how your SAN/NAS environment can be designed and implemented to meet your business storage needs.

The on-going support offerings include various response times (4 hour same day, next day, etc) as well as coverage periods (Monday - Friday, 24x7, 1 yr, 3 yr, etc). These services are available for both hardware and software to ensure all customer support needs are met and can be purchased from either value or volume channels.

Finally HP offers an optional migration service to assist the customer in moving to the newest product release. This may be in the form of a defined kit and service, or may alternatively be performed on a time & material basis.

HP Services allows the customer to leverage HP's experience in selecting and configuring the most widely used security features, and provides an environment that is immediately more available due to increased change control and significantly improved data security.

For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at: [http://www.hp.com/hps/storage/ns\\_nas.html](http://www.hp.com/hps/storage/ns_nas.html)

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#### Installation Services

The service deployment activities will include:

- Unpacking the product, performing initial inspection, and setting up product hardware and power connectivity
- Connecting Customer-provided cables
- Setting the network address and setting appropriate domain variables in the NAS operating system
- Configuring the storage by creating a file share
- Configuring user mapping to make the share available for access
- Creating a sample file data copy or Snapshot

### Service and Support, HP Care Pack, and Warranty Information

Product number(s):	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
All	Installation for Storage (per event)	One time	Available	HA113A1 - 5D6

### Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling

### Product Configuration Wizard

In the following you will be guided through a series of steps to help you configure your ProLiant Storage Server.

**NOTE:** Except for CTO SDRAM (available in select regions only), options ship separately and are not factory integrated.

### Step 1 – Choose a Model

Select one of five available DL320s Storage Server models.

**NOTE:** Models names are based on raw storage capacity, not available user storage.

<b>HP ProLiant DL320s Storage Server Common Specifications</b>	<b>Operating System</b>	Microsoft Windows Storage Server 2003 Release 2, Standard Edition
	<b>Processor</b>	Dual-Core Intel® Xeon® 3070 (2.67 GHz, 65 Watts, 1066 FSB)
	<b>Cache Memory</b>	4MB (2 x 2MB) Level 2
	<b>Number of Processors</b>	1
	<b>Memory</b>	1GB (1 x 1 GB)
	<b>Memory Type</b>	PC2-5300 (667 MHz) Unbuffered DDR2 ECC SDRAM
	<b>Storage Controller</b>	HP Smart Array P400/512MB Controller with battery-backed write cache (BBWC); occupies x8 slot
	<b>Network Controller</b>	Embedded NC324i PCIe Dual Port Gigabit Server Adapter
	<b>Expansion Slots</b>	Two Expansion Slots <ul style="list-style-type: none"> <li>• One full-length PCI Express x8 slot, occupied by SA P400</li> <li>• One half-length, low-profile PCI Express x1 slot (x8 connector)</li> </ul>
	<b>Optical Drive</b>	Rear Slimline CD-RW/DVD-ROM 24X combo drive
	<b>Redundancy</b>	Hot plug redundant power supply and fully redundant (N+1) fans
	<b>Remote Management</b>	iLO2 Port with Advanced License Pack Included
	<b>Form Factor</b>	Rack (2U), (24.5")
<b>Factory Racking</b>	Factory integrates select Storage Servers with other HP products such as HP ProLiant Servers or Enterprise Virtual Arrays. <b>NOTE:</b> #OD1 will appear after the part number on the sales order if HP factory integration is supported.	

<b>HP ProLiant DL320s 3TB SATA Storage Server AG650A</b>	<b>Internal Storage</b>	12 x 250GB SATA 7.2K 3.5" hot plug HDDs
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<b>HP ProLiant DL320s 6TB SATA Storage Server AG651A</b>	<b>Internal Storage</b>	12 x 500GB SATA 7.2K 3.5" hot plug HDDs
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<b>HP ProLiant DL320s 9TB SATA Storage Server AG652A</b>	<b>Internal Storage</b>	12 x 750GB SATA 7.2K 3.5" hot plug HDDs
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<b>HP ProLiant DL320s 1.7TB SAS Storage Server AG653A</b>	<b>Internal Storage</b>	12 x 146GB 3G SAS 15K 3.5" SP hot plug HDDs
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### Product Configuration Wizard

HP ProLiant DL320s Internal Storage 12 x 300GB 3G SAS 15K 3.5" SP hot plug HDDs  
 3.6TB SAS Storage Server  
 AG654A

