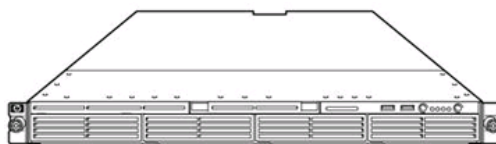*Overview*

This QS has been merged into a new QS: 13218 - HP StorageWorks D2D Backup System

HP StorageWorks D2D2500 Backup System provides consolidated, disk-based data protection in an intelligent self-managing 1U rack-mountable solution. It integrates seamlessly into your existing environment and works with your backup software application to automate the simultaneous daily backup of up to six servers onto a single network-connected device, eliminating the management of multiple devices and reducing errors caused by tape media handling. An intuitive browser based user interface simplifies local and remote device management to deliver reliable data protection for remote offices and smaller IT environments. The HP D2D2500 Backup System features Dynamic deduplication, which removes redundant backup data to retain up to 50x more data on the same 3 TB disk and allows low bandwidth replication for cost-effective offsite backup and recovery. At less than the cost of comparable solutions, the D2D2500 Backup System is an affordable step toward improved data protection.

HP StorageWorks D2D2500 Backup System

What's New

- Available with low bandwidth replication for cost-effective backup of remote offices and offsite disaster recovery. License by target device required.
- Allows direct attach to tape autoloaders and tape libraries, enabling easy offload to physical tape for an additional level of data security and disaster recovery.

QuickSpecs

Features and Benefits

"Hands-free" backup	Automating the backup process simplifies and reduces the time spent managing your data protection processes. Implementing unattended daily backup is especially good for environments with limited IT resources.
Backup multiple servers faster	Backing up six servers simultaneously to a disk-based solution at speeds of up to 270 GB per hour instead of sequentially to a tape drive or autoloader means that you can substantially reduce your backup window.
Make your backups more reliable	Improve the overall reliability of your backup infrastructure by automating and consolidating the backup of multiple servers to a single D2D2500 Backup System. This reduces the incidence of human error related to backup processes such as tape media rotation and management.
Easier backup of remote offices	An intuitive web-based browser interface allows you to monitor your D2D2500 Backup System device, locally or remotely, to check on available capacity, view progress or to make a change to device setup.
Retain up to 50 times more data on disk	Dynamic deduplication reduces the disk space required to store backup data sets by up to 50x without impacting backup performance. Retaining more backup data on disk for longer periods of time results in greater data accessibility for rapid restore of lost or corrupt files and reduces the impact on business productivity.
Low bandwidth replication	HP's Dynamic deduplication technology makes replication of backup data a cost-effective solution by significantly reducing the bandwidth required. Using low bandwidth links, backup data sets can be inexpensively transmitted from remote offices to a central location or from the data center to an offsite location for disaster recovery purposes.
Directly attach HP LTO tape drives to create a comprehensive D2D2T data protection solution	Create a comprehensive D2D2T data protection solution by directly attaching an HP LTO-2, LTO-3, or LTO-4 Ultrium tape drive, 1/8 G2 Tape Autoloader or MSL2024 or MSL4048 Tape Library using one of HP's flexible rack-mount solutions. By directly connecting a tape drive, backup jobs can be exported to tape without impacting network bandwidth.
Offload to tape for longer term archival	The D2D2500 Backup System includes offload to tape capability for cost-effective archival and offsite vaulting. Use your backup application to copy data from the D2D2500 Backup System to tape, or use the appliance's direct copy facility at any time of day without reducing network bandwidth.
More affordable data protection	At less than the cost of comparable solutions with deduplication, the HP D2D2500 Backup System delivers more affordable data protection by storing more data in the same raw 3 TB disk and supporting savings in IT resources, physical space and power requirements.
Seamlessly integrates into current environment	The D2D2500 Backup System has a 1U form factor and is easily rack-mounted in standard racks for efficient use of space in the data center. It supports all leading backup applications allowing the device to be installed and used without additional investment in systems, software or staff training.
Reduce maintenance	With the highly reliable D2D2500 Backup System you can also reduce the time spent on routine maintenance; pre-configured with hardware-based RAID 5, this self-managing device does not require you to create RAID sets, conduct disk defragmentation or apply security patches.

