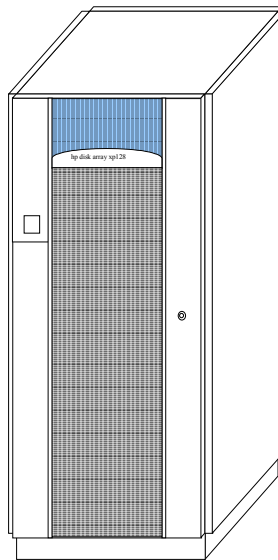


## 4.7.2—HP Surestore Disk Array XP128

This document provides an overview of the configuration and ordering information for the HP Surestore Disk Array XP128 enterprise disk array. The Hewlett-Packard Surestore Disk Array XP128 provides high-capacity, high-speed Enterprise Level storage with continuous data availability, heterogeneous systems support, ease-of-serviceability, scalability, and connectivity. The XP128 can be attached to multiple open systems servers as well as to mainframes. Supporting a wide range of performance and capacities, the XP128 meets a variety of customer enterprise storage needs. The XP128 is appropriate for capacity needs from one hundred gigabytes up to a maximum raw capacity of 9.3 TB with 73-GB disk drives.

This guide includes an overview of the hardware and software, a description of the XP128 products by product number, instructions for ordering new systems and upgrades to existing XP128 systems. Detailed instructions for ordering software for XP128 are in a separate section in this book, HP XP Software. There is a glossary of XP specific terms at the end of this section for users new to the XP.

Figure 4.7.2.1 XP128 Disk Array



### Hardware and Software Overview

This exciting new storage solution consists of the following major components:

#### XP128 Hardware

The XP128 hardware consists of a single cabinet for controller and disks. The controller cabinet contains the control panel, service processor (SVP), cache modules, shared memory modules, crossbar switch, Client-Host Interface Processors (CHIPs) and Array Control Processors (ACPs). There is space in the cabinet for up to 128 disk drives.

#### XP128 Software

A full complement of software tools are available for XP128 Disk Array management, management integration, and to enable a wide range of High Availability solutions. Please refer to **Subchapter 4.7**, “XP Surestore Disk Array Software” for more information.

#### Support and Services

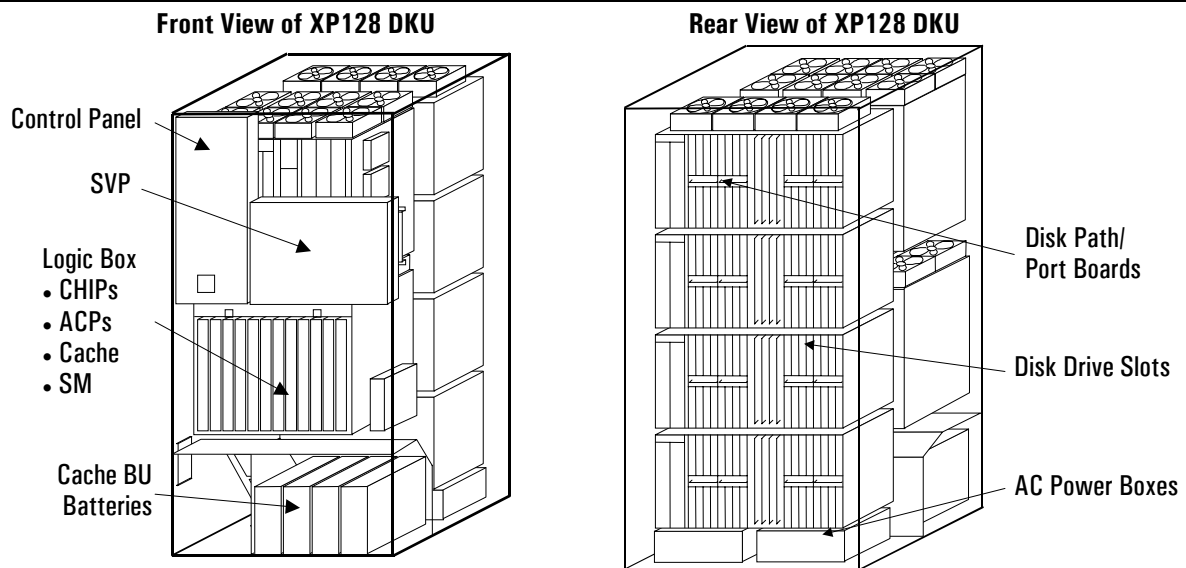
- Hardware Support
- Software Support

## Hardware

### Hardware Components

**Figure 4.7.2.2** shows the layout of the single cabinet comprising the subsystem. The controller section or DKC contains the Array Control Processor (ACP) pair(s), redundant power, cache memory, shared memory (SM), control panel, Service Processor (SVP), and Client Host Interface Processors (CHIPs) and batteries for cache and shared memory backup (BU). The disk drive section or DKU holds up to 128 disk drives.

**Figure 4.7.2.2** XP128 Cabinet Detailed View



## Features

The XP128 features the following:

- Fully redundant components, with no single point of failure
- Dynamically-duplexed cache with battery backup (BU)—cache is expandable from 2 GB up to 32 GB total capacity in 2-GB increments.
- Crossbar switch—fast, efficient, switching with direct point-to-point connections at 7.5 GB/sec.
- Shared memory—stores command and control data so that the entire amount of cache memory is available for quick access to user data. Shared memory is expandable from 512 MB to 3.0 GB in 512-MB increments.
- Power redundancy—two connections to AC power with different sources, using single-phase or three-phase in 50- or 60-Hz

### Client Host Interface Processors (CHIPs)

Client Host Interface Processors provide connections to host or servers that use the XP128 for data storage. CHIPs come in board pairs with a minimum of one pair and up to a maximum of three pairs of CHIPs per XP128 system. CHIP pairs available for use in the XP128 include:

- 4- and 8-port 1- to 2-Gbit Auto sensing Fibre Channel with Continuous Access support
- 8-port 1-Gbit Fibre Channel with Continuous Access support
- 8-port ExSA Channel (ESCON compatible)

### Array Control Processor (ACP)

The ACP performs reads and writes to the cache and cache reads and writes to the disks. The ACP also provides data protection through the use of RAID 0/1 mirroring and RAID 5 parity generation. The Array Control Processor (ACP) is configured in pairs for redundancy. The XP128 can have one of the following ACP configurations:

- one standard-performance ACP pair
- one high-performance ACP pair
- two high-performance ACP pairs

### Cache Memory

Cache memory is used to temporarily store data from the host until it is written to disk, or to stage data requested by the host from the disk. The XP128 base product comes standard with 2-GB cache and is expandable up to 32 GB in increments of 2 GB. All cache is backed up by a fully redundant 48-hour battery.

### Shared Memory

Shared memory is independent of the cache memory and is used to store tables, side files, and other information, thus freeing up the cache memory for user data. Shared memory is also used to store system configuration information. The configuration information includes system components mapping, LUN maps, cache pointers, and RAID levels. The base XP128 configuration contains 512 MB of shared memory and is expandable to a maximum of 3 GB of shared memory in increments of 512 MB.

### XP128 Disk Enclosures

The disk enclosures hold the disk drives. A single enclosure can hold up to 32 physical disks. There are four disk enclosures in each XP128. The disks in a single enclosure are connected to both the primary and secondary ACP channels by two separate Fibre Channel arbitrated loops.

### XP128 Disk Drives

The following table summarizes the specifications of the disk drives supported by the HP Surestore Disk Array XP128. All disks are dual ported with fibre channel interface.