### Step 2 – Add More Memory

<b>Memory (All Regions)</b>	<p><b>NOTE:</b> All models include 1 GB (1 x 1GB) of SDRAM standard and are expandable to 4GB.</p> <p><b>NOTE:</b> All models have a total of four DIMM sockets. See 'Memory' section of QuickSpecs below for more information on memory configuration</p>		
	2 GB Unbuffered PC2-5300 ECC DIMM (1 x 2 GB)		432806-B21
	1 GB Unbuffered PC2-5300 ECC DIMM (1 x 1 GB)		432804-B21
	512 MB Unbuffered PC2-5300 ECC DIMM (1 x 512 MB)		432803-B21
<b>Configure-to-Order Memory Upgrades</b> (available in North America, Japan, and Asia Pacific only)	<p>Configure-to-order (CTO) memory upgrades are available only in select regions (North America, Japan, and Asia Pacific). With CTO, your memory upgrade is factory integrated and tested in your storage server. Consult your HP Sales Contact or authorized reseller for more information.</p> <p><b>NOTE:</b> Choose memory upgrade option by selecting the quantity (1 or 3 allowed) of 1GB DIMMs (432804-B21) to add to the standard 1GB (1 x 1GB)</p> <p><b>NOTE:</b> CTO is available for memory upgrades only; all other options ship separately and are not factory integrated</p>		
	<b>Memory Upgrade Option</b>	<b>Part Number</b>	<b>Quantity of additional 1GB DIMMs</b>
	Option 1: 2GB (2 x 1GB DIMMs total)	432804-B21	1
	Option 2: 4GB (4 x 1GB DIMMs total)	432804-B21	3

### Step 3 – Add a Network Adapter

The DL320s Storage Server has one half-length, low-profile PCI Express x1 slot (x8 connector) available for additional network ports or external backup connection.

**NOTE:** Choose only one expansion card

**NOTE:** Multifunction Server Adapters require installation of the Microsoft Windows Server 2003 Scalable Networking Pack (a free download from Microsoft) to enable TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

<b>Network Adapters</b>	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21

### Step 4 – Add More Storage

The DL320s Storage Server has one half-length, low-profile PCI Express x1 slot (x8 connector) available for additional network ports



### Product Configuration Wizard

or external backup connection.

**NOTE:** Choose only one expansion card.

**NOTE:** Adding external storage to the DL320s Storage Server requires replacing the factory-integrated Smart Array P400/512MB controller in the full-length PCIe slot with a Smart Array P800/512MB controller (since neither fits in the open low-profile x1 PCIe slot). A Smart Array P800 controller can also support external tape backup connect (except for libraries and autoloaders)

**NOTE:** The Smart Array P800/512MB controller is fully supported by the DL320s Storage Server QuickRestore DVD included with all models.

<b>Storage Controllers</b>	<p><b>SAS Controllers</b></p> <p><b>Smart Array P800 Controller</b></p> <p>HP Smart Array P800/512MB BBWC Controller 381513-B21</p> <p><b>NOTE:</b> Please see the following QuickSpecs for Technical Specifications additional information::  <a href="http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html">http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html</a>            (Smart Array P800 Controller)</p> <p><b>SAS HBAs</b></p> <p>HP SC44Ge Host Bus Adapter 416096-B21</p> <p><b>NOTE:</b> For external tape support only</p> <p><b>NOTE:</b> Please see the following QuickSpecs for additional information:  <a href="http://h18004.www1.hp.com/products/quickspecs/12617_na/12617_na.html">http://h18004.www1.hp.com/products/quickspecs/12617_na/12617_na.html</a>            (SC44Ge HBA)</p> <p><b>SCSI HBAs</b></p> <p>HP SC11Xe Host Bus Adapter 412911-B21</p> <p>HP U320e SCSI Host Bus Adapter AH627A</p> <p><b>NOTE:</b> Please see the following QuickSpecs for Technical Specifications and additional information:  <a href="http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html">http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html</a>            (SC11Xe HBA)</p>
<b>External Storage Enclosures</b>	<p><b>HP StorageWorks Modular Smart Arrays</b></p> <p>HP StorageWorks Modular Smart Array 50 Enclosure (MSA50) 364430-B21</p> <p><b>NOTE:</b> Rack-mountable 10 drive (2.5" SAS/SATA) 1U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.</p> <p>HP StorageWorks 60 Modular Smart Array (MSA60) 418408-B21</p> <p><b>NOTE:</b> Rack-mountable 12 drive (3.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.</p> <p>HP StorageWorks MSA60 1.8TB SAS HDD Bundle (MSA60 w/12 146GB 15K SAS LFF HDD) AG822A</p> <p>HP StorageWorks MSA60 9TB SATA HDD Bundle (MSA60 w/12 750GB 15K SATA LFF HDD) AG823A</p> <p>HP StorageWorks MSA60 3.6TB SAS HDD Bundle (MSA60 w/12 300GB 15K SAS LFF HDD) AG824A</p> <p><b>NOTE:</b> The MSA60 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.</p> <p>HP StorageWorks 70 Modular Smart Array (MSA70) 418800-B21</p> <p><b>NOTE:</b> Rack-mountable 25 drive (2.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.</p> <p>HP StorageWorks MSA70 1.8TB SAS HDD Bundle (MSA70 w/25 72GB 15K SAS SFF HDD) AG825A</p>

### Product Configuration Wizard

HP StorageWorks MSA70 3.6TB SAS HDD Bundle (MSA70 w/25 146GB 10K SAS SFF HDD) AG893A

**NOTE:** The MSA70 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.

**NOTE:** Please see the following QuickSpecs for Technical Specifications additional information:

[http://h18000.www1.hp.com/products/quickspecs/12245\\_na/12245\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12245_na/12245_na.html) (MSA50)

[http://h18000.www1.hp.com/products/quickspecs/12627\\_na/12627\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html) (MSA60)