Features and Benefits

Automation - making backup easier

Using your backup software application, create "hands-free" daily backup with the following benefits:

- Reduce your backup window - backing up six servers simultaneously at disk speeds of up to 270 GB per hour, instead of one after the other to a tape drive or autoloader, means that you can dramatically reduce your backup window.
- Takes the manual labor out of daily backup - no one has to remember to change the backup tapes each day. Use HP Data Protector Express Software or other compatible backup software to set your backup schedule and then forget it. Unlike over-the-network backup to a tape drive or autoloader, where every backup job happens sequentially, the HP D2D2500 Backup System can back up six servers simultaneously. This means that you don't have to worry about backup jobs not finishing within the backup window, leaving data unprotected or having an adverse impact on user productivity at the beginning of the workday.
- Reduced media handling - using the D2D2500 Backup System for daily backup means fewer tape cartridges to store and track and lower IT costs. You may be able to reduce backup to tape to a weekly event, creating a weekly full backup to tape to meet offsite, disaster recovery and archiving requirements.

Data protection for remote or branch offices and smaller IT environments

Easy to install - the D2D2500 Backup System integrates seamlessly into your existing IT environment using an install wizard to take you from power-on to ready for backup in just three steps. Because it's a preconfigured backup solution, you won't need to configure RAID sets or set up LUNs as you would with other types of disk-based backup products. And your backup software views the D2D2500 Backup System as tape, so adding extra software components is not typically required.

Remote management - a web-based browser interface means that you can monitor and manage the D2D2500 Backup System from anywhere, at anytime, on the network, locally or remotely. You can monitor deduplication stats, check available capacity, view and change tape emulation configurations, copy or export data to physical tape, set up tape copy schedules, set up or change e-mail alerts, upload new device firmware, or setup new "virtual" tape devices anytime, anywhere.

Low bandwidth replication - HP Dynamic deduplication reduces the amount of backup data to be transmitted for data replication, significantly reducing the bandwidth required and delivering more cost effective centralized backup of distributed offices.

Minimal maintenance - unlike other disk-based backup devices that use Microsoft Windows operating systems, such as NAS or storage servers, the D2D2500 Backup System requires no routine maintenance. It's a secure, self-managing device that doesn't need periodic disk defragmentation, security patches, or updates to virus protection.

HP Dynamic deduplication - keep more data on disk for longer

Why data deduplication?

Data deduplication is a method of reducing storage needs by eliminating redundant data so that over time only one unique instance of the data is actually retained on disk. As a result, up to 50x more backup data can be retained in the same disk footprint.

Adding data deduplication to disk-based backup delivers a number of benefits:

- A cost-effective way of keeping your backup data on disk for a number of weeks or even months. More efficient use of disk-space effectively reduces the cost-per-gigabyte of storage and the need to purchase more disk capacity.
- Making file restores fast and easy from multiple available recovery points. By extending data

Features and Benefits

retention periods on disk, your backup data is more accessible for longer periods of time, before archiving to tape. This way lost or corrupt files can be quickly and easily restored from backups taken over a longer time span.

● Ultimately, data deduplication makes the replication of backup data over low-bandwidth WAN links viable (providing offsite protection for backup data) as only changed data is sent across the connection to a second device.

How it works

Deduplication works by examining the data stream as it arrives at the storage appliance, checking for blocks of data that are identical and eliminating redundant copies. If duplicate data is found, a pointer is established to the original set of data as opposed to actually storing the duplicate blocks-removing or "deduplicating" the redundant blocks from the volume. The key here is that the data deduplication is being done at the block level to remove far more redundant data than deduplication done at the file level where only duplicate files are removed.

Data deduplication is especially powerful when it is applied to backup, since most backup data sets have a great deal of redundancy. The amount of redundancy will depend on the type of data being backed up, the backup methodology and the length of time the data is retained.

Example: Backing up a large customer database that gets updated with new orders throughout the day. With the typical backup application you would normally have to back up, and more importantly store, the entire database with each backup, (and even incremental backups will store the full database again). With block-level deduplication, you can backup the same database to the device on two successive nights and, due to its ability to identify redundant blocks, only the blocks that have changed will be stored. All the redundant data will have pointers established.

