

4.6.2—HP StorageWorks Disk System 2300 (DS2300)

Description

The HP StorageWorks Disk System 2300 is a fourteen-slot Ultra160 SCSI (160 MB/s LVD SCSI) capable interface storage enclosure. The enclosure is 3 EIA units (3U) high and consists of a single bay in front that has 14 vertically oriented hot-swappable disk module slots. The low voltage differential Ultra160 SCSI bus provides a data transfer rate of up to 160 MB/s. The DS2300 has a storage capacity of up to one terabyte in a single enclosure. The DS2300 is intended as a stand-alone JBOD, connected to a host, or hosts (up to two).

Modular and redundant components are easy to upgrade and maintain. Disks, fans, power supplies, and Bus Control Cards (BCCs) are replaceable parts that plug into individual slots in the front and back of the disk system. Redundant fans and power supplies can be removed and replaced without interrupting storage operations. Disks also can be replaced with the system on and with only the affected file systems taken offline. Hewlett-Packard technical support is optional for these procedures.

A switchable, SES or SAF-TE, environmental monitoring controller and HP software enable remote monitoring and diagnostics. Sensors on the BCCs monitor the disk system environment, including temperature, voltage, fan speed, and component status. A not-for-resale version of Command View SDM is included with the enclosure providing monitoring and diagnostic capabilities for many configurations. For MPE/iX environments, the status of the enclosure controller and disk drives can be monitored using cstm. Command View SDM is not supported on MPE/iX.

This storage enclosure is available in field rack, factory rack, and desktside pedestal configurations. A minimum of one disk drive must be installed for the Disk System 2300 to function.

The Disk System 2300 also includes a product manual, a VHDTS68 LVD/SE terminator, disk drive filler panels, a BCC filler panel and AC power cords.

The DS2300 will support new Ultra320 drives that will replace the existing Ultra160 drives and offer new capacity and performance points, including 73-GB 15K RPM and 146-GB 10K RPM drives. However, the enclosure will only support host connectivity at U160 transfer rates. If you are using a U320 host bus adapter, you may need to manually set it's transfer speed to 160Mb/s.

Figure 4.6.2.1 Disk System 2300



Part Numbers

Table 4.6.2.1 Disk System 2300—Field rack

Product/Option Number	Description
A6490A	Disk System 2300 field rack enclosure
A6490AE	Disk System 2300 field rack enclosure (empty enclosure for distributor stocking – disk drives cannot be integrated)
A6491A	Redundant Controller for HP DS2300
A6491A option OD1	Redundant Controller for HP DS2300 installed into the enclosure
A6571A	36-GB 10K RPM LVD Ultra320 disk module add-on
A6571A option OD1	36-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7285A	73-GB 10K RPM LVD Ultra320 disk module add-on
A7285A option OD1	73-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7286A	73-GB 15K RPM LVD Ultra320 disk module add-on
A7286A option OD1	73-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7287A	146-GB 10K RPM LVD Ultra320 disk module add-on
A7287A option OD1	146-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7328A	18-GB 15K RPM LVD Ultra320 disk module add-on
A7328A option OD1	18-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7329A	36-GB 15K RPM LVD Ultra320 disk module add-on
A7329A option OD1	36-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure

Note: The rack kit for the field rack option must be ordered separately.

Table 4.6.2.2 Disk System 2300—Factory rack

Product/Option Number	Description
A6490AZ	Disk System 2300 factory rack enclosure
A6491A	Redundant Controller for HP DS2300
A6491A option OD1	Redundant Controller for HP DS2300 installed into the enclosure
A6571A	36-GB 10K RPM LVD Ultra320 disk module add-on
A6571A option OD1	36-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7285A	73-GB 10K RPM LVD Ultra320 disk module add-on
A7285A option OD1	73-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7286A	73-GB 15K RPM LVD Ultra320 disk module add-on
A7286A option OD1	73-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7287A	146-GB 10K RPM LVD Ultra320 disk module add-on
A7287A option OD1	146-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7328A	18-GB 15K RPM LVD Ultra320 disk module add-on
A7328A option OD1	18-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7329A	36-GB 15K RPM LVD Ultra320 disk module add-on
A7329A option OD1	36-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure

Note: The rack kit for the factory rack is included with this option.

