RPC12 (695x1 Series) Getting Started Guide

P/N 83-00004284-11
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Contents

Preface

This guide describes how to install and initially configure a Phoenix RPC12 Series storage system, and applies to the following enclosures:

695x1 FC Controller Enclosure
695x2 SAS Expansion Enclosure

Before You Read This Book

Before you begin to follow the procedures in this book, you must prepare the site and learn of any late-breaking information related to installation as described in the following documents:

Phoenix Storage System Site Planning Guide
Phoenix 69501 Release Notes

Typographic Conventions

Typeface[1]	Meaning	Examples
AaBbCc123	Book title, new term, or emphasized word	See the *Release Notes*. A virtual disk (*vdisk*) can .... You *must* be an advanced user to ....
`AaBbCc123`	Directory or file name, value, command, or on-screen output	The default file name is `store.logs`. The default IP address is `10.0.0.1`. Type `exit`.
`AaBbCc123`	Text you type, contrasted with on-screen output	`# set password` `Enter new password:`
`AaBbCc123`	Variable text you replace with an actual value	Use the format `http://`*`ip-address`*.

1 The fonts used in your viewer might differ.

Related Documentation

Application	Title	Part Number
Site planning information	*Phoenix Storage System Site Planning Guide*	83-00004283
Late-breaking information not included in the documentation set	*Phoenix 69501 Release Notes*	83-00004282
Configuring and managing storage	*Phoenix RPC12 Series Administrator's Guide*	83-00004289
Using the command-line interface (CLI)	*Phoenix RPC12 Series CLI Reference Manual*	83-00004288
Troubleshooting	*Phoenix RPC12 Series Troubleshooting Guide*	83-00004287
Recommendations for maximizing reliability, accessibility, and serviceability	*Phoenix RPC12 Series Best Practices Guide*	83-00004286

CHAPTER 1

Before You Begin

The Phoenix RPC12 FC Controller Enclosure and SAS Expansion Enclosure are high-performance storage solutions that combine outstanding performance with high reliability, availability, flexibility, and manageability.

Supported configurations include a controller enclosure with or without attached expansion enclosures. A controller enclosure can contain two RAID controller modules that interact and provide failover capability for the data path. The controller enclosure can use SATA or SAS disk drive modules. Enclosures can be installed in standard 19-inch EIA rack cabinets.

This chapter provides information that you must know before installing and initially configuring your storage system:

System Management Software

Embedded management software includes the RAIDar web-browser interface (WBI) and the command-line interface (CLI) described below.

RAIDar

RAIDar is the primary interface for configuring and managing the system. A web server resides in each controller module. RAIDar enables you to manage the system from a web browser that is properly configured and that can access a controller module through an Ethernet connection.

Information about using RAIDar is in its online help and in the *Administrator's Guide*.

Command-Line Interface

The embedded CLI enables you to configure and manage the system using individual commands or command scripts through an out-of-band RS-232 or Ethernet connection.

Information about using the CLI is in the *CLI Reference Manual*.

Hardware Components and LEDs

This section describes the main hardware components of Phoenix storage system enclosures.

Phoenix RPC12 FC Controller Enclosure Components and LEDs

The controller enclosure can be connected to Fibre Channel host bus adapters (HBAs) or switches. Table 1-1 describes the enclosure components.

Table 1-1 Controller Enclosure Components

Description	Quantity
FC controller (I/O) module	1 or 2[1]
SAS or SATA drive module	2–12 per enclosure
AC power-and-cooling module	2 per enclosure
2- or 4-Gbps FC host port with SFP	2 per controller module
3-Gbps, 4-lane SAS expansion port	1 per controller module
Ethernet port (RJ-45)	1 per controller module
CLI port (RS-232 micro-DB9)	1 per controller module
Service port (RS-232 3.5-mm jack)	1 per controller module

1 Air-management system drive blanks or I/O blanks must fill empty slots to maintain optimum airflow through the chassis.

Figure 1-1 shows the components and LEDs on the front of an enclosure.

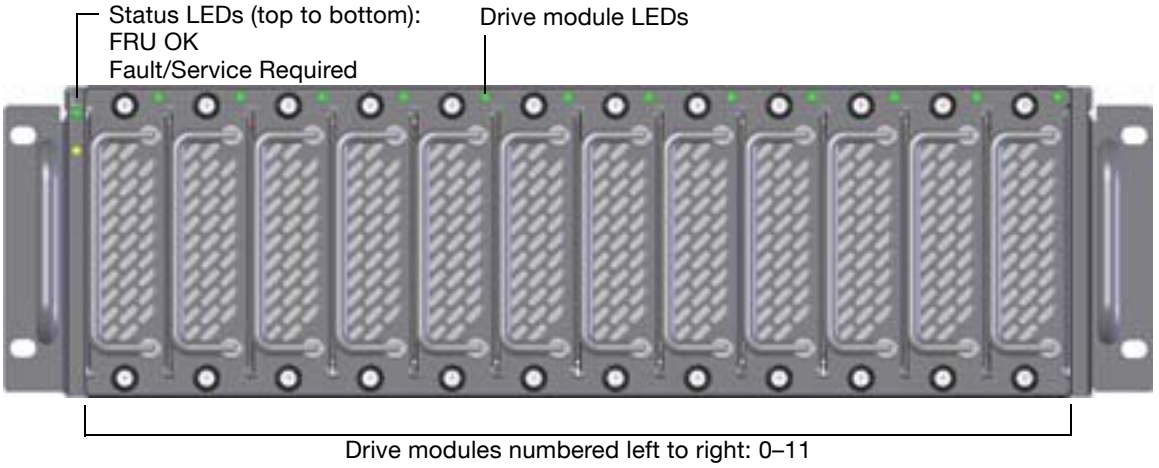


Figure 1-1 Enclosure (Front View)

Table 1-2 describes the LEDs on the front of an enclosure.

Table 1-2 Enclosure LEDs (Front)

Location	LED	Color	Operating State	Description
Drive module	Power/Activity/ Fault (Lower LED)	Green	Off	
			On	The drive module is operating normally.
			Blink	The drive module is active and processing I/O or is performing a media scan.
		Yellow	Off	No Fault.
			On	• The drive module has experienced a fault or has failed • The vdisk is initializing or rebuilding • The vdisk is down or critical.
			Blink	Physically identifies the drive module.
Right side	⚠ Fault/Service Required	Yellow	Off	No fault.

Table 1-2 Enclosure LEDs (Front) *(Continued)*

Location	LED	Color	Operating State	Description
			On	An enclosure-level fault occurred. Service action is required. The event has been acknowledged but the problem needs attention.
Right side	OK FRU OK	Green	On	The enclosure is powered on with at least one power and cooling module operating normally.
			Off	Both power and cooling modules are off.

Figure 1-2 shows the ports and switches at the back of the controller enclosure.