The HP approach to deduplication - D2D and VLS

Recognizing the differing needs of the small and medium businesses versus large and enterprise data centers, HP has selected two different deduplication technologies to match each requirement.

HP Dynamic deduplication for HP StorageWorks D2D Backup Systems - meeting the needs of smaller IT environments with requirements for low-cost solutions, smaller storage capacities, ease of use and broad compatibility.

HP Accelerated deduplication for HP StorageWorks Virtual Library Systems (VLS) - delivering maximum performance.

HP Dynamic deduplication

The HP patented Dynamic deduplication algorithm has been designed specifically for smaller IT environments, such as remote and branch offices, to provide for low cost solutions with a small footprint. It uses in line deduplication based on hash algorithms with additional levels of error prevention and correction to verify the integrity of data backup and restore. Importantly and unlike some other forms of data deduplication technology the HP Dynamic deduplication is independent of the data format recorded and therefore works with all the leading backup application packages.

What deduplication ratio can I expect?

The actual data deduplication ratio you can expect will depend on a number of factors including; the type of data, the backup methodology used, the length of time you retain your data. However, assuming standard business data mix and extended on disk retention (periods of more than 12 weeks) you could expect to see:
20:1 capacity ratio assuming a weekly full and daily incremental backup model
50:1 capacity ratio assuming daily full backups

Features and Benefits

For more information on achieving deduplication ratios go to: www.hp.com/go/deduplication

| Low bandwidth replication - cost-effective data protection and disaster recovery | Data replication is the process of making a replica copy of a data set across a network to a "target site". It is generally used to provide disaster recovery (DR) protection in the event of catastrophic data loss at the "source site". |

In the past, only the largest companies could afford to implement data replication as replicating large volumes of data backup over a typical WAN is expensive. However, today's D2D products with data deduplication have made replication a practical disaster recovery solution for most sizes of business, in addition to an ideal solution for centralizing the backup of remote offices.

Data deduplication shrinks the amount of backup data that needs to be replicated from the source HP D2D appliance, and as a result significantly reduces replication bandwidth requirements. Once a replica of the data backup set has been created on a remote HP D2D target appliance, all that is required to keep the replica identical to the source is the automatic, periodic copying and movement of the new data segments which are created during each backup. With such small amounts of data being transmitted asynchronously, low bandwidth networks offer sufficient performance and a much lower cost solution.

HP's replication feature includes replication bandwidth limitation, limiting the amount of bandwidth being used when replicating data. Without replication bandwidth limitation, a replication job could use as much bandwidth as is available to it. It is possible that this could, make other network activities unresponsive. Replication bandwidth limitation is customer configurable at the appliance level via the graphical user interface and is set as a percentage of the available network bandwidth.

The HP StorageWorks D2D2500 Backup System is available with replication purchased as a license by target. It delivers the most affordable replication solution on the market for the following environments:

- For remote offices, low bandwidth replication provides an affordable means to centralize backup at the data center, reducing operator costs and also decreasing the usage of removable media.
- For data centers, low bandwidth replication gives IT departments a new disaster recovery option by making inter-site replication over WANs a practical alternative.

The HP StorageWorks D2D2500 Backup System is available with replication which may be licensed by target. A total of 6 source appliances can replicate into a single D2D2500 target appliance, see the "configuring" section of this document for ordering information. Once a license has been obtained, configuring and using replication is then made straightforward by the graphical user interface and configuration wizard on the HP D2D2500 appliance.

HP D2D2500 products prior to January 2009 may also use the replication feature, but will require a free firmware upgrade by web download before purchasing a replication license This upgrade is available from the "support for your product" link on www.hp.com/go/d2d2500 or by following the "software drivers and downloads" link from: www.hp.com.

Features and Benefits

Disk-to-Disk-to-Tape - complete data protection

Although Disk-to-disk (D2D) based backup meets the need for greater speed and data accessibility, it remains prone to many of the same risks as your server - fire, flood, and theft. Tape storage retains its place as the foundation of a good data protection strategy because of its portability, long shelf life and low cost per gigabyte which make it ideal for longer term archival of data and offsite storage for disaster recovery. Storing backup data offline and offsite provides protection from virtually all risks to data, and removable tape media allows this to be done easily and cost-effectively.

