PROMISE
TECHNOLOGY, INC.

PROMISE ARRAY MANAGEMENT (PAM)

USER MANUAL

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Table of Contents

CHAPTER 1: INTRODUCTION 1

PAM COMPONENTS 1
How They Work Together *2*
PAM INSTALLATION OPTIONS 3

CHAPTER 2: INSTALLATION 7

INSTALLATION LOCATIONS 7
Monitoring Utility *7*
Message Server *9*
Message Agent *9*
OPERATING SYSTEM SUPPORT 10
NETWORK REQUIREMENTS 10
INSTALLATION PROCEDURE 11
UltraTrak Users *11*
PAM Installation *11*

CHAPTER 3: INITIAL SETUP 19

Create a New Message Server *20*
Access the Message Agent *22*
UltraTrak Users *22*
Create a New User *24*
Create an Array *25*
Setup Email Alert Notification *29*
Add a User to the Recipient List *30*
Specify Alert Notification Events *31*

CHAPTER 4: PAM USER INTERFACE 33

Tree View *34*
Tree View and Component Specific Menus 34
Object View *35*
Information View *36*
Status Bar *36*
Pulldown Menus *37*
Main 37
View 37
Connection 37
Preference 38

Help 39
Toolbar *40*
Popup Menus *42*
MyConsole Icon 42
Message Server Icon 42
Message Agent Icon 43
Device Icon 43
Controller Icon 43
Channel Icon 43
Disk Icon 44
Enclosure Icon 44
Array Icon 44
Users Icon 45
User Icon 45

CHAPTER 5: RAID MONITORING AND MAINTENANCE WITH PAM 47

Message Server *47*
Create a New Message Server 47
Delete a Message Server 49
Disconnect a Message Server Logout of RAID Server 49
Reconnect a Message Server 49
Message Server Address Change 50
Message Agent *51*
Login / User Name and Password 51
Create a New User 51
Delete a User 53
Assign User Rights 53
Object Icons 53
Alert Notification 54
Add a User to the Recipient List 55
Delete a User from the Recipient List 56
Specify Alert Notification Events 57
Device *57*
Controller *59*
Memory Buffer Events 59
Controller Options 60
Arrays *64*
Create a New Array 64
Scheduled Array Synchronization 67
On-Demand Array Synchronization 67
Rebuild an Array 68

Object View 71
Array Options 71

APPENDIX 74

IP ADDRESS 74
Windows XP *74*
Earlier Windows Systems *75*
DHCP ISSUES 76
OPERATING SYSTEM SUPPORT 77

Chapter 1: Introduction

Promise Array Management (PAM) is a utility application designed specifically for monitoring and managing Promise Technology RAID products. PAM runs over a local area network and makes possible RAID monitoring and management from any computer on the network and even over Internet. This allows your IT manager to watch your RAIDs and take care of them over the network.

PAM Components

There are three components to PAM. Depending on your installation, all three may be on the same workstation or work separately across your network:

Monitoring Utility ? The Monitoring Utility is a Graphic User Interface (GUI) that reports on the condition of the RAID array. It receives and displays reports on RAID condition and operation through the Message Server. The Monitoring Utility works on any PC with a TCP/IP network connection to your RAID.

When installed on the computer that operates the RAID, the Monitoring Utility also provides a complete set of RAID management tools.

Message Server ? The Message Server is the link connecting a PC with the Monitoring Utility. Normally, the Message Server runs on a network file server. But it can also run on the PC controlling the RAID.

Message Agent ? The Message Agent runs on the PC that controls the RAID. It directly monitors the RAID and sends messages through the Message Server to all PCs running the Monitoring Utility.

How They Work Together

The Promise Array Management (PAM) utility provides an easy way to set up, monitor, modify and repair your RAID. PAM works with the Promise FastTrak card, SuperTrak card and UltraTrak RAID subsystem.

PAM watches the RAID and when significant events happen, or it discovers a problem, the Message Agent sends a warning to the Message Server. The Message Server passes the warning along to all PCs running the Monitoring Utility.

Warnings appear on the PC in the form of email messages and popup alerts. You can select either one or both. You can also select which events and problems PAM will report.

A major benefit of PAM is that it runs over a TCP/IP network. This enables remote monitoring of your RAIDs, including offsite monitoring over an Internet connection.

Once you become aware of a problem, go to the RAID PC to take corrective action. If you have more than one RAID PC on your network, PAM will indicate which one has the problem.

PAM allows only monitoring access through the network. Management access occurs only at the RAID PC.

PAM Installation Options

Following are some examples of ways you can incorporate PAM into your network and RAID systems.

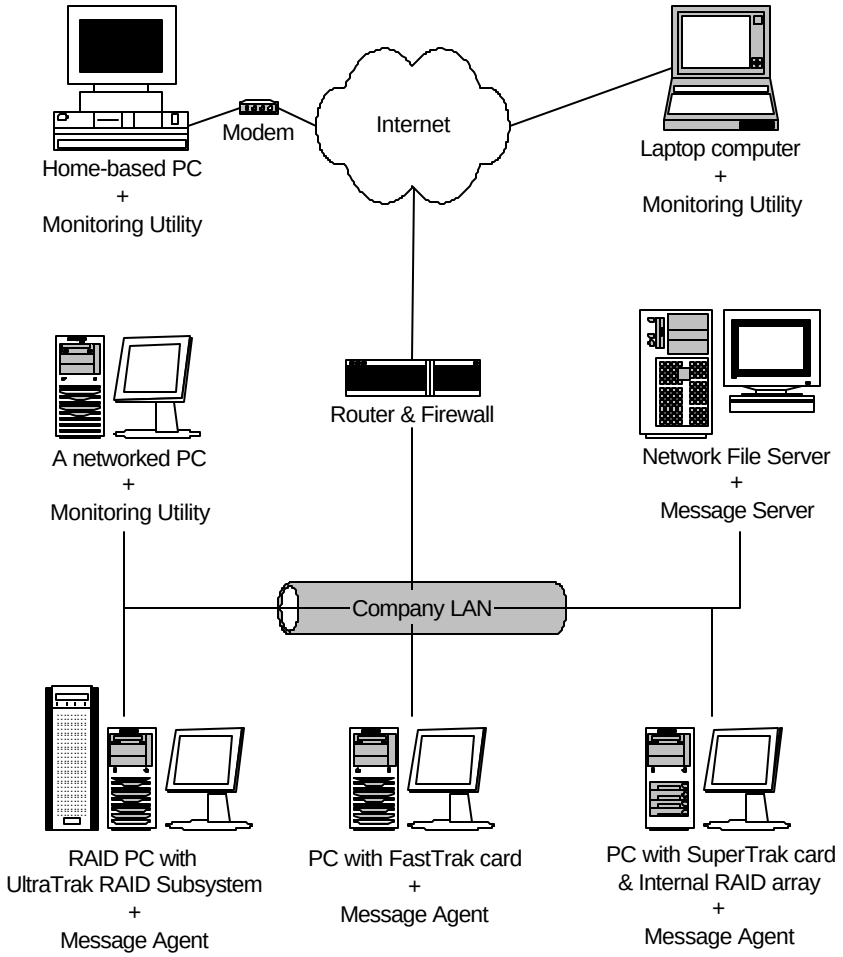


Figure 1-1. LAN and Internet connections.

In the example on the facing page, there are three Promise RAID products connected to the company's LAN. The PAM Message Agent runs on each of the PCs controlling the RAIDs. The PAM Message Server runs on the

company's file server. The PAM Monitoring Utility runs on networked PCs and also on remote PCs connecting to the company network through the Internet. With this arrangement, you can monitor RAID condition and activity from offsite, such as a hotel room or home office.

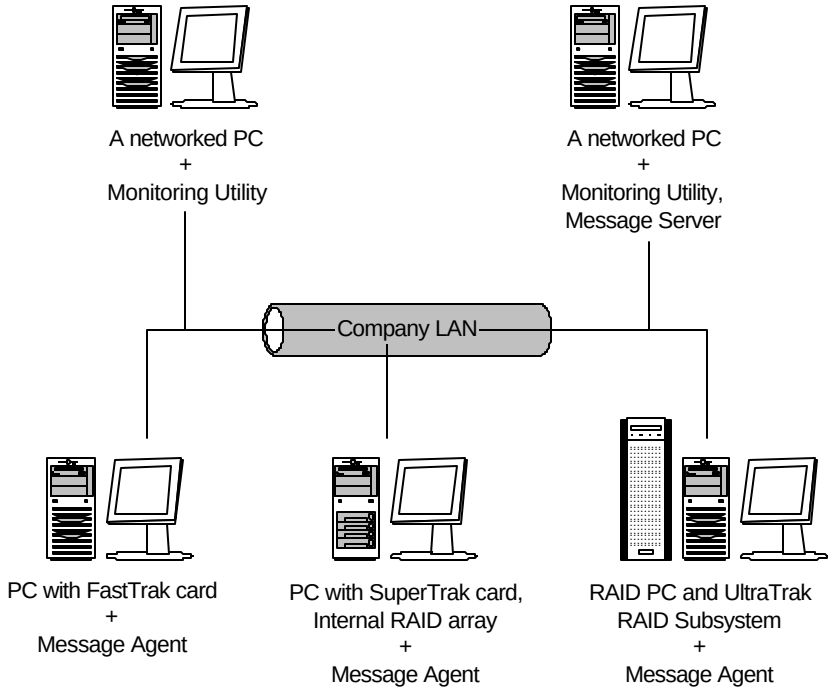
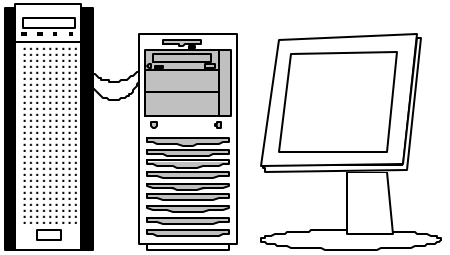


Figure 1-2. Company LAN without a File Server

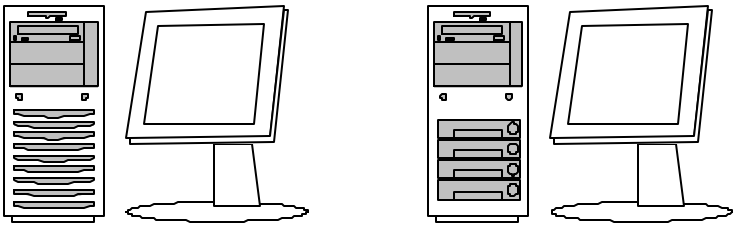
In the above example, there are three Promise RAID products connected to the company's LAN, the same as before. But this network has no file server, so the PAM Message Server runs on one of the networked PCs. PAM Monitoring Utility runs on both networked PCs. If this LAN were upgraded with a suitable router and an Internet connection, you could set up offsite monitoring as in Figure 1-1.



RAID PC with an
UltraTrak RAID Subystem
+
Monitoring Utility,
Message Server,
Message Agent

Figure 1-3. Locally managed RAID.

