Compaq StorageWorks

Modular Array Configuration Guide

First Edition (April 2000)
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Compaq Computer Corporation

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About This Guide

This guide is designed to be used as a reference for modular configurations.

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

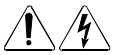
CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.



Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.
WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.
WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single rack installation.
- The racks are coupled together in multiple rack installations.
- A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

You are entitled to free hardware technical telephone support for your product for as long you own the product. A technical support specialist will help you diagnose the problem or guide you to the next step in the warranty process.

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ[1]. This service is available 24 hours a day, 7 days a week.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number (s)
- Product model name(s) and numbers(s)
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Detailed, specific questions

Compaq Website

The Compaq website has the latest information on this product. You can access the Compaq website by logging on to the Internet at http://www.compaq.com.

Compaq Authorized Reseller

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.

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

Modular Array Configuration Guide

Introduction

The purpose of this configuration guide is to list the components that have been qualified in and can be installed in RETMA cabinets. The predefined and Configure-To-Order solutions are assembled in the Modular Storage Cabinets. These cabinets include Power Distribution Units and are pre-cabled.

The Series 9000 cabinets are available in three heights: 42U, 36U and 22U. The top gun blue RETMA cabinet is available in a 41U height.

Single-Bus Mode or Dual-Bus Mode

The HSG80 controller firmware (ACS 8.5) can address up to 12 drives per UltraSCSI bus. In single-bus mode this means that 12 of the 14 drive bays are used. The 2 extra drive bays can be used for in-cabinet inventory. In dual-bus mode the firmware can see seven drives on each bus allowing use of all 14 drives.

The Model 4214R disk enclosure is a single-bus enclosure that has slots for 14 drives. It supports 12 drives in single bus mode. It does not support daisy chaining between shelves.

The Model 4254 is a dual-bus enclosure that has slots for 14 drives. It supports seven drives per bus, for a total of 14 drives.

Table 1 describes the advantages and disadvantages between single-bus and dual-bus mode.

Table 1
Single-Bus and Dual-Bus Modes

Mode	Advantages	Disadvantages
Single Bus	Greater disk capacity per controller channel.	More drives per channel can degrade performance.
	Shelf failure only effects one channel.	Doubles rack space consumed versus dual bus shelves.
Dual Bus	Fewer drives per channel may increase performance.	Less disk capacity per controller channel.
	Half the rack space consumed versus single bus shelves allows greater disk and controller capacity per cabinet.	Shelf failure effects two channels possibly causing RAIDset failure.

The maximum number of drives behind an HSG80 (single or cooperating pair) using six single-bus Model 4214 disk enclosures is 72.

The maximum number of drives behind an HSG80 (single or cooperating pair) using three dual-bus Model 4254 disk enclosures is 42.

Rack Configurations

Figure 1 shows an example of the cabinets.

Figure 1. Example of the 42U, 36U, and 22U cabinets

Table 2 lists the height of the various components that can be installed in the cabinets.

Table 2
Component Height

Component	Height
Model 2200 controller enclosure	4U
Model 4214 disk enclosure	3U
Model 4254 disk enclosure	3U
Compaq StorageWorks SAN Switch 8	1U
Compaq StorageWorks SAN Switch 16	2U
Fibre Channel Hub, 7-port	1U (2 hubs can be mounted side-by side)
Fibre Channel Hub, 12-port	1U

Modular Building Blocks

A Model 2200 controller enclosure can support up to six Model 4214R disk enclosures or three Model 4254 disk enclosures.

A typical building block using Model 4214R disk enclosures (single-bus) consists of one Model 2200 controller enclosure with one to six Model 4214R disk enclosures. Typically, when more than three disk enclosures are used, the first three would be installed under the Model 2200 controller enclosure, the next three would be installed on top of the controller enclosure (see Figure 2).