Disk-based deduplication and replication can reduce the amount of tape you use, but most IT departments combine the technologies, using tape for longer term retention. This approach makes sense to most users. If you want to keep data for six months or three years or seven years, tape provides the right economics and portability.

With a direct attached tape drive, the HP D2D2500 Backup System can offload data to physical tape cartridge providing a full disk-to-disk-to-tape (D2D2T) solution without involving the backup server or impacting network performance. It supports LTO Ultrium tape drives for direct attach physical backup using either a manual or scheduled cartridge copy operation.

You can use the HP D2D2500 Backup System for daily backup, while utilizing direct attach HP LTO tape drives, or using HP LTO tape drives and autoloaders attached to your network servers, for regular full backups to tape. Tape backup can be done using a tape-to-tape copy from the "virtual tapes" in the D2D2500 to physical tape, or a direct backup from the server to physical tape. Such backup regimes combine the advantages of disk-to-disk backup with the disaster recovery protection of tape, providing you with the best of both worlds.

Reliable and dependable

The D2D2500 Backup System makes your data protection more reliable in a number of ways.

- Automated backup - makes sure that backups happen when they should, day in and day out and also removes the risk of human errors from handling tape media, a common cause of failed backups.
- The D2D2500 Backup System employs hardware-based RAID 5 support to protect your data in the event of a hardware problem. In the event of a single disk failure, the D2D2500 can completely recover your data while rebuilding your original data RAID set when the new disk drive is added.
- Unlike other disk-based backup solutions, the D2D2500 Backup System uses integrated flash memory to store device software so that in the event of a system failure it can be quickly reconfigured without the need to reinstall device software.
- The D2D2500 Backup System has enhanced security over NAS-based storage systems because it is a dedicated backup device. It is accessible as a tape device, making it virtually invulnerable to accidental file deletion and virus or hacker attacks.
- Built on HP ProLiant Server technology, the HP D2D2500 Backup System delivers high reliability using proven hardware from the industry leader in server solutions.

Features and Benefits

An affordable way to improve your backup	The HP D2D2500 Backup System makes disk-based backup even more affordable.

- Data deduplication allows you to store up to 50x more data on the same disk, effectively reducing the cost per gigabyte of storage, the need to purchase more disk space, and enabling cost-effective low bandwidth replication.
- Backing up as many as six servers simultaneously is equivalent to adding six LTO autoloaders for less than the price of one. At less than the cost of virtual tape libraries with similar capacity and data deduplication functionality, it makes disk-to-disk backup affordable for smaller businesses with limited IT budgets.
- Using the D2D2500 dramatically reduces the amount of time it takes to restore lost or corrupted data, especially used in conjunction with data deduplication which retains backup data on disk for longer. This improves productivity by allowing employees get back to work faster, saving the organization both time and money and protecting against other associated issues with business downtime.
- There's no need to purchase or allocate server hardware to manage this device, nor is there a need to purchase additional cables and host bus adapters for connectivity to your network.
- Consolidating your daily backup onto a single, automated, disk-based device reduces your IT operational costs. Doing away with daily backup to tape also decreases media costs; however, for a robust data protection strategy HP recommends regular backup to tape. At a minimum, offload weekly full backups to tape for vaulting and protection against all types of site-wide disasters.

Seamlessly integrates into your current environment

The D2D2500 Backup System's iSCSI interface plugs right into your existing Ethernet network and HP extensive compatibility testing program verifies that your HP StorageWorks D2D2500 Backup System works with leading servers, operating systems, and backup applications, including those not manufactured by HP.

The HP StorageWorks D2D2500 Backup System works with leading backup applications to deliver a total solution for protecting data. HP Data Protector, HP Data Protector Express and other leading backup and recovery applications support the D2D2500 Backup System to allow easy integration into existing environments or for new installations. The licenses required to backup to the D2D2500 Backup System virtual drives are different for different backup and recovery applications and should be verified with the vendor.