[http://h18000.www1.hp.com/products/quickspecs/12652\\_na/12652\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html) (MSA70)

#### Hard Drives

(External Array Expansion)

#### Serial Attached SCSI (SAS) Hard Drives

##### Hot Plug 3.5" (LFF) SAS

HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
HP 300GB 3G SAS 15K 3.5" DP HDD	416127-B21
HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
HP 146GB 3G SAS 15K 3.5" DP HDD	384854-B21
HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
HP 72GB 3G SAS 15K 3.5" DP HDD	384852-B21

##### Hot Plug 2.5" (SFF) SAS

HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
HP 72GB 3G SAS 10K SFF DP HDD	384842-B21
HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
HP 72GB 3G SAS 15K SFF DP HDD	418371-B21
HP 36GB 3G SAS 15K SFF SP HDD	431933-B21
HP 36GB 3G SAS 15K SFF DP HDD	418369-B21

**NOTE:** Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature:

[http://h18000.www1.hp.com/products/quickspecs/12244\\_na/12244\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html)

#### Serial ATA (SATA) Hard Drives

##### Hot Plug 3.5" (LFF) SATA

HP 750GB SATA 7.2K 3.5" HDD	432341-B21
HP 500GB SATA 7.2K 3.5" HDD	395473-B21
HP 250GB SATA 7.2K 3.5" HDD	349239-B21

##### Hot Plug 2.5" (SFF) SATA

HP 120GB SATA 5.4K SFF HDD	431786-B21
HP 60GB SATA 5.4K SFF HDD	379306-B21

**NOTE:** SATA drives have a 1 year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature:

[http://h18000.www1.hp.com/products/quickspecs/12091\\_na/12091\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12091_na/12091_na.html)

## Step 5 – Add Optional Software

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### Microsoft® iSCSI Software Target

Microsoft iSCSI Software Target adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It is a powerful iSCSI software solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

Microsoft iSCSI Target Software 1 LTU

T4433A

**NOTE:** For more information go to HP's Microsoft® iSCSI Software Target website at: [http://h18006.www1.hp.com/products/storageworks/ms\\_iscsi/index.html](http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html)

### HP StorageWorks Storage Mirroring Software

HP StorageWorks Storage Mirroring (SM) Software is an ideal entry host-based software product for IP networks. SM does not require high bandwidth Fibre Channel networks, high capacity replication and zero down time service levels. Storage Mirroring provides near real-time full application or file recovery up to the last byte replication. SM is an excellent choice for low bandwidth; low storage volume changes and meets business recovery goals within tens of minutes or hours. The immediate return on investment is realized in the reduced management cost associated with branch or small offices networks.

#### Product Highlights:

- High availability with Microsoft Windows 2000/NT/2003 servers
- Application aware and supported with Exchange, SQL and Oracle
- Host-based remote storage copy with TCP/IP networks
- Data distribution one-to-many or 'fan-out' to multiple destinations
- Data migration utility for transferring large data projects
- Centralize backup, data protection and recovery operations
- Built in scheduler for off hours replication
- Built in network bandwidth utilization management
- Disaster recovery between source and destination failover sites
- Powered by NSI Software's Double-Take patented 'Sequential Transfer Asynchronous Replication' technology
- Sequential transfer maintains write sequential across multiple files for data integrity
- Asynchronous replication allows hosts to continue processing for maximum performance
- Introducing a new software option (Server Recovery Option) that captures a server's configuration information including OS, patches, drivers, and Service Packs. The IT department can respond to a server failure and use the Server Recover Option to re-create the boot sequence on a new server plus all of the data captured during the replication and send that data to the production site for replacement.
- Introducing a new software feature (Full Server Failover) that creates a one-to-one relationship between two servers. Should a production server fail, the server running Full Server Failover would assume the identify of the production server.

### Product Configuration Wizard

The failover can occur over any distance and does not require "Enterprise" versions of the operating system or applications

#### Special note about Microsoft iSCSI Software Target and replication:

All HP ProLiant Storage Servers include the Distributed File System Replication (DFS-R) feature in the pre-installed Windows Storage Server 2003 R2 and Windows Unified Data Storage Server 2003 operating systems. DFS-R is a file-based replication technology that only replicates files when they are closed. Microsoft iSCSI Software Target does not close the virtual disk files (.vhd files) while they are in use, and so these files are not replicated during normal usage when replicating using DFS-R. Therefore, if iSCSI Software Target virtual disk files need to be replicated, DFS-R should not be used, and HP StorageWorks Storage Mirroring software should be considered instead. Storage Mirroring software asynchronously replicates each write into the file system to a secondary system, and therefore it can be used to effectively replicate iSCSI Software Target virtual disk files.

StorageWorks Storage Mirroring Media Kit v5	T5437A
StorageWorks Storage Mirroring NAS Edition 1 LTU	T5442A
StorageWorks Storage Mirroring NAS Edition 10 LTU	T5443A

**NOTE:** For more information go to the HP StorageWorks Storage Mirroring website at: <http://h18006.www1.hp.com/products/storage/software/sm/index.html>

## Step 6 – Add a Backup Solution

The DL320s Storage Server has one half-length, low-profile PCI Express x1 slot (x8 connector) available for additional network ports or external backup connection.