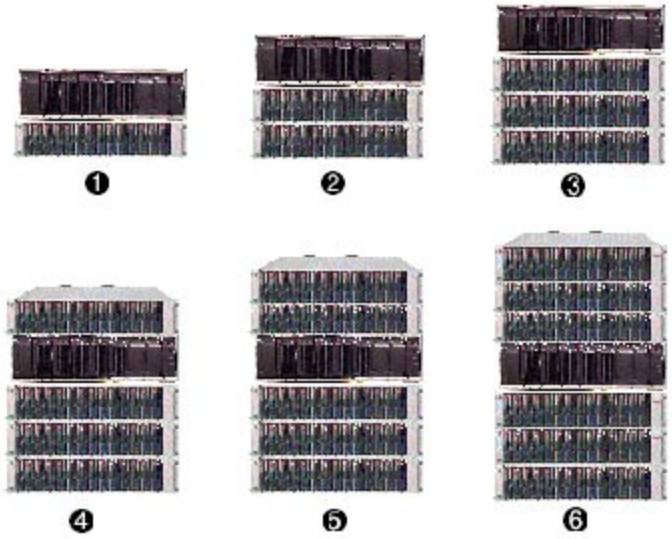

Figure 2. Examples of modular building blocks using Model 4214R disk enclosures (single-bus)

❶ One Model 2200 controller enclosure and one Model 4214R disk enclosure

❷ One Model 2200 controller enclosure and two Model 4214R disk enclosures

❸ One Model 2200 controller enclosure and three Model 4214R disk enclosures

❹ One Model 2200 controller enclosure and four Model 4214R disk enclosures

❺ One Model 2200 controller enclosure and five Model 4214R disk enclosures

❻ One Model 2200 controller enclosure and six Model 4214R disk enclosures

A typical building block using Model 4254 disk enclosures (dual-bus) consists of one Model 2200 controller enclosure with three Model 4254 disk enclosures (see Figure 3). The Model 4214R can also be configured in this manner.

NOTE: If a Model 4214R disk enclosure is configured in this manner, only three of the I/O ports are being used.

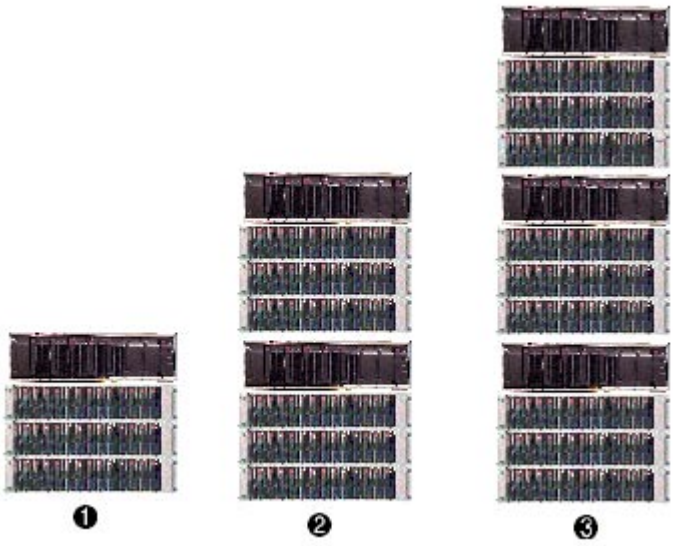

Figure 3. Examples of modular building blocks using either the Model 4214R (single-bus) or Model 4254 (dual-bus) disk enclosures

❶	One Model 2200 controller enclosure and three Model 4214R disk enclosures	or	One Model 2200 controller enclosure and three Model 4254 disk enclosures
❷	Two Model 2200 controller enclosure and six Model 4214R disk enclosures	or	Two Model 2200 controller enclosure and six Model 4254 disk enclosures
❸	Three Model 2200 controller enclosure and nine Model 4214R disk enclosures	or	Three Model 2200 controller enclosure and nine Model 4254 disk enclosures

Configuration using a 41U Modular Storage Cabinet

The 41U modular storage cabinet supports the following configurations:

NOTE: The following lists what the maximum number of each component that can be installed in a 41U cabinet. The total number of components that will physically fit into the 41U cabinet is limited by the amount of space. See Table 2 for individual component height.

