

HP StorageWorks XP12000 Disk Array Owner's Guide

sixth edition (September 2005)

part number: AE002-96020

This guide describes features, components, options, and general operations for the HP StorageWorks XP12000 Disk Array.



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Contents

About this guide	7
Related information	7
HP storage web site	7
Helpful web sites	8
HP technical support	8
HP authorized reseller	9
Document conventions and symbols	9
Revision history	10
1 Overview	11
Continuous data availability	12
Nondisruptive service and upgrades	13
Connectivity	14
Fibre Channel	14
ESCON	14
FICON	14
Scalability	15
Data integrity and high availability	16
Summary of features	17
Web-based array management	17
Operating systems	17
External storage	18
Included components	18
Required additional components	19
Optional components	19
Hardware specifications	20
2 Hardware	21
Physical components	22

Disk control frame	23
Control panel	23
Unit emergency power off switch	30
Service processor (SVP)	30
Disk drives	31
HP StorageWorks Continuous Track XP	31
Disk array frames	32
Disk drives	32
RAID options	32
Backup batteries	33
Disk array management	34
Specifications	35
Temperature	35
Humidity	36
Mechanical vibration	36
AC line voltage requirements	36

3 Operations 41

General safety guidelines	42
Powering down the disk array	44
Emergency power-off	44
Planned power-off	46
Recovering from an unplanned power outage	47
Manual restart of the disk array after power is restored	47
Automatic restart when power is restored	48

4 HP StorageWorks XP Disk Array family of software products 49

Storage area management software	50
HP OpenView Storage Area Manager suite	50
Device and configuration management software	51
HP StorageWorks XP Remote Web Console and Command View Advanced Edition (AE)	51
HP StorageWorks LUN Configuration and Security Manager XP	52
HP StorageWorks LUN Security XP Extension	52
HP StorageWorks External Storage XP	53
Performance management software	54
HP StorageWorks Cache LUN XP	54
HP StorageWorks Auto LUN XP	54
HP StorageWorks Performance Advisor	54
HP StorageWorks Performance Control XP	55

Replication software	56
HP StorageWorks Business Copy	56
HP StorageWorks Continuous Access	56
HP StorageWorks Continuous Access Extension	56
HP StorageWorks Flex Copy XP	56
Multipathing/high availability software	57
HP StorageWorks Secure Path	57
HP StorageWorks Data Integrity Check for XP	57
Mainframe software	59
HP StorageWorks Resource Manager XP	59
HP StorageWorks Data Exchange XP	59
Business continuity solutions	60
HP OpenView Data Protector	60
HP StorageWorks Cluster Extension XP	60
HP StorageWorks Fast Recovery Solution for Windows 2003	61
HP StorageWorks Rapid Backup Solution with Direct Backup XP	61
5 Troubleshooting	63
Service information messages	64
Failure detection and reporting process	65
6 Regulatory statements	67
FCC EMC statement (USA)	68
IEC statement (worldwide)	69
EMC statement (Canada)	70
Spécification ATI Classe A (France)	71
VCCI EMC statement (Japan)	72
BSMI EMC statement (Taiwan)	73
RRL EMC statement (Korea)	74
Harmonics conformance (Japan)	75
German noise declaration	76
Laser safety	77
Japan DENAN law cordset caution	78
European WEEE statements	79
Glossary	87
Index	95

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

Unless otherwise noted, the term *disk array* refers to the HP StorageWorks disk array models listed on the title page of this publication.

Related information

For additional product documentation, refer to the following guides:

- *HP StorageWorks XP12000 Disk Array Site Preparation Guide*
- *HP StorageWorks Remote Web Console XP User Guide*
- *HP StorageWorks Command View XP Advanced Edition 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>

HP storage web site

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

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

Helpful web sites

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

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

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

HP technical support

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

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 authorized reseller

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**.

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
Blue underlined sans serif font (www.hp.com)	Web site addresses

Caution *Failure to follow directions could result in hardware or software damage.*



Warning

Failure to follow directions could result in personal injury or death.

Revision history

September 2004	First edition
September 2004	Second edition
March 2005	Third edition
May 2005	Fourth edition
July 2005	Fifth edition
September 2005	Sixth edition

Overview

This disk array is part of the HP StorageWorks XP Disk Array family of products, which provide reliable and secure data storage and protection. These disk arrays also support multiple operating systems, platforms, and RAID groups. Advantages include:

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

Continuous data availability

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

The following features ensure continuous data availability:

- No single point of component failure, which enables uninterrupted access to data
- Component and function redundancy, providing full fault tolerance for disk array microprocessors, control storage, cache, control and data buses, power supplies, and cooling fans
- Can sustain multiple component failures and still continue to provide full access to stored data

Note Although access to data is not compromised, the failure of a key component can cause a temporary reduction in disk array performance.

Nondisruptive service and upgrades

Without disrupting normal disk array operations (if alternate pathing is used), an HP support representative can:

- Remove, service, repair, or replace hardware subassemblies
- Use the built-in service processor (SVP) to upgrade microcode

Alternate paths can be established using host failover software, alternate Fibre Channel paths, or both.

Caution *The disk array has no user-serviceable components. The SVP does not include a keyboard or monitor and is not a customer-accessible component. Only an HP support representative should open the cabinets.*

HP StorageWorks Continuous Track XP monitoring software detects internal hardware component problems and automatically reports them to the HP Storage Technology Center (STC) before they are noticed by operators and users. An HP support representative can then verify the problem and perform the appropriate maintenance activity, with no interruption to applications or hosts. For more information on Continuous Track XP, see “HP StorageWorks Continuous Track XP” ([page 31](#)).

Connectivity

The disk array uses these types of connections to connect to host systems:

- Fibre Channel
- ESCON
- FICON

Fibre Channel

The disk array supports:

- A maximum of seven¹ pairs of channel adapters that can support up to 224 Fibre Channel ports
- Up to 16,384 LDEVs that can be configured as up to 229,376 LUNs² through the Fibre Channel, which provides data transfer rates up to 4 GB/s depending on the Fibre Channel interface option
- Fibre Channel arbitrated loop (FC-AL) and Fabric Fibre Channel topologies

ESCON

The disk array supports a maximum of seven¹ pairs of channel adapters that can support 112 ESCON ports for connection to mainframe hosts and up to 16,384 LDEVs.

FICON

The disk array supports a maximum of seven¹ pairs of channel adapters that can support up to 112 FICON ports and up to 16,384 LDEVs.

1. When more than four CHIP pairs are installed, each additional pair reduces the maximum number of ACP pairs by one. For example, an array with six CHIP pairs can have a maximum of two ACP pairs installed.
2. The maximum number of LUNs is 1024 per installed FC port.

Scalability

The disk array is scalable to accommodate your current and future storage capacity needs.

The minimum XP12000 configuration includes one DKC containing 9 to 128 disk drives. You can expand the disk array to include one to four DKUs, each containing up to 256 disk drives. The maximum array configuration can contain 1152 disk drives providing up to 332 TB of storage capacity in a single array.

Your HP support representative can add DKUs and disk drives online with no interruptions to applications or hosts.

Data integrity and high availability

To provide the highest levels of data integrity and availability, the HP StorageWorks XP Disk Array family uses RAID technologies and redundant hardware throughout the disk arrays, including:

- RAID1, RAID5, RAID6
- 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

The following software features and products help to ensure that the disk array meets your requirements for high availability:

- XP12000 support
 - Capability to “phone home” to the multidisciplinary HP Storage Technology Center (STC). See “HP StorageWorks Continuous Track XP” ([page 31](#)).
 - Advanced remote diagnostics
 - Full solution (host-SAN-storage) support
- Full software and solution integration enabled by HP software products. See [Chapter 4](#) for details.

