

4.7.7—HP Surestore Disk Array XP256

Overview

This document provides an overview of the basic configurations as well as sales ordering information for the HP Surestore Disk Array XP256 storage solution.

The new Hewlett-Packard Surestore Disk Array XP256 provides high-capacity, high speed Enterprise level storage with continuous data availability, heterogeneous systems support, and ease of serviceability, scalability, and connectivity. It can be attached to multiple open systems servers as well as to mainframes, meeting the need for a wide range of configurations up to a maximum raw capacity of 9 TB.

The storage solution consists of the following major components:

- Array Hardware:
 - One DKC Controller Cabinet – contains control panel, service processor, cache modules, Client-Host Interface Processors (CHIPs), and Array Control Processors (ACPs).
 - One to four DKU disk cabinets – contain the disk drives
- Array Software:
 - Continuous Access XP
 - Business Copy XP
 - Performance Manager XP *
 - Remote Control XP *

* *Requires a remote PC*
- Support and Services:
 - Hardware support
 - Software support
 - Technical assistance

Hardware

Figure 4.7.7.1 shows the layout of the cabinets or frames comprising the subsystem. A minimum capacity system includes only one DKC and one DKU, while a maximum capacity system includes one DKC and four DKUs. The central frame or DKC contains the Array Control Processors (ACPs), redundant power, cache memory, shared memory, and Client Host Interface Processors (CHIPs). The DKUs contain the disk drives and redundant power.

Figure 4.7.7.1 XP256 Cabinet/Frame Configuration

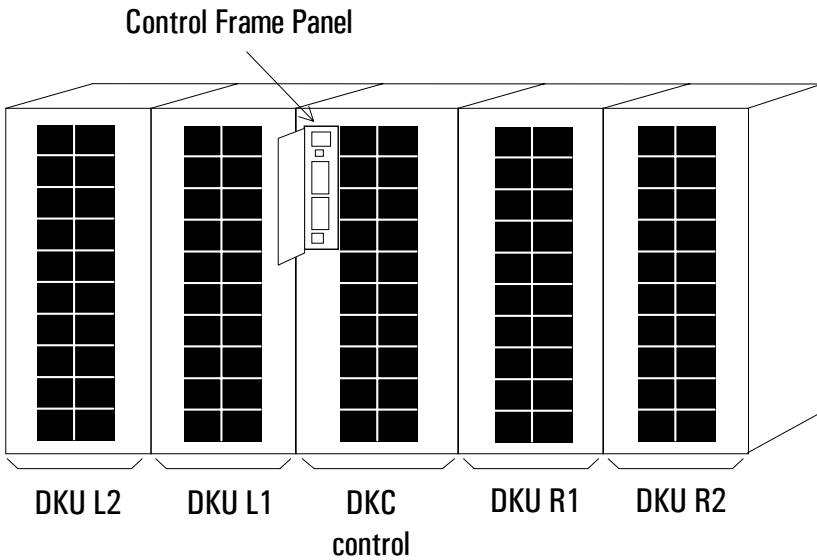
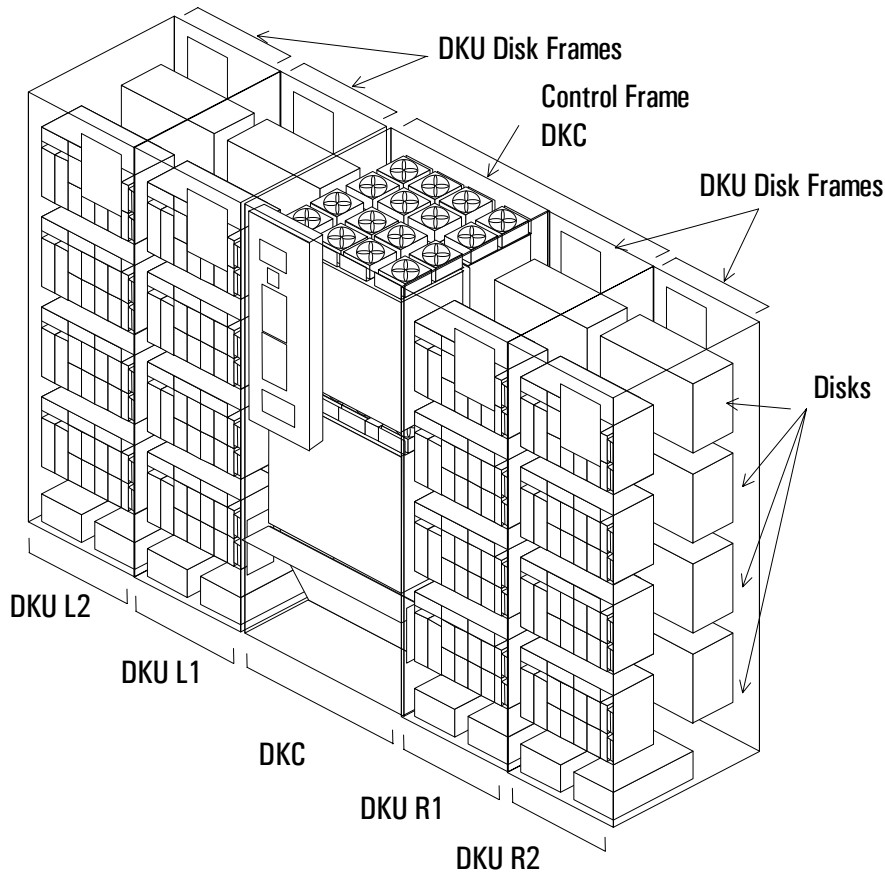


Figure 4.7.7.2 is an isometric view of the Surestore Disk Array XP256, showing the front and back accessibility of the frames and their components.