**NOTE:** Choose only one expansion card

**NOTE:** Adding external storage to the DL320s Storage Server requires replacing the factory-integrated Smart Array P400/512MB controller in the full-length PCIe slot with a Smart Array P800/512MB controller (since neither fits in the open low-profile x1 PCIe slot). A Smart Array P800 controller can also support external tape backup connect (except for libraries and autoloaders)

#### Tape Drives

**NOTE:** For the complete listing of Tape Drive offerings, please see:

<http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

For recommended tape drive offerings for this ProLiant server see the following:

#### USB Tape Drives

HP StorageWorks 1U USB Rack-Mount Kit with one DAT 160 USB Tape Drive AG703A

#### SAS Tape Drives

**NOTE:** HP recommends purchasing the HP SC44Ge HBA (416096-B21) for a dedicated SAS HBA for tape.

HP StorageWorks Ultrium 448 SAS Internal Tape Drive DW085A

**NOTE:** HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.

HP StorageWorks Ultrium 920 SAS Internal Tape Drive EH847A

**NOTE:** HP recommends combining this tape drive with the 1U SAS Rack-Mount kit (AE459A) for a complete rack-mount solution.

HP StorageWorks 1U SAS Rack-mount kit with one LTO-4 Ultrium 1760 EH946A

### Product Configuration Wizard

HP StorageWorks LTO-4 Ultrium 1840 SAS Internal Tape Drive EH860A

**NOTE:** HP recommends combining this tape drive with the 3U SAS Rack-Mount kit (AG576A) for a complete rack-mount solution.

**NOTE:** Please refer to the "Tape Drives, Tape Autoloaders & Tape Libraries" table in the Storage section of this document for a list of SAS controllers with tape support.

#### Ultrium Tape Drives

HP StorageWorks 1U Rack-mount kit with one Ultrium 448 (Carbonite) DW028B

HP StorageWorks 1U SCSI Rack-mount kit with one Ultrium 920 EH903A

HP StorageWorks 3U SCSI Rack-Mount with 1 LTO-4 Ultrium 1840 Tape Drive EH926A

**NOTE:** Please see the HP StorageWorks Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items:

[http://h18006.www1.hp.com/products/quickspecs/11739\\_na/11739\\_na.html](http://h18006.www1.hp.com/products/quickspecs/11739_na/11739_na.html)

For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: <http://www.hp.com/go/connect>.

#### Rack-Mount Tape Drive Enclosures

HP StorageWorks 1U SCSI Rack-Mount kit A7445B

**NOTE:** The 1U Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including the DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160, Ultrium 215, Ultrium 232, Ultrium 448 and Ultrium 920 tape drives.

HP StorageWorks 1U USB Rack-Mount Kit A8007A

**NOTE:** The 1U USB Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 24 USB, DAT 40 USB and DAT 72 USB tape drives.

HP StorageWorks 1U SAS Rack-Mount Kit AE459A

**NOTE:** The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the Ultrium 448 SAS and Ultrium 920 SAS tape drives.

**NOTE:** Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

HP StorageWorks 3U Rack-mount kit 274338-B22

**NOTE:** The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple Single-Ended and LVD SCSI tape drives including DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160, SDLT 320, SDLT 600, Ultrium 215, Ultrium 230, Ultrium 232, Ultrium 460, Ultrium 448, Ultrium 920 and Ultrium 960 tape drives.

HP StorageWorks 3U SAS Rack-mount Kit AG576A

**NOTE:** The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple SAS tape drives including DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS, and LTO-4 Ultrium 1840 SAS tape drives.

**NOTE:** Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits:

[http://h18000.www1.hp.com/products/quickspecs/10854\\_na/10854\\_na.html](http://h18000.www1.hp.com/products/quickspecs/10854_na/10854_na.html)

### Product Configuration Wizard

HP D2D Backup System	HP StorageWorks D2D110 Backup System	EH880A
	<b>NOTE:</b> 1TB of Disk Storage.	
	HP StorageWorks D2D110 Backup System with Data Protector Express Software Kit	EH923A
	<b>NOTE:</b> 1TB of Disk Storage.	
	HP StorageWorks D2D120 Backup System	EH884A
	<b>NOTE:</b> 2TB of Disk Storage.	
	HP StorageWorks D2D120 Backup System with Data Protector Express Software Kit	EH924A
	<b>NOTE:</b> 2TB of Disk Storage.	
HP StorageWorks D2D130 Backup System	EH950A	
<b>NOTE:</b> 3TB of Disk Storage.		
HP StorageWorks D2D130 Backup System with Data Protector Express Software Kit	EH951A	
<b>NOTE:</b> 3TB of Disk Storage.		
HP StorageWorks D2D130 Backup System with LTO-3 Ultrium 920 SAS Tape Drive	EH952A	
<b>NOTE:</b> 3TB of Disk Storage.		
<b>NOTE:</b> Please see the HP D2D Backup Systems QuickSpecs for additional information: <a href="http://h18000.www1.hp.com/products/quickspecs/12651_na/12651_na.html">http://h18000.www1.hp.com/products/quickspecs/12651_na/12651_na.html</a>		