Summary of features

This section summarizes the features and specifications of the disk array. For the most current product information, visit the HP web site: <http://h18006.www1.hp.com/storage/enterprisestorage.html>.

Web-based array management

The disk array comes with HP StorageWorks Remote Web Console, a browser-based interface that runs on the SVP and enables you to manage one disk array. For managing multiple arrays, the optional HP StorageWorks Command View XP or Command View XP Advanced Edition runs on a single Windows-based Device Manager server and can be accessed using remote web-based clients.

Operating systems

The disk array supports these operating systems:

- HP-UX
- Linux
- Windows
- HP OpenVMS
- HP Tru64
- Sun Solaris
- IBM AIX
- MPE/iX
- Novell NetWare
- SGI IRIX64
- Guardian for HP NonStop servers
- VMware

The disk array also supports various mainframe operating systems through ESCON and FICON host interconnections. For the latest information on supported operating systems and versions, contact your HP support representative or visit the HP web site: www.hp.com.

External storage

The disk array supports the following types of external storage:

- HP StorageWorks XP48, XP512, XP128, and XP1024 disk arrays
- HP StorageWorks Modular Smart Array 1000
- HP StorageWorks EVA 3000 and 5000 disk arrays
- Specific disk array models of other manufacturers. Consult your HP representative for details.

For more information about HP external storage, see the *HP StorageWorks Command View XP for XP Disk Arrays User Guide* or *Command View XP Advanced Edition for XP Disk Arrays User Guide* as applicable.

Included components

The XP12000 base product includes the following hardware, software, services, and support:

- One XP12000 DKC
- Basic redundant power supplies and base batteries for up to 64 GB of cache and up to 64 disk drives
- HP microcode
- Continuous Track XP
- Modem
- This owner's guide
- An XP operating system configuration guides CD
- RAID Manager library
- Site preparation services
- Installation and configuration services
- Proactive 24 support for one year
- Reactive hardware support, 24x7, for two years
- Software support for one year (included with software title)

Required additional components

- Cache memory
- Shared memory
- ACP pair
- CHIP pair
- Hard disk drives
- HP StorageWorks XP Remote Web Console ([page 51](#))
- HP StorageWorks LUN Configuration and Security Manager XP ([page 52](#))

Optional components

HP offers an extensive list of optional products and services tailored for XP disk arrays, including a full suite of software products. HP StorageWorks Command View XP or Command View XP Advanced Edition ([page 51](#)) are among these options.

For more information, see [Chapter 4](#) and contact your HP support representative.

Hardware specifications

Table 2. Hardware specifications

Feature	Specification
Power	Single-phase or 3-phase
DKC/DKU	One XP12000 DKC Zero to four XP12000 DKUs
Maximum hard disk drives	1152
Maximum spare disk drives	40
Maximum parity groups/subsystem	280
Maximum disk drive capacity	332 TB
Maximum cache	128 GB
Available hard disk drives	146 GB 10K rpm Fibre Channel 146 GB 15K rpm Fibre Channel 73 GB 15K rpm Fibre Channel 300 GB 10K rpm Fibre Channel
Maximum shared memory	12 GB ¹
ACP pairs	1 to 4
CHIP pairs	1 to 7 ²
Configuration disk	XP12000-specific
SVP code	XP12000-specific
High-availability secondary SVP	Optionally available
RAID level	RAID 1 (2D+2D) RAID 1 (4D+4D) RAID 5 (3D+1P) RAID 5 (7D+1P) RAID 6 (6D+2P)
Maximum LDEVs	16,384 ³
Available LUNs	229,376
Maximum LUNs per port	1024

1. The amount of shared memory available depends on your configuration.
2. Each added CHIP pair above four reduces available ACP slots by one.
3. Contact HP for the firmware version required to achieve this number of LDEVs.

Hardware

The HP StorageWorks XP series of disk arrays are high-performance RAID-capable disk array systems used to store large quantities of data in an efficient and secure manner.

There are no single points of failure in the disk arrays. They include redundant logic assemblies, controllers, disk drives, and power supplies, all of which can be removed or replaced without interrupting access to data.

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

Physical components

The disk array includes the following major hardware components:

- One disk control frame (DKC), [page 23](#)
- Zero to four disk array frames (DKUs), [page 32](#)
- One service processor (SVP), [page 30](#)

To monitor and manage the array, a Device Manager server ([page 34](#)) is also required.

[Figure 1](#) shows the disk array with the maximum of four DKUs.

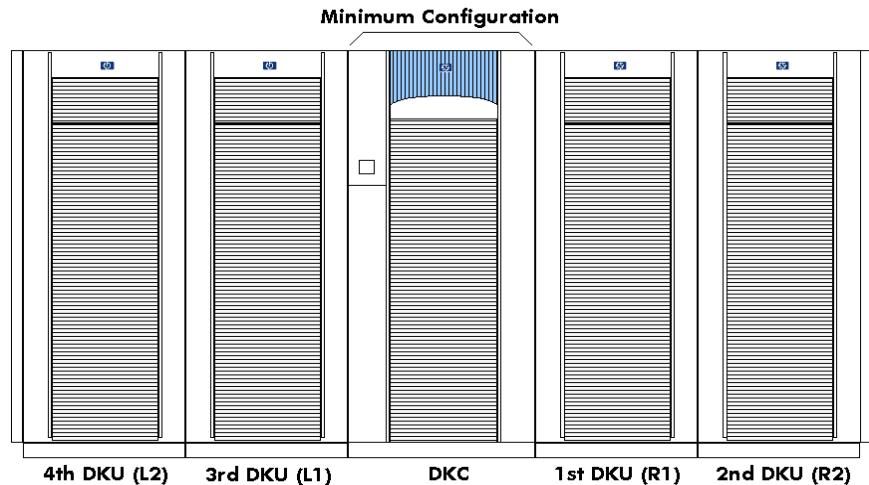


Figure 1. Disk array minimum/maximum configuration

Disk control frame

The DKC controls the disk array. It contains the control panel, connection hardware, power supplies, SVP, and control boards for the disk array. It also contains 9 to 128 disk drives.

Control panel

Once the disk array is powered on and running normally, no user operations are required at the control panel, except when instructed by your HP support representative.

Figure 2 ([page 24](#)) shows the control panel location and layout. Table 3 ([page 25](#)) explains the control panel functions.