HP Data Protector Express has features specifically designed for D2D2500

Data Protector Express provides simple, reliable and efficient data protection for organizations without specialist IT storage staff. It is easy to install, operate and manage and has features and licensing specially designed to easily integrate the D2D2500 into a robust backup and recovery strategy.
The starting point for Data Protector Express is the Data Protector Express Backup Server, This also allows the backup of data to local virtual D2D2500 drives. All servers that are backed up to local virtual D2D2500 drive require the capability to act as media servers. This media serving capability is included in the backup server capabilities. For additional machines, it requires the Data Protector Express Network Server Agent to be installed on each machine that is backed up to a local virtual D2D2500 device. These Network Server Agents make it easy to backup additional servers to the D2D2500. There is also a Data Protector Express agent to provide online protection for application servers so these can be backed up to the D2D2500 without disconnecting users, The Data Protector Express D2DAny2Any has been revised specifically to make integrated disk and tape backup easy. It makes it easy to associate a copy job with a backup to D2D2500 job. This means that some or all of the backup data in the D2D2500 can be automatically moved or copied to tape to provide another level of protection, longer term backup data retention or archiving.

Features and Benefits

HP StorageWorks D2D Backup System Family

The family of HP StorageWorks D2D Backup Systems has been specifically designed to deliver affordable disk-based backup for small and medium size data centers and remote or branch offices. The family includes:

D2D120 and D2D130 Backup Systems
Entry level tower products with up to 3 TB raw capacity and speeds of up to 50 MB/sec. These products feature an optional integrated HP LTO Ultrium Tape Drive and an optional Data Protector Express Software kit.

D2D2500 Backup System
An Entry level 1U rack-mount product with up to 3 TB raw capacity and speeds of up to 75 MB/sec. This product includes HP Dynamic deduplication technology and replication functionality.

D2D4000 Backup System
For highest capacity and performance in a 2U rack-mount form factor and a choice of two raw capacity points of either 4.5 TB or 9 TB with speeds of more than 90 MB/sec. These products include HP Dynamic deduplication technology, replication functionality and offer a choice of dual iSCSI or Fibre Channel interfaces.

HP also offers the HP StorageWorks Virtual Library Systems (VLS) products for dedicated disk-based backup. These products, including the VLS6000, VLS9000 and VLS12000, are designed for large and enterprise data centers requiring the highest capacity and performance. For more information visit: www.hp.com/go/vls

QuickSpecs

Compatibility

Server Compatibility

HP extensive compatibility testing program verifies that your HP StorageWorks D2D2500 Backup System works with leading servers, operating systems, and backup applications, including those not manufactured by HP.

The HP D2D2500 Backup System is supported on servers that use Microsoft Windows or Linux operating systems, including HP ProLiant Servers, HP Integrity and a variety of third-party servers. For compatibility details on specific servers, refer to our website for the latest hardware compatibility information: http://www.hp.com/go/connect

OS Support

The HP D2D2500 Backup System is supported by the following operating systems:

- Windows using MS iSCSI initiator
- Linux using Open iSCSI initiator
- HP-UX 11.23 and 11.31
- Solaris 10

For more details of operating system compatibility, refer to our website for the latest information: http://www.hp.com/go/connect

Software Support

The HP D2D2500 Backup System is supported by a range of popular backup applications, including HP Data Protector software and HP Data Protector Express Software. For details of specific backup application compatibility, refer to our website for the latest information: http://www.hp.com/go/connect

Tape drive compatibility

The HP D2D2500 Backup System supports direct connection of the following HP Ultrium tape drives, autoloaders and libraries using an appropriate host bus adapter:

- HP External LTO-2, LTO-3, and LTO-4 Ultrium tape drives
- HP Internal LTO-2, LTO-3, and LTO-4 Ultrium tape drives in either an HP 1U or 3U Rack-mount Kit
- HP External 1/8 G2 Autoloader with LTO-2, LTO-3, and LTO-4 Ultrium tape drives
- HP External MSL2024 Tape Library with LTO-2, LTO-3 and LTO-4 Ultrium tape drives
- HP External MSL4048 Tape Library with LTO-2, LTO-3 and LTO-4 Ultrium tape drives

Backup to tape drives, tape autoloaders and tape libraries is also available, across the network, using the tape-to-tape (or media copy) feature in your backup. For further information about these products, visit the HP Web site at: www.hp.com/go/tape.