<b>Disk Drive Specifications</b>	36 GB, 15K	73 GB
<b>Raw capacity (User area)</b>	35.76	72.91 GB
<b>Disk diameter</b>	2.5 inches	3 inches
<b>Rotation speed</b>	14,904 rpm	10,025 rpm
<b>Mean latency time</b>	2.01 ms	2.99 ms
<b>Mean seek time (Read/Write)</b>	3.8-4.2 ms	4.9 to 5.7 ms
<b>Internal data transfer rate</b>	68.5 to 88.3 MB/sec	44.2 to 74.0 MB/sec
<b>Interface type</b>	Dual-ported Fibre Channel	Dual-ported Fibre Channel

### AC Power Options

The XP128 is orderable with either three-phase or single-phase power at 50-Hz or 60-Hz.

### Server Connectivity

Like other members of the XP family, the XP128 connects to a variety of servers and operating systems. For details on which servers and operating systems are currently supported, please check the current listings at the following link “XP128/XP1024 Connectivity streams documents” at the URL below:

[http://turbo.rose.hp.com/spock/#Disk\\_Storage\\_Information](http://turbo.rose.hp.com/spock/#Disk_Storage_Information). This is an internal HP web site. Resellers will need to work with an HP contact to review the supported server and operating system information.

### Switch Support Details

The XP128 connects to the leading Fibre Channel switches in the industry today. For detailed information on supported switch configurations, please check the current listings at the following link “XP128/XP1024 Connectivity streams documents” at the URL below:

[http://turbo.rose.hp.com/spock/#Disk\\_Storage\\_Information](http://turbo.rose.hp.com/spock/#Disk_Storage_Information). This is an internal HP web site. Resellers will need to work with an HP contact to review the supported switch information.

### Reference Documents

For more information on the XP128 array and how it operates, please see [www.hp.com/support/XP128](http://www.hp.com/support/XP128)

## Configuration

### Steps Required for XP128 Configuration

Below is a list of the major steps involved in designing an XP128 array configuration. These are the steps associated with the array.

Configuring an XP array precisely can be an exacting challenge. For precise answers to technical details regarding optimal configurations, please contact the appropriate technical expert in your area.

1. Determine the total raw capacity of storage that will be required by the customer.
  - a. Determine the performance characteristics required by the customer
    - i. Will the customer want to maximize performance or minimize price per megabyte?
    - ii. Has the customer specified a particular drive capacity or rotational speed?
  - b. Determine the number and type of disk drives required
2. Determine the type of configuration and software to be required.
  - a. Will Continuous Access XP be required?
  - b. Will local copies using Business Copy XP be made?
  - c. How much of the storage will be configured in RAID 0/1?
  - d. How much of the storage will be configured in RAID 5?
3. Determine the number and type of hosts or switches that will connect to the array.
  - a. How many Fibre Channel ports will be required?
  - b. How many ExSA ports will be required?

When you have determined the answers to the above questions, you can follow the steps below to correctly configure an XP128.

### Configuration Steps

Using the table provided below configure an XP128 using the following steps.

1. Select the basic SSP product number A7875A for the XP128.
2. Select the Disk Control (DKC) product number A7876A for the XP128 and the desired power option.
3. Select the desired type and number of Array Control Processors (ACPs). For an entry-level configuration with up to 15 disk array groups (60 drives) and up to four spare drives, select the A7890A standard-performance ACP. Where higher performance is required (now or in the future) or where greater than 15 array groups are required, select the A7922A high-performance ACP. For applications where the highest performance is desired, configure two high-performance ACP pairs. Be sure to understand the upgrade rules described in the upgrade section of this configuration guide when making an ACP selection.
4. Configure at least one and not more than three CHIP pairs for connection of the XP128 to host processors or switches. If two high performance ACP pairs are to be configured, only two CHIP pairs may be configured. If the A7909A ExSA Channel CHIP is configured, then the software product T1617A Resource Manager XP must also be configured.
5. Configure the appropriate number and type of cables to connect the CHIPs to their respective hosts or switches. See **Table 4.7.2.6** below for a description of the types of cables available to match the CHIPs available with the XP128.
6. Configure the appropriate disk path expansion product. If one high performance ACP pair is ordered with more than 15 array groups, then add the XP128 Additional Disk Port Switch Set, A7893A. If two ACP pairs are ordered, then add the XP128 Disk Path Expansion Kit, A7894A.
7. Configure the desired amount of cache memory. See the table below to select the correct cache memory configuration.
8. Configure the desired amount of shared memory. See the table below to select the correct shared memory configuration.
9. Select the correct number of disk array groups. Note that a disk array group consists of four drives. The XP128 can support a mix of types of drive sizes and speeds.
10. Configure at least one spare drive for each drive type configured in the array.

11. Configure the appropriate software for the array using the XP Software Configuration guide found elsewhere in this book or on Electronic Sales Partner.
12. Confirm that there will be a workstation available at the customer site on which to run the software configured above. The specifications for the workstation are described below in the section “Specifications for Workstation for Command View”. The customer cannot run the XP software on the SVP processor. More than one array can be managed by the same workstation, so a workstation does not have to be dedicated to each array. There must be at least one workstation on which to run the Command View software, however.

**Product Structure**

**Table 4.7.2.1** shows the products and product numbers that make up the XP128. Product numbers ending with an “A” or an “S” are for purchase with a new system. Product numbers ending with a “U” are for purchase as an upgrade to existing disk arrays. If there is no “U” product number listed, the product cannot be purchased as an upgrade.

**Table 4.7.2.1 XP128 Product Structure**

Product Name and Configuration Rules	Product Number	Quote Description	Ordering Instructions
HP Disk Array XP128 SSP Solution	A7875A	HP Disk Array XP128 SSP Solution	One A7875A must be ordered to start each new XP128 configuration
XP128 Disk Control Frame with 2-GB Cache, 512-MB Shared Memory, Redundant Power Supplies for CHIP pairs 1-3, HP microcode, HP Continuous Track XP, Modem and pcAnywhere. Does not include basic ACP pair	A7876A	XP128 Disk Control Frame (DKC). Includes HP firmware, 2-GB cache, 512-MB shared memory, redundant power for CHIPS and Continuous Monitor XP software.	Required to configure a XP128 system. Must also order DKC power option, CHIP, ACP, Disk Array Group and a Spare Drive. DKC is always factory integrated, cannot be ordered as an upgrade.
3-phase 60-Hz for XP128	A7876A #001	3-phase 60-Hz configuration for XP128 DKC	Required for customers with 3-phase 60-Hz power
3-phase 50-Hz for XP128	A7876A #002	3-phase 50-Hz configuration for XP128 DKC	Required for customers with 3-phase 50-Hz power
Single-phase 60-Hz for XP128	A7876A #003	Single-phase 60-Hz configuration for XP128 DKC	Required for customers with single-phase 60-Hz power
Single-phase 50-Hz for XP128	A7876A #004	Single-phase 50-Hz configuration for XP128 DKC	Required for customers with single-phase 50-Hz power
XP1024/XP128 8-port ExSA Channel Adapter Pair	A7909A A7909U	8-port ESCON Serial Adapter (ExSA) Client-Host Interface Processor pair (CHIP pair) for mainframe connect. Two boards, four ports per board.	Compatible with XP1024 and XP128. Resource Manager XP software must be ordered if only ExSA CHIPS are configured in a XP array. Must use A5752A ESCON fibre optic cables. Maximum 3 CHIP pairs for XP128 with 1 ACP or maximum 2 CHIP pairs if 2 ACPs are configured.
XP1024/XP128 8-port 1 Gb/sec FC/CA Adapter Pair	A7910A A7910U	8-port 1 Gb/sec Short Wave Fibre Channel (FC) Client-Host Interface Processor pair (CHIP pair) for open systems connect. Interfaces are Non-OFC optical. Two boards, four ports per board.	Compatible with XP1024 and XP128. Does not support 2-Gb/sec protocol. Standard short wave FC cables with 1 Gb/sec SC form factor connectors required. Maximum 3 CHIP pairs for XP128 with 1 ACP or maximum 2 CHIP pairs if 2 ACPs are configured.
XP1024/XP128 4-port 1- to 2-Gb/sec Auto-sensing FC/CA CHIP Pair	A7911A A7911U	4-port 1 to 2-Gb/sec Auto-sensing Short Wave Fibre Channel (FC) Client-Host Interface Processor pair (CHIP pr) for open systems connect. Interfaces are Non-OFC optical. Two boards, two ports per board.	Compatible with XP1024 and XP128. Special short wave FC cables with 2 Gb/sec LC form factor connectors required. Maximum 3 CHIP pairs for XP128 with 1 ACP or maximum 2 CHIP pairs if 2 ACPs are configured.
XP1024/XP128 8-port 1- to 2-Gb/sec Auto-sensing FC/CA CHIP Pair	A7912A A7912U	8-port 1- to 2-Gb/sec Auto-sensing Short Wave Fibre Channel (FC) Client-Host Interface Processor pair (CHIP pr) for open systems connect. Interfaces are Non-OFC optical. Two boards, four ports per board.	Compatible with XP1024 and XP128. Special short wave FC cables with 2-Gb/sec LC form factor connectors required. Maximum 3 CHIP pairs for XP128 with 1 ACP or maximum 2 CHIP pairs if 2 ACPs are configured.