Figure 4.7.7.2 XP256 Isometric View



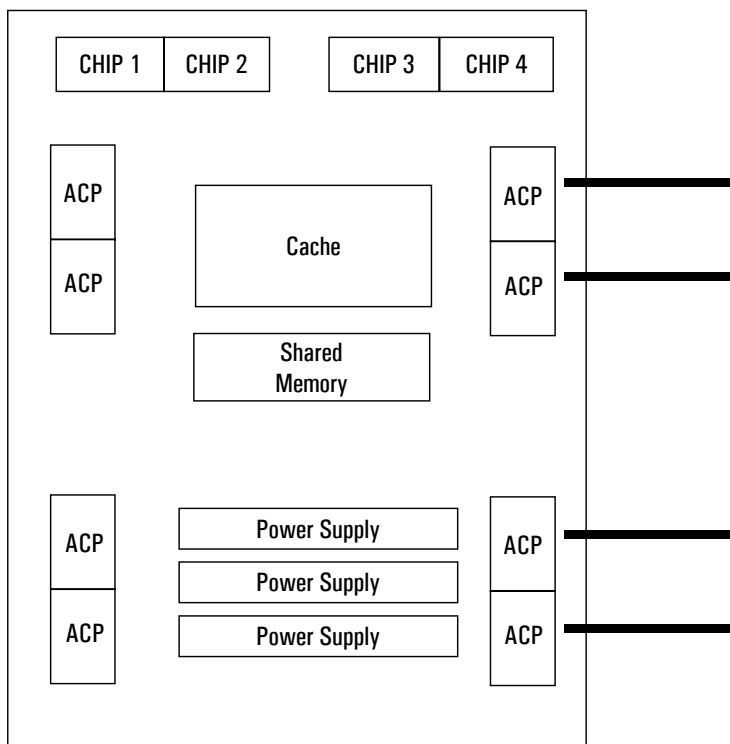
Controller Frame (DKC)

The Controller Frame (DKC) features the following:

- Fully redundant components, no single points of failure
- Dynamically-duplexed cache with battery backup – expandable from 1 GB up to 16 GB total capacity.
- Multiple data and control buses – two data and two command (Each CHIP, ACP, and cache element is attached to all four buses.)
- Shared memory – holds command and control data so that the entire amount of cache memory is available for quick access to user data.
- Power redundancy

Figure 4.7.7.3 shows representation of the DKC componentry.

Figure 4.7.7.3 XP256 DKC Cabinet Representation



Client Host Interface Processors (CHIPs)

CHIPs are sold only in pairs with a minimum of one pair and up to a maximum of four pairs of fully mixable CHIPs.

- 8-port SCSI adapter pair
- 4-port Fibre Channel adapter pair *
- 4-port ExSA - Extended serial interface (ESCON compatible) adapter pair.
- 8-port ExSA – Extended serial interface (ESCON compatible) adapter pair.

* Not supported for HP e3000 connectivity

Note: ESCON links can also be used to interconnect two arrays in remote storage solutions.

SCSI-Fibre Channel Router for XP256 (Extend Connectivity Only)

For configurations requiring the XP256 to be located beyond the SCSI-2 limitations, the SCSI-Fibre Channel Router allows for distances up to 500 meters. Two SCSI-FC routers are required and are connected FC port to FC port. For more information on the SCSI-FC Router see Mass Storage section.

Array Control Processors (ACPs)

Array Control Processors (ACPs) are configured in pairs for redundancy—up to a maximum of four pairs per system. The exact number of ACP pairs chosen depends on the number and frame location of the disk drive configuration. The quantity may also be influenced by workload performance characteristics. Each ACP pair controls a single disk domain. See Array Group Domain Mapping for more information.

Cache Memory

The XP256 comes standard with 1-GB cache and two cache memory boards, expandable to 16 GB total cache and four memory boards. Each GB consists of eight 128-MB SIMMs. The standard two memory boards can accommodate 8 GB of cache memory. Additional cache memory boards are required for cache capacities greater than 8 GB. All cache is backed up by a 48-hour battery.

Dynamic Duplex Cache is an area of cache set aside for “write” data. All data written to the cache is written to the Dynamic Duplex Cache and is duplicated across power boundaries. The write cache percentage may be modified manually or can be adjusted dynamically by the XP256.