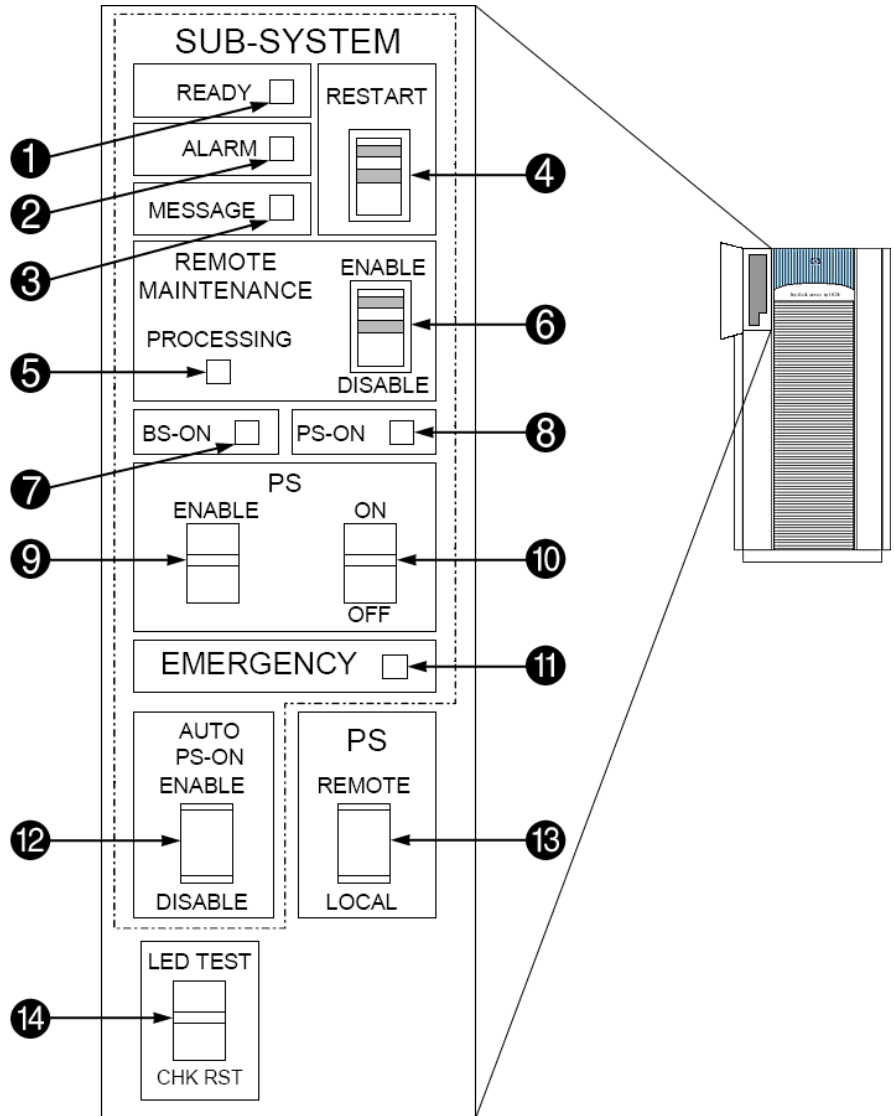


Figure 2. Control panel

Table 3. Control panel functions

Item	Label	Indicator	Description
1	SUB-SYSTEM READY	LED (Green)	<p>During normal operation, this LED should be on.</p> <p>On: Input/output operation on the channel interface is enabled.</p> <p>Off: The system is not accepting data.</p>
2	SUB-SYSTEM ALARM	LED (Red)	<p>During normal operation, this LED should be off.</p> <p>On: One or more of the following:</p> <ul style="list-style-type: none"> • The DC is under the voltage of the DKC part. • The DC is over current. • The temperature is abnormally high. • An unrecoverable failure has occurred. <p>If the disk array is set up to “phone home” to STC, your HP support representative is notified automatically. If the disk array is not set up to “phone home,” place a service call to HP to have the message evaluated to determine if any action is required.</p> <p>Blinking: The DC is under the voltage of the DKU part.</p>
3	SUB-SYSTEM MESSAGE	LED (Amber)	<p>During normal operation, this LED should be off.</p> <p>On: A service information message (SIM) has been issued from either storage cluster. If the disk array is set up to “phone home” to STC, your HP support representative is notified automatically. If the disk array is not set up to phone home, place a service call to HP to have the message evaluated to determine if any action is required.</p> <p>Blinking: An SVP failure has occurred. The disk array will continue to operate normally. Place a service call to HP to ensure notification. SVP failures might not be reported automatically to STC.</p>

Table 3. Control panel functions (continued)

Item	Label	Indicator	Description
4	SUB-SYSTEM RESTART	Switch	<p>If a blocked path occurs between a host and a disk drive, this switch is used to unfence the fenced drive path and to release Write Inhibit.</p> <p>During normal operation, this switch should be in the upper position.</p> <p>Restarting the subsystem performs a soft reset to try to recover. If the system restart does not unblock the path, an HP support representative will be notified.</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p>
5	REMOTE MAINTENANCE PROCESSING	LED (Amber)	<p>During normal operation, this LED may be on if remote maintenance is allowed (the REMOTE MAINTENANCE ENABLE/DISABLE switch (6) is in the ENABLE position).</p> <p>On: Remote maintenance is in progress. An HP support representative is probably working on the system, but the system is online and accepting data.</p>
6	REMOTE MAINTENANCE ENABLE/DISABLE	Switch	<p>Used to permit remote service maintenance. During normal operation, this switch should be in the ENABLE position.</p> <p>Disable: No one can provide remote maintenance.</p> <p>Enable: An HP support representative can provide remote maintenance.</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p>

Table 3. Control panel functions (continued)

Item	Label	Indicator	Description
7	BS-ON	LED (Amber)	<p>During normal operation, this LED should be on.</p> <p>On: The disk array is plugged in and receiving power from the primary AC outlet. The SVP is receiving power from the outlet.</p> <p>Off: The disk array is not receiving power from the primary AC outlet. Check the electrical outlets in your building.</p>
8	PS-ON	LED (Green)	<p>During normal operation, this LED should be on.</p> <p>On: The PS ON/OFF switch is on. If the SUB-SYSTEM READY light (1) is also on, the disk array is ready to receive data.</p> <p>Off: The PS ON/OFF switch is off and the disk array is not ready to receive data.</p>
9	PS ENABLE	Switch	<p>Used to enable the PS ON/OFF switch (10). During normal operation, this switch should be in the “Disable” position (opposite the ENABLE position).</p> <p>Enable: The PS ON/OFF switch can be used.</p> <p>“Disable”: The PS ON/OFF switch cannot be used.</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p> <hr/>

Table 3. Control panel functions (continued)

Item	Label	Indicator	Description
10	PS ON/OFF	Switch	<p>Used to power on/off the disk array. During normal operation, this switch should be in the ON position.</p> <p>The switch functions only if:</p> <ul style="list-style-type: none"> • The PS ENABLE switch (9) is in the ENABLE position. <p style="text-align: center;"><i>and</i></p> <ul style="list-style-type: none"> • The PS REMOTE/LOCAL switch (13) is in the LOCAL position. <hr/> <p>Caution: Do not change the switch position unless directed to do so by HP service personnel.</p> <hr/>
11	EMERGENCY	LED (Red)	<p>During normal operation, this LED should be on.</p> <p>On: The UNIT EMERGENCY POWER OFF switch on the back of the disk array cabinet is in the ON position.</p> <p>Off: The UNIT EMERGENCY POWER OFF switch is in the OFF position. Place a service call to HP to have an HP support representative reset the switch.</p>

Table 3. Control panel functions (continued)

Item	Label	Indicator	Description
12	AUTO PS-ON ENABLE/DISABLE	Switch	<p>Used to enable the automatic power on restart feature, which specifies how the disk array is powered on when the AC power is turned on or restored after a power outage.</p> <p>Enable: When the AC power is turned on, the disk array is powered on automatically.</p> <hr/> <p>Caution: <i>As with all sophisticated electronic equipment, unstable power conditions during a restart can cause problems. This switch should be in the ENABLE position only if the power to the disk array is subject to power conditioning equipment, such as a UPS, to ensure that the power restored to the disk array is stable. If your site does not have a UPS, keep this switch in the DISABLE position. After a power outage, follow the manual restart procedure only after power has been restored and verified to be stable.</i></p> <hr/> <p>Disable: The disk array must be powered on manually, using the PS ON/OFF switch (10) or the host power control interface (PCI) (<i>mainframe only</i>).</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p> <hr/>

Table 3. Control panel functions (continued)

Item	Label	Indicator	Description
13	PS REMOTE/LOCAL	Switch	<p>Determines how the disk array is powered on or off. During normal operation, this switch may be in either position, depending on your operating environment.</p> <p>Remote: Disk array is powered on/off by the instructions of the host PCI (<i>mainframe only</i>).</p> <p>Local: Disk array is powered on/off by the PS ON/OFF switch (10).</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p>
14	LED TEST/CHK RST	Switch	<p>Used by an HP support representative to test the functioning of the LEDs on the control panel or to reset various alarms. During normal operations, this switch should be in the middle position between LED TEST and CHK RST.</p> <hr/> <p>Caution: <i>Do not change the switch position unless directed to do so by HP service personnel.</i></p>

Unit emergency power off switch

The UNIT EMERGENCY POWER OFF switch is located on the back of the DKC cabinet. For information on using this switch, see “Emergency power-off” (page 44).

