

HP StorageWorks Disk Arrays XP128/XP1024 Owner's Guide

fifth edition (July 2005)

part number: A7906-96012

This guide describes the general operations, components, specifications, and options for the HP StorageWorks Disk Array XP128 and Disk Array XP1024.



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About this guide

This guide is for use by system administrators who have expertise in:

- Disk arrays and RAID technology
- Operating system commands and utilities
- Data processing concepts
- Direct-access storage device subsystems and their basic functions

This document describes the general operations, components, specifications, and options for the HP StorageWorks Disk Array XP128 and XP1024.

Unless otherwise noted, the term *disk array* refers to the HP StorageWorks XP128 and/or XP1024 Disk Array.

Related information

In addition to this guide, please refer to other documents for this product:

- *HP StorageWorks Command View XP for XP Disk Arrays: User Guide*
- *HP StorageWorks Disk Array XP128 Site Preparation Guide*
- *HP StorageWorks Disk Array XP1024 Site Preparation Guide*
- *HP StorageWorks XP Remote Web Console User Guide*
- *HP StorageWorks Command View XP Advanced Edition for XP Disk Arrays User Guide*
- *HP StorageWorks Disk Array XP Operating System Configuration Guide* (various operating systems)

To locate these documents, to learn more about HP software products, or to obtain software updates, visit the HP web site:

<http://h18006.www1.hp.com/storage/xparrays.html>

Document conventions and symbols

Table 1. Document conventions

Convention	Element
Blue text (Figure 1)	Cross-reference links
Bold	Menu items, button names, key names, tab names, and group box names
<i>Italics</i>	Text emphasis and document titles
<u>Blue underlined sans serif font</u> (www.hp.com)	Web site addresses

Caution Indicates that failure to follow directions could result in damage to equipment or data.



Warning

Indicates that failure to follow directions could result in injury or death.

HP technical support

In North America, call technical support at 1-800-633-3600, available 24 hours a day, 7 days a week.

Outside North America, call technical support at the location nearest you. The HP web site lists telephone numbers for worldwide technical support at: <http://www.hp.com/support>. From this web site, select your country.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages

- Operating system type and revision level
- Detailed questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the Subscriber's choice web site at <http://www.hp.com/go/e-updates>. Subscribing to this service provides you with email updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.

HP storage website

For the most current information about HP StorageWorks XP products, visit: <http://h18006.www1.hp.com/storage/arraysystems.html>.

For information about product availability, configuration, and connectivity, contact your HP support representative.

HP sales and authorized resellers

To reach HP sales or find a local authorized reseller of HP products, call 1-800-282-6672 or visit the HP How To Buy web site:

<http://welcome.hp.com/country/us/en/howtobuy.html>

You can also find HP sales and resellers at <http://www.hp.com>. Click **Contact HP**.

Helpful web sites

For third party product information, see the following web sites:

<http://www.hp.com/go/storage>

<http://www.hp.com/support>

Revision history

May 2002	First Edition
Oct. 2002	Second Edition
May 2004	Third Edition
May 2005	Fourth Edition
July 2005	Fifth Edition

Overview

The Disk Array XP128 and Disk Array XP1024 are part of the HP StorageWorks Disk Array family of products. These disk arrays provide reliable and secure data storage and protection, featuring redundant circuitry and RAID storage options for data security. These disk arrays also support multiple operating systems, platforms, and RAID groups. The advantages include:

- Continuous data availability
- Nondisruptive service and upgrades
- Connectivity
- Scalability
- Data integrity

Continuous data availability

The HP StorageWorks Disk Array XP family are the first RAID disk arrays to provide truly continuous data availability. They are designed for nonstop operation and continuous access to all user data.

HP StorageWorks Disk Array XP128 and XP1024 disk arrays have no single point of component failure, which enables uninterrupted access to data.

The disk array has component and function redundancy, providing full fault tolerance for disk array microprocessors, control storage, control and data buses, power supplies, and cooling fans. The disk array can sustain multiple component failures and still continue to provide full access to your stored data.

While access to your data is never compromised, the failure of a key component can cause a temporary reduction in disk array performance.

Nondisruptive service and upgrades

Monitoring software detects internal hardware component problems and notifies the HP Storage Technology Center automatically. At the support center, the problem is verified and the appropriate maintenance activity is executed by an HP service representative. There are no user serviceable components. Only an HP service representative should open the cabinets.

All hardware subassemblies can be removed, serviced, repaired, or replaced non-disruptively during disk array operation. All microcode upgrades can be performed during normal disk array operations (provided array connectivity infrastructure requirements are satisfied), using your disk array's built-in service processor (SVP). Alternate paths can be set by host failover software and/or alternate Fibre Channel paths.

Connectivity

The HP StorageWorks Disk Array XP128 and HP StorageWorks Disk Array XP1024 are connected to host systems using one of these types of connections:

- Fibre Channel
- ESCON
- FICON
- iSCSI

Fibre Channel connectivity

HP StorageWorks Disk Array XP128

The XP128 supports a maximum of three pairs of channel adapters that can support up to 48 Fibre Channel ports. Your disk array can support up to 8,192 LDEVs which can be configured as up to 24,576 LUNs through the Fibre Channel. The Fibre Channel provides data transfer rates up to 2GB/sec depending on which Fibre Channel interface option is installed. The disk array can support Fibre Channel Arbitrated Loop (FC-AL) and Fabric Fibre Channel topologies.

HP StorageWorks Disk Array XP1024

The XP1024 supports a maximum of four pairs of channel adapters that can support up to 64 Fibre Channel ports. Your disk array can support up to 8,192 LDEVs which can be configured as up to 32,768 LUNs through the Fibre Channel. The Fibre Channel provides data transfer rates up to 2GB/sec depending on which Fibre Channel interface option is installed. The disk array can support Fibre Channel Arbitrated Loop (FC-AL) and Fabric Fibre Channel topologies.

ESCON connectivity

HP StorageWorks Disk Array XP128

The XP128 supports a maximum of three pairs of channel adapters that can support 24 ESCON ports for connection to mainframe hosts. The disk array can support up to 8,192 LDEVs.

HP StorageWorks Disk Array XP1024

The XP1024 supports a maximum of six pairs of channel adapters that can support 48 ESCON ports for connection to mainframe hosts. The disk array can support up to 8,192 LDEVs.

Note: When more than four pairs of ESCON channel adapters are configured, the number of disk drives that can be installed is reduced. Other restrictions may apply, depending on what other types of channel adapters are installed.

FICON connectivity

HP StorageWorks Disk Array XP128

The XP128 supports a maximum of three pairs of channel adapters that can support up to 24 FICON ports. The disk array can support up to 8,192 LDEVs.

HP StorageWorks Disk Array XP1024

The XP1024 supports a maximum of four pairs of channel adapters that can support up to 32 FICON ports. The disk array can support up to 8,192 LDEVs.

iSCSI connectivity

HP StorageWorks Disk Array XP128

The XP128 supports a maximum of three pairs of channel adapters that can support up to 24 iSCSI ports. The disk array can support up to 6,144 LDEVs through iSCSI.

HP StorageWorks Disk Array XP1024

The XP1024 supports a maximum of four pairs of channel adapters that can support up to 32 iSCSI ports. Your disk array can support up to 8,192 LDEVs through iSCSI.

Data integrity

HP disk arrays provide the highest levels of data integrity. This is accomplished using RAID technologies, together with redundant hardware throughout the disk array. The following hardware features allow the HP StorageWorks Disk Array XP family to achieve its high availability and data integrity:

- RAID1, RAID5
- Mirrored write cache
- Dual channel adapters (CHAs) and array control processors (ACPs)
- Dual and concurrently active data and control paths through the array
- Split power domains on internal data paths
- Hot-pluggable boards
- Hot-pluggable fans, power supplies, and controllers
- Online upgradable firmware

Some of the available software features and products that complement the disk array hardware are listed below:

- HP StorageWorks Disk Array XP128 support
 - “Phone Home” capability to the multidisciplinary Storage Technology Center
 - advanced remote diagnostics
 - full solution (Host-SAN-Storage) support
- Full software and solution integration
 - local and remote mirroring for online backup and disaster recovery (HP StorageWorks Business Copy XP and Continuous Access XP)
 - security for multiple server consolidation (HP StorageWorks LUN Configuration and Security Manager XP)
 - zero downtime backup (HP OmniBack, Exchange, Oracle, or SAP)
 - centralized resource management (HP StorageWorks Remote Web Console XP, HP StorageWorks Command View XP, HP StorageWorks SAN Manager LM/DM, Performance Advisor XP and Auto LUN XP)
- I/O path failover and load balancing (HP StorageWorks AutoPath XP). To obtain updates to the software, go to the following main web site and access the appropriate support product:

<http://www.hp.com>

Summary of features

Table 2. XP128 and XP1024 Features

Feature	XP128	XP1024 with XP1024 & XP512 DKU Support	XP1024 XP1024 DKU Support
Power	Single-phase or 3-phase		Single-phase or 3-phase
DKC/DKU	Single cabinet unit only (no expansion)	One DKC with either: 1 or 2 XP1024 DKUs, and 1 to 3 XP512 DKUs	One DKC cabinet with 1 to 4 XP1024 DKU cabinets
Maximum hard disk drives	128	768	1024
Maximum spare disk drives	4	16	16
Maximum parity groups/subsystem	31	191	255
Maximum Disk Drive Capacity	36 TB	121 TB	149 TB
Max. cache	64 GB	128 GB	128 GB

(continued)

Table 2. XP128 and XP1024 Features (Continued)

Feature	XP128	XP1024 with XP1024 & XP512 DKU Support	XP1024 XP1024 DKU Support	
Available hard disk drives	73GB 10K rpm Fibre Channel disk drive	73GB 10K rpm Fibre Channel disk drive	73GB 10K rpm Fibre Channel disk drive	
	36GB 15K rpm Fibre Channel disk drive	47GB 10K rpm Fibre Channel disk drive1	36GB 15K rpm Fibre Channel disk drive	
	73GB 15K rpm Fibre Channel disk drive	18GB 10K rpm Fibre Channel disk drive1	73GB 15K rpm Fibre Channel disk drive	
	146GB 10K rpm Fibre Channel disk drive	18GB 15K rpm Fibre Channel disk drive1	146GB 10K rpm Fibre Channel disk drive	
	300GB 10K rpm Fibre Channel disk drive		181GB 7200 rpm Fibre Channel disk drive1	300GB 10K rpm Fibre Channel disk drive
			36GB 15K rpm Fibre Channel disk drive2	
			73GB 15K rpm Fibre Channel disk drive2	
			146GB 10K rpm Fibre Channel disk drive2	
300GB 10K rpm Fibre Channel disk drive2				
		1XP512 DKU Only 2XP1024 DKU Only		
Max shared memory	4.0 GB	4.0 GB	4.0 GB	

(continued)

Table 2. XP128 and XP1024 Features (Continued)

Feature	XP128	XP1024 with XP1024 & XP512 DKU Support	XP1024 XP1024 DKU Support
Max ACP pairs	2	4	4
Max CHIP pairs	3 2 if >1 ACP pair installed	4	4
Configuration disk	XP128-specific	XP1024-specific	XP1024-specific
SVP code	XP128-specific	XP1024-specific	XP1024-specific
High Availability SVP	Optionally Available	Optionally Available	Optionally Available
RAID level	RAID 1 (2D+2D) RAID 1 (4D+4D) RAID 5 (3D+1P) RAID 5 (7D+1P)	RAID 1 (2D+2D) RAID 1 (4D+4D)* RAID 5 (3D+1P) RAID 5 (7D+1P)*	RAID 1 (2D+2D) RAID 1 (4D+4D) RAID 5 (3D+1P) RAID 5 (7D+1P)
Maximum LDEV #	8192	8192	8192
Available LUNs	24,576	32,768	32,768
Maximum LU #/port	512	512	512
*XP1024 DKU supported only.			

XP128 hardware

General safety guidelines

Read the following safety guidelines carefully and follow them when you work with the HP StorageWorks Disk Array XP128 disk array.

- Remember that the maintenance of your machine must be done only by trained and qualified HP field engineers. Only an HP service representative can power off the disk array in a non-emergency situation.
- Please read and follow the safety guidelines and procedures in this manual and you other disk array manuals.
- In this manual and on the machine, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- The hazard warnings that appear on the warning labels on the machine or in the manual have one of the following alert headings consisting of an alert symbol and a signal word, “**Warning**,” or “**Caution**”:



Warning

This indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

Caution

This indicates a hazardous situation which, if not avoided, will or can result in serious damage to the product or loss of data.

- The signal word “NOTICE” is used to present warnings that are not directly related to personal injury hazards.
- When warning labels become dirty or start peeling off, replace them.
- If any physical accident such as abnormal noise, smell, or smoke occurs on the disk array while it is running, immediately power off the disk array by pulling the UNIT EMERGENCY POWER OFF switch on the disk array.

- Do not power off the system unless it is an emergency power-off situation.
- Keep the front and rear doors closed at all times.
- Keep the tops and sides of the cabinets clear to allow air to flow properly.
- Do not perform any procedures not described in this document. If you have any questions or concerns, please contact your HP service representative.



Warning

Do not touch areas marked HAZARDOUS, even with the power off. These areas contain high-voltage power.

Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances before hand.

Follow the procedures in this guide carefully and always be alert for any unusual equipment indications or behavior. If you have any questions, contact your HP service representative.

