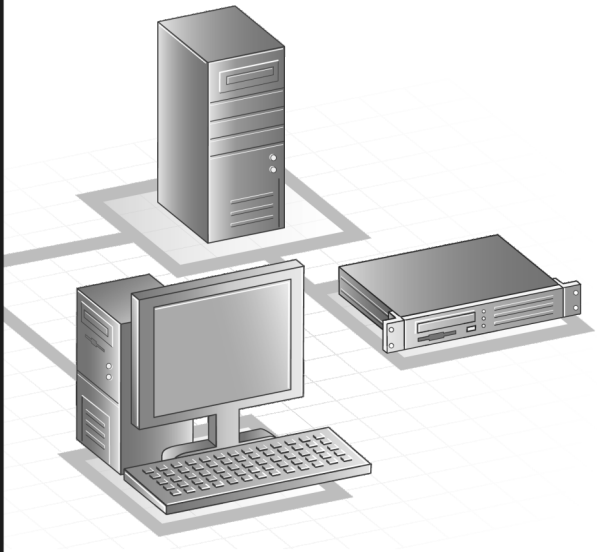




INSTALLATION AND USER'S GUIDE

SPHERAS RAIDWATCH



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Glossary

1

Introduction

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This chapter provides an overview of Sphas RAIDWatch and describes the basic requirements for installation.

Overview of Sphas RAIDWatch

Sphas RAIDWatch is a Java-based program that runs under operating systems compatible with the Java Run-time Environment, and is designed for managing Redundant Array of Independent Disks (RAID) systems implemented using Adaptec's Maxima RAID controller.

Sphas RAIDWatch provides at-a-glance monitoring and customizable real-time status reporting of the entire RAID system, clearly shows the relationship between RAID system elements, and simplifies array configuration.

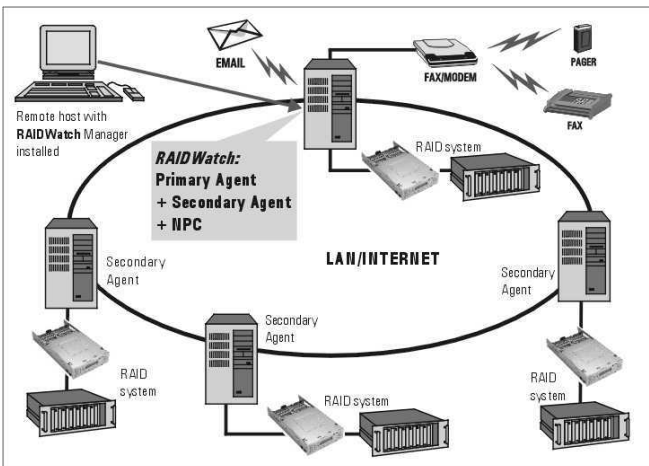
Sphas RAIDWatch provides remote access to your RAID systems and allows for multiple management sessions with a RAID system.

Included with Sphas RAIDWatch, the Event Monitor application can be used to constantly monitor multiple RAID systems.

About Java-based Remote Management

Sphas RAIDWatch supports remote management of RAID controllers over a Local Area Network (LAN), Wide Area Network (WAN), or the Internet using the TCP/IP protocol.

Management over the LAN is achieved through data exchanges between a remote Sphas RAIDWatch manager station and Sphas RAIDWatch agents on the host server(s). The Figure below shows a typical connection.



Preparing for Installation

For Sphas RAIDWatch to function properly, different software modules must be correctly installed on different servers and stations in a given LAN or WAN.

If a network has multiple RAID systems, one RAID-connected server must be chosen as the main server. If RAIDWatch will be operated through Web browsers, the main server must be a Web server.

The main server must have the Primary Agent and Secondary Agent (if the main server is also a RAID host) installed. The main server must also have the Notification Processing Center (NPC) installed, if you will be using the NPC. The main server must have Java Run-time Environment (JRE) installed if it is a Sphas RAIDWatch manager or Event Monitor site. Subsequent installations at other RAID servers only need the Secondary Agent installed.

The Table below provides a guide to what modules need to be installed on which servers.

Install Elements	Main RAID Server ¹	Web Server ¹	Secondary Server	RAIDWatch Station
Primary Agent	X	X		
Secondary Agent	X		X	
RAIDWatch				X
NPC	X	X		
JRE				X

¹ If RAIDWatch is going to be operated or installed through Web browsers, the Web server must be the main RAID server.

The next Table lists requirements that are *not* included with Sphas RAIDWatch but must be installed or modified by system users.

Install Elements	Main RAID Server	Web Server	Secondary Server	RAIDWatch Station
OS Drivers ¹	X			
OS Patches ²	X			
Web Browser				X
Edit Browser Preferences ³				X
Web Server		X		

¹ OS drivers are required for Solaris servers.

² OS patches are required to run JRE on Solaris, AIX, and Linux servers.

³ Browser preferences must be edited for browsers running under all Windows OSs.

System Requirements

To successfully install and run Sphas RAIDWatch and Event Monitor, your system must meet these requirements.

Servers Running Sphas RAIDWatch

- Pentium or above compatible (or equivalent PC) running one of these operating systems (OSs):
 - Microsoft® Windows 2000
 - Microsoft Server 2003 Enterprise Edition
 - Red Hat® Linux 8.0, 9.0, AS 3.0
 - Sun™ Sparc Solaris™ 9



Note: Contact your Adaptec sales representative for updates on supported OSs.

- At least one available RS-232C port (if telephone remote event notification is desired)

- Hayes-compatible modem (if pager/telephone/mobile phone event notification is desired) or fax/modem (if fax event notification is desired).



Note: Fax command class 2.0 support only.

- SNMP service for Windows NT (if SNMP remote management is desired)
- Windows Messaging (MAPI) for Windows NT (if support for pager or fax notification is needed)
- Windows NetBEUI support for Windows NT (if network broadcast support notification is needed)

Local Clients Running Spheras RAIDWatch

- Pentium or above compatible (or equivalent PC) running one of these OSs:
 - Microsoft® Windows 2000
 - Microsoft Server 2003 Enterprise Edition
 - Red Hat® Linux 8.0, 9.0, AS 3.0
 - Sun™ Sparc Solaris™ 9



Note: Contact your Adaptec sales representative for updates on supported OSs.

- SNMP service for Windows NT (if SNMP agent is under the Windows NT environment)
- Windows Messaging (MAPI) for Windows NT, Windows 2000, Windows 95/98 (if support for pager or fax notification is needed)
- Windows NetBEUI support for Windows NT, Windows 2000, Windows 95/98 (if network broadcast notification support is needed)

Platform Requirements

Although Sphas RAIDWatch supports various OSs, support for Java, varies from OS to OS. Carefully read this section for special instructions for specific OSs.

Platform Limitations

INSTALL.JAR

Under Windows NT Server 4.0 (Windows 95/98/2000), the Java installation program, INSTALL.JAR, only supports:

- Netscape Navigator 4.5 (or later)
- Microsoft Internet Explorer 4.0 (or later)

Under Solaris (x86, SPARC), the Java installation program, INSTALL.JAR, only supports:

- Netscape[®] Navigator 4.5 (or later)

GRM.JAR

Under Windows NT Server 4.0 (Windows 95/98/2000), the RAIDWatch program, GRM.JAR, only supports:

- Netscape Navigator 4.5 (or later)

Under Solaris (x86, SPARC), the RAIDWatch program, GRM.JAR, only supports:

- Netscape Navigator 4.5 (or later)

Solaris Platforms

Sphas RAIDWatch supports Solaris 7, Solaris 8(x86) and Solaris 9 running on Solaris SPARC servers and workstations. Prior to running the installation procedure for Sphas RAIDWatch on a Solaris machine, mount the installation CD, then download the required Java Patch Files, following the instructions provided.

To download JRE patches for Solaris and make the files accessible:

- 1 Open your Web browser and browse to the Sun Microsystems Web site at <http://www.sun.com/software/solaris/jre/download.html>.
- 2 Click on the HTTP hotspot that corresponds with your Solaris version.

- 3 Sign in when prompted.
- 4 Click **OK** to accept the license agreement.
- 5 Put the patch files in the right directory. The install shell script (install.sh) needs for you to put the patch files in your system.

For example, in a Solaris SPARC workstation, if the patch file name is 2.2_05a_patches_sparc_5.7.tar, enter:

```
#mkdir /usr/patches
#cp 2.2_05a_patches_sparc_5.7.tar /usr/patches
#cd /usr/patches
#tar xvf 2.2_05a_patches_sparc_5.7.tar
```

Red Hat Linux Servers

RAIDWatch supports Red Hat Linux 8.0 and higher servers and workstations. Complete these steps before you run the installation:

- 1 Mount installation CD.
- 2 If your Red Hat Linux host is a Web server:
 - a Make sure that Web server software is already installed on your Linux server.

The default web directory will be /usr/home/httpd. Allow the RAIDWatch installation package to be accessed from /usr/home/httpd/html.

- b Mount the RAIDWatch installation CD to /cdrom:
 - c Type the following and press **Enter** to proceed (assuming that the CD-ROM drive is /dev/hdc):
- 3 Copy the common file folder from the installation package CD to the Apache html directory, type the following, then press **Enter** to proceed:

```
#mount /dev/hdc /cdrom
#cp -r /cdrom/common /home/httpd/html/
```

Windows Platforms

RAIDWatch supports Windows Server 2003, Windows NT 4.0 for servers and Windows 95, Windows 98, Windows Me, Windows NT, and Windows 2000 for workstations.

- 1 In order to use Netscape in Windows, append the string:

```
user_pref("signed.applets.codebase_principal_support", true);
```

to

```
c:\winnt\profiles\<username> (Windows NT or Windows 2000)
```

-or-

```
c:\Program_Files\Netscape\Users\<username> (Windows 95/98/Me)
```

- 2 Locate Services under the Windows Control Panel. Enable or install SNMP services. Refer to your Windows documentation for more information.

SNMP service for Windows NT (if the SNMP agent is under a Windows NT environment) must be enabled.

- 3 Windows Messaging (MAPI for Windows NT/95/98/Me/2000 if support for pager, fax, or e-mail notification is needed) must be enabled. Refer to your Windows documentation for more information.
- 4 Windows NetBEUI support for Windows NT/95/98/Me/2000 (if network broadcast support notification is needed) must be enabled. Refer to your Windows documentation for more information.

Installing Spheras RAIDWatch

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<i>Installed Files</i>	2-8
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<i>Configuring a RAID Controller to Use In-band SCSI</i>	2-9
<i>Uninstalling Spheras RAIDWatch</i>	2-10

This section discusses how to install RAIDWatch in your system. Before proceeding with the setup procedure, read *Before You Start* on page 2-2.

Before You Start

Before starting the installation, read through the notes listed below.

- TCP/IP must be installed and running with a valid IP address assigned to each Primary and Secondary Agent station, even if Sphas RAIDWatch is being used on the local host.
- Your system display must be running in 256 color mode or some configuration items will not be visible.
- Your RAID controller must be defined as a peripheral device or as logical drives mapped to host Logical Unit Numbers (LUNs); otherwise, Sphas RAIDWatch will be unable to locate the controller.

Be certain that your system meets the minimum hardware and software requirements listed in [System Requirements on page 1-4](#).

Check to be certain that the RAID systems and controllers are installed properly. For the installation procedure, see the documentation that came with the controller.

Follow the directions provided in [Platform Requirements on page 1-6](#) to prepare for installation and operation under different OS environments.

Installing the Software

Follow these steps to install Sphas RAIDWatch on your server(s) and RAID systems.



Note: Adaptec recommends that you close all other programs before beginning the installation procedure.

- 1 Insert the Sphas RAIDWatch installation CD into your CD-ROM drive.
- 2 If installing on a Unix system, mount the RAIDWatch CD to /mnt.
- 3 Run the install script file for your OS.

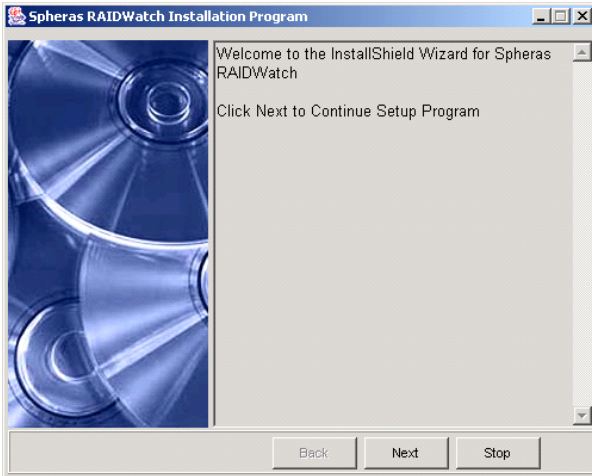
A command line window opens, asking if you want to install JRE.

4 Type *yes* (Linux) or *y* (Windows).

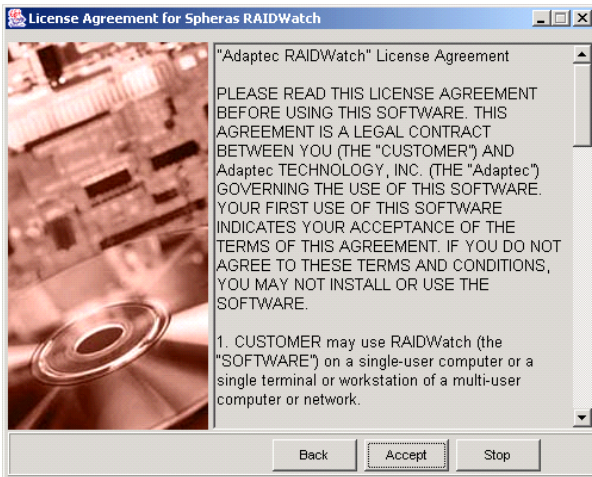
You are asked if you want to install RAIDWatch.

5 Type *yes* (Linux) or *y* (Windows). (Also type *yes* or *y* if this is a reinstallation or if you are reconfiguring the program.)

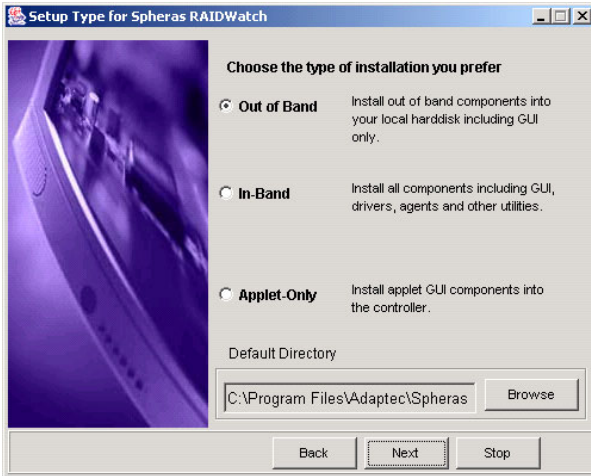
6 When the Welcome screen appears, click **Next**.



7 Click **Accept**.



Three installation options appear.



8 Continue as directed for the installation option you want:

- **Out-Band**—This option allows you to install Spheras RAIDWatch and the Event Monitor on the local computer. If this option is selected, none of the Primary or Secondary Agents will be installed and it will be necessary to access the controller through a LAN. (See [Installing Out of Band Components on page 2-5](#) to continue the installation.)
- **In-Band**—This option installs the In-Band driver and associated Agents and configuration tools, in addition to Spheras RAIDWatch. Select this option only when the controller is connected directly to the local computer through the serial port. (See [Installing In-Band Components on page 2-6](#) to continue the installation.)
- **Applet Only**—This option installs Spheras RAIDWatch onto the controller itself. Before you select this option, you must reserve space on the controller. After the space has been reserved, the associated Spheras RAIDWatch files are automatically installed on the controller. (See [Applet-Only Installation on page 2-7](#) to continue the installation.)

If you select Applet Only installation, you must use a Web browser to connect to Spheras RAIDWatch.

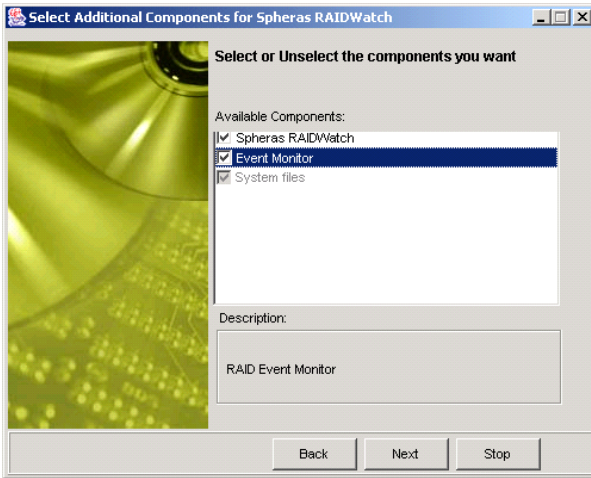
Installing Out of Band Components

To install the Out of Band components:

- 1 Select **Out of Band** in [Step 8 on page 2-4](#).

If you do not want to use the default directory, click **Browse** to choose a new directory.

- 2 Click **Next**.



In the Available Components list, you can choose to deselect any components you don't want to install.

- 3 Click **Next**. When the installation is complete, click **OK**.

Installing In-Band Components



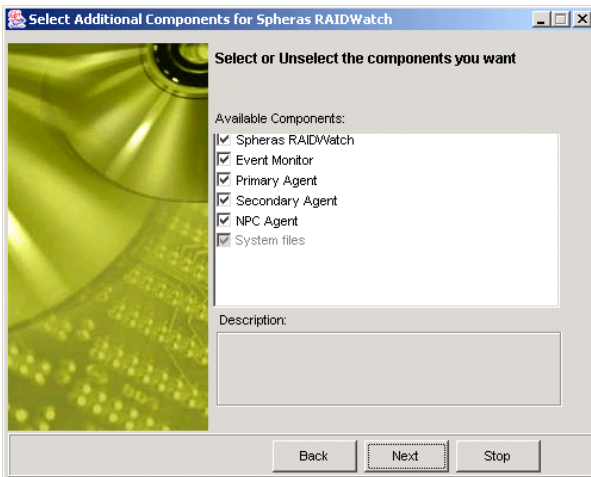
Note: To use in-band SCSI, you must have a third-party adapter and a channel on your RAID controller that can be designated as a host channel. See [Configuring a RAID Controller to Use In-band SCSI on page 2-9](#) for more information.

To install In-Band components only:

- 1 Select **In-Band** in [Step 8 on page 2-4](#).

If you do not want to use the default directory, click **Browse** to choose a new directory.

- 2 Click **Next**.



In the Available Components list, you can choose to deselect any components you don't want to install.

- 3 Click **Next**. When the installation is complete, click **OK**.

Applet-Only Installation

Before you can complete an Applet-only installation, you must reserve space on the controller for the Sphas RAIDWatch files. If you have already reserved controller space, continue the installation starting with [Step 4](#) below.

If you have not already reserved space on your controller, start with [Step 1](#) below.

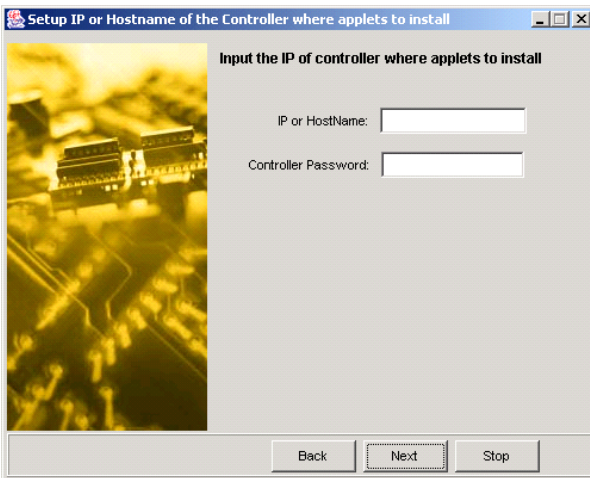
- 1 Click **Stop** in [Step 8 on page 2-4](#).
- 2 Use either the front panel LCD screen or the terminal emulation program to access the preinstalled firmware on the controller.
- 3 Use the firmware to create a logical array (refer to your controller's documentation). Ensure that you reserve *at least* 256 MB of space for the Sphas RAIDWatch files.