Product Name and Configuration Rules	Product Number	Quote Description	Ordering Instructions
XP1024/XP128 2-GB Cache Memory Module	A7918A A7918U	2 GB cache memory module. Data memory consists of four 512-MB DRAM modules	Compatible with XP1024 and XP128. 2 GB cache is included in XP128 DKC A7876A. Maximum allowable cache is 32 GB for XP128.
XP1024/XP128 512-MB Shared Memory Module	A7921A A7921U	512 MB Shared Memory Module. Control Memory consists of two 256-MB DRAM modules.	Compatible with XP1024 and XP128. 512-MB Shared Memory is included in base XP1024 DKC and XP128 DKC A7876A. Maximum allowable Shared Memory is 3072 MB for XP 128 and XP1024.
XP128 Array Control Processor (ACP) pair—Standard Performance	A7890A	Array Control Processor (ACP) pair—Standard-performance is composed of 2 PCBs with 4 ports/2 micro processors per PCB, providing 8 paths of FC-AL to connect between cache and disk drives.	Standard-performance ACP is only supported with XP128 and is used when price is an issue. Maximum one standard performance ACP with XP128. Factory integrated only.
XP1024/XP128 Array Control Processor (ACP) pair, High Performance	A7922A A7922U	Array Control Processor (ACP) pair—High-performance is composed of 2 PCBs with 4 ports/4 micro processors per PCB providing 8 paths of FC-AL to connect between cache and disk drives.	High performance ACP is compatible with XP1024 and XP128. Maximum 2 high performance ACP with XP128. When configuring XP128 with 2 ACPs must also configure XP128 Disk Path Expansion Kit A7894A and CHIP pairs are limited to 2 pair.
XP128 Additional Disk Port Switch Set	A7893A A7893U	Additional Disk Port Switch Set for increasing disk array group capacity for XP128 with only 1 high performance ACP pair.	Required, and only allowed, for XP128 with 1 high-performance ACP pair and with 16 or more disk array groups.
XP128 Disk Path Expansion Kit	A7894A A7894U	Disk Path Expansion Kit for supporting 2 ACP configurations for XP128.	Required, and only allowed, for XP128 with 2 high-performance ACP pairs. (A7922A). 2 or more disk array groups are required. CHIP pairs for XP128 will be limited to maximum 2 pairs with this kit installed.
XP1024/XP128 36-GB 15k rpm, FC Array Group—4 disks	A7928A A7928U	36-GB 15K RPM High Performance FC Disk Array Group. 4 drives per group.	Compatible with XP1024 and XP128. Must order minimum one 36-GB 15k rpm spare drive, A7928S, when XP128 or XP1024 is configured with 36 GB 15k rpm array group.
XP1024/XP128 73-GB 10k rpm, FC Array Group—4 disks	A7929A A7929U	73-GB 10K RPM FC Disk Array Group. 4 drives per group.	Compatible with XP1024 and XP128. Must order minimum one 73-GB 10k rpm spare drive, A7929S, when XP128 or XP1024 is configured with 73 GB 10k rpm array group.
XP1024/XP128 36-GB 15k rpm, FC Spare Disk Drive	A7928S A7928SU	36-GB 15K RPM High Performance FC Spare Disk	Compatible with XP1024 and XP128. Minimum one 36-GB 15k rpm spare drive required, and only allowed, when XP128 or XP1024 is configured with 36-GB 15k rpm array group A7928A.
XP1024/XP128 73-GB 10K rpm, FC Spare Disk Drive	A7929S A7929SU	73-GB 10K RPM FC Spare Disk	Compatible with XP1024 and XP128. Minimum one 73-GB 10k rpm spare drive required, and only allowed, when XP128 or XP1024 is configured with 73-GB 10k rpm array group A7929A.

### Cache Memory Requirements

The minimum amount of cache memory required is determined by the usable capacity of disk storage configured. The configured amount of cache memory for an XP128 must be at least the minimum shown in the table, and can be up to the maximum of 32 GB.

To determine the minimum amount of cache required, calculate the total amount of usable disk to be configured. Use the number and type of disk drives configured above and the table Array Group Data Storage GB and LDEV Capacity for RAID5 and RAID1 below to calculate the usable capacity of storage. Select the amount of cache as shown in the table below based on the usable capacity. For higher performance, additional cache may be configured. Remember the base XP128 comes with 2 GB of cache memory included.

**Table 4.7.2.2 XP128 Minimum Cache Requirements**

Data Storage Capacity (GB)	Required Minimum Cache (GB)	Number of Additional 2 GB modules to Order
Up to 160	2	0
161-700	4	1
701-1350	6	2
1351-2752	8	3
2753-5517	10	4
5518+	12	5

**Shared Memory Requirements**

Shared memory is used to store values internal to the operation of the array. Use the table below to specify the correct amount of shared memory for your configuration. The amount of shared memory required increases depending on the volume of cache memory, the number of LDEVs configured and whether Business Copy (BC) or Continuous Access (CA) are enabled. Configuring additional shared memory does not enhance the performance of the array and is not recommended by HP. If the customer desires to configure more than the recommended amount of shared memory, HP recommends that the full 3 GB of shared memory be configured, which configuration will support all possible LDEV combinations.