Table 4.7.7.1 XP256 Cache Memory Requirements

Usable Storage Capacity (GB)	Recommended Minimum Cache (GB) ¹	Raw Storage Capacity Required for RAID 5 (GB)	Raw Storage Capacity Required for RAID 1 (GB)
272	1	373	558
545	2	746	1,117
726	3	995	1,489
1,090	4	1,493	2,234
1,271	5	1,741	2,606
1,453	6	1,990	2,978
1,816	7	2,488	3,468
2,179	8	2,986	5,513
2,542	9	3,483	6,432
2,906	10	4,068	7,351
3,409	11	4,942	8,566
3,911	12	5,672	
4,414	13	6,401	
4,917	14	7,130	
5,420	15	7,859	
5,923	16	8,566	

¹ Base XP256 configurations come standard with 1 GB of cache memory

The following simplified rules for determining cache memory requirements may also be used:

1. 1-GB cache memory recommended for every 300 GB usable storage capacity, and
2. 1-GB cache memory recommended for every 400 GB ray capacity to be configured RAID 5, or
3. 1-GB cache memory recommended for every 550 GB ray capacity to be configured RAID 1

General guidelines are provided to estimate minimum cache memory size requirements. The optimum cache memory size requirement for each subsystem will vary depending upon disk storage capacity, workload characteristics, cache LUN XP software utilization, and subsystem configuration parameters.

Shared Memory

Shared memory is independent of the cache memory and is used to store tables and other information overhead, thus freeing up the cache for user data.

Table 4.7.7.2 and **Table 4.7.7.3** summarize shared memory requirements changes with the use of Business Copy XP software for 1-2 and 3-4 ACP configurations.

Table 4.7.7.2 XP256 Shared Memory Requirements—1-2 ACP Configurations

Cache Capacity	Shared Memory (MB)	
	36.9-GB Disk	Business Copy XP
Up to 4 GB	256	384
5 GB	256	384
6 GB	256	384
7 GB	384	384
8 GB	384	384
9 GB	384	384
10 GB	384	384
11 GB	384	512
12 GB	384	512
13 GB	384	512
14 GB	384	512
15 GB	384	512
16 GB	512	512

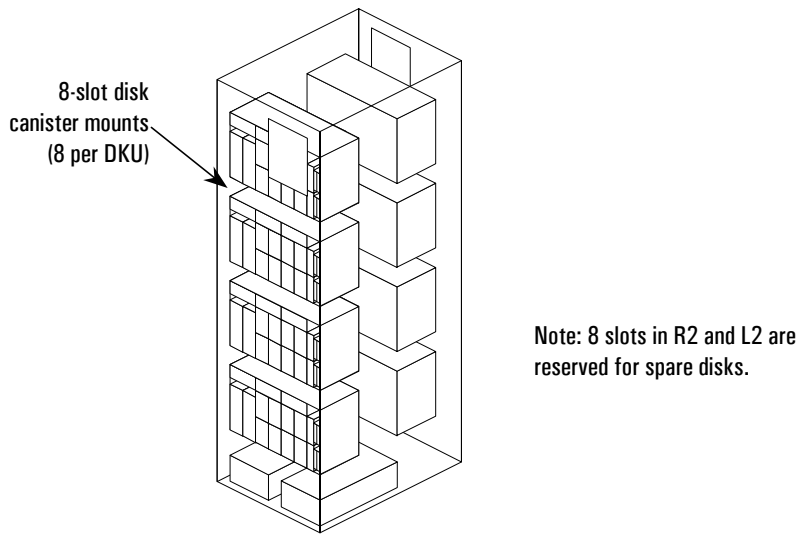
Table 4.7.7.3 XP256 Shared Memory Requirements—3-4 ACP Configurations

Cache Capacity	Shared Memory (MB)	
	36.9-GB Disk	Business Copy XP
Up to 4 GB	384	384
5 GB	384	384
6 GB	384	384
7 GB	384	384
8 GB	384	384
9 GB	384	384
10 GB	384	384
11 GB	384	512
12 GB	384	512
13 GB	384	512
14 GB	512	512
15 GB	512	512
16 GB	512	512

Disk Array Frames (DKUs)

Each system can accommodate a minimum of one up to a maximum of four DKU frames. Each frame comes with 8 each 8-slot disk canister mounts, providing a total of 64 disk drive slots (32 via front access and 32 via rear access). Four slots are reserved in both the L1 and R1 DKUs for spare drives. 8 slots in both L2 and R2 DKUs are unavailable for disk drives. See **Table 4.7.7.5** for more information on DKU disk capacities. See **Figure 4.7.7.4** for an isometric view of the DKU

Figure 4.7.7.4 XP256 Disk Array Frame (DKU)—Isometric View



Disk Drives

Table 4.7.7.4 summarizes the specifications for the disk drives supported by the HP Surestore Disk Array XP256. There is a large capacity disk drive of 36.9 GB (raw capacity) and a smaller capacity, high performance 15-GB disk drive. The exact mix of drives chosen to populate the disk array is entirely dependent upon your application workload and its characteristics. We recommend starting with a homogeneous set of disk drives. However, it is possible that some applications may benefit from a mixture of high capacity and high performance drives.