Service processor (SVP)

The SVP blade processor inside the DKC performs these functions:

- Collects performance data on the disk array for diagnostic testing and analysis; see “Service information messages” (page 64)
- Provides your HP support representative with access to the disk array

Your HP support representative uses the SVP to configure, maintain, and upgrade the disk array software and hardware. The SVP does not include a keyboard or monitor and is not a customer-accessible component.

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

Note If you have extreme availability requirements, an optional second SVP is available.

Disk drives

The DKC must contain at least nine hard disk drives and can contain up to 128. For more information, see “Disk drives” ([page 32](#)) and Table 2 ([page 20](#)).

HP StorageWorks Continuous Track XP

Continuous Track XP is a program in the disk array that detects and reports problems even before they are noticed by operators and users. Continuous Track XP “phones home” to the HP Storage Technology Center (STC), providing:

- Periodic “well” checkups

This checkup records the health of the disk array on a day-to-day basis. Every 24 hours, Continuous Track XP calls STC (your HP support representative sets the time of the call). When a successful connection is made, status information is transferred from the disk array to STC. If any configuration changes have been made, configuration information is also sent.

- Incidental “sick” calls

When an error occurs, a service information message (SIM) is generated, stored in the disk array for use by your HP support representative, and reported to STC. For more information, see [Chapter 5](#).

Note The “phone home” capability can be turned off, if desired. Continuous Track XP still monitors the disk array, but does not automatically notify HP if a problem occurs.

Disk array frames

DKUs are optional cabinets that allow you to expand the disk array's storage capacity. DKUs contain physical disk drives. The disk array can include up to four DKUs. Four DKUs fully populated with disk drives provide up to 332 TB of storage capacity.

Disk drives

Each DKU can contain up to 256 hard disk drives. A variety of disk capacities are available; see Table 2 ([page 20](#)). Ask your HP support representative about currently available disk drives. The disk array automatically detects and corrects disk errors, and an HP support representative can replace any of the disk drives without disrupting user activity.

The disk array must contain at least one spare disk drive and can contain up to 40. Any of the spare disk drives can back up any other disk drive of equal rotational speed and equal or lesser capacity, in any DKU, even if the failed disk and the spare disk are in different array domains.

RAID options

The disk array supports RAID1, RAID5, or RAID6 array groups.

Backup batteries

In each frame (DKC and DKU), internal nickel-metal-hydrate batteries provide backup power for the cache memory, shared memory, ACPs, CHIPS, and disk drives. If AC input power is lost, the backup batteries enable the disk array to continue normal operations for up to one minute. If power is not restored within one minute, the disk array executes either the De-Stage or Backup battery operation mode.

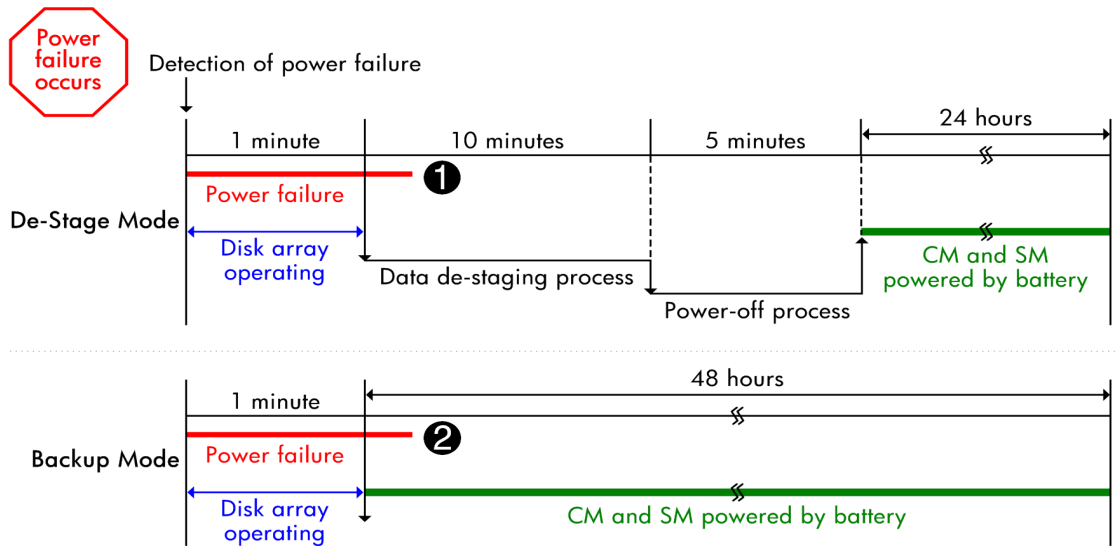


Figure 3. Battery operation modes

Table 4.

1	If power is restored during the de-staging process, the disk array continues with the data de-staging and power-off processes.
2	If power is restored during the battery backup period, the disk array either automatically restarts or must be restarted manually, depending on the setting of the AUTO PS-ON ENABLE/DISABLE switch (page 29) on the control panel. For more information, see “Recovering from an unplanned power outage” (page 47).

HP representatives will help you determine the best battery mode for your configuration, and will configure the selected mode during installation.

Disk array management

HP Remote Web Console (RWC) allows browser-based management of a single disk array. The optional Command View XP Advanced Edition software may be installed on an optional Device Manager server to enable additional management capabilities, including the ability to manage multiple arrays. Other HP StorageWorks XP Disk Array software may also be installed on this host; see [Chapter 4](#) for information on optional HP software products.

To protect your security, Remote Web Console and HP Command View XP Advanced Edition do not have access to user data stored on the disk array.

You may use an existing host (such as your storage administrator's PC) as the Device Manager server provided that it meets system requirements for the software you plan to deploy.

The CV XP AE Device Manager server connects to the disk array(s) using a private Ethernet LAN connection, as shown in [Figure 4](#).

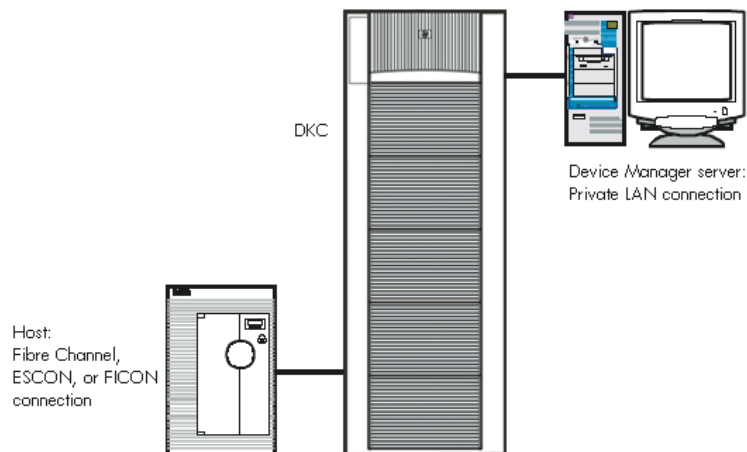


Figure 4. Connections to the disk array

Specifications

This section provides some general specifications for the XP12000. For complete specifications, see the *HP StorageWorks XP12000 Disk Array Site Preparation Guide*, available on the HP web site: www.hp.com.