Network Compatibility

For the best performance, the HP D2D2500 Backup System should be connected to the servers it protects via a 1Gb (gigabit) Ethernet network. It is supported on all 1Gb Ethernet network interface cards (NICs) and switches. The HP D2D2500 Backup System is also supported on 100 base-T Ethernet networks, but performance may be severely restricted. This product is not supported on networks using slower Ethernet technology. The D2D2500 Backup System communicates over your Ethernet network using iSCSI technology:

- For Windows systems, this requires installation of the Microsoft iSCSI Initiator 2.06 (or above) software driver on each server that will be backed up to the HP D2D2500 Backup System. This initiator is downloaded and installed from Microsoft automatically by the installation wizard and is also available via free download from the Microsoft website at: http://www.microsoft.com
- For supported Linux operating systems, a software iSCSI initiator is provided with the operating system but may need to be installed separately if not included in the initial operating system

Compatibility

installation.

Service and Support, HP Care Pack, and Warranty Information

Warranty and Services Included with the Product

Hewlett-Packard provides a 1-year, next-day, parts exchange, limited warranty for StorageWorks D2D2500 Backup System products, plus 9x5 phone support for the duration of the warranty.

Where a tape drive is attached to a D2D2500 Backup System the tape drive carries its own separate warranty. Hewlett-Packard provides a 3-year, next-day, parts exchange, limited warranty for the StorageWorks Ultrium tape drive, plus 9x5 phone support for the duration of the warranty.

HP warrants only that the StorageWorks Data Protector Express software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit:
ftp://ftp.compaq.com/pub/products/storageworks/warranty/en_321708-008.pdf

HP Care Pack Services

HP Care Pack Services offer upgraded service levels to extend and expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your hardware and software investments. They let you choose the support levels that meet your business requirements, from basic to mission-critical. They help you contain total cost of ownership.

HP Care Pack warranty extensions can be purchased along with HP products to cost-effectively upgrade or extend your warranty. For many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

Why purchase an HP Care Pack Service?

Your standard warranty protects against product defects. HP Care Pack Services help you guard against unplanned downtime, which can reduce your productivity and profitability. These convenient service packages:

- Protect your investment in HP products
- Provide consistent, predictable levels of support across your entire department or business
- Ease budget planning with fixed-cost support that includes parts and labor
- Give you direct access to proven technical and problem-solving expertise
- Offer a choice of response-time and repair-time commitments
- Deliver prompt, measurable results
- Are available whenever and wherever you do business
- Also available to provide consistent, predicable levels of software support for replication functionality

HP Care Pack availability may vary by country and product.

HP Care Pack Services are sold by HP and HP authorized enterprise and commercial resellers. Services for customers purchasing via direct and enterprise resellers are quoted using HP order configuration tools. Additional information about HP Care Pack Service features and benefits is available at:
http://www.hp.com/hps/carepack/services/.

To find HP Care Pack Services available via HP authorized commercial resellers, visit:
http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf_nonlkup_ctrylang.asp?code=elnl

Service and Support, HP Care Pack, and Warranty Information

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

HP Education Services

For more information about HP Education Services for Storage and SAN, visit
http://h10076.www1.hp.com/education/curr-storsan.htm

Additional Services Information

For more information about Deployment, Per Event, Consulting and Education services for HP Storage, visit: http://www.hp.com/hps/storage/

For more information about HP Care Pack services for storage products, visit:
http://www.hp.com/hps/carepack/storage/cp_networked.html

For more information about HP storage software, services and updates, visit:
http://h18006.www1.hp.com/storage/software.html

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com/

QuickSpecs

Configuration Information

Step 1 - Select a Configuration

Select one:

Model Name	Model Description	Part Number
HP StorageWorks D2D2503i Backup System	D2D2503i Backup System with 3 TB of disk storage	EH945A

Kit Contents:
D2D2503i Backup System
Ethernet cable(Cat 5e) 3m (x2)
Power cable (IEC 320 C13 Connector for Rack PDU)
Installation poster
HP StorageWorks D2D2500 Backup System CD(contains installation wizard, device drivers, and documentation, all localized in multiple languages)

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

Step 2- Related Options

Replication License	HP StorageWorks D2D2500 Replication License	EH990A

- This license enables an appliance to host replication target libraries. (No license is required for appliances which only act as replication sources)
- Licensing is "per appliance" i.e. A single license is required to enable an appliance to host as many replication target libraries as it is capable of (e.g. D2D2500 may host up to 6 replication target libraries).
- Licenses are delivered via www.webware.hp.com and are node-locked by appliance serial number (and are not transferable)
- A total of 6 source appliances can replicate into a single D2D2500 target appliance.