**Table 4.7.2.3 XP128 Shared Memory Requirements**

Cache Memory (GB)	Without BC or CA					With BC or CA				
	Minimum Shared Memory (MB)				Maximum	Minimum Shared Memory (MB)				Maximum
	Up to 1024 LDEV	1025 to 2048 LDEV	2049 to 4096 LDEV	4097 to 8192 LDEV		Up to 1024 LDEV	1025 to 2048 LDEV	2049 to 4096 LDEV	4097 to 8192 LDEV	
2	512	1536	1536	2048	3072	1024	2048	2048	2560	3072
4	512	1536	1536	2048	3072	1024	2048	2048	2560	3072
6	512	1536	1536	2048	3072	1024	2048	2048	2560	3072
8	512	1536	1536	2048	3072	1024	2048	2048	2560	3072
10	1024	1536	1536	2048	3072	1536	2048	2048	2560	3072
12	1024	1536	1536	2048	3072	1536	2048	2048	2560	3072
14	1024	1536	1536	2048	3072	1536	2048	2048	2560	3072
16	1024	1536	1536	2048	3072	1536	2048	2048	2560	3072
18	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
20	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
22	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
24	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
26	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
28	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
30	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072
32	1024	1536	2048	2560	3072	1536	2048	2560	3072	3072

BC = Business Copy XP software T1613AA or T1613AB

CA = Continuous Access XP software T1611AA or T1611AB

**Table 4.7.2.4 Array Group Data Storage (GB) and LDEV Capacity for RAID 5**

Emulation Type	OPEN Emulation					
	3	8 (NS)	9	E	L	M (NS)
<b>LDEV Capacity (GB)</b>	<b>2.461</b>	<b>7.347</b>	<b>7.384</b>	<b>14.568</b>	<b>36.450</b>	<b>47.185</b>
<b>Data Storage Capacity (GB)</b>	36 GB 15k Disk	105.82	Not supported	103.38 <sup>1</sup>	101.98	Not supported
	73 GB 10k Disk	218.56	Not supported	214.14	218.52	218.70 <sup>1</sup>
<b>LDEV</b>	36 GB 15k Disk	43	Not supported	14 <sup>1</sup>	7	Not supported
	73 GB 10k Disk	88	Not supported	29	15	6 <sup>1</sup>

<sup>1</sup> Factory default

**Table 4.7.2.5 Array Group Data Storage (GB) and LDEV Capacity for RAID 1**

Emulation Type		OPEN Emulation					
		3	8 (NS)	9	E	L	M (NS)
<b>LDEV Capacity (GB)</b>		<b>2.461</b>	<b>7.347</b>	<b>7.384</b>	<b>14.568</b>	<b>36.450</b>	<b>47.185</b>
<b>Data Storage Capacity (GB)</b>	36 GB 15k Disk	68.91	Not supported	66.46	58.27	Not supported	Not supported
	73 GB 10k Disk	145.20	Not supported	140.30	145.68	145.8	Not supported
<b>LDEV</b>	36 GB 15k Disk	28	Not supported	9	4	Not supported	Not supported
	73 GB 10k Disk	59	Not supported	19	10	4	Not supported

**FC Cables for Host or Switch connection**

**Table 4.7.2.6** shows the interdependencies between FC cable sets and CHIPS. Be sure to order sufficient cables to connect the configured CHIPS to their respective switches or host bus adapters.

**Table 4.7.2.6 XP1024/XP128 Host Cable to CHIP Compatibility**

Cable Product Number	XP1024/XP128 CHIP Pair		
	A7909A/U	A7910A/U	A7911A/A7912A/U
<b>A5750A FC</b>			
A5750A #001		X	
A5750A #002		X	
A5750A #003		X	
A5750A #004			X
A5750A #005			X
A5750A #006			X
A5750A #007		X	X
A5750A #008		X	X
A5750A #010		X	X
<b>A5752A ESCON</b>			
A5752A #001	X		
A5752A #002	X		
A5752A #003	X		
A5752A #004	X		
A5752A #005	X		
A5752A #006	X		
A5752A #007	X		
A5752A #008	X		

**Standard Performance versus High Performance ACP Selection**

The standard-performance ACP A7890A is intended for entry-level enterprise array applications where performance that is roughly 50% of the high-performance ACP pair is adequate for the customer application. Standard-performance ACP pairs support up to 15 disk array groups (up to 60 drives and four spare drives). Standard-performance ACP pairs can be upgraded in the field with an online upgrade to high-performance ACP pairs. Once such an upgrade is completed, the XP128 can support up to 31 disk array groups. The high-performance ACP A7922A is recommended where customers will need to expand to greater than 15 disk array groups and where high performance is required.

**Specifications for Management Station for Command View**

To operate any XP128 array, the array must be controlled using the Command View software. Command View runs on a Windows workstation per the specifications below. Multiple arrays can be managed using one workstation, therefore a unique workstation for each array is not a requirement. However, at least one workstation **MUST** be available to run Command View for the XP128 array somewhere in the customer's environment.

- Windows NT 4 SP5+ or Windows 2000
- 800-MHz CPU
- 512-MB RAM
- 350 MB free disk space; 350 MB additional per disk array to be managed
- Internet Explorer 5.0+ or Netscape 4.73+
- Java Runtime Environment 1.3.1 (installed automatically by Command View)
- If Performance Advisor is installed, an additional 2 GB of disk space will be required



## XP128/XP1024 Hardware and Software Support and Services

Figure 4.7.2.3 shows the different support offerings available for the HP Surestore XP128/XP1024 Disk Array.