Not all PAM installations will involve a network. In the figure above, the PC controlling the RAID has no network connection. For this arrangement, all three PAM components are installed on the PC itself.



PC with FastTrak card
+
Monitoring Utility,
Message Server,
Message Agent

PC with SuperTrak card
& Internal RAID array
+
Monitoring Utility,
Message Server,
Message Agent

Figure 1-4. PCs with Internal RAID.

Promise's FastTrak and SuperTrak cards are designed to setup and control a RAID within the PC's enclosure. They have the same need of monitoring and management as an external RAID subsystem. All three PAM components run on the PC itself.

Chapter 2: Installation

To install Promise Array Management (PAM) is an uncomplicated procedure, once you understand your systems and how you want to use PAM. The purpose of this Chapter is to help you plan and carry out your installation of PAM.

By way of review, PAM consists of three components:

- Monitoring Utility
- Message Server
- Message Agent

These were described in the previous chapter. Before proceeding with the installation, you must know which component goes where. If you plan to run PAM over a network, you must know the IP addresses of each computer on the network that will be involved in your RAID monitoring and management activity.

Installation Locations

In the table below, possible locations for each of the three PAM components.

	Monitoring Utility	Message Server	Message Agent
Internet-connected PC	•		
Network PC	•	•	
Network File Server	•	•	
RAID PC	•	•	•

Table 2-1. Acceptable PAM Component Installation Locations.

Monitoring Utility

The Monitoring Utility installs on any computer you will use to monitor and manage the RAIDs.

If your RAID runs without a network connection, install it on the RAID PC with the rest of the PAM components.

If your RAIDs are networked, you can install the Monitoring Utility on any computer connected to the network.

If your company has networked RAIDs and Internet access, you may choose to install the Monitoring Utility on a laptop or home-based PC for dial-in remote access.

Limit your installation to the computers of RAID users and your IT administrator. PAM features password protection to further limit access and provide security of your data.

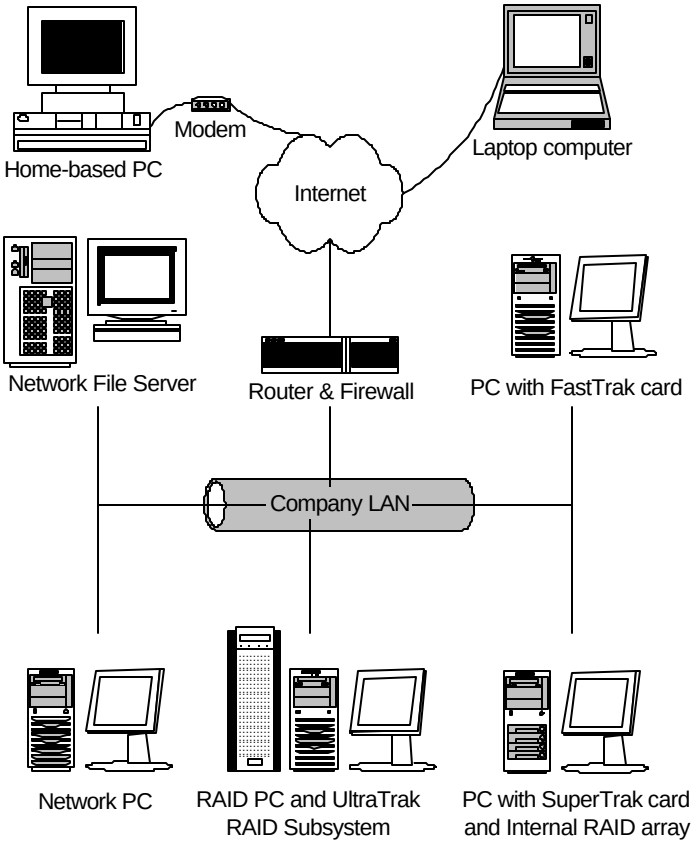


Figure 2-1. Networked RAID has many installation options.

Message Server

The Message Server installs onto the RAID PC if your installation does not involve a network.

If you want run PAM over a network, install the Message Server on one of your networked computers including a file server, a networked PC or the RAID PC.

Only one installation of the Message Server is required for PAM to work over a network. You may install Message Server on more than one network PC or file server, but PAM's network configuration will only use one of them, thus any additional installations are not necessary.

Do not install the Message Server on any PC that may be disconnected from the network, such as a laptop or a computer that connects via the Internet. Not only will a disconnect cause PAM to fail, but reconnecting again may involve time-consuming network configuration.

Network configuration is discussed later in this chapter.

Note: Refer to Table 2-2 for acceptable operating systems.

Message Agent

The Message Agent installs on the RAID PC, whether your RAID is networked or not. In order for PAM to monitor and manage a RAID, it must have Message Agent installed.

If you have more than one PAM-compatible RAID PC on your network, you may install a copy of Message Agent on all of them.

Note: Refer to Table 2-2 for acceptable operating systems.

Operating System Support

PAM is a utility designed to run on top of previously installed Promise controller card and RAID products. Generally, if your PC runs the Promise card or RAID properly, it will run PAM also.

Promise Technology recommends Windows NT 4.0, 2000 and XP Professional to take full advantage of all the features of PAM. In some cases, you can run PAM on other Windows operating systems. This becomes an issue when running PAM over a network where there are PCs with different operating systems.

The table below shows which versions of Windows work with specific Promise products and PAM components.

Windows versions	Monitoring Utility	Message Server / Message Agent		
	All	FastTrak	SuperTrak	UltraTrak
98	•	•		•
ME	•	•		•
NT 4.0	•	•	•	•
2000	•	•	•	•
Windows XP	•	•	•	•

Table 2-2. Operating system support.

Network Requirements

If you plan to install PAM on a network be sure all the hosts and servers are connected and running. That is, each of the PCs, RAIDs and Servers must have a working network connection before you install PAM.

In order for PAM to be configured over a network, you must know the IP (network) address of the RAID PC(s) in your system. The Message Server uses IP addresses to communicate with the Message Agent on the RAID PCs and the Monitoring Utility on the network PCs.

See the Appendix for help in finding the IP Address of the RAID PC.

Installation Procedure

Before you start…

If you are installing PAM to run over a network, determine the computers and servers onto which you will install PAM. Obtain the IP addresses of all RAID PCs where PAM will be installed.

UltraTrak Users

The UltraTrak is an external enclosure and must be online during PAM installation. Follow these steps before you install PAM:

1. With your UltraTrak powered down, attach a null modem cable to the UltraTrak serial port connector and one of the COM ports on your RAID PC.

   PAM will automatically detect the UltraTrak during installation.

2. Power up the UltraTrak and wait for it to boot completely.
3. Proceed with the PAM installation.

PC with FastTrak card | PC with SuperTrak card, Internal RAID array | PC with UltraTrak RAID Subsystem

Figure 2-2. Three examples of RAID PCs.

PAM Installation

With that information ready, follow these steps to install PAM on each computer or server:

1. Boot the PC/server and launch Windows.

   If the computer is already running, exit all programs.

2. Within Windows, go to Start > Run.

3. In the RUN dialog box, type in the location of the PAM Setup file (ex. - D:\Utility\PAMSetup) and press [Enter]. The opening screen appears. See below.

Figure 2-3. PAM Setup Opening Screen.

4. RAID PC

   If you are installing PAM onto the RAID PC, that is a PC with a FastTrak or SuperTrak card or an UltraTrak RAID subsystem, select that product from the dropdown menu.

   Click Next or press [Enter] to continue. The Setup Summary dialog box appears.

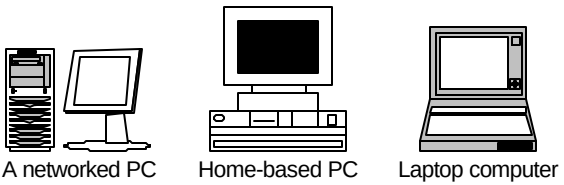


Figure 2-4. Some examples of networkable PCs.

File Server or Networked PC

a. If you are installing PAM onto a file server or PC that does NOT have a FastTrak or SuperTrak card or an UltraTrak RAID subsystem, select *Customize* from the dropdown menu.

   Click Next or press [Enter] to continue. The Customize Setup dialog box appears.

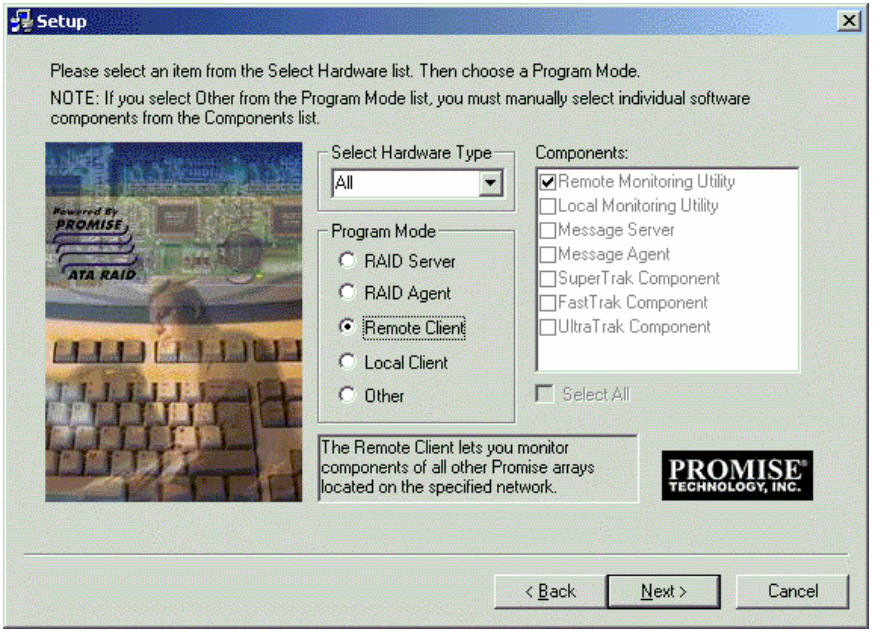


Figure 2-5. The Customize Setup dialog box.

b. In the Customize Setup dialog box, make the selections appropriate for the computer on which you are installing software.

   - If this is a File Server, select the RAID Server radio button.
   - If this is a Networked PC, home-based PC or a laptop, select the Remote Client radio button.

Click Next or press [Enter] to continue. The Setup Summary dialog box appears.