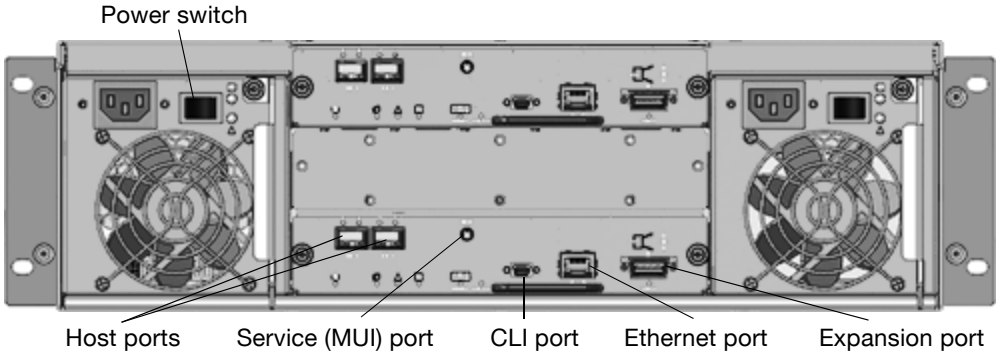


Figure 1-2 Controller Enclosure Ports and Switches (Back View)

Table 1-3 describes the ports and switches on the back of the controller enclosure.

Table 1-3 Controller Enclosure Ports and Switches (Back)

Location	Port/Switch	Description
Power and cooling module	Power switch	Toggle, where: • – is On • O is Off
Controller module	Host ports	4-Gbps FC ports used to connect to data hosts. Each port contains a Small Form-factor Pluggable (SFP) transceiver. Host port 0 and 1 correspond to host channel 0 and 1, respectively.
Controller module	Expansion port	3-Gbps, 4-lane (12 Gbps total) table-routed SAS Out port used to connect SAS expansion enclosures.
Controller module	Ethernet port	10/100BASE-T Ethernet port used for TCP/IP-based out-of-band management of the RAID controller. An internal Ethernet device provides standard 10 Mbit/second and 100 Mbit/second full-duplex connectivity.
Controller module	CLI port	Micro-DB9 port used to connect the controller enclosure to a local management host using RS-232 communication for out-of-band configuration and management.
Controller module	Service port	3.5-mm jack port used by service technicians only.

Figure 1-3 shows the LEDs at the back of the controller enclosure.

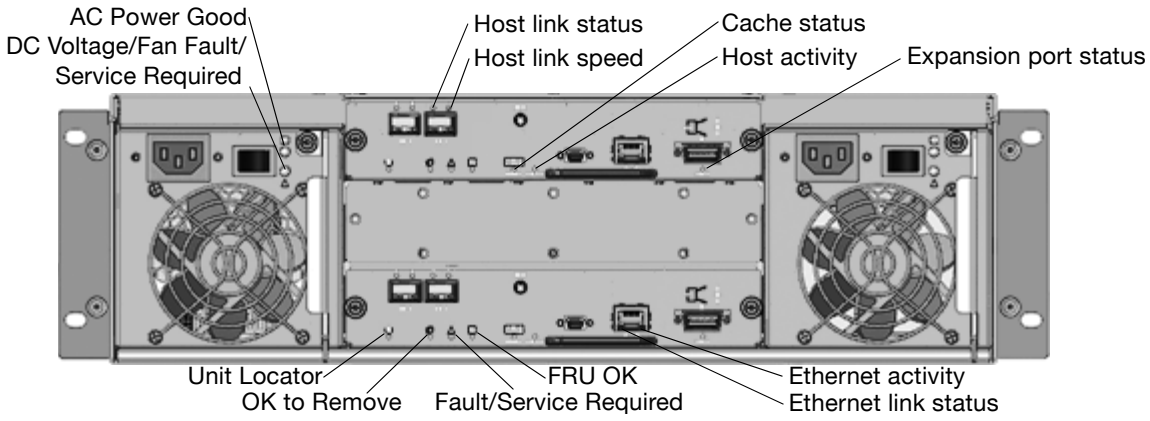


Figure 1-3 Controller Enclosure LEDs (Back View)

Table 1-4 describes the LEDs on the back of the controller enclosure.

Table 1-4 Controller Enclosure LEDs (Back)

Location	LED	Color	State	Description
Power and cooling module	AC Power Good	Green	Off	AC power is off or input voltage is below the minimum threshold.
			On	AC power is on and input voltage is normal.
Power and cooling module	DC Voltage/ Fan Fault/ Service Required	Yellow	Off	DC output voltage is normal.
			On	DC output voltage is out of range or a fan is operating below the minimum required RPM.
Controller module	Host link status	Green	Off	The port is empty or the link is down.
			On	The port link is up and connected.
Controller module	Host link speed	Green	Off	The data transfer rate is 2 Gbps.
			On	The data transfer rate is 4 Gbps.

Table 1-4 Controller Enclosure LEDs (Back) *(Continued)*

Location	LED	Color	State	Description
Controller module	Unit Locator	White	Off	Normal operation.
			Blink	Physically identifies the controller module.
Controller module	OK to Remove	Blue	Off	The controller module is not prepared for removal.
			On	The controller module can be removed.
Controller module	Fault/Service Required	Yellow	On	A fault has been detected or a service action is required.
			Blink	Indicates a hardware-controlled power up or a cache flush or restore error.
Controller module	FRU OK	Green	Off	Controller module is not OK.
			On	Controller module is operating normally.
			Blink	System is booting.
Controller module	Cache status	Green	Off	Cache is clean (contains no unwritten data).
			On	Cache is dirty (contains unwritten data) and operation is normal.
			Blink	A Compact Flash flush or cache self-refresh is in progress. Indicates cache activity.
Controller module	Host activity	Green	Off	The host ports have no I/O activity.
			Blink	At least one host port has I/O activity.
Controller module	Ethernet link status	Green	Off	The Ethernet port is not connected or the link is down.
			On	The Ethernet link is up.
Controller module	Ethernet activity	Green	Off	The Ethernet link has no I/O activity.
			Blink	The Ethernet link has I/O activity.
Controller module	Expansion port status	Green	Off	The port is empty or the link is down.
			On	The port link is up and connected.

Phoenix SAS Expansion Enclosure Components and LEDs

An expansion enclosure can be connected to a controller enclosure or to another expansion enclosure to provide additional disk storage capacity. Table 1-5 describes the enclosure components.

Table 1-5 Expansion Enclosure Components

Description	Quantity
SAS expansion (I/O) module	1 or 2[1]
SAS or SATA drive module	2–12 per enclosure
AC power and cooling module	2 per enclosure
3-Gbps, 4-lane SAS In port	1 per expansion module
3-Gbps, 4-lane SAS Out port	1 per expansion module
Service port (RS-232 micro-DB9)	1 per expansion module

1 Air-management system drive blanks or I/O blanks must fill empty slots to maintain optimum airflow through the chassis.

The components and LEDs on the front of an expansion enclosure are the same as on a controller enclosure; see Figure 1-1 and Table 1-2.