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Tape Autoloaders	<b>HP StorageWorks DAT Autoloader</b>	
	HP StorageWorks DAT 72x10 tape autoloader	AE313A
	<b>HP StorageWorks 1/8 Tape Autoloader</b>	
	HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
	HP StorageWorks 1/8 Ultrium 920 G2 Tape Autoloader	AH165A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	HP StorageWorks 1/8 Ultrium 448 G2 Tape Autoloader	AH164A
	HP StorageWorks 1/8 Ultrium 232 G2 Tape Autoloader	AH163A
	HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit	AH166A
	<b>NOTE:</b> Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions <b>NOTE:</b> Please reference the Tape Autoloader QuickSpecs at: <a href="http://www.hp.com/go/automation">http://www.hp.com/go/automation</a> for additional information needed to create a complete solution; reference current compatibility information at: <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a>	

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### Product Configuration Wizard

#### Tape Libraries

##### HP StorageWorks MSL2024 Tape Library

HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ033A
HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 4GB FC Library	AJ034A
HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
HP StorageWorks MSL2024 1 Ultrium 960 Drive Library	AG115A
HP StorageWorks MSL2024 1 Ultrium 960 4GB FC Library	AG326B
HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
HP StorageWorks MSL2024 1 Ultrium 920 Drive Library	AH169A
HP StorageWorks MSL2024 1 Ultrium 448 Drive Library	AG116A

##### HP StorageWorks MSL4048 Tape Library

HP StorageWorks MSL4048 1 Ultrium 448 Drive Library	AG320A
HP StorageWorks MSL4048 1 Ultrium 920 SAS Drive Library	AH560A
HP StorageWorks MSL4048 1 Ultrium 920 Drive Library	AH171A
HP StorageWorks MSL4048 1 Ultrium 960 Drive Library	AG322A
HP StorageWorks MSL4048 1 Ultrium 960 4GB FC Library	AG324B
HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ035A
HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library	AJ036A

##### HP StorageWorks MSL8096 Tape Library

HP StorageWorks MSL8096 2 Ultrium 920 SAS Drive Library	AH561A
HP StorageWorks MSL8096 2 Ultrium 960 4GB FC Library	AH218A
HP StorageWorks MSL8096 2 Ultrium 960 Drive Library	AH219A
HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Drive Library	AK382A
HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ039A
HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 4GB FC Library	AJ040A

##### HP StorageWorks MSL6000 Tape Library

###### LTO-4 Ultrium 1840 technology

HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ029A
HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 4GB FC Library	AJ030A
HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ031A
HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 4GB FC Library	AJ032A

###### LTO-3 Ultrium 960 technology

HP StorageWorks MSL6030 1 Ultrium 960 Dr LVDS Library	AD606B
HP StorageWorks MSL6030 1 Ultrium 960 Dr FC Library	AD608B
HP StorageWorks MSL6030 2 Ultrium 960 Dr LVDS Library	AD607B
HP StorageWorks MSL6030 2 Ultrium 960 Dr FC Library	AD609B

**NOTE:** Please reference the [MSL2024](http://www.hp.com/go/automation), [MSL4048](http://www.hp.com/go/automation), [MSL8096](http://www.hp.com/go/automation), and [MSL6000](http://www.hp.com/go/automation) Tape Library QuickSpecs at: <http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at: <http://www.hp.com/go/ebs>

### Product Configuration Wizard

<b>HP Data Protector Express Software</b>	HP Data Protector Express Backup Server Software Media & LTU	BB117EA
	HP Data Protector Express Backup Server Upgrade from Data Protector Express Single Server Edition Media & LTU	BB117ET

**NOTE:** To obtain a free licensed copy of HP Data Protector Express for ProLiant edition software, please visit the "Protect Your Data" link accessible from your ProLiant server's System Management Homepage (SMH) software (SmartStart 7.5 or later).

**NOTE:** Please see the HP Data Protector Express QuickSpecs for additional information regarding the purchase of HP Data Protector Express software:  
[http://h18000.www1.hp.com/products/quickspecs/12337\\_na/12337\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12337_na/12337_na.html)

### Step 7 – Add UPS, Power, and Rack Options

<b>HP Rack 5000 Series</b> (Metallic Carbonite)	HP 5642 Rack-Unassembled	358254-B21
	<p><b>NOTE:</b> Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color:  <a href="http://h18000.www1.hp.com/products/quickspecs/12074_na/12074_na.html">http://h18000.www1.hp.com/products/quickspecs/12074_na/12074_na.html</a></p> <p><b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a>.</p>	