Physical components

The HP StorageWorks Disk Array XP128 is a high-performance disk array system. It is used to store large quantities of data in an efficient and secure manner.

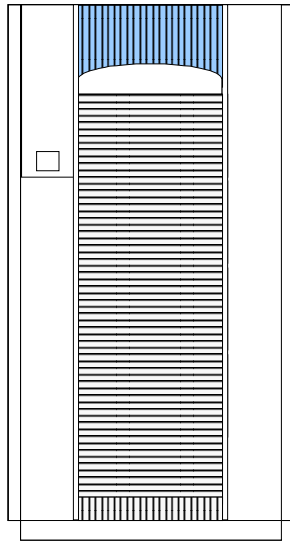


Figure 1. HP StorageWorks Disk Array XP128

Your disk array has the following major hardware components:

- Disk array cabinet

The single disk array frame cabinet contains the control panel, connection hardware, the service processor, control boards and hard disk drives.

- One service processor (SVP)

The service processor (SVP) is a built-in PC inside the disk array cabinet. The SVP gives your HP service representative a method of accessing the software system on the disk array.

Your HP service representative uses the SVP to configure, maintain, and upgrade your disk array software and hardware. The service

processor also collects performance data about the disk array for diagnostic testing and analysis.

To ensure data security, the SVP does not have access to any user data stored on the disk array.

- *(Optional)* second service processor

This is available for users with extreme high availability requirements. This is not a required feature.

- Control panel

The control panel is your view of the disk array. Once the disk array is powered on and running normally, there are no user operations required at the control panel, except in the case of a power failure recovery. The control panel is discussed in further detail on [page 29](#).

- Hard disk drives

The disk array uses 3.5-inch disk drives, and different disk capacities are available. Ask your HP service representative about currently available disk drives or visit the XP128 web site at <http://www.hp.com>. Any of the disk drives in the disk array frames can be replaced without disrupting user activity. The disk array automatically detects and corrects disk errors.

- *(Optional)* Device Manager server

The Device Manager server is attached to your disk array by a local area network (LAN) connection. The Device Manager server runs HP Command View XP and/or Command View XP Advanced Edition which, combined with other optional applications, allows you to monitor and manage disk array operations.

The following figure illustrates how the Device Manager server and host connect to the XP128.

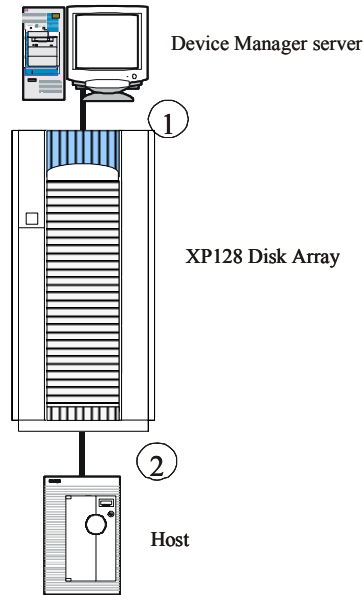


Figure 2. The XP128 connections

1. The management station connects to the XP128 by means of a public LAN connection. The XP128 has an Ethernet connection for this purpose.
2. The host server uses a Fibre Channel, FICON, iSCSI, or ESCON connection.

The hardware requirements for your Device Manager server, such as the required processor speed, storage capacity, and memory, will vary depending on the optional software that you use and the number of disk array frames you have connected to the system.

To ensure data security, neither edition of HP Command View software (CVXP or CVXP AE) has access to any user data stored on the disk array.

There is no single point of failure in the disk array. It is designed with redundant logic assemblies, disk drives and power supplies, all of which can be removed or replaced without interrupting access to your data.

Caution *Only your HP service representative can remove or replace hardware.*

Control panel

Figure 3 and Table 3 on page 30 show the control panel and its functions, respectively.

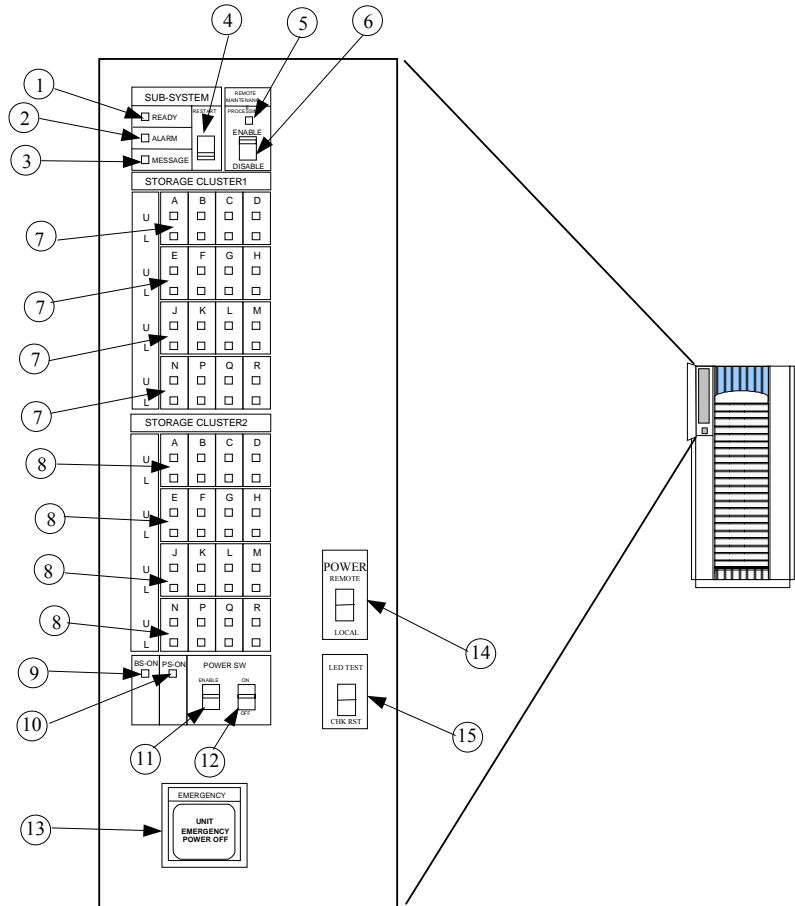


Figure 3. Control Panel

Table 3. Control or indicator function on control panel

Item	Label	Indicator	Description
1	SUBSYSTEM READY	LED (Green)	Indicates that channel interface input/output operations are enabled. If the LED is off, the system is not accepting data.
2	SUBSYSTEM ALARM	LED (Red)	Indicates DC under voltage, DC over current, abnormally high temperature, or an unrecoverable failure. If your disk array is set up to report messages to the remote center, your HP service representative is notified automatically. If the disk array is not set up to report messages to the remote center, you should place a service call to HP to have the message evaluated to determine if any action is required.
3	SUBSYSTEM MESSAGE	LED (Amber)	<p>ON: Indicates that a message has been issued from either cluster. If your disk array is set up to report messages to the remote center, your HP service representative is notified automatically. If your disk array is not set up to report messages to the remote center, you should place a service call to HP to have the message evaluated to determine if any action is required.</p> <p>Blinking: Indicates the internal service processor has failed. The disk array will continue to operate normally. You should place a service call to HP to ensure notification. Service processor failures might not be reported automatically to the remote center.</p>
4	SUBSYSTEM RESTART	Switch	Used to unfence the fenced drive path and to release Write Inhibit. There is a blocked path somewhere between a host and a disk drive. By restarting the subsystem, a soft reset will be performed to try to recover. If system restart does not unblock the path, an HP service representative will be notified.

Table 3. Control or indicator function on control panel (Continued)

Item	Label	Indicator	Description
5	REMOTE MAINTENANCE PROCESSING	LED (Amber)	Indicates remote maintenance activity. An HP service representative is checking your system, but the system is online and accepting data.
6	REMOTE MAINTENANCE ENABLE/DISABLE	Switch	Used to permit remote service maintenance. Disable: No one can provide maintenance Enable: HP service representative can provide maintenance.
7	STORAGE CLUSTER 1 CHANNEL A-M U: UPPER L: LOWER	LED (Green)	Serial Channel/Fibre Channel: (1) On: Indicates some of the logical paths are established. (2) Fast blinking: Indicates the corresponding channel route is executing the channel command. (Only Serial Channel) (3) Slow blinking: Indicates none of the logical paths are established. (4) Off: Indicates the corresponding channel route is not enabled.

Table 3. Control or indicator function on control panel (Continued)

Item	Label	Indicator	Description
8	STORAGE CLUSTER 2 CHANNEL A-M U: UPPER L: LOWER	LED (Green)	Serial Channel/Fibre Channel: (1) On: Indicates some of the logical paths are established. (2) Fast blinking: Indicates the corresponding channel route is executing the channel command. (Only Serial Channel) (3) Slow blinking: Indicates none of the logical paths are established. (4) Off: Indicates the corresponding channel route is not enabled.
9	BS ON	LED (Yellow)	When the LED is on, unit is plugged in and receiving power from either AC power source. The SVP is receiving power from the outlet. If BS is off, the disk array is not receiving power from either AC power source. Check the electrical outlets in your building.
10	PS ON	LED (Green)	When the LED is on power is on and the array is ready to process data. Off means the disk array power is off. The disk array is not ready to process data.

Table 3. Control or indicator function on control panel (Continued)

Item	Label	Indicator	Description
11	PWR SW ENABLE	Switch	Used to enable the PWR on/off switch. To enable the PWR on/off switch, turn the PWR SW ENABLE switch to the ENABLE position. If the automatic power on restart feature is not being used, this switch should be in the DISABLE (opposite of ENABLE) position during normal operation.
12	PWR ON/PWR OFF	Switch	To switch on/off the subsystem, use this switch while the PWR SW ENABLE switch is in the ENABLE position. This switch only performs this function when the REMOTE/LOCAL switch is set to the LOCAL position. This switch should be in the PWR ON position during normal operation. The position of this switch should only be changed when directed by HP service personnel.
13	EMERGENCY POWER OFF	Switch	Used to power off the storage subsystem in an emergency situation.
14	PWR ON/PWR OFF REMOTE/LOCAL	Switch	Determines how the disk array is powered on or off. REMOTE: Disk array power on/off is controlled by the power control interface to the CPU (mainframe only). LOCAL: Disk array power on/off is controlled by the PWR ON/PWR OFF switch,
15	LED TEST/CHK RESET	Switch	LED TEST position: The LEDs on the panel go on. CHK RESET position: The PS ALARM and TH ALARMS are reset.

Emergency power-off

A switch is provided on the control panel for an emergency powering off. See [Figure 4 on page 35](#).

If you detect an abnormal sound, smell, or smoke, power off the disk subsystem by operating the UNIT EMERGENCY POWER OFF switch following the procedure below. The procedure for operating the switch is as follows:

1. Push the operator panel cover at the location where PUSH is marked, open the operator panel cover, then operate the EMERGENCY POWER OFF switch.
2. In using a UNIT EMERGENCY POWER OFF switch, first pull it up and then pull it toward you as illustrated in the figure below.

Caution *Pulling the UNIT EMERGENCY POWER OFF switch on the disk array cabinet instantly shuts down the array, neglecting the system's power-off sequence. Jobs in process are aborted and their integrity after recovery is not guaranteed. Therefore, this method should be used only in an emergency and not in normal operation.*

Caution *The UNIT EMERGENCY POWER OFF switch on the disk array cabinet only partially removes power from the array. AC input power remains present at the primary circuit. Therefore, do not use the Emergency Power-Off switch unless you need to power off of the unit as an emergency measure.*

When pulled, a UNIT EMERGENCY POWER OFF switch locks itself to prevent further powering on and requires a trained and qualified HP field engineer for recovery. Any time the unit Emergency/Only OFF switch is pulled, place a service call to Hewlett-Packard to have the switch reset and have the disk array restored to service.

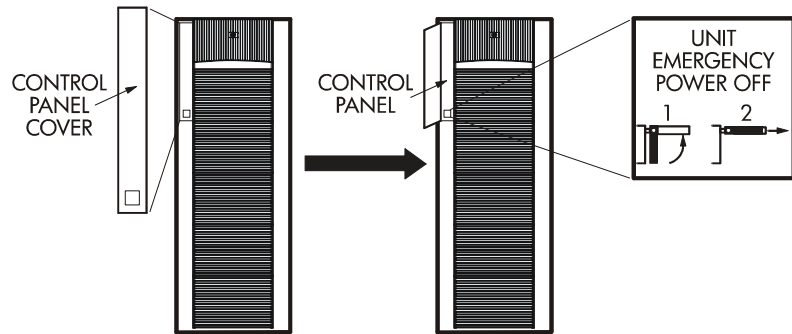


Figure 4. Pulling Unit Emergency Power Off Switch

Normal operations

The disk array does not require user intervention. The disk array automatically reports any remote system information messages (R-SIMs) to your Device Manager server running HP Command View XP or Command View XP Advanced Edition, to the internal disk array service processor, and also to the HP Service Center. For more information on SIMs, see Chapter 5, "[Troubleshooting](#)" on page 87.

Powering down the disk array

Situations may arise in the operation of the disk array that require you to power down the disk array. These situations include:

- Emergency power-off
- Planned power-off

Emergency power-off

An emergency is a critical situation such as a physical plant catastrophe. In an emergency, the critical need is to quickly remove power from the disk array. A quick restart is not necessary.

In an emergency, the operator should trip the Emergency Power-Off (EPO) switch. The disk array emergency power-off (EPO) switch is located on the control panel.