Table 4.6.2.3 Disk System 2300—Deskside

Product/Option Number	Description
A6490AD	Disk System 2300 deskside disk enclosure
A6490ED	Disk System 2300 deskside disk enclosure (empty enclosure for distributor stocking – disk drives cannot be integrated)
A6491A	Redundant Controller for HP DS2300
A6491A option OD1	Redundant Controller for HP DS2300 installed into the enclosure
A6571A	36-GB 10K RPM LVD Ultra320 disk module add-on
A6571A option OD1	36-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7285A	73-GB 10K RPM LVD Ultra320 disk module add-on
A7285A option OD1	73-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7286A	73-GB 15K RPM LVD Ultra320 disk module add-on
A7286A option OD1	73-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7287A	146-GB 10K RPM LVD Ultra320 disk module add-on
A7287A option OD1	146-GB 10K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7328A	18-GB 15K RPM LVD Ultra320 disk module add-on
A7328A option OD1	18-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure
A7329A	36-GB 15K RPM LVD Ultra320 disk module add-on
A7329A option OD1	36-GB 15K RPM LVD Ultra320 disk module installed into the A5675A field rack enclosure

Table 4.6.2.4 Disk System 2300—Accessories, Enterprise Systems

Product/Option Number	Description
A6209A	HP System/E Rack Rail Kit
A6244A	C278xx rackmount Hardware Kit
A6496A	NT/Rittal Rack Rail Kit
A6498A	Two Post Rack Rail Kit
C2373A	SCSI Cable 2-meter VHDS68 M/M Multimode
C2373A option OD1	SCSI Cable 2-meter VHDS68 M/M Multimode integrated into enclosure packaging
C2374A	SCSI Cable 5-meter VHDS68 M/M Multimode
C2374A option OD1	SCSI Cable 5-meter VHDS68 M/M Multimode integrated into enclosure packaging
C2375A	SCSI Cable 10-meter VHDS68 M/M Multimode
C2375A option OD1	SCSI Cable 10-meter VHDS68 M/M Multimode integrated into enclosure packaging
C2362B	SCSI Cable 2.5-meter VHDS68/HDTS68 M/M Multimode
C2362B option OD1	SCSI Cable 2.5-meter VHDS68/HDTS68 M/M Multimode integrated into enclosure packaging
C2365B	SCSI Cable 5-meter VHDS68/HDTS68 M/M Multimode
C2365B option OD1	SCSI Cable 5-meter VHDS68/HDTS68 M/M Multimode integrated into enclosure packaging
C2363B	SCSI Cable 10-meter VHDS68/HDTS68 M/M Multimode
C2363B option OD1	SCSI Cable 10-meter VHDS68/HDTS68 M/M Multimode integrated into enclosure packaging
C2370A	SCSI Terminator LVD/SE VHDS68

Notes: The System Integration Specification Plan (SISP), product number A3142B must be ordered with the server for a complete factory assembled server/storage configuration.

Supported Servers and HBAs

Table 4.6.2.5 Supported PA-RISC Platforms

System	Class	HBA	Description	Bus
HP e3000		A6828A	Single-port Ultra160 Adapter	PCI
		A6829A	Dual-port Ultra160 Adapter (N-Class only)	PCI
HP 9000	A-/N-/L-/V-Class, Superdome	A5149A	Single-port Ultra2 SCSI HBA	PCI
		A6828A	Single-port Ultra160 Adapter (see note 2)	PCI
		A5150A	Dual-port Ultra2 SCSI HBA	PCI
		A6829A	Dual-port Ultra160 Adapter (see note 2)	PCI
		A5838A	Dual-port 100Base-T/Dual-Port Wide Ultra2 HBA	PCI
		A5856A	RAID 4si – 4-port Ultra2 LVD/SE RAID HBA	PCI
	rp5400 series, rp7400, rp7410 rp8400	A5149A	Single-port Ultra2 SCSI HBA	PCI
		A6828A	Single-port Ultra160 Adapter	PCI
		A6829A	Dual-port Ultra160 Adapter	PCI
		A5856A	RAID 4si – 4-port Ultra2 LVD/SE RAID HBA	PCI
Itanium	rx4610, rx9610	A5150A	Dual-port Ultra2 SCSI HBA	PCI
		A5159A	Dual-port FWD SCSI (PCI Bus) adapter	PCI
Workstations	B-/C-/J-Class	A4999A	Ultra2 Low Voltage Differential SCSI HBA	PCI

Note 1: A-, C-, L-, and N-Class systems, as well as, rp2400, rp5400, rp74x0, and rp8400 core I/O cards are supported on the disk system 2300.

Note 2: The Ultra160 SCSI HBAs are not supported on Superdome, V-Class, rp8400, and rp7410. In addition, the Ultra160 SCSI HBAs do not have multi-initiator support. Please use the Ultra2 SCSI cards for multi-initiator applications. Patches for both of these issues are currently being created. Contact SISL for additional information.