Temperature

Table 5. Temperature specifications

Temperature range type	Range
Recommended operating temperature range	21° to 24° C 70° to 75° F
Operating temperature	16° to 32° C 61° to 89° F
Nonoperating temperature range	-10° to +43° C 14° to 109° F
Shipping and storage temperature (product packed in factory packing)	-25° to +60° C -13° to +140° F
Temperature shock immunity (maximum rate of temperature change)	10° C per hour 18° F per hour
Over-temperature warning	At 40° C At 104° F
Over-temperature shutdown	At 60° C At 140° F

Humidity

Take care to protect the disk array from excessive humidity. You should not observe condensation in or around the product under any conditions. There is no procedure for recovery from moisture condensation.

Table 6. Humidity specifications

Humidity range type	Noncondensing relative humidity (RH)
Recommended operating humidity range at 22° C (71° F)	50% to 55%
Operating humidity range at 22° C (71° F)	20% to 80%
Nonoperating humidity range	8% to 90%
Shipping and storage humidity range (product packed in factory packing)	5% to 95%

Mechanical vibration

Maximum operating acceleration is 0.05G at a frequency range of 10 to 300 Hz.

AC line voltage requirements

This section lists the AC power recommendations for each power cord. Each DKC or DKU has two or four power cords. In case of a failure of the power source for one cord, the power requirements, and therefore the current requirement for the remaining power cord, will double.

For details on electrical specifications, cabling, and connectors, see the *HP StorageWorks XP12000 Disk Array Site Preparation Guide*.

50-amp, single-phase DKC

Table 7. 40-Amp, 50 or 60 Hz, single-phase DKC operation

Parameter	Nominal rated voltage (VAC)				
	200	208 ¹	220	230	240
Rated line current per power cord (amps RMS)	22.6	21.7	20.5	19.6	18.8
Number of power cords	2	2	2	2	2
Recommended circuit breakers	50A	50A	50A	50A	50A
Number of circuit breakers	2	2	2	2	2

1 60 Hz only.

30-amp, single-phase DKC

Table 8. 30-Amp, 50 or 60 Hz, single-phase DKC operation

Parameter	Nominal rated voltage (VAC)				
	200	208 ¹	220	230	240
Rated line current per power cord (amps RMS)	11.3	10.9	10.3	9.8	9.4
Number of power cords	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A
Number of circuit breakers ²	4	4	4	4	4

1 60 Hz only.

2 Units with only two power cords require only two circuit breakers.

30-amp, three-phase DKC

Table 9. 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 (amps RMS)	13	12.5	11.9	11.3	10.9	6.9	6.5	6.3
Number of power cords	2	2	2	2	2	2	2	2
Recommended circuit breakers	30A	30A	30A	30A	30A	30A	30A	30A
Number of circuit breakers	2	2	2	2	2	2	2	2

¹ 60 Hz only.

50-amp, single-phase DKU

Table 10. 50-Amp, 50 or 60 Hz, single-phase DKU operation

Parameter	Nominal rated voltage (VAC)				
	200	208 ¹	220	230	240
Rated line current per power cord (amps RMS)	18	17.3	16.4	15.7	15
Number of power cords	2	2	2	2	2
Recommended circuit breakers	50A	50A	50A	50A	50A
Number of circuit breakers	2	2	2	2	2

¹ 60 Hz only.

30-amp, single-phase DKU

Table 11. 30-Amp, 50 or 60 Hz, single-phase DKU operation

Parameter	Nominal rated voltage (VAC)				
	200	208 ¹	220	230	240
Rated line current per power cord (amps RMS)	9	8.7	8.2	7.8	7.5
Number of power cords	4	4	4	4	4
Recommended circuit breakers	30A	30A	30A	30A	30A
Number of circuit breakers ²	4	4	4	4	4

1 60 Hz only.

2 Units with only two power cords require only two circuit breakers.

30-amp, three-phase DKU

Table 12. 30-Amp, 50 or 60 Hz, three-phase DKU operation

Parameter	Nominal rated voltage (VAC)							
	200	208 ¹	220	230	240	380	400	415
Rated line current per power cord (amps RMS)	10.4	10	9.4	9	8.7	5.5	5.2	5
Number of power cords	2	2	2	2	2	2	2	2
Recommended circuit breakers	30A	30A	30A	30A	30A	30A	30A	30A
Number of circuit breakers	2	2	2	2	2	2	2	2

1 60 Hz only.

Operations

During normal operations, the disk array does not require your intervention and you should not attempt to open the disk array cabinets.

The disk array reports any service information messages (SIMs) to the SVP and the Device Manager server. If the array is set up to “phone home,” the SVP automatically reports SIMs to the HP Storage Technology Center (STC). For more information on automatic reporting, see “HP StorageWorks Continuous Track XP” ([page 31](#)). For more information on SIMs, see [Chapter 5](#).

General safety guidelines

Carefully read these safety guidelines and follow them when working with the disk array.

- Fully understand and follow all hazard warnings in this guide and on warning labels on the disk array. These hazard warnings help you to prevent or reduce the risk of death, personal injury, or product damage. Hazard warnings include alert headings consisting of an alert symbol and the word *Caution* or *Warning*:

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



Warning

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

- Replace any warning label that becomes dirty or starts peeling off.
- Keep in mind that the hazard warnings in this guide and on the disk array cannot cover every possible hazard because it is impossible to predict and evaluate all potentially hazardous circumstances. Be alert and use common sense. If you have any questions, contact your HP support representative.
- Follow the safety guidelines and procedures in all documentation for this and related products.

Caution *Disk array maintenance must be done only by trained and qualified HP support representatives. Only an HP support representative can power off the disk array.*

Caution *Do not perform any procedures not described in this guide. If you have any questions or concerns, contact your HP support representative.*



Warning

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

Caution *If you detect any abnormal noise, smell, or smoke coming from the disk array, immediately power off the disk array by pulling the UNIT EMERGENCY POWER OFF switch on the back of the disk array cabinet. See “Emergency power-off” (page 44).*

Caution *Do not power off the system unless it is an emergency situation and you follow the emergency power-off procedure (page 44).*

Caution *Keep the front and rear doors closed at all times.*

Caution *Keep the tops and sides of the cabinets clear to allow air to flow properly.*

Caution *Use the supplied power cord. The power cord may not be used with other products.*

Powering down the disk array

Two situations may arise when you need to power down the disk array:

- Emergency power-off
- Planned power-off

Emergency power-off

In an emergency, it is critical to remove power to the disk array as quickly as possible.