Figure 1-4 shows the ports and switches at the back of the expansion enclosure.

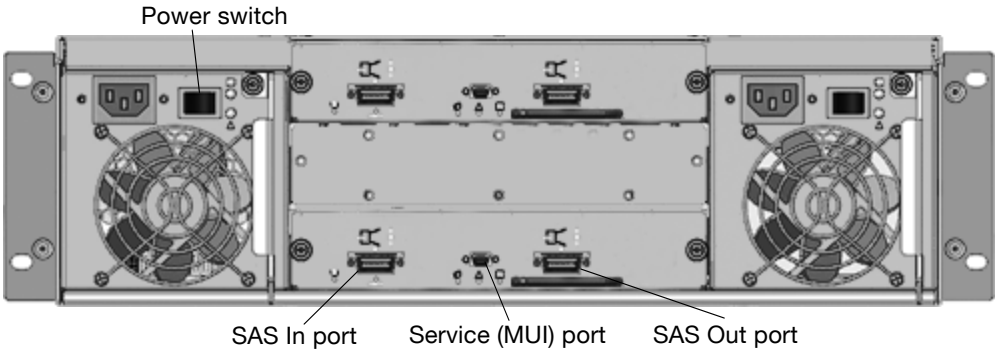


Figure 1-4 Expansion Enclosure Ports and Switches (Back View)

Table 1-6 describes the ports and switches on the back of the expansion enclosure.

Table 1-6 Expansion Enclosure Ports and Switches (Back)

Location	Port/Switch	Description
Power and cooling module	Power switch	Toggle, where: • – is On • O is Off
Expansion module	SAS In port	3-Gbps, 4-lane (12 Gbps total) subtractive ingress port used to connect to a controller enclosure.
Expansion module	SAS Out port	3-Gbps, 4-lane (12 Gbps total) table-routed egress port used to connect to another expansion enclosure.
Expansion module	Service port	Micro-DB9 port for manufacturing technicians.

Figure 1-5 shows the LEDs at the back of the expansion enclosure.

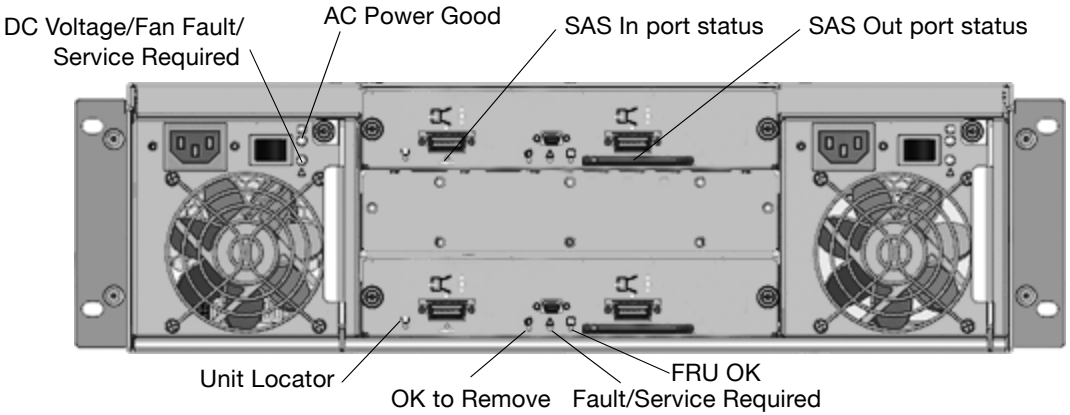


Figure 1-5 Expansion Enclosure LEDs (Back View)

Table 1-7 describes the LEDs on the back of the expansion enclosure.

Table 1-7 Expansion Enclosure LEDs (Back)

Location	LED	Color	State	Description
Power and cooling module	AC Power Good	Green	Off	AC power is off or input voltage is below the minimum threshold.
			On	AC power is on and input voltage is normal.
Power and cooling module	DC Voltage/ Fan Fault/ Service Required	Yellow	Off	DC output voltage is normal.
			On	DC output voltage is out of range or a fan is operating below the minimum required RPM.
Expansion module	SAS In port status	Green	Off	The port is empty or the link is down.
			On	The port link is up and connected.
Expansion module	Unit Locator	White	Off	Normal operation.
			Blink	Physically identifies the expansion module.
Expansion module	OK to Remove	Blue	Off	Not implemented.

Table 1-7 Expansion Enclosure LEDs (Back) *(Continued)*

Location	LED	Color	State	Description
Expansion module	⚠ Fault/Service Required	Yellow	On	A fault has been detected or a service action is required.
			Blink	Indicates a hardware-controlled power up or a cache flush or restore error.
Expansion module	OK FRU OK	Green	Off	Expansion module is not OK.
			On	Expansion module is operating normally.
			Blink	System is booting.
Expansion module	SAS Out port status	Green	Off	The port is empty or the link is down.
			On	The port link is up and connected.

Obtaining IP Values for Your Storage System

Before installing or configuring your system, obtain IP and gateway addresses for the Ethernet management ports on your RPC12 storage system from your network administrator.

A different IP address should be assigned for each Ethernet management port (one each for controller A and controller B).

You will use these values when you set IP addresses for Ethernet management ports during initial configuration (see “Setting Management Port IP Addresses Using the CLI” on page 52).

Note – You can also obtain IP values for Ethernet management ports from a DHCP server if one is available. For more information, refer to the *Administrator’s Guide*.

Installation Checklist

Before you begin installing the system, you must prepare the site as described in the *Site Planning Guide* and learn of any late-breaking information in the *Release Notes* for your system.

Table 1-8 outlines the steps required to install and initially configure the system. To ensure a successful installation, perform the tasks in the order they are presented.

Table 1-8 Installation Checklist

Step	Installation Task	Where to Find Procedure
1.	Connect the enclosures.	"Connecting Controller and Expansion Enclosures" on page 33
2.	Connect the power cords.	"Connecting AC Power" on page 37
3.	Test the enclosure connections.	"Testing the Enclosure Connections" on page 38
4.	Install required host software and drivers, including: • HBA drivers • RPC12 MPIO DSM • RPC12 SES Driver	"Host System Requirements" on page 39
5.	Connect the data hosts.	"Connecting Hosts" on page 39
6.	Connect the management host.	"Connecting Remote Management Hosts" on page 49
7.	Perform initial configuration tasks: • Set management port IP properties on the controller enclosure • Set the date and time on the controller enclosure • Configure host ports on the controller enclosure • Create virtual disks and map volumes • Test the configuration	"Configuring a System for the First Time" on page 51

CHAPTER 2

Installing and Cabling Enclosures

This chapter describes how to install and cable enclosures in a standard 19-inch EIA rack cabinet. It contains the following sections:

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Note – Do not make mechanical or electrical modifications to the product. The vendor is not responsible for the safety or regulatory compliance of a modified product.