Once space has been reserved on the controller, restart the installation as described in [Installing the Software on page 2-2](#).

- 4 Select **Applet Only** in [Step 8 on page 2-4](#).

If you do not want to use the default directory, click **Browse** to choose a new directory.

- 5 Click **Next**.
- 6 Enter the controller's IP address or hostname.



- 7 Click **Next**. When the installation is complete, click **OK**.

Installed Files

This is a list of key Sphas RAIDWatch files installed during the installation process. All files should be found in the default directory, or in the directory you chose during the installation.

In Windows, the default directory is
C:\Program Files\Adaptec\Sphas RAIDWatch

In Linux, the default directory is
/usr/local/Adaptec/Sphas RAIDWatch.

- Sphas RAIDWatch access:
 - **GRM.JAR**—executable .jar Java file
 - **GRM.HTM**—browser accessible HTML file
- Event Monitor access:
 - **GREM.JAR**—executable .jar Java file
 - **GREM.HTM**—browser accessible HTML file
- Executable Agent files:
 - **PRIMARY.EXE**—to start the Primary Agent
 - **SECONDARY.EXE**—to start the Secondary Agent
 - **NPC.EXE**—to start the NPC
- Configuration and Install files:
 - **CONFIGURE.JAR**—executable .jar Java file

Accessing Sphas RAIDWatch and Event Monitor

To access Sphas RAIDWatch, open a Web browser and type in the IP address that you used in [Step 6 on page 2-7](#) with the associated filename.

To run the Event Monitor, enter `http://www.xxx.yyy.zzz/grem.htm` into the address bar of your Web browser, where `www.xxx.yyy.zzz` is the IP address entered in [Step 6 on page 2-7](#).

Configuring a RAID Controller to Use In-band SCSI

RAID Controller Adjustments

Some adjustments must be made to the RAID controller and to the host computer's SNMP settings before the two can communicate using SCSI commands. The RAID controller settings can be changed using the front panel.

From the Main Menu, use the up and down arrows to select **View and Edit Configuration Parameters**.

Press **Enter**, use the up and down arrows to select **Host-side SCSI Parameters**, then press **Enter** again.

You will need to make adjustments in the following four submenus: Peripheral Device Type, Peripheral Device Qualifier, Device Support for Removable Media, and LUN Application. Different host OSs require different adjustments. Look at the Table below to find the proper settings for your host OS.

Operating System	Peripheral Device Type	Peripheral Device Qualifier	Device Support for Removable Media	LUN Applicability
NT 4.0	1f	Connected	Disabled	All undefined LUNs
Windows 2000/2003	3	Connected	Enabled	All undefined LUNs
Solaris 9	7f	Connected	Enabled or disabled	All undefined LUNs

Device Type	Setting
No device present	7f
Direct-access device	0
Sequential-access device	1
CD-ROM device	5
Scanner device	6
MO device	7
Unknown device	1f
Processor type	3

For an example of settings for Windows NT 4.0, refer to the RAIDWatch online Help.

Uninstalling Sphas RAIDWatch

To uninstall Sphas RAIDWatch, follow the instructions for your OS:

Uninstalling on Windows

To uninstall Sphas RAIDWatch:

- 1** From the **Start** menu, select **Programs, Adaptec, Uninstall**.
- 2** When the uninstall is complete, delete the Sphas RAIDWatch directory under Program Files\Adaptec.

Uninstalling on Linux:

To uninstall Sphas RAIDWatch:

- 1** Run `uninstall.sh` from `/usr/local/Adaptec/ Sphas RAIDWatch`.
- 2** When the uninstall is complete, delete the Sphas RAIDWatch directory under `/usr/local/Adaptec`.

Configuring the RAID Controller

<i>Accessing the Configuration Panel</i>	3-2
<i>Configuring the Primary Agent</i>	3-4
<i>Configuring the Secondary Agent</i>	3-7
<i>Configuring NPC Settings</i>	3-8
<i>Saving New Configuration Settings</i>	3-14

This chapter provides instructions for using Sphas RAIDWatch to configure your RAID controllers.

Accessing the Configuration Panel

To access the Configuration Panel, follow the instructions for the installation type you used in *Installing the Software on page 2-2*:

- If you installed In-Band components, see the section below.
- If you installed the Applet only, see [page 3-3](#).



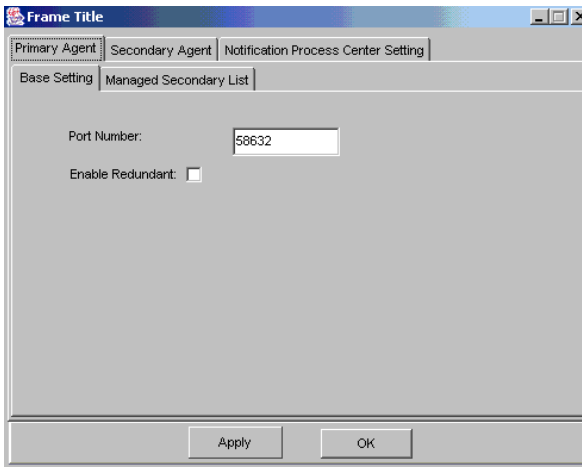
Note: If you completed an Out of Band installation (see *Installing Out of Band Components on page 2-5*), the configuration options explained in this chapter are not available, as you installed neither the Primary nor Secondary Agents.

If You Completed an In-Band Installation

If you installed the In-Band components (see *Installing In-Band Components on page 2-6*), the In-Band SCSI driver, associated agents and configuration tools were installed on the local computer.

To access the configuration tools using Windows:

- 1 From the **Start** menu on your desktop, select **Programs**.
- 2 Select **Adaptec**, then select **Configure**. The Configuration Panel opens.



- 3 Configure the settings as required, following the instructions provided in the rest of this chapter.

If You Completed an Applet Installation

If you installed the Applet only (see [Applet-Only Installation on page 2-7](#)), RAIDWatch must be accessed through a Web browser.

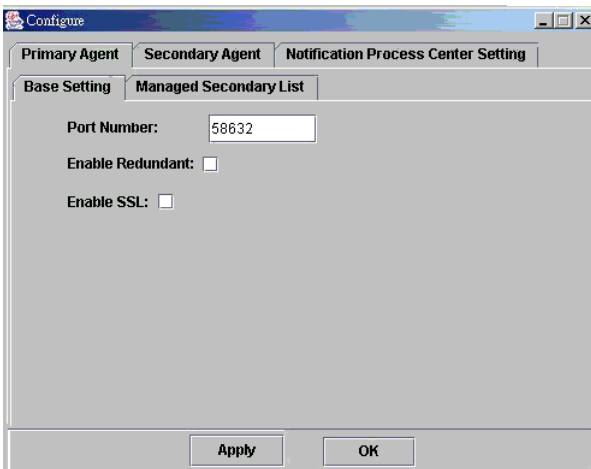
To access the Configuration Panel:

- 1 Type in the controller IP address followed by `configure.htm`.

For instance, if the controller IP address is `ww.xx.yy.zz`, type:

```
http://ww.xx.yy.zz/configure.htm
```

The Applet-only Configuration Panel appears.



- 2 Configure the settings as required, following the instructions provided in the rest of this chapter.

Configuring the Primary Agent

To configure the Primary Agent settings, open the Configuration Panel and select the **Primary Agent** tab.

The Primary Agent tab has two subtabs—Base Settings (described in [Configuring Base Settings](#) below, and Managed Secondary List, described on [page 3-6](#).)

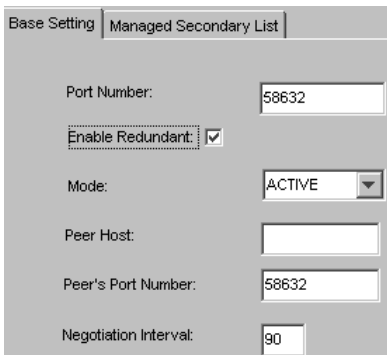
Configuring Base Settings

Up to three options appear on the Base Settings subtab, depending on your installation type:

- **Port Number**—The port number Sphas RAIDWatch stations use to communicate with the Primary Agent.
- **SSL Enable**—(*Applet installations only*) This setting enables the Secure Sockets Layer (SSL).
- **Enable Redundant**—This setting enables Primary Agent/NPC on another server so that if a Primary Agent/NPC fails, fatal system events are noticed.

Adaptec recommends that you install Primary and NPC Agents redundantly on different servers. If the Primary Agent or NPC goes down, the redundant Primary Agent can take over instantly, allowing NPC to work and avoiding blind time. The redundant Primary Agent and NPC must be installed manually; the configuration utility does not install them automatically.

If you select Enable Redundant, additional options appear on the Base Settings subtab, as shown in the Figure below.



Field	Value
Port Number:	58632
Enable Redundant:	<input checked="" type="checkbox"/>
Mode:	ACTIVE
Peer Host:	
Peer's Port Number:	58632
Negotiation Interval:	90

- **Mode**—This setting assigns the preferred mode for the Primary Agent on the current server to Active or Standby. An active-standby relationship exists between Primary Agents, and the relationship can be automatically resolved between agents.
- **Peer Host**—This setting is the peer host's IP address.
- **Peer's Port Number**—This setting is the Primary Agent host's port number.
- **Negotiation Interval**—This setting is the duration of time (in seconds) for Primary Agents to negotiate for the active-standby status. A Primary Agent might wait for seconds for its peer agent to start up.



Note: You must install at least one Primary Agent and one Secondary Agent on a network managed by RAIDWatch. Even if the system only has one RAID controller and all RAIDWatch components are installed on a single server, both a Primary Agent and a Secondary Agent *must* be installed.

RAID controllers are managed by Secondary Agents. Secondary Agents are managed by the Primary Agent. Without Secondary Agents associated with each RAID controller, you will not be able to manage RAID systems. Additionally, the Event Monitor (see [Appendix A, Using Event Monitor](#)) requires Primary and Secondary Agents to be running on RAID servers to record system events and report system status.

Configuring Managed Secondary Agent Settings

To configure the Managed Secondary Agent settings, open the **Configuration Panel** (see [page 3-2](#)) and select the **Primary Agent** tab. Then click on the **Managed Secondary List** subtab.

Host Name	Port Number
192.168.4.16	58633

On the Managed Secondary List subtab, you can manage the Secondary Agent RAID server that will be managed through the Primary Agent where you are installing RAIDWatch.

Two options appear on the Managed Secondary List subtab:

- **Host Name**—This setting is the IP addresses for the RAID server.
- **Port Number**—This setting is the Secondary Agent's TCP port number. The port number should be the same for all Secondary Agents, and different from the Primary Agent's TCP port number.



Note: The Primary Agent default port setting should be unique to your network. The default TCP port setting is 58632. You can use any port number between 49152 and 65535.

Configuring the Secondary Agent

To configure the Secondary Agent settings, open the **Configuration Panel** (see [page 3-2](#)) and select the **Secondary Agent** tab.



Note: Local Secondary Agents must be installed at all RAID hosts managed by RAIDWatch.

The screenshot shows a configuration window with three tabs: 'Primary Agent', 'Secondary Agent', and 'Notification Process Center Setting'. The 'Secondary Agent' tab is active. It contains three labeled input fields: 'Host Name' with the value '192.168.4.16', 'Port Number' with the value '58633', and 'Event Polling Period' with the value '10'. At the bottom of the window are two buttons: 'Apply' and 'OK'.

Three options appear on the Secondary Agent tab:

- **Host Name/IP Address**—This setting is the RAID server’s IP address.
- **Port Number**—This setting is the TCP port to be used by all Secondary Agents.
- **Event Polling Period**—This setting is the time interval (in seconds) for event queries from the Secondary Agent to the RAID controller.

Configuring NPC Settings

Spheras RAIDWatch includes a separate software application called Notification Processing Center (NPC), which lets you manage how you are notified about RAID system events. Once installed and configured, NPC allows you to monitor and manage your RAID system even when the administrator is away from the manager station.



Note: NPC must be installed and run on the same host computer as the Primary Agent. Adaptec recommends that you install the NPC and Primary Agent redundantly, on two different servers, so that if the Primary Agent or NPC fails, the Primary Agent and NPC installed on the other server continues event notification. This avoids a situation where a fatal system failure occurs and goes unnoticed because the NPC or Primary Agent is unable to function.

To configure the NPC settings, open the **Configuration Panel** (see [page 3-2](#)) and select the **Notification Process Center Setting** tab.

Primary Agent	Secondary Agent	Notification Process Center Setting				
Agent	Event Log	FAX	Pager	EMAIL	SNMP Trap	BroadCast
Host Name:	<input type="text" value="192.168.4.16"/>					
Port Number:	<input type="text" value="58632"/>					
Apply			OK			

Configure the NPC settings following the instructions provided in these sections:

- [Configuring the Agent on page 3-9.](#)
- [Configuring the Event Log on page 3-9.](#)
- [Configuring Fax Notification on page 3-10.](#)
- [Configuring Pager Notification on page 3-11.](#)
- [Configuring Email Notification on page 3-12.](#)
- [Configuring SNMP Trap Notification on page 3-13.](#)
- [Configuring Broadcast Notification on page 3-14.](#)



Note: Agent and NPC configuration parameters can be reconfigured later using the installation program. Run the installation program and select **Configure Only** from the **Start** menu to reconfigure Agent and NPC settings.

Configuring the Agent

Click on the **Agent** subtab to configure the controller's IP address (Host Name) and the Port Number that Spheras RAIDWatch stations use to communicate with the Primary Agent.

Configuring the Event Log

Click on the **Event Log** subtab (shown below) to enable or disable the Event Log and set the severity level of events logged.

The screenshot shows a configuration window with several tabs: Agent, Event Log, FAX, Pager, EMAIL, SNMP Trap, and BroadCast. The 'Event Log' tab is selected. Below the tabs, there is a section for 'Enabled' with a checked checkbox. Below that is a 'Severity' dropdown menu with a list of options: 1, 2, and 3. The option '1' is currently selected and highlighted in blue.

See [Viewing the Event Log on page 9-11](#) for more information.

Configuring Fax Notification

Click on the **FAX** subtab (shown below) to set event notification by fax.



Note: You must set Modem parameters to use fax notification. For NPC to work on NT servers, Windows Messaging and Personal Fax must be installed and running. Refer to your Microsoft documentation for instructions.

Two tabs appear under the Fax subtab:

- **Base Setting**—Click on **Base Setting** to enable fax notification and set the device.
- **Phone Number List**—Click on **Phone Number List** (shown below) to set the phone number for the fax machine(s) that will be receiving event messages .

Phone Number	Severities
2222 1111	1
2222 2222	2
2222 3333	3

Severity Level	Notifications Sent For...
Severity Level 1	All Events
Severity Level 2	Warning and Alert Events
Severity Level 3	Alert Events Only

Enter the phone number and set the Severity level (shown in the Table on [page 3-10](#)) according to your requirements, then click **Add**.



Note: All elements of the phone number, including a number for accessing an outside line, must be included in the phone number. For example, type 9 , , , 2241603 where 9 is the access number for an outside line and [, ,] indicates a pause.

Configuring Pager Notification

Click on the **Pager** subtab (shown below) to set event notification by pager.

The screenshot shows a configuration window with several tabs: Agent, Event Log, FAX, Pager, EMAIL, SNMP Trap, and BroadCast. The 'Pager' tab is active. Below the tabs, there are two sub-tabs: 'Base Setting' and 'Phone Number List'. Under 'Base Setting', there is a checkbox labeled 'Enabled' which is checked, and a text box labeled 'Device' containing the text 'ttyS0'.



Note: You must set Modem parameters to use pager notification. For NPC to work on NT servers, Windows Messaging and Personal Fax must be installed and running.

Two tabs appear under the Pager subtab:

- **Base Setting**—Click **Base Setting** to enable pager notification and set the device.
- **Phone Number List**—Click **Phone Number List** to set the phone number for the pager(s) that will be receiving event messages.

Enter the phone number and set the severity level (see the Table on [page 3-10](#)) according to your requirements, then click **Add**.



Note: All elements of the phone number, including a number for accessing an outside line, must be included in the phone number. For example, type 9 , , , 2241603 where 9 is the access number for an outside line and [, ,] indicates a pause.

Configuring Email Notification

Click on the **EMAIL** subtab (shown below) to set event notification by email.



Agent | Event Log | FAX | Pager | **EMAIL** | SNMP Trap | BroadCast

Base Setting | Mail Address List

SMTP Server:

Sender's Email:

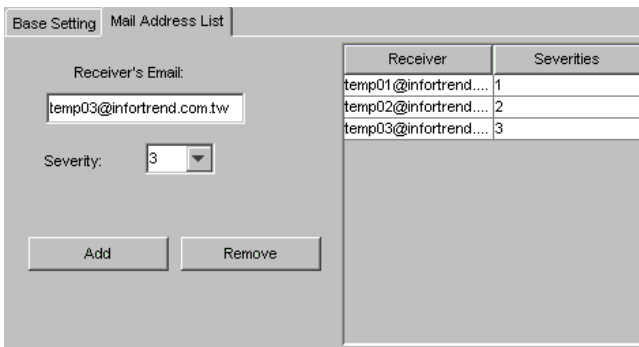
Enabled:

Subject:

Two tabs appear under the Email subtab:

- **Base Setting**—Click **Base Setting** to enable email notifications and configure the SMTP mail server that's used to send email event notifications. You can also set a valid email address to be used in the From part of the notification, and create a title to be used in the emails' Subject line.
- **Mail Address List**—Click **Mail Address List** (shown below) to enter multiple event notification email addresses for notifications.

Enter an email address, set the severity level for event notifications (see the Table on [page 3-10](#)), then click **Add**.



Base Setting | **Mail Address List**

Receiver's Email:

Severity: ▼

Receiver	Severities
temp01@infotrend....	1
temp02@infotrend....	2
temp03@infotrend....	3

Configuring SNMP Trap Notification

Click on the **SNMP Trap** subtab (shown below) to configure the SNMP Trap settings.

Agent | Event Log | FAX | Pager | EMAIL | **SNMP Trap** | BroadCast

Base Setting | **SNMP Trap List**

Enabled:

Community:

Two tabs appear under the SNMP Trap subtab:

- **Base Setting**—Click on **Base Setting** to enable the SNMP Trap settings and view or change the Community setting, which is a string authentication and can be seen as a plain text password.
- **SNMP Trap List**—Click on **SNMP Trap List** (shown below) to set the port number (Host IP) of the agents listening for traps. Enter the Host IP number, set the severity level (see the Table on [page 3-10](#)), then click **Add**.

Base Setting | **SNMP Trap List**

Host IP:

Severity:

1
2
3

Trap Receivers	Severities
000.111.111	1
000.111.222	2
000.111.333	3

Configuring Broadcast Notification

Click **Broadcast** subtab (shown below) to configure the broadcast settings.

The screenshot shows a configuration window with several tabs: Agent, Event Log, FAX, Pager, EMAIL, SNMP Trap, and Broadcast. The Broadcast tab is selected. Underneath, there are two sub-tabs: Base Setting and BroadCasting List. The Base Setting sub-tab is active, showing a checkbox labeled "Enabled:" which is checked.

Two tabs appear under the Broadcast subtab:

- **Base Setting**—Click **Base Setting** to enable the broadcast settings.
- **Broadcasting List**—Click **Broadcasting List** (shown below) to set the Host IP address to which broadcast messages are sent. Enter the Host IP address, set the severity level of events to be broadcast (see the Table on [page 3-10](#)), then click **Add**.

The screenshot shows the Broadcasting List sub-tab configuration. On the left, there is a "Host IP:" field containing "000.111.333" and a "Severity:" dropdown menu with options 1, 2, and 3. Below these are "Add" and "Remove" buttons. On the right, there is a table with two columns: "Host Name" and "Severities".

Host Name	Severities
000.111.111	1
000.111.222	2
000.111.333	3

Saving New Configuration Settings

Once you have finished configuring the controller, reboot the controller. The new settings will not take effect until the controller is rebooted.

Getting Started with Sphas RAIDWatch

In this Chapter...