Supported HBAs for Non-PA-RISC Systems

HP NetServer customers should use the same product numbers as HP 9000 customers. Customers wishing to stock empty enclosures should order the empty enclosure products (A6490AE and A6490ED).

Table 4.6.2.6 HP NetServer Supported PCI—Host Bus Adapters, Commercial Systems

Product Number	Description
C7430A	PCI Ultra2 wide Host Bus Adapter for NetServers
D5025A	HP Ultra/Wide SCSI adapter for NetServers
D9161A	NetRAID 4M/64 Host Bus Adapter for HP NetServers
D9351A	NetRAID 4M/128 Host Bus Adapter for HP NetServers
P3413A	Single-port Ultra3 SCSI Host Bus Adapter for HP NetServers
P3410A	NetRAID 1M Ultra3 SCSI Host Bus Adapter
P3411A/B	NetRAID 2M Ultra3 SCSI Host Bust Adapter
P3475A/B	NetRAID 2M Ultra3 SCSI Host Bust Adapter

Operating Systems Supported with DS2300

- HP-UX (11.0 and later)
- Novell NetWare (5.1, 6.0, 6.5)
- RedHat Linux (6.2, 7.0, 7.1, AS2.1)
- Microsoft NT 4.0 Server and Enterprise
- Microsoft Windows 2000 Server and Advanced Server
- Microsoft Windows 2003 Server
- SCO UnixWare7.1.1
- SCO OpenServer 5.0.6
- MPE/iX 7.0 Express 1 or later

For more specific information about supported operating systems, refer to SPOCK @ <http://turbo.rose.hp.com/spock/>

Features

The disk system occupies 3.0 EIA units in a standard 19-inch rack. Disk drives mount in the front of the system. Redundant power supplies, fans, and BCCs mount in the back.

Table 4.6.2.7 Disk System 2300 Summary

Functionality	Disk System 2300	
	Rackmount	
Number of 3.5 inch mechanisms	14 LP	
Disk Drive Support		
18.2 GB 10K Ultra160 SCSI	Yes	These drives are no longer orderable, but are kept here for reference.
18.2 GB 15K Ultra160 SCSI	Yes	
36 GB 10K Ultra160 SCSI	Yes	
36 GB 15K Ultra160 SCSI	Yes	
73 GB 10K Ultra160 SCSI	Yes	
36 GB 10K Ultra320 SCSI	Yes, at 160 MB/s	
73 GB 10K Ultra320 SCSI	Yes, at 160 MB/s	
73 GB 15K Ultra320 SCSI	Yes, at 160 MB/s	
146 GB 10K Ultra320 SCSI	Yes, at 160 MB/s	
18 GB 15K Ultra320 SCSI	Yes, at 160 MB/s	
36 GB 15K Ultra320 SCSI	Yes, at 160 MB/s	
Enclosures Per Rack		
	HP Original Rack (install base)	HP Rack System/E
1-meter rack	5	8
1.6-meter rack	8	11
2-meter rack	10	13
High Availability Functionality		
Hot Plug	Yes	
Boot (Single-host)	Yes	
Root	Yes	
Swap	Yes	
Redundant power Supply\Fan	Yes	
Number of power cords	2	
Number of Ultra SCSI Busses	2	

¹ LP - Low-Profile, 1 inch high mechanisms

Power Switch

Located in the upper right corner of the front of the disk system, the power switch interrupts DC power from the power supplies to the BCCs and other internal components. Input AC power to the power supplies is controlled by the power cords and AC source.

High Availability

High availability is a general term describing computer systems that are designed to minimize planned and unplanned downtime. The Disk System 2300 provides high availability through the following features:

- Hot-pluggable, high-capacity, high-speed disks
- Redundant, hot-pluggable, and user-replaceable fans, power supplies, and BCCs
- Support for mirrored disks.
- Online BCC firmware upgrades.
- Hardware event monitoring and real-time error reporting

Environmental Services

Environmental services circuitry monitors the following elements:

- Fan rotation
- Power supply outputs
- Power supply status
- Disk drive status, presence
- BCC status
- Temperature
- Self-test results

Each BCC reports the status of all elements in the disk system, even if the BCC does not have direct access to the element. Additionally, the EEPROM on each BCC stores 2 KB of configuration information and user-defined data, including the manufacturer serial number, and product number. The DS2300 is equipped with a switchable environmental services controller to enable both SCSI enclosure services (SES) and SAF-TE. The DS2300 ships with the environmental monitoring controller set to SAF-TE. Information on setting this controller is included in the following section titled configuration considerations.