Caution – Electrostatic discharge can damage sensitive components. Be sure you are properly grounded before touching a static-sensitive component or assembly.

Connecting Controller and Expansion Enclosures

Note – For additional recommendations on connecting controller and expansion enclosures, see the *Best Practices Guide*.

Use the supplied SAS cables to connect a controller enclosure to up to four expansion enclosures. Figure 2-1 and Figure 2-2 show the recommended fault-tolerant cabling patterns. In an enclosure, the upper module is designated *A* and the lower module is designated *B*.

When connecting multiple expansion enclosures, use reverse cabling to ensure the highest level of fault tolerance. For example, Figure 2-2 shows controller A connected to expansion module 1A, and the chain of connections continuing down. Controller B is connected to the lower module (B) of the last expansion enclosure in the chain, with connections moving in the opposite direction.

Fault-tolerant cabling is recommended because it enables the controllers to access remaining expansion enclosures if any one expansion enclosure fails. However, the system also supports non-fault-tolerant cabling using the supplied SAS cables.

Figure 2-3 shows non-fault-tolerant cabling between a controller and up to four expansion enclosures.

Note – For clarity, the schematic illustrations of the controllers shown in this section show only relevant details such as expansion ports. For detailed illustrations showing all components, see “Hardware Components and LEDs” on page 11.

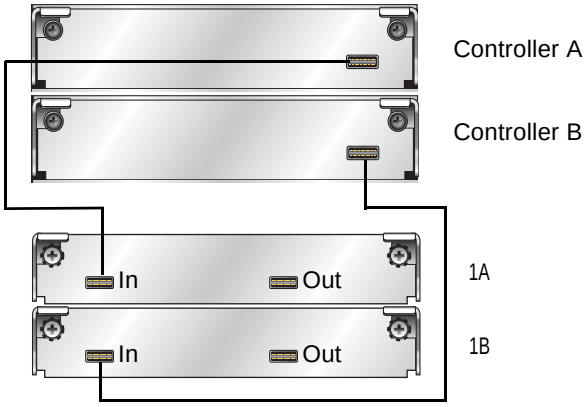


Figure 2-1 Cabling Connections Between One Controller Enclosure and One Expansion Enclosure

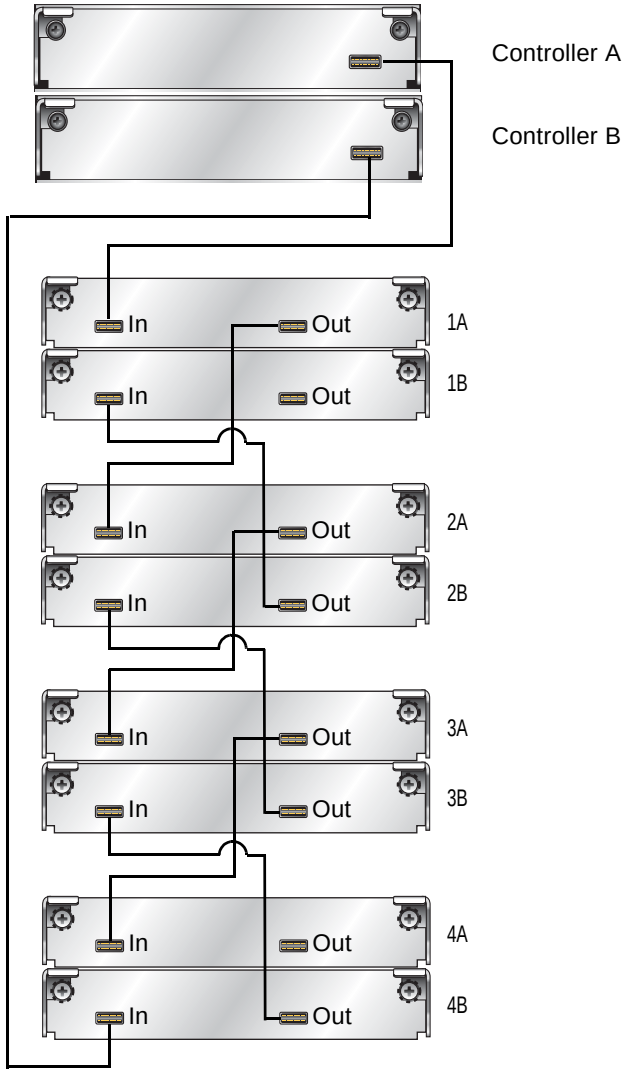


Figure 2-2 Fault-Tolerant Cabling Connections Between One Controller Enclosure and Up to Four Expansion Enclosures

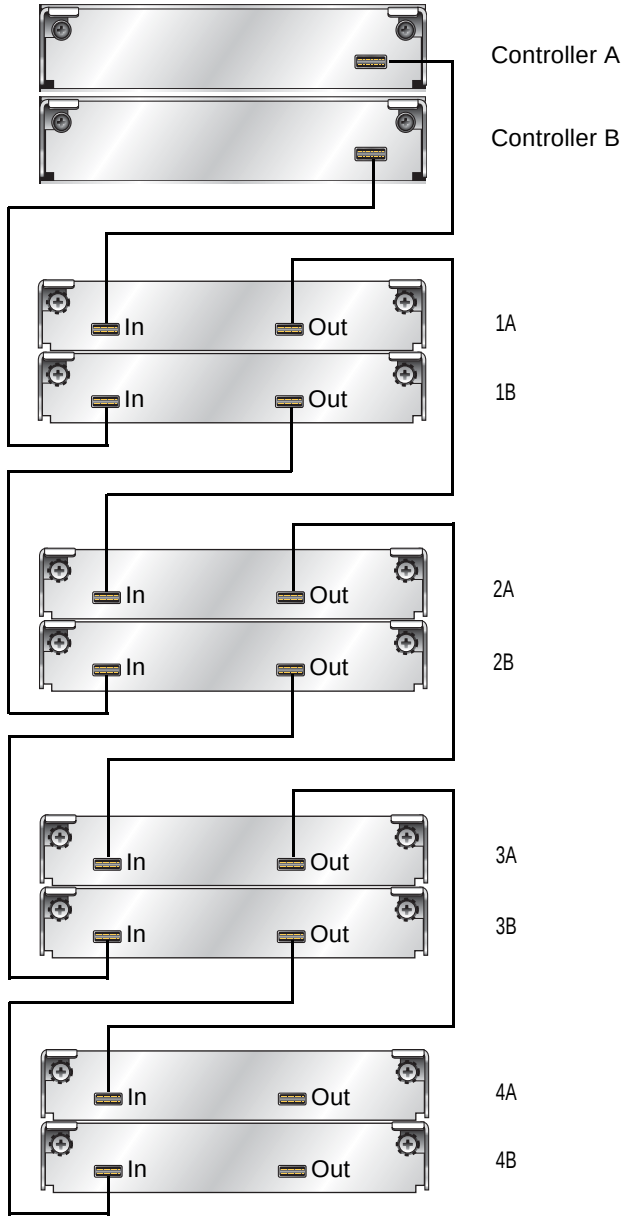
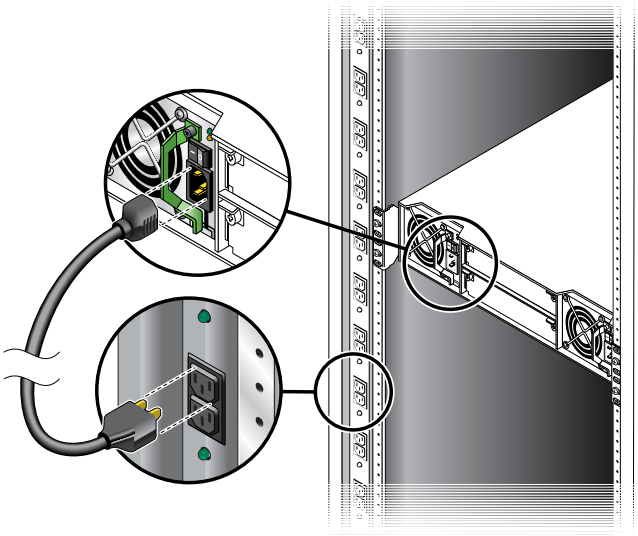