Caution *Performing the emergency power-off procedure immediately shuts down the disk array, neglecting the array's normal power-off sequence. Jobs in process are aborted and their integrity after recovery is not guaranteed.*

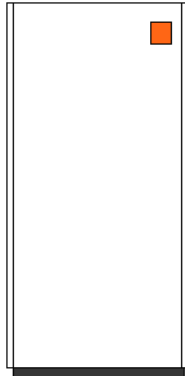
*Use this power-off method **only** in an emergency. Only a qualified HP support representative can reset the switch and restore power to the disk array.*

Emergency situations in which you should consider performing the emergency power-off procedure are:

- A physical location catastrophe such as a flood, hurricane, tornado, or earthquake
- Any circumstance that presents the threat of injury or death to a person
- You detect any smoke, abnormal loud noise, or smell coming from the disk array

To power off the disk array in an emergency:

1. Locate the UNIT EMERGENCY POWER OFF switch on the back side of the DKC.



Rear view of DKC

Figure 5. Unit emergency power off switch

2. Pull the switch up and then out towards you.

The disk array shuts down immediately. The UNIT EMERGENCY POWER OFF switch mechanically locks itself in the off position to prevent anyone from restoring power in a potentially hazardous situation.



Warning

The UNIT EMERGENCY POWER OFF switch provides only partial power-off capability. AC input power remains present at the primary circuit.

3. When the emergency situation is over, call the HP support center. Only a qualified HP support representative can reset the switch and restore power to the disk array.

Planned power-off

Occasionally, you may need to plan a site power outage, such as during alterations to the data center, inspections, or work by the electric company. If a scheduled power outage will affect the disk array, contact your HP support representative to schedule a planned power-off.

Caution *Only a trained HP support representative can shut down and power off the disk array. **Do not attempt to power down the disk array other than during an emergency.***

Recovering from an unplanned power outage

Unplanned power outages occur when the primary building power is lost due to electrical blackouts, thunderstorm activity, or similar occurrences, and input AC power is not received by the disk array. The disk array will maintain its state and recover when power is restored.

The disk array cache is powered by backup batteries that will maintain the array state for up to 48 hours, depending on the selected battery operation mode. For more information, see “Backup batteries” ([page 33](#)).

Manual restart of the disk array after power is restored

Caution *After power is restored to your site and before restoring power to the disk array, HP recommends that you have an electrician verify the power to ensure that all phases are restored and input power to the disk is stable.*

Contact your HP representative for help recovering from a power outage.

To restart the disk array manually:

1. On the DKC control panel [Figure 2 ([page 24](#))], move the PS ENABLE switch to the ENABLE position.
2. Move the PS ON/OFF switch to the ON position.

The following LED power sequence occurs:

- BS-ON turns amber.
- PS-ON turns green.
- SUB-SYSTEM MESSAGE may turn amber if the disk array is not configured to “phone home,” signifying a SIM was generated because the disk array lost power unexpectedly.
- SUB-SYSTEM READY turns green, indicating the system is ready.

Caution *Powering on the disk array can take upwards of 10 minutes, depending on the number of disks installed in the disk array. Power-on is complete only when the SUB-SYSTEM READY LED turns green.*

3. Move the PS ENABLE switch to “DISABLE” (opposite ENABLE).

Automatic restart when power is restored

Caution *As with all sophisticated electronic equipment, unstable power conditions during a restart can cause problems. HP recommends the use of automatic power on restart **only** if the power to the disk array is subject to power conditioning equipment, such as a UPS, to ensure that the power restored to the disk array is stable. If your site does not have a UPS, HP recommends that the disk array be configured for manual restart, meaning the POWER ENABLE switch on the control panel (page 24) is in the DISABLE position. After a power outage, follow the manual restart procedure (page 47) only after power has been restored and verified to be stable.*

With automatic restart enabled, the disk array automatically restarts and returns to service when power is restored after a power outage.

During the automatic restart, the following LED power sequence occurs:

- BS-ON turns amber.
- PS-ON turns green.
- SUB-SYSTEM MESSAGE may turn amber if the disk array is not configured to “phone home,” signifying a SIM was generated because the disk array lost power unexpectedly.
- SUB-SYSTEM READY turns green, signifying the system is ready.

Caution *Powering on the disk array can take upwards of 10 minutes, depending on the number of disks installed in the disk array. Power-on is complete only when the SUB-SYSTEM READY LED turns green.*

To enable automatic restart:

1. On the DKC control panel [Figure 2 (page 24)], move the AUTO PS-ON ENABLE/DISABLE switch to the ENABLE position.

HP StorageWorks XP Disk Array family of software products

This chapter describes HP's suite of software products designed to help you get the most from your disk array. HP StorageWorks XP Disk Array software:

- Augments critical array capabilities
- Helps optimize your IT resources
- Improves overall storage availability
- Simplifies disaster recovery
- Improves data security

Before installing a software package, refer to the software product documentation to verify equipment requirements.

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>.

Storage area management software

HP OpenView Storage Area Manager suite

OpenView Storage Area Manager provides comprehensive, centralized management across distributed, heterogeneous storage networks. The Storage Area Manager product suite includes the following applications:

- Storage Node Manager
- Storage Accountant
- Storage Allocator
- Storage Builder
- Storage Optimizer

Storage Area Manager provides:

- Automatic discovery and mapping of supported devices in the storage network, including hosts, interconnect devices, bridges, storage devices, and NAS devices
- Integrated device, capacity, performance, allocation, and cost management
- Support for Storage Management Initiative Specification (SMI-S) devices
- Monitoring and management of all discovered devices
- Centralized monitoring, management, and planning for Oracle and Microsoft Exchange applications
- Event management including the ability to set thresholds and configure triggers to perform automated actions when event criteria is met
- Reports to identify wasted or unused storage space
- Reports to identify trends to analyze and predict storage demand
- Integration with third-party reporting tools

Device and configuration management software

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

Remote Web Console (RWC) which comes installed on the SVP, is the standard software package for managing the XP disk array. 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, you will need the optional Command View XP Advanced Edition software.

The optional 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 management workstation 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

HP StorageWorks LUN Configuration and Security Manager XP

LUN Configuration and Security Manager XP provides additional LUN configuration and security options. You can add and delete paths, create custom-sized volumes, and configure foolproof LUN security that provides controlled, secure access to data stored on the XP disk array—preventing unauthorized servers from accessing your data. It also configures the array to meet changing storage requirements and enables users to share a single Fibre Channel array among multiple servers.

LUN Configuration and Security Manager XP allows you to:

- Create, define, and configure LUNs on the disk array
- Consolidate LUNs (combine up to 36 LUNs)
- Create small size LUNs to accommodate data locked into cache
- Establish security at the LUN level so that you can enable multiple server connectivity to the disk array
- Hide LUNs assigned to one server from other servers during IOSCAN operations
- Configure LUSE and create custom volume sizes

HP StorageWorks LUN Security XP Extension

LUN Security XP Extension helps you manage business-critical or sensitive data by providing a highly secure method of LDEV access control, allowing you to protect critical data from being changed.

Key features and benefits include:

- Creation of read-only volumes
- Protection of datasets from write and read access
- Protection from local and remote replication activities
- Data read only by authorized applications
- Access attributes assigned to each logical volume
- Global masking for protection from all host servers

- Rejection of file system device inquiry requests
- Reporting of access failures to host server
- Allows XP disk array deployment in data retention¹ solutions that assist in meeting SEC-related data integrity requirements²
- Firmware-based solution accessible from Remote Web Console XP

HP StorageWorks External Storage XP

HP StorageWorks External Storage XP enables you to connect low-cost and/or legacy external storage utilizing the superior functionality of XP disk arrays.

Key features and benefits include:

- Accessed as a full privilege internal XP disk array LUN
- Use without restrictions:
 - As a regular XP disk array LUN
 - As part of a Flex Copy XP or Business Copy
 - With full solutions support
- Facilitates data migration
- Reduces costs by allowing less expensive secondary storage

1. Once the retention period is set, it cannot be changed.

2. Purchase and deployment of this product does not by itself ensure that regulatory/legal requirements for data retention will be met, and compliance is not implicitly or explicitly guaranteed.