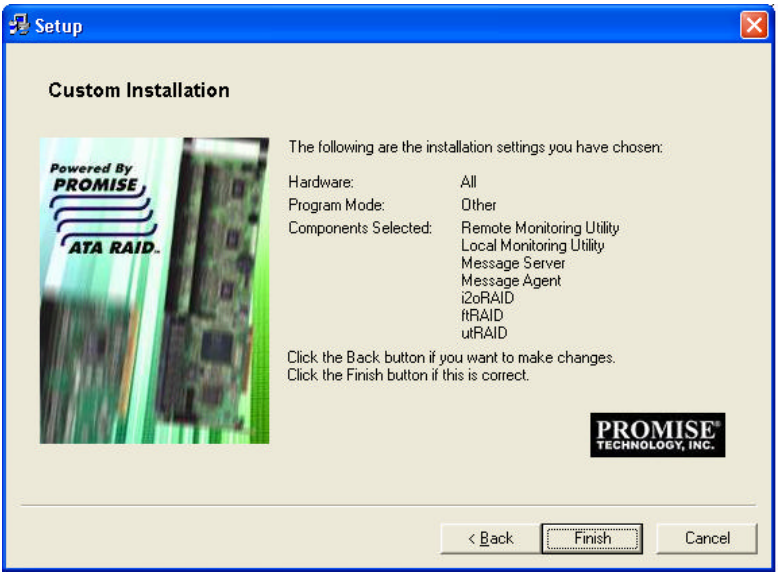


Figure 2-6.The Setup Summary dialog box.

5. In the Setup Summary dialog box, click the Finish button or press [Enter] to continue.

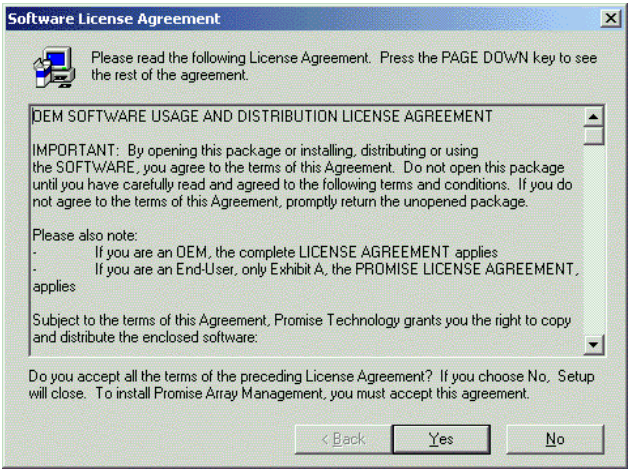


Figure 2-8. The License Agreement.

6. When the License Agreement appears, click the Yes button to agree to the terms and continue the installation. If you click No, PAM Setup will exit.

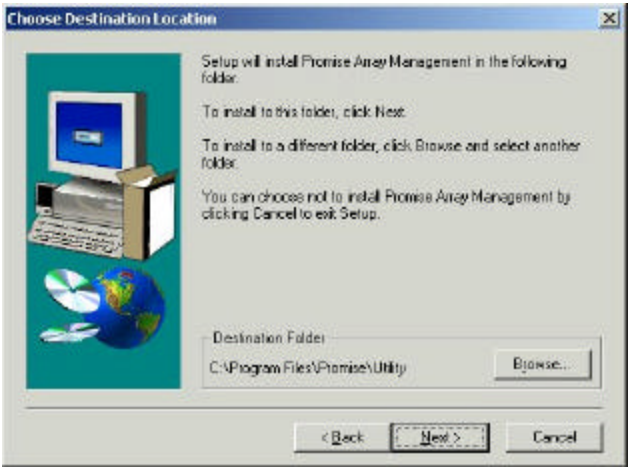


Figure 2-9. Choose Destination dialog box.

7. When the Choose Destination dialog box appears, click the Browse button to specify a destination folder other than the default. When you are satisfied with the folder location, click Next or press [Enter].

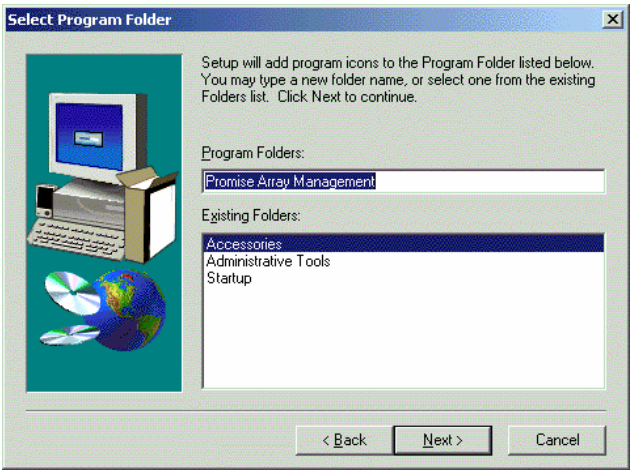


Figure 2-10. Select Program Folder dialog box.

8. The Select Program Folder dialog box adds the PAM Remote Monitoring Utility in your Windows Start menu. When it appears, you may accept this folder name or change it. When you are satisfied with the folder name, click Next or press [Enter].

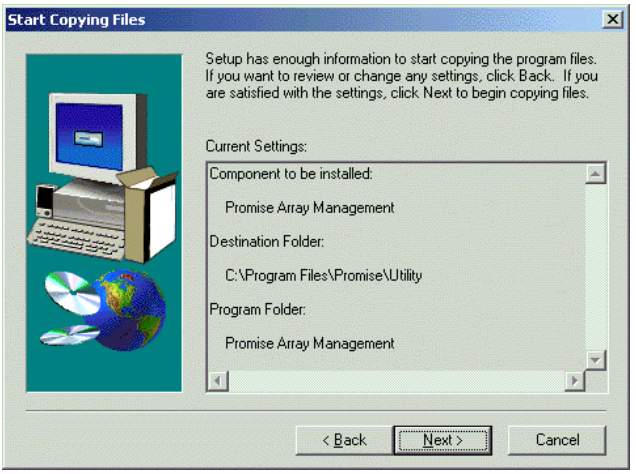


Figure 2-11. Start Copying Files dialog box.

9. When the Start Copying Files dialog box appears review the selection of application (Promise Array Management) and its destination. If you want to make a change, click the Back button. Otherwise, click Next or press [Enter] to continue with the installation.

   If you are only installing the Message Server, skip to Step 12.

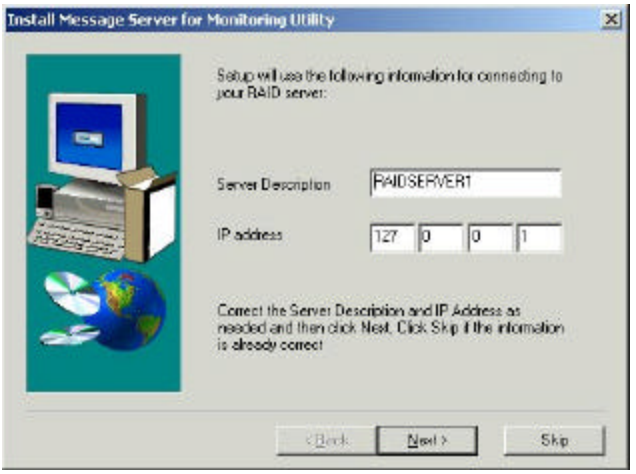


Figure 2-12. Install Message Server dialog box.

10. When the Install Message Server dialog box appears, type in the IP address of the RAID PC that is a PC with a FastTrak or SuperTrak card or an UltraTrak RAID subsystem. Click Next or press [Enter] to continue.

    Note: If you are only installing the Message Server, this dialog box does not appear.

Figure 2-13. Add User Account dialog box.

11. When the Add User Account dialog box appears, you may accept the default name or enter a new one in the Name field. Enter your password in the Password and Confirm Password fields. When you are done, click Next or press [Enter] to continue.

    Note: If you are only installing the Message Server, this dialog box does not appear.

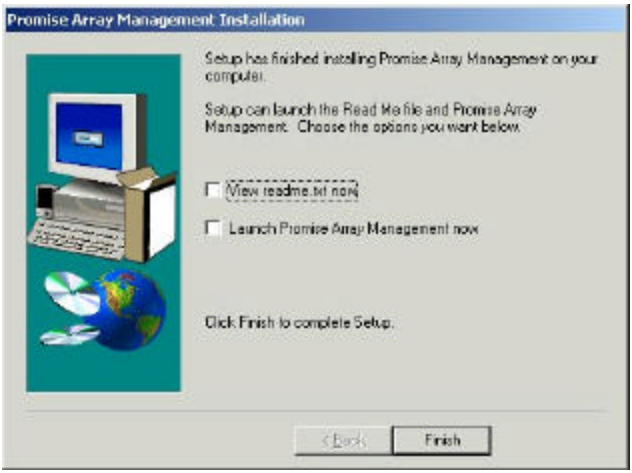


Figure 2-14. The PAM Installation dialog box.

12. When the PAM Installation dialog box appears, the installation is complete.

    Check one or both boxes to see the latest ReadMe file and launch PAM. When you are done, click Finish or press [Enter].

    Note: If you are only installing the Message Server, the option to launch PAM now does not appear.

This completes the PAM installation. Go on to Chapter 3, Initial Setup.

Chapter 3: Initial Setup

After you have completed installation, you must setup your PAM Monitoring Utility to work with your RAID.

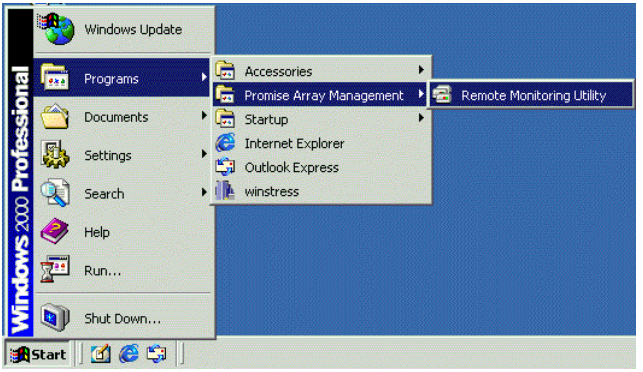


Figure 3-1. PAM in the Start Menu.

In the Windows Start Menu, launch the PAM Monitoring Utility. The opening screen appears.

Note: If you only installed the Message Server, this shortcut does not appear. The Message Server works only through network connections and has no user interface. Go to the RAID PC or a Networked PC to setup PAM.

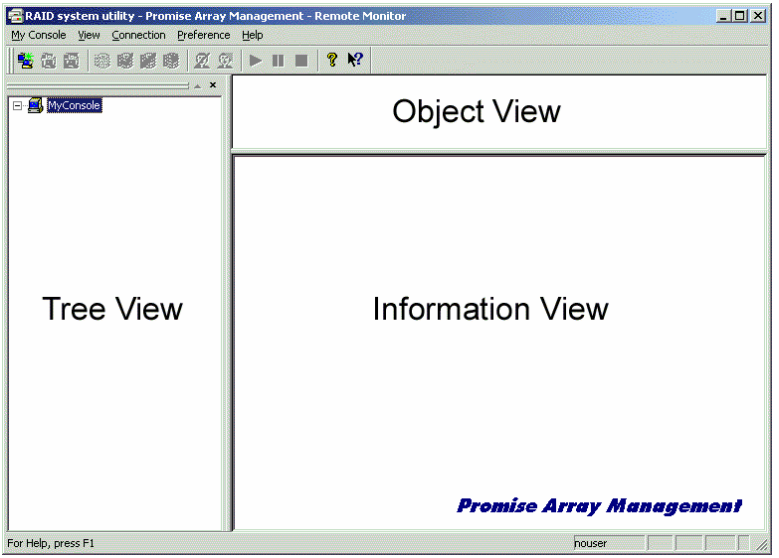


Figure 3-2. The PAM Monitor window has three views.