<i>Starting Sphas RAIDWatch Agents and NPC</i>	4-2
<i>Opening Sphas RAIDWatch</i>	4-3
<i>Connecting to and Disconnecting from a RAID System</i>	4-5
<i>Setting Security on RAIDWatch</i>	4-7
<i>Setting TCP Port Numbers</i>	4-7
<i>Navigating Sphas RAIDWatch</i>	4-8
<i>Getting to Know the RAIDWatch Windows</i>	4-8
<i>Exiting Sphas RAIDWatch</i>	4-11

This chapter explains how to open Sphas RAIDWatch and provides an overview of its windows and navigation tools. It also explains how to connect to a RAID system.

Familiarize yourself with the information in this chapter before beginning to manage your RAID systems.

Starting Sphas RAIDWatch Agents and NPC

To start the Primary Agent, the Secondary Agent, and the NPC, follow the instructions provided for your OS:

For Windows

The Primary Agent and Secondary Agents start automatically under Windows each time the host computer is reset.

However, the NPC must be started manually by executing the NPC.exe file each time the host is reset.

Continue with [Opening Sphas RAIDWatch on page 4-3](#).

For Unix

On Unix systems, the Primary Agent, Secondary Agent, and NPC are all installed on the host computer and must be started manually and in a specific order each time the host computer is reset.

To start the agents and NPC, follow these steps in order:

- 1 At the host computer, change directories to /usr/local/Adaptec/SphasRAIDWatch or whatever directory you chose during the installation (if not the default).

- 2 At the command line, type `primary` <Enter> to start the Primary Agent.

In Linux, type `./primary` <Enter>.

- 3 At the command line, type `secondary` <Enter> to start the Secondary Agent.

- 4 At the command line, type `npc` <Enter> to start the NPC.

Sphas RAIDWatch is now running. Continue with [Opening Sphas RAIDWatch on page 4-3](#).

Opening Sphas RAIDWatch

Sphas RAIDWatch must be opened by a network or RAID systems manager.

To open RAIDWatch, follow the instructions for your specific OS and setup:

- To open RAIDWatch locally or over a LAN (Windows), see the next section.
- To open RAIDWatch locally or over a LAN (Solaris Sparc and Red Hat Linux), see [page 4-4](#).
- To open RAIDWatch remotely using a Web browser (any OS), see [page 4-4](#).

Opening RAIDWatch Locally or Over a LAN (Windows)

To open RAIDWatch on a local or network system running Windows:

- 1 From the Windows **Start** menu, select **Programs, Adaptec, RAIDWatch Manager**.

The Connect to RAID Agent window opens.

- 2 Enter the IP address and TCP port of the RAID system where the Primary Agent was installed.

If RAIDWatch is running *locally* (on the Primary Agent host machine) and you want to manage a RAID hosted by the Primary machine, click **Default**.

- 3 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.
- 4 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system. (See [Connecting to and Disconnecting from a RAID System on page 4-5](#) for more information.)

Opening Sphas RAIDWatch Locally or Over a LAN (Other OSs)

Follow these instructions to open Sphas RAIDWatch locally or over a LAN on systems running Solaris Sparc and Red Hat Linux.

To open Sphas RAIDWatch:

- 1 Open a terminal application or command line window.
- 2 Change the directory to `/usr/local/Adaptec/SphasRAIDWatch` (or the directory you chose during installation, if not the default).
- 3 At the command prompt, type:

```
java -jar grm.jar
```

The Sphas RAIDWatch main connection window opens.

- 4 Enter the IP address and TCP port of the RAID system where the Primary Agent was installed.

If Sphas RAIDWatch is running *locally* (on the Primary Agent host machine) and you want to manage a RAID hosted by the Primary machine, click **Default**.

- 5 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.
- 6 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system. (See [Connecting to and Disconnecting from a RAID System on page 4-5](#) for more information.)

Opening Sphas RAIDWatch Remotely Using a Web Browser (Any OS)

You can use these instructions to open Sphas RAIDWatch remotely, using a Web browser on any supported OS.

To open Sphas RAIDWatch:

- 1 Open your Web browser and enter the IP address of the Primary Agent host followed by `GRM.HTML`. (For example, `222.212.121.123/GRM.HTML`).

The Java Applet starts, then the Sphas RAIDWatch main connection window opens.

- 2 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.
- 3 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system. (See [Connecting to and Disconnecting from a RAID System](#) below for more information.)

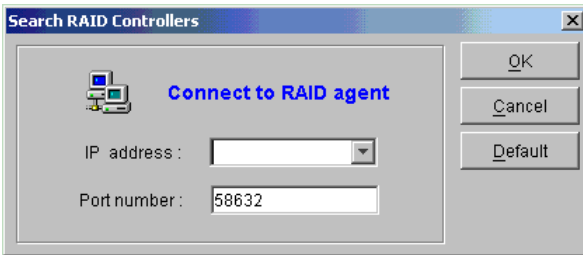
Connecting to and Disconnecting from a RAID System

Before you can manage a particular RAID system, you must first establish a connection between your Sphas RAIDWatch station and the Primary Agent host.

Connecting to a RAID System

To connect to a RAID system from either the local host (or Primary Agent) or a remote host:

- 1 Click **Connect**.



- 2 Click **Default**.

The Connection View window appears.



- 3 Double-click the IP address of the RAID system you want to manage.

- 4 Double-click the controller icon, then double-click the connection method you want.

The Non-SSL Authentication window opens and prompts you for the controller password.



- 5 Type the password, then click **OK**.



Note: Sphas RAIDWatch is not password-protected by default. The first time you connect to a controller, press **Enter** when prompted for a password. See [Setting Security on RAIDWatch on page 4-7](#) for more information.

If you are connecting from the local host, the RAID View Introduction window appears and the tool bar buttons are activated.

Disconnecting From a RAID System

Instead of restarting Sphas RAIDWatch every time you need to switch to another system, you can *disconnect* (break the link between the Sphas RAIDWatch station and the array) from one RAID system and then connect to another.

Disconnection is useful if you have multiple RAID systems being managed at the same time.

To disconnect from a RAID system, click the **Disconnect** button (shown at right).



When the disconnection is complete, all the toolbar buttons (except the Connect button) become greyed-out and the Sphas RAIDWatch Connection View window opens.

Setting Security on RAIDWatch

You can prevent unauthorized access to RAID controllers by setting a password with the Primary Agent. When password protection is set, any user attempting to connect to a controller through a Secondary Agent is prompted for the station password.

Sphas RAIDWatch is not password-protected by default. The first time you connect to a controller, press **Enter** when prompted for a password. Once connected to the controller, set a controller password by following these steps:

- 1 On the RAIDWatch toolbar, click the **RAID View** button.
- 2 Click **Configuration**.
- 3 Click the **Controller** tab, then click the **Operation** tab, then click the **Password** tab.

The Change Password dialog box appears.

- 4 Type in a new password, then retype it as confirmation.
- 5 Click **OK**.

Setting TCP Port Numbers

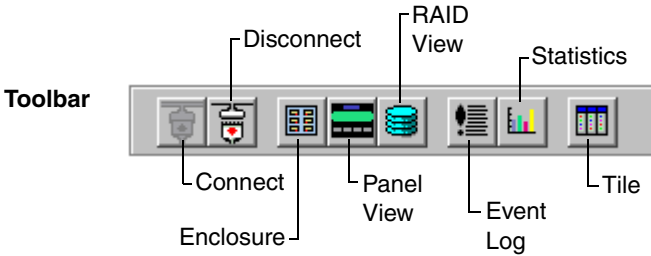
A security related setting that should be considered is the TCP port setting of Primary Agent hosts. TCP port assignments must be made in order for Sphas RAIDWatch to work. Modifying TCP port settings to something other than the default will increase system security.

RAIDWatch is shipped with a default TCP port setting for the Primary Agent: 58632. It is recommended that users change the default TCP port setting to a less commonly used TCP port assignment.

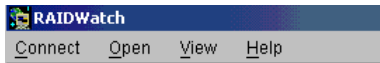
TCP ports can be assigned any number between 1 and 65535, but as some of the smaller possible assignments are commonly used for other purposes, we recommend using a port number between 49152 and 65535.

Navigating Sphas RAIDWatch

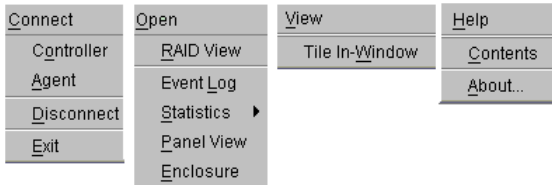
You can access commands using the RAIDWatch toolbar and menu bar, both shown below. Commonly-used commands appear on both bars.



Menu Bar



Menu Bar (Expanded)



Getting to Know the RAIDWatch Windows

RAIDWatch has four main *views* or windows of information:

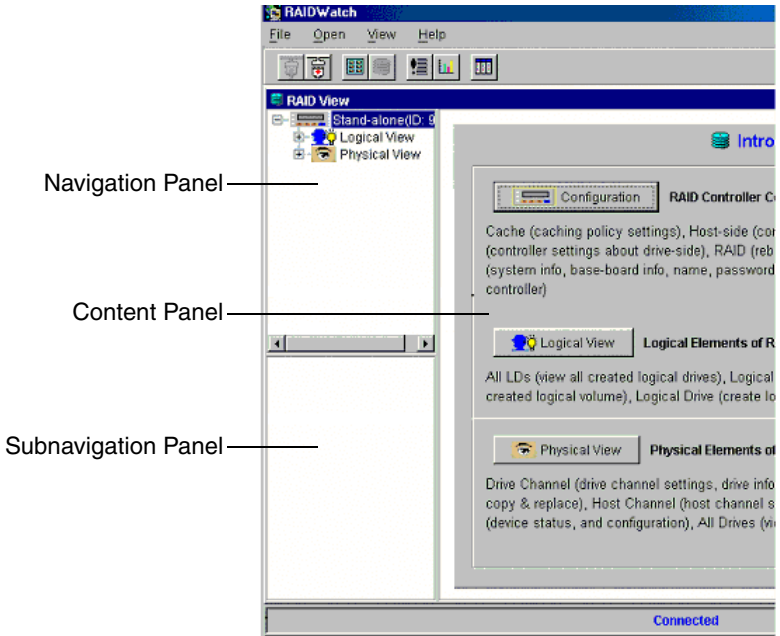
- RAID View window (see [page 4-9](#)).
- Enclosure window (see [page 4-10](#)).
- Event Log window (see [page 4-10](#)).
- Statistics window (see [page 4-11](#)).

Click the **Tile** button on the toolbar to rearrange open Sphas RAIDWatch windows, or arrange the windows manually to suit your current task.

This section provides a brief overview of the purpose and function of each window.

About the RAID View Window

The RAID View window (shown below) opens automatically when you connect to a RAID system.



In the RAID View window, you can perform configuration, management, and monitoring tasks for your RAID systems.

Three buttons appear on the Content Panel:

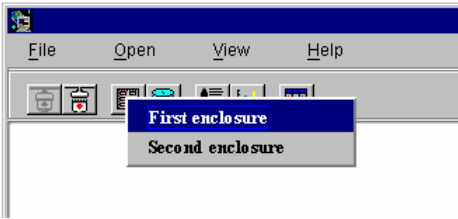
- **Configuration**—Click this button to manage RAID controller configuration, such as controller passwords and RAID settings.
- **Logical View**—Click this button to manage logical drives and logical volumes on your RAID systems.
- **Physical View**—Click this button to view and modify the configuration of drive and host channels, the fault bus, and physical drives. The Physical View also allows access to host channel LUN configuration and remote enclosure monitoring.

You can access the RAID View window at any time by clicking the **RAID View** button on the tool bar (see the Figure in [page 4-8](#)).

About the Enclosure Window

In the Enclosure window, you can define enclosures for creating an exact replica of a RAID system's drive bay arrangement, displaying the exact location of the physical drives and controllers.

You can open the Enclosure window at any time by clicking the **Enclosure** button on the toolbar (see the Figure in [page 4-8](#)) or by selecting **Enclosure** from the Open menu. A selection box appears (shown below), listing all enclosures.



Access the enclosure you want by clicking on it in the selection box. See [Monitoring Drives and Devices on page 9-3](#) for more information on managing your enclosures.

About the Event Log Window

In the Event Log window, you can view controller and array events that have occurred since the last time Spheras RAIDWatch was started.

You can open the Event Log window at any time by clicking the **Event Log** button on the toolbar (see the Figure in [page 4-8](#)) or by selecting **Event Log** from the Open menu.

More information about using the Event Log, see [Viewing the Event Log on page 9-11](#).

About the Statistics Window

In the Statistics window, you can view detailed information about cache hits and sustained read/write performance.

You can open the Statistics window at any time by clicking the **Statistics** button on the toolbar (see the Figure in [page 4-8](#)) or by selecting **Statistics** from the Open menu.

More information about using the Statistics window, see [Monitoring RAID System Statistics on page 9-12](#).

Exiting Sphas RAIDWatch

When you exit Sphas RAIDWatch, you terminate the current management session with the RAID system.

To exit Sphas RAIDWatch, you can either:

- Select **File**, then select **Exit**.
or
- Click the **Close** button on the program window.


To exit Sphas RAIDWatch if you are connected through a Web browser, you can:

- Select **File**, then select **Exit** (recommended).
or
- Exit the browser application.
or
- Change the browser HTTP address to a URL or IP other than that of a RAIDWatch Primary Agent.

Configuring Your Controllers

In this Chapter...

<i>Accessing the RAID Controller Configuration Functions</i>	5-2
<i>Configuring the Data Cache</i>	5-3
<i>Configuring Host-side SCSI Options</i>	5-4
<i>Configuring Drive-side SCSI Options</i>	5-4
<i>Configuring RAID Options</i>	5-5
<i>Configuring Controller Options</i>	5-5
<i>Configuring Communication Options</i>	5-8



This chapter describes how to use the Configuration options of Sphas RAIDWatch to configure your RAID controllers.

Accessing the RAID Controller Configuration Functions

To begin configuring a RAID controller:

- 1 Open the **RAID View** window by clicking the **RAID View** button on the toolbar, or by opening **Spheras RAIDWatch** and connecting to the RAID controller. (See [Chapter 4, Getting Started with Spheras RAIDWatch](#).)

The RAID View window opens.

- 2 Click **Configuration**.

The Configuration View window opens, showing six tabs of information, as shown below.



The options available on these tabs are described in these sections:

- Configuring the data cache. (See the next section.)
- Configuring host-side SCSI options. (See [page 5-4](#).)
- Configuring drive-side SCSI options. (See [page 5-4](#).)
- Configuring RAID options. (See [page 5-5](#).)
- Configuring controller options. (See [page 5-5](#).)
- Configuring communication options. (See [page 5-8](#).)

Configuring the Data Cache

To configure the data cache, click the **Caching** tab (shown in the Figure on [page 5-2](#)).

You can configure the data cache for optimal I/O performance. Two options can be configured, as required for your RAID system:

Caching Policy Options

- **Cache Write Back**—This setting is selected by default and is the operating mode recommended by Adaptec, as it provides better performance than the Cache Write Through setting described next.
- **Cache Write Through**—This setting is used primarily if no cache battery backup is installed and there is increased likelihood of a power failure.

Optimization Policy Options



Caution: Optimization settings should not be changed after logical drives are created. Changing the optimization settings after logical drives have been created may destroy existing data on those drives.

- **Optimization for Random I/O**—This setting is used for environments with smaller I/O transactions, such as database maintenance. This is the most commonly used Optimization Policy setting.
- **Optimization for Sequential I/O**— This setting is used for large I/O environments, such as video recording and editing. This setting is especially useful when I/O read/write must be in sequential order.

Configuring Host-side SCSI Options

To configure the host-side SCSI parameters, click the **Host-side** tab on the Configuration View window (shown in the Figure on [page 5-2](#)).

On the Host-side tab (shown in the Figure below), you can change two settings:

Host Side SCSI Parameters	
LUNs per Host SCSI ID	256
Maximum Queued I/O Count	8

- **LUNS per Host SCSI ID**—This setting controls the LUNs assigned to each SCSI ID. The number of LUNs that can be assigned to a SCSI ID are: 1, 2, 4, 8 (*default*), 16, and 32.
- **Maximum Queued I/O Count**—This setting controls the maximum size of the I/O queue. The size options range from 1 to 1024, plus an option to select Auto.

Configuring Drive-side SCSI Options

To configure the drive-side SCSI parameters, click the **Drive-side** tab of the Configuration View window (shown in the Figure on [page 5-2](#)).

Drive Side SCSI Parameters	
Power-Up SCSI Reset :	Enabled
SCSI Motor Spin-Up :	Disabled
Maximum Tag Count :	32
Disk Access Delay Time(Sec.) :	15
SCSI I/O Timeout(Sec.) :	Default(7.0)
Drive Check Period(Sec.) :	Disabled
SAF-TE Device Check Period(Sec.) :	30.0
Drive Fail Swap Check Period(Sec.) :	Disabled
SMART :	Disabled
Auto-Assign Global Spare Drive :	Disabled

Configuring RAID Options

To configure the RAID or *disk array* parameters, click the **RAID** tab on the Configuration View window (shown in the Figure on [page 5-2](#)).

Disk Array Parameters

LD Rebuild Priority :	Low
Write Verify On LD Initialization :	Disabled
Write Verify On LD Rebuild :	Disabled
Write Verify On Normal Drives Access :	Disabled

Configuring Controller Options

To configure the controller parameters, click the **Controller** tab on the Configuration View window (shown in the Figure on [page 5-2](#)).

Information | Operation

System | Board

System Information

Total Cache Size	512MB(ECC SDRAM)
Firmware Version	3.31F
Bootrecord Version	1.31H
Serial Number	3387746
CPU Type	PPC750

On the Controller tab (shown in the Figure above), there are subtabs of options, as described in the following sections.

Information Subtab

Click the **Information** tab to view system information such as total cache size and firmware version.

Board Subtab

Click the **Board** tab to view controller information such as battery information and temperature sensor values.

Operation Subtab

Click the **Operation** tab to open these subtabs:

- **Name**—This setting identifies the controller. The Name and Password (see below) settings combined have a maximum size of 16 characters.
- **Password**—This setting controls the password used to connect to the controller. The Name and Password (see below) settings combined have a maximum size of 16 characters.
- **Time**—Click this subtab (shown below) to set the Time Zone and current time for the controller.

Time Zone: [GMT[+/-]hh:mm]

Time : [yyyy/MM/dd hh:mm]

The Time Zone setting is formatted as hours and minutes ahead of or behind Greenwich Mean Time (GMT). For example, a Time Zone setting of six and a half hours ahead of GMT would be formatted as GMT+06:30.

The Time setting is formatted as yyyy/mm/dd hh:mm. For example, a date of September 1, 2004, 1:30 pm would be formatted as 2004/09/01 13:30.

- **Download**—Click this subtab to access the download functions shown in the Figure below.

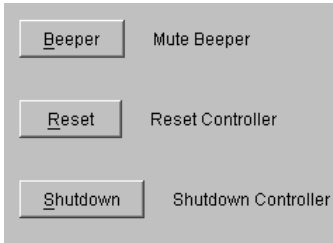
Download FW Download FWBR

Download NVRAM Upload NVRAM

Download BIOS

All of the Download functions prompt you for a file source from the current workstation. The Upload NVRAM function prompts you for a file destination at the current workstation.

- **System**—Click this subtab (shown below) to temporarily mute the controller alarm (or *beeper*) when it is sounding, reset the controller (which allows configuration changes to occur), and shut down the controller.



- **Redundant**—Sphas RAIDWatch can configure some aspects of redundant controller implementation for SCSI-to-FC controllers. Click the **Redundant** subtab to configure these options:
 - **Controller Unique Identifier**—A unique ID used by the controller to generate a controller-unique *WWPN* (a Fibre Channel port name). In Redundant Controller Configuration, each controller *must* be assigned with a unique ID from 1 to 65535. Adaptec recommends that you use the default value.
 - **Redundant Controller Configuration**—Set this option to *Enabled* if the RAID system has controller redundancy.
 - **Redundant Controller Channel**—This setting is the communication channel for redundant controllers.
 - **ECC Function**

All other Primary and Secondary Redundant Controller features must be configured using the controller's front panel. Please refer to your RAID controller's documentation for instructions.