Rack-Mount Options
(Connecting a tape drive option to the D2D2503i requires installation of the appropriate host bus adapter. Please select an option from the list provided below)

Rack-mount Tape Drive Kits

	Part Number
HP StorageWorks 1U SCSI Rack-mount Kit	A7445B
HP Storage Works 1U SAS Rack-mount Kit	AE459A
HP StorageWorks 3U SCSI Rack-mount Kit	274338-B22
HP StorageWorks 3U SAS Rack-mount Kit	AG576A

Pre-Configured Rack-mount Tape Options

HP StorageWorks 1U Rack-mount Kit with one LTO-2 Ultrium 448 drive	DW028B
HP StorageWorks 1U Rack-mount Kit with one LTO-3 Ultrium 920 drive	EH903A
HP StorageWorks 3U Rack-mount Kit with one LTO-3 Ultrium 960 drive	Q1595B
HP StorageWorks 3U Rack-mount Kit with one LTO-4 Ultrium 1760 drive	EH946A
HP StorageWorks 3U Rack-mount Kit with one LTO-4 Ultrium 1840 drive	EH926A

Internal Tape Drive Options for Rack-mount Kits

HP StorageWorks LTO-2 Ultrium 448 SCSI Internal Tape Drive	DW016A
HP StorageWorks LTO-2 Ultrium 448 SAS Internal Tape Drive	DW085A
HP StorageWorks LTO-3 Ultrium 920 SCSI Internal Tape Drive	EH903A
HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A
HP StorageWorks LTO-3 Ultrium 960 SCSI Internal Tape Drive	Q1538A

Configuration Information

	HP StorageWorks LTO-4 Ultrium 1760 SAS Internal Tape Drive	EH919A
	HP StorageWorks LTO-4 Ultrium 1840 SCSI Internal Tape Drive	EH853A
	HP StorageWorks LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A

NOTE: HP Rack-mount kits can support a maximum of either 2 (1U) or 4 (3U) tape drives. While the HP D2D2500 can only attach to a single tape drive, you may add additional tape drives to the kit to allow for connection to other devices in your rack.

Tape Drive Options (Connecting a tape drive option to the D2D2503i requires installation of the appropriate host bus adapter. Please select an option from the list provided in the following section.)	HP StorageWorks Ultrium 1840 SCSI External Tape Drive	EH854A
	HP StorageWorks Ultrium 1840 SAS External Tape Drive	EG861A
	HP StorageWorks Ultrium 1760 SAS External Tape Drive	EH920A
	HP StorageWorks Ultrium 960 SCSI External Tape Drive	Q1539B
	HP StorageWorks Ultrium 920 SCSI External Tape Drive	EH842A
	HP StorageWorks Ultrium 920 SAS External Tape Drive	EH848A
	HP StorageWorks Ultrium 448 SCSI External Tape Drive	DW017B
	HP StorageWorks Ultrium 448 SAS External Tape Drive	DW086A

HP StorageWorks 1/8 G2 Tape Autoloader
http://h18000.www1.hp.com/products/quickspecs/12630_div/12630_div.html

HP StorageWorks MSL2024 Tape Library
http://h18000.www1.hp.com/products/quickspecs/12383_div/12383_div.html

HP StorageWorks MSL4048 Tape Library
http://h18000.www1.hp.com/products/quickspecs/12422_div/12422_div.html

NOTE: HP StorageWorks Tape Autoloaders and Tape Libraries listed above are available with a wide range of LTO Ultrium tape drive and interface options. Please refer to the product Quickspecs for detailed ordering information. www.hp.com/go/tape.