Caution *Use this switch only in case of an emergency. An HP service representative is required to reset the EPO and to power-on the disk array.*

To power off the disk array in an emergency:

1. Open the control panel cover by pushing on the point marked **PUSH**.
2. Pull the emergency power-off switch up and then out towards you as illustrated on the switch. See [Figure 4 on page 35](#).
3. Call the HP support center. The EPO switch must be reset by an HP service representative before the disk array can be powered on again.

Planned power-off

There may be times when a site power outage is planned. These situations would include alterations to the data center, inspections, or work by the electric company. If a scheduled power outage affects an HP StorageWorks Disk Array XP128, the power down of the disk array must be scheduled with a trained HP support representative.

Caution *Only a trained HP representative can shut down and power-off a disk array. Shutting down and powering off a disk array is not a customer activity. A user should not attempt to power down the disk array at any time other than an emergency.*

When planning for your planned power outage, please contact your HP CE to schedule a customer visit.

Recovering from a power outage to the disk array

If AC input power is lost, the disk array maintains its state and recovers when power is restored. The array cache is backed up by batteries that will maintain its state for a minimum of 48 hours. This length of time will provide coverage for most outages. In cases where the outage will extend beyond 48 hours, the batteries can be replaced by a HP to extend the time, if necessary. To extend the backup time beyond 48 hours, you must notify HP support in time to receive service.

Manual restart of the disk array after power is restored

Caution *Before you restore power to the disk array after an outage, HP recommends you have an electrician check the power to ensure it is stable and clean.*

You may opt to call a trained HP representative or you may restore power to the disk array yourself:

1. Move the ENABLE/DISABLE switch to the ENABLE position. Move the PWR ON/OFF switch to the PWR ON position ([Figure 3 on page 29](#), items 11 & 12)

2. The following LED sequence will occur:

The BS-ON LED ([Figure 3 on page 29](#), item 9) will turn amber and the PS ON LED (10, [Figure 3 on page 29](#), item 10) will turn green.

The CHANNEL LED ([Figure 3 on page 29](#), item 7) will light green for every adapter installed.

The MESSAGE LED ([Figure 3 on page 29](#), item 3) may turn amber if your disk array is not configured for automatic maintenance notification, signifying a SIM was generated (because the disk array went down unexpectedly).

Finally, the Ready LED ([Figure 3 on page 29](#), item 1) will light green when the system is ready, which may take up to 10 minutes, depending on the number of disks installed in your disk array.

3. Move the ENABLE/DISABLE switch to the DISABLE position.

Automatic power on restart

Caution *As with all sophisticated electronic equipment, unstable power during a restart can induce problems. Hewlett-Packard recommends automatic power on restart only when the power to the disk array is conditioned to ensure stability (for example, using a UPS). If your site does not have a UPS, HP recommends configuring the disk array for manual restart by keeping the ENABLE/DISABLE switch in the DISABLE position and using the manual restart procedure when power has been restored and verified.*

Your disk array will automatically restart and return to service when power is restored. To enable this feature, place the ENABLE/DISABLE switch in the ENABLE position and the PWR ON/OFF switch in the PWR ON position (Figure 3 on page 29, items 11 & 12). When power is restored, your disk array will restart and the following LED sequence will occur:

The BS-ON LED (Figure 3 on page 29, item 9) will turn amber and the PS ON LED (10, Figure 3 on page 29, item 10) will turn green.

The CHANNEL LED (Figure 3 on page 29, item 7) will light green for every adapter installed.

The MESSAGE LED (Figure 3 on page 29, item 3) may turn amber if your disk array is not configured for automatic maintenance notification, signifying a SIM was generated (because the disk array went down unexpectedly).

Finally, the Ready LED (Figure 3 on page 29, item 1) will light green when the system is ready, which may take up to 10 minutes, depending on the number of disks installed in your disk array.

Specifications

Some of the HP StorageWorks Disk Array XP128 disk array specifications are listed in this section. For a complete set of environmental specifications, refer to the *HP Disk Array XP128 Site Prep Guide* on the following main web site and access the appropriate support product:

<http://www.hp.com>

Temperature

Table 4. Temperature Specifications

Temperature Specification (Degrees F = 1.8 x Degrees C + 32)	
Nonoperating temperature Range	-10° to +43° C
Operating Temperature	+16° to + 32° C
Recommended Operating Temperature Range	+21° to +24° C
Shipping and storage temperature	-25° to 60° C
Temperature Shock Immunity—Maximum rate of change	10° C per hour
Over-Temperature shutdown	Shutdown at 60° C

Humidity

Table 5. Humidity Specifications

Humidity Specification	
Nonoperating/storage Humidity Range	8% to 90% RH
Operating Humidity Range at 22° C	20% to 80 % RH
Recommended Operating Humidity Range at 22° C	50% to 55 % RH
Procedure for recovery from moisture condensation	None

Mechanical vibration

Table 6. Mechanical vibration

Mechanical vibration	
Maximum Operating Acceleration	0.05G at a frequency range of 10 to 300 Hz

AC line voltage

The following AC power recommendations for the HP StorageWorks Disk Array XP128 are for each power cord. Each array frame has two power cords (with the AC power cord option there are four cords). In case of a failure of the power source for one cord, the power requirements and the current requirement for the remaining power cord will double.

[Table 7 \(page 42\)](#) lists the basic AC power requirements for a 50-amp single-phase XP128 DKU. [Table 8 \(page 43\)](#) lists the basic AC power requirements for a 30-amp single-phase XP128 DKU.

Table 7. 50-Amp, 50 or 60 Hz, Single-Phase DKU Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	16.2	15.1	14.9	14.3	13.8
Number of power cords	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2
Recommended circuit breakers	50A	50A	50A	50A	50A

* 60 Hz only.

Table 8. 30-Amp, 50 or 60 Hz, Single-Phase DKC Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	10.2	9.5	9.4	9.0	8.7
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A

* 60 Hz only.

Table 9 (page 43) lists the basic AC power requirements for three-phase operation of the XP128 DKC.

Table 9. 30-Amp, 50 or 60 Hz, Three-Phase DKU Operation

Parameter	Nominal Rated Voltage (VAC)							
	200	208*	220	230	240	380	400	415
Rated line current per power cord (Arms)	11.1	10.7	10.0	9.6	9.1	6.0	5.5	5.3
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	30 A	30 A	30 A	30 A	30 A	30 A	30 A	30 A

* 60 Hz only.

Web site

For the most current support information on the HP StorageWorks Disk Array XP128, please visit the following main web site and access the appropriate support product:

<http://www.hp.com>

XP1024 hardware

General safety guidelines

Read the following safety guidelines carefully and follow them when you work with your XP1024 disk array.

- Remember that maintenance of your machine must be done only by trained and qualified HP field engineers. Only an HP service representative can power off the disk array.
- Please read and follow the safety guidelines and procedures in this manual and any of your related manuals.
- In this manual and on the machine, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- The hazard warnings that appear on the warning labels on the machine or in the manual have one of the following alert headings consisting of an alert symbol and a signal word, “**Warning**,” or “**Caution**”:



Warning

This indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

Caution

This indicates a hazardous situation which, if not avoided, will or can result in serious damage of product or loss of data.

- The signal word “NOTICE” is used to present warnings that are not directly related to personal injury hazards.
- When warning labels become dirty or start peeling off, replace them.
- If any physical accident such as abnormal noise, smell, or smoke occurs on the disk subsystem while running, immediately power off

the disk subsystem by pulling the UNIT EMERGENCY POWER OFF switch on the disk subsystem.

- Do not power off the system unless it is in an emergency power-off state.
- Keep the front and rear doors closed at all times.
- Keep the tops and sides of the cabinets clear to allow air to flow properly.
- Do not perform any procedures not described in this document. If you have any questions or concerns, please contact your HP service representative.



Warning

Do not touch areas marked HAZARDOUS, even with the power off. These areas contain high-voltage power.

Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances before hand.

Be alert and use your common sense. If you have any questions, contact your HP service representative.

Physical components

The HP Disk Array XP1024 is a high-performance RAID-capable disk array system. It is used to store large quantities of data in an efficient and secure manner.

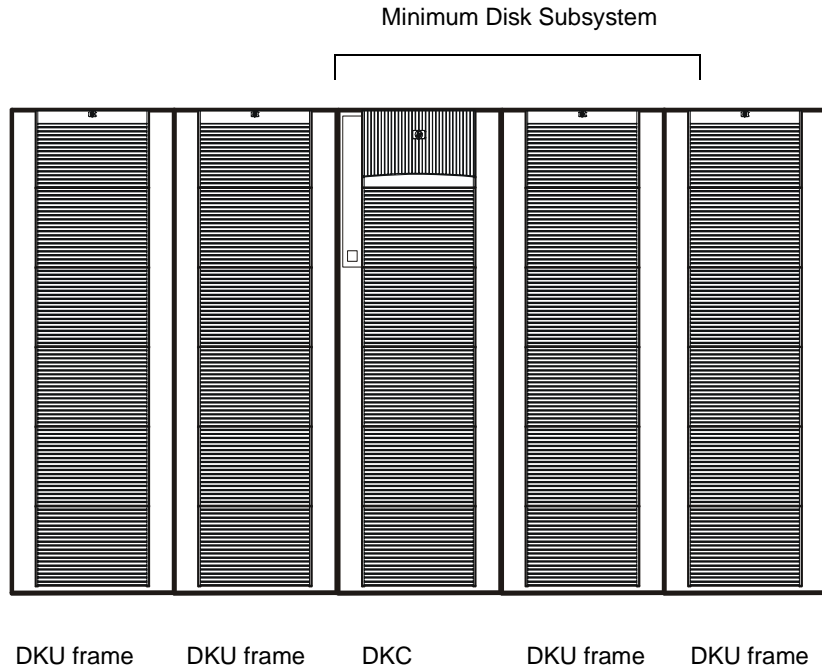


Figure 5. HP StorageWorks 1024 Disk Array

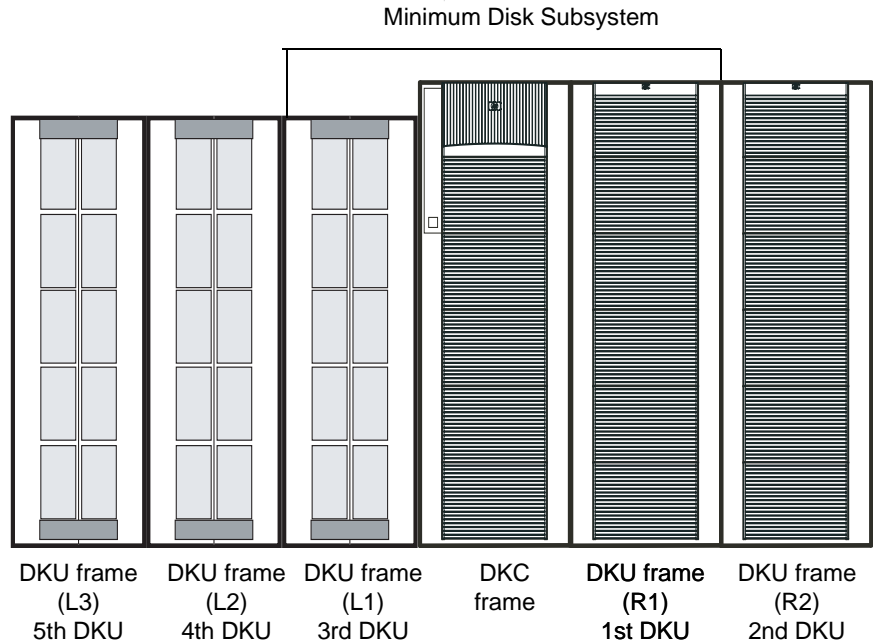


Figure 6. HP Disk Array XP1024 with HP Disk Array XP512 DKUs

The maximum HDD configuration for an XP1024 with XP512 DKUs is 768. This is due to specifications for the 3 XP512 DKUs, which can contain a total of 256 HDDs (96+96+64).

The disk array has the following major hardware components:

- One disk control frame (DKC)

The single disk control frame cabinet contains the control panel, connection hardware, the service processor, and control boards for the disk arrays.

- One to four XP1024 disk array frames (DKU) or
- One to two XP1024 disk array frames and one to three XP512 DKU frames.

The DKU cabinets contain your disk drives.

When using only XP1024 DKUs, you can connect up to 4 DKUs.

When connecting XP512 DKUs to the XP1024 disk array, the supported configuration is a maximum of 2 XP1024 DKUS on the right, and a maximum of 3 XP512 DKUs on the left.



Warning

XP1024 and XP512 DKUs may not be configured on the same side of the DKC. Only XP1024 DKUs may be installed on the right of the DKC and only XP512 DKUs may be installed on the left of the DKC in configurations that support both types of DKUs.

- One service processor (SVP)

The SVP is an internally mounted notebook computer used for maintenance. The SVP is located in the disk control frame cabinet. The SVP is used by your HP service representative only.

- *(Optional)* second service processor

This is available for users with extreme availability requirements. This is not a required feature.

Disk control frame

The disk control frame controls your disk array. It provides you with a control panel, power supplies, controller boards, and your service processor. See [Figure 7](#).