Figure 4.7.2.3 Surestore XP128/XP1024 Disk Array Support Offerings

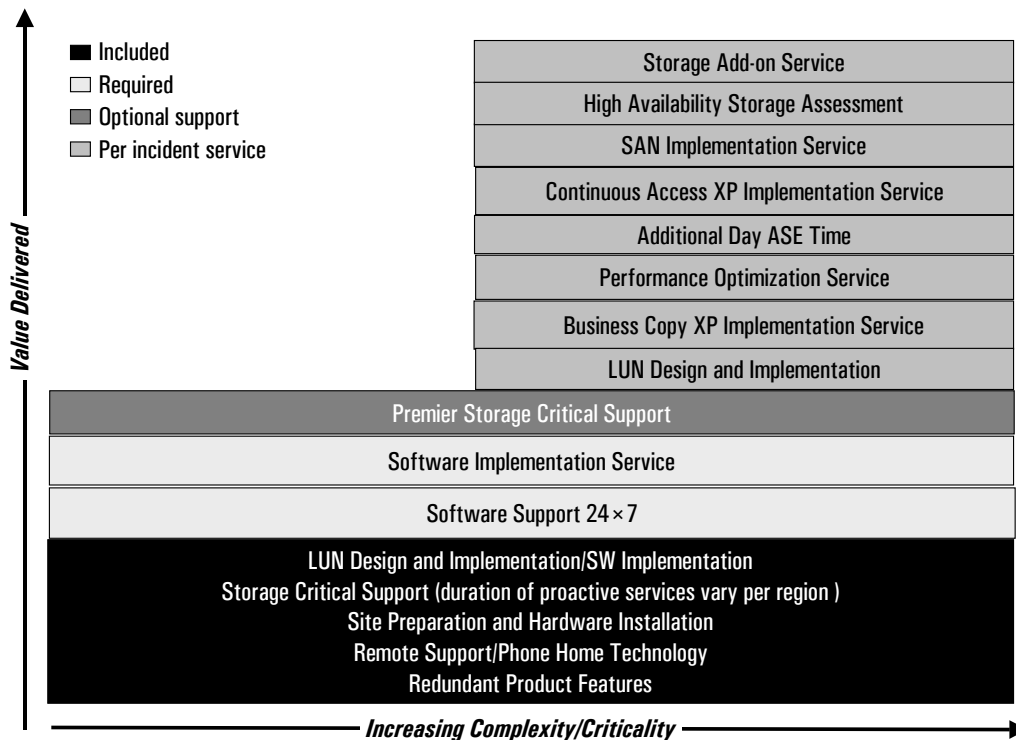


Table 4.7.2.7 Surestore XP128/XP1024 Warranty and Bundled Support and Services

XP128	XP1024
HW Site Prep/Installation (3 hours/9 hours) 1 hour per upgrade array group	HW Site Prep/Installation (3 hours/9 hours + 1 per DKU) 4 hours per upgrade DKU plus 1 hour per upgrade array group
LUN Configuration (15 hours on DKC, 6 hours on ACP Pairs and .25 hours on Array Groups) 2 hour bundled with every upgrade array group	LUN Configuration (15 hours on DKC, 6 hours on ACP Pairs and .25 hours on Array Groups) 2 hour bundled with every upgrade array group
Warranty level is Availability Support (2 years)	Warranty level is Availability Support (2 years)
ASE Start Up Services (20 hours)	ASE Start Up Services (20 hours)
ASE Core Services (36 hours)	ASE Core Services (36 hours)
Additional Services Hard bundled at the option of regional management (46 hours)	Additional Services Hard bundled at the option of regional management (46 hours)
Software Enablement (number of hours varies per title). Bundled in with each individual software title with these exceptions:	
<ul style="list-style-type: none"> <li>• Continuous Access (order instead H9273A-307 for open systems environments, H4726A-5DB for mainframe environments)</li> <li>• Business Copy (order instead H9273A-302 or 303 for open systems environments, H4726A-5DB for mainframe environments)</li> <li>• Cluster Extension XP for VCS, HACMP, Windows 2000 or MC/ServiceGuard (order instead H4726A-5DD)</li> </ul>	

## XP128/XP1024 Mainframe Software Ordering Information

As of August 1, 2002, the mainframe software titles for the XP128 and XP1024 have been added to the CPL. Software titles that run in XP512, XP48 and XP256 environments will not be put on the CPL and must be managed as local specials. Four hours of Software Enablement is needed for each software title. Four hours of SW Enablement have been bundled into the XP128/XP1024 mainframe software titles with these exceptions:

- Business Copy XP (T1613AA/AB/AC/AD)
- Continuous Access XP (T1611AA/AB/AC/AD)



Order H4726A-5DB for Software Enablement with Business Copy and Continuous Access.

H4726A-5DB must be ordered for four hours of Software Enablement with each software title in local specials.

### XP128/XP1024 Ordering Information

The following table summarizes support and services that can be purchased up front or via support agreements, during warranty and post-warranty.

Support Rules	During Warranty	Post Warranty			
	Year 1	Year 2	Year 3	Year 4	Year 5
Preferred Customer Experience: Premier Storage Critical Support, 1 Year <sup>1</sup>	H4394A	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3
Premier Storage Critical Support, 2 Years <sup>1</sup>	H4394J	Included (H4399K must be ordered in LAR)	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3
Premier Storage Critical Support, 3 Years <sup>1</sup>	H4394Y	Included (H4399K must be ordered in LAR)	Included	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3
Premier Storage Critical Support, 4 Years <sup>1</sup>	H4394G	Included (H4399K must be ordered in LAR)	Included	Included	H4394C A9267A + C00 U2370A + C00 02W H00 + H24 + L00 or SL3
Premier Storage Critical Support, 5 Years <sup>1</sup>	H4394H	Included (H4399K must be ordered in LAR)	Included	Included	Included
Storage Critical Support, 3rd Year <sup>2</sup> (Not for sale on XP256)	H4393W (This is the warranty level of support)	N/A (H4399K must be ordered in LAR)	Included	H4393C H9267A + T00 02M H00 + H24 + L00 or SL3	H4393C H9267A + T00 02M H00 + H24 + L00 or SL3
Storage Critical Support, 4 Years <sup>2</sup> (Not for sale on XP256)	H4393G	Included (H4399K must be ordered in LAR)	Included	Included	H4393C H9267A + T00 02M H00 + H24 + L00 or SL3
Storage Critical Support, 5 Years <sup>2</sup> (Not for sale on XP256)	H4393H	Included (H4399K must be ordered in LAR)	Included	Included	Included
Storage Critical Support (XP256 only) <sup>3</sup>	N/A H4399A or H4399J could be ordered for Proactive Services	N/A	U2417C H9267A + T00 02N H00 + H24 + L00 or SL3	U2417C H9267A + T00 02N H00 + H24 + L00 or SL3	U2417C H9267A + T00 02N H00 + H24 + L00 or SL3
Technical Account Services, 1 Year <sup>4</sup>	H4399A-300	H9267A + T00	H9267A + T00	H9267A + T00	H9267A + T00
Technical Account Services, 2 Years <sup>4</sup>	H4399J-300	Included	H9267A + T00	H9267A + T00	H9267A + T00
Technical Account Services, 2nd Year <sup>4</sup>	N/A	H4399K-300	H9267A + T00	H9267A + T00	H9267A + T00

Support Rules	During Warranty	Post Warranty			
Preferred Customer Experience:	Year 1	Year 2	Year 3	Year 4	Year 5
Software Support, 1 Year <sup>5</sup>	H4405A	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3
Software Support, 2 Year <sup>6</sup>	H4393J	Included	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3
Software Support, 3 Year <sup>7</sup>	H4405Y	Included	Included	H00 + H24 + L00 or SL3	H00 + H24 + L00 or SL3
LUN Design and Implementation <sup>8</sup>	H9273A-301	H9268A + T00	H9268A + T00	H9268A + T00	H9268A + T00
Business Copy Implementation Service <sup>8</sup>	H9273A-302 or H9273A-303	H9269A + T00 or H9270A + T00	H9269A + T00 or H9270A + T00	H9269A + T00 or H9270A + T00	H9269A + T00 or H9270A + T00
HP Performance Analysis for the XP Disk Array <sup>8</sup>	H9273A-304	H9271A + T00	H9271A + T00	H9271A + T00	H9271A + T00
Additional ASE Day <sup>8</sup>	H9273A-305 or 306	H9272A + T00 or H9275A + T00	H9272A + T00 or H9275A + T00	H9272A + T00 or H9275A + T00	H9272A + T00 or H9275A + T00
Continuous Access XP Implementation Service <sup>8</sup>	H9273A-307	H7373A + T00	H7373A + T00	H7373A + T00	H7373A + T00
XP Storage ASE Back Up/Recovery Service <sup>7</sup>	H9273A-308	H8384A + T00	H8384A + T00	H8384A + T00	H8384A + T00
HP Performance Tuning and Optimization for the XP Disk Array <sup>8</sup>	H9273A-309	U3593AA + T00	U3593AA + T00	U3593AA + T00	U3593AA + T00
SAN Implementation Service <sup>8</sup>	H9273A-380	H7384AA + T00	H7384AA + T00	H7384AA + T00	H7384AA + T00
SAN Implementation Extension <sup>8</sup>	H9273A-381	H7385A + T00	H7385A + T00	H7385A + T00	H7385A + T00
High Availability Storage Assessment Service <sup>8</sup>	H9273A-3A1, 3A2 or 3A3	H8386A + T00 H8387A + T00 H8388A + T00	H8386A + T00 H8387A + T00 H8388A + T00	H8386A + T00 H8387A + T00 H8388A + T00	H8386A + T00 H8387A + T00 H8388A + T00