Hardware Event Monitoring

For MPE/iX environments, the status of the enclosure controller and disk drives can be monitored using cstm. Command View SDM and Top Tools are not supported on MPE/iX.

Command View SDM is primarily used in HP-UX environments to provide HW monitoring, diagnostics, and firmware download. It provides both a GUI and command line interface. Each DS2300 ships with a not-for-resale version of this software. Command View SDM may use either the SES or SAF-TE setting on the environmental services controller. More environmental information can be gathered through Command View SDM using the SES environmental controller setting. The DS2300 must be set on the SAF-TE controller setting when Command View SDM is used in a Windows environment.

Note: *Command View SDM does not function with a NetRAID card.*

Top Tools is the most likely event-monitoring tool to be used in a NetServer environment. Top Tools requires that SAF-TE be enabled on the environmental services controller. Top Tools is available on the Navigator CD or Top Tools CD that ships with the NetServer system.

In addition, the NetRAID 4M card utilizes the FAST Utility (Windows only) to provide for event monitoring. The rest of the NetRAID cards use the NetRAID Assistant (Windows only) utility. Netware uses Megamon behind an HBA or NetRAID card. These utilities are included on the Navigator CD that ships with NetServer systems. The FAST Utility, NetRAID Assistant, and Megamon all use the SAF-TE controller setting.

Status Indicators

LEDs on the disk system enable you to detect and replace failed components and thereby prevent or minimize downtime for users. On the front of the disk system, a pair of LEDs indicate the status of the disk system. Each disk module contains two LEDs. The LEDs indicate the following conditions:

- The system power LED indicates that power is on or off.
- The system fault LED indicates whether or not a fault has occurred anywhere in the disk system.
- At the bottom of each disk module, the left LED indicates the presence of I/O activity on the disk.
- The second LED on the right of each disk module should be green indicating drive presence. It can be flashed to help an engineer locate the disk for physical inspection or removal. A drive fault is indicated by an amber color.

LEDs on the back of the disk system indicate status of the replaceable components and the SCSI bus. See users manual for more specific information.

Configuration Considerations

Cables

The cables must be explicitly ordered for both factory-racked, field-racked and desktside configurations. They are offered as separate products but may be included in the enclosure box on the factory-integrated products (A6490A, A6490AD, A6490AV, A6490AZ).

Note: Support and use of in-line terminated (ILT) cables is prohibited. Use of ILT cables with this product may result in data corruption.

Disk Modules

- Utilizes the Common HP Disk Carrier with downloadable firmware
- Non-OS Specific Disk Firmware
- Hot swappable disk modules
- Front Access only
- Rotational vibration damping control
- Easy insertion/removal (accomplished with a cam handle)
- Positive lock-in
- LED status indicator
- ESD grounding

At least one HDD is required for the DS2300 to function in a single BCC configuration. If a second BCC is added, at least two HDDs should be in the enclosure.

Note: Since disks require exclusive access, data is unavailable during the disk firmware download.

Storage Capacity

The Disk System 2300 has fourteen (14) slots for low profile (1-inch width) LVD disk mechanisms. The enclosure can accept multiple-capacity drives such as 18-, 36-, or 73-GB simultaneously, subject to host file system restrictions. Further, the disk system can accept different spindle speed drives and different interface speed drives. The bus will negotiate each disk individually maximizing its throughput. These drive capacity notes are tied to the printing of this document. Future capacities will be made available for this enclosure.

Upgradability

You can increase disk system storage capacity by:

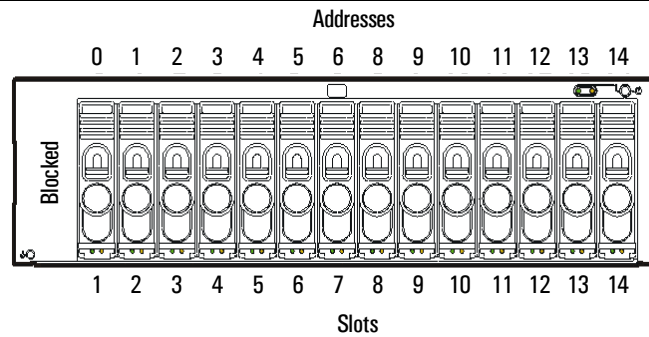
- Replacing disk drives with higher-capacity disk drives
- Adding disks in unused slots

None of these actions require shutting down the product, but some may require the use of system utilities to manage file systems.