Configuring Communication Options

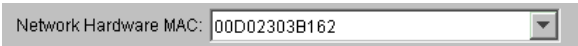
To configure the communication settings, click the **Communication** tab on the configuration View window (shown in the Figure on [page 5-2](#)).

On the Communication tab, there are three subtabs, as described in the following sections.

TCP/IP Subtab

Select the **TCP/IP** subtab to configure these options:

- **Network Hardware MAC**—This setting (shown in the Figure below) is the network hardware (or *MAC*) address that a DHCP client uses to identify itself to the server.



- **Set IP Address**—Click the TCP/IP subtab to configure these options:
 - **IP Assignment**
 - **IP Address**—This setting is the IP Address assigned to the subsystem.
 - **Subnet Mask**—This setting is the Subnet Mask that will be used by the subsystem. For example, 255.255.0.0.
 - **Default Gateway**— This is the default value of the gateway. For example, 192.168.1.254.

RS232 Port Subtab

Click the **RS232 Port** subtab to configure these options:

- **COM Port Select**—This setting is the serial port that will be used for serial port connection.
- **RS232 Configuration**—Enable or disable the Point-to-Point Protocol (PPP) routing status and terminal emulation status, and set the baud rate.

PPP Configuration Subtab

Click the **PPP Configuration** subtab to set the access name and password.

Configuring Controller Channels

In this Chapter...

<i>Accessing the Channel Configuration Functions</i>	6-2
<i>Configuring the Channel Mode</i>	6-4
<i>Configuring Termination</i>	6-4
<i>Configuring the Transfer Clock (Xfer Clock)</i>	6-5
<i>Configuring the Transfer Width (Xfer Width)</i>	6-5
<i>Setting SCSI IDs</i>	6-6
<i>Saving Your Changes</i>	6-6

This chapter describes how to use the options in the Physical View (see [page 4-9](#)) of Sphas RAIDWatch to configure your RAID controller channels.

Accessing the Channel Configuration Functions

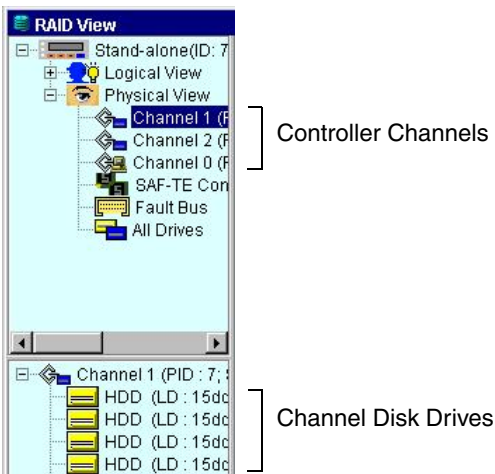
To begin configuring a RAID controller:

- 1 Open the **RAID View** window by clicking the **RAID View** button on the toolbar, or by opening **Sphas RAIDWatch** and connecting to the RAID controller. (See [Chapter 4, Getting Started with Sphas RAIDWatch.](#))

The RAID View window opens.

- 2 Click **Physical View**.

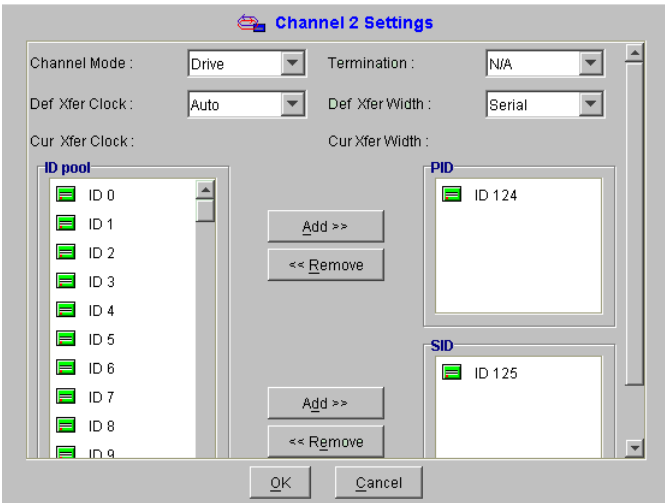
In the Navigation Panel, a list of controller channels opens under Physical View, as shown below. Below the Navigation Panel, a list of all drives assigned to that channel appears. (For more information, see [Chapter 7, Managing Your Drives.](#))



- 3 Click on the channel you want to configure.

The Channel Settings screen opens in the Content Window. For example, in the Figure on [page 6-2](#), Channel 1 is selected.

The Channel Settings screen opens in the Content Window, as shown below.



The configuration options in the Channel Settings screen are described in these sections:

- Channel mode configuration. (See [page 6-4](#).)
- Termination configuration. (See [page 6-4](#).)
- Transfer clock configuration. (See [page 6-5](#).)
- Transfer width configuration. (See [page 6-5](#).)
- SCSI ID assignment. (See [page 6-6](#).)

Configuring the Channel Mode

The Channel Mode parameter sets the operation mode of the channel. From the **Channel Mode** drop-down menu (shown in the Figure on [page 6-3](#)), select **Host** for a host channel that is connecting to a host, or select **Drive** for a drive channel that is connecting to drives. Any channel on the controller can serve as either a host channel or drive channel.

By default, Channel 0 is the host channel and has SCSI ID 0.

In redundant mode, Channel 0 is also the default channel for synchronized cache communications.

Configuring Termination

The Termination parameter enables or disables channel SCSI termination. From the **Termination** drop-down menu (shown in the Figure on [page 6-3](#)), select **On** to enable termination; select **Off** to disable termination.

Because SCSI cables must be properly terminated at both ends, channel termination must be enabled when you connect a SCSI cable to the channel.

To terminate the other end of the cable, Adaptec recommends that you install an external terminator on the end connector of the SCSI cable instead of enabling termination on the SCSI drive farthest from the controller. (The external terminator is recommended so that termination isn't affected by the removal of drives.)

All terminators in between the controller and the external terminator at the end of the cable must be removed or disabled.

Configuring the Transfer Clock (Xfer Clock)

The Def Xfer Clock parameter sets the data transfer clock rate (in MHz) for synchronous communication over the SCSI bus.

Data that is transferred across the bus in synchronous transfer mode is timed using a synchronous transfer clock signal; the frequency of this signal determines the rate at which data is transferred.

For example, from the Def Xfer Clock drop-down menu ((shown in the Figure on [page 6-3](#)), set the Default Xfer Clock to **10 MHz** for a data transfer rate of 10 million bytes per second (assuming narrow transfer—see the next section for more information).

Configuring the Transfer Width (Xfer Width)

The Default Xfer Width parameter enables or disables wide transfer. From the Def Xfer Width drop-down menu (shown in the Figure on [page 6-3](#)), select the transfer width you require.

Data can transfer across the SCSI bus either 8 bits (*narrow*) or 16 bits (*wide*) at a time. At the same synchronous transfer clock rate (see the previous section), data transfers twice as fast using wide transfer compared to narrow transfer. For example, with a transfer clock of 10 MHz, the data transfer rate is 10 Mb/sec with narrow transfer and 20 Mb/sec with wide transfer.



Note: Some older SCSI devices support narrow transfer only. If you are using such a device, set the **Default Xfer Width to Disabled**.

Under certain conditions (extremely long cables, poor SCSI signal quality) you may want to reduce the synchronous transfer clock rate to improve SCSI channel performance. If necessary, switch to asynchronous communication mode.

Setting SCSI IDs

Use the ID Pool (shown in the Figure on [page 6-3](#)) to assign SCSI IDs to the controller channel. Every controller channel *must* have a unique SCSI ID to work properly. You can choose any SCSI ID from 0 to 15—by default, 0 is the host channel ID and 7 is the Primary ID (PID).

You must create a Secondary ID (SID) on every channel in redundant controller configurations. By default, 6 is the SID.



Note: In Adaptec's dual-redundant configurations, 9 is the default PID and 8 is the default SID. For more information, refer to your controller's documentation.

When you set a SCSI ID for a controller channel, ensure that it does not conflict with other device IDs on the channel. Select the ID you want in the ID Pool, then click **Add** to move the ID to either the PID box or SID box (shown in the Figure on [page 6-3](#)), as required.

Saving Your Changes

When you have completed the channel configuration, click **OK** to save the information. Enter the password when prompted to complete the save.

Managing Your Drives

In this Chapter...

<i>Scanning in Drives</i>	7-2
<i>Creating Logical Drives</i>	7-3
<i>Expanding a Logical Drive</i>	7-5
<i>Using Dynamic Logical Drive Expansion</i>	7-7
<i>Adding and Deleting Spare Drives</i>	7-9
<i>Rebuilding Logical Drives</i>	7-12
<i>Deleting a Logical Drive</i>	7-13
<i>Creating Logical Volumes</i>	7-14
<i>Expanding a Logical Volume</i>	7-16
<i>Deleting a Logical Volume</i>	7-17
<i>Creating Partitions</i>	7-18

This chapter explains how to use Sphas RAIDWatch to manage the drives in your RAID systems.

Using Sphas RAIDWatch, you can create and delete logical drives and logical volumes. Both logical drives and logical volumes can be partitioned.

Scanning in Drives

You must *scan in* (introduce a newly installed drive to a RAID system) a drive whenever:

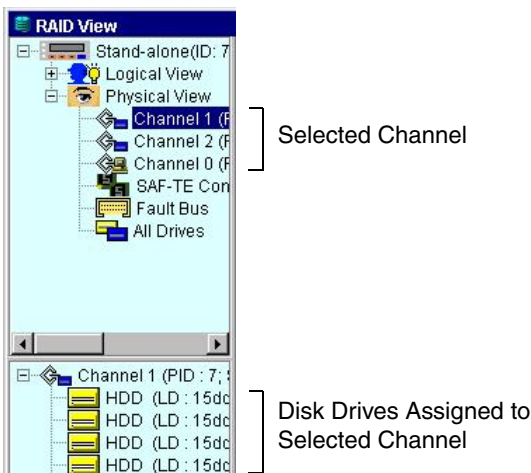
- The drive is new. A drive is considered new if it is not yet displayed in the Physical View display of the RAID View window. (See the Figure on [page 6-2.](#))
- The drive is a replacement for a failed drive that is installed on a different channel or has a different SCSI ID.

If you don't scan in a drive, it won't be seen by the RAID system.

To scan in a drive:

- 1 Click the **RAID View** button on the toolbar, then click **Physical View**. (See the Figure on [page 6-2.](#))
- 2 In the Navigation Panel, double-click the controller channel that the drive is assigned to.

Below the Navigation Panel, a list of drives assigned to the channel appears, as shown below.



- 3 Click on any drive, then select **Scan New Drive**.
- 4 Choose the channel number and SCSI ID where the new drive is located.

- 5 Click **OK**, then enter the password when prompted.

The system scans for a drive with the specified ID, then displays a confirmation message. The new drive is added to the list of drives assigned to the channel.

The new drive can now be added to an existing logical drive or be used to create a new logical drive.

- 6 Repeat [Step 2](#) to [Step 5](#) to scan additional drives.

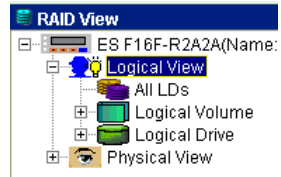
Creating Logical Drives

A logical drive is a drive that is created using physical disk drives. You can combine physical drives into logical drives to create a RAID system of a specified RAID level.

To create a logical drive:

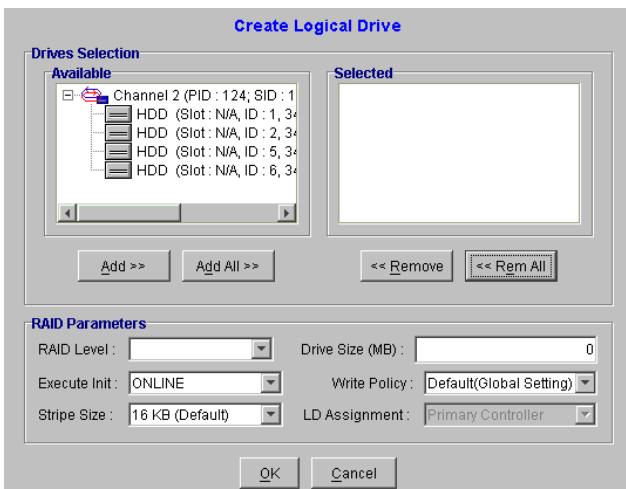
- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).

Logical Drive and Logical Volume options are listed under Logical View, as shown at right.

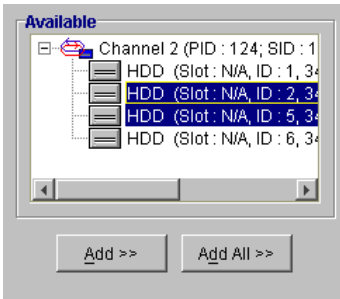


- 2 Click **Logical Drive**.

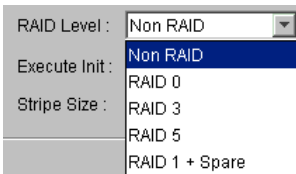
The Create Logical Drive window opens.



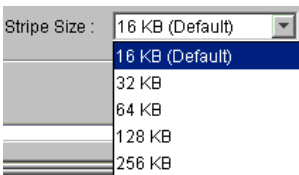
- From the list of In the Available box, select the physical drives to use in the logical drive, then click **Add**. Alternately, select all the available drives by clicking **Add All**.



- In the RAID Level drop-down menu, select the RAID level to use for the logical drive.

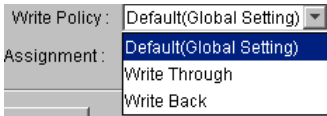


- In the Execute Init drop-down menu, select whether the logical drive is initialized online or offline.
- In the **Stripe Size** drop-down menu, select the stripe size to be used when the logical drive is created. By default, the stripe size is 128 KB. You can select any available stripe size from the menu.



- In the Drive Size box, enter the capacity from each drive to be used in the logical drive. (You can expand the logical drive at any time with unused drive capacity.)

- In the Write Policy drop-down menu, select the write policy you want for the logical drive.



- From the LD Assignment drop-down menu, select whether your logical drive is assigned to the Primary Controller or a Secondary Controller.



Note: If the redundant controller function is not enabled or if Secondary SCSI IDs are not assigned on drive channels, the Logical Drive Assignment menu will not be available.

- Click **OK** to create the logical drive. Click **OK** again to confirm the creation.

The logical drive is created.

Expanding a Logical Drive

If you have unused capacity on a physical drive, or if you have added new physical drives to a RAID system, the additional capacity can be added to an existing logical drive.

To expand a logical drive:

- Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- Click **Logical Drive**.

A list of all the logical drives that have been created appears.



- Select the logical drive you want to expand.

The View and Edit Logical Drive Partition screen appears in the Content Panel.

4 Click the **Operation** tab.

The Expand Logical Drive screen appears in the Content Panel.

You can expand the selected logical drive if there is an amount shown in the Maximum Free Capacity box. (In the example above, there is 34521 MB of free capacity available.)

- 5 In the Set Expansion Size box, enter the amount (in MB) by which you want to expand the logical drive. This amount must be less than or equal to the amount shown in the Maximum Free Capacity box.
- 6 In the Execute Init drop-down menu, select **Online** to do an online expansion; otherwise, select **Offline**.
- 7 Click **OK** to begin the expansion. Click **OK** again to confirm the expansion.

The logical drive is expanded, using the parameters you set.

When the expansion is complete, the logical drive has a new last partition the same size as the expansion. To verify this new partition, in the Navigation Panel click on the logical drive to open the View and Edit Logical Drive Partition screen.

Using Dynamic Logical Drive Expansion

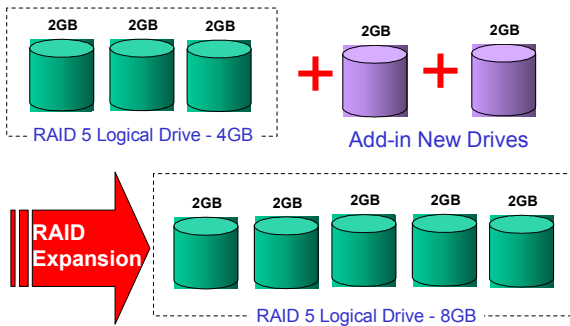
Before Dynamic Logical Drive Expansion, increasing the capacity of a RAID system using traditional methods meant backing up, recreating, and then restoring. Dynamic Logical Drive Expansion allows users to add new drives and expand RAID 0, RAID 3, and RAID 5 logical drives without powering down the system.

Modes of Dynamic Logical Drive Expansion

There are two modes of Dynamic Logical Drive Expansion.

Mode 1 Expansion (shown in the Figure below) involves adding more drives to a logical drive, which may require you to obtain an enclosure with more drive bays. The data will be restriped onto the original and newly added disks.

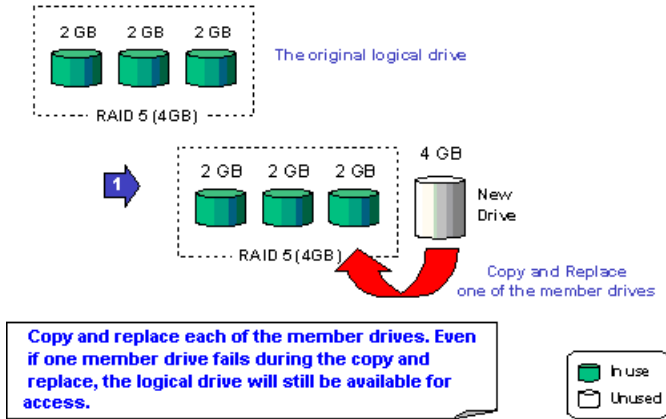
RAID Expansion - Mode 1



In the Figure above, new drives are added to increase the capacity of a 4-GB RAID 5 logical drive. The two new drives increase the capacity to 8 GB.

Mode 2 Expansion (shown in the Figure below) requires the same number of higher-capacity hard disk drives for a given logical drive.

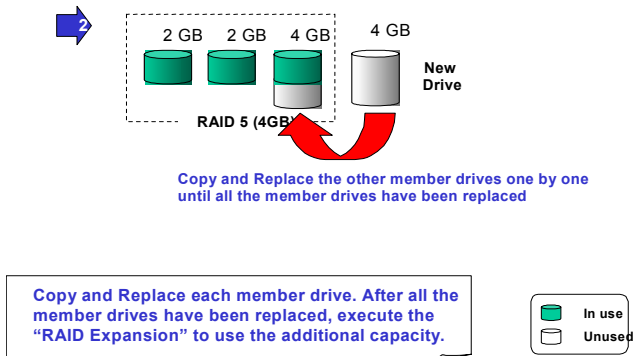
RAID Expansion - Mode 2



The Figure above illustrates expansion of the same 4-GB RAID 5 logical drive using Mode 2 Expansion. Drives are copied and replaced, one by one, onto three higher-capacity drives.

This yields a new 4-GB, RAID 5 logical drive composed of three physical drives. The 4 GB of increased capacity is in a new partition.

RAID Expansion - Mode 2





Note: The increased capacity from either expansion type will be a new partition.

Three new drives are scanned in (see [Scanning in Drives on page 7-2](#)). To add the drives to the logical drive:

- 1 Select the logical drive where they will be added.
- 2 Click the **Operation** tab, then click the **Add Drive** subtab.
- 3 Select a drive to add and click **Add**.
- 4 When you have selected all of the new drives you want to add, click **OK**.

When you return to the View and Edit Logical Drive Partition screen, either partition 0 or the last partition is larger than before.

- 5 See [Chapter 8, LUN Mapping](#) for instructions on mapping a new partition to a host LUN. (The new partition must be mapped to a host LUN in order for the host bus adapter to see it.)

Adding and Deleting Spare Drives

A spare is a physical drive that serves as a back-up drive. When a RAID system drive fails, the spare is automatically configured into the array and data reconstruction begins immediately.

Spare drives appear in Sphas RAIDWatch in darker or shaded colors (compared to normal drives) and have a red cross superimposed on them. Large red crosses indicate global spares; small red crosses indicate local spares.

A typical configuration includes one spare drive per logical drive. (Although logical drives can support multiple spare drives, one spare drive offers adequate protection from drive failure at a much lower cost.

This section provides instructions for managing spare drives on your logical drives.