The Monitor window is the user interface for PAM. It has three views:

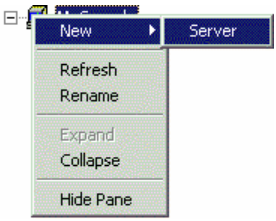
Tree View ? Displays the elements of your RAID system. It works like Windows Explorer with hierarchical menus. You can expand individual items to see their components.

Object View ? Displays icons representing the devices below the highlighted device in the Tree View.

Information View ? Displays information on the item highlighted in the Tree View. This may include text boxes, list boxes, fields and buttons. It varies with the item selected.

Create a New Message Server

The Message Server relays data and commands between the Monitoring Utility on this computer and the Message Agent on the RAID PC.



1. To select the MyConsole icon in the Tree View, right-click on it.

2. Select New > Server from the popup menu (right). This action adds a new server RAIDSERVER1 icon (see Figure 3-3).

3. Click on the new server icon to select it. The Information window displays fields to add a Label and IP Address.

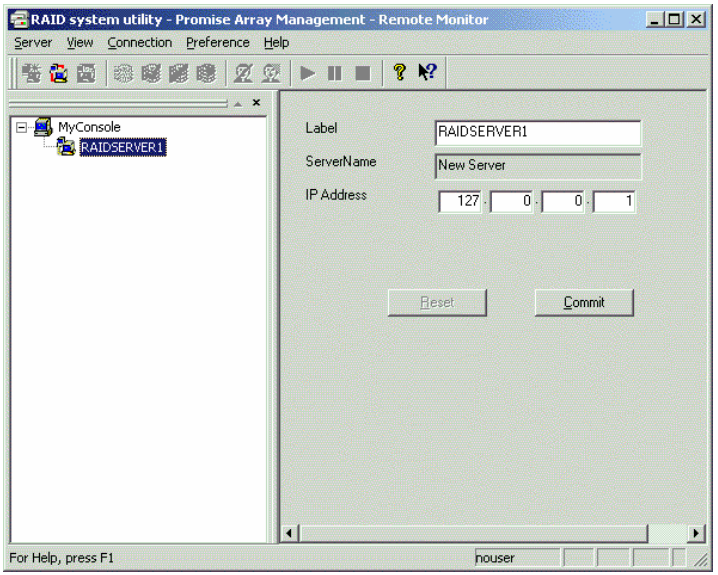


Figure 3-3. The RAID Server's Label and IP Address.

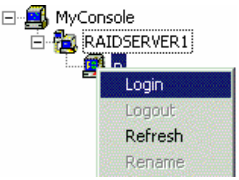
Note: The IP Address shown above: 127.0.0.1, means that this computer is equipped with a FastTrak or SuperTrak card, or the UltraTrak subsystem.

If you are performing this procedure on a networked PC, input the actual IP Address of the RAID PC in this field.

4. Click the Commit button. PAM connects the Message Server and creates a new Message Agent icon .

Access the Message Agent

The Message Agent resides on the RAID PC and sends the monitoring data to the Message Server and on to the Monitoring Utility.



1. In the Tree View, right-click on the Message Agent icon and select Login from the popup menu (right).

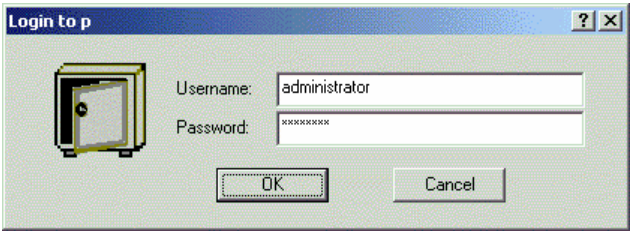


Figure 3-4. The Message Agent login dialog box.

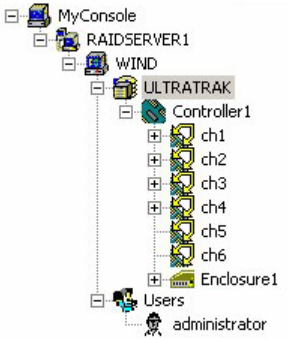
2. In the Message Agent login dialog box, type in the Username and Password in their respective fields.

   Note: Contact your IT Administrator if you don't know this information.

3. Click OK to access the Message Agent.

UltraTrak Users

These instructions pertain to the RAID PC connected to the UltraTrak subsystem. You must successfully complete this connection before any remote monitoring connections will function.



1. When you log into the Message Agent, you should see the UltraTrak icon and the Controller icon below it in Tree View (right). If you do, your connection is correct.

   If you set up your UltraTrak with an array before installing PAM on your PC, you will also see the array and drives.

If you do NOT see the Controller icon below UltraTrak icon (right), click on the UltraTrak icon to select it.

2. In Information View, click the Connect button (See Figure 3-5). The Status should change to Connected.
3. If the Status remains Disconnected, double check your UltraTrak to PC COM port connection and restart both machines.

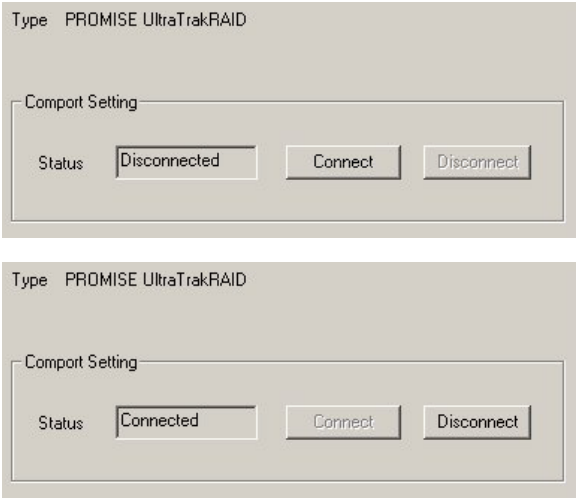
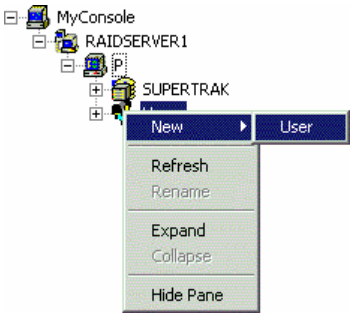


Figure 3-5. Information View for UltraTrak device, disconnected (top) and connected (bottom).

Create a New User

With the Message Agent accessed, you can add a new user. The Administrator is created by default. You must create additional users manually.

1. Right-click on the Users icon and select New > User from the popup menu (right). A new user icon appears.
2. Double-click on the new user icon to display the User Information View.



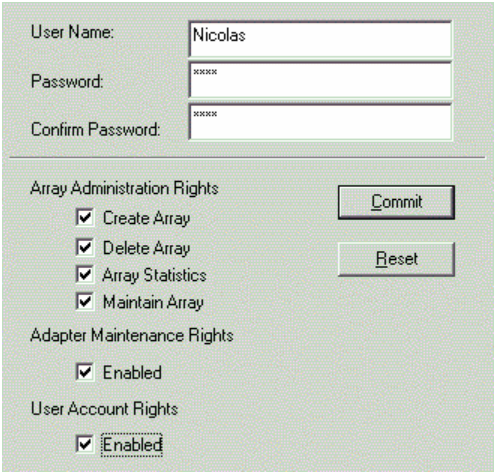
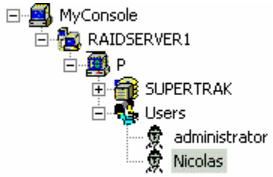


Figure 3-6. User Information View.

The User Information View displays a request for new user identification and access rights.

3. Type in a type in the Username and Password in their respective fields. Check all the appropriate boxes to set access rights. Click the Commit button when you are done.

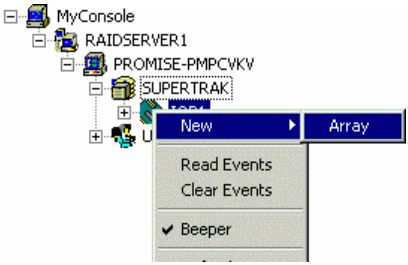
   The new user's name appears in the Tree View (right).



Create an Array

1. Select a Controller icon on which you want to create an array.
2. Right-click on the icon. Select New > Array from the popup menu (right).

   A window opens for the new Array in the information view.



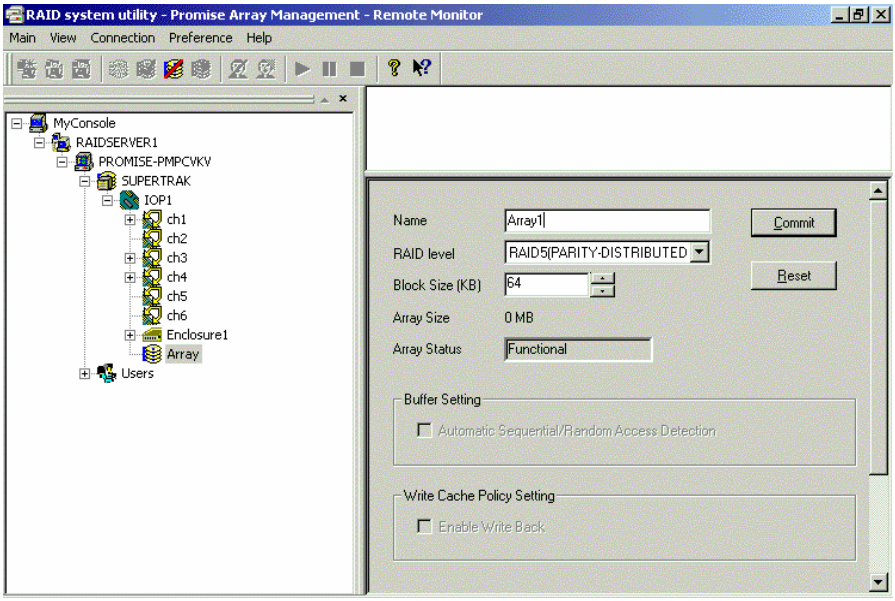


Figure 3-7. New Array information window.

3. Type in an Array name, RAID level and Block Size. The default Block size is 64KB. Do NOT click the Commit button yet.

   A new array icon appears in the Tree View.

   Note: The available RAID selection depends on which Promise product you have and the number of disk drives available. The table below lists the options. See the Appendix for a more detailed description.

RAID Level	Name	Minimum drives	Promise Product
0	Striping	2	FastTrak SuperTrak UltraTrak
1	Mirroring	2	
0+1	Striping + Mirroring	4	
JBOD	Spanning	2	
3	Separate Parity	3	SuperTrak UltraTrak
5	Distributed Parity	3	

Table 3-1. RAID Levels for Promise Products.

4. Expand the Channels to find the unassigned drives. Unassigned drives display this icon . You cannot add assigned drives to a new array.