Table 4.7.7.4 Disk Drive Specifications

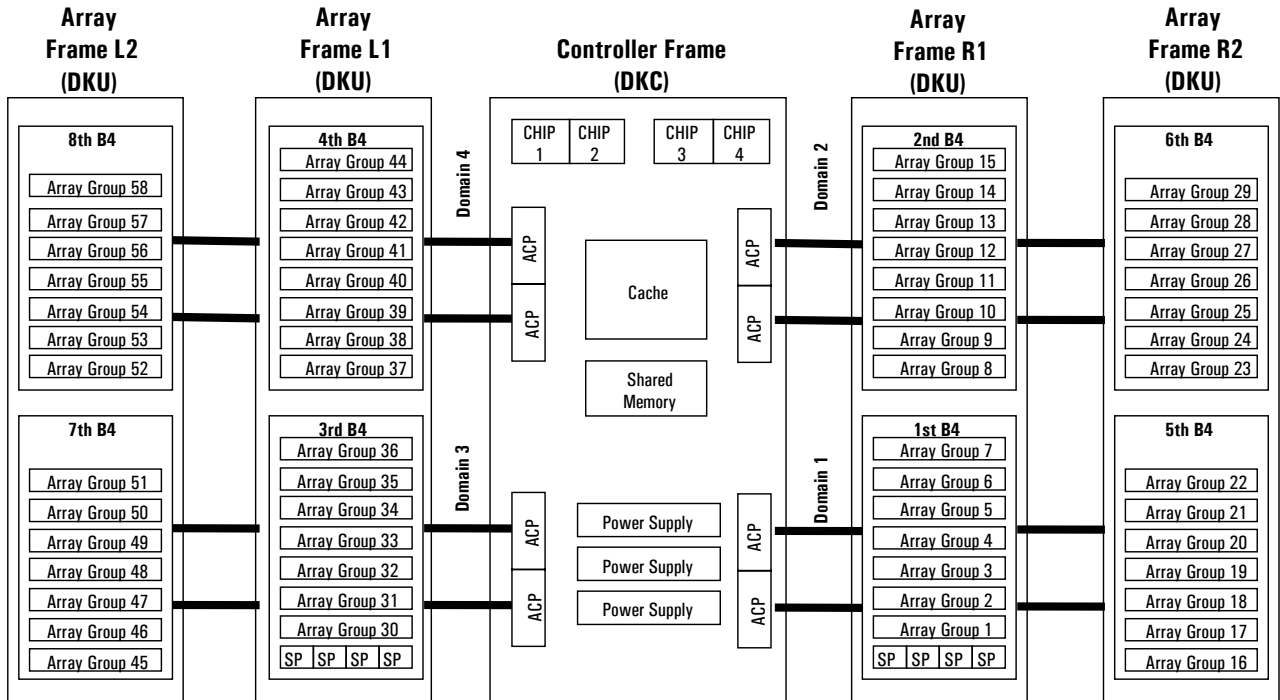
Disk Drives	15 GB	36.9 GB
Raw Capacity	14.947 GB	36.925 GB
Platter size	2.5 inches	3.5 inches
Rotation speed	12030 rpm	6300 rpm
Mean latency time	2.5 ms.	4.8 ms.
Mean seek time	5.5-6.5 ms.	11.5-12.5 ms.
Sustained transfer rate	13.7 to 16 MB/sec	9.9 to 15.2 MB/sec
Interface type	Dual-Ported SCSI Fast-Wide Differential	Dual-Ported SCSI Fast-Wide Differential

Disk drives are added in array groups comprised of four disks each. There is a maximum of 58 array groups per system with the following distribution: 14 groups each for Frame R2 and L2, 15 groups each for Frames R1 and L1.

Array Group Configurations

Figure 4.7.7.5 illustrates the physical array group configuration in the XP256 solution.

Figure 4.7.7.5 XP256 Array Group Configuration Diagram



Array Group Domain Mapping

Table 4.7.7.5 maps array groups to the XP256 disk domains.

Table 4.7.7.5 XP256 Array Group Domain Mapping

	Array Groups					Disk Drives*				
	Maximum Number of Groups	DKU R1	DKU R2	DKU L1	DKU L2	Maximum Number of Drives	DKU R1	DKU R2	DKU L1	DKU L2
Disk Domain 1	14	7	7			56	28	28		
Disk Domain 2	15	8	7			60	32	28		
Disk Domain 3	14			7	7	56			28	28
Disk Domain 4	15			8	7	60			32	28
Total Per Array	58	15	14	15	14	232	60	56	60	56

* Does not include spare Disk Drives for R1 and L1 DKUs.

Disk Drive Loading Sequence

The 1 to 58 Array Group numbering designation represented in Figure 4.7.7.5 is for Array Group identification purposes only and does not necessarily represent the recommended disk drive loading sequence. The Array Group expansion sequence may be tailored to meet specific customer needs, regardless of the numbers assigned to the Array Groups. For example, customers desiring the best performance will want to populate Array Frame R1 first, and after that begin to populate Frame L1, etc.

Disk Drive Intermix Rules

- Cannot mix LUN sizes within an Array Group
- Cannot mix disk sizes within an Array Group
- Cannot mix RAID levels on a single ACP pair (RAID 1 and RAID 5)

ESCON Extenders

In Continuous Access XP applications, ESCON extenders are used to link two XP256 Arrays over distances up to 43 kilometers. For these types of solutions (distance connection of up to 43 Km) ESCON extenders from any manufacturer are supported, as long the link is entirely ESCON.