- To add a spare drive, see [page 7-10](#).
- To delete a spare drive, see [page 7-11](#).

Adding a Spare to a Logical Drive

To add a spare drive:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- 2 Click **Logical Drive**.

A list of all the logical drives that have been created appears, as shown in the Figure on [page 4-9](#).

- 3 Select the logical drive to which you want to add a spare.

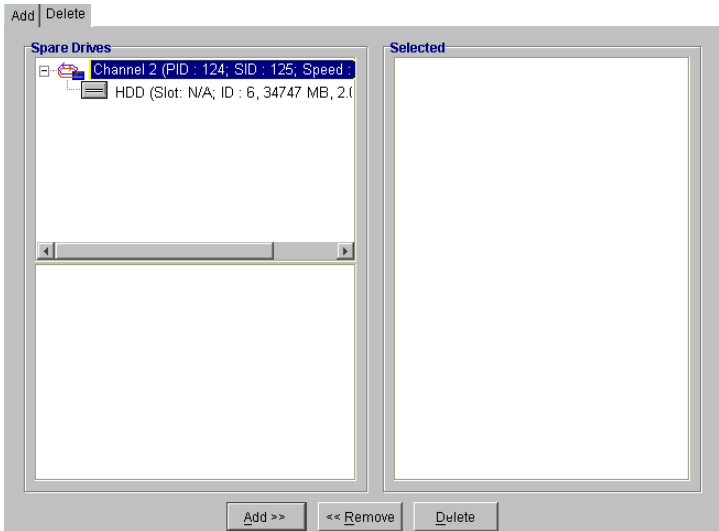
The View and Edit Logical Drive Partition screen appears in the Content Panel.

- 4 Click the **Operation** tab.

The Expand Logical Drive screen appears in the Content Panel.

- 5 Click the **Spare** tab.

The Spare Drive Management screen opens in the Content Panel.



- 6 Click the **Add** tab.

If there are drives available to be assign as spares, their channels will be listed under **Spare Drives**.

- 7 Click on the drive you want to use as a spare, then click **Add**.
- 8 Click **Local** to create a spare that will only replace failed drives in the same logical drive, or click **Global** to create a spare that will replace any drive that fails in any logical drive on the RAID controller.
- 9 Click **OK** to confirm the spare creation.



Note: You can add a spare drive automatically when you create a logical drive by selecting any one of the three RAID+Spare options from the RAID Level drop-down menu. (See [page 7-3](#).)

You can also assign a spare when you are scanning in a new drive. (See [page 7-2](#).)

Deleting a Spare from a Logical Drive

To delete a spare:

- 1 Follow Steps 1 to 5 in [Adding a Spare to a Logical Drive on page 7-10](#).
- 2 Click the **Delete** tab.
Any spare drives are listed in the Spare Drives boxes—the upper box lists Local Spares; the lower box lists Global Spares.
- 3 Click the spare drive you want to delete, then click **Add**.
The spare drive you selected is moved to the Selected box. Repeat this step if you want to delete more than one spare drive.
- 4 Click **Delete**.
- 5 Enter the password when prompted, then click **OK**.
The spare drives return to normal (non-spare) status.
- 6 You will be prompted for a password. Enter it and click **OK**. All selected spare drives will return to normal status.

Rebuilding Logical Drives

If a logical drive has an assigned spare, a failed drive is replaced immediately by the spare, which is automatically configured into the array. The logical drive is rebuilt transparently, without user intervention.

If a logical drive has no assigned spare when a drive fails, you must initiate the rebuilding of the logical drive manually.



Note: Before beginning a manual rebuild, you *must* replace the failed drive. Either install the replacement drive on the same channel with the same SCSI ID, or install a new drive and scan it in. When the failed drive is replaced, use Spheras RAIDWatch to complete the rebuilding of the logical drive.

To rebuild a logical drive:

- 1 After the failed drive is replaced, click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- 2 Click **Logical Drive**.

A list of all the logical drives that have been created appears, as shown in the Figure on [page 7-5](#).

- 3 Select the logical drive you want to rebuild.

The View and Edit Logical Drive Partition screen appears in the Content Panel.

- 4 Click the **Operation** tab.

The Expand Logical Drive screen appears in the Content Panel.

- 5 Click the **Rebuild** tab.

The Rebuild in Progress window opens, showing the progression of the rebuild until it is complete.

When the logical drive is rebuilt, its icon returns to its normal color and the Rebuild tab is no longer available.

Deleting a Logical Drive

When you delete a logical drive, all physical drives assigned to the logical drive are released, making them available for the creation or expansion of other logical drives.



Caution: Deleting a logical drive irretrievably erases all data currently stored on the logical drive.

To delete a logical drive:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).

- 2 Click **Logical Drive**.

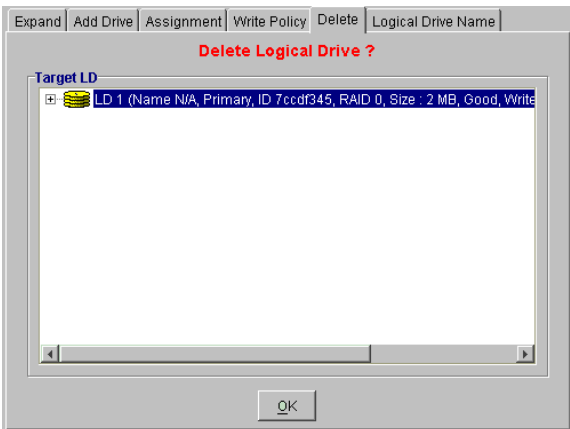
A list of all the logical drives that have been created appears, as shown in the Figure on [page 7-5](#).

- 3 Select the logical drive you want to rebuild.

The View and Edit Logical Drive Partition screen appears in the Content Panel.

- 4 Click the **Operation** tab, then click the **Delete** tab.

The Delete Logical Drive screen appears in the Content Panel.



- 5 Select the logical drive you want to delete, then click **OK**. Click **OK** again to confirm the deletion.

The logical drive is deleted.

Creating Logical Volumes

You can combine logical drives (even ones with different capacities and RAID levels) into a logical volume, which gives you a single logical unit with even larger capacity. You can map logical volumes or their partitions to host LUNs.

To create a logical volume:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- 2 Click **Logical Volume**.

The Create Logical Volume screen appears in the Content Panel.

The Available box lists all the logical drives that can be used to create logical volumes.



Note: Partitioned logical drives can not be part of a logical volume, and won't appear in the Available box.

- 3 In the Available box, select the logical drives to use in the logical volume, then click **Add**.
- 4 In the Logical Volume Assignment drop-down menu, select which controller (Primary or Secondary) to assign the logical volume.



Note: If the redundant controller function is not enabled, or if the Secondary SCSI IDs are not assigned on drive channels, the Logical Drive Assignment drop-down menu will not be available.

- 5 In the Execute Init drop-down menu, select whether the logical volume is initialized online or offline.
- 6 In the Write Policy drop-down menu, select the write policy you want for the logical volume.



Note: Maximum memory to be used from each logical drive to create the logical volume is determined automatically and can't be manually adjusted.

- 7 Click **OK** to create the logical volume. Click **OK** again to confirm the creation.

The logical volume is created.

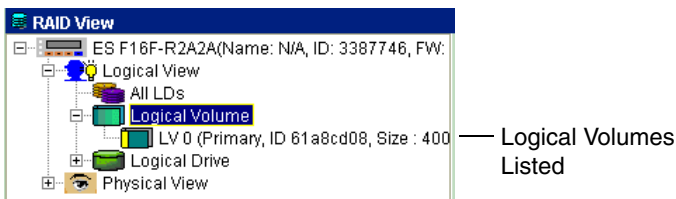
Expanding a Logical Volume

You can add capacity to an existing logical volume by adding new logical drives.

To expand a logical volume:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- 2 Click **Logical Volume**.

A list of all the logical volumes that have been created appears.



- 3 Select the logical volume you want to expand.

The View and Edit Logical Volume Partition screen appears in the Content Panel.

- 4 Click the **Operation** tab, then click the **Expand** tab.
- 5 In the Size to Expand box, enter the amount of memory (in MB) by which to expand the logical drive. This value can't be larger than the Maximum Free Capacity value. (The Maximum Free Capacity setting tells you how much available memory can be used. This setting is automatic and can't be manually adjusted.)
- 6 Click **OK** to begin the logical volume expansion. Click **OK** again to confirm the expansion.

When the expansion is complete, the logical drive has a new last partition the same size as the expansion.

Deleting a Logical Volume

When you delete a logical volume, all logical drives assigned to it are released, making them available for use in other logical volumes.



Caution: Deleting a logical drive irretrievably wipes all data currently stored on the logical drive.

To delete a logical volume:

1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).

2 Click **Logical Volume**.

A list of all the logical volumes that have been created appears, as shown in the Figure on [page 7-16](#).

3 Select the logical volume you want to delete.

The View and Edit Logical Volume Partition screen appears in the Content Panel.

4 Click the **Operation** tab.

5 Click the **Delete** tab.

The Delete Logical Volume screen appears in the Content Panel.

6 Select the logical volume you want to delete, then click **OK**. Click **OK** again to confirm the deletion.

The logical volume is deleted, and disappears from the logical volumes list.

Creating Partitions

You can divide a logical drive into independent sections, or *partitions*, that can be assigned different tasks or can be mapped to separate host LUNs.

You can create partitions in both logical drives and logical volumes. You can create one large partition that covers an entire logical drive or logical volume, or you can partition a logical drive or logical volume into smaller sizes.

If you plan to map an entire logical drive or logical volume to a single host LUN, you do not need to partition that logical drive/volume. However, if you plan to map the logical drive or logical volume to *multiple* host LUNs, you must partition that logical drive/volume.



Note: You can create a maximum of eight partitions per logical drive or logical volume. Partitioned logical drives can not be part of a logical volume.

Partitioning a Logical Drive

You can use the instructions in this section to create a new partition or modify an existing partition.

To partition a logical drive:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).
- 2 Click **Logical Drive**.

A list of all the logical drives that have been created appears.

- 3 Select the logical drive you want to partition.

The View and Edit Logical Drive Partition screen appears in the Content Panel.

- 4 Click **Edit**. Enter the password when prompted, then click **OK**.

Partition	Offset(MB)	Size(MB)
0	0	30
1	30	70
2	100	10
3	110	40
4	150	20
5	170	50
6	220	10
7	230	70

- 5 Select the last partition in the list. (Partitions must be contiguous.) If no partitions exist, select **Partition 0**.
If you are modifying an existing partition, select that partition.
- 6 In the Size field, enter the size of the partition in MB.
All unallocated space is automatically assigned to a new partition.
- 7 Repeat [Step 5](#) and [6](#) to create multiple partitions.
- 8 The logical drive is now ready for mapping to host LUNs. See [Chapter 8, LUN Mapping](#).

Combining Partitions

You may combine partitions by expanding the size of partition 0 so that it is as large as all partitions combined.



Caution: Combining partitions destroys existing data on all drive partitions.

Partitioning a Logical Volume

You can use the instructions in this section to create a new partition or modify an existing partition.

To partition a logical volume:

- 1 Click **Logical View** in the Navigation Panel (shown in the Figure on [page 4-9](#)).

2 Click **Logical Volume**.

A list of all the logical volumes that have been created appears, as shown in the Figure in [page 7-16](#).

3 Select the logical volume you want to partition.

The View and Edit Logical Volume Partition screen appears in the Content Panel.

4 Click **Edit**. Enter the password when prompted, then click **OK**.

Partition	Offset(MB)	Size(MB)
0	0	30
1	30	70
2	100	10
3	110	40
4	150	20
5	170	50
6	220	10
7	230	70

5 Select the last partition in the list. (Partitions must be contiguous.) If no partitions exist, select **Partition 0**.

If you are modifying an existing partition, select that partition.

6 In the Size field, enter the size of the partition in MB.

All unallocated space is automatically assigned to a new partition.

7 Repeat [Step 5](#) and [6](#) to create multiple partitions.

8 The logical drive is now ready for mapping to host LUNs. (See [Chapter 8, LUN Mapping](#).)

Removing a Partition from a Logical Drive or Logical Volume

To remove a partition, make the size of that partition 0.

The partition is deleted and the excess memory moves up to the next partition on the list. Any partitions further down on the list move one place higher. (For example, if you delete Partition 5, it's released memory goes to Partition 4, and Partition 6 and 7 become Partition 5 and 6 respectively.)

LUN Mapping

In this Chapter...

<i>Mapping a Complete Logical Drive or Logical Volume</i>	8-2
<i>Mapping a Logical Drive/Volume Partition</i>	8-4
<i>Deleting a LUN Mapping</i>	8-5
<i>Extended LUN Mapping</i>	8-6

On a SCSI bus, each target device accommodates up to eight other devices, which are known as logical units. Each of these devices is assigned a LUN (or Logical Unit Number) that the controller uses when it sends commands. LUNs uniquely identify devices that share the same SCSI bus.

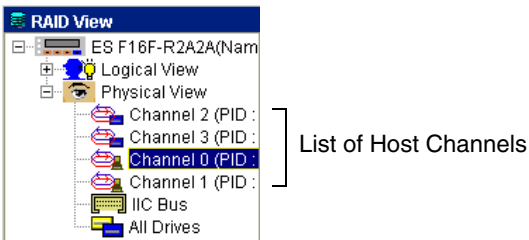
This chapter provides detailed instructions for using Spheras RAIDWatch to map logical drives, logical volumes, and partitions to host LUNs. (For more information on logical drives and logical volumes, see [Chapter 7, *Managing Your Drives*](#).)

Mapping a Complete Logical Drive or Logical Volume

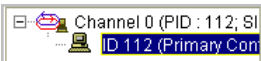
To map a complete (non-partitioned) logical drive or logical volume to a host LUN:

- 1 In the Navigation Panel (shown in the Figure on [page 4-9](#)), click **Physical View**.

A list of all available host channels appears.



- 2 Click the channel you want.
- 3 In the Subnavigation Panel (shown in the Figure on [page 4-9](#)), click the host channel ID number you want to map to, as shown below.



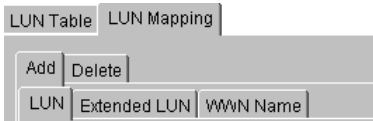
The LUN Table appears in the Content Panel.

LUN Table | LUN Mapping

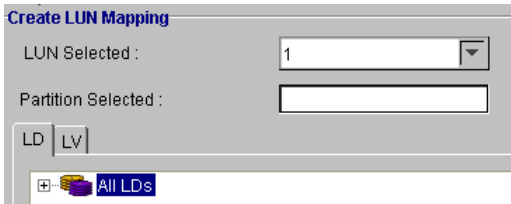
ID 112 (for Primary Controller)

LUN	Extended LUN	WWNN Name			
LUN	LD/LV	Partition	Size (MB)	RAID	
0	LD 1	0	34747	1	
1					
2					
3					
4					
5					
6					
7					

- Click the **LUN Mapping** tab. Then, click the **Add** tab, then the **LUN** tab.



The Create LUN Mapping window opens.

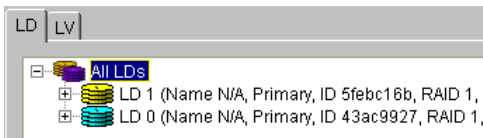


- Click the **LD** tab to map a logical drive, or click the **LV** tab to map a logical volume.



Note: Although the examples shown in the rest of this procedure are for mapping a logical drive, the same steps apply to logical volume mapping.

- To view a list of available logical drives or logical volumes, click **All LDs**.



- Click the logical drive or logical volume you want to map. The only partition listed under that logical drive/volume should be Partition 0. (To map partitions, see [page 8-4](#).)
- In the LUN Selected drop-down menu, select the LUN ID to assign to the logical drive or logical volume. (Only unused LUNs are listed.)

9 Click **Partition 0**.

Partition 0 appears in the Partition Selected box.

10 Click **OK**. Enter the password when prompted, then click **OK** again to confirm the mapping.

The newly mapped LUN appears in the LUN Table.

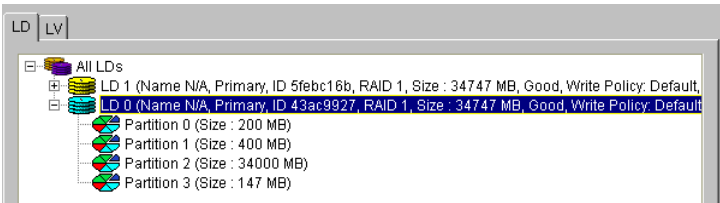
LUN	Extended LUN	WWN Name			
LUN	LD/LV	Partition	Size(MB)	RAID	
0	LD 1	0	34747	1	
1					
2					
3					
4	LD 1	0	34747	1	
5					
6					
7					

Newly Mapped LUN

Mapping a Logical Drive/Volume Partition

To map a logical drive or logical volume partition:

- 1 Create the partition. (See [Creating Partitions on page 7-18](#) for instructions.)
- 2 Open the Create LUN Mapping window, as described from [Step 1 to Step 6 in Mapping a Complete Logical Drive or Logical Volume on page 8-2](#).
- 3 Click the logical drive or logical volume you want to display a list of all its partitions. Each drive or volume can have up to eight partitions, each of which can be mapped to a host LUN.



- 4 In the LUN Selected drop-down menu, select the LUN ID to assign. (Only unused LUNs are listed.)

- 5 Double-click the partition you want to map, to enter its name in the Partition Selected box.
- 6 Click **OK**. Enter the password if prompted, then click **OK** again to confirm the mapping.

The newly mapped LUN appears in the LUN Table

- 7 Repeat Steps 4 and 6 to map additional partitions, if required.

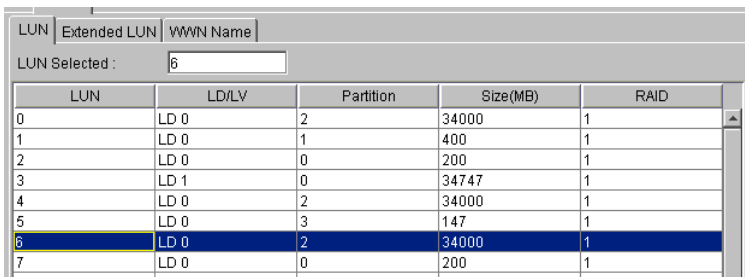
Deleting a LUN Mapping

To delete a LUN mapping:

- 1 Open the LUN Table, as described in Steps 1 to 3 in *Mapping a Complete Logical Drive or Logical Volume on page 8-2*.
- 2 Click the **LUN Mapping** tab. Then, click the **Delete** tab, then the **LUN** tab.

The LUN Map Table appears, listing all LUN mappings.

- 3 Double-click the LUN mapping you want, to display its ID in the LUN Selected box.



LUN	LD/LV	Partition	Size(MB)	RAID
0	LD 0	2	34000	1
1	LD 0	1	400	1
2	LD 0	0	200	1
3	LD 1	0	34747	1
4	LD 0	2	34000	1
5	LD 0	3	147	1
6	LD 0	2	34000	1
7	LD 0	0	200	1

- 4 Click **OK**. Enter the password if prompted, then click **OK** again.

The LUN mapping disappears from the LUN Map Table.

Extended LUN Mapping

Extended LUN Mapping adds extra functionality to normal LUN mapping, which only allows you to assign LUNs.

Extended LUN mapping provides you with added masking and filtering features, which allow you to restrict access to specified LUNs. It also lets you assign different access modes (such as Read and Write or Read only) to prespecified LUNs.

Before You Begin

- Before you can use the Extended LUN Mapping feature, you must first create logical drives and logical volumes. (See [Chapter 7, *Managing Your Drives*](#) for instructions.)
- To use Extended LUN Mapping to map an entire logical drive or logical volume, ensure that logical drive/volume is *not* partitioned.
- To use the Extended LUN Mapping to map a logical drive or logical volume partition, ensure that logical drive/volume is partitioned before accessing the Extended LUN Mapping feature.

Creating an Extended LUN Mapping

To create an Extended LUN Mapping:

- 1 In the Navigation Panel (shown in the Figure on [page 4-9](#)), click **Physical View**.