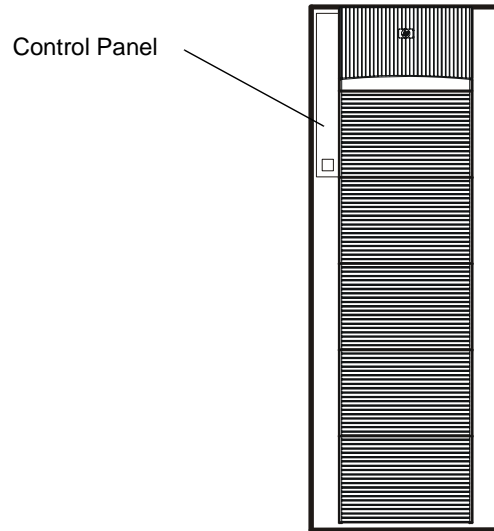


Figure 7. Disk Control Frame

There is no single point of failure in the disk array. It is designed with redundant controllers and redundant power supplies, all of which can be removed or replaced without interrupting access to your data. Only your HP service representative can remove or replace hardware.

Control panel

The control panel is your view to the disk array. Once the disk array is powered on and running normally, there are no user operations required at the control panel, except in case of a power failure recovery. The control panel will be discussed in further detail later in this chapter.

Service processor

The service processor (SVP) is a built-in PC connected inside the disk control frame. The SVP gives your HP service representative a method to access the software system on the disk array.

Your HP service representative uses the SVP to configure, maintain, and upgrade your disk array software and hardware. The service processor also collects performance data on the disk array for diagnostic testing and analysis.

To protect the user's security, the SVP does not have access to any user data stored on the disk array.

An optional service processor is available for users with extreme availability requirements. This is not a required feature.

Disk array frames

The disk array frames are where the physical disk drives, the disk groups, and any dynamic spare disk drives are located. You must have at least one disk array frame to operate the system, and you may have up to a maximum of four disk array frames installed on your system. If you have four disk array frames that are fully populated with disk drives, you will have a maximum of 149 TB. You may also have one to two XP1024 disk array frames grouped with one to three XP512 DKU frames.

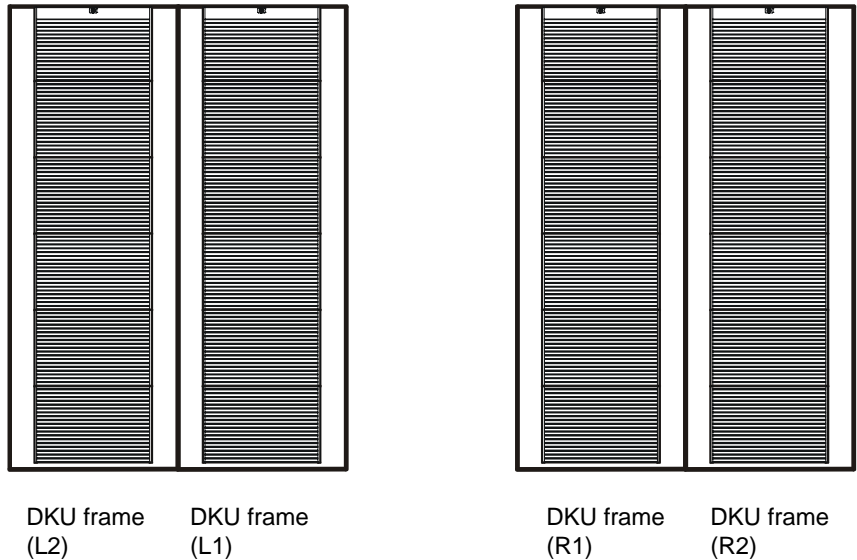


Figure 8. XP1024 Disk Array Frames

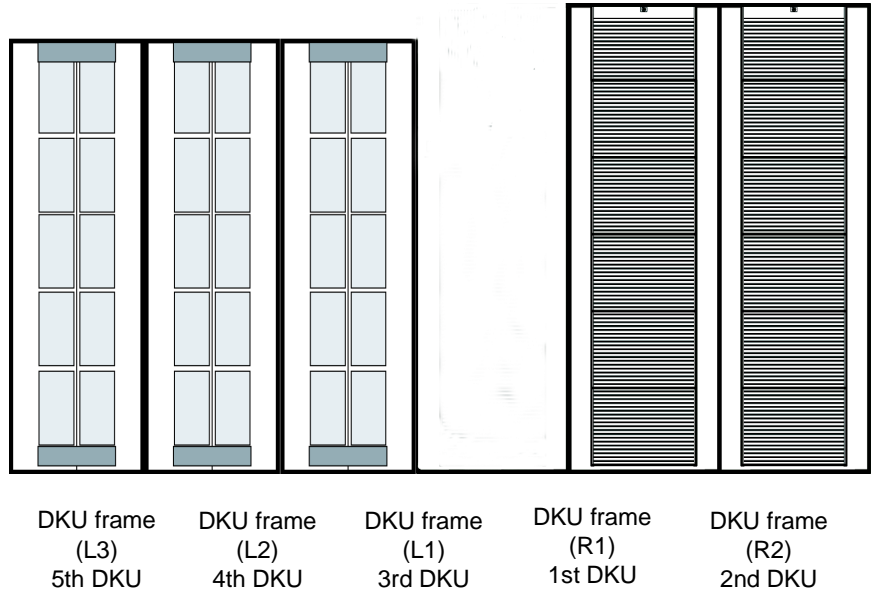


Figure 9. XP1024 and XP512 Disk Array Frames

Available disk drives

The disk array uses 3.5-inch disk drives, and a variety of disk capacities are available. Ask your HP service representative about currently available disk drives. Any of the disk drives in your disk array frames can be replaced without disrupting user activity. The disk array automatically detects and corrects disk errors. All HP Disk Array XP512 disk drives are supported in XP512 DKU frames.

XP512 DKUs can be used in conjunction with the XP1024.

RAID options

Any of your spare disk drives can back up any other disk drive of the same or lesser capacity (and equal rotational speed), in any DKU frame, even if the failed disk and the spare disk are in different array domains, whether you are using RAID1 or RAID5 array groups.

XP512 DKU Supported disk drives must have a spare drive in the XP512 DKU domain(s).

Your disk arrays can be configured with a minimum of one and a maximum of 16 spare disk drives.

Device Manager server (optional)

The Device Manager server is for user access to the system software. Your Device Manager server runs a main remote control application and other standard and optional software to manage and monitor the disk array. The Device Manager server can be connected to multiple disk arrays using a special LAN connection. See [Figure 10](#). See [Table 10 on page 56](#).

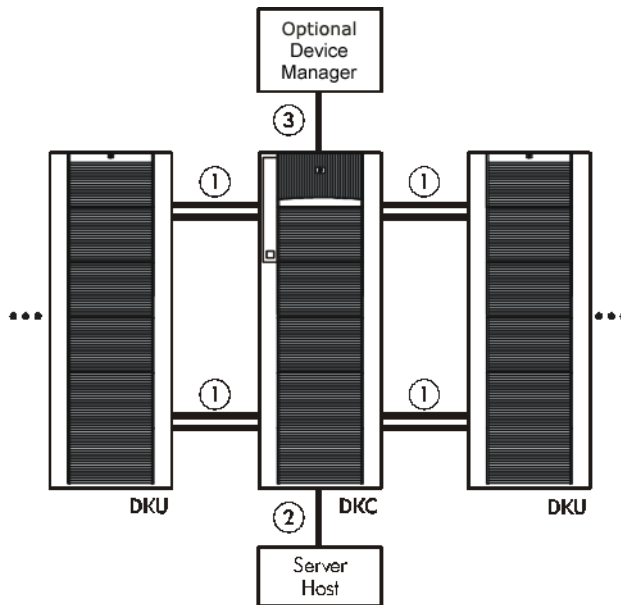


Figure 10. XP1024 Disk Array

Table 10. Connections to the XP1024 Disk Array

Callout in figure 10 (page 55)	Connecting	Type
1	A DKC to a DKU; A DKU to another DKU	Fibre Channel
2	The DKC to the server host	Fibre Channel ESCON FICON iSCSI
3	DKC to the Management Console	LAN

The specific hardware requirements for your Device Manager server, such as the required processor speed, storage capacity, and memory, vary depending on the optional software that you use and the number of disk array frames you have connected to the system.

To protect your user's security, neither edition of HP Command View software for the Device Manager server (CVXP or CVXP AE) has access to any user data stored on the disk array.

There is no single point of failure in the disk array. It is designed with redundant logic assemblies, disk drives, and the power supplies, all of which can be removed or replaced without interrupting access to your data.

Caution *Only your HP service representative can remove or replace hardware.*

Control panel

Figure 11 and Table 11 on page 58 show the control panel and its functions, respectively.

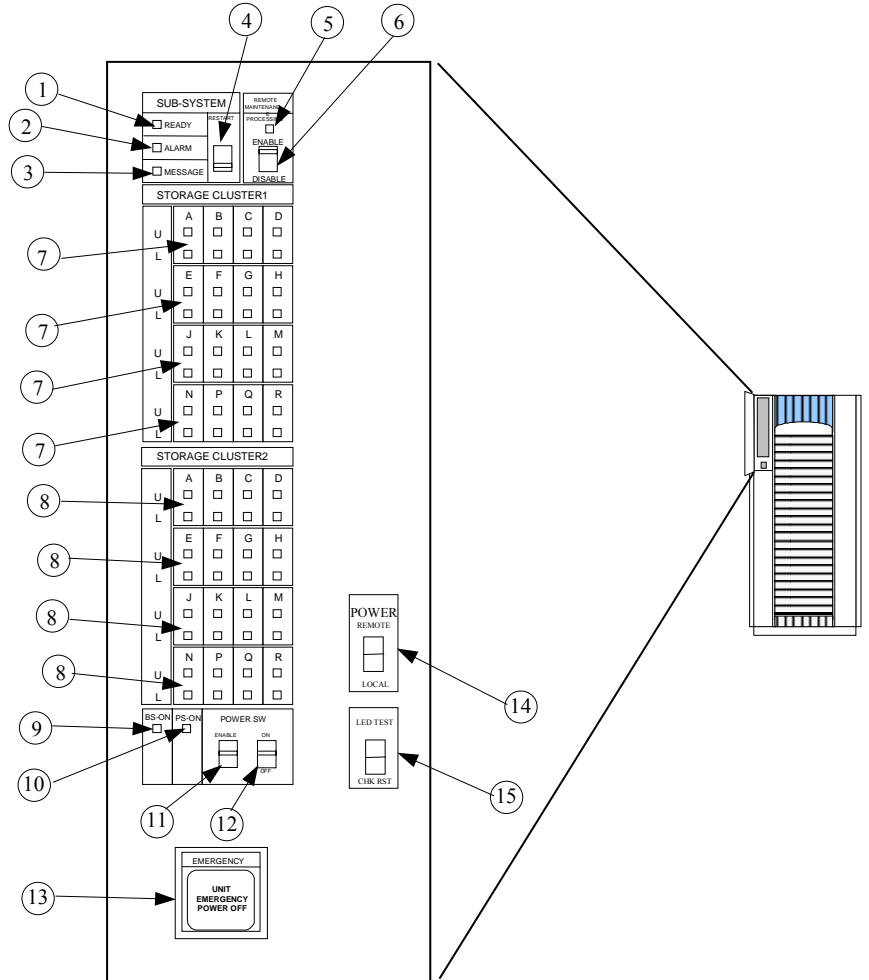


Figure 11. Control panel

Table 11. Control panel functions

Item	Label	Indicator	Description
1	SUBSYSTEM READY	LED (Green)	Indicates that input/output operation on the channel interface is enabled. If the LED is off, the system is not accepting data.
2	SUBSYSTEM ALARM	LED (Red)	Indicates DC under voltage, DC over current, abnormally high temperature, or an unrecoverable failure has occurred. If your disk array is set up to report messages to the remote center, your HP service representative is notified automatically. If your disk array is not setup to report messages to the remote center, you should place a service call to HP to have the message evaluated to determine if any action is required.
3	SUBSYSTEM MESSAGE	LED (Amber)	<p>ON: Indicates a message has been issued from either Cluster. If your disk array is set up to report messages to the remote center, your HP service representative is notified automatically. If your disk array is not set up to report messages to the remote center, you should place a service call to HP to have the message evaluated to determine if any action is required.</p> <p>Blinking: Indicates the internal service processor has experienced a failure. The disk array will continue to operate normally. You should place a service call to HP to ensure notification. Service processor failures may not be reported automatically to the remote center.</p>
4	SUBSYSTEM RESTART	Switch	Used to unfence the fenced drive path and to release Write Inhibit. There is a blocked path somewhere between a host and a disk drive. By restarting the subsystem, a soft reset will be performed to try to recover. If system restart does not unblock the path, an HP service representative will be notified.
5	REMOTE MAINTENANCE PROCESSING	LED (Amber)	Indicates remote maintenance is being processed. An HP service representative may be working on your system, but the system is online and accepting data.

Table 11. Control panel functions

Item	Label	Indicator	Description
6	REMOTE MAINTENANCE ENABLE/DISABLE	Switch	Used to permit remote service maintenance. Disable: No one can provide maintenance Enable: HP service representative can provide maintenance.
7	STORAGE CLUSTER 1 CHANNEL A-R ENABLE	LED (Green)	Serial Channel/Fibre Channel: (1) On: Indicates some of the logical paths are established. (2) Fast blinking: Indicates the corresponding channel route is executing the channel command. (Only Serial Channel) (3) Slow blinking: Indicates none of the logical paths are established. (4) Off: Indicates the corresponding channel route is not enabled.
8	STORAGE CLUSTER 2 CHANNEL A-R ENABLE	LED (Green)	Serial Channel/Fibre Channel: (1) On: Indicates some of the logical paths are established. (2) Fast blinking: Indicates that the corresponding channel route is executing the channel command. (Only Serial Channel) (3) Slow blinking: Indicates none of the logical paths are established. (4) Off: Indicates that the corresponding channel route is not enabled.