For solutions requiring connection over distances greater than 43 Km or where a dark fiber implementation is not possible, WAN connections are required. ESCON to T3/E3/ATM extenders may be used for this purpose. ESCON to T1 extenders may also be used but they are not recommended due to their slow link speed. CNT is the only 3rd party certified to provide XP256/WAN connection solutions in these environments. CNT can be contacted to assist in the design of the WAN extender implementations and help determine performance characteristics for the customer's solution (see the CNT personnel contact list).

Software

Software Descriptions

Following are brief descriptions of the software products available with the XP256:

Note: A separate PC is required to interface with the products.

- **Continuous Access XP—B7905A** (Available Jan 00)
Provides data replication or remote site mirroring across two sites, allowing data to be copied from an array at one site to an array at a remote site. (Remote mirroring solutions requiring distancing of greater than 3 km require ESCON/WAN Extenders). This allows for implementation of a disaster recovery plan. Remote Manager software provides linkage between the “failover controller/arbitrator” and the array to initiate, monitor, and report status to the host. HP can control this functionality remotely from “Stress Free Central”, or if desired, the customer can control this using Remote Control XP software **Remote Control XP required. Separate PC required.**
- **Business Copy XP—B7906A (Available Jan 00)**
Provides local multi-mirroring, by creating up to 3 data copies, for a total of 4 images, including the original. Useful for allowing non-production activities such as backup, batch, and Y2K testing to take place on the copies. Control can be established either by HP's Stress Free Central or via RAID Manager and Remote Control XP software. **Remote Control XP required. Separate PC required.**
- **Performance Manager XP—B7909A**
Provides performance monitoring for the disk array. Runs on the Remote Control XP platform (W95 at first release) to monitor and adjust disk array performance. A customer or service consultant can examine the workload and reallocate the cache read/write ratio according to user needs, e.g. optimize batch at nights, and OLTP days. This may not be run on the same PC at the same time as other Remote Control XP applications. If a customer wants to use this tool regularly, it is best to run a separate Remote Control XP on a separate PC. **Remote Control XP required. Separate PC required.**
- **Remote Control XP—B7911A** (Available Jan 00)
This application runs on a Microsoft Windows95 or Windows98 based PC, supplied by the customer. The software provides an interface for the customer to access the array configuration. A number of management products can be run on top of this platform, including both array hardware and software configuration, performance monitoring, and bridging for remote access from a central “management station” (e.g. where SAN Manager or OpenView would also be running). Inside every subsystem is a Service Processor (SVP) which is connected to a private LAN. The PC is also connected to this LAN using Remote Control XP. Another LAN card can be put in the PC to connect it to the public network (LAN). Eight arrays can be managed by a single PC with Remote Control XP, allowing it to act as a surrogate for all the SVPs that are attached on the private LAN.

Software Licensing

Table 4.7.7.6 summarizes the licensing structure for XP256 software products which is based on raw disk capacity levels.

For example, a configuration with 35 each 15-GB and 75 each 36.9-GB storage disks would represent $(35 \times 15) + (75 \times 36.9) = 3,292.5$ GB (~3.3 TB) raw disk capacity.

Table 4.7.7.6 XP256 Software Licensing

HP Software Name	HP Product Number	License To Use
Continuous Access XP	B7905A 3 TB LTU B7905AU 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.
Business Copy XP	B7906A 3 TB LTU B7906AU 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.
Secure Manager XP	B7907A 3 TB LTU B7907AU 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.
Cache LUN XP	B7908A 3 TB LTU B7908AU 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.
Performance Manager XP	B7909A	One PC client (remote console)
RAID Manager XP	B7910A HP-UX B7915A NT B7916A Solaris B7917A AIX B7918A DEC UNIX	HP-UX systems on 1 array NT systems on 1 array Solaris systems on 1 array AIX systems on 1 array DEC UNIX systems on 1 array
Remote Control XP	B7911A	One PC Client (remote console)
Configuration Manager XP	B7912A 3 TB LTU B7912AU 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.
Resource Manager XP	B7913A	One array connected to MVS systems
Data Exchange XP	B7914A HP-UX, 3 TB LTU B7914AU HP-UX, 3 TB LTU upgrade	One array with capacity tiers of 3,6,9 TB.

Note: Capacity tiers for software licenses represent raw disk capacity storage levels.

Connectivity

SCSI Host Connection

Table 4.7.7.7 summarizes HP-UX, HP-NT, and MPE/iX OS SCSI host connection capabilities of the XP256.

Table 4.7.7.7 XP256 HP-UX/HP-NT/MPE OS SCSI Host Connect

Operating System	Platform	SCSI HBA*	Drivers
HP-UX 11.0	V-Class (2200/2250/2500)	A4800A	PHKL-17258
	T-Class (600)	28696A (HP-PB)	PHKL-17258
	R-Class	A4107A	PHKL-17258
	K-Class	A2969A (HSC) 28696A (HP-PB)	PHKL-17258
	D-Class	A4107A	PHKL-17258
	A-Class	A4107A	PHKL-17258
	N-Class	A5149A/A5150A	PHKL-17258
HP-UX 10.20	T-Class (500/600)	28696A (HP-PB)	PHKL-17258
	R-Class	A4107A	PHKL-17258
	K-Class	A2969A (HSC) 28696A (HP-PB)	PHKL-17258
	D-Class	A4107A	PHKL-17258
	A-Class	A4107A	PHKL-17258
NT EE4.0, SP4	HP: NetServers: LH4, LX, LXrPro, LXr Pro8, LXr 8000	A5252B	2.3(4.0.1433)
MPE/iX 5.5	9x9	28696A Rev. 3728	PowerPatch 7 plus patch
MPE/iX 6.0	9x9	28696A Rev. 3728	Express 1 plus patch MPEKXL9
MPE/iX 6.5	9x9	28696A Rev. 3728	N/A
MPE/iX 7.0	N-Class A-Class	A4800A or A5159A	

* Fast Wide SCSI and Ultra SCSI supported for all the OSs listed above.