Figure 2-3 Non-Fault-Tolerant Cabling Connections Between One Controller and Up to Four Expansion Enclosures

Connecting AC Power

Use this procedure to connect AC power to the enclosures.

1. Verify that both power switches are off for each enclosure in the rack.
2. Using the AC power cords, for each enclosure, connect one power and cooling module to one power source in the rack, and the other power and cooling module to a separate power source in the rack.



3. Connect the primary power cords from the rack to separate external power sources.

   Power on the system as described in the topic that follows.

Testing the Enclosure Connections

Use this procedure to power on the newly installed system.

1. Press the power switches at the back of each expansion enclosure to the On (–) position.

   This ensures that the disks in the expansion enclosures have enough time to completely spin up before being scanned by the RAID modules in the controller enclosure. Depending on your configuration, it can take several minutes for the system to power up.

   While enclosures power up, their LEDs blink. After the LEDs stop blinking, if no LEDs on the front and back of the enclosure are yellow, the power-on sequence is complete and no faults have been detected.

   For a description of LED behavior and status, see “Hardware Components and LEDs” on page 11.

2. Press the power switches at the back of the controller enclosure to the On position.

   If the enclosure’s power-on sequence succeeds as described in Step 1, the system is ready to use.

Next Steps

Now you are ready to connect the data and management hosts, as described in Chapter 3.

CHAPTER 3

Connecting Hosts

This chapter describes how to connect data and management hosts to controller enclosures. It contains the following sections:

For additional recommendations on connecting controller enclosures to data hosts, refer to the *Best Practices Guide*.

Host System Requirements

Data hosts connected to Phoenix 96501 FC Controller Enclosures must meet the following requirements:

- To configure an FC HBA that is directly attached to controller enclosure host ports, set the HBA parameters as specified in your storage system's *Release Notes*. This ensures the HBA can identify the system.
- Data host operating systems must support multipathing.
- To prevent Microsoft® Windows® data hosts from displaying the Found New Hardware Wizard when the storage system is discovered, install the Phoenix SCSI Enclosure Services driver. For more information, see "Installing the RPC12 SES Driver for Microsoft Windows Hosts" on page 40.

Installing the Phoenix SES Driver for Microsoft Windows Hosts

Installing the Phoenix SCSI Enclosure Services (SES) driver prevents Microsoft Windows hosts from displaying the Found New Hardware Wizard when the storage system is discovered.

1. Contact Phoenix for the latest driver.
2. Extract the package contents to a temporary folder on the host.
3. In that folder, double-click `Setup.exe` to install the driver.
4. Click Finish.

   The driver is installed.
5. Optionally, delete the extracted files and the SES driver package.

Configuration Considerations

Before connecting the controller enclosure to one or more data hosts, consider the following options and limitations. Fault tolerance and performance requirements determine whether to optimize your configuration for high availability or high performance.

Using a Direct or Switch Attach Configuration

Attaching the controller enclosure directly to data hosts is suitable for environments where the storage is only used by one or two hosts.

Switch attach storage places one or more FC switches between the controller enclosure and data hosts. This enables more than one host to share a storage system and provides a level of redundancy if more than one switch is used.

Using Host Port Interconnects

When the internal connections between host ports are enabled through RAIDar, host port 0 on each controller is internally connected to host port 1 on the other controller. This provides redundancy in the event one controller fails (failover) by making volumes owned by the failed controller accessible on the surviving controller.

Enable port interconnects when controller enclosures are attached directly to hosts and high availability is required, or when switch ports are at a premium and fault tolerance is required but highest performance is not.

When ports are not interconnected, volumes owned by a controller are accessible from two of its host ports only. Use this default setting when controller enclosures are attached through one or more switches, or when they are attached directly but performance is more important than availability.

Using Loop or Point-to-Point Topology

Phoenix 96501 FC Controller Enclosures use Fibre Channel Arbitrated Loop (loop) topology by default.

Using loop topology enables hosts to see all volumes on all ports after failover. Use loop topology, where possible, as it provides the most flexible and host-independent, fault-tolerant configuration. Point-to-point topology restricts the ability for the system to present volumes from both controllers after a failover, limiting the overall configuration choices.

When ports are interconnected, you can use loop topology only. When ports are not interconnected, you can use either loop or point-to-point topology.

Note – Point-to-point topology is supported for switch attach configurations only.

For additional guidelines on connecting controller enclosures to hosts, refer to the *Best Practices Guide*. For information on placing and connecting enclosures safely, refer to the *Site Planning Guide*. For information on how controllers present volumes to data hosts, see the *Administrator's Guide*.

Connecting Direct Attach Configurations

This section explains how to connect the controller enclosure directly to data hosts. It shows configurations that support high availability and high performance, and notes when host port interconnects must be enabled.

The controller enclosure has four host connections, two per controller. Connect FC cables from host ports on each controller to FC HBAs on data hosts, as shown in the following figures. To maintain redundancy, connect each data host to both controller A and controller B.

Caution – Fiber optic cables are fragile. Do not bend, twist, fold, pinch, or step on the fiber optic cables. Doing so can degrade performance or render data unavailable.

Note – For clarity, the schematic illustrations of the controllers shown in this section show only relevant details such as host ports. For detailed illustrations showing all components, see “Hardware Components and LEDs” on page 11.

Figure 3-1 shows the preferred redundant configuration. This configuration requires that host port interconnects are enabled as described in “Configuring Host Ports” on page 57.