- No more than two Model 2200 controller enclosure shelves (each controller enclosure can contain a maximum of two HSG80 controllers) (DS-SE2ZS-C8 / 135820-B21)
- No more than six Model 4214R disk enclosure shelves (DS-SSL14-RS / 103381-001)
  or six Model 4254 disk enclosure shelves (DS-SSL14-RM / 103381-001)
- No more than two Compaq StorageWorks SAN Switch 8 (DS-DSGGB-AA / 158222-B21)
- No more than two Compaq StorageWorks SAN Switch 16 (DS-DSGGB-AB / 158223-B21)
- No more than seven Fibre Channel Hub, 7-port (DS-SWXHB-07 / 234453-001)
  (DS-SWXHB-I7 / 234453-B31)
  (DS-SWXHB-J7 / 234453-291)
- No more than two Fibre Channel Hub, 12-port (DS-GHGGB-AA / 295573-B22)

Configuration using a 42U Modular Storage Cabinet

The 42U modular storage cabinet supports the following configurations:

NOTE: The following lists what the maximum number of each component that can be installed in a 42U cabinet. The total number of components that will physically fit into the 42U cabinet is limited by the amount of space. See Table 2 for individual component height.

- No more than three Model 2200 controller enclosure shelves (each controller enclosure can contain a maximum of two HSG80 controllers) (DS-SE2ZS-C8 / 135820-B21)
- No more than nine Model 4214R disk enclosure shelves (DS-SSL14-RS / 103381-001) or nine Model 4254 disk enclosure shelves (DS-SSL14-RM / 103381-001)
- No more than two Compaq StorageWorks SAN Switch 8 (DS-DSGGB-AA / 158222-B21)
- No more than two Compaq StorageWorks SAN Switch 16 (DS-DSGGB-AB / 158223-B21)
- No more than seven Fibre Channel Hub, 7-port (DS-SWXHB-07 / 234453-001) (DS-SWXHB-I7 / 234453-B31) (DS-SWXHB-J7 / 234453-291)
- No more than two Fibre Channel Hub, 12-port (DS-GHGGB-AA / 295573-B22)

Configuration using a 36U Modular Storage Cabinet

The 36U modular storage cabinet supports the following configurations:

NOTE: The following lists what the maximum number of each component that can be installed in a 36U cabinet. The total number of components that will physically fit into the 36U cabinet is limited by the amount of space. See Table 2 for individual component height.

- No more than two Model 2200 controller enclosure shelves (each controller enclosure can contain a maximum of two HSG80 controllers) (DS-SE2ZS-C8 / 135820-B21)
- No more than six Model 4214R disk enclosure shelves (DS-SSL14-RS / 103381-001)
  or six Model 4254 disk enclosure shelves (DS-SSL14-RM / 103381-001)
- No more than two Compaq StorageWorks SAN Switch 8 (DS-DSGGB-AA / 158222-B21)
- No more than two Compaq StorageWorks SAN Switch 16 (DS-DSGGB-AB / 158223-B21)
- No more than seven Fibre Channel Hub, 7-port (DS-SWXHB-07 / 234453-001) (DS-SWXHB-I7 / 234453-B31) (DS-SWXHB-J7 / 234453-291)
- No more than two Fibre Channel Hub, 12-port (DS-GHGGB-AA / 295573-B22)

Configuration using a 22U Modular Storage Cabinet

The 22U modular storage cabinet supports the following configurations:

NOTE: The following lists what the maximum number of each component that can be installed in a 22U cabinet. The total number of components that will physically fit into the 22U cabinet is limited by the amount of space. See Table 2 for individual component height.

- No more than two Model 2200 controller enclosure shelves (each controller enclosure can contain a maximum of two HSG80 controllers) (DS-SE2ZS-C8 / 135820-B21)
- No more than six Model 4214R disk enclosure shelves (DS-SSL14-RS / 103381-001)
  or six Model 4254 disk enclosure shelves (DS-SSL14-RM / 103381-001)
- No more than two Compaq StorageWorks SAN Switch 8 (DS-DSGGB-AA / 158222-B21)
- No more than two Compaq StorageWorks SAN Switch 16 (DS-DSGGB-AB / 158223-B21)
- No more than seven Fibre Channel Hub, 7-port (DS-SWXHB-07 / 234453-001)
  (DS-SWXHB-I7 / 234453-B31)
  (DS-SWXHB-J7 / 234453-291)
- No more than two Fibre Channel Hub, 12-port (DS-GHGGB-AA / 295573-B22)