Performance management software

HP StorageWorks Cache LUN XP

Cache LUN XP lets you reserve areas of memory cache on the XP disk arrays to store frequently accessed information. It improves file access times and enables faster data transfers. Assigning information to on-board cache speeds up access to your data because cache-resident data is available at host data transfer speeds for both read and write operations.

Cache LUN XP redirects I/O requests from the XP disk drives to data locked in the array's cache. It's transparent, simple to implement, and it delivers immediate performance gains. Cache memory for Cache LUN XP can be set as low as one logical block or 512 MB. As your needs grow, you can increase cache volumes in increments of one logical block to a maximum of 1,024 cached volumes. The software integrates with Remote Web Console XP for web-based anytime, anywhere access.

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

Performance Advisor 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 other well-known performance management software to view your performance metrics.

HP StorageWorks Performance Control XP

Performance Control 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. Performance Control XP enables sophisticated service provider solutions based on distinct levels of service.

Performance Control XP has a rich feature set for flexible policy definition, scheduling, monitoring, and analysis.

Replication software

HP StorageWorks Business Copy

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 nonproduction activities such as backup, batching, and system testing.

HP StorageWorks Continuous Access

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

HP StorageWorks Continuous Access Extension

Continuous Access Extension is similar to Continuous Access, but operates in asynchronous mode. Transactions to be written to the secondary array are kept in cache memory on the local array in a “side-file.” This potentially increases performance in remote copying. Copy operations are sequence-stamped to ensure they are executed and sorted correctly at the remote disk array. You can purchase Continuous Access Extension separately or as an upgrade to Continuous Access.

HP StorageWorks Flex Copy XP

Flex Copy XP enables bidirectional, server-independent data transfer between HP Disk Array XP12000/1024/128 and MSA 1000 storage systems. Data can be transferred locally within a single data center or over metropolitan distances in a distributed storage network, without consuming server or LAN performance resources. This capability allows for more efficient, cost-effective leverage of business-critical data in a wide range of storage solutions, resulting in enhanced IT effectiveness and better return-on-investment in storage infrastructures. These storage solutions include nearline/array-based storage backup, data distribution and concentration, and hierarchical storage management.

Multipathing/high availability software

HP StorageWorks Secure Path

Secure Path is a family of high availability multipathing 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

HP StorageWorks Data Integrity Check for XP

Data Integrity Check for XP corrects extraneous data problems in the I/O path from server to array. It provides XP disk arrays with an added level of protection when deployed in Oracle database environments, eliminating data corruption-related downtime and ensuring business continuity. It comprises flexible tools for solution configuration and management and supports raw disk, LVM, and VxVM environments.

The software is compatible with HP-UX, Sun Solaris, and MC/Service Guard for HP-UX.

Key features and benefits include:

- Enhanced data protection in Oracle environments
- Implementation on Oracle's Hardware Assisted Resilient Data (HARD) framework
- Correction of any random data corruption in the I/O path from server to array
- Averts unplanned downtime
- Increases uptime and business continuity

Mainframe software

Resource Manager XP and Data Exchange XP merge open systems and mainframe storage with the XP family of arrays for maximum flexibility, scalability, and ease of management. Together, these products can free your network of host-to-host data conversion traffic.

HP StorageWorks Resource Manager XP

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.

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.

Business continuity solutions

HP OpenView Data Protector

Backup and restore with HP OpenView Data Protector.

- Offers new levels of recovery with a service-driven management approach
- Enterprise-wide data protection
- Eliminate recovery windows with instant recovery, system disaster recovery, and direct backup

HP StorageWorks Cluster Extension XP

Cluster Extension XP offers protection against system downtime from a variety of faults, failures, and disasters. It enables flawless integration of an XP disk array's remote mirroring capabilities with high-availability server clustering solutions, including clusters covering metropolitan distances and based on SUN, AIX, Linux, and Microsoft systems (similar functionality exists for HP-UX servers with HP cluster software).

This extended-distance solution allows for more robust disaster recovery topologies as well as automatic failover, failback, and redirection of mirrored pairs for fast recovery. A host-based utility, Cluster Extension XP requires Continuous Access and Continuous Access Extension.

Key features and benefits include:

- Automatic failover/failback disaster recovery solutions for Serviceguard for Linux, Windows with Microsoft Cluster Server (MSCS), Solaris with Veritas Cluster Server (VCS), and AIX with IBM's HACMP cluster software
- Seamless integration of remote mirroring with server clusters
- A fully scripted turnkey solution for disaster recovery
- Allows consolidated disaster recovery across heterogeneous server clusters

- Speeds recovery implementation
- Simplifies automatic failover and failback; no user intervention is required

HP StorageWorks Fast Recovery Solution for Windows 2003

Fast Recovery Solution (FRS) for Windows 2003 enables quick recovery of Microsoft Exchange and SQL databases. Using the Business Copy secondary volumes, FRS can recover these databases in minutes rather than hours.

Key features and benefits include:

- Management of recovery databases using secondary volumes
- An easy-to-use GUI
- Integrity check features
- Log file recovery
- Reduces downtime with quick recovery
- Saves time and money
- Compatible with any backup solution
- Eliminates access conflicts with backup devices

HP StorageWorks Rapid Backup Solution with Direct Backup XP

Rapid Backup Solution with Direct Backup XP provides a zero downtime and serverless backup solution for XP disk array customers wanting to use an array-based data mover to backup data directly from the disk array to the tape library within a SAN.

Rapid Backup Solution with Direct Backup XP uses Business Copy to make a point-in-time copy of data, then uses the Direct Backup Engine (or data mover) on the XP disk array to move the data copy to tape.

Key features and benefits include:

- Integrated data mover (Direct Backup Engine XP within the StorageWorks Disk Array XP) maximizes system performance, providing efficient backup and restore of mission-critical data within a SAN
- The tight integration of Business Copy with backup software enables zero downtime and impact upon applications during backup operations.
- Leverages existing LAN and SAN networks to provide a lower cost of ownership
- Supports multiple platforms and applications to meet your business needs

5

Troubleshooting

Service information messages

The disk array generates service information messages (SIMs) to identify normal operations, service requirements, and failures. SIMs are generated by the SVP and the disk array microprocessors. Your HP support representative uses the SIMs to monitor and troubleshoot the disk array. You can view SIMs using the disk array's management software ([page 34](#)).

Failure detection and reporting process

If a failure occurs in the disk array, the failure is detected and reported to the system log, the SIM log, and the HP STC, as shown in Figure 6 and explained in Table 13 (page 65).

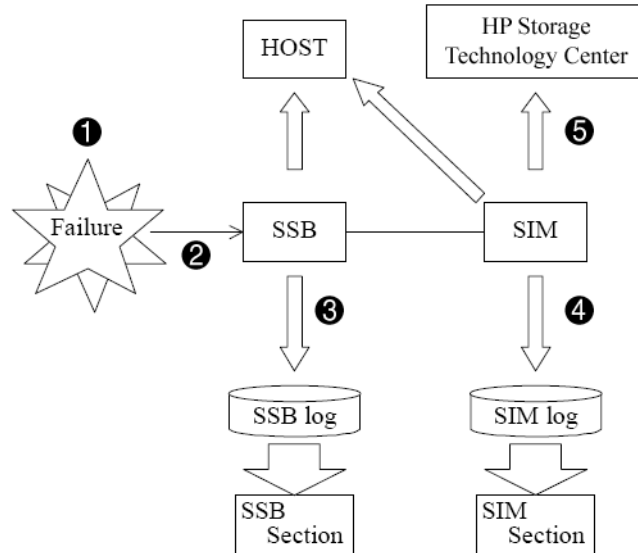


Figure 6. Failure detection and reporting process

Table 13. Failure detection and reporting process

Item	Description
1	A failure is detected in the disk array.
2	The failure is reported to the system.
3	The system stores the failure information in the system log.
4	The generated SIMs are stored on the disk array for use by HP support representatives, and logged on the Device Manager server as remote SIMs (R-SIMs). If the disk array is not set up to “phone home,” when a SIM is generated, the amber message LED on the disk array control panel turns on. Call HP to determine the reason for the message.