Enclosure Addressing and SCSI IDs

The disk system has 14 available disk slots; SCSI addressing does not follow a “one-to-one” relationship between slot positions and SCSI addresses. Slot assignments and SCSI addresses are shown below. In full bus mode, the SCSI address 7 is reserved for the host bus adapter. If more than one HBA connects to the disk system then a disk module must be removed from the slot that corresponds to the SCSI address of the additional host bus adapter. In split bus mode, slots 1 through 7 are on one bus and slots 8 through 14 are on the other bus.

Figure 4.6.2.2 Slot and Address Illustration



Disk and BCC SCSI addresses for full and split bus mode are as follows:

Table 4.6.2.8 Slot and Address Summary

Physical Disk Slot	Full Bus	Split Bus (BCC A)	Split Bus (BCC B)
1	0	0	
2	1	1	
3	2	2	
4	3	3	
5	4	4	
6	5	5	
7	6	6	
8	8		8
9	9		9
10	10		10
11	11		11
12	12		12
13	13		13
14	14		14
BCC A	15		15
BCC B	See Note		15

Note: In split bus mode, the enclosure monitor circuitry on each BCC utilizes SCSI address 15. This is allowable since each BCC is connected to a separate SCSI bus. However, when the enclosure is in full bus mode and the separate SCSI busses on the midplane are connected together and the enclosure is configured with two BCCs, the secondary BCC enclosure monitor circuitry is inactive. One disk must be removed to corresponding to the second HBA on the bus.

Setting Dip Switches

Two Dip Switch banks on the rear bulkhead of BCC A (left slot) determine bus architecture and some bus behavior. If BCC A is removed, then the Dip Switches on BCC B define the bus. See **Table 4.6.2.9** for a description of switch settings.

Figure 4.6.2.3 Switch Bank 1

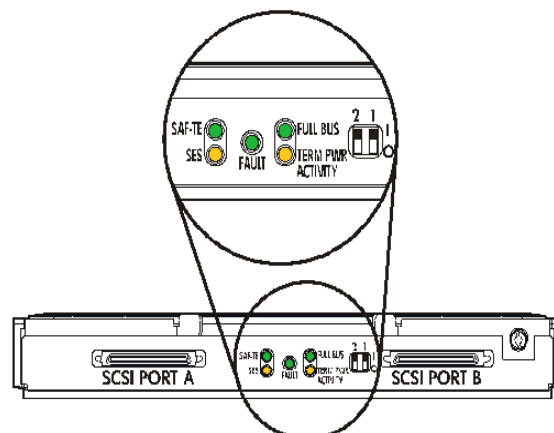


Figure 4.6.2.4 Switch Bank 2

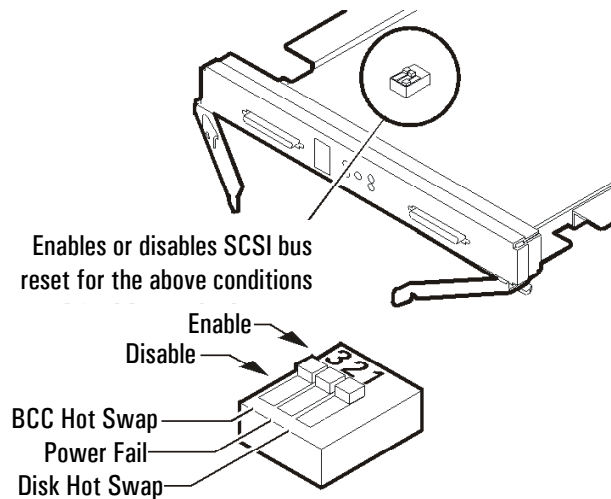


Table 4.6.2.9 Dip Switch Settings

Switch Bank 1	OFF =	ON = 0
1 Full Bus	Creates a single bus of up to 14 disk drives	Splits the bus into two buses, up to 7 disk drives each
2 SES/SAF-TE	SAF-TE Mode	SES Mode
Switch Bank 2	OFF =	ON = 0
1 Bus Reset: Hot Swap Disk	Automatically issues a SCSI bus reset when a disk is removed or inserted	Lets the host detect change and determine action
2 Bus Reset: Power Fail	Issues a SCSI reset when the power supply/fan module indicates it will go offline	
3 Bus Reset: Hot Swap BCC	Automatically issues a SCSI bus reset when a BCC is removed or inserted	Lets the host detect change and determine action

Note: The switch settings on BCC A must match the switch settings on BCC B. All DS2300 enclosures will be shipped set to Full Bus Mode, SAF-TE enabled with all SCSI Bus Reset switches enabled.

Sites choose Dip Switch options according to their priorities and preferences. High availability sites, for example, may want automatic bus reset on whereas high performance sites may choose to turn it off. The following table gives some of the typical reasons for choosing specific Dip Switch settings.