Table 11. Control panel functions

Item	Label	Indicator	Description
9	BS ON	LED (Yellow)	<p>When the LED is on, unit is plugged in and receiving power from the primary AC outlet. The SVP is receiving power from the outlet.</p> <p>If BS is off, then the disk array is not receiving power from the primary AC outlet. Check the electrical outlets in your building.</p>
10	PS ON	LED (Green)	<p>When the LED is on power switch is on, the array is ready to receive data.</p> <p>Off means the power switch is off; the disk array is not powered on and is not ready to receive data.</p>
11	PWR SW ENABLE	Switch	Used to enable the PWR on/off switch. To enable the PWR on/off switch, turn the PWR SW ENABLE switch to the ENABLE position. If the automatic power on restart feature is not being used, this switch should be in the DISABLE (opposite of ENABLE) position during normal operation.
12	PWR ON/PWR OFF	Switch	To switch on/off the subsystem, use this switch while turning the PWR SW ENABLE switch is in the ENABLE position. This switch only performs this function when the REMOTE/LOCAL switch is set to the LOCAL position. This switch should be in the PWR ON position during normal operation. The position of this switch should only be changed when directed by HP service personnel.
13	EMERGENCY POWER OFF	Switch	Used to power off the storage subsystem in an emergency situation.

Table 11. Control panel functions

Item	Label	Indicator	Description
14	PWR ON/PWR OFF REMOTE/LOCAL	Switch	<p>Determines how the disk array is powered on or off.</p> <p>REMOTE: Disk array is powered on/off by the instructions of the host power control interface (mainframe only).</p> <p>LOCAL: Disk array is powered on/off by the PWR ON/PWR OFF switch,</p>
15	LED TEST/CHK RESET	Switch	<p>LED TEST position: The LEDs on the panel go on.</p> <p>CHK RESET position: The PS ALARM and TH ALARMS is reset.</p>

Emergency power-off

A switch is provided on the operator panel on the front side of the disk control frame (DKC) for turning power off in an emergency.

If you encounter any abnormality such as an abnormal sound, smell, or smoke, power off the disk subsystem by operating the UNIT EMERGENCY POWER OFF switch following the procedure below. The procedure for operating the switch is as follows:

1. Push the operator panel cover at the location where PUSH is marked, open the operator panel cover, then operate the EMERGENCY POWER OFF switch.
2. In using a UNIT EMERGENCY POWER OFF switch, first pull it up and then pull it toward you as illustrated in the figure below.

Caution *Pulling a UNIT EMERGENCY POWER OFF switch on the disk controller instantly shuts down, neglecting the system's power-off sequence. Jobs in process are aborted and their integrity after recovery is not guaranteed. Therefore, this method should be used only in an emergency and not in usual maintenance.*

Caution *The UNIT EMERGENCY POWER OFF switch on the disk controller only provides partial power-off capability. AC input power remains present at the primary circuit. Therefore, do not use the switches on these units unless you need to power off of the unit as an emergency measure.*

When pulled, the UNIT EMERGENCY POWER OFF switch mechanically locks itself in the off position to prevent restoring power in a potentially hazardous situation. A qualified HP service representative is required on site to restore power. Any time the unit Emergency/Only OFF switch is pulled, place a service call to Hewlett-Packard to have the switch reset and have the disk array restored to service.

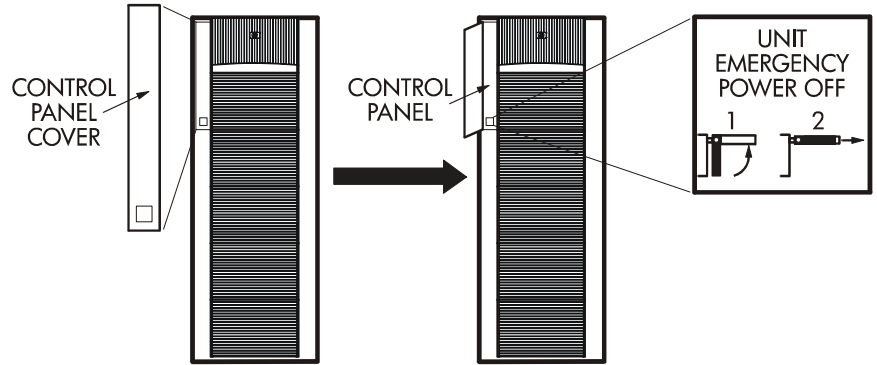


Figure 12. Pulling Unit Emergency Power OFF Switch

Normal operations

The disk array does not require intervention from the user. The disk array reports any remote system information messages (R-SIMs) to your Device Manager server running HP Command View XP or Command View XP Advanced Edition. The internal disk array service processor also sends the report to the HP Service Center automatically. For more information on SIMs, see Chapter 5, "[Troubleshooting](#)" on page 87

Powering down the disk array

Situations may arise in the operation of the disk array that require the user to power down the disk array. These situations include:

- Emergency power-off
- Planned power-off

Emergency power-off

An emergency is a critical situation such as a physical plant catastrophe. In an emergency, the critical need is to quickly remove power from the disk array. A quick restart is not necessary.

In an emergency, you should trip the Emergency Power-Off (EPO) switch, which is located on the control panel.

Caution *Use this switch only in case of an emergency. An HP service representative is required to reset the EPO and to power-on the disk array.*

To power off the disk array in an emergency:

1. Open the control panel cover by pushing on the point marked **PUSH**.
2. Pull the emergency power-off switch ([Figure 12 on page 63](#)) up and then out towards you as illustrated on the switch.
3. Call the HP support center. The EPO switch must be reset by an HP service representative before the disk array can be powered on again.

Planned power-off

There may be times when a site power outage is planned, such as to make alterations to the data center, do inspections, or to allow work by the electric company. If a scheduled power outage affects an HP Disk Array XP1024, the power down of the disk array must be scheduled with a trained HP support representative.

Caution *Only a trained HP representative may shut-down and power-off a disk array. Shutting down and powering off a disk array should not be done by customers except in an emergency.*

When planning for your planned power outage, please contact your HP customer engineer to schedule a customer visit.

Recovering from a power outage to the disk array

If a power outage to the array occurs, the disk array will maintain its state and recover when power is restored. The array cache is backed up by batteries that will maintain its state for a minimum of 48 hours. This length of time will provide coverage for most outages. In cases where the outage will extend beyond 48 hours, the batteries can be replaced by an HP CE which will extend the time, if necessary. You must notify HP support if your power outage is expected to extend beyond the backup time.

Manual restart of the disk array after power is restored

Caution *Before restoring power to the disk array, HP recommends that an electrician check the input power to ensure it is stable and clean.*

You may call a trained HP representative or you may use the following procedure yourself to recover the disk array from a power failure:

1. Move the ENABLE/DISABLE switch to the ENABLE position. Move the PWR ON/OFF switch to the PWR ON position. (Figure 11 on page 57, item 11/12)

2. The following LED power sequence will occur:

The BS-ON (Figure 11 on page 57, item 9) will turn amber and the PS ON LED (Figure 11 on page 57, item 10) will turn green.

The CHANNEL LED (Figure 11 on page 57, item 7) will light green for every adapter installed.

The MESSAGE LED (Figure 11 on page 57, item 3) may turn amber, if your disk array is not configured for automatic maintenance notification, signifying a SIM was generated (because the disk array went down unexpectedly).

Finally, the READY LED (Figure 11 on page 57, item 1) will light green signifying the system is ready. Powering on the disk array may take up to 10 minutes, depending on the number of disks installed in the disk array. Power-on is complete only when the READY LED turns green.

3. Move the ENABLE/DISABLE switch to the DISABLE position.

Automatic power on restart

Caution *As with all sophisticated electronic equipment, unstable power conditions during a restart can induce problems. HP recommends automatic power on restart only when power to the disk array is conditioned to ensure it is stable, such as by using a UPS. If your site does not have a UPS, HP recommends the disk array be configured for manual restart by keeping the ENABLE/DISABLE switch in the DISABLE position and using the manual restart procedure when power has been restored and verified.*

The disk array will automatically restart and return to service when power is restored. To enable this feature, place the ENABLE/DISABLE switch in the ENABLE position and the PWR ON/OFF switch in the PWR ON position. (Figure 11 on page 57, item 11/12). When power is restored, your disk array will restart and the following LED power sequence will occur:

The BS-ON (Figure 11 on page 57, item 9) will turn amber and the PS ON LED (Figure 11 on page 57, item 10) will turn green.

The CHANNEL LED (Figure 11 on page 57, item 7) will light green for every adapter installed.

The MESSAGE LED (Figure 11 on page 57, item 3) may turn amber, if your disk array is not configured for automatic maintenance notification, signifying a SIM was generated (because the disk array went down unexpectedly).

Finally, the READY LED (Figure 11 on page 57, item 1) will light green when the system is ready, which may take up to 10 minutes, depending on the number of disks installed in the disk array.

Specifications

Some of the XP1024 disk array specifications are listed in this section. Refer to the HP Disk Array XP1024 Site Prep Guide on the XP1024 web site at on the following main web site and access the appropriate product for a complete set of XP1024 specifications:

<http://www.hp.com>

Temperature

Table 12. Temperature Specifications

Temperature Specifications (Degrees F = 1.8 x Degrees C + 32)	
Nonoperating/storage Temperature Range	-10° to +43° C
Operating Temperature	+16° to + 32° C
Recommended Operating Temperature Range	+21° to +24° C
Shipping and storage temperature	-25° to 60° C
Temperature Shock Immunity—Maximum rate of change	10° C per hour
Over-Temperature shutdown	Shutdown at 60° C

Table 13. Humidity Specifications

Humidity Specifications	
Nonoperating/storage Humidity Range	5% to 95 % RH
Non-operating humidity range	8% to 90%
Operating Humidity Range at 22° C	20% to 80 % RH
Recommended Operating Humidity Range at 22° C	50% to 55 % RH
Procedure for recovery from moisture condensation	None

Table 14. Mechanical Vibration Specification

Mechanical Vibration Specifications	
Maximum Operating Acceleration	0.05 G at a frequency range of 10 to 300 Hz

AC line voltage requirements for the HP Disk Array XP1024 (DKC)

Table 15 (page 71) lists the basic AC power requirements for a 40-amp, single-phase XP1024 DKC.

Table 15. 40-Amp, 50 or 60 Hz, Single-Phase DKC Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	8.0	7.7	7.2	7.0	6.6
Number of power cords	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2
Recommended circuit breakers	40 A	40A	40A	40A	40A

* 60 Hz only.

Table 16 (page 71) lists the basic AC power requirements for a 30-amp, single-phase, XP1024 DKC.

Table 16. 30-Amp, 50 or 60 Hz, Single-Phase DKC Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	4.0	3.9	3.6	3.5	3.3
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers	30 A	30 A	30 A	30 A	30 A

* 60 Hz only.

Table 17 (page 72) lists the basic AC power requirements for a 30-amp, three-phase XP1024 DKC.

Table 17. 30-Amp, 50 or 60 Hz, Three-Phase DKC Operation

Parameter	Nominal Rated Voltage (VAC)							
	200	208 ¹	220	230	240	380	400	415
Rated line current per power cord (Arms)	5.2	5.0	4.7	4.6	4.3	2.7	2.6	2.5
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	30 A	30 A	30 A	30 A	30 A	30 A	30 A	30 A

* 60 Hz only.

AC line voltage requirements for the HP Disk Array XP1024 (DKU)

Table 18 (page 73) lists the basic AC power requirements for a 50-amp, single-phase, XP1024 DKU.

Table 18. 50-Amp, 50 or 60 Hz, Single-Phase DKU Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	22.3	21.6	20.3	19.4	18.6
Number of power cords	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2
Recommended circuit breakers	50 A	50 A	50 A	50 A	50 A

* 60 Hz only.

Table 19 (page 73) lists the basic AC power requirements for a 30-amp, single-phase XP1024 DKU.

Table 19. 30-Amp, 50 or 60 Hz, Single-Phase DKU Operation

Parameter	Nominal Rated Voltage (VAC)				
	200	208*	220	230	240
Rated line current per power cord (Arms)	13.5	13.0	12.3	11.7	11.2
Number of power cords	4	4	4	4	4
Number of circuit breakers	4	4	4	4	4
Recommended circuit breakers	30 A	30 A	30 A	30 A	30 A

* 60 Hz only.

Table 20 (page 74) lists the basic AC power requirements for a 60-amp, three-phase XP1024 R1 DKU.

Table 20. 60-Amp, 50 or 60 Hz, three-phase R1 DKU operation

Parameter	Nominal Rated Voltage (VAC)							
	200	208 ¹	220	230	240	380	400	415
Rated line current per power cord (Arms)	19.0	18.2	17.2	16.6	15.7	10.7	10.2	9.8
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	60 A	60 A	60 A	60 A	60 A	30 A min ²	30 A min ²	30 A min ²

1. 60 Hz only.
2. 30-amp breakers are adequate at 380, 400, and 415 VAC, because the current drawn at these voltages is considerably less than at the lower voltages.

Table 21 (page 74) lists the basic AC power requirements for 60-amp, three-phase, R2, L1, and L2 XP1024 DKUs. Unlike the first DKU (R1), DKUs R2, L1, and L2 do not provide AC power to the DKC.