Table 13. Failure detection and reporting process (continued)

Item	Description
5	<p data-bbox="491 249 1258 314">If the disk array is set up to “phone home,” Continuous Track XP reports the SIMs to STC through a dedicated dialup connection.</p> <p data-bbox="491 343 1196 407">SIMs are classified according to severity: service, moderate, serious, or acute.</p> <ul data-bbox="511 423 1258 638" style="list-style-type: none"><li data-bbox="511 423 1258 562">• Service and moderate levels—Do not require immediate attention and are addressed during routine maintenance. These failures are often corrected before the failure becomes apparent.<li data-bbox="511 574 1258 638">• Serious and acute levels—Reported immediately to STC to ensure that the problem is addressed as soon as possible.

For more information on Continuous Track XP, see “HP StorageWorks Continuous Track XP” ([page 31](#)).

6

Regulatory statements

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

XP12000: Schalldruckpegel $L_p = 70$ dB(A)

Am Arbeitsplatz (operator position)

Normaler Betrieb (normal operation)

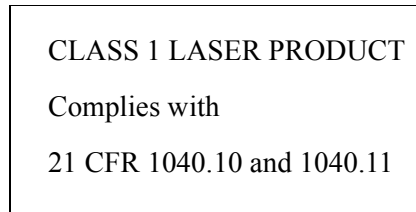
Nach ISO 7779:1988 / EN 27779:1991 (Typprüfung)

Laser safety

When equipped with native Fibre Channel adapters, this product contains a laser internal to the Optical Link Module (OLM) contained on the 8-port Fibre Channel Adapter board and 8-port FICON board, and on the 16-port Fibre Channel Adapter board and 16-port FICON board for connection to a fibre communications network.

In the USA, the OLM is certified as a Class 1 laser product conforming to the PRT 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 an internal 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。

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

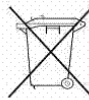
Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie



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 selejtezés kori 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 elárúsító 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 y electrónicos 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. On some XP models, such as the XP12000, the ACP handles the passing of data between the cache and the physical drives. On other XP models, such as the XP10000, this function is handled by the disk adapter on the MIX board.
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 array groups are made up of 4 HDDs (2D+2D). A RAID1 group is two 4 HDD array groups concatenated together (4D+4D). 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 array</td> </tr> <tr> <td>OPEN-L:</td> <td>36 GB</td> </tr> <tr> <td>OPEN-M:</td> <td>Not available on this 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 array	OPEN-L:	36 GB	OPEN-M:	Not available on this array	OPEN-V:	User-defined custom size
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OPEN-M:	Not available on this array																
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.

A

array management 17
authorized resellers 9
Auto LUN XP 54
automatic restart 29, 48

B

backup battery operation mode 33
batteries, backup 33, 47
business continuity solutions 60
Business Copy 56

C

cache battery backup 33
Cache LUN XP 54
Command View XP 17, 34, 51
Command View XP Advanced Edition 51
components
 hardware 22
 included 18
 optional 19
 required additional 19
configuration management software 51
connectivity 14
Continuous Access 56
Continuous Track XP 13, 16, 31, 66
control panel 23–30
conventions, document 9

D

data availability 12
Data Exchange XP 59
data integrity 16
de-stage battery operation mode 33
device management software 51
Device Manager server (formerly Management server) 34
disk array features
 connectivity 14
 continuous data availability 12
 data integrity 16
 hardware 18–20
 high availability 16
 nondisruptive service and upgrades 13
 scalability 15
 software 16, 18–19
 summary of 17–20
disk array frame. *See* DKU
disk control frame. *See* DKC
disk drives 31, 32
DKC 22, 23–31
DKU 22, 32
documentation
 audience 7
 conventions 9
 for related products 7
 revision history 10

- E**
- emergency power off switch. *See* unit
 - emergency power off switch
 - emergency power-off 43, 44–45
 - environmental specifications 35–36
 - ESCON connectivity 14
 - external storage 18
- F**
- failure detection and reporting process 65
 - Fibre Channel connectivity 14
 - FICON connectivity 14
 - Flex Copy XP 56
- H**
- hardware
 - control panel 23–30
 - disk array frame 32
 - disk control frame 23–31
 - disk drives 31, 32
 - features 18–20
 - normal operations 41
 - physical components 22
 - RAID options 32
 - service processor. *See* SVP
 - specifications 35–39
 - hazard warnings 42–43
 - high availability 16
 - high availability software 57
 - HP Storage Technology Center. *See* STC
 - humidity specifications 36
- L**
- line voltage 36–39
 - LUN Configuration and Security Manager XP 52
- M**
- mainframe software 59
 - maintenance, remote 26
 - management server 22, 51
 - Management server (now Device Manager server) 34
 - manual restart 47
 - mechanical vibration specifications 36
 - multipathing software 57
- N**
- normal operations 41
- O**
- OpenView Data Protector 60
 - OpenView Storage Area Manager suite 50
 - operating systems 17
- P**
- Performance Advisor XP 54
 - performance management software 54
 - phone home 16, 25, 65
 - See also* Continuous Track XP
 - physical components. *See* hardware
 - power cords 36–39
 - powering down the disk array 43, 44–46
 - power-off
 - emergency 43, 44–45
 - planned 46
 - recovery from unplanned 47–48
 - unplanned 33, 47
- R**
- RAID options 32
 - recovering from a power outage 47–48
 - regulatory statements 67–77
 - remote maintenance 26
 - Remote Web Console XP 34, 51
 - replication software 56
 - resellers, authorized 9
 - Resource Manager XP 59
 - restart

- automatic 48
- manual 47

S

- safety guidelines 42–43
- scalability 15
- Secure Path 57
- service 13
- service information messages 64–66
- service processor. *See* SVP
- software
 - and solution integration 16
 - Auto LUN XP 54
 - business continuity solutions 60
 - Business Copy 56
 - Cache LUN XP 54
 - Command View XP 51
 - Continuous Access 56
 - Data Exchange XP 59
 - device and configuration management 51
 - features 16, 18–19
 - Flex Copy XP 56
 - LUN Configuration and Security Manager XP 52
 - mainframe 59
 - multipathing/high availability 57
 - OpenView Data Protector 60
 - OpenView Storage Area Manager suite 50
 - Performance Advisor XP 54
 - performance management 54
 - products for XP disk arrays 49, 60
 - replication 56
 - Resource Manager XP 59
 - Secure Path 57
 - storage area management 50
- STC 13, 16, 25, 65
- storage area management software 50
- Storage Technology Center. *See* STC
- SVP 22, 30, 64

T

- technical support 8, 16
- temperature specifications 35
- troubleshooting 63–66

U

- unit emergency power off switch 28, 30, 43
- upgrades 13

V

- vibration specifications 36

W

- web site
 - HP storage 7
 - HP support 8