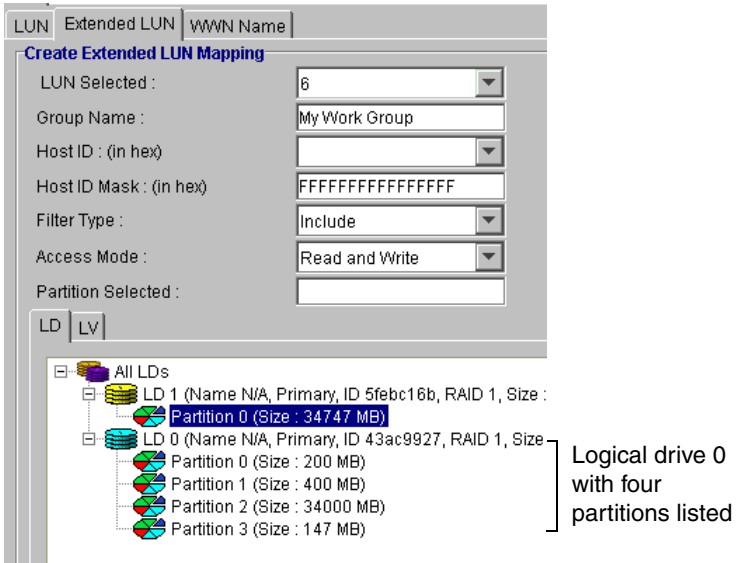
A list of all available host channels appears.

- 2 Click the channel you want.
- 3 In the Subnavigation Panel (shown in the Figure on [page 4-9](#)), click the host channel ID number you want to map to, as shown in the Figure on [page 8-7](#).

The LUN Table appears in the Content Panel.

- Click the **LUN Mapping** tab. Click the **Add** tab, then click the **Extended LUN** tab.

The Create Extended LUN Mapping window appears in the content panel.



- Click the **LD** tab to map a logical drive, or click the **LV** tab to map a logical volume, then click **All LDs**.
- Click on the logical drive or logical volume you want. Any partitions on that drive/volume appear in a list below it, as shown in the Figure above. Click on a partition to map it instead of the whole logical drive/volume.
- In the LUN Selected drop-down menu, select the LUN you want. (Only unused LUNs are listed.)

- 8 Configure these Extended LUN Mapping parameters, as required:
 - In the Group Name box, enter a name for the group, such as Work Group 1.
 - From the Host ID drop-down menu, select the World Wide Name (WWN) of the host that will have access to the drive/volume/partition being mapped.

To add a WWN number manually, see [page 8-8](#).
 - Accept the default Host ID Mask or enter your own. The Host ID Mask is a 16-bit hexadecimal number.
 - In the Filter Type drop-down menu, select **Include** to enable host access to the drive/volume/partition being mapped, or select **Exclude** to prevent the host from accessing the drive/volume/partition being mapped.
 - In the Access Mode drop-down menu, select the access rights for the host. Select **Read and Write** if you want the host to be able to read *and* write to the drive/volume/partition being mapped. Select **Read Only** if you want the host to have read-only access to the drive/volume/partition being mapped.
- 9 Click **OK**. Type the password if prompted, then click **OK** again.

Extended LUN mappings are listed in the Extended LUN Mapping Table.

Adding a WWN Name

To manually add a WWN name:

- 1 In the Navigation Panel (shown in the Figure on [page 4-9](#)), click **Physical View**.

A list of all available host channels appears.
- 2 Click the channel you want.
- 3 In the Subnavigation Panel (shown in the Figure on [page 4-9](#)), click the host channel ID number you want to map to, as shown below.

The LUN Table appears in the Content Panel.

- 4 Click the **LUN Mapping** tab. Click the **Add** tab, then click the **WWN Name** tab.

The Create WWN Name Mapping window appears.

- 5 In the WWN Name box, enter the name you want to assign to a host.
- 6 In the Host ID box, manually enter the Host ID of the host (refer to your HBA's documentation for more information) or click on the Host ID you want in the Host ID Pool. (Host IDs shown in the pool are automatically detected by the controller's embedded firmware.)
- 7 Click **OK**. Type the password if prompted, then click **OK** again. Newly added WWNs appear in the LUN Table.

Deleting an Extended LUN Mapping or WWN Name

To delete an Extended LUN Mapping or WWN name:

- 1 In the Navigation Panel (shown in the Figure on [page 4-9](#)), click **Physical View**.

A list of all available host channels appears.

- 2 Click the channel you want.
- 3 In the Subnavigation Panel (shown in the Figure on [page 4-9](#)), click the host channel ID number you want to map to, as shown below.

The LUN Table appears in the Content Panel.

- 4 Click the **LUN Mapping** tab, then click **Delete**.
- 5 Depending on what you want to delete, click either the **Extended LUN** tab or the **WWN Name** tab.

- 6 Select the Extended LUN Group or WWN Name you want to delete, then click **OK**. Enter the password when prompted, then click **OK** again.

The mapping is no longer listed in the Extended LUN Mapping Table or the WWN Name Table.

Monitoring Your RAID System

In this Chapter...

<i>Monitoring Technologies</i>	9-2
<i>SES Monitoring</i>	9-2
<i>Monitoring Drives and Devices</i>	9-3
<i>Monitoring Enclosures in Panel View</i>	9-8
<i>Viewing the Event Log</i>	9-11
<i>Monitoring RAID System Statistics</i>	9-12



This chapter provides an overview of the RAID system monitoring features of Spheras RAIDWatch.

Monitoring Technologies

Sphas RAIDWatch supports these enclosure monitoring technologies:

I²C (IIC)

I²C is an interface which passes signals from enclosure sensors to the RAID controller. It provides a basic status report on enclosure devices and system parameters such as power supplies, fans, and voltage.

I²C is an enclosure-proprietary monitoring technologies that must be configured by the enclosure manufacturer.

Access I²C by selecting **RAID View** in the Navigation Panel (shown on page [page 4-9](#)) and clicking **Physical View**. Click the **IIC** icon to open the IIC Bus Device Status screen in the Content Panel.

Fault Bus

Fault Bus is a proprietary enclosure management interface. It monitors the fault signals of the ventilation fans, power supply, enclosure temperature sensor, and UPS and warns of dangerous failures within the RAID system. Fault Bus only detects failure signals; it does not otherwise monitor system status. In Sphas RAIDWatch, a failure appears as a red X on the device icon.

Access Fault Bus by selecting **RAID View** in the Navigation Panel (shown on page [page 4-9](#)) and clicking **Physical View**. Click the **Fault Bus** icon to open the Fault Bus Device Status screen in the Content Panel.

You can monitor current status, modify Fault Bus settings, and change the active signal settings in the Fault Bus Device Status screen. Click **OK** to save any changes before closing this screen.

SES Monitoring

The SCSI Enclosure Services (SES) protocol is used to manage and sense the status of the power supplies, cooling devices, temperature sensors, individual drives, and other non-SCSI elements installed in a Fibre Channel (FC) JBOD enclosure. If you have a SES-compliant enclosure, you can use Sphas RAIDWatch to monitor status.

Access SES by selecting **RAID View** in the Navigation Panel (shown on page [page 4-9](#)) and clicking **Physical View**. Click **SES Management Device** to open the Managed Unit Status screen in the Content Panel. Click the **Monitor** tab to view status information on enclosure hardware components, or click the **Information** tab to view enclosure information such as vendor and model number.

Monitoring Drives and Devices

In the Enclosure window, you can create exact replicas of your RAID system enclosures and use them to view drive status in real-time on Sphas RAIDWatch, which uses symbols and colors to represent various conditions.

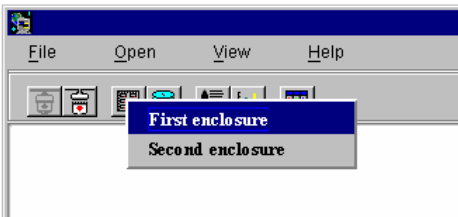
Creating an Enclosure on RAIDWatch

The first step to monitoring your drives is to recreate your enclosures in enclosure windows on Sphas RAIDWatch.

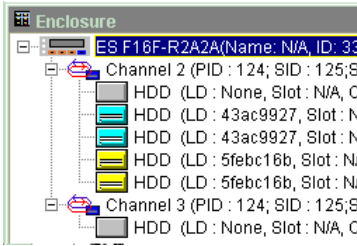
You can replicate real enclosures with real drive bays, depicting the exact locations and positions of the physical drives and RAID controller(s).

To create an enclosure:

- 1 Click the **Enclosure** button on the toolbar (shown in the Figure on [page 4-8](#)). If you have more than one enclosure, a selection box appears, listing all enclosures. Access the enclosure you want by clicking on it in the selection box. (If you have just one enclosure, it opens automatically.)



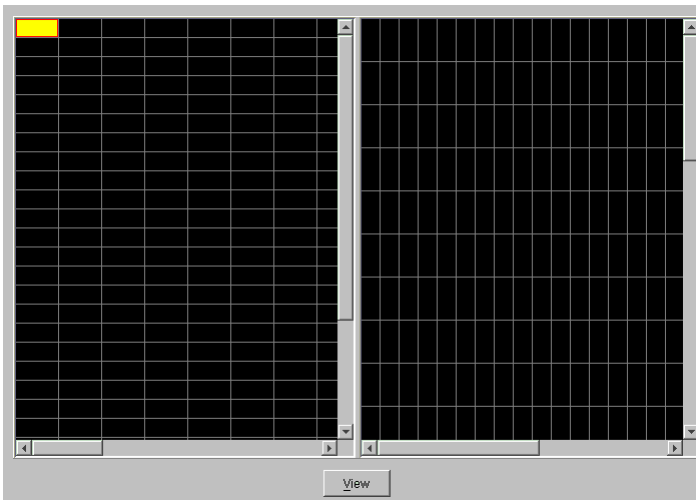
The Enclosure View opens, showing enclosure information in the Navigation Panel.



In the Content Panel, a screen with two windows opens.

2 Click **Edit**.

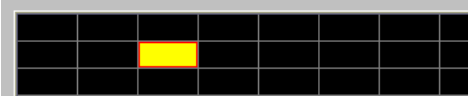
The Enclosure window opens.



The Enclosure window has preconfigured spaces that represent controller and drive bays or canisters on your enclosure. (Your enclosure may generate a graphical representation such as a photograph, instead of the boxes shown in the Figure above.)

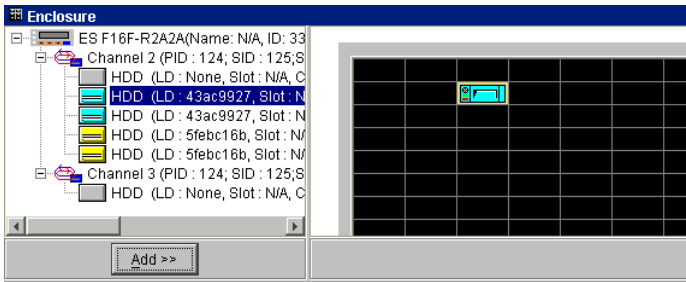
- Click inside an empty space that represents an empty canister or drive bay.

The space changes color.



- In the Navigation Panel, select a disk drive, then click **Add**.

The drive's icon appears in the space you selected.



Note: Arrange your drives according to actual locations and SCSI ID sequence. If you select an empty space that does not match the drive icon or controller icon you selected, the Add button is inactivated. For instance, Spheras RAIDWatch won't allow you to place a drive in a controller canister.

- Continue to add drives until the enclosure is complete.



Note: You can only add drives to the selected enclosure. (To add drives to another enclosure, repeat [Step 1 on page 9-3](#), selecting that enclosure.)

- If desired, repeat [Step 3](#) and [4](#) to add monitoring devices to the enclosure.



Note: To remove a drive from an enclosure, see [page 9-8](#).

Viewing and Monitoring Your Enclosure

When your enclosure is created, you can view and monitor it at any time by clicking the **Enclosure** button in the toolbar.

Identifying Drives and Spares

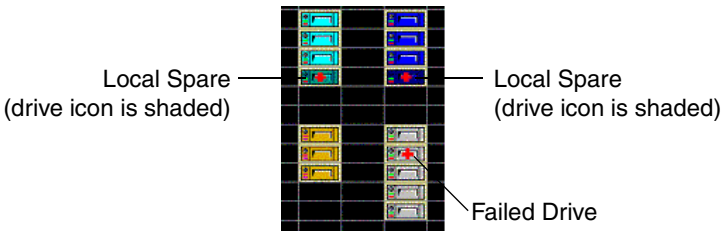
In the Enclosure window, normal drives and spare drives look similar, but spare drives are shaded and have a red cross superimposed on them. Large red crosses indicate Global spares (as shown in the example at right); small red crosses indicate Local spares (as shown in the example in [Identifying Failed Drives](#) below).



When you remove a drive, its corresponding icon disappears from the Enclosure window.

Identifying Failed Drives

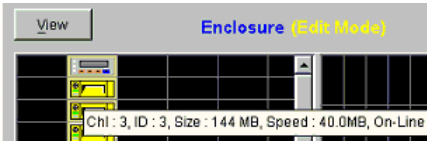
When a drive fails, a large red X appears on the drive's icon in the Enclosure window.



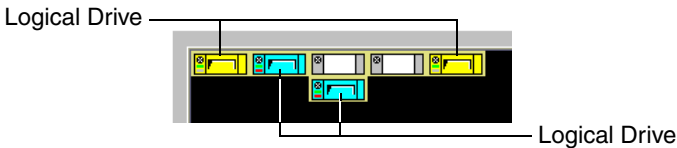
Note: This same drive status information is also shown under Physical View in the RAID View Navigation Panel. (Click the **RAID View** button on the toolbar, then click **Physical View** in the Navigation Panel.) Drive status is reported real-time in both places, using the same system of colors and symbols, although in the Physical View the drives are arranged according to channel connections, not actual location.

Viewing Drive Information

To view detailed information about a specific drive, move the cursor over the drive's icon. A message tip appears, showing channel number, SCSI ID, drive capacity, transfer rate, and current status, similar to the example shown below.



Click **View** in the Enclosure window to see the logical relationship among physical drives in your enclosure. Physical drives configured in a logical drive group are the same color. If you have multiple logical drives, each logical drive has its own color. For example, in the Figure below, the members of one logical drive are yellow, the members of another logical drive are light blue.



Keeping Your Enclosure Window Accurate

Sphas RAIDWatch has no automatic update function for the Enclosure window. If you add or remove drives from your RAID system, you must manually update the enclosure settings in the Enclosure window.

Removing a Drive from an Enclosure



Note: To remove a physical drive from a physical enclosure, refer to the enclosure's documentation. These instructions are *only* for removing drive icons from the Spheras RAIDWatch Enclosure window.

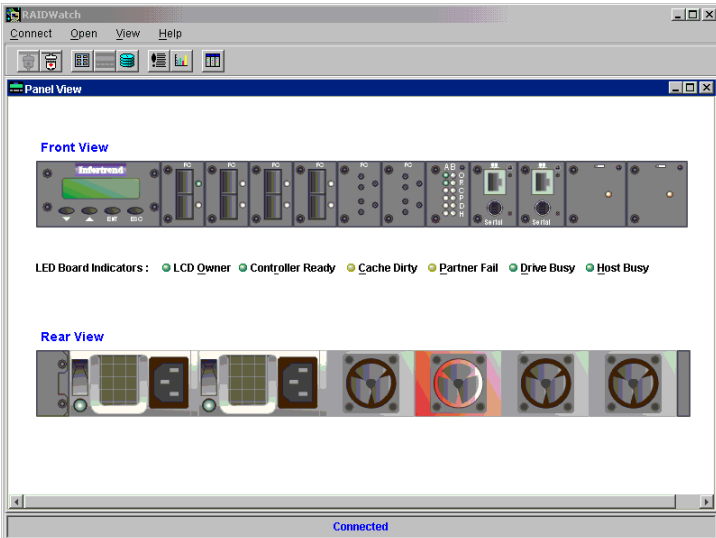
To remove a drive from an enclosure on Spheras RAIDWatch:

- 1 Follow [Step 1](#) and [2](#) in [Creating an Enclosure on RAIDWatch on page 9-3](#).
- 2 In the Enclosure window, click on the drive you want to remove, then click **Remove**.

The drive is removed from the enclosure.

Monitoring Enclosures in Panel View

The Panel View in Spheras RAIDWatch shows a representation of a physical RAID device (like the example shown below). In the Panel View, you can see the operational status of RAID device components and access critical RAID information about the controller, IO channel, serial port, and Ethernet port.



To obtain access component information:

- 1 Click the **Panel View** button on the toolbar.

The Panel View opens.



Note: If nothing appears in the Panel View, your RAID enclosure does not provide a Panel View.

- 2 Hold your cursor over the component about which you want current information. (It may take a few seconds before the message tag appears.)

Additional information about components may be available by holding the cursor over the LCD panel. (Refer to your enclosure's documentation for information on LCD indicators.)

Decoding Panel View Message Tags

Some message tags, such as the ones for PSU Status and Cooling Fan status, are self-explanatory. (For instance, Power supply not present, and Fan functioning normally.)

Other message tags include the categories and acronyms explained in the following Tables:

RAID Controller Tags

Category / Acronym	Definition
Name	Controller's assigned name
ID	Controller's SCSI ID
CPU	CPU installed on controller
Cache	Size and nature of the SDRAM chip installed for cache memory
FW	Controller's firmware version
BR	Boot record

A typical RAID controller message tag is shown below:

Name: Infor ID: 3194591; CPU: PPC750; Cache: 128MB(ECC SDRAM); FW: 9.25P; BR: 1.21F

IO Channel Message Tags

Category / Acronym	Definition
Host Channel	Channel is a Host Channel
Drive Channel	Channel is a Drive Channel
PID	Channel's Primary SCSI ID
SID	Channel's Secondary SCSI ID
Speed	Channel's speed

Two typical IO Channel message tags are shown below:

```
Host Channel; PID : 119; SID : N/A; Speed : 1 Ghz
```

```
Drive Channel; PID : 119; SID : N/A; Speed : 1 Ghz
```

RS-232C Serial Port/Ethernet Port Message Tags

Category / Acronym	Definition
IP	IP address assigned to controller during RAIDWatch installation
Mask	Subnet mask IP address
Gateway	Gateway IP address

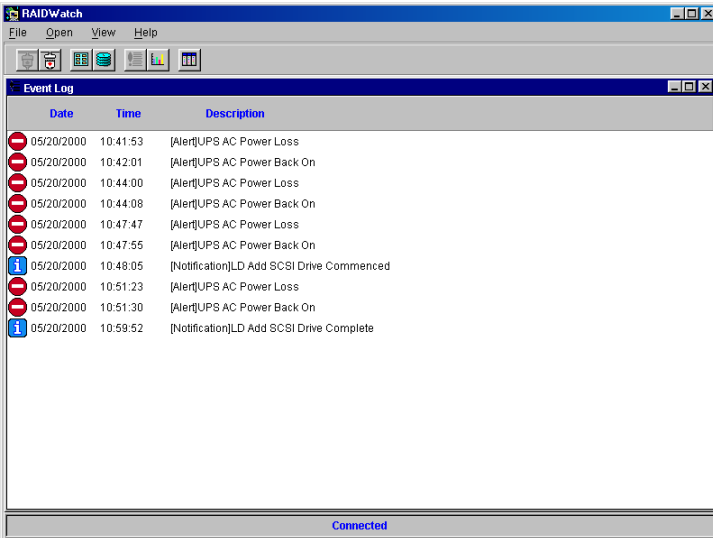
A typical port message tag is shown below:

```
IP: 192.168.30.27; Mask: 255.255.255.0; Gateway: 192.168.30.1
```

Viewing the Event Log

In the Event Log window, you can view controller and array events that have occurred since the last time Spheras RAIDWatch was started.

You can open the Event Log window at any time by clicking the **Event Log** button on the toolbar (shown in the Figure on [page 4-8](#)) or by selecting **Event Log** from the Open menu.



Events are listed by date and time, with the most recent event at the bottom. A description of each event is included.

If events occur when the Event Log window is not open, a red Event Flag button appears on the toolbar. Click the **Event Flag** button to view the Event Log.