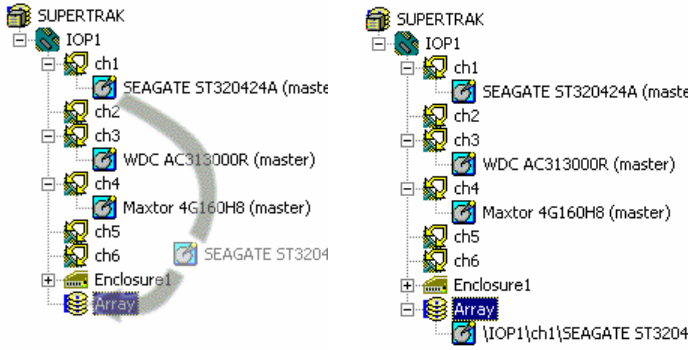


Figure 3-8. Drag and drop unassigned drive icons onto the array icon.

5. Drag and drop the unassigned drive icons onto the array icon. The drives are assigned to the new array in the order you add them.

6. Repeat the above step until you have added all the drives you intended.

   Note: If you added a drive that you did not want, right-click on its icon and select Delete from the popup menu. This action removes the selected drive from the array.

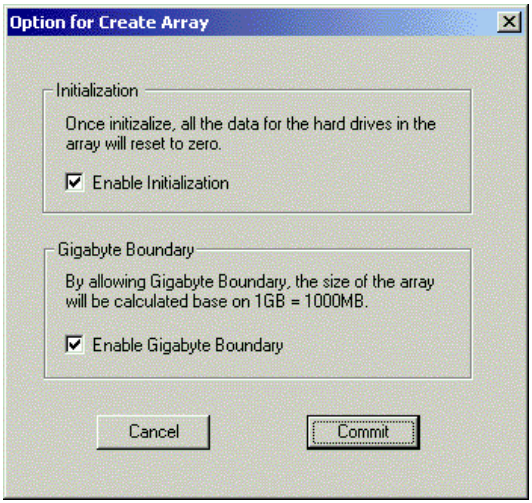


Figure 3-9. Options dialog box.

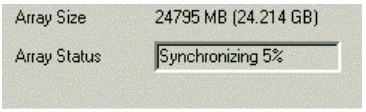
7. Click the Commit button in the Information View. The Options dialog box appears. Check the box to enable:

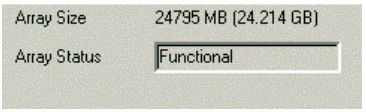
   Initialization ? Data on all drives is set to zero, effectively erasing any data on the disks.

   Gigabyte Boundary ? On the array, a GB will be based on 1000 MB used in networking, rather than the 1024 MB normally used with computers.

8. When you have made your selection, click the Commit button on the Options dialog box.

   The Array Status field in the Information View will show that the array is synchronizing (right).





9. When the Array Status field shows Functional (right), reboot your computer.

   Once rebooted, the new Array is ready.

Setup Email Alert Notification

PAM alerts you to the problems and processes happening to your RAID through email and popup messages. These steps describe how to setup the email function.

1. Click on the Message Agent icon from which you wish to receive email alert messages.

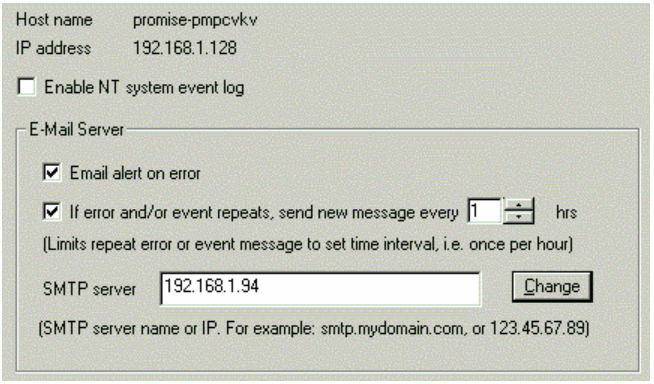


Figure 3-10. Email Server portion of Information View.

2. Click on the Email alert on error box in the Information View, if it is not already checked.
3. In the SMTP server field, type in the SMTP address for your mail server.
4. Click the Change button to update your configuration.

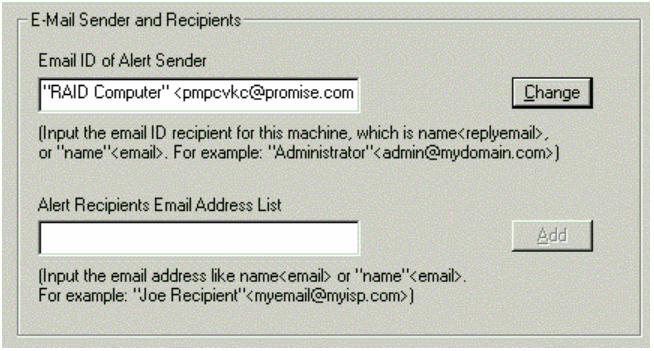


Figure 3-11. Email Sender and Recipients.

5. Scroll down to the Email Sender and Recipients box.
6. In the Email ID of Alert Sender field, type in the email address of this computer.

   This address will appear in the From field of the email alerts. Recipients may reply to this address, if it is valid.
7. Click the Change button to update your configuration.

Add a User to the Recipient List

After you have setup email alert notification, you must specify who shall receive the alerts.

1. Click on the Message Agent icon to which you wish to add an email alert message recipient.
2. In the Alert Recipients Email Address List, type in the email address of the user who you wish to receive alerts. See Figure 3-10.
3. Click the Add button when you are done. The names appear in the Current Recipients window.

Figure 3-12. Current Email Alert Recipients

4. Repeat Step 2 until all addresses have been added.

Specify Alert Notification Events

PAM can be configured to report a variety of alerts, by email, popup message or both. This section describes how to tell PAM what to report and which method to use.

1. Click on the Message Agent icon whose alert notification events you wish to modify.
2. In the Information View, scroll down to see the Add Events window.

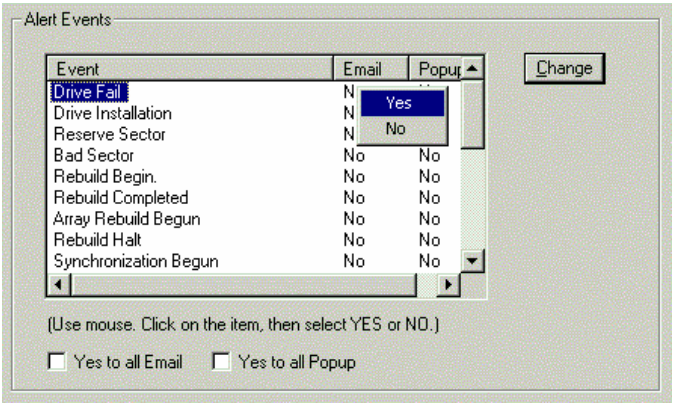


Figure 3-13. Specifying Events for Alert Notification.

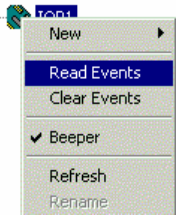
3. From the left column, select an Event you want reported.

4. Right click on the Email column. Select Yes or No from the popup menu.
5. Right click on the Popup column. Select Yes or No from the popup menu.

   Selecting Yes adds that item to the Email or Popup list. Selecting No deletes the item. Use the checkboxes at the bottom to set all Events or Popups to Yes or No.

6. When you are finished, click the Change button.

   Note: To view all Events, right click on the Controller icon and select Read Events from the popup menu (right).



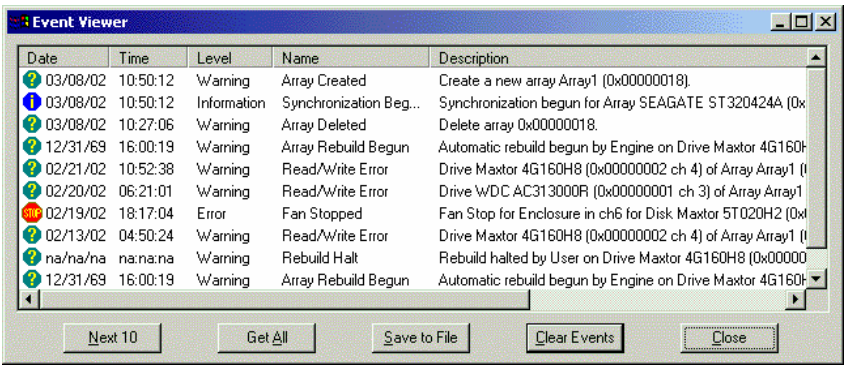


Figure 3-14. Controller Event Viewer.

The Controller receives a report on all events, regardless of your selection of Alert events. At this point, you may save the events to a text file for future reference, clear the window or click Close to leave the events as they are.

Chapter 4: PAM User Interface

This chapter describes PAM's Graphic User Interface (GUI). You should understand that PAM is software running on top of the Promise RAID BIOS and other applications that came with your Promise RAID product. PAM adds a graphic user interface to make RAID management functions easier to understand and perform.

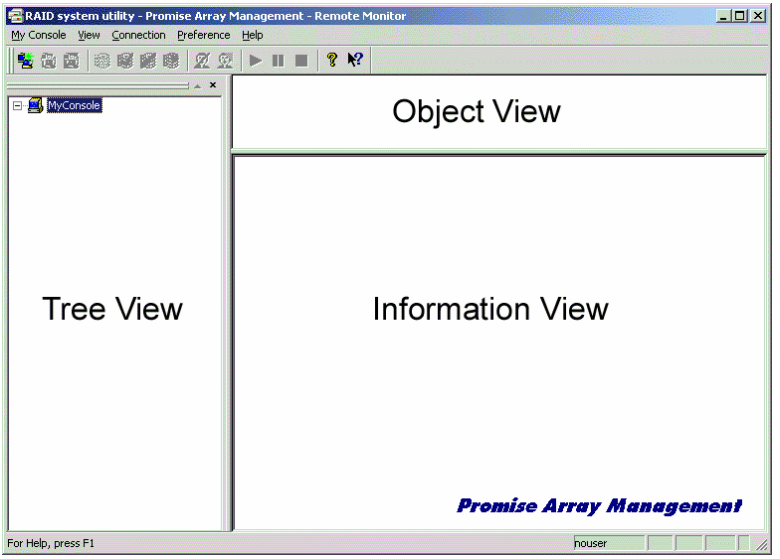


Figure 4-1. The PAM Monitor window has three views.

Tree View

The Monitor window is the user interface for PAM. It has three views: Tree View, Object View and Information View which were introduced in Chapter 3. The Tree View displays all of the elements of your RAID system. Use it to navigate to specific components.