<b>HP Rack 10000 G2 Series</b> (Carbon/Graphite Metallic)	10642 G2 (42U) Rack Cabinet – Pallet	AF001A
	10642 G2 (42U) Rack Cabinet – Shock Pallet	AF002A
	10642 G2 (42U) Rack Cabinet – Crated	AF003A
	10642 G2 (42U) Rack Cabinet, with Extension – Shock Pallet	AF004A
	10636 G2 (36U) Rack Cabinet – Pallet	AF011A
	10636 G2 (36U) Rack Cabinet – Shock Pallet	AF012A
	10636 G2 (36U) Rack Cabinet – Crated	AF013A
	10636 G2 (36U) Rack Cabinet, with Extension – Shock Pallet	AF014A
	10622 G2 (22U) Rack Cabinet – Pallet	AF021A
	10622 G2 (22U) Rack Cabinet – Shock Pallet	AF022A
	10842 G2 (42U) 800mm Wide Rack Cabinet – Pallet	AF041A
	10842 G2 (42U) 800mm Wide Rack Cabinet – Shock Pallet	AF042A
	10647 G2 (47U) Rack Cabinet – Pallet	AF031A
	<p><b>NOTE:</b> It is mandatory to use a shock pallet when shipping racks with equipment installed.</p> <p><b>NOTE:</b> Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color:  <a href="http://h18000.www1.hp.com/products/quickspecs/12402_na/12402_na.html">http://h18000.www1.hp.com/products/quickspecs/12402_na/12402_na.html</a></p> <p><b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a>.</p>	

### Product Configuration Wizard

<b>HP Rack 10000 Series</b> (Graphite Metallic)	<p>HP Rack S10614 (14U) Rack Cabinet - Shock Pallet <span style="float: right;">292302-B22</span></p> <p><b>NOTE:</b> xxxxx-B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels).</p> <p><b>NOTE:</b> It is mandatory to use a shock pallet in order to ship racks with equipment installed. Not all Compaq equipment is qualified to be shipped in the Rack 10000 series.</p> <p><b>NOTE:</b> Please see the Rack 10000 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color:  <a href="http://h18000.www1.hp.com/products/quickspecs/10995_na/10995_na.html">http://h18000.www1.hp.com/products/quickspecs/10995_na/10995_na.html</a></p> <p><b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a></p>
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<b>USB Options</b>	<p>USB 1.44-MB External Diskette Drive (Carbonite) <span style="float: right;">DC141B</span></p> <p>HP 1GB USB 2.0 Floppy Drive Key <span style="float: right;">442085-B21</span></p> <p>HP 256MB USB 2.0 Floppy Drive Key <span style="float: right;">442084-B21</span></p>
<hr/>	
<b>Keyboards and Monitors</b>	<p>TFT7210R Rack Mounted 17" Monitor <span style="float: right;">348373-B21</span></p> <p><b>NOTE:</b> For a complete list of Monitors please view the following URL:  <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a></p> <p>TFT7600 Rackmount Keyboard Monitor <span style="float: right;">AG052A</span></p> <p>1U Rackmount Keyboard with USB <span style="float: right;">AG072A</span></p> <p><b>NOTE:</b> For additional information regarding Rack Options, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a>.</p>
<hr/>	
<b>HP KVM Switch Options</b>	<p>2x1x16 IP Console Switch with Virtual Media <span style="float: right;">AF601A</span></p> <p>4x1x16 IP Console Switch with Virtual Media <span style="float: right;">AF602A</span></p> <p>PS/2 Virtual Media Interface Adapter, 1 pack <span style="float: right;">AF604A</span></p> <p><b>NOTE:</b> Requires PS/2 and one USB port on server.</p> <p>Server Console Switch (KVM), 0 x 1 x 8 port <span style="float: right;">336044-B21</span></p> <p>Server Console Switch (KVM), 0 x 2 x 16 port <span style="float: right;">336045-B21</span></p> <p>PS/2 Interface Adapter, 1 pack <span style="float: right;">262588-B21</span></p> <p>PS/2 Interface Adapter, 8 pack <span style="float: right;">262587-B21</span></p> <p>USB Interface Adapter, 1 pack <span style="float: right;">336047-B21</span></p> <p>Serial Interface adapter - 1 Pack with power supply <span style="float: right;">373035-B21</span></p> <p><b>NOTE:</b> Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>.</p> <p>HP 1x4 Console Switch <span style="float: right;">AF611A</span></p> <p>HP PS2 Server Console Cable, 6 foot, 2-Pack <span style="float: right;">AF612A</span></p> <p>HP USB Server Console Cable, 6 foot, 2-Pack <span style="float: right;">AF613A</span></p> <p><b>NOTE:</b> Required for supporting USB peripherals.</p> <p><b>NOTE:</b> For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>.</p>

### Product Configuration Wizard

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<b>HP Serial Console Server Options</b>	HP 16 Port Serial Console Server	AF101A
	HP 48 Port Serial Console Server	AF102A
	Serial Adapter, RJ45-DB9 DCE Female, 1 Pack	AF103A
	Serial Adapter, RJ45-DB9 DCE Female, 8 Pack	AF110A

**NOTE:** Cat5e cables are required to connect Serial Adapters to Serial Console Servers. Additional Serial Adapters and Cat5e cables can be found at the following URL: <http://www.hp.com/go/kvm>.

**NOTE:** For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <http://www.hp.com/go/kvm>.

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### Step 8- Order HPTS Service Care Packs

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Service Care Packs or warranty upgrades enhance the base hardware warranty provided with the HP ProLiant DL320s Storage Server. The Care Packs provide support for product software and operating system with extended hours of coverage and reduced response time. And Care Packs allow the customer to budget fixed cost support rather than variable costs that include parts and labor.