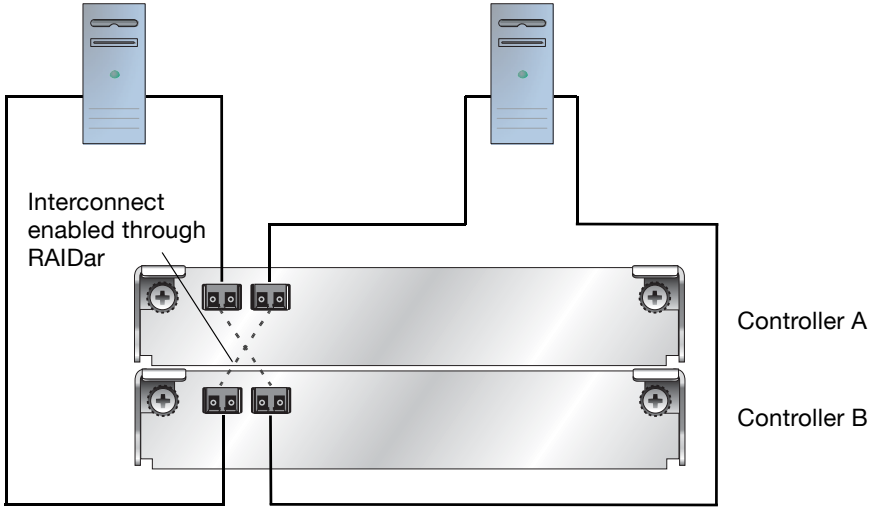


Figure 3-1 High-Availability, Dual-Controller, Direct Attach Connection to Two Dual-Port Data Hosts

Figure 3-2 shows a non-redundant configuration that can be used when high performance is more important than high availability. This configuration requires host port interconnects to be disabled, which they are by default.

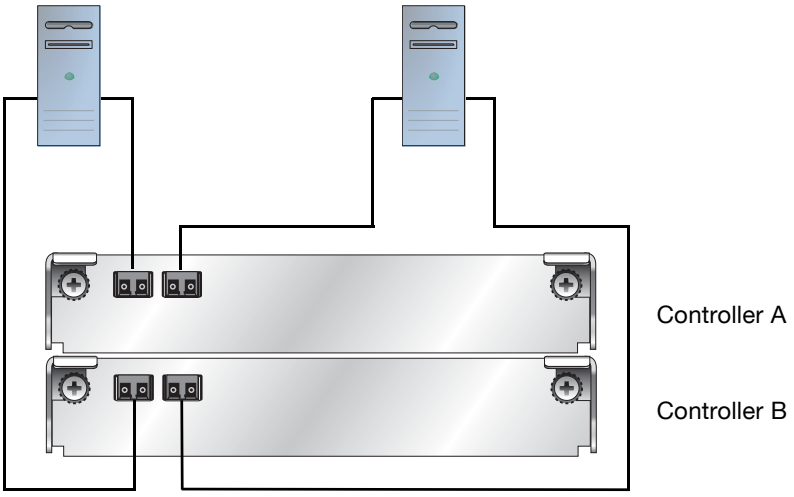


Figure 3-2 High-Performance, Dual-Controller, Direct Attach Connection to Two Dual-Port Data Hosts (Not Fault Tolerant)

Connecting Switch Attach Configurations

This section explains how to connect the controller enclosure to data hosts through one or more external FC switch.

The controller enclosure has four host connections, two per controller. Connect FC cables from controller hosts ports to switch ports, and from switch ports to data hosts, as shown in the following figures.

To maintain redundancy, connect each data host through the switch or switches to both controller A and controller B. Make sure that link speed and topology settings on switches match those on the controller host ports to which they are connected. A speed mismatch prevents the host from accessing the storage system.

Caution – Fiber optic cables are fragile. Do not bend, twist, fold, pinch, or step on the fiber optic cables. Doing so can degrade performance or cause data loss.

Note – For clarity, the schematic illustrations of the controllers shown in this section show only relevant details such as host ports. For detailed illustrations showing all components, see “Hardware Components and LEDs” on page 11.

Connecting One Data Host Through One Switch

Figure 3-3 shows a dual-controller connection through one switch to one dual-port data host with two FC HBA ports. This configuration requires that host port interconnects are disabled, which they are by default. It also requires host-based multipathing software.

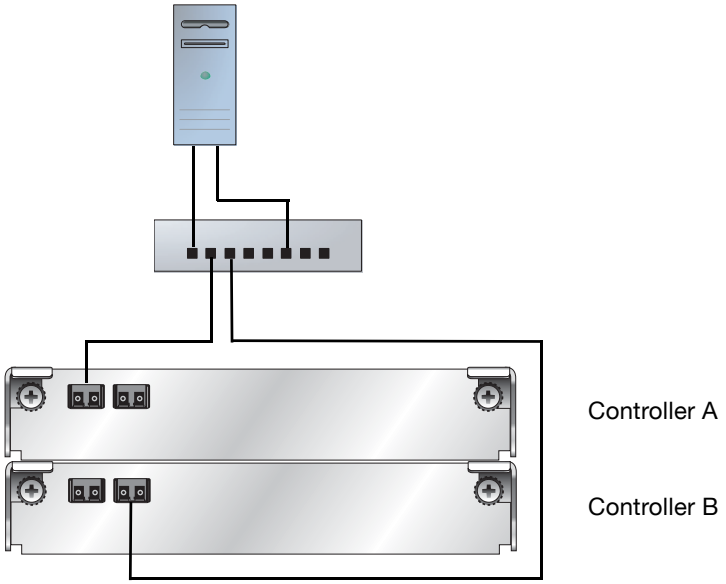


Figure 3-3 Dual-Controller Connection Through One Switch to One Dual-Port Data Host

Connecting Two Data Hosts Through Two Switches

Figure 3-4 shows the preferred high-availability dual-controller connection through two switches to two dual-port data hosts, in which each data host has two FC HBA ports with each port connected to a different switch. This configuration requires that host port interconnects are disabled, which they are by default.

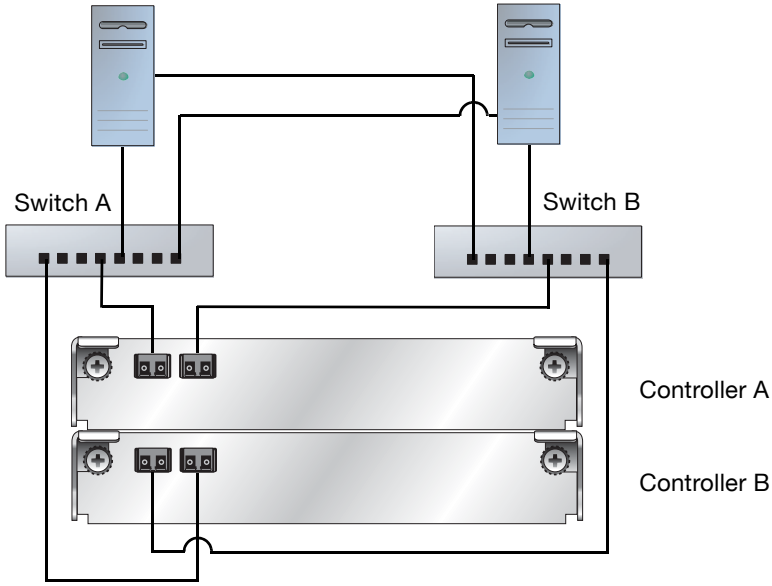


Figure 3-4 High-Availability Connection Through Two Switches to Two Dual-Port Data Hosts

Connecting Two Data Hosts Through a Zoned Switch

Figure 3-5 shows a high-availability, dual-controller connection through a two-zone switch. Each zone can be an independent switch (see Figure 3-4).