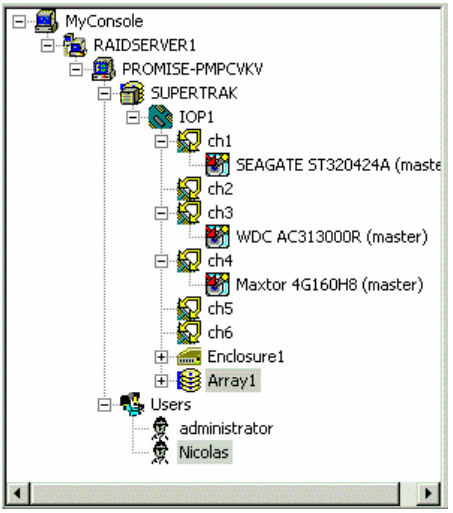


Figure 4-2. An example of a RAID system in Tree View.

Normally, the Tree View is present. To close it, right-click on any object and select Hide Pane from the popup menu. To open it again, go to View menu and Outline.

Tree View and Component Specific Menus

In PAM, like most Windows applications, you can access the various commands and functions by opening dropdown menus and clicking on icons. Each time you click on a component in Tree View, PAM's menu bar also displays that component's dropdown menu. Below are some examples.

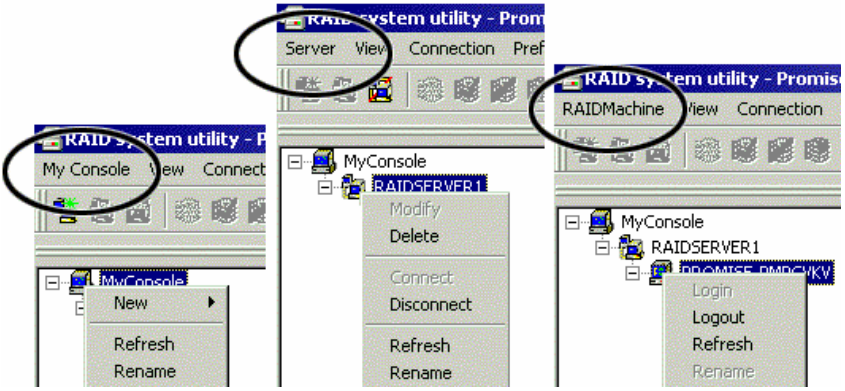


Figure 4-3. Each item in Tree View has its own dropdown menu in the menu bar.

Rather than access the menu bar, you can right click on the icon of the component you are working with. The menu bar and popup menus for Tree View items are identical.

Object View

Object View is visible whenever the Tree View is visible. The items appearing in Object View are determined by which component you select in Tree View. In the example below, we selected a Controller icon in Tree View.

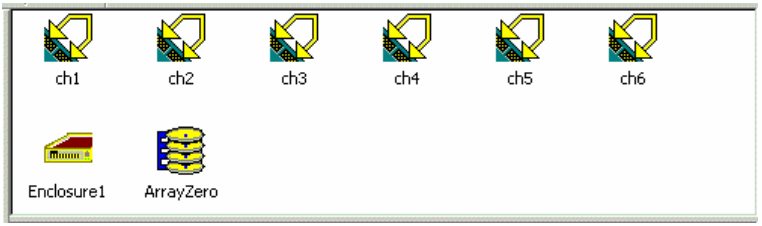


Figure 4-4. Object View of a Controller's components.

As a result, you see the components of that Controller, in this case, six channels, an enclosure and an array. This feature makes it easy to find an individual component as well as see what items are assigned to higher level components. Double-click on these items to see their components in Object View and their configuration in Information View.

Information View

Information View, like Object View, changes its content depending on which item you select in Tree View. The difference is that you use Information View to obtain data, input settings and information.

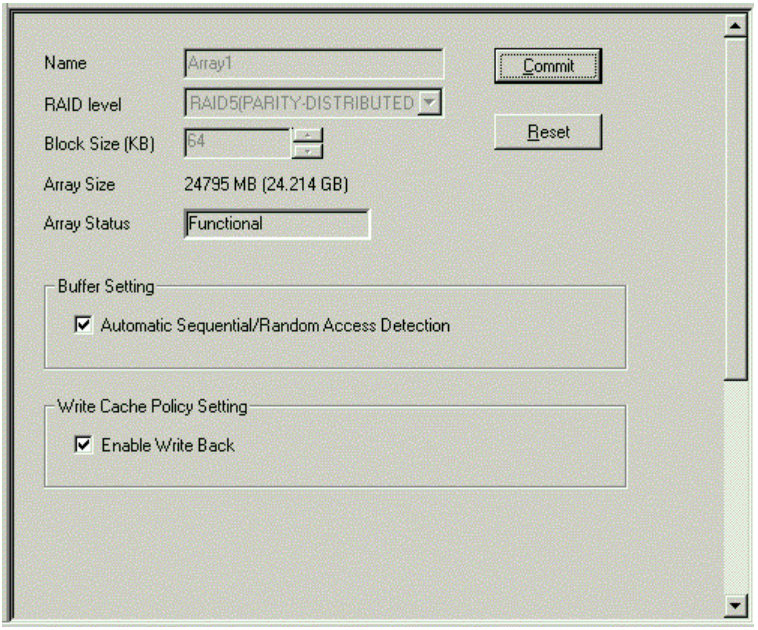


Figure 4-5. Information View showing part of the setup for an Array.

Status Bar

The PAM Status Bar is the same as other Windows applications. It indicates such things as the selected RAID is rebuilding, and the current user is the Administrator (shown below).

Figure 4-6. PAM Status Bar.

Normally the Status Bar is visible. To show or hide the Status Bar, go to the View menu and check or uncheck Status Bar.

Pulldown Menus

As indicated above, the left-most item of the Pulldown Menus changes according to which component is selected in the Tree View. The Pulldown menu and popup (right-click) menus are the same.

Main

When no item in Tree View is selected, the left-most menu item is Main.

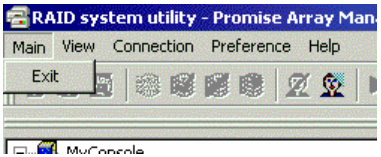


Figure 4-7. Main Menu.

Its only function is Exit, which quits the PAM application.

View

The View menu displays or hides three items:

- Toolbar
- Status Bar
- Tree View (Outline)

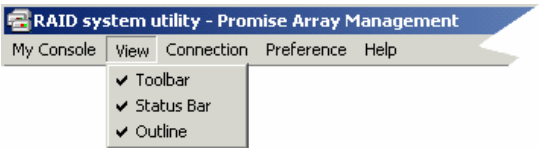


Figure 4-8. View Menu.

Check to display or uncheck to hide each one as you prefer.

Connection

The Connection menu deals with server connections. Use it to:

- Create a new Message Server
- Connect to a RAID Server
- Disconnect from a RAID server

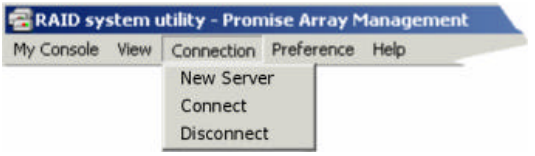


Figure 4-9.The Connection Menu.

To create a new Message Server, click on the MyConsole icon , then select Connection > New Server.

To connect a Message Server to a RAID server, click on the Message Server icon , the select Connection > Connect.

To disconnect a Message Server from a RAID server, click on the Message Server icon , the select Connection > Disconnect.

Preference

The Preference menu allows you to:

- Select the font PAM displays
- Select the background colors of the Views
- Have PAM run automatically when your PC boots

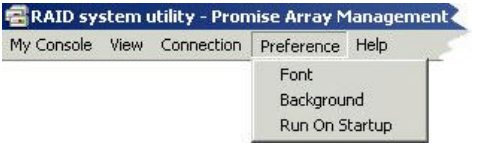


Figure 4-10. The Preference Menu.

Fonts and colors are a matter of individual preference. PAM will display any font properly loaded on your PC. PAM uses the Windows color palette, allowing you to select any color your monitor can display.

If you are using PAM for remote monitoring, running PAM automatically is a good idea. This way, your PC will be connected to the RAID and you will receive all the alerts messages you have specified.

Help

Under Help, PAM has:

- Full online Help file
- Table of keyboard shortcuts
- Auto Demo display
- About page with PAM information

Figure 4-11. Help Menu.

PAM's online help follows the standard three-panel interface with Contents, Index and Find.

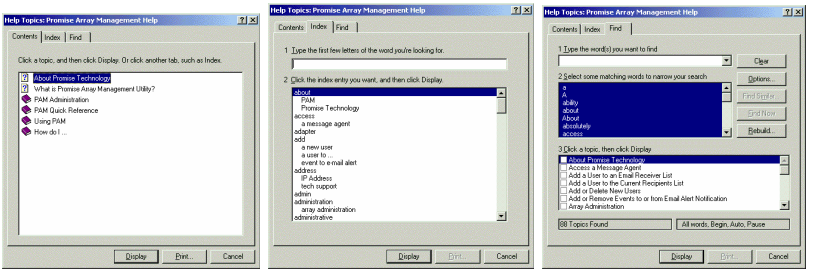


Figure 4-12. Online Help panels: (L to R) Contents, Index, Find.

The table of keyboard shortcuts lists effort saving ways to perform certain functions.

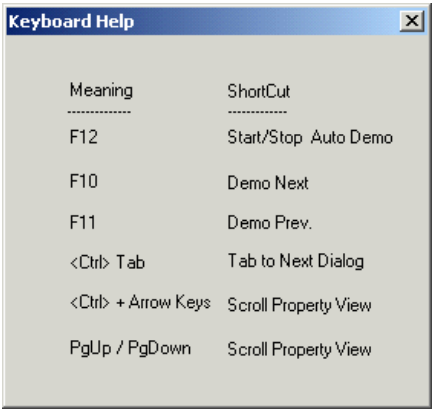


Figure 4-13. Keyboard shortcuts.

The Auto Demo display provides a level-by-level display of each screen in the PAM interface. There are keyboard shortcuts for controlling the Auto Demo.

The about page provides information about the PAM software. This information may be of use should you find the need to contact Promise Technical Support.

Toolbar

The Toolbar is a series of buttons that are shortcuts to performing specific tasks. You will never see all buttons active as in the example below.

Figure 4-14. The Toolbar.

They become active when you click on specific system components in Tree View. Only the tool buttons pertaining to that component are active.

Most of these functions require User Account Rights. These are specified when a User is added or modified. Following is a description of the Toolbar buttons:

New Server. Available when you select the MyConsole icon. Creates a new Message Server.

Connect. Available when you select a Message Server icon. Initiates a connection with the RAID Server.

Disconnect. Available when you select a Message Server icon. Disconnects from the RAID Server. Used when you want to shut down a RAID server for repair.

Rebuild Array. Available when you select an Array icon for RAID level 1, 0+1, 3 or 5. Begins the process of restoring data after a drive was replaced.

Synchronize Array. Available when you select an Array icon for RAID 1, 0+1, 3 or 5. Writes mirrored data or parity data to ensure both have identical data.

Delete Array. Available when you select an Array icon. Deletes the array from the RAID system.

Create Array. Available when you select a Message Agent icon. Allows you to create a new array on the RAID system.

Delete User. Available when you select a User icon. Deletes a user from monitoring and alert access.

New User. Available when you select the Users icon.