Table 4.6.2.10 Dip Switch Reasoning

Switch Bank 1	OFF =	ON = 0
1 Full Bus	<ul style="list-style-type: none"> a. Full-bus mode is the only way to access all 14 disks with one BCC. b. With two BCCs, full-bus mode allows two external connections to the bus. c. Full-bus mode with two BCCs gives redundant environmental services. 	<ul style="list-style-type: none"> a. Split buses allow you to mirror disks within the disk system. b. Split-bus mode uses fewer IDs on the bus, improving bus performance.
2 SES/SAF-TE	SAF-TE is required for most non HP-UX platforms.	SES is required for HP-UX using EMS.
Switch Bank 2	OFF =	ON = 0
1 Bus Reset: Hot Swap Disk	Automatic bus reset reduces the chances of data corruption and saves the 30 to 60 seconds that the host would spend determining that a disk is unavailable. Bus reset signals the host to resend outstanding I/O requests.	<ul style="list-style-type: none"> a. No bus reset reserves bus control to the host. b. No bus reset avoids resetting the entire bus for one disk.
2 Bus Reset: Power Fail	SCSI bus is held in reset as power goes down, thus avoiding data corruption.	Bus control is restricted to the host.
3 Bus Reset: Hot Swap BCC	Automatic SCSI bus reset reduces the chance of data corruption when a BCC is inserted or removed from the disk system.	<ul style="list-style-type: none"> a. No bus reset reserves bus control to the host. b. No bus reset avoids resetting the entire bus for one disk.

Termination

Termination is a requirement for the SCSI bus connecting the disk system and the host or other device connected to the disk system. Termination is required and must be enabled whenever the disk system is at the end of a bus. The LVD/SE VHDTS68-pin terminator is included with the Disk System 2300 product.

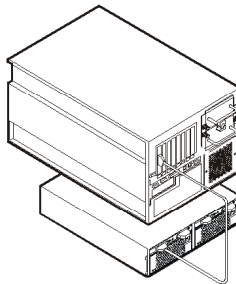
Topologies

The Disk System 2300 supports multiple configuration options based on either single or dual host environments. This section is not meant to be representative of every supported topology but merely represent typical configurations.

Single Host, One Disk System

This configuration presents the most basic setup of a single host connected to a single DS2300 disk enclosure. Notice that the unused SCSI port on the BCC is terminated because it resides at the end of the SCSI chain.

Figure 4.6.2.5



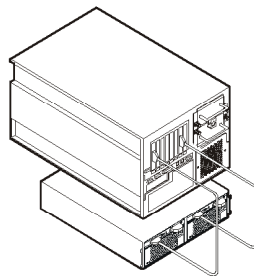
Single Host, Dual HBA, Single Disk System (Duplexing)

Note: The following configuration is not supported on MPE/iX.

This configuration requires the installation of two HBA ports on the host. Both ports connect to the Disk System 2300. This technique, known as duplexing, increases throughput by providing two paths to the data and provides some level of redundancy, as the loss of a single HBA in the host would not cause a complete system failure. The host would continue to operate with some performance degradation. This configuration is only supported in an HP-UX environment with LVM software. It is recommended that LVM software be installed and the pvlincs feature used to create the redundant data path.

An alternative configuration utilizing this same physical cable configuration would be to split the bus and create a software mirror within the DS2300 enclosure.

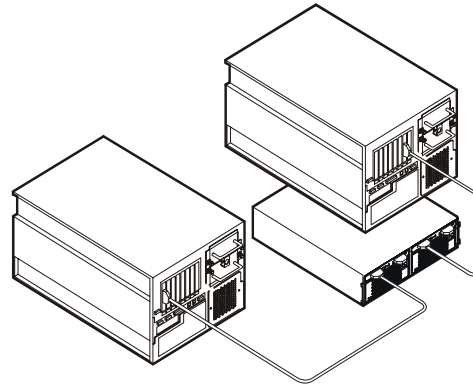
Figure 4.6.2.6



Dual Host, Dual HBA, Single Disk System

This configuration allows two servers to share a single DS2300 in split bus mode. Each bus is independent of the other and is not affected by activity on the other bus. Note that this configuration requires two bus control cards and only one server is supported on each BCC. The unused SCSI port on the BCC must be terminated.

Figure 4.6.2.7



Dual Host, Dual HBA, Dual Disk Systems (Cluster)

Note: The following configuration is not supported on MPE/iX.

This completely redundant configuration provides host and disk system redundancy if clustering software and mirroring software are employed. This configuration is only valid when two BCC cards are used. The loss of a host, HBA or SCSI channel would allow the system to continue to function, but with reduced functionality.