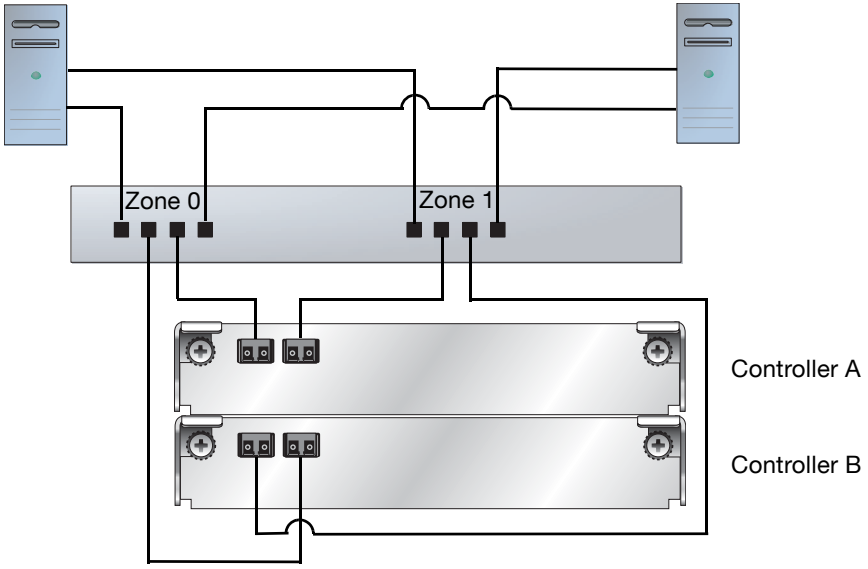


Figure 3-5 High-Availability Dual-Controller Connection Through a Two-Zone Switch to Two Dual-Port Data Hosts

Connecting Remote Management Hosts

The management host directly manages systems out-of-band over an Ethernet network. This section describes how to connect the Ethernet cables to the management host.

1. Connect an Ethernet cable to the Ethernet management port on each controller.
2. Connect the other end of each Ethernet cable to a network that your management host can access (preferably on the same subnet).

Next Steps

After you have connected the management host and data hosts, you are ready to perform first-time configuration on the storage system as described in Chapter 4.

CHAPTER 4

Configuring a System for the First Time

This chapter describes how to perform first-time configuration on the storage system. It also describes how to perform basic storage configuration to verify that your system is working.

This chapter includes the following topics:

For information about additional configuration and management tasks, including changing the `manage` user's password, refer to RAIDar's online help or the *Administrator's Guide*.

Setting Management Port IP Addresses Using the CLI

Ethernet Management ports on controller module A and controller module B are configured with the following default values:

Management Port IP Address: 10.0.0.1 (controller A), 10.0.0.2 (controller B)
IP Subnet Mask: 255.255.255.0
Gateway IP Address: 0.0.0.0

If the default IP addresses are not compatible with your network, you must set an IP address for each management port using the command-line interface (CLI) embedded in each controller module. The CLI enables you to access the system using RS-232 communication and terminal emulation software.

Use the CLI commands described in the steps below to set the IP address for the Ethernet management port on each controller module.

Once new IP addresses are set, you can change them as needed using RAIDar.

Note – Changing IP settings can cause management hosts to lose access to the storage system.

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1. From your network administrator obtain an IP address, subnet mask, and gateway address for controller A and controller B.

Note – The *Site Planning Guide* provides installation and configuration worksheets that you can use to record values.

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2. Use a micro-DB9 serial cable to connect controller A to a serial port on a host computer.

   If necessary, use a DB9-to-DB25 adapter for connecting the serial cable to a DB25 serial port on the host computer.

3. Start and configure a terminal emulator, such as HyperTerminal or VT-100, using the display settings in Table 4-1 and the connection settings in Table 4-2.

Table 4-1 Terminal Emulator Display Settings

Parameter	Value
Terminal Emulation Mode	VT-100 or ANSI (for color support)
Font	Terminal
Translations	None
Columns	80

Table 4-2 Terminal Emulator Connection Settings

Parameter	Value
Connector	COM1 (typically)
Baud rate (bits/sec)	115,200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

4. In the terminal emulator, connect to controller A.

5. Press Enter to display the CLI prompt (#).

6. At the prompt, type the following command to set the values you obtained in Step 1 for each Ethernet management port, first for controller A and then for controller B:

```
set network-parameters ip address netmask netmask gateway gateway
controller a|b
```

where:

address is the IP address of the controller

netmask is the subnet mask, in dotted-decimal format

gateway is the IP address of the subnet router
`a|b` specifies the controller whose network parameters you are setting

For example:

```
# set network-parameters ip 192.168.0.10 netmask 255.255.255.0
gateway 192.168.0.1 controller a

# set network-parameters ip 192.168.0.11 netmask 255.255.255.0
gateway 192.168.0.1 controller b
```

7. Type the following command to verify the new IP addresses:

```
show network-parameters
```

Network parameters, including the IP address, subnet mask, and gateway address are displayed for each controller.

8. Disconnect from the CLI and exit the emulator.
9. In the host computer's command window, type the following command to verify Ethernet connectivity, first for controller A and then for controller B:

```
ping IP-address
```

Configuring Your Web Browser for RAIDar

Before using RAIDar to perform remaining steps, ensure that your web browser is properly configured according to the following guidelines:

Use one of the following browsers:

Microsoft Internet Explorer 5.5 or later
Mozilla Firefox 1.0.7 or later

Because RAIDar uses popup windows to indicate the progress of user-requested tasks, disable any browser features or tools that block popup windows.

For optimal performance, set your browser to use stored (cached) web pages.

Note – Changing your browser cache setting might affect other sites you visit with your browser.

To optimize display, use a color monitor and set its color quality to the highest setting.

For Internet Explorer, to ensure you can navigate beyond RAIDar login page, set the local-intranet security option to medium or medium-low.

Logging in to RAIDar from a Local Management Host

To log in to RAIDar from a local management host:

1. In your web browser's address field, type the IP address of one of the controller enclosure's Ethernet management ports and press Enter. Ethernet management ports are preconfigured with the values `10.0.0.1` for controller A and `10.0.0.2` for controller B.

   The RAIDar Login page is displayed. If the Login page does not display, verify that you have entered the correct IP address.