Table 21. 60-Amp, 50 or 60 Hz, three-phase, R2, L1, and L2 DKU operation

Parameter	Nominal Rated Voltage (VAC)							
	200	208 ¹	220	230	240	380	400	415
Rated line current per power cord (Arms)	19.0	18.2	17.2	16.6	15.7	10.7	10.2	9.8
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	60 A	60 A	60 A	60 A	60 A	30 A min ²	30 A min ²	30 A min ²

1. 60 Hz only.
2. 30-amp breakers are adequate at 380, 400, and 415 VAC, because the current drawn at these voltages is considerably less than at the lower voltages.

Table 22 (page 75) lists the basic AC power requirements for a 30-amp, three-phase XP1024 DKU.

Table 22. 30-Amp, 50 or 60 Hz, three-phase DKU operation

Parameter	Nominal Rated Voltage (VAC)							
	200	208*	220	230	240	380	400	415
Rated line current per power cord (Arms)	15.0	14.4	13.6	13.0	12.5	8.8	8.4	8.1
Number of power cords	2	2	2	2	2	2	2	2
Number of circuit breakers	2	2	2	2	2	2	2	2
Recommended circuit breakers	30 A	30 A	30 A	30 A	30 A	30 A	30 A	30 A

* 60 Hz only.

If you intend to use HP Disk Array XP512 DKUs with your HP XP1024 Disk Array, see the *HP StorageWorks Disk Array XP512 Site Preparation Guide* for power requirements information for these DKUs.

Optional software products

Several optional HP software packages are available to increase your data accessibility and enable continuous access to user data on the disk array. This chapter describes how these optional software applications can help you run your disk array system.

Before installing the optional software packages, refer to the package's manual to verify equipment requirements.

XP array management

HP StorageWorks XP Remote Web Console and Command View Advanced Edition (AE)

Remote Web Console (RWC) is the standard management software package for the XP disk array. It provides a web-based interface for managing one disk array and is built into the SVP. To access RWC, you open a browser and enter the IP address of the SVP.

RWC allows you to install and manage the disk array but does not allow you to manage multiple arrays. To manage multiple XP disk arrays, install the Command View XP Advanced Edition optional software.

Command View XP Advanced Edition (CVXP AE) provides a browser-based common management platform from which you can manage the XP family of disk arrays. CVXP AE installs on a Device Manager server that you provide and from there can manage multiple XP arrays—even globally distributed arrays.

Remote Web Console XP and/or Command View XP Advanced Edition provide:

- Web-browser based GUI interface
- Visual representation and management of host and storage resources
- Common user interface for launching XP management applications
- Security through authentication, authorization, and encryption
- Event level integration into the leading network and system management solutions such as OpenView Network Node Manager, CA Unicenter TNG, Tivoli, and BMC Patrol

Storage management and LUN security

HP StorageWorks LUN Configuration and Security Manager XP

LUN Configuration Manager comes with three applications that are executed from Remote Web Console XP or StorageWorks Command View XP.

LUN Configuration Manager enables:

- LUN creation and port assignment
- consolidation of LUNs (up to 36 LUNs can be combined)
- creation of small size LUNs to accommodate data placed in cache

Security Manager establishes security at the LUN level, allowing you to enable secure multiple server connectivity to the disk array. Security Manager XP enables the disk array to hide LUNs assigned to one server from other servers.

Remote and local data replication

Continuous Access XP, Continuous Access Extension XP, and Business Copy XP are valuable tools for creating copies of data for testing, backup, and disaster recovery.

HP StorageWorks Continuous Access XP

Continuous Access allows you to make ongoing synchronous copies of disk array data to a remote site 27 miles (43 kilometers) away.

HP StorageWorks Continuous Access Extension XP

Continuous Access Extension XP is similar to Continuous Access XP, but operating in asynchronous mode. This can produce increased performance in remote copying. Copy operations are sequenced-stamped to ensure they are executed and sorted correctly at the remote disk array.

You must purchase Continuous Access Extension as an upgrade if you are currently using the Continuous Access XP in synchronous mode, but would prefer to use asynchronous mode.

HP StorageWorks Business Copy XP

Business Copy allows you to make up to nine ongoing copies of data. These copies are maintained on the local disk array. Use Business Copy for non-production activities such as backup, batching, and system testing.

Failover and load balancing

HP StorageWorks Auto Path XP

Using Auto Path XP, you can enable Windows NT server I/O path failover and load balancing control for dual path connections. You can configure up to eight multiple paths per LUN that will provide automatic and transparent failover in the event of path failure. You can also enable dynamic, multi-path load balancing to prevent overloaded I/O operations.

HP StorageWorks Secure Path

HP StorageWorks Secure Path is a family of high availability multi-pathing software products providing continuous data access from the disk array to host servers running Windows Server 2003, Windows 2000, Windows NT, Linux, Sun Solaris, Novell NetWare, IBM AIX, and HP-UX.

Redundant hardware, advanced RAID technology and Secure Path's automated failover capability enhance fault tolerance and availability. Secure Path effectively eliminates controllers, disk drives, interconnect hardware and host bus adapters as single points of failure. Secure Path:

- Ensures increased business efficiency by maintaining high availability of business critical data and by simplifying the task of path management.
- Monitors path status, and in the case of a path failure, automatically re-routes data to an alternate path.
- Allows easy path management from a single application with graphical displays and task automation.

Performance management

HP StorageWorks Cache LUN XP

Cache LUN XP enables you to reserve disk array cache memory for storing high-use data, greatly increasing access speed to that data.

HP StorageWorks Auto LUN XP

Auto LUN XP provides monitoring and disk usage analysis for your disk array based on user thresholds. Auto LUN develops a plan to migrate impacted data volumes to lower usage LUNs, using the data acquired during monitoring. You can perform the migration manually or automatically.

HP StorageWorks Performance Advisor XP

HP StorageWorks Performance Advisor XP is an Internet application used to monitor real-time performance of the HP StorageWorks XP family of disk array products. Using a simple, browser-based interface, you can quickly customize performance data collection and set performance alarms. Performance Advisor provides real-time and historical data on:

- LDEV I/Os
- front-end and back-end port utilization
- internal bus utilization
- cache usage

You can easily integrate with VantagePoint's DSI log and user PerfView to view your performance metrics.

HP StorageWorks Application Policy Manager XP

HP StorageWorks Application Policy Manager XP is a performance allocation and management tool for XP disk arrays. It lets you allocate storage performance resources to hosts by means of policies you define.

It ensures that critical business processes have all the XP disk array performance they need to meet business objectives. You can ensure that processes such as backups and data warehouse loads get the array bandwidth necessary to meet deadlines. Application Policy Manager enables sophisticated service provider solutions based on distinct levels of service.

Application Policy Manager has a rich feature set for flexible policy definition, scheduling, monitoring, and analysis.

Network management products

HP OpenView SPI for XP Disk Arrays

HP OpenView SPI for XP Disk Arrays establishes an agent that monitors XP disk arrays, provides a correlation of events on the disk arrays, and then forwards those events to the OpenView Operations management console.

HP OpenView SPI for HP storage devices

The OpenView SPI solutions enable integration of the XP disk array infrastructure into the OpenView Operations and OpenView Service Navigator, providing you with the ability to integrate storage into your service level agreements. These solutions perform the following functions:

- Intercept and filter over 1,000 events from the XP disk array
- Show associations and dependencies existing between XP components
- Isolate root causes of failures and predict results
- Enable management of globally distributed XP disk arrays from the OpenView management console

Mainframe solutions

HP StorageWorks Resource Manager XP

HP StorageWorks Resource Manager XP allows you to share data stored on the disk array with mainframe systems and open system servers. This can reduce and optimize your storage maintenance and management overhead.

HP StorageWorks Resource Manager XP allows an XP array to connect to a mainframe system via an ESCON link.

HP StorageWorks Data Exchange XP

Data Exchange XP provides high-speed bidirectional data sharing between mainframe systems and open systems. File translations are provided through a file conversion utility.

Together, these products can free your network of host-to-host data conversion traffic.

5

Troubleshooting

This chapter explains the monitoring and reporting capabilities and the flow of troubleshooting used on the HP StorageWorks Disk Array family of disk arrays.

Monitoring and reporting

The disk array generates service information messages (SIMs) to identify normal operations, service requirements, and failures. SIMs can be generated on the disk array by the CHIP (Client Host Interface Processor) and ACP (Array Control Processor) microprocessors and by the internal service processor (SVP). Your HP service representative will use the SIMs to monitor and troubleshoot your disk array.

Troubleshooting flow diagram

When the system encounters trouble, it will report the trouble to the HP Storage Technology Center.

If a failure occurs in the disk array, it is detected and reported to the system log, the SIM log, and the HP Storage Technology Center. [Figure 13](#) is a flow diagram that explains the progress of error detection and reporting.

1. A failure is detected in your disk array.
2. The failure is reported to the system.
3. The system stores the failure information in the system log.

The generated SIMs are stored on your disk array's SVP for use by HP personnel. The Continuous Track remote maintenance software tool also reports SIMs to the HP Storage Technology Center. When a SIM is generated, the amber message LED on your disk array control panel turns on if the disk array is not configured to automatically phone the HP Storage Technology Center. In this case, call HP to determine the reason for the message.

SIMs are classified according to severity: service, moderate, serious, or acute. Service-level and moderate-level SIMs do not require immediate attention and are addressed during routine maintenance. These failures are often corrected before the failure actually occurs.

Serious-level and acute-level SIMs are reported to the HP Storage Technology Center immediately to ensure that the problem is addressed as soon as possible. Your HP service representative will configure your modem during installation.

4. The Continuous Track remote maintenance tool reports the SIMs to the HP Storage Technology Center through a dedicated dial up connection.

The HP Storage Technology Center then takes action to correct the failure.

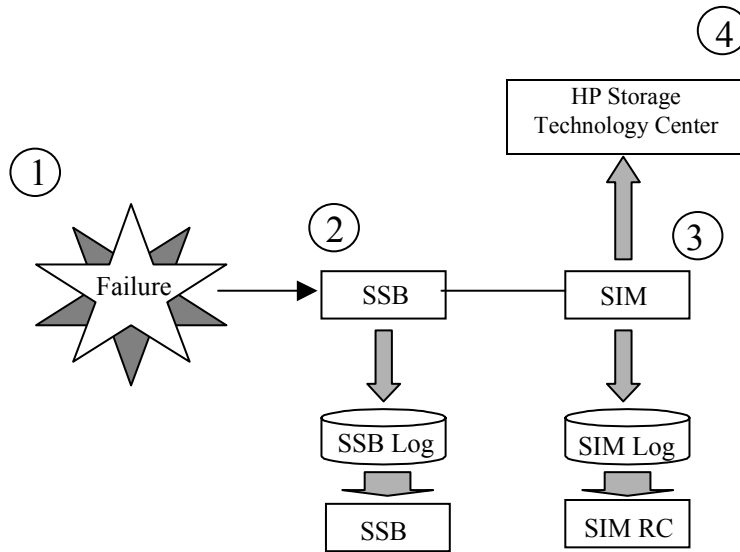


Figure 13. Error Detection and Reporting

6

Regulatory statements

The following regulatory statements apply to the HP Disk Array XP128 and XP1024.

FCC EMC Statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

Hewlett-Packard's device certification tests were conducted with HP computer systems and HP shielded cables, such as those you received with your product. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment. Cables used with this device must be properly shielded to comply with the requirements of the FCC.

IEC Statement (Worldwide)

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

EMC Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Spécification ATI Classe A (France)

DECLARATION D'INSTALLATION ET DE MISE EN EXPLOITATION d'un matériel de traitement de l'information (ATI), classé A en fonction des niveaux de perturbations radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

VCCI EMC Statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI EMC Statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策的對策

RRL EMC Statement (Korea)

사용자 안내문 :A 급 기기

이 기기는 업무용으로 전자파적합등록을 받은 기기이오니, 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못 구입 하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

Harmonics Conformance (Japan)

高調波ガイドライン適合品

German Noise Declaration

XP10000: Schalldruckpegel $L_p = 70$ dB(A)

Am Arbeitsplatz (operator position)

Normaler Betrieb (normal operation)

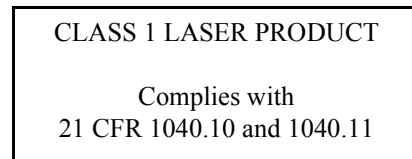
Nach ISO 7779:1988 / EN 27779:1991 (Typprüfung)

Laser Safety

When equipped with native Fibre Channel adapters or iSCSI adapters, this product contains a laser internal to the Optical Link Module (OLM) contained on the 4-port Fibre Channel Adapter board and 4-port FICON board, the 8-port Fibre Channel Adapter board and 8-port FICON board, and the 4-port iSCSI board for connection to a fiber communications network.

In the USA, the OLM is certified as a Class 1 laser product conforming to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. The certification is indicated by a label on the plastic OLM housing. Outside the USA, the OLM is certified as a Class 1 laser product conforming to the requirements contained in IEC 825-1:1993 and EN 60825-1:1994, including Amendment 11:1996.

The following figure shows the Class 1 information label that appears on the plastic housing of the OLM.



Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains internally a semiconductor laser diode in the wavelength range of 770 to 850 nanometers. In the event of a break anywhere in the fibre path, the OLM control system prevents laser emissions from exceeding Class 1 levels. Class 1 laser products are not considered hazardous.