 Purchased Up Front

 Purchased Contractually

- <sup>1</sup> Premier Storage Critical Support: Each package has a different time period to facilitate cost of ownership quoting. H4394A is for one year and pricing is incremental to the bundled support. H4394J is for two years and again, is incremental to the bundled support for the duration of the warranty. H4399K-300 will need to be ordered with H4394J in LAR. H4394Y is for three years and is priced as H4394J plus a full year of PSCS deliverables for the third years. H4399K-300 must be ordered with H4394Y in LAR. H4394G is for four years and is priced as H4394Y plus a fourth year of full PSCS deliverables. H4394H is priced as H4394G plus a fifth year of full PSCS deliverables. H4399K-300 must be ordered in LAR for both H4394G and H4394H. Contractually, PSCS is represented as H9267A + C00 for the first seven days of Proactive Services. U2370A + C00 is for the additional 12 days of Proactive Services. O2W is the hardware SPN and will be attached to each hardware goods product. Note: H4399K-300 does not need to be ordered in AP because they continue to bundle two years of Proactive Services with the XP128 and XP1024. H4399K-300 does not need to be ordered in NA or EMEA because they have taken the charge for this second year of Proactive Services, and have added it to option 300 of H4393W/G/H and H4394J/Y/G/H.
- <sup>2</sup> Standard warranty: 2 years. H4399K-300 can be ordered in LAR to add a second year of Proactive Services, which makes two full years of Storage Critical Support. H4393W can be purchased for a third year of SCS. H4393G is for four years of SCS and H4393H is for five years of SCS. H4399K-300 must be ordered in LAR for H4393W, H4393G and H4393H. Note: H4399K-300 does not need to be ordered in AP because they continue to bundle two years of Proactive Services with the XP128 and XP1024. H4399K-300 does not need to be ordered in NA or EMEA because they have taken the charge for this second year of Proactive Services, and have added it to option 300 of H4393W/G/H and H4394J/Y/G/H. Contractually, SCS is represented by H9267A + T00 for seven days of Proactive Services and O2M for the hardware SPN.
- <sup>3</sup> U2417A was created as a contractual SCS package for the XP256. O2N is the hardware SPN for this package. SCS cannot be purchased up front for the XP256.
- <sup>4</sup> Technical Account Services provide seven days of proactive services per year. H4399A can be ordered in EMEA, for example, if these services are debundled from the hard bundle. H4399J is for seven days for two years and can be ordered in AP, for example, if the proactive services are debundled from the XP hard bundle. H4399K is for a 2nd year, for those regions (today, only LAR) that bundle in one year of proactive services and would like to order a second for two full years of SCS ordered up front.
- <sup>5</sup> Software Support: 1 year. Software support is required on each and every software product. Software licenses are not transferable between arrays or between customers.
- <sup>6</sup> Software Support: 2 years. Software support is required on each and every software product. Software licenses are not transferable between arrays or between customers.
- <sup>7</sup> Software Support: 3 years. Software support is required on each and every software product. Software licenses are not transferable between arrays or between customers.
- <sup>8</sup> Technical Services are usually ordered up front at the time of the XP purchase. Some can be renewed or purchased contractually as well. If 305/306/309 are ordered in WATSON, and an SCS or PSCS package is purchased, the option will appear under the package. If it is purchased without an SCS or PSCS package, it will appear like the other Technical Services, under H9273A.

The following table summarizes the deliverables of the contractual SPNs.

SPN	Deliverable	Comments
<b>Hardware Services</b>		
02N	Availability Support	Storage Critical Support level hardware response time for XP256. Response is next business day.
02M	Storage Hardware Support	Storage Critical Support level hardware response time for all non-XP256 XP Disk Arrays. Response is within 24 hours.
02W	Premier Storage Hardware Support	Premier Storage Critical Support level hardware response time for all XP Disk Arrays. Response time is within 8 hours. This is not available for up-front purchase for the XP256 as it is obsolete.
<b>Technical Account Services for Storage</b>		
T00	Proactive Storage Technical Services	Contractual SPN that represents seven days of proactive time delivered by an ASE.
C00	Premier Proactive Storage Services	Contractual SPN that represents twelve days of proactive time delivered by an ASE for Premier Storage Critical Support.
<b>Software Services</b>		
H00	Phone-in Assistance; standard	Legacy SPN.
H24	Phone-in Assistance; 24 × 365	Legacy SPN. Must be ordered with H00.
L00	License to Use Updates	Legacy SPN.
B00	Software Media Updates	Legacy SPN.
D00	Software Documentation Update	Legacy SPN.
SL3	SW Updates and 24 × 365 Phone-in Assistance	New CATS number which replaces H00 + H24 + L00 + B00 + D00.

### Support Ordering Examples Years 1 through 5

#### Sample Sales Order (Hardware and Software Product Only)

Listed below is a typical hardware configuration for an XP1024 with 25 TB of disk. The used capacity for Business Copy is 10 TB. An XP128 has different product numbers, but the concepts for support configuration are the same.

Item Number	Product Number	Option	Quantity	Description
1	A7905A		1	HP Disk Array XP1024 SSP Solution
2	A7906A		1	XP1024 Disk Control Frame
3	A7906A	001	1	3-phase 60- or 50-Hz for XP1024
4	A7929A		85	XP 1024/XP128 73-GB 10K rpm, FC Array Group, 4 disks
5	A7929S		2	XP 1024/XP128 73-GB 10K rpm FC Spare disk drive
6	A7922A		2	XP1024/128 Array Control Processor (ACP) pair – High Performance
7	A7917A		1	XP1024 Additional CHIP Power Supply
8	A7912A		3	XP 1024/XP128 8-port 1-2 Gbit/sec Auto-sensing FC/CA CHIP Pair
9	A7918A		12	XP1024/XP128 2-GB Cache Memory Module
10	A7919A		1	XP1024 Cache Platform Board
11	A7921A		2	XP1024/XP128 512-MB Shared Memory Module
12	A7925A		2	XP1024 Disk Array Frame (DKU)
14	T1614AA		1	LUN Mgr/Secure Mgr. (Media and 1 TB LTU)
15	T1614AB		24	1-TB LTU (for 25 TB total)
16	B9357AC		1	Command View (Media and LTU)
17	B9369A		1	Performance Advisor XP (Media and LTU)
18	T1613AA		1	Business Copy (Media and 1-TB LTU)
19	T1613AB		9	1-TB LTU (for 10 TB total used capacity)

**Sample Sales Order (Years 1 – 3 Support and Services Products Only)**

*Note: H4394Y covers three years of Premier Storage Critical Support (PSCS). H4399K-300 must be ordered in EMEA, NA and LAR for a second year of the proactive services of SCS. Three years of software support are now included in H4394Y.*

Item Number	Product Number	Option	Quantity	Description
1	H4394Y <sup>2,3</sup>		1	Support – Premier Storage Critical Support, 3 Year
2		300	1	Support – Proactive Storage Services
3		8KD	1	Support – XP1024 Disk Control Frame
4		8KS	85	Support – 73-GB FC Array Group - 4 disks
5		8KT	2	Support – 73-GB FC Spare Disk Drive
6		8KM	2	Support – ACP pair- High Performance
7		8KH	1	Support – Additional CHIP Power Supply
8		8KG	3	Support – ExSA 8-port Channel Adapter Pr.
9		8KI	12	Support – 2-GB Cache Memory Module
10		8KJ	1	Support – Cache Platform Board
11		8KL	2	Support – 512-MB Shared Memory Module
12		8KN	2	Support – XP1024 Disk Array Frame
13		8EI	1	Support – LUN Configuration/Secure Manager LTU 1 TB (0-1)
14		8EJ	24	Support – LUN Configuration/Secure Manager Upgrade 1 TB (2-6)
15		8FO	1	Support – Command View XP
16		8EG	1	Support – Performance Advisor XP
17		8FX	1	Support – Business Copy Base License 1 TB
18		8FY	9	Support – Business Copy Upgrade 1 TB (2-6)
19	H4399K <sup>3</sup>		1	Support – Storage Critical Support, 2nd Year
20		300	1	Support – Storage Critical Support, 2nd Year
21	H9273A <sup>2</sup>	380	1	SAN Implementation Service
22	H9273A <sup>1</sup>	302	1	Business Copy Implementation Service

<sup>1</sup> Required

<sup>2</sup> Recommended

<sup>3</sup> H4399K-300 would also need to be ordered in LAR for a second year of Proactive Services.