This configuration is supported in a Microsoft Cluster Server environment with several HP NetServers.

Further information may be obtained at the following URL:

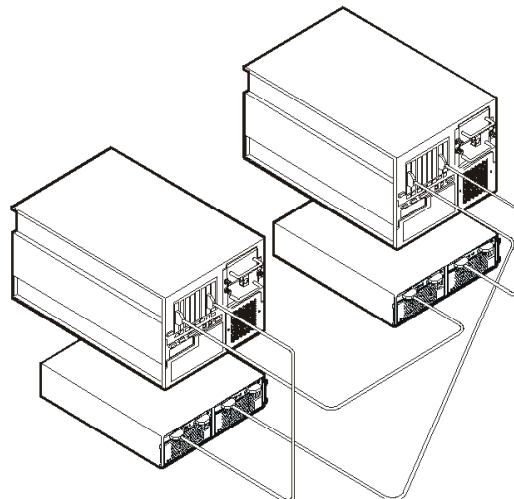
http://netserver.hp.com/products/high_availability/ms_supported_config.asp.

MC/ServiceGuard support can be found at the following URL:

<http://haweab.cup.hp.com/Support/DiskSupport.html>.

Note: These configurations do not use in-line terminated (ILT) cables. Use of ILT cables may result in data corruption.

Figure 4.6.2.8



Disk Mirroring

Disk mirroring is available through the use of the Mirror-UX software provided with the HP-UX operating system. Disk mirroring software is also available through other operating systems or through third party applications. MPE/iX utilizes HP Mirrored Disk/iX.

Racking Considerations

Rack/rail kits required for the DS2300 disk system:

- A6209A—HP System E Racking Kit
- A6244A—HP Original Rack Systems Racking Kit (rack kit and enclosure occupy 4U of rack space)
- A6498A—Two Post Rack Rail Kit
- A6496A—NT/Rittal Rack Rail Kit

Powerfail Protection

A UPS is required for powerfail protection for the Disk System 2300. A 500 VA (minimum) UPS is recommended for use with the Disk System 2300.

Recommended Rack Configurations

The Disk System 2300 has been tested for thermal profiles in the HP System-E Racks. The following are the recommended configurations for a 1.25-meter, 1.6-meter and 2-meter rack.

Table 4.6.2.11 Rack Configurations

Rack size	Maximum Number of DS2300	Empty EIAs	PDUs Needed ^{3,4}	Input Voltage ¹	Input Current per Power Supply ^{1,2}	Minimum European and American Standard Circuit Breaker Rating per Bus (two buses required for redundancy) ²	
						Type, trip range	Current
RB2, 1.25-meter, 25 U	8	1	6	120 V	4.8 A continuous, 19.4 A inrush	D, 10-20X	40 A (5)
						K, 8-12X	40 A (5)
						C, 5-10X	40 A (5)
						730-5, 7X	40 A (5)
RB2, 1.25-meter, 25 U	8	1	4	240 V	2.0 A continuous, 19.4 A inrush	D, 10-20X	16 A
						K, 8-12X	25 A
						C, 5-10X	32 A
						730-4, 12X	20 A
RB2, 1.6-meter, 33 U	11	0	4	240 V	2.0 A continuous, 19.4 A inrush	D, 10-20X	25 A
						K, 8-12X	40 A
						C, 5-10X	50 A
						730-5, 10X	30 A
RB2, 2.0-meter, 41 U	13	2	6	240 V	2.0 A continuous, 19.4 A inrush	D, 10-20X	32 A
						K, 8-12X	40 A
						C, 5-10X	63 A
						730-5, 10X	30 A

¹ Label rating of DS2300 power supply is 100-240 V, 4.8-2.0 A. This indicates the steady state current.

² Maximum inrush current is 19.4 A. Current = (19.4 A inrush/minimum trip point) × total power supplies per bus. This specifies the minimum breaker rating for inrush current but does not necessarily satisfy the steady state current requirement. Choose a higher standard rating of breaker that satisfies the steady state current also.

³ Calculation of number of PDUs required is as follows, (120 V example):

- 16 A PDU/4.8 A nominal input per power supply = 3 power supplies per PDU max
- 8 chassis' per rack/3 power supplies per PDU max = 3 PDUs per bus
- 3 PDUs per bus × 2 redundant buses = 6 PDUs required

⁴ PDU E7674-63001/5183-1837, is rated for 20 A. The derating is 80%, or 16 A maximum, which is stamped on the side of the PDU.