Warning

There are no user maintenance operations, service operations, or adjustments to be performed on the Optical Link Module.

Japan DENAN law cordset caution

Please use the supplied power cord. The power cord may not be used with other products.

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

XP128 Declaration of Conformity

Manufacturer's Name: Hewlett-Packard Company

Manufacturer's Address: 8000 Foothills Blvd.
Roseville, CA 95747
USA

declares, that the product

Product Name: hp StorageWorks disk array xp128

Model Number(s): A7876A, A7876AR

Regulatory Model: N/A

Product Options: All

conforms to the following Product Specifications:

Safety: IEC 60950:1991 + A1, A2, A3, A4 / EN 60950:1992 + A1, A2, A3, A4, A11
GB 4943-1995

IEC 60825-1:1993 + A1 / EN 60825-1:1994 + A11, Class 1 (Laser/LED)

EMC¹: CISPR 22:1997 +A1 / EN 55022:1998 Class A
GB 9254-1988

CISPR 24:1997 / EN 55024:1998

IEC 61000-3-2:1995 / EN 61000-3-2:1995 + A1, A2

IEC 61000-3-3:1994 / EN 61000-3-3:1995

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.


1) The Product was tested in a typical configuration with an HP xp512 disk array and system peripherals from several manufacturers.

Roseville, January 18, 2002


George E. Barrett, Regulatory Mgr.

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH,
Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen (FAX: + 49-7031-14-3143)

XP1024 Declaration of Conformity

	DECLARATION OF CONFORMITY according to ISO/IEC Guide 22 and EN 45014
Manufacturer's Name: Hewlett-Packard Company	
Manufacturer's Address: 8000 Foothills Blvd. Roseville, CA 95747 USA	
declares, that the product	
Product Name:	hp StorageWorks disk array xp1024
Model Number(s):	A7906A, A7906AR, A7925A, A7925AR, A7925U
Regulatory Model:	N/A
Product Options:	All
conforms to the following Product Specifications:	
Safety:	IEC 60950:1991+A1+A2+A3+A4 / EN 60950:1992+A1+A2+A3+A4+A11 GB 4943-1995 IEC 60825-1:1993+A1 / EN 60825-1:1994+A11, Class 1 (Laser/LED)
EMC:	CISPR 22:1997 / EN 55022:1998 Class A GB 9254-1988 CISPR 24:1997 / EN 55024:1998 IEC 61000-3-2:1995 / EN 61000-3-2:1995+A1+A2 IEC 61000-3-3:1994 / EN 61000-3-3:1995
Supplementary Information:	
The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.	
1) The Product was tested in a typical configuration with an HP xp512 disk array and system peripherals from several manufacturers.	
Roseville, October 8, 2002	 George E. Barrett, Regulatory Mgr.
European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen (FAX: +49-7031-14-3143)	

European WEEE statements

Czech

Likvidace zařízení soukromými domácími uživateli v Evropské unii



Tento symbol na produktu nebo balení označuje výrobek, který nesmí být vyhozen spolu s ostatním domácím odpadem. Povinností uživatele je předat takto označený odpad na předem určené sběrné místo pro recyklaci elektrických a elektronických zařízení. Okamžité třídění a recyklace odpadu pomůže uchovat přírodní prostředí a zajistí takový způsob recyklace, který ochrání zdraví a životní prostředí člověka.

Další informace o možnostech odevzdání odpadu k recyklaci získáte na příslušném obecním nebo městském úřadě, od firmy zabývající se sběrem a svozem odpadu nebo v obchodě, kde jste produkt zakoupili.

Danish

Bortskaffelse af affald fra husstande i den Europæiske Union



Hvis produktet eller dets emballage er forsynet med dette symbol, angiver det, at produktet ikke må bortskaffes med andet almindeligt husholdningsaffald. I stedet er det dit ansvar at bortskaffe kasseret udstyr ved at aflevere det på den kommunale genbrugsstation, der forestår genvinding af kasseret elektrisk og elektronisk udstyr. Den centrale modtagelse og genvinding af kasseret udstyr

i forbindelse med bortskaffelsen bidrager til bevarelse af naturlige ressourcer og sikrer, at udstyret genvindes på en måde, der beskytter både mennesker og miljø. Yderligere oplysninger om, hvor du kan aflevere kasseret udstyr til genvinding, kan du få hos kommunen, den lokale genbrugsstation eller i den butik, hvor du købte produktet.

Dutch

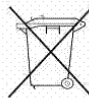
Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie



Dit symbool op het product of de verpakking geeft aan dat dit product niet mag worden gedeponerd bij het normale huishoudelijke afval. U bent zelf verantwoordelijk voor het inleveren van uw afgedankte apparatuur bij een inzamelingspunt voor het recyclen van oude elektrische en elektronische apparatuur. Door uw oude apparatuur apart aan te bieden en te recyclen, kunnen natuurlijke bronnen worden behouden en kan het materiaal worden hergebruikt op een manier waarmee de volksgezondheid en het milieu worden beschermd. Neem contact op met uw gemeente, het afvalinzamelingsbedrijf of de winkel waar u het product hebt gekocht voor meer informatie over inzamelingspunten waar u oude apparatuur kunt aanbieden voor recycling.

English

Disposal of Waste Equipment by Users in Private Household in the European Union



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Estonian

Seadmete jäätmete kõrvaldamine eramajapidamistes Euroopa Liidus



See tootel või selle pakendil olev sümbol näitab, et kõnealust toodet ei tohi koos teiste majapidamisjäätmetega kõrvaldada. Teie kohus on oma seadmete jäätmed kõrvaldada, viies need elektri- ja elektroonikaseadmete jäätmete ringlussevõtmiseks selleks ettenähtud kogumispunkti. Seadmete jäätmete eraldi kogumine ja ringlussevõtmine kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmine toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantselei, majapidamisjäätmete kõrvaldamise teenistuse või kauplusega, kust Te toote ostsite.

Finnish

Laitteiden hävittäminen kotitalouksissa Euroopan unionin alueella



Jos tuotteessa tai sen pakkauksessa on tämä merkki, tuotetta ei saa hävittää kotitalousjätteiden mukana. Tällöin hävitettävä laite on toimitettava sähkölaitteiden ja elektronisten laitteiden kierrätyspisteeseen. Hävitettävien laitteiden erillinen käsittely ja kierrätys auttavat säästämään luonnonvaroja ja varmistamaan, että laite kierrätetään tavalla, joka estää terveyshaitat ja suojelee luontoa. Lisätietoja palkoista, joihin hävitettävät laitteet voi toimittaa kierrätettäväksi, saa ottamalla yhteyttä jätehuoltoon tai liikkeeseen, josta tuote on ostettu.

French

Élimination des appareils mis au rebut par les ménages dans l'Union européenne



Le symbole apposé sur ce produit ou sur son emballage indique que ce produit ne doit pas être jeté avec les déchets ménagers ordinaires. Il est de votre responsabilité de mettre au rebut vos appareils en les déposant dans les centres de collecte publique désignés pour le recyclage des équipements électriques et électroniques. La collecte et le recyclage de vos appareils mis au rebut indépendamment du reste des déchets contribue à la préservation des ressources naturelles et garantit que ces appareils seront recyclés dans le respect de la santé humaine et de l'environnement. Pour obtenir plus d'informations sur les centres de collecte et de recyclage des appareils mis au rebut, veuillez contacter les autorités locales de votre région, les services de collecte des ordures ménagères ou le magasin dans lequel vous avez acheté ce produit.

German

Entsorgung von Altgeräten aus privaten Haushalten in der EU



Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass das Produkt nicht über den normalen Hausmüll entsorgt werden darf. Benutzer sind verpflichtet, die Altgeräte an einer Rücknahmestelle für Elektro- und Elektronik-Altgeräte abzugeben. Die getrennte Sammlung und ordnungsgemäße Entsorgung Ihrer Altgeräte trägt zur Erhaltung der natürlichen Ressourcen bei und garantiert eine Wiederverwertung, die die Gesundheit des Menschen und die Umwelt schützt. Informationen dazu, wo Sie Rücknahmestellen für Ihre Altgeräte finden, erhalten Sie bei Ihrer Stadtverwaltung, den örtlichen Müllentsorgungsbetrieben oder im Geschäft, in dem Sie das Gerät erworben haben.

Greek

Απόρριψη άχρηστου εξοπλισμού από χρήστες σε ιδιωτικά νοικοκυριά στην Ευρωπαϊκή Ένωση



Το σύμβολο αυτό στο προϊόν ή τη συσκευασία του υποδεικνύει ότι το συγκεκριμένο προϊόν δεν πρέπει να διατίθεται μαζί με τα άλλα οικιακά σας απορρίμματα. Αντίθετα, είναι δική σας ευθύνη να απορρίψετε τον άχρηστο εξοπλισμό σας παραδίδοντάς τον σε καθορισμένο σημείο συλλογής για την ανακύκλωση άχρηστου ηλεκτρικού και ηλεκτρονικού εξοπλισμού.

Η ξεχωριστή συλλογή και ανακύκλωση του άχρηστου εξοπλισμού σας κατά την απόρριψη θα συμβάλει στη διατήρηση των φυσικών πόρων και θα διασφαλίσει ότι η ανακύκλωση γίνεται με τρόπο που προστατεύει την ανθρώπινη υγεία και το περιβάλλον. Για περισσότερες πληροφορίες σχετικά με το πού μπορείτε να παραδώσετε τον άχρηστο εξοπλισμό σας για ανακύκλωση, επικοινωνήστε με το αρμόδιο τοπικό γραφείο, την τοπική υπηρεσία διάθεσης οικιακών απορριμμάτων ή το κατάστημα όπου αγοράσατε το προϊόν.

Hungarian

Készülékek magánháztartásban történő selejtezése az Európai Unió területén



A készüléken, illetve a készülék csomagolásán látható azonos szimbólum annak jelzésére szolgál, hogy a készülék a selejtezés során az egyéb háztartási hulladéktól eltérő módon kezelendő. A vásárló a hulladékká vált készüléket köteles a kijelölt gyűjtőhelyre szállítani az elektromos és elektronikai készülékek újrahasznosítása céljából. A hulladékká vált készülékek selejtezési begyűjtése

és újrahasznosítása hozzájárul a természeti erőforrások megőrzéséhez, valamint biztosítja a selejtezett termékek környezetre és emberi egészségre nézve biztonságos feldolgozását. A begyűjtés pontos helyéről bővebb tájékoztatást a lakhelye szerint illetékes önkormányzattól, az illetékes személtakarító vállalattól, illetve a terméket eláruló helyen kaphat.

Italian

Smaltimento delle apparecchiature da parte di privati nel territorio dell'Unione Europea



Questo simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non può essere smaltito insieme ai rifiuti domestici. È responsabilità dell'utente smaltire le apparecchiature consegnandole presso un punto di raccolta designato al riciclo e allo smaltimento di apparecchiature elettriche ed elettroniche. La raccolta differenziata e il corretto riciclo delle apparecchiature da smaltire permette di proteggere la salute degli individui e l'ecosistema. Per ulteriori informazioni relative ai punti di raccolta delle apparecchiature, contattare l'ente locale per lo smaltimento dei rifiuti, oppure il negozio presso il quale è stato acquistato il prodotto.

Latvian

Nolietotu iekārtu iznīcināšanas noteikumi lietotājiem Eiropas Savienības privātajās māsaimniecībās



Šāds simbols uz izstrādājuma vai uz tā iesaiņojuma norāda, ka šo izstrādājumu nedrīkst izmest kopā ar citiem sadzīves atkritumiem. Jūs atbildat par to, lai nolietotās iekārtas tiktu nodotas speciāli iekārtotos punktos, kas paredzēti izmantoto elektrisko un elektronisko iekārtu savākšanai otrreizējai pārstrādei. Atsevišķa nolietoto iekārtu savākšana un otrreizējā pārstrāde palīdzēs saglabāt dabas resursus un garantēs, ka šīs iekārtas tiks otrreizēji pārstrādātas tādā veidā, lai pasargātu vidi un cilvēku veselību. Lai uzzinātu, kur nolietotās iekārtas var izmest otrreizējai pārstrādei, jāvērsas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

Lithuanian

Vartotojų iš privačių namų ūkių įrangos atliekų šalinimas Europos Sąjungoje



Šis simbolis ant gaminio arba jo pakuotės rodo, kad šio gaminio šalinti kartu su kitomis namų ūkio atliekomis negalima. Šalintinas įrangos atliekas privalote pristatyti į specialią surinkimo vietą elektros ir elektroninės įrangos atliekoms perdirbti. Atskirai surenkamos ir perdirbamos šalintinos įrangos atliekos padės saugoti gamtinius išteklius ir užtikrinti, kad jos bus perdirbtos tokiu būdu, kuris nekenkia žmonių sveikatai ir aplinkai. Jeigu norite sužinoti daugiau apie tai, kur galima pristatyti perdirbtinas įrangos atliekas, kreipkitės į savo seniūniją, namų ūkio atliekų šalinimo tarnybą arba parduotuvę, kurioje įsigijote gaminį.