2. On the login page, type the default management user name `manage` and default password `!manage`.

3. Click Log In.

   The Status Summary page is displayed.

Setting the Date and Time

To configure the system's date and time:

1. Select Manage > General Config > Set Date/Time.

2. In the Set System Date panel, select the current month, day, and year.

3. In the Set System Time panel, type time values using a 24-hour clock (where hour 8 represents 8 a.m. and hour 20 represents 8 p.m.) and select the proper time zone.

4. Click Change Date/Time.

Configuring Host Ports

Note – If you need to change FC Loop ID settings as described below, consult with your network administrator on the best addresses to use.

To configure controller enclosure host ports:

1. Select Manage > General Config > Host Port Configuration.
2. In the Controller Module Host Port Configuration panels, for each port to which an HBA or switch is attached, set the appropriate link speed.

   An FC port's link speed must match the speed of the FC HBA or switch to which the port is connected. In a dual-controller system, if FC port interconnects are enabled, changing the speed of a port on one controller also changes the speed of the interconnected port on the other controller.
3. Click Update Host Port Configuration.
4. In the Advanced Options panel, configure FC loop ID, port interconnect, and topology settings as required for your configuration:

   FC Loop ID: (Loop topology configurations only) If you want data hosts to identify a controller using a specific address, click Change FC Loop ID. In the Requested Loop ID for Host Ports panel, select a specific number (from 1 to 125) for each controller, click Save and Continue, and then click OK to restart the controller.

   During loop initialization the controller will request the specified ID but it might be assigned another ID instead.

   Port Interconnect Settings: (Direct attach configurations only) If your configuration requires that host port interconnects be enabled, click Change FC Port Interconnect Settings. In the Host Port Configuration panel, set Internal Host Port Interconnect to Interconnected (enabled), and click Save and Continue.

   This setting affects all FC ports on both controllers.

Note – If one or more ports are set to use point-to-point topology, you cannot enable interconnects.

   Fibre Channel Topology: (Switch attach configurations only) To change the topology used on controller FC ports from Loop to Point to Point, click Change Host Port Topology. In the Controller Module Host Port Configuration panels, select Point to Point for each port, and click Save and Continue.

Note – If interconnects are enabled, you cannot use point-to-point topology.

The Host Port Configuration page displays again.

Creating Virtual Disks

Two or more disk drives can be logically combined to form a virtual disk. The combined storage capacity can then be partitioned into volumes. RAIDar provides both manual and automatic methods for creating virtual disks, as described in its online help and in the *Administrator's Guide*.

As an example, the following steps use the manual method to create two virtual disks with the following characteristics:

RAID 5, in which parity is distributed across all disk drives in the virtual disk
Five disk drives per virtual disk
One spare disk drive dedicated to each virtual disk
One volume per virtual disk, where the volume is not visible to data hosts

To create both virtual disks:

1. Select Manage > Virtual Disk Config > Create A Vdisk.
2. Select Manual Virtual Disk Creation (Detail-based).
3. Type a name for the virtual disk.

   The name is case-sensitive and can include 17 characters. Allowed characters include letters, numbers, hyphens, underscores, and spaces.
4. Select RAID 5 – Parity RAID, Parity Distributed.
5. Click Create New Virtual Disk.
6. Select five drives of the same size and type (all SAS or all SATA).
7. For the dedicated spare drive option, select Yes and click Continue.
8. Select a drive to be the spare and click Continue.
9. For the number of volumes, select 1.

   Notice that by default the volume will not be exposed to (accessible by) hosts.
10. Click Create Virtual Disk.

    A page is displayed that shows the progress of initializing the virtual disk.

11. Click the link to create another virtual disk.
12. Repeat Step 2 to Step 10 to create a second virtual disk with a different name.

Mapping a Data Host to a Volume

To enable a data host to access a volume you created, you must map the volume to the host. The port World Wide Name (WWN) of each host connected to the system is automatically added to the system's global host port list.

Before mapping a data host to a volume you must identify the data host's port WWN and a LUN that the host is not using.

To map a data host to a volume:

1. Select Manage > Volume Management > Volume Mapping > Map Hosts To Volume.

   Notice that your first virtual disk and its volume are selected, and the volume's host mapping values are set to None.

2. In the Assign Host Access Privileges panel:

   a. Select the host port WWN value that you identified before beginning.

   b. Type the LUN that you identified.

      Notice that the mapped host will have read-write access through all controller host ports.

   c. Click Map It.

Testing the Configuration

To determine that your system is ready for use, test the configuration as follows:

1. In RAIDar, select Monitor > Vdisk Status and view the configuration information for each virtual disk.

   The virtual disk status is Critical during initialization but you can perform I/O to the volume.

2. From the data host:

   a. Make the volume an operating system partition.

   b. Verify that you can access the mapped volume and the volume size shown on the data host matches the size shown in RAIDar.

   c. Verify that you can write data to the volume.

   If the above tests succeed, your system is ready for use.

3. Once you have determined that your system is ready for use, tighten the thumb screws on all SAS cables.

4. Optionally, unmount the volume and delete the test vdisks.

Logging Out of RAIDar

If you do not log out of RAIDar when you have finished using it, other `manage` users cannot log in to the same controller module and your IP address stays logged in for 30 minutes (the default auto-logout timeout setting).

To log out of RAIDar:

1. Click Log Off at the bottom of the menu.

   The Log Off page is displayed.

2. Click Log Off.

Next Steps

You have completed the initial configuration tasks covered in this guide. For additional information on configuring your system and performing administrative tasks, refer to RAIDar's online help or the *Administrator's Guide*. If you encounter problems with the operation of your system, refer to the *Troubleshooting Guide*.

APPENDIX A

Powering the System Off and On

This appendix describes how to power off and power on the system when needed.

Powering Off the System

The system rarely needs to be powered off. You remove power only when you plan to physically move the system to another location.

Use this procedure when you need to power off the system.

1. Stop all I/O from hosts to the system.
2. Use RAIDar to shut down both controllers.

   Wait until RAIDar indicates that processing is complete.
3. Press the power switches at the back of the controller enclosure to the Off position.
4. Press the power switches at the back of each expansion enclosure to the Off position.

Powering On the System

Power on any expansion enclosures before powering on the controller enclosure. This ensures that the disks in the expansion enclosures have enough time to completely spin up before being scanned by the RAID controllers in the controller enclosure. Depending on your configuration, it can take several minutes for the system to power up.

Use this procedure to turn power on for all enclosures installed in a rack.

1. Press the power switches at the back of each expansion enclosure to the On (–) position.

   While enclosures power up, their LEDs blink. After the LEDs stop blinking, if no LEDs on the front and back of the enclosure are yellow, the power-on sequence is complete and no faults have been detected.

2. Press the power switches at the back of the controller enclosure to the On (–) position.

   If the enclosure's power-on sequence succeeds as described in Step 1, the system is ready to use.

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