Hardware and Software Services

Services Overview

Hardware and software services complete HP's mass storage solution by providing customers with assistance in planning, implementing, enhancing and maintaining their critical data storage environment.

HP's service and support offering provides robust levels of bundled support for the HP Surestore Disk Array XP256, including Site Prep and Installation plus two years of Technical Account Management a new support level for hardware called "Availability Support."

Several additional support services are required for XP256 software products. These include 24x7 Phone In Assistance and Software Enablement services. Finally, HP also offers optional consulting services delivered by the Technical Account Manager. The following provides configuration and ordering details for these service features designed for the XP256.

What's Included with the HP Surestore Disk Array XP256

Hardware Support

This product comes with a new and exclusive level of hardware warranty and support called Availability Support. The warranty includes not only site prep and installation, but also Availability support providing 24x7 for two years and capitalizing on the proactive support technology features of the product:

- Parts Redundancy
- Phone Home (event based)
- Remote Repair

Availability Support is defined as:

- “Next Day support except when it has been determined by the Response Center that an immediate dispatch of CE and parts are required to prevent or repair a hard-down situation”.
- For the majority of situations (95% or more) the onsite CE can be scheduled for Next Day. Immediate dispatch of CE upon customer request is also included, but expected to be rare.
- To deliver both warranty and post warranty support, HP requires modem access to the storage device.

Surestore Technical Assistance

The HP Surestore Disk Array customer’s product (A5701A) also provides Technical Account Management as a standard service delivered over two years. The customer is assigned a Surestore Technical Account Manager, typically a mass storage peaked Account Support Engineer who also delivers the customer’s PSS, CSS, or BCS account service. The customer value of this relationship is based on the ASE’s technical expertise and advice in managing and operating high availability IT environments, including mass storage and networked open systems (MPE/iX, UX and NT) servers. This ensures that HP Surestore Disk Array customers have an ongoing technical relationship with HP related to their mass storage environments. Bundled in with the hardware/software solution are bimonthly customer visits per frame over the two-year warranty period (12 visits total). For the average customers having two XP256 frames, this translates into one visit per month over the two-year warranty period.

What’s Required for the HP Surestore Disk Array XP256

The following three software support elements are required to achieve a mission critical mass storage offering. Each are purchased using an option structured to the Surestore Software Products.

1. Software Foundation Services on each Software Product:
 - #0S6 Option—Software Foundation Services provide round the clock response to software problems plus delivery of Update Materials and continuing Software License-to-Use. 24×7 is the standard service level that is implemented using standard up-front software support product options.
 - 24×365 Software Phone-in Assistance—Toll-free access to the HP Response Center is provided to authorized callers. When Customer calls with a software problem, response will be 2 hours. The standard support provides 24×7 coverage for supported software products.
 - Software License to Use/Updates—Customers can use and copy updates to HP software updates as described in the HP Terms and Conditions of Sale and Service.
 - Software Media and Documentation Materials Updates—As HP releases updates to the customer’s HP software, the latest revisions of the software and reference manuals are made available to them. Media types available for software and documentation updates will include floppy disk and paper. Compact disc read-only memory (CD-ROM) will not available at first release.
2. Surestore Software Enablement on each XP256 Software Product:
 - #0SY Option—This provides the installation and functionality enablement of the software product for the customer. Once the software is activated, the Technical Account Manager provides a simple software enablement:
 - To ensure basic software functionality is available,
 - To enable simple operational configuration,
 - To show and tell basic software operational usage,
 - To respond to basic software operational usage questions.
3. Delivery Trigger Option to A5701A:
 - #2YY Option—A zero-price product option has been structured to the HP Surestore Disk Array product (A5701A). This option must be included in every order to ensure the complete delivery of the bundled services described in the “What’s Bundled” section above.

What's Recommended—Surestore Technical Services

Finally, several technical services are offered both for implementation and ongoing operational consulting for the mass storage environment. These services will be options structured to Surestore Support Enhancement, H9273A, which represents the support enhancements around the mass storage environment.

Surestore Implementation Services to H9273A

- **Surestore LUN/SAN Implementation Service**

Option #301—LUN/SAN Implementation service provides the customer with a LUN configuration specifically designed to meet current operational needs including application-specific LUN mappings. This service is highly recommended when transitioning from factory default or test configurations into production. RAID and mirroring reconfigurations are not included. Implementation may involve any or all of the following previously enabled software products:

- B7907A—HP Surestore Secure Manager XP
- B7908A—HP Surestore Cache LUN XP
- B7912A—HP Surestore LUN Configuration Manager XP
- B7911A—HP Surestore Remote Control XP

- **Surestore Business copy Implementation Service**

Option #302—Surestore Business Copy Implementation provides the implementation of the HP Surestore Business Copy XP product and any one of the HP Surestore RAID Manager XP products. This includes the configuration of a single (1) frame and up to four (4) hosts.