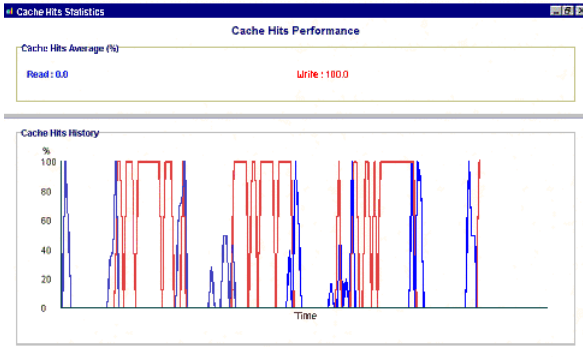


Monitoring RAID System Statistics

You can use Spheras RAIDWatch to view real-time information on the overall performance of your RAID system. Throughput statistics are continually updated and displayed in graphical format.

To view your RAID system statistics:

- 1 Click the **Statistics** button on the toolbar (shown in the Figure on [page 4-8](#)).
- 2 Select **Cache Hits** or **Disk R/W**, as required:
 - The Cache Hits Statistic window displays what percentage of data is being accessed through cache memory. Read values appear in blue and Write values in red.



- The Read/Write Statistics window displays the amount of data (MB/sec) being read from and written to the RAID System. Read values appear in blue and Write values in red.

10

Troubleshooting

In this Chapter...

<i>General Troubleshooting Tips</i>	10-2
<i>NPC Troubleshooting</i>	10-3
<i>Error Codes</i>	10-3
<i>Error Messages</i>	10-4

This chapter provides troubleshooting tips for common problems you may encounter while using Spheras RAIDWatch.

General Troubleshooting Tips

If you encounter difficulties installing or running Sphas RAIDWatch, work through the items on this list:

- Ensure that all OS-specific installation configuration steps have been completed.
- Check your Sphas RAIDWatch connections.
 - **In-Band SCSI** (Solaris only)—Ensure that all systems running a Solaris OS have an in-band SCSI driver installed.
 - **Agents**—Ensure that all RAID host servers have a Secondary Agent installed and running.
 - **Windows NT Systems**—Ensure that the status of the Primary and Secondary Agents read *Start*. Open the Control Panel, then double-click the **Service** icon. The status of Primary Agent and Secondary Agent should say *Start*.
 - **Unix Systems (including Linux)**—Ensure that the in-band SCSI driver is installed (Solaris only). You can run Text RAID Manager to determine this.

Check the Primary and Secondary agents

```
#ps -eaf |grep primary
```

```
#ps -eaf |grep secondary
```

If either program is not running, open a terminal session and run the program manually.

- **IP Settings**—Ensure that each RAID host server has a unique IP address assigned.

Ensure that each Secondary agent IP and TCP port setting is listed under the Primary agent's configuration. Run the RAIDWatch installation program at the Primary Agent host and choose **Configuration Only**.

- **TCP Port Settings**—Ensure that the Primary Agent has a TCP port setting that's different from the Secondary Agents'. The Secondary Agents should have a common TCP port setting, and that setting should be listed with each Secondary Agent's IP under the Primary Agent configuration.

NPC Troubleshooting

Windows NT

- If NPC has trouble sending fax messages, ensure that Microsoft Personal Fax is installed.
- If NPC does not broadcast normally, ensure that Windows Messaging is installed on *both* server and client(s).

RedHat

- **rwalld**—Under some circumstances, the software component necessary for running NPC under RedHat—`rpc.rwalld`—may be absent from the system. If this occurs on a system, find the associated rpms, `rwall-server-<version>-.i386.rpm` and `rwall-<version>.i386.rpm` under the directory RedHat/RPMS on the RedHat installation CD.

To install the rpm packages, use this command:

```
rpm -i <your rpm package>+
```

Error Codes

Code: RC=1

Explanation—The Primary Agent did not respond to a RAIDWatch command before timeout.

What You Can Do—Check your network environment to determine whether or not the Primary Agent is available. Use a ping utility to see if the server exists on the network.

Code: RC=2

Explanation—The Primary Agent did not understand the last RAIDWatch command.

What You Can Do—Check the firmware version of controller to see if it is compatible with your version of RAIDWatch. Ensure you have the latest firmware installed on your controller.

Code: RC=3

Explanation—Exception error detected

What You Can Do—Check that the versions of RAIDWatch, Primary Agent, and Secondary Agent are compatible.

Code: RC=7

Explanation— RAIDWatch didn't find the RAID controller.

What You Can Do—Check if the Secondary and Primary Agents are running on their respective servers. Check if the RAID controller that RAIDWatch wants to control has failed. (The Secondary Agent on the host might be functioning, but the RAID controller it relates to may have failed.)

Code: RC=9

Explanation—The Primary or Secondary Agent is not running, or one or more servers is down.

What You Can Do—Restart the suspect servers and all related RAIDWatch agents.

Error Messages

This section provides an explanation of some of the error messages you may encounter while using Spheras RAIDWatch.

Undefined Channel Mode

Explanation—Channels must be defined as either a drive or host channel.

Drive channel should have at least one PID!

Explanation—Please assign one PID to each drive channel.

Channel settings failed!

Explanation—Please check the channel settings.

Drive channel can only have one ID! Please remove ID from PID list first, and then add.

Explanation—Please remove the current ID from the PID list first, then add the new one.

Maximum RAID 3 or RAID 5 drive count is 31!

Explanation—You cannot create a RAID 3 or RAID 5 logical drive with more than 31 SCSI drives. Reduce the number of drives you are using.

Delete Logical Drive failed!

The logical drive may be a member of a logical volume, so it can not be deleted.

Rebuild failed!

What you can do—Use another new drive and try to perform the rebuild again.

Expand logical drive failed!

What you can do—Replace the hard drive and rebuild the logical drive.

Add drives failed!

Explanation—Adding drive is a re-initialization process. A failure during the process will be fatal.

What you can do—Delete the logical drive then recreate the logical drive.

Change LD assignment failed!

What you can do—Check if drive channel is assigned both PID and SID that own the member SCSI drive of this logical drive.

Currently, controller supports 8 LDs.

Explanation—Currently, the controller can only support 8 logical drives.

Setup redundant controller failed!

Explanation—Check the redundant controller configuration and see if the PID and SID of drive and host channels are all correct and if the logical drives (volumes) are correctly assigned.

A

Using Event Monitor

In this Appendix

<i>Getting Started</i>	A-2
<i>Opening Event Monitor</i>	A-3
<i>Connecting to a RAID System</i>	A-6
<i>Navigating Event Monitor</i>	A-7
<i>Using the Connect Menu</i>	A-8
<i>Getting to Know the Event Monitor Windows</i>	A-8
<i>Understanding Event Severity Levels</i>	A-10
<i>Exiting Event Monitor</i>	A-10

Event Monitor is an event monitoring utility included with Sphas RAIDWatch. With Event Monitor, you can monitor multiple RAID systems simultaneously, receive real-time event notifications, and track up to 1024 events per connection to a controller.

Event Monitor is installed with Sphas RAIDWatch, but can be run even when Sphas RAIDWatch is not running. You can run Event Monitor locally, or remotely through a Web browser.

Once connected to a RAID system through Event Monitor, you can open Sphas RAIDWatch and make required adjustments to that RAID system through the same connection.

This appendix provides detailed instructions for using Event Monitor with your RAID systems.

Getting Started

To begin using Event Monitor:

- If you did not install Event Monitor as part of the Sphas RAIDWatch installation (see [Chapter 2, *Installing Sphas RAIDWatch*](#)), do so now. Follow the instructions provided for Sphas RAIDWatch in [Chapter 2](#).

Event Monitor must be installed with Sphas RAIDWatch. RAID Agents serve as the communication bridges between controller and RAID servers.

- Java Applet starts when you connect to Event Monitor remotely, using a Web browser. When Java Applet starts, it prompts you to enter the IP address of a Primary Agent server. Connection to other Primary Agents can be established through the program's menu commands.

For remote connection, you need a connection to an HTTP server with these files:

File Type	File Name
HTML	grem.htm grm.htm
Jar	grem.jar grm.jar
Multilanguage support	IFTBundle_0 IFTBundle_1
OEM definitions	Em_oemname Oemname Oemlogo Default.enc
Help files if online help is preferred	/help /em_help

Basic Running Requirements

Event Monitor shares Java class with Sphas RAIDWatch. Both programs must be installed before you can run Event Monitor, which must be started manually (and rerun after a host computer reset).

Ensure that your system meets the requirements listed in *System Requirements* on page 1-4, that your RAID systems are properly installed, and that you have at least one RAID system operating normally. Sphas RAIDWatch Primary and Secondary Agents must be installed on a main management server.

Opening Event Monitor

To open Event Monitor:

- 1 Start the NPC and RAIDWatch Agents, following the instructions provided in *Starting Sphas RAIDWatch Agents and NPC* on page 4-2.
- 2 Run Event Monitor locally or remotely, as required, by following the instructions for your OS:
 - For local management, or for management over LAN (Windows OSs), see page A-3.
 - For local management, or for management over LAN (Unix OSs), see page A-4.
 - For remote management with Web browser (any supported OS), see page A-4.

Opening Event Monitor Locally or Over a LAN (Windows)

To open Event Monitor on a local or network system running Windows:

- 1 From the Windows **Start** menu, select **Programs**, then select **Event Monitor**.
- 2 Enter the IP address and TCP port of the RAID system.
If Event Monitor is running *locally* (on the Primary Agent host machine) and you want to manage a RAID system hosted by the Primary machine, click **Default**.
- 3 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.
- 4 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system.

Opening Event Monitor Locally or Over a LAN (Unix)

Follow these instructions to open Event Monitor locally or over a LAN on systems running Unix or AIX (Solaris 7, SPARC, x86, Red Hat Linux 6.1).

To open Event Monitor:

- 1 Open a terminal application or command line window.
- 2 Change the directory to `/usr/hybrid/bin/` (or whatever directory you chose during the installation, if not the default).
- 3 At the command prompt, type:

```
java -cp grem.jar:grm.jar grem.EvtWatch
```

- 4 Enter the IP address and TCP port of the RAID system where the Primary Agent was installed.

If Event Monitor is running *locally* (on the Primary Agent host machine) and you want to manage a RAID hosted by the Primary machine, click **Default**.

- 5 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.
- 6 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system.

Opening Event Monitor Remotely Using a Web Browser (Any OS)

You can use these instructions to open Event Monitor remotely, using a Web browser on any supported OS.

To open Event Monitor:

- 1 Open your Web browser and enter the IP address of the Primary Agent host followed by `GREM.HTML`. (For example, `222.212.121.123\GRM.HTML`).

The Java Applet starts, then the Event Monitor language support and main connection window opens.

- 2 Enter the IP address of your Primary Agent host.
- 3 Double-click the IP address of the RAID host you want to manage, then double-click the controller icon.

- 4 Double-click the connection method you want to use (for example, **In-Band SCSI**) to connect to the RAID system.

If you want to run Event Monitor with a Web browser and the connection is always made to the same HTTP server providing GREM.htm, and if the HTTP server is a Primary Agent host, you can edit the HTML to avoid re-entering the same IP address each time you connect.



Note: Once you've edited the HTML, you cannot access other Primary Agent hosts except through the HTTP/Primary Agent server.

In the HTML file, change the variable in this line:

```
<PARAM NAME = "PrimaryInServer" VALUE = "No" >
```

to

```
<PARAM NAME = "PrimaryInServer" VALUE = "Yes" >
```

If you use Netscape, you must add this attribute to the embedded tag, as shown below:

```
<EMBED type="application/x-java-
applet;version=1.2.2"
java_CODE = "grem.EvtWatch.class"
java_ARCHIVE = "grem.jar, grm.jar"
WIDTH = 260
HEIGHT = 90
pluginspage="http://java.sun.com/products/
plugin/1.2/plugin-install.html"
PrimaryInServer="Yes">
```

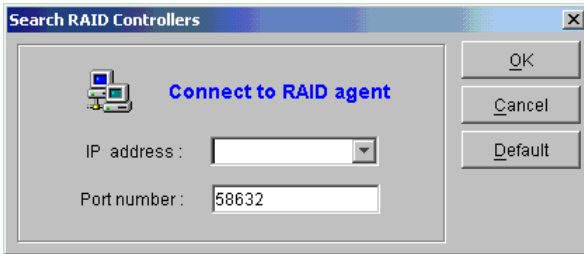
Once you've edited the HTML, you are connected to the same HTTP/Primary Agent server whenever Event Monitor is started and run as a Java Applet with a Web browser.

Connecting to a RAID System

To connect to a RAID system from either the local host (or Primary Agent) or a remote host:

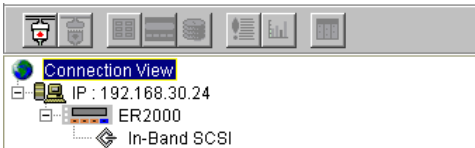
- 1 In the Connect menu, click **Open**. Repeat this process to select all the Primary Agent hosts.

The Connect to RAID Agent window opens.



- 2 Click **Default**.

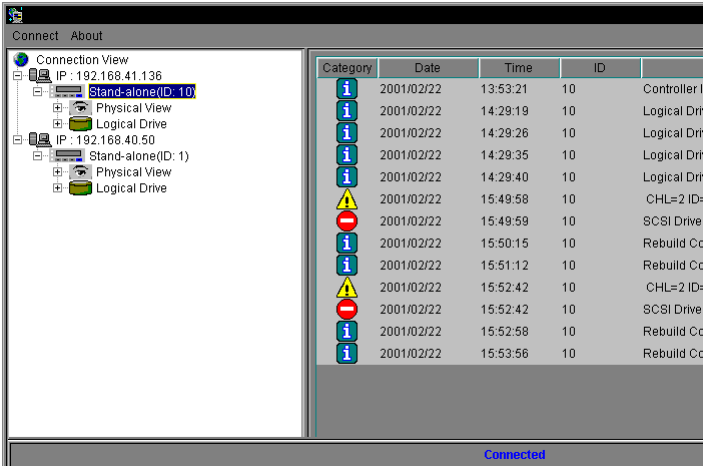
The Connection View window appears.



- 3 Double-click the IP address of the RAID system you want to manage.

- 4 Double-click the controller icon, then double-click the connection method you want.

A list of events (all the events recorded since the Primary Agent was installed) appears in the Content Panel, and Physical View and Logical Drive appear in the Navigation Panel, as shown in the Figure below.



Disconnecting from a RAID System

Click on the RAID system's IP address. In the Connect menu, click **Close**. The host computer with the selected IP address is disconnected.

If the host is a Primary Agent server, it is disconnected from all the RAID systems being managed by it.

Navigating Event Monitor

Event Monitor looks very similar to Spheras RAIDWatch, with a Navigation Panel, a menu bar, and an Event List (which appears in the Content Panel). See [Getting to Know the RAIDWatch Windows on page 4-8](#) for an overview.

Using the Connect Menu

The Connect menu has four options:

- **Open**—Connects to a Primary Agent server. (See [Connecting to a RAID System on page A-6.](#))
- **Close**—Terminates the connection to a Primary Agent server. (See [Disconnecting from a RAID System on page A-7.](#))
- **RAIDWatch**—Starts RAIDWatch. Use this option when you want to configure the RAID system you're connected to.
- **Exit**—Ends the current Event Monitor session.

Getting to Know the Event Monitor Windows

RAIDWatch has two *views* or windows of information:

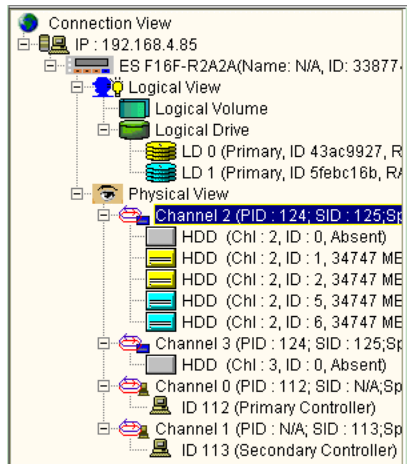
- Connection View (see [page A-8](#)).
- Event List (see [page A-9](#)).

About the Connection View

The Connection View window (shown at right) provides real-time system status to help you monitor your RAID systems. In the Connection View, the logical and physical elements are grouped with the controller that manages them. Event Monitor uses unique colors and icons to represent component status.

Component status is reflected in the Event List and the Navigation Panel simultaneously. In the

Navigation Panel, failures are reported with a red X on the icon of the failed device.



About the Event List

The Event List (shown below) displays all the event messages recorded since the Primary Agent was installed.

Category	Date	Time	ID	Description
	2003/07/10	14:59:21	3387746	Controller Init Complete
	2003/07/10	14:59:21	3387746	Unknown Events(0)
	2003/07/10	14:59:23	3387746	I2C Power Supply 1 General Failure Detected
	2003/07/10	14:59:49	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/10	14:59:52	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/10	14:59:52	3387746	LD Init. Commenced(On-Line Init. Operation Started.)
	2003/07/10	14:59:55	3387746	LD Init. Complete(On-Line Init. Operation Complete Ok)
	2003/07/10	15:10:41	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/10	15:10:42	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/10	15:10:42	3387746	LD Init. Commenced(On-Line Init. Operation Started.)
	2003/07/10	15:10:43	3387746	LD Init. Complete(On-Line Init. Operation Complete Ok)
	2003/07/10	15:34:59	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/10	15:34:59	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/10	15:35:31	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/10	15:35:31	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/10	15:49:26	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/10	15:49:27	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/10	15:49:27	3387746	LD Init. Commenced(On-Line Init. Operation Started.)
	2003/07/10	15:49:28	3387746	LD Init. Complete(On-Line Init. Operation Complete Ok)
	2003/07/11	11:07:35	3387746	LD Init. Commenced(Creation Operation Started.)
	2003/07/11	11:07:37	3387746	LD Init. Complete(Creation Operation Complete Ok)
	2003/07/11	11:07:37	3387746	LD Init. Commenced(On-Line Init. Operation Started.)
	2003/07/11	11:07:38	3387746	LD Init. Complete(On-Line Init. Operation Complete Ok)

You can sort events by clicking the header buttons along the top of the Event List. You can also sort events by using the Event List drop-down menus (shown below) at the bottom of the Event List window.

Category Interval

From To

- Select from the Category drop-down menu to display different event types, including Notification, Warning, or Critical. Events are listed in an ascending order.
- Select from the Interval drop-down menu to limit the events by date and time of occurrence. You also can set a time-frame for event occurrence by using the From and To drop-down menus.

To compare system events between two controllers, press and hold the **Ctrl** key and select both controllers. Events from both RAID systems are listed in ascending order.

Understanding Event Severity Levels

Event Monitor classifies RAID system events into three severity levels:

- **Level 1**—Noncritical information events such as initialization of the controller.
- **Level 2**—Events which require warning messages, such as drive bad block reassignment.
- **Level 3**—Most serious events, including component failures that require immediate attention.

Exiting Event Monitor

When you exit Event Monitor, you terminate the current management session with the RAID system.

- Select **Connect**, then select **Exit**, or
- Click the **Close** button on the program window.

To exit Event Monitor if you are connected through a Web browser:

- Select **Connect**, then select **Exit** (recommended), or
- Exit the browser application, or
- Change the browser HTTP address to a URL or IP other than that of a RAIDWatch Primary Agent.

B

Configuring the RAID Controller Using Terminal Emulation Software

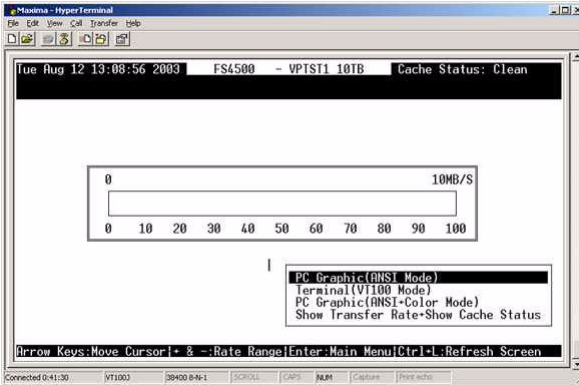
In this Appendix.