Note that the standard HP warranty ensures software media will be free of physical defect for a period of 90 days from delivery. However the HP ProLiant DL320s Storage Server products all come with a full year of 9 hours by 5 days software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service. Extended hours of coverage and additional years of service are available should the customer require more support.

See "**Service and Support Upgrade options**" section for more information on available Care Packs for the DL320s Storage Server.

## Memory

### Standard Memory

PC2-5300 (667MHz) Unbuffered ECC DDR2 SDRAM with interleaving optional (enabled when DIMMs populated in pairs)

- 1 GB (1 x 1 GB DIMM)

### Configure-to-Order (CTO) Memory Upgrade Options

**NOTE:** CTO memory upgrade options are available only in North America, Japan, and Asia Pacific.

- 2 GB (2 x 1 GB DIMMs) or 4 GB (4 x 1 GB DIMMs)

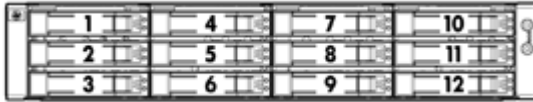
### Maximum Memory

- 4 GB (limited by operating system license).

**NOTE:** The chart below represents available options for memory configuration.

Memory		Slot			
		1A	2A	3B	4B
Standard	1 GB	1 GB	Empty	Empty	Empty
CTO Upgrade Option 1	2 GB	1 GB	Empty	1 GB	Empty
CTO Upgrade Option 2 (Maximum)	4 GB	1 GB	1 GB	1 GB	1 GB

### Storage



1- 12 Twelve Large Form Factor (LFF) 3.5" drive bays for SATA or SAS hard drives

### Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media	1	Rear	Slimline CD-RW/DVD-ROM 24X Combo Drive

### Hard Drives

#### Hot Plug 3.5" (LFF) Serial Attached SCSI – SAS

	Quantity Supported	Position Supported	Controller
146GB 3G SAS 15K SP 300 GB 3G SAS 15K SP	12	1-12	HP Smart Array P400/512MB Controller

#### Hot Plug 3.5" (LFF) Serial ATA – SATA

	Quantity Supported	Position Supported	Controller
750GB SATA 7.2K 500GB SATA 7.2K 250GB SATA 7.2K	12	1-12	HP Smart Array P400/512MB Controller

### External Storage

**NOTE:** Adding external storage to the DL320s Storage Server requires replacing the factory-integrated Smart Array P400/512MB controller in the full-length PCIe slot with a Smart Array P800/512MB controller (since neither fits in the open low-profile x1 PCIe slot).

**NOTE:** The Smart Array P800/512MB controller is fully supported by the DL320s Storage Server QuickRestore DVD included with all models.

	Quantity Supported	Position Supported	Controller
Modular Smart Array 60	Up to 4 per Smart Array P800 controller recommended	External	Smart Array P800 controller
Modular Smart Array 70	Up to 2 per Smart Array P800 controller recommended	External	Smart Array P800 controller
Modular Smart Array 50 Enclosure	2 per connector (supports 1+1 cascading)	External	Smart Array P800 controller

### Storage

#### Maximum Raw Storage Capacity

Internal SAS	3.6TB (12 x 300GB SAS Drives)
Internal SATA	9.0TB (12 x 750GB SATA Drives)
Internal plus External SATA (Smart Array P800/512MB controller and MSA60 external enclosures)	45TB raw (60 x 750 GB SATA) [1 x SA P800 connected to 4 x MSA60 full of 750 GB SATA HDDs]

**NOTE:** Adding external storage to the DL320s Storage Server requires replacing the factory-integrated Smart Array P400/512MB controller in the full-length PCIe slot with a Smart Array P800/512MB controller

#### Factory RAID Configuration and User Storage

**NOTE:** User storage is factory configured into 2TB (maximum) logical drives to accommodate optional installation of Microsoft iSCSI Software Target (which currently does not support either dynamic disks or logical drives greater than 2TB on basic disks). However, both the Windows Storage Server 2003 R2 O/S and the Smart Array P400 controller do support creation of logical drives greater than 2TB using GUID Partitioning Table (GPT) disk architecture.

#### Operating System Partitions

	Volume	RAID Level	Physical Drives
Logical Disk 1	Operating System	RAID 1	0-1
Logical Disk 2	DON'T ERASE recovery partition	RAID 1	0-1

#### Preconfigured User Storage

SAS models: Ten physical drives allocated in one or more logical drives (2TB max), configured as RAID 5

SATA models: Ten physical drives allocated in one or more logical drives (2TB max), configured as RAID 6 (ADG)

	Controller reported	O/S reported
1.7TB SAS model	1259840 MB	1230.30 GB
3.6TB SAS model	1: 2097152 MB 2: 477479 MB	1: 2048.00 GB 2: 466.28 GB
3TB SATA model	1907544 MB	1862.83 GB
6TB SATA model	1: 2097152 MB 2: 1718110 MB	1: 2048.00 GB 2: 1677.84 GB
9TB SATA model	1: 2097152 MB 2: 2097152 MB 3: 1528676 MB	1: 2048.00 GB 2: 2048.00 GB 3: 1492.85 GB