Continue. Available when you have paused the rebuild of an Array. Resumes the rebuild process.

Pause. Available when you are rebuilding an Array. Temporarily interrupts the rebuild process.

Stop. Available when you are rebuilding an Array. Permanently halts the rebuild process.

About. Always available. Provides information about the PAM interface.

Help. Always available. Brings up the Online Help.

Popup Menus

In addition to the commands in the dropdown menus, there is a corresponding set of commands you can access via popup menus.

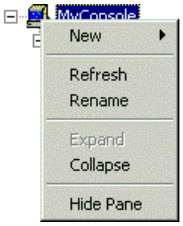
In a popup menu, you can use any of the commands that are in black. You will notice that some functions are grayed out, meaning that you cannot use them. Many functions require that you have User Account Rights to perform them.

All the menus have these three features, relating to Tree View but not the icon itself:

- Refresh the screen display
- Expand / Collapse the Tree
- Hide Tree View

MyConsole Icon

Right-click on the MyConsole icon to access the following commands (right):

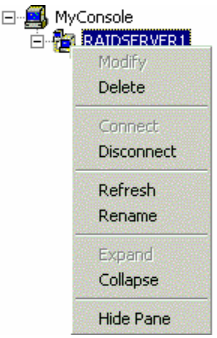


- Create a new Message Server
- Rename MyConsole

This menu matches the MyConsole pulldown menu.

Message Server Icon

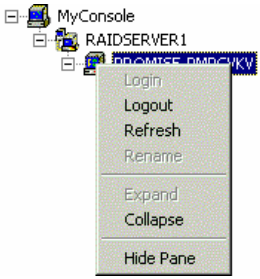
Right-click on the Message Server icon to access the following commands (right):



- Modify this Message Server. See Information View
- Delete this Message Server
- Connect / Disconnect this Message Server from the Message Agent
- Rename this Message Server

This menu matches the Server pulldown menu.

Message Agent Icon

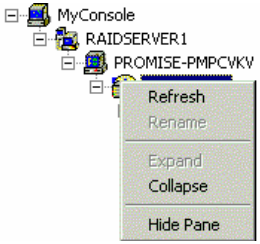


Right-click on the Message Agent icon to access the following commands (right):

- Login to / Logout from this Message Agent
- Rename this Message Agent

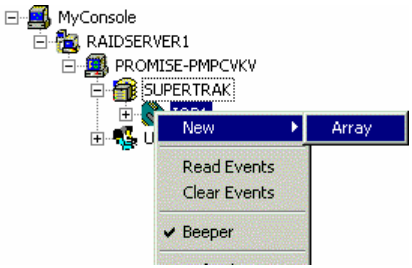
This menu matches the RAIDMachine pulldown menu.

Device Icon



The Device icon represents the FastTrak or SuperTrak PCI card or the UltraTrak subsystem (right). There are no commands for this item. This menu matches the RAIDSystem pulldown menu.

Controller Icon

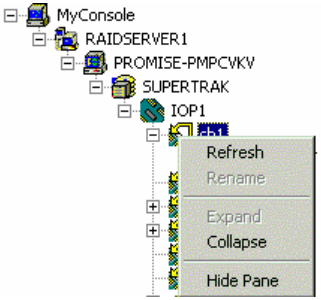


Right-click on the Controller icon to access the following commands (right):

- Create a new Array
- Read controller events
- Clear controller events
- Toggle the Synchronize/Rebuild beeper on and off. Checked is ON.

This menu matches the Controller pulldown menu.

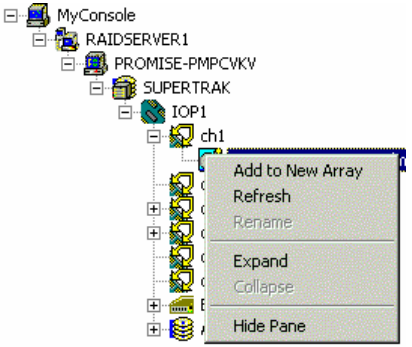
Channel Icon



The Channel icon represents an individual channel on the FastTrak or SuperTrak PCI card or the UltraTrak subsystem (right). There are no commands for this item.

This menu matches the Channel pulldown menu.

Disk Icon

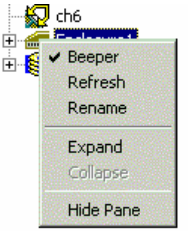


Right-click on the Disk icon of an *unassigned* drive to add it to a new array.

If you right-click on the Disk icon of an *assigned* drive, this command will be grayed out.

This menu matches the Disk pulldown menu.

Enclosure Icon

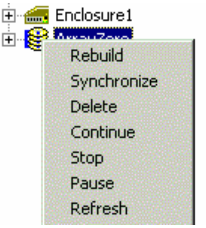


Right click on the Enclosure icon to access the following commands (right):

- Toggle the Synchronize/Rebuild beeper on and off. Checked is ON.
- Rename the Enclosure

This menu matches the Enclosure pulldown menu.

Array Icon



Right-click on the Array icon to access the following commands (right):

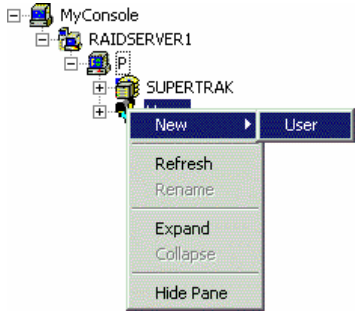
- Rebuild this array
- Synchronize this array
- Delete this array
- Pause, Continue or Stop the Rebuild or Synchronize procedure

This menu matches the Array pulldown menu.

Users Icon

Right-click on the Users icon to create a new User account (right).

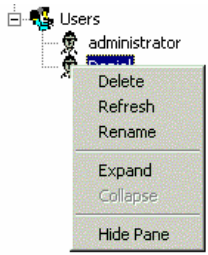
This menu matches the User Account pulldown menu.



User Icon

Right-click the User icon to delete or rename this user.

This menu matches the User pulldown menu.



Chapter 5: RAID Monitoring and Maintenance with PAM

This chapter describes using PAM to monitor and manage your RAID system. The chapter is divided into sections for major PAM components:

- Message Server
- Message Agent
- Controller
- Channel
- Enclosure
- Array

Message Server

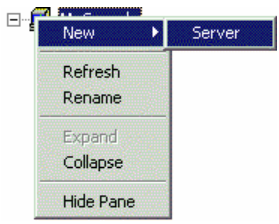
In order to perform the following procedures, you, as a user, must have Array Administration Rights. User rights are discussed in the Message Agent section of this chapter.

Create a New Message Server

1. Click on the MyConsole icon in the Tree View.
2. Right-click and select New > Server from the popup menu (right).

   OR click the New Server button in the Toolbar.

   This action adds a new server RAIDSERVER1 icon (see Figure 5-1).



3. Click on the new server icon to select it.

   The Information window displays fields to add a Label and IP Address.

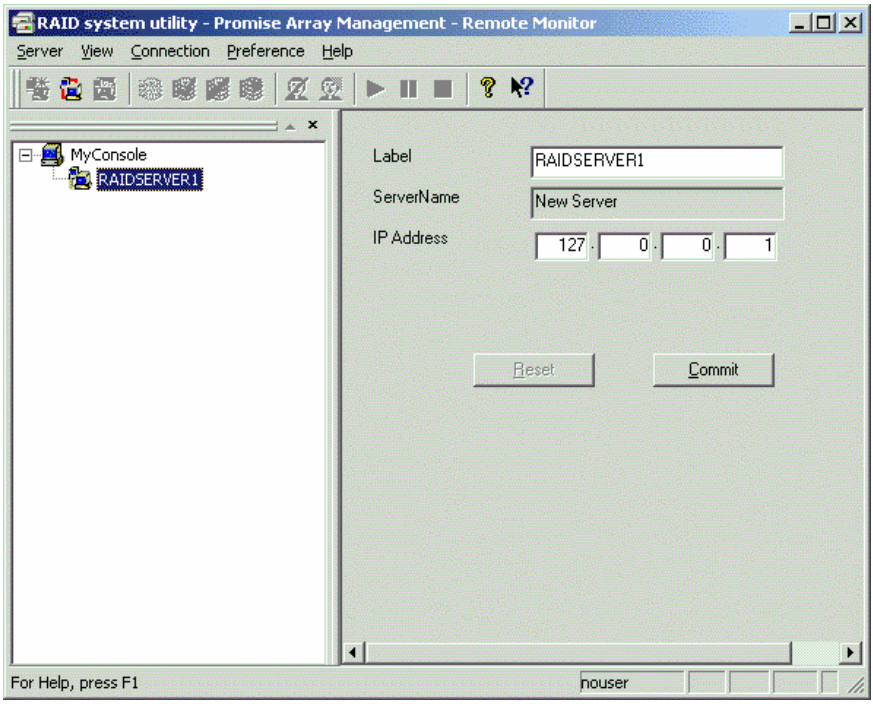


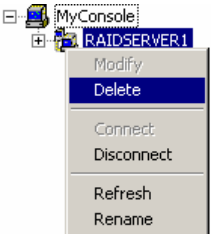
Figure 5-1. The Message Server's Label and IP Address.

Note: The IP Address shown above: 127.0.0.1, means that this computer is equipped with a FastTrak or SuperTrak card, or the UltraTrak subsystem.

If you are performing this procedure on a networked PC, input the actual IP Address of the RAID PC in this field. See the Appendix for help in finding a PC's IP address.

4. Click the Commit button. PAM connects the Message Server and creates a new Message Agent icon .

Delete a Message Server



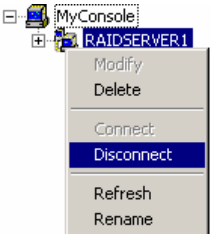
If the Server's IP address has changed, it will no longer function. You must delete the existing Server and create a new one with the current IP address.

1. Right click on the Message Server icon in Tree View.
2. Select Delete from the popup menu (right).

Disconnect a Message Server
Logout of RAID Server

When you are about to perform maintenance or repair on a RAID server, use this procedure. This action will preserve your connection settings. PAM will still see the Message Server and show a disconnected status.

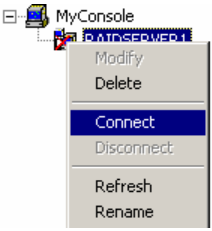
Note: This is the only correct way to log out a RAID Server from the system.