<i>Communication Parameters</i>	B-2
<i>Navigating the Terminal Emulation Software</i>	B-2
<i>Initial Screen</i>	B-2
<i>Creating a Logical Drive</i>	B-3
<i>Terminal Emulation Software Menu Options</i>	B-3

This appendix explains how to use terminal emulation software to create a logical drive. It also introduces the text menu options used when configuring the RAID controller in FS4500 Storage Enclosures using terminal emulation software.

Communication Parameters

- 38,400 baud
- 8 data bits
- No parity
- One stop bit
- No flow control



Navigating the Terminal Emulation Software

- **Arrow keys**—Move to options.
- **<Enter>**—Move to a submenu or execute a function.
- **<Esc>**—Move back to a higher level menu.
- **<Ctrl+L>**—Refresh the screen.
- **Ctrl+W**—Switch to secondary controller. (Cable must be in the primary controller RS-232 port.)

Shortcut keys shown in **bold** on-screen can also be used for navigation. For example, L is the shortcut key to open the **View and Edit Logical Drives** menu.

Initial Screen

Use **<Ctrl-L>** to refresh, if necessary. Select the appropriate terminal emulation mode or display the data transfer rates.

Creating a Logical Drive

This section describes the steps necessary to create a logical drive that is visible to the operating system.

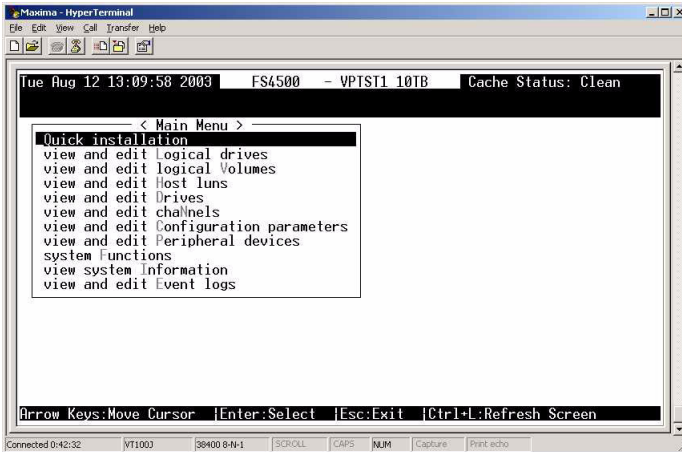
To create a logical drive:

- 1 Create a logical drive using the **View and Edit Logical Drives** menu (see [page B-5](#)). Enter the parameters when prompted.
- 2 Map the Host LUN using the **View and Edit Host LUNs** menu (see [page B-6](#)).

When you are finished, the logical drive should be available to the operating system, and file systems can be prepared for it using the appropriate utilities.

Terminal Emulation Software Menu Options

The remainder of this appendix outlines the menu options available on the terminal emulation software.

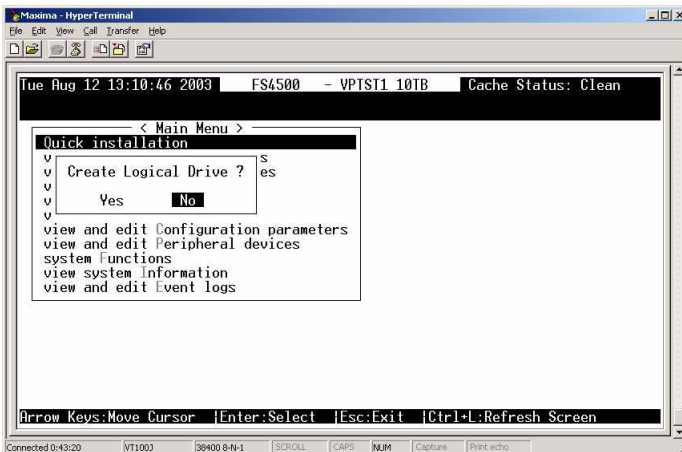


See the referenced page numbers for more information on any menu item:

- Quick installation (see [page B-4](#))
- View and edit logical drives (see [page B-5](#))
- View and edit logical volumes (see [page B-5](#))
- View and edit host LUNs (see [page B-6](#))
- View and edit drives (see [page B-7](#))
- View and edit channels (see [page B-8](#))
- View and edit configuration parameters (see [page B-9](#))
- View and edit peripheral devices (see [page B-11](#))
- System functions (see [page B-11](#))
- View system information (see [page B-12](#))
- View and edit event logs (see [page B-12](#))

Quick Installation Option

This option creates a logical drive with minimal user input. It prompts for the RAID level, and in a single shelf uses all the drives and assigns a LUN number of 0 to the logical drive.



View and Edit Logical Drives Option

This option displays the Volume Information list, if a valid volume is selected. If no valid volume is selected then the menu prompts you to create one.

Submenu options:

- **View drives**—Shows the drives that are associated with the logical volume that was selected.
- **Delete logical drive**—Deletes the selected logical drive.
- **Partition logical drive**—Permits the logical drive to be partitioned into smaller volumes, which will appear as LUNs to the system.
- **Logical drive name**—Assigns a name to the logical volume.
- **Logical drive assignments**—Lets logical drives be assigned to the alternate (for instance, from Primary to Secondary.)
- **Expand logical drive**—If free capacity is available, the drive can be expanded.
- **Add drives**—If physical drives are available they can be added to increase the overall capacity of the logical drive.
- **Regenerate parity**—Includes Execute Regenerate Logical Drive Parity, Overwrite Inconsistency Parity (Enabled), and Generate Check Parity Event (Enabled) options.
- **Copy and replace drive**—Presents a list of physical drives associated with the logical drives and allows the user to select a drive for copying.
- **Media scan**—Includes Media Scan Priority (Normal) and Iteration Count (Single Time) options.
- **Write policy**—This option permits the caching to policy to be set as Write-Back, Write Through, or Default for the selected logical drive.

View and Edit Logical Volumes Option

A *logical volume* is a grouping of logical drives.

This option displays the Volume Information list, if a valid volume is selected. If no valid volume is selected, it prompts you to create one.

View and Edit Host LUNs

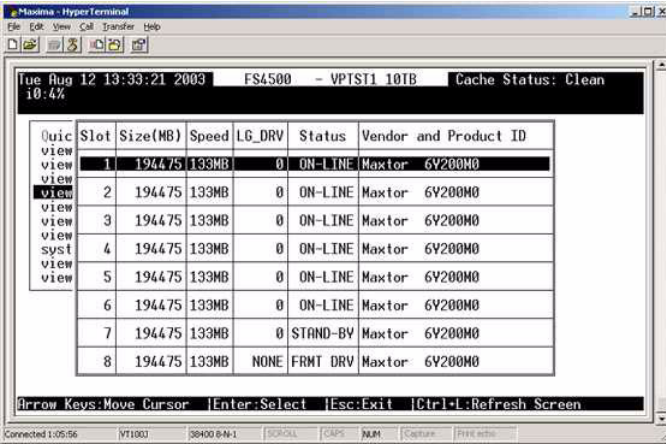
Submenu options:

- CHL 0 ID *xxx* (Primary Controller)
LUN# LV/LD (Type) DRV# Partition# Size (MB) RAID (Level)
- CHL 0 ID *xxx* (Secondary Controller)
LUN# LV/LD (Type) DRV# Partition# Size (MB) RAID (Level)
- CHL 1 ID *xxx* (Primary Controller)
LUN# LV/LD (Type) DRV# Partition# Size (MB) RAID (Level)
- CHL 1 ID *xxx* (Secondary Controller)
LUN# LV/LD (Type) DRV# Partition# Size (MB) RAID (Level)

If no logical drives or volumes are assigned, the submenu changes from an information line to:

- CHL *Y* ID *xxx* (*Z* Controller)
Logical Drive
Logical Volume
- Edit Host-ID/WWN Name List
No Host-ID/WWN Name List – Create Name List ? (If not set)

View and Edit Drives (Select Drive) Option



Submenu options:

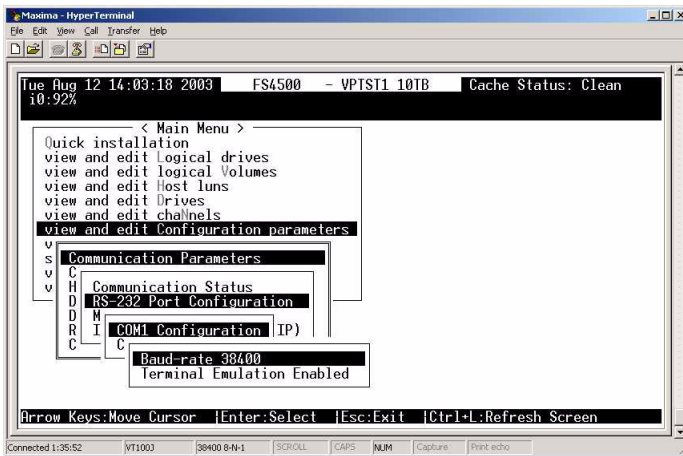
- Revision number
- Serial number
- Disk capacity (blocks)
- Disk reserved space

View and Edit Channels (Select Channel) Option

Submenu Options:

- **Host**
 - View and edit scsi Id
 - View chip information
 - View channel host-id/Wwn
 - View device port name list (wwpn)
 - Data rate
 - Issue lip
- **RCCOM**
 - View chip information
 - Data rate
- **Drive/Serial**
 - Primary controller scsi id
 - Secondary controller scsi id
 - View chip information
 - Data rate
 - Issue lip
- **Drive/SATA**
 - Primary controller scsi id
 - Secondary controller scsi id
 - View chip information
 - Data rate

View and Edit Configuration Parameters Option



Submenu Options:

■ Communication Parameters

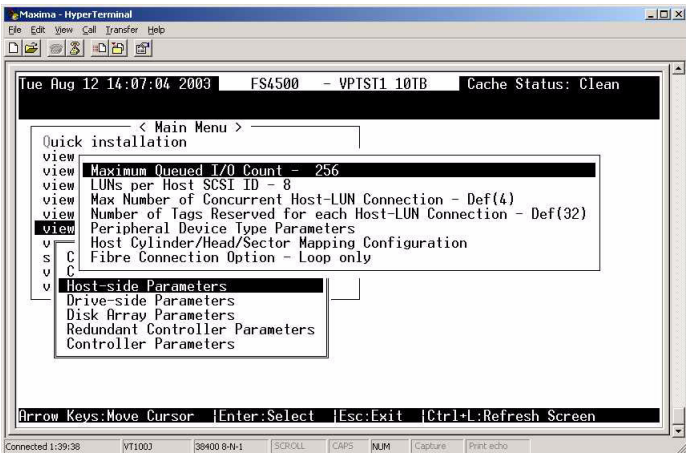
- Communication Status
- RS-232 Port Configuration
 - COM1 Configuration
 - Baud Rate 38400 (Use this option to change the baud rate)
 - Terminal Emulation Enabled (Leave this option enabled)

■ Modem Operation

This option allows various modem parameters to be configured.

- Modem Functions
- Modem Setup
 - Configure Modem Port
 - Modem Operating Modes
 - Modem Initialization
 - Dial out Function

- Internet Protocol (TCP/IP)
Displays MAC information and DHCP status. (Select to change)
 - View Statistics
 - Set IP Address
- Caching Parameters
 - Write-Back Cache Enabled
 - Optimization for Sequential I/O. (This option toggles between Random and Sequential)
- Host-side Parameters



- Maximum Queued I/O Count – 256
- LUNs per SCSI ID - 8
- Max Number of Concurrent Host-LUN Connection – Def (4)
- Number of Tags Reserved for each Host – LUN Connection – Def (32)
- Peripheral Device Type Parameters
- Host/Cylinder/Head/Sector Mapping Configuration
- Fibre Connection Option – Loop Only

- **Drive-side Parameters**
 - Disk Array Parameters
 - Redundant Controller Parameters
 - Controller Parameters

View and Edit Peripheral Devices Option

Submenu options:

- **View Peripheral Device Status**
- **Set Peripheral Device Entry**
- **Adjust LCD Contrast Device Configuration**
- **Controller Peripheral**

System Functions Option

Submenu options:

- **Mute beeper**
- **Change password**
- **Reset controller**
- **Shutdown controller**
- **Controller maintenance**
 - Download Firmware
 - Advanced Maintenance Functions
 - Save nvram to disks
 - Restore nvram from disks

View System Information Option

Submenu options:

- **CPU Type**
- **Total Cache Size**
- **Firmware Version**
- **Bootrecord Version**
- **FW Upgradability**
- **Serial Number**
- **Battery Backup Unit**
- **Base Board Rev. ID**
- **Base Board ID**
- **ID of NVRAM Defaults**
- **Controller Position**

View and Edit Event Logs Option

This option permits viewing of event activity within the controller.



Command Summary

In this Appendix






<i>RAIDWatch File Menu Commands</i>	C-2
<i>RAIDWatch Open Menu Commands</i>	C-2
<i>RAIDWatch View Menu Commands</i>	C-3
<i>RAIDWatch Help Menu Commands</i>	C-3
<i>Event Monitor Connect Menu Commands</i>	C-3
<i>Event Monitor About Menu Commands</i>	C-4

This appendix describes the commands available in RAIDWatch. These commands are presented as part of menus and as command buttons (if available) on the toolbar. Keyboard shortcuts are also included, and are shown inside angle brackets.


RAIDWatch File Menu Commands

Menu Item	Keyboard Shortcut	Toolbar Button	Description
Connect	<C>		Connects RAIDWatch to a particular RAID system.
Disconnect	<D>		Disconnects from the current RAID system, terminating the current management session with the device but not exiting RAIDWatch.
Agent	<A>		Opens the Connect to RAID Agent dialog box.
Exit	<X>		Closes RAIDWatch.

RAIDWatch Open Menu Commands

Menu Item	Keyboard Shortcut	Toolbar Button	Description
Enclosure	<E>		Opens the Enclosure window.
RAID View	<R>		Displays the main RAID View window.
Event Log	<L>	 and 	Opens the Event Log window.
Statistics	<S>		Accesses the two statistics display commands (Cache Hits and Disk R/W).
Cache Hits	<S> <C>	Cache Hits button	Opens the Cache Hits statistics window.
Disk R/W	<S> <D>	Disk R/W button	Opens the Disk Read/Write statistics window.

RAIDWatch View Menu Commands

Menu Item	Keyboard Shortcut	Toolbar Button	Description
Tile In-Window	<W>		This command arranges currently open windows so that they are all visible and occupy an equal part of the RAIDWatch application window.

RAIDWatch Help Menu Commands

Menu Item	Keyboard Shortcut	Description
Contents	<C>	Opens RAIDWatch on-line help.
About	<A>	Displays information about RAIDWatch.

Event Monitor Connect Menu Commands

Menu Item	Keyboard Shortcut	Description
Open	<O>	Connects Event Monitor to a specific RAID system.
Close	<C>	Disconnects Event Monitor from a specific RAID system.
RAIDWatch	<R>	When a RAID system IP address is selected, this command opens the RAIDWatch application.
Exit	<E>	Closes Event Monitor.

Event Monitor About Menu Commands

Menu Item	Keyboard Shortcut	Description
Help	<H>	Opens Event Monitor online help.
About	<A>	Displays information about Event Monitor.

Glossary

Fault Bus

A proprietary enclosure management interface. It is intended to be used to warn RAID managers of enclosure environment component failures.

Fiber

An optical network data transmission cable type which is unrelated to fibre channel (above).

Fibre Channel

A device protocol capable of high data transfer rates. Fibre channel simplifies data bus sharing and supports not only greater speed, but also more devices on the same bus. Fibre channel can be used over both copper wire and optical cable.

Host

A computer, typically a server, which uses a RAID system (internal or external) for data storage.

Host Bus Adapter (HBA)

A device that permits a computer bus to pass data to and receive data from a storage bus (such as SCSI or Fibre Channel).

Host LUN

Host LUN is another term for a LUN.

I²C (Inter-IC)

A type of bus designed by Philips Semiconductors which is used to connect integrated circuits. I²C is a *multi-master bus*, which means that multiple chips can be connected to the same bus and each one can act as a master by initiating a data transfer.

In-Band SCSI

A means whereby RAID management software can use SCSI cabling and protocols to manage a controller. (**Note:** in-band SCSI is typically used in place of RS-232 for controller management.)

JBOD

Just a Bunch of Drives. Non-RAID use of multiple hard disks for data storage.

JRE

Java Runtime Environment, the Solaris Java program used to run .JAR applications locally or over a network or the internet.

Logical Drive

Typically, a group of hard disks logically combined to form a single large storage unit. More broadly, the assignment of an ID to a drive or drives for use in storage management.

Logical Volume

A group of logical drives logically combined to form a single large storage unit. Often abbreviated, "LV."

LUN

Logical Unit Number. A 3-bit identifier used on a bus to distinguish between up to eight devices (logical units) with the same ID.

Mapping

The assignment of a protocol or logical ID to a device for purposes of data storage, data transfer, or device management.

Mirroring

A form of RAID where two or more identical copies of data are kept on separate disks. Used in RAID 1.

NAS

Network Attached Storage. A RAID enclosure that includes a network interface so that the RAID system can be directly connected to a LAN.

NPC

Notification Processing Center. A software application included with RAIDWatch which permits event notification via various methods including e-mail and fax.

NRAID

Non-RAID

Parity

Parity checking is used to detect errors in binary-coded data. The fact that all numbers have parity is commonly used in data communications to ensure the validity of data. This is called parity checking.

Primary Agent

The RAIDWatch module which manages secondary agents and supports both NPC and Spheras RAIDWatch.

RAID

Redundant Array of Independent Disks. The use of two or more disk drives instead of one disk, which provides better disk performance, error recovery, and fault tolerance, and includes interleaved storage techniques and mirroring of important data.

SAF-TE

SCSI Accessed Fault-Tolerant Enclosures. An evolving enclosure monitoring device type used as a simple real-time check on the go/no-go status of enclosure UPS, fans, and other items.

SAN

Storage Area Network. A high-speed subnetwork of shared storage devices. A storage device is a machine that contains nothing but a disk or disks for storing data. A SAN's architecture works in a way that makes all storage devices available to all servers on a LAN or WAN. Because stored data does not reside directly on the network's servers, server power is utilized for applications rather than for data passing.

SCSI

Small Computer Systems Interface (pronounced "scuzzy"). A high-speed interface for mass storage that can connect computer devices such as hard drives, CD-ROM drives, floppy drives, and tape drives. SCSI can connect up to sixteen devices.

Secondary Agent

The RAIDWatch module which manages and monitors a RAID controller and receives Spheras RAIDWatch commands via the primary agent.

SES

SCSI Enclosure Services is a protocol that is used to manage and sense the state of the power supplies, cooling devices, temperature sensors, individual drives, and other non-SCSI elements installed in a FC JBOD enclosure.

S.M.A.R.T.

Self-Monitoring, Analysis and Reporting Technology. An open standard for developing disk drives and software systems that automatically monitor a disk drive's health and report potential problems. Ideally, this should allow users to take proactive actions to prevent impending disk crashes.

Spare

(Local / Global) A drive designation used in RAID systems for drives that are not used, but are instead "hot-ready" and used to automatically replace a failed drive. RAID systems generally support two types of spares, Local and Global. Local spares only replace drives that fail in the same logical drive. Global spares replace any drive in the RAID that fails.

Stripe

A contiguous region of disk space. Stripes may be as small as one sector or may be composed of many contiguous sectors.

Stripe Size

(Also known as *chunk size*.) The smallest block of data read from or written to a physical drive. Modern hardware implementations let users tune this block to the typical access patterns of the most common system applications.

Stripe Width

The number of physical drives used for a stripe. As a rule, the wider the stripe, the better the performance.

Striping

Also called RAID-0. A method of distributing data evenly across all drives in an array by concatenating interleaved stripes from each drive.

Write-back Cache

Many modern disk controllers have several megabytes of cache on board. On-board cache gives the controller greater freedom in scheduling reads and writes to disks attached to the controller. In write-back mode, the controller reports a write operation as complete as soon as the data is in the cache. This sequence improves write performance at the expense of reliability. Power failures or system crashes can result in lost data in the cache, possibly corrupting the file system.

Write-through Cache

The opposite of write-back. When running in Write-through mode, the controller will not report a write as complete until it is written to the disk drives. This sequence reduces read/write performance by forcing the controller to suspend an operation while it satisfies the write request.



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Part Number: MAN-00007-UG LB 02/04