Host Bus Adapter (HBA) **Options**	HP SC11Xe Host Bus Adapter (SCSI)	412911-B21
	HP SC44Ge Host Bus Adapter (SAS)	416096-B21

Step 3 - Select Optional Data Protector Express backup and recovery software

This software allows a D2D500 Backup System to be installed into a new installation. If adding to an existing Data Protector Express environment just the agents and options will be needed. If adding to a different environment, the options and agents for that backup software will be needed.

HP Data Protector Express Software Backup Server Base product and starting point for a Data Protector Express installation. Allows local connection of a D2D2500 virtual tape device	BB117BA
HP Data Protector Express Software Network Server Agent LTU Allows an additional server to be backed up to a local D2D2500 tape device	BB121BA
HP Data Protector Express Software Network Server Agent 3-Pack LTU Allows 3 additional servers to be backed up to a local D2D2500 tape device	BB122BA
HP Data Protector Express Application Online Agent LTU Allows online protection of Microsoft Exchange or Microsoft SQL Server	BB125BA
HP Data Protector Express D2Any2Any Option LTU Allows D2D2500 backup data to be automatically copied or moved to tertiary media such as tape	BB130BA
HP Data Protector Express Drive Expansion Option LTU Allows backup to multi-drive tape or emulated tape devices	BB133BA

Technical Specifications

	D2D2503i Backup System
Form Factor	1U Rack
Total Capacity (Raw)	3 TB
Total Capacity (Usable)	2.25 TB
Data Deduplication Usable capacity using data deduplication at 20:1*	45 TB
Usable capacity using data deduplication at 50:1*	112.5 TB
Replication	Supports low bandwidth replication of libraries between D2D appliances. Replication is automatic and up to 6 source appliances may replicate into a single D2D2500 target appliance. Appliances may function as both replication targets and sources simultaneously with a license only being required for any appliance acting as a target.
Maximum number of source appliances per target appliance (fan in)	6
Disk Drive Capacity, Type	750 GB, SATA 7200rpm, 3.5"
Number of Disk Drives	4
RAID Support	Hardware RAID 5
Performance* (maximum aggregate data transfer rate)	Up to 75 MB/s
Device Interface	Two 1 Gb (Ethernet) iSCSI (also supports 100 base-T)
Tape Devices Emulated	HP LTO- 2 Ultrium /LTO-3 Ultrium/LTO-4 Ultrium Tape Drives in HP 1/8 G2 Autoloader, MSL2024 Tape Library, MSL4048 Tape Library, HP D2DBS generic library
Maximum Number of Tape Devices Emulated	6
Maximum Number of Cartridges Emulated	288 (48 per tape device in D2D Backup System Generic, up 800 GB per cartridge)
Direct-attach Tape Drives Supported (maximum of one external tape drive - requires HBA)	HP LTO-4 (Ultrium 1840/ Ultrium 1760) tape drives, LTO-3 (Ultrium 920 and Ultrium 960) tape drives, and LTO-2 (Ultrium 448) tape drives

* Actual results of data deduplication will vary with data type, change rates over time and backup methodologies used. Assuming standard business data mix and extended on-disk retention, a 20:1 data deduplication ratio could be assumed with a weekly full and daily incremental backup model. A 50:1 capacity ratio could be assumed for daily full backups.

Dimensions (HxWxD)	Shipping	8.88 x 23.31 x 38.56 in (22.5 x 59.2 x 97.9 cm)
	Out of box	1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm)
Weight (without tape drive)	Shipping	51.00 lb (23 kg)
	Out of box	37.00 lb (16.78 kg)
Power Requirements	Range Input Voltage	100-240 VAC
	Line Frequency	47 to 63 Hz
	Rated Input Current	10.0 A (at 115 VAC) 5.5A (at 230 VAC)
	BTU Rating	Maximum 2217.89 BTU/hr (at 100 VAC) 2217.89 BTU/hr (at 200 VAC)
	Rated Steady-State Power	650 W (at 100 VAC), 650 W (at 200 VAC)
	Maximum Peak Power	700 W (at 100 VAC), 700 W (at 200 VAC)

Technical Specifications

	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
Relative Humidity (non-condensing)	Shipping	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
Temperature Range	Shipping	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
Acoustic Noise		Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).
	Idle (disks spinning)	LWAd 6.82 B LpAm 51.93 dBA
	Operating (random seeks to disks)	LWAd 6.84 B LpAm 51.93 dBA