**Sample Contract (Years 4, 5 and beyond)**

*Note: SAN Implementation and Business Copy Implementation are per incident services that are not renewed on the support agreement.*

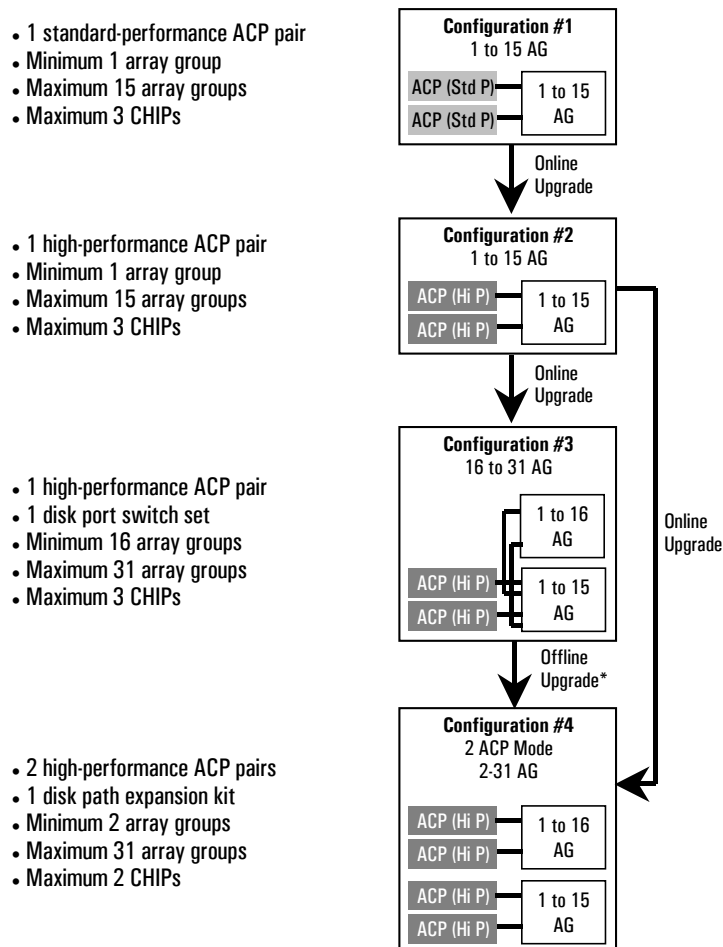
Item Number	Product Number	Option	Quantity	Description
1	H9267A	C00	1	XP Storage Technical Services
2	U2370A	C00	1	Premier Storage Services, XP
3	A7905A	02W	1	Premier Storage Critical Reactive Support
4	A7906A	02W	1	Premier Storage Critical Reactive Support
5	A7929A	02W	85	Premier Storage Critical Reactive Support
6	A7929S	02W	2	Premier Storage Critical Reactive Support
7	A7922A	02W	2	Premier Storage Critical Reactive Support
8	A7917A	02W	1	Premier Storage Critical Reactive Support
9	A7912A	02W	3	Premier Storage Critical Reactive Support
10	A7918A	02W	12	Premier Storage Critical Reactive Support
11	A7919A	02W	1	Premier Storage Critical Reactive Support
12	A7921A	02W	2	Premier Storage Critical Reactive Support
13	A7925A	02W	2	Premier Storage Critical Reactive Support
14	A7926A	02W	1	Premier Storage Critical Reactive Support
15	T1614AA	SL3	1	SW Updates and 24 × 365 Phone In
16	T1614AB	SL3	24	SW Updates and 24 × 365 Phone In
17	B9357AC	SL3	1	SW Updates and 24 × 365 Phone In
18	B9369A	SL3	1	SW Updates and 24 × 365 Phone In
19	T1613AA	SL3	1	SW Updates and 24 × 365 Phone In
20	T1613AB	SL3	9	SW Updates and 24 × 365 Phone In

## XP128 Upgrades

The XP128 Disk Array can be upgraded to provide greater capacity, performance and connectivity. This section describes the various upgrades possible with the XP128. Careful planning at the time of initial purchase of the array will help in executing the most desirable XP128 upgrades for the customer.

All upgrades for XP128 systems must be structured under the A7873A HP Disk Array XP1024/XP128 Upgrade SSP. The components of the XP128 that can be upgraded or expanded include the Array Control Processors, the number and type of disks, the CHIP pairs, cache memory and shared memory. Products that can be added to the XP128 are described above in the Product Structure section with product numbers that end with a letter “U”. All upgrades for the XP128 are added to the single physical frame. Additional frames cannot be added to XP128. If disk space for more than 128 disk drives is a requirement, then the XP1024 should be considered.

**Figure 4.7.2.4 XP128 Configurations—Relationship Between AGs, ACPs, CHIPS, Disk Port Switch and Disk Path Expansion**



\* Requires backup and reformat of disks and reload of data  
AG=Array Group of 4 disks

The same configuration guidelines and maximums that are used in configuring new systems must be followed for upgrades. In addition to these rules, there is one additional significant rule for upgrades. This rule is illustrated in the diagram above, which shows supported upgrades. The key rule is that upgrading from one high performance ACP pair with greater than 64 disks to two high-performance ACP pairs requires an OFFLINE time-consuming upgrade. (All data must be copied to tape or a different array. The disks are physically reconfigured within the array, disks must be reformatted and then the data reloaded. For most configurations, this will require a substantial period of downtime. HP recommends that users plan the growth path of their XP128s to avoid having to perform such an upgrade, if possible.)

### Steps to Configure an XP128 Upgrade

1. Determine the nature of the upgrade. Upgrades will typically increase capacity, performance, connectivity or a combination of capacity, performance and connectivity.
2. To upgrade any XP128, you must first know the array controller pair configuration, the number of currently installed disk array groups, the number of installed CHIP pairs, the amount of installed cache memory, the amount of shared memory, the number of configured LUNs and whether BC or CA software is installed.
3. To upgrade capacity, specify additional disk array groups up to the limits described above, depending on the number and type of ACPs currently installed. Drives of different capacities and rotational speeds may be configured in the same array. At least one spare drive must be configured for each type and speed of drive configured in the same XP128.
4. Either order additional cache to support the additional disk array groups, or verify that there is sufficient cache memory installed to support the additional disk array groups, per the XP128 Minimum Cache Requirement table included above.
5. Order additional Shared Memory to support the additional LUNs that will be created on the new disk array groups, to support the additional cache memory to be ordered, or to support a software upgrade for the first installation of BC or CA software, per the XP128 Shared Memory Requirements table above.
6. To increase performance, customers can upgrade from a standard-performance ACP pair to a high-performance ACP pair. If customers already have one high-performance ACP pair installed, they may add a second ACP pair. Please be sure to note the upgrade impacts as described below for configurations with greater than 64 drives. Generally, if a customer is going to upgrade beyond 64 drives, they should plan the upgrade path in advance to avoid the need to upgrade from one ACP pair to two after they have crossed the 64-drive threshold. For some customers, the required off-line period of up to several days may be unacceptable and therefore must be avoided.
7. When expanding to beyond 64 drives, be sure to specify either the A7893A Additional Disk Port Switch set for configurations with one High Performance ACP, or the A7894A Disk Path Expansion kit for configurations where two High Performance ACP pairs are configured. Please note, when there are two ACP pairs configured, only two CHIP pairs may be configured in the same XP128.
8. To expand connectivity, additional CHIP pairs may be installed. The XP128 can hold up to three CHIP pairs, except where two ACP pairs are installed. With two ACP pairs installed only two CHIP pairs may be installed.