Surestore Consulting Services to H9273A

- **Surestore Critical Data Availability Service**

Option #303—Surestore Critical Data Availability provides analysis, design and implementation of optimal functionality of the HP Surestore Business Copy XP product and any one of the HP Surestore RAID Manager XP products. This is to ensure that the software products will support the customer's Mission Critical business, application operation needs, and High Availability integration. Customer environment includes up to two (2) frames and four (4) hosts.

- **Surestore Performance Optimization Service**

Option #304—Surestore Performance Optimization provides performance data gathered and produced by the HP Surestore Performance Manager XP product on one (1) HP Surestore Disk Array product (A5701A). Upon completing the analysis using the software product and other available performance data, the service also provides a report of the current status and a recommendation of appropriate actions to optimize storage performance on the HP Surestore Disk Array product (A5701A). The performance analysis is performed for the disk array only.

Additional Surestore Technical Assistance

Additional 1 day (8 hours) of Surestore Technical Assistance is provided. This additional assistance is delivered by the assigned Surestore Technical Account Manager. Select one option to H9273A as follows: use option #306 for environments supported under CSS-SAP contract; use option #305 for all other environments.

Support Contract Renewals

HP's Account Services, including Personalized System Support (PSS), Critical Systems Support (CSS) and Business Continuity Support (BCS), have each been enhanced to include Surestore service options as underlying products. The Support Sales Admin teams will have further instructions for contract renewals.

Configuration

Table 4.7.7.8 provides a step-by-step guide for specifying the configuration of an XP256.

Table 4.7.7.8 Configuration Steps for the XP256

Steps	Comments
1. Select the raw disk capacity desired	
<ul style="list-style-type: none"> • Determine the quantity and type of disks desired (15- or 36.9-GB) • Calculate the number of 4-disk array groups 	
2. Select the control frame components.	<ul style="list-style-type: none"> • One DKC contains 1 ACP pair. • 1-GB cache, 256 MB shared memory • Redundant power supply for first two CHIP pairs
<ul style="list-style-type: none"> • Host interface (quantity and type) • Additional cache • Cache board • Additional shared memory • Additional array control processor pairs • Redundant power supply for CHIP pairs 3 to 4 	<ul style="list-style-type: none"> • SCSI, Fiber Channel, ExSA (ESCON compatible) • Cache can be configured up to 16 GB • An extra cache board is needed for > 8-GB cache memory.
3. Select disk array frames and the array groups	<ul style="list-style-type: none"> • Choose from 50-Hertz or 60-Hertz Frames for the desired AC power input. • Follow the minimum/maximum array group requirements for disk frames R1, R2, L1, and L2, as required.
4. Select host interface cables	
5. Select software and licenses	
6. Select upgrade products including spare disk drives	
7. Select hardware and software services and support features	
8. Import a configuration generated by Watson or SBW	

Miscellaneous

Simplified Manual Procedures for XP256 Configurations

Cautions and Warnings

These procedures make many general assumptions about the most common XP256 configurations and do not cover mixed drive sizes, mixed RAID-1/RAID-5 configurations or many other special cases (which are supported). Please contact the appropriate GSS team (1-447-7070) for a more detailed analysis or review.

Some of the selections in these procedures are not orderable from the factory. The factory will configure and ship based on the following rules:

- All subsystems from the factory will be configured with RAID 1.
- LUN configurations will follow a “fixed standard” where:
 - The first set of seven 36.9-GB Array Groups (AGs) configured in domain 1 and 3 (lower domains) will be configured Open3.
 - The first set of six AGs configured in domain 2 and 4 (upper domains) will be configured Open3.
 - All other AGs (15- and/or 36.9-GB) installed will be configured Open9.

Intent

To provide rules of thumb and describe the basic configuration process as an educational tool, as well as provide enough information for the manual selection of required components as a starting point for a valid configuration (first order approximation). These procedures do not cover spares analysis and selection or storage requirements for the Business Copy or other additional software.

General Steps

The following general steps are required to determine the basic configuration parameters desired

1. Disk Storage and Structure
2. Cache and Shared Memory Sizes
3. Front-end Interfaces
4. Software, Installation and Support
5. Console Requirements

Disk Storage and Structure

A. Select Disk Size and RAID Level

Two drive sizes are currently supported with either RAID level. Choose the drive size and RAID level that most closely matches your existing drives and protection needs:

	RAID-1	RAID-5
15 GB	yes	yes
36.9 GB	yes	yes

RESULTS:

Disk Size: _____
RAID Level: _____

B. Select Emulation Type (Open3 or Open9)

Open9 emulation uses a larger LDEV size (7.3 GB) and provides better scalability into larger configurations. It is the type that should be used in most cases.

If however, you have selected the 36.9-GB drives and need less than about 2.5 TB of useable capacity, you may consider the Open3 emulation type. Open3 emulation provides better disk utilization in these configurations with a smaller LDEV size (2.4 GB) but limited expandability.