⁵ Steady state current is much higher when operated at 120 V.

Support Information

Warranty

The DS2300 includes a standard 3 Year, Next Day, On-Site warranty with the enclosure.

Product Support Packs for Indirect Channel

The support packs are on the disk system only and contains the support pricing of the drives.

Table 4.6.2.12 Support Packs

HP Service levels	Support Packs—1 Year	Support Packs—3 year
Same Day	N/A	U2075A/U2075E
24×7, on-site	N/A	U2076A/U2076E
6-hour Call-to-Repair	N/A	U2077A/U2077E

Note: Commercial channel product support pack codes ending with the letter “A” denote physical device support. Those ending with the letter “E” denote electronic support.

Product Upfront Support Options for Direct Channel

The Upfront Options are on the disk system only and contains the support pricing of the drives.

Table 4.6.2.13 CATS Support Options

HP Service Levels	CATS Support Options—1 Year	CATS Support Options—3 year
Same Day	H4402A/H4403A	H4402Y/H4403Y
24×7	H4404A/H4405A	H4404Y/H4405Y
6-hour Call-to-Repair	H4385A	N/A
Business Continuity Support	H4395A	N/A

Description of Services Offered

The 02x are the post warranty support contractual monthly pricing available after the warranty. The 07x are the upgrade warranty support contractual monthly pricing available during the warranty.

Table 4.6.2.14 Monthly Support Pricing Code Descriptions

Code	Description
02A	On-site 4 hour same day hardware response, Monday – Friday, business hours.
07A	07A is available as a warranty upgrade to a 02A response level
02C	On-site next day hardware response, Monday – Friday, business hours (vary by country).
07C	07C available as a warranty upgrade to a 02C response level
02G	On-site 4 hour same day hardware response, seven days a week, 24 hours a day.
07G	07G available as a warranty upgrade to a 02G response level
02V	On-site six-hour hardware call-to-repair, seven days a week, 24 hours a day. Time begins when the original call to the call center is made. Recovery of operating system and other software are excluded from time commitment. Available only for customer sites up to 50 miles (80 km) from a primary HP Support Response Office.
07V	07V available as a warranty upgrade to a 02V repair level
02X	On-site four-hour hardware call-to-restoration, seven days a week, 24 hours a day. Time begins when the original call to the call center is made. Restoration considered complete when an operating system prompt is re-established and the operating system is restored to the customer’s last configuration (or when the operating system is restored to a generic configuration for that operating system configuration). Time commitment does not include time needed for recovery of middleware, application software or data. Available only for customer sites up to 50 miles (80 km) from a primary HP Support Response Office. In order to purchase this level of response, the system must be part of a BCS contract.
07X	07X available as a warranty upgrade to a 02X repair level

Product Specifications

Table 4.6.2.15 Physical Dimensions

Measure	Metric	English
Width	44.8 cm	17.6 in
Depth	50.5 cm	19.9 in
Height	13.0 cm	5.1 in
Weight of deskside enclosure w/out disk modules	37.3 kg	82 lbs
Weight of deskside enclosure fully loaded	46.4 kg	102 lbs
Weight of rack mount enclosure w/out disk modules	27.3 kg	60 lbs
Weight of rack mount enclosure fully loaded	36.4 kg	80 lbs

Table 4.6.2.16 Electrical Requirements

Electrical Element	Requirement
Input Voltage Range	100-240 VAC Auto-ranging
Line Frequency Range	50/60 Hz
Published Input Voltage Range	100-240 VAC
Published Line Frequency Range	50/60 Hz
Input Current	100-240 VAC @ 4.8-2.0 Amp
Maximum Surge Current	40 Amps peak

Operating Temperatures

If the storage system is installed in a multi-unit rack assembly, the operating ambient temperature of the rack environment may exceed room ambient temperature. The rack environment ambient temperature cannot exceed 38° Celsius (100° Fahrenheit). If your storage system contains less than 14 disk modules, the remaining empty slots require filler panels. These filler panels (part number A6198-60001), which are included with the DS2300 product, ensure that the proper cooling is maintained within the storage system.

Table 4.6.2.17 Climate Control

Measure	Type	Range
Temperature (dry bulb)	Operating	5°C to +38°C
	Storage	-40°C to +70°C
Relative Humidity (non-condensing)	Operating	10%-80% Relative Humidity at 28°C wet bulb
	Storage	10%-90% Relative Humidity at 28°C wet bulb
Altitude (based on disks)	Operating -1000 ft to +10,000 ft (3,048 meters)	Storage 40,000 ft (12,092 meters)
Heat Dissipation (maximum)	Operating	500 watts