### Miscellaneous

**Table 4.7.2.8 XP128 Glossary of Terms and Abbreviations**

Term	Definition
ACP	Array Control Processor. Synonymous with the term Disk Adapter (DKA). The ACP is a PCB used for data transfer control between disk drives and cache memory. There are four ports per PCB. Ports are controlled by their respective microprocessors, and data are transferred concurrently between four ports and disk drives. Standard-performance ACPs have two microprocessors per PCB. High-performance ACPs have four microprocessors per PCB (1 microprocessor per port). ACPs work in pairs, providing a total of 8 FC buses. Each FC bus associated with one ACP is paired with a FC bus on the other ACP pair element. In the event of an ACP failure, the redundant ACP takes control. Both ACPs work together sharing the load.
Array Group	Physical disk drives contained in a RAID group. For XP platforms there are four physical disks in a RAID group. XP128 array groups can be comprised of 10k rpm drives or 15k rpm drives. Higher rpm drives are used for high performance applications.
BC	The HP Surestore Business Copy XP software program that lets you maintain internal copies of a logical volume on the disk array. Multiple logical volumes may be copied with up to nine copies per volume supported.
CA	The HP Surestore Continuous Access XP software program that mirrors data in real time to a remote disk array.
Cache	Very high-speed memory that is used to speed I/O transaction time. All reads and writes to the XP array family are sent to the cache. The data is buffered there until the transfer to/from physical disks (with slower data throughput) is complete. The benefit of cache memory is that it speeds I/O throughput to the application. The larger the cache size, the greater the amount of data buffering that can occur and the greater throughput to the applications. In the event of power loss, the contents of the cache boards are battery backed up to be retained for 48 hours. Write data is duplicated so that data loss does not occur even when a failure of one cache component occurs. Cache memory on the XP 128 and 1024 is composed 512-Mb DRAM modules
Channel Adapter (CHA)	This term is used synonymously with the term channel host interface processor (CHIP).
Channel Host Interface Processor (CHIP)	The channel host interface processor is a PCB used for data transfer control between the host and cache memory. The XP1024/128 disk arrays support Fibre Channel (FC/AL) for open systems and ESCON (ExSA) interfaces for mainframe connection. The Fibre Channel CHIP is also used for connecting multiple disk arrays when using the CA software. Synonymous with the term channel adapter (CHA)
Disk Port Switch	Installed in the DKU for data and control to the disks from the ACPs.

<b>Term</b>	<b>Definition</b>
Disk Adapter (DKA)	Synonymous with the term Array Control Processor (ACP)
Disk Controller Unit (DKC)	The disk controller unit refers to the array hardware which houses the channel adapters, cache, SM, ACPs and service processor (SVP). For the XP128, the DKC is the front side of the disk array physical frame. For the XP1024, the DKC is a single physical frame. There is only one DKC for either disk array.
Disk Cabinet Unit (DKU)	The disk cabinet unit refers to the array hardware that houses the physical disks in the array. For the XP128, the DKU is the rear side of the disk array physical frame. For the XP1024, the DKU is one to four physical frames. The XP1024 DKU cabinets are referenced as follows: R1, R2, L1, L2 where R is right side and L is the left side facing the front of the array. Location 1 is next to the DKC and location 2 is on the opposite side of the first DKU on a side from the DKC. Each XP1024 DKU can contain up to 256 disk drives. DKU in position R1 supplies AC power for the DKC in a 3-phase power configuration.
Emulation Modes	In the XP family each array group of disks is logically divided into multiple units of equal size. The Emulation mode specifies the size of these units. The logical devices (LDEVs) associated with each RAID group must be assigned one of the following emulation modes: OPEN-3: 2.46 GB OPEN-9: 7.42 GB OPEN-E: 13.56 GB OPEN-L: 36 GB
ESCON	Enterprise System Connection (the IBM trademark for optical channels)
ExSA	Extended serial adapter. A CHIP that supports ESCON
FC	Fibre Channel.
FC Cable Sets	A set of copper FC data cables and control cables required to connect the Disk Port Switches in a DKU to the ACPs in the DKC. Data and control cables cascade from DKUs in position R1 and L1 to DKUs in position R2 and L2 respectively.
FSW	Fibre Switch. A PCB component of the Disk Port Switches installed in the DKU that connects the disks to the ACPs via the FC Cable sets.
GB	Gigabyte, 1,000,000,000 bytes
HW	Hardware.
Hz	Hertz, cycles per second
LDEV	Logical device. An LDEV is created when a RAID array group is carved into pieces according to the selected host emulation mode (that is, OPEN-3, OPEN-8, OPEN-9, etc). The number of resulting LDEVs depends on the selected emulation mode, the size of the disk drives in the array group and the type of RAID selected for the RAID group. For example, if four 73 GB disk drives are combined in a RAID 1 array group, there will be 146 GB of available capacity. Using Open-3 emulation that array group could be divided into approximately 59 LDEVs.
MB	Megabyte, 1,000,000 bytes
Port	Host cable interface on the CHIP or FC loop connection on an ACP.
RAID	Redundant array of inexpensive disks.
RAID Group	A RAID group is a mode of disk operation and configuration. RAID groups 1 to 5 vary in the number of bits used in data/parity encoding, mirroring, and striping features. You may occasionally see the term parity group and array group used synonymously with RAID group.
Shared Memory (SM)	Stores the shared information about the subsystem and the cache control information (directories). This type of information is used for the exclusive control of the subsystem. The size of shared memory is determined by the amount of cache memory, number of control units (CUs) and whether the BC or CA software is installed.
SISP	Solution Integration Service Plan. The SISP is a web-based tool that provides a means to send hardware and software configuration information direct to the factory if default integration is not desired.
SSP	Structured Solution Program. A vehicle to implement marketing strategies and provides a process to integrate multiple products to provide business solutions to customers.
SVP	Service Processor. The SVP consists of laptop PC mounted in the DKC. The SVP monitors the running condition of the subsystem and provides diagnostic and service tools for field support engineers. Connecting the SVP to a service center via integral modem enables remote maintenance. The SVP is for trained support engineers, it is not customer usable. In the even of an SVP failure, the disk array will continue to deliver all data services. Depending on the specific details of the SVP failure, management station software (such as Command View and Performance Advisor) may not function. Management of BC and CA devices using RAID Manager is not impacted by an SVP failure.
SVP High Reliability Support Kit	This kit provides a high reliability configuration for the SVP using a duplicate the SVP PC. It consists of a second laptop PC and automatic fail over logic.
SW	Software
System	An XP Disk Array configured under a Solution SSP. Also known as a Storage subsystem.
TB	Terabyte