Polish

Pozbywanie się zużytego sprzętu przez użytkowników w prywatnych gospodarstwach domowych w Unii Europejskiej



Ten symbol na produkcie lub jego opakowaniu oznacza, że produktu nie wolno wyrzucać do zwykłych pojemników na śmieci. Obowiązkiem użytkownika jest przekazanie zużytego sprzętu do wyznaczonego punktu zbiórki w celu recyklingu odpadów powstałych ze sprzętu elektrycznego i elektronicznego. Osobna zbiórka oraz recykling zużytego sprzętu pomogą w ochronie zasobów naturalnych i zapewnią ponowne wprowadzenie go do obiegu w sposób chroniący zdrowie człowieka i środowisko. Aby uzyskać więcej informacji o tym, gdzie można przekazać zużyty sprzęt do recyklingu, należy się skontaktować z urzędem miasta, zakładem gospodarki odpadami lub sklepem, w którym zakupiono produkt.

Portuguese

Descarte de Lixo Elétrico na Comunidade Européia



Este símbolo encontrado no produto ou na embalagem indica que o produto não deve ser descartado no lixo doméstico comum. É responsabilidade do cliente descartar o material usado (lixo elétrico), encaminhando-o para um ponto de coleta para reciclagem. A coleta e a reciclagem seletivas desse tipo de lixo ajudarão a conservar as reservas naturais; sendo assim, a reciclagem será feita de uma forma segura, protegendo o ambiente e a saúde das pessoas. Para obter mais informações sobre locais que reciclam esse tipo de material, entre em contato com o escritório da HP em sua cidade, com o serviço de coleta de lixo ou com a loja em que o produto foi adquirido.

Slovak

Likvidácia vyradených zariadení v domácnostiach v Európskej únii



Symbol na výrobku alebo jeho balení označuje, že daný výrobok sa nesmie likvidovať s domovým odpadom. Povinnosťou spotrebiteľa je odovzdať vyradené zariadenie v zbernom mieste, ktoré je určené na recykláciu vyradených elektrických a elektronických zariadení. Separovaný zber a recyklácia vyradených zariadení prispieva k ochrane prírodných zdrojov a zabezpečuje, že recyklácia sa vykonáva spôsobom chrániacim ľudské zdravie a životné prostredie. Informácie o zberných miestach na recykláciu vyradených zariadení vám poskytne miestne zastupiteľstvo, spoločnosť zabezpečujúca odvoz domového odpadu alebo obchod, v ktorom ste si výrobok zakúpili.

Slovenian

Odstranjevanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji



Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjske odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščen za recikliranje odslužene električne in elektronske opreme. Ločeno zbiranje in recikliranje odslužene opreme prispeva k ohranjanju naravnih virov in zagotavlja recikliranje te opreme na zdravju in okolju neškodljiv način. Za podrobnejše informacije o tem, kam lahko odpeljete odsluženo opremo na recikliranje, se obrnite na pristojni organ, komunalno službo ali trgovino, kjer ste izdelek kupili.

Spanish

Eliminación de residuos de equipos eléctricos y electrónicos por parte de usuarios particulares en la Unión Europea



Este símbolo en el producto o en su envase indica que no debe eliminarse junto con los desperdicios generales de la casa. Es responsabilidad del usuario eliminar los residuos de este tipo depositándolos en un "punto limpio" para el reciclado de residuos eléctricos y electrónicos. La recogida y el reciclado selectivos de los residuos de aparatos eléctricos en el momento de su eliminación contribuirá a conservar los recursos naturales y a garantizar el reciclado de estos residuos de forma que se proteja el medio ambiente y la salud. Para obtener más información sobre los puntos de recogida de residuos eléctricos y electrónicos para reciclado, póngase en contacto con su ayuntamiento, con el servicio de eliminación de residuos domésticos o con el establecimiento en el que adquirió el producto.

Swedish

Bortskaffande av avfallsprodukter från användare i privathushåll inom Europeiska Unionen



Om den här symbolen visas på produkten eller förpackningen betyder det att produkten inte får slängas på samma ställe som hushållssopor. I stället är det ditt ansvar att bortskaffa avfallet genom att överlämna det till ett uppsamlingsställe avsett för återvinning av avfall från elektriska och elektroniska produkter. Separat insamling och återvinning av avfallet hjälper till att spara på våra naturresurser och gör att avfallet återvinns på ett sätt som skyddar människors hälsa och miljön. Kontakta ditt lokala kommunkontor, din närmsta återvinningsstation för hushållsavfall eller affären där du köpte produkten för att få mer information om var du kan lämna ditt avfall för återvinning.

ACP	Array control processor. The ACP handles the passing of data between the cache and the physical drives held in the DKUs. ACPs work in pairs, providing a total of eight SCSI buses. Each SCSI bus associated with one ACP is paired with a SCSI 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.
AL	Arbitrated loop.
AL-PA	Arbitrated loop physical address.
allocation	The ratio of allocated storage capacity versus total capacity as a percentage. “Allocated storage” refers to those LDEVs that have paths assigned to them. The allocated storage capacity is the sum of the storage of these LDEVs. Total capacity refers to the sum of the capacity of all LDEVs on the disk array.
array group	A group of 4 or 8 physical hard disk drives (HDDs) installed in an XP disk array and assigned a common RAID level. RAID1 2D+2D array groups are made up of 4 HDDs. A RAID1 4D+4D group is two 4 HDD array groups concatenated together. RAID5 array groups are made up of 4 or 8 HDDs, depending on whether they are RAID5 3D+1P or RAID5 7D+1P, respectively. All RAID6 array groups are made up of 8 HDDs (6D+2P).
ASE	Application System Engineer.
BC	The HP StorageWorks Business Copy XP software program, which enables you to maintain up to nine internal copies of logical volumes on the disk array.

C-Track	The HP StorageWorks Continuous Track XP software program, which detects internal hardware component problems on a disk array and automatically reports them to the HP STC.
CA	The HP StorageWorks Continuous Access XP program, which enables you to replicate data stored on a local disk array to a remote disk array.
cache	<p>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.</p> <p>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.</p> <p>XP arrays support a range of cache memory. In the event of power loss, battery power holds up the contents of cache for up to 36 hours.</p>
CE	Customer engineer.
channel adapter (CHA)	The channel adapter (CHA) provides the interface between the disk array and the external host system. Occasionally this term is used synonymously with the term channel host interface processor (CHIP).
channel host interface processor (CHIP)	Synonymous with the term channel adapter (CHA).
channel processor (CHP)	The processors located on the channel adapter (CHA). Synonymous with CHIP.
command device	A volume on the disk array that accepts Continuous Access or Business Copy control operations which are then executed by the disk array.
control unit	To organize the storage space attached to the DKC, you can group similarly configured logical devices (LDEVs) with unique control unit images (CUs). CUs are numbered sequentially. The disk array supports a certain number of CUs, depending on the disk array model. Each CU can manage multiple LDEVs. Therefore, to uniquely identify a particular LDEV requires both the CU number and the LDEV number.

CU	Control unit.																
CVS	Custom volume size. CVS devices (OPEN-x CVS) are custom volumes configured using array management software to be smaller than normal fixed-size OPEN system volumes. Synonymous with volume size customization (VSC).																
disk adapter (DKA)	Synonymous with the term ACP.																
disk unit (DKU)	The array hardware that houses the disk array physical disks.																
disk controller (DKC)	The array hardware that houses the channel adapters and service processor (SVP).																
disk recovery and restore unit (DRR)	The unit responsible for data recovery and restoration in the event of a cache failure.																
disk group	The physical disk locations associated with a parity group.																
disk type	The manufacturing label burned into the physical disk controller firmware. In most cases, the disk type is identical to the disk model number.																
emulation modes	The logical devices (LDEVs) associated with each RAID group are assigned an emulation mode that makes them operate like OPEN system disk drives. The emulation mode determines the size of an LDEV.																
	<table> <tr> <td>OPEN-3:</td> <td>2.46 GB</td> </tr> <tr> <td>OPEN-8:</td> <td>7.38 GB</td> </tr> <tr> <td>OPEN-9:</td> <td>7.42 GB</td> </tr> <tr> <td>OPEN-E:</td> <td>13.56 GB</td> </tr> <tr> <td>OPEN-K:</td> <td>Not available on this disk array</td> </tr> <tr> <td>OPEN-L:</td> <td>36 GB</td> </tr> <tr> <td>OPEN-M:</td> <td>Not available on this disk array</td> </tr> <tr> <td>OPEN-V:</td> <td>User-defined custom size</td> </tr> </table>	OPEN-3:	2.46 GB	OPEN-8:	7.38 GB	OPEN-9:	7.42 GB	OPEN-E:	13.56 GB	OPEN-K:	Not available on this disk array	OPEN-L:	36 GB	OPEN-M:	Not available on this disk array	OPEN-V:	User-defined custom size
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OPEN-V:	User-defined custom size																
EPO	Emergency power-off.																
ESCON	Enterprise System Connection (the IBM trademark for optical channels).																
expanded LUN	A LUN is normally associated with only a single LDEV. The LUSE feature allows a LUN to be associated with 1 to 36 LDEVs. Essentially, LUSE makes it possible for applications to access a single large pool of storage.																

The LUSE feature is available when the HP StorageWorks LUN Configuration Manager product is installed.

ExSA	Extended serial adapter.
failover	Disconnecting a failed unit or path and replacing it with an alternative unit or path in order to continue functioning.
FC	Fibre Channel.
FC-AL	Fibre Channel arbitrated loop.
FCP	Fibre Channel Protocol.
fence level	A level for selecting rejection of a write I/O request from the host according to the condition of mirroring consistency.
FICON	IBM mainframe Fiber Optic Connection.
GB	Gigabytes.
GLM	Gigabyte link module.
HA	High availability.
HBA	Host bus adapter. A built-in function or a card installed in a PC or other host computer to enable connection of the host to the SAN.
host mode	Each port can be configured for a particular host type. These modes are represented as two-digit hexadecimal numbers. For example, host mode 08 represents an HP-UX host.
hot standby	Using two or more servers as a standby in case of a primary server failure.
HP	Hewlett-Packard Development Company.
I/O	Input/output (applies to an operation or device).
LAN	Local area network.
LD, LDEV	Logical device. An LDEV is created when a RAID group is carved into pieces according to the selected host emulation mode (that is, OPEN-3, OPEN-8, OPEN-9). The number of resulting LDEVs depends on the selected emulation mode. The term LDEV is often used synonymously with the term volume.

LED	Light emitting diode.
local disk	A disk in the host.
LU	Logical unit.
LUN	Logical unit number. A LUN results from mapping a SCSI logical unit number, port ID, and LDEV ID to a RAID group. The size of the LUN is determined by the emulation mode of the LDEV, and the number of LDEVs associated with the LUN. For example, a LUN associated with two OPEN-3 LDEVs has a size of 4,693 MB.
LUSE	Logical unit size expansion. See also <i>Expanded LUN</i> .
m	Meters.
MB	Megabytes.
MCU	Main control unit.
MIX	A circuit board in the disk control unit that includes disk adapters and channel adapters for interfacing disk drives and the host to cache memory.
mirroring consistency	The consistency (usability) of data in a volume (for example, S-VOL).
mm	Millimeters.
MR	Magnetoresistive.
ms, msec	Milliseconds.
mutual hot standby system	Two servers that are poised to cover for each other if necessary.
NAS	Network attached storage.
node	Logically speaking, an environment where instances can be executed. Physically, a processor, which is an element of a cluster system.
NVS	Nonvolatile storage.
OFC	Open Fibre Control.
OLM	Optical link module.

OS	Operating system.
PA	Physical address.
parity group	A parity group is a disk configuration in which multiple disks work together to provide redundancy. Synonymous with “array group.”
partition	Dividing a specific physical disk into two or more areas as if there are two or more physical disks.
path	Paths are created by associating a port, a target, and a LUN ID with one or more LDEVs.
PCI	Power control interface or peripheral component interconnect.
port	A physical connection that allows data to pass between a host and the disk array. The number of ports on an XP disk array depends on the number of supported I/O slots and the number of ports available per I/O adapter. The XP family of disk arrays supports Fibre Channel (FC) ports as well as other port types. Ports are named by port group and port letter, such as CL1-A. CL1 is the group, and A is the port letter.
P-P	Point-to-point.
PS	Power supply.
RS	Russellstoll [®] , a brand of electrical plugs and receptacles manufactured by Thomas & Betts Corporation.
RAID	Redundant array of independent disks.
RAID group	See “array group.”
RAID level	A RAID Level is one of the ways that disk drives are grouped together to improve performance, data availability/reliability or both. RAID levels are defined from RAID0 to RAID6. HP StorageWorks Disk Arrays in the XP product family support RAID1, RAID5 and RAID6. Not all of these RAID levels are supported by all XP family members. Consult the owner's guide or your HP representative for the details of which RAID levels are supported by your specific XP disk array.
RAM	Random access memory.

RM	HP StorageWorks RAID Manager XP, a command line interface for managing XP arrays.
R-SIM	Remote service information message.
R/W, r/w	Read/write.
script file	A file containing a shell script.
SCSI	Small computer system interface.
shell script	A command sequence executed by a UNIX shell.
sidefile	An area of cache used to store the data sequence number, record location, record length, and queued control information.
SIM	Service information message.
SMI-S	Storage Management Initiative Specification.
SMS	System managed storage.
SNMP	Simple Network Management Protocol.
SSID	Storage subsystem identification.
STC	HP Storage Technology Center.
SVP	Service processor, which is the PC built into the disk controller. The SVP provides a direct interface into the disk array. <i>SVP use is reserved for HP support representatives only.</i>
TB	Terabyte.
TCP/IP	Transmission control protocol/Internet protocol
TID	Target ID.
VSC	Volume size customization. Synonymous with CVS.
VOLID	Volume ID.
volume	Synonymous with LDEV.

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