### Storage

#### Tape Drives, Tape Autoloaders, and Tape Libraries

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: [http://h18000.www1.hp.com/products/quickspecs/north\\_america/10233.html](http://h18000.www1.hp.com/products/quickspecs/north_america/10233.html)

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders & Tape Libraries listed below, please see the following: [http://h18000.www1.hp.com/products/quickspecs/north\\_america/10809.html](http://h18000.www1.hp.com/products/quickspecs/north_america/10809.html)

**NOTE:** For complete listing of tape drive offerings see: <http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

**NOTE:** SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

For details on connecting tape drives to this storage server, see the following:

	Position Supported	Controller	Controller Part Number
<b>HP StorageWorks SCSI Tape Drives, External</b> LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-2 Ultrium 460 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO-4 Ultrium 1840 DAT 40 DAT 72 DAT 160 DLT VS160 SDLT 600 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Host Bus Adapter	412911-B21
<b>HP StorageWorks USB Tape Drives, External</b> DAT 40 USB DAT 72 USB DAT 160 USB 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
<b>HP StorageWorks Tape Drives, SAS External</b> LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS 1U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter	416096-B21
<b>HP StorageWorks SCSI Tape Automation, External</b>	External	HP SC11Xe Host Bus Adapter	412911-B21

### Storage

DAT 72X10 Autoloader  
1/8 G2 Autoloader  
MSL2024  
MSL4048  
MSL8096  
MSL6000

HP U320e SCSI Host Bus Adapter  
**NOTE:** Only valid for MSL tape libraries.

AH627A

**HP StorageWorks SAS  
Tape Automation,  
External**  
1/8 G2 Autoloader  
MSL2024  
MSL4048  
MSL8096

External

HP SC44Ge Host Bus Adapter  
**NOTE:** Please visit <http://www.hp.com/go/connect> for details about minimum SAS controller firmware version and SAS cabling requirements.

416096-B21

**HP StorageWorks Fibre  
Tape Libraries, External**  
MSL2024  
MSL4048  
MSL8096  
MSL6000

External

Please consult the EBS connectivity matrix at <http://www.hp.com/go/ebs> for detailed connectivity information

N/A

**HP StorageWorks D2D  
Backup Systems**  
D2D110  
D2D120

External

Embedded Network Controller

N/A

### Technical Specifications

<b>System Unit Rack</b>	<b>Dimensions (HxWxD)</b>	3.5 x 19.2 x 23.5 in (8.8 x 48.8 x 59.7 cm)		
	<b>Weight</b>	Chassis without power supply and drives	30.20 lb	
		Weight of each power supply, max 2 per unit	4.10 lb	
		Weight of each drive, max 12 per unit	1.72 lb	
	<b>Input Requirements</b>	Fully configured with twelve hard drives, four DIMM modules, and a PCIe expansion board	59.04lbs	
		120/240 VAC		
		8.6A		
		47-63 Hz		
	<b>Max BTU Rating</b>	4070 BTU		
	<b>Power Supply Output</b>	12V/47A, 5V/5A		
<b>Acoustic Noise</b>	<b>L WAd (BELS)</b>	6.75		
	<b>Bystander L pAm (dBA)</b>	54.8		
	Operating (Random Seeks to Fixed Disks)			
	<b>L WAd (BELS)</b>	7.2		
	<b>Bystander L pAm (dBA)</b>	58.6		

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<b>Power Supply</b>	<b>Input voltage specifications</b>	Rated input voltage	100-240 VAC	
	<b>Input Specifications</b>	Rated input line	120/240 VAC	
		Frequency range	47-63 Hz	
		Rated input power	575 W	
		Rated input current	8.6 A Max	
		Steady state power	575 W	
	<b>Ambient temperature range</b>	Operating	5-50 C	
		Non-operating	-40-85 C	
	<b>Relative humidity (non-condensing)</b>	Operating	5%-95%	
		Non-operating	5%-95%	
<b>Dielectric voltage withstand</b>	Input to output	2150 VDC		
	Input to ground	2150 VDC		

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### Technical Specifications

<b>Embedded NC324i PCIe Dual Port Gigabit Server Adapter</b>	<b>Network Interface</b>	10Base-T/ 100Base-TX/ 1000Base-TX
	<b>Compatibility</b>	IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX
	<b>Data Transfer Method</b>	Four lane (x4), 100MHz PCI Express Reference Clock
	<b>Network Transfer Rate</b>	10Base-T (Half-Duplex) 10 Mb/s 10Base-T (Full-Duplex) 20 Mb/s 100Base-TX (Half-Duplex) 100 Mb/s 100Base-TX (Full-Duplex) 200 Mb/s 1000Base-TX (Half and Full-Duplex) 2000 Mb/s
	<b>Connector</b>	RJ-45
	<b>Cable Support</b>	10Base-T Categories 3, 4, or 5 UTP; up to 328 ft (100 m) 10/100/1000 Base-TX Category 5 UTP up to 328 ft (100 m)

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.