RESULT:

Open: _____

C. Compute Number of Array Groups Required

Tables exist that show the number of Array Groups required for various amounts of useable storage (by drive size). These are maintained separately from this document (see raid.xls).

Using the amount of useable storage desired, drive size, RAID type, and desired emulation mode (Open3 or Open9), look up the number of Array Groups required. You may also be interested in seeing the number of LDEVs required.

RESULT:

Number of Array Groups: _____

D. Select ACP Pairs and DKU Cabinet Types

The following loading sequence is the recommended default and will provide the highest level of performance.

Array Groups	ACP Pairs	Cabinet Type
1-7	1	R1 (base configuration)
8-15	2	R1
16-22	3	R1 L1
23-30	4	R1 L1
31-44	4	R1 L1 R2
45-58	4	R1 L1 R2 L2

RESULTS:

ACP Pairs: _____
Cabinet Type: _____

Cache and Shared Memory Sizes

Use **Table 4.7.7.1** to determine the recommended minimum cache size. Simply use the useable storage capacity to select the minimum cache size. If the Cache LUN XP or LUN Configuration Manager XP is being proposed, the cache memory requirements should be increased.

Use **Table 4.7.7.2** and **Table 4.7.7.3** to determine the required minimum shared memory size. Select the correct amount by using the cache capacity from above and whether or not 36.9-GB drives or the Business Copy software is being used.

RESULTS:
Cache Size: _____
Shared Memory Size: _____

Front-end Interfaces

Open systems host connections can be either SCSI or Fibre Channel based. Follow the appropriate procedures below:

- SCSI Based Connections—One to four Client-Host Interface Processor pairs (CHIPs) can be specified, each pair providing 8 SCSI ports. Select the correct number based on the number of hosts and their connectivity and performance needs. Order the additional power supply for CHIP pairs 3 to 4.

Note: Fibre Channel connections to the HP e3000 are not currently supported.

Software, Installation and Support

See the configuration guide chapters for these topics.

Console Requirements

One or two Windows 95/98 PCs will be required—one for the console, one additional PC will be required if ordering the performance analysis tools.

HP e3000 Supports HP Surestore Disk Array XP256

The Hewlett-Packard Surestore Disk Array XP256 provides high-capacity, high-speed mass storage, with continuous data availability, ease of service, scalability, and connectivity. The disk array can be connected to multiple server systems. The HP e3000 supports the XP256 through Fast-wide differential SCSI connections.

The disk array is the first RAID disk array to truly provide continuous data availability. It is designed for nonstop operation and continuous access to all user data. The disk array has no active single point of component failure. It is not expected to fail in anyway that would interrupt user access to data. The XP256 is easily configured on the HP e3000, see the following:

Requirements for HP Surestore Disk Array XP256 on the HP e3000:

The following is a summary of Site, Software and Hardware requirements for support of the HP Surestore Disk Array XP256. Device installation and Support is to be provided by HP. For detail information on the support and configuration of XP256, refer customers to the Operating System Configuration Guide (A5701-90910). Support of XP256 product will have the following general restrictions:

- Support will only be allowed on a dedicated SCSI bus, with no other types of devices (homogeneous bus environment).
- Daisy-chaining of two or more XP256 units are not supported.
- Maximum of 15 LDEVs per SCSI bus (Maximum of 8 LDEVs for performance)
Note: Having 9 or more LDEVs configured will cause performance degeneration under high I/O loads.
- No support for shared SCSI busses.
- F/W SCSI Device Adapter Card (28696A, a.k.a. “Wizard”) firmware MUST be at level 3728 or greater.
- 9x9 Core I/O card (A2372-60004 or A3453-60010, a.k.a. “Mustang”) will be
- Conditionally supported:
 - Must disconnect all internal F/W SCSI drives.
 - Must have firmware level of 3636.
 - Up to eight LDEVs will be supported (Tested limit).
- LDEV 1 boot will have the following conditions:
 - ONLINE HOT replacement of FRUs is supported with the exception of microcode downloading, online memory replacements, disk adapter replacements.
 - Only RAID 1 is support for LDEV 1.
 - Microcode downloading, online memory replacements and disk adapter replacements must be performed with no jobs or sessions logged on.
 - LDEV 1 capacity limited to 4 GB (due to NIO IODC limits).

XP256 is supported on the following MPE/iX Releases:

- MPE/iX 5.5 PowerPatch 7 + KXL9
- MPE/iX 6.0 PowerPatch plus KXL9 patch or later
- MPE/iX 6.5
- MPE/iX 7.0

Support on 5.5 and 6.0 will have the following restrictions:

- No logging to the host of any vendor unique error codes. These codes are used to identify any hardware component (FRU) that has failed. For example, the failure of a fan inside the device would be reported as a FRU error.
- SYSMAP will identify the XP256 device as non-supported.
- No predictive support.
- SYSGEN product ID is “HPDARRAY”.
- XP256 microcode revision level B++(rev 36) or later is required. Host mode table should be set to 08.
- Target address support only (multi-LUN support available on request).
- Alternate path failover is not currently supported.

An additional requirement for support is that each XP256 will have a telephone modem connected for remote access. Normally, the XP256 will call HP support when it detects any errors. SCSIDSK2 can be used on the XP256 to validate access to the device. For information on support, see the HP support plan.