To disconnect a Message Server, select it in Tree View then click the Disconnect button in the Toolbar, or:

1. Right click on the Message Server icon in Tree View.
2. Select Disconnect from the popup menu (right).

Reconnect a Message Server



To reconnect a message Server you have taken offline, select it in Tree View then click on the Connect button in the Toolbar, or:

1. Right click on the Message Server icon in Tree View.
2. Select Connect from the popup menu (right).

Message Server Address Change

Occasionally, the IP address of a RAID server may change. This happens when:

- A RAID PC is physically moved to a different location
- The RAID PC gets a new static IP address
- A RAID PC with a DHCP-assigned IP address was disconnected or shut down

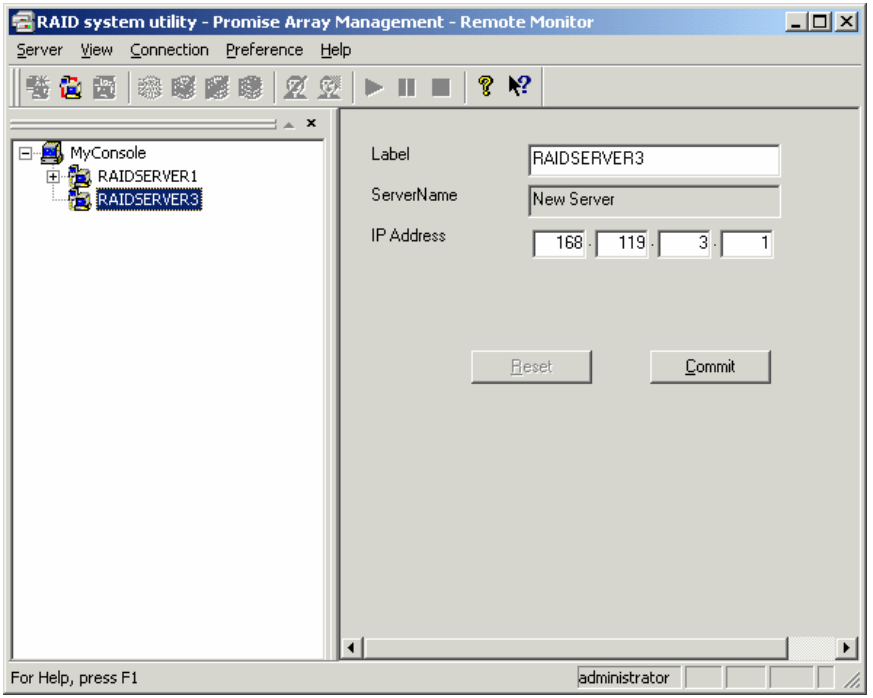


Figure 5-2. Changing a RAID server's Label and IP address.

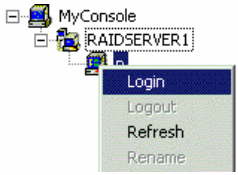
1. Select the Message Server icon in Tree View.
2. Type in the new Label and IP Address in Information View.
3. Click the Commit button.

See the Appendix for help in finding a PC's IP address.

Message Agent

The Message Agent resides on the RAID PC. It manages user access, reports events as directed and synchronizes array synchronization.

Login / User Name and Password



1. In the Tree View, right-click on the Message Agent icon and select Login from the popup menu (right).

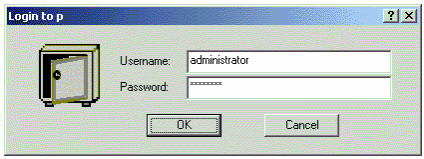


Figure 5-3. The Message Agent login dialog box.

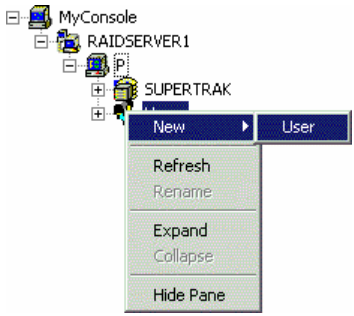
2. In the Message Agent login dialog box, type in the Username and Password in their respective fields.

   Note: Contact your IT Administrator if you don't know this information.

3. Click OK to log into the Message Agent.

Create a New User

With the Message Agent accessed, you can add a new user. The Administrator is created by default. You must create additional users manually.



1. Right-click on the Users icon and select New > User from the popup menu (right). A new user icon appears.
2. Double-click on the new user icon to display the User Information View.

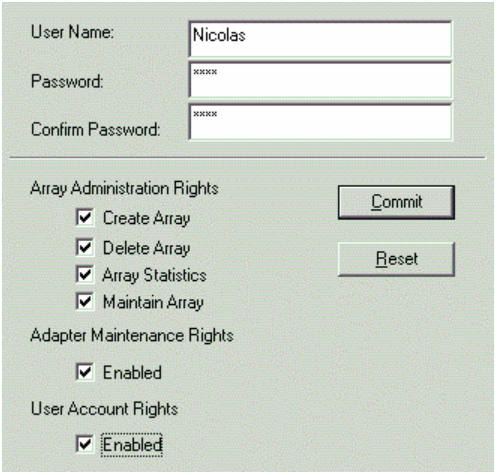
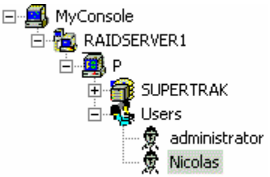


Figure 5-4. User Information View.

The User Information View displays a request for new user identification and access rights.

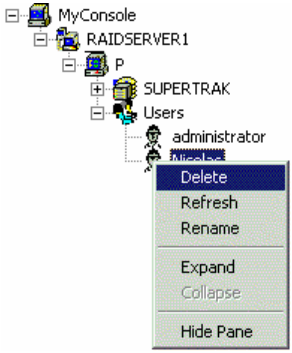
3. Type the Username and Password in their respective fields. Check all the appropriate boxes to set access rights. Click the Commit button when you are done.

   The new user's name appears in the Tree View (right).



Another way to add a User: Select the Users icon in Tree View the click the New User button . Follow Step 3 (above) to complete the process.

Delete a User



1. In the Tree View, right-click on the icon of the User you wish to delete and select Delete from the popup menu (right).
2. In the confirmation dialog box, click OK.

   Note: PAM will always keep one user account with access rights, typically the Administrator. This action protects you from being locked out of the system.

Another way to delete a User: Select the User's icon in Tree View then click the Delete User button in the Toolbar.

Assign User Rights

The following Rights are available for assignment to individual Users. The Administrator, by default, has full Rights. For other users, check the boxes to enable the desired functions. See Figure 5-4 above.

Array Administration Rights ? These allow the User to create, delete and maintain arrays and view array statistics.

Adapter Maintenance Rights ? Allows the User to modify cache and performance parameters for the RAID Controller.

User Account Rights ? Allows the User to modify his/her own Array Administration and Adapter Maintenance Rights. Also allows the User to add and delete other Users.

Object Icons

Select the Users icon in Tree View to see a display of individual Users in Object View.

Figure 5-5. Users in Object View

Alert Notification

PAM alerts you to the problems and processes happening to your RAID through email and popup messages. These steps describe how to setup the email function.

1. Click on the Message Agent icon from which you wish to receive email alert messages.

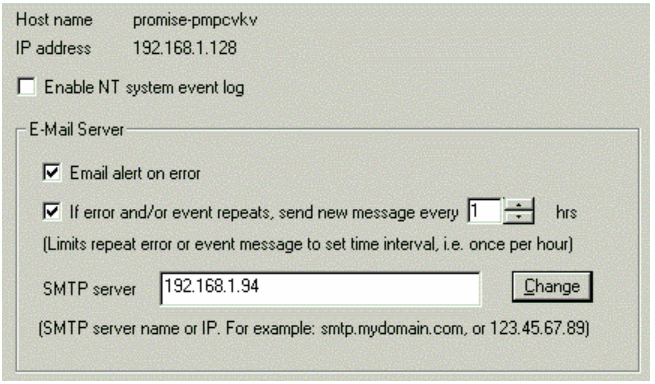


Figure 5-6. Email Server portion of Information View.

2. Click on the Email alert on error box in the Information View, if it is not already checked.
3. In the SMTP server field, type in the SMTP address for your mail server.
4. Click the Change button to update your configuration.

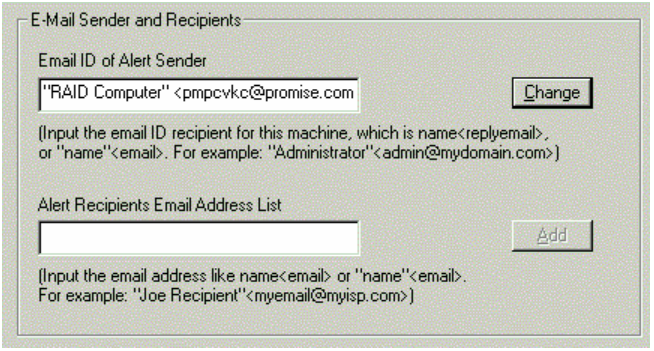


Figure 5-7. Email Sender and Recipients.

5. Scroll down to the Email Sender and Recipients box.
6. In the Email ID of Alert Sender field, type in the email address of this computer.

   This address will appear in the From field of the email alerts. Recipients may reply to this address, if it is valid.
7. Click the Change button to update your configuration.

Add a User to the Recipient List

After you have setup email alert notification, you must specify who shall receive the alerts.

1. Click on the Message Agent icon to which you wish to add an email alert message recipient.
2. In the Alert Recipients Email Address List, type in the email address of the user who you wish to receive alerts. See Figure 5-7.
3. Click the Add button when you are done. The names appear in the Current Recipients window.

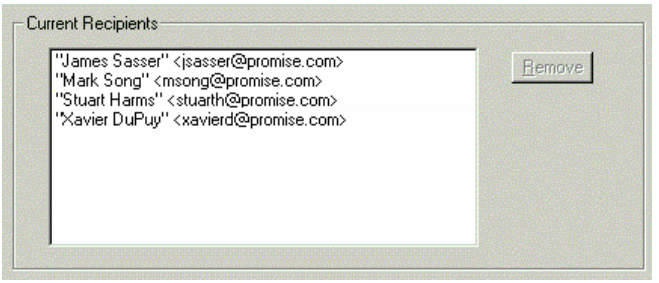


Figure 5-8. Current Email Alert Recipients

4. Repeat Step 2 until all addresses have been added.

Delete a User from the Recipient List

To remove a recipient from the Email Address List, do the following:

1. Click on the Message Agent icon from which you wish to delete an email alert message recipient.

   The Current Recipients window appears in the Information View. See Figure 5-8.

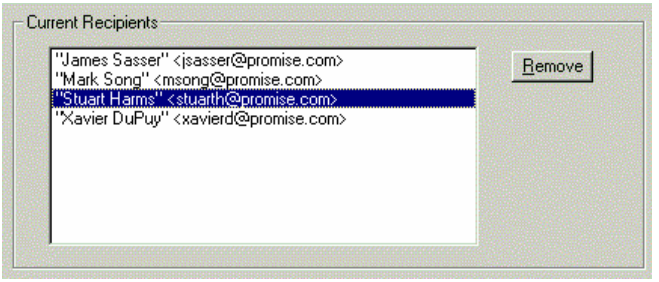


Figure 5-9. Select and remove a recipient.

2. Select the recipient you wish to delete
3. Click the Remove button or press [Delete] to remove the address from the list.

Specify Alert Notification Events

PAM can be configured to report a variety of alerts, by email, popup message or both. This section describes how to tell PAM what to report and which method to use.

1. Click on the Message Agent icon whose alert notification events you wish to modify.
2. In the Information View, scroll down to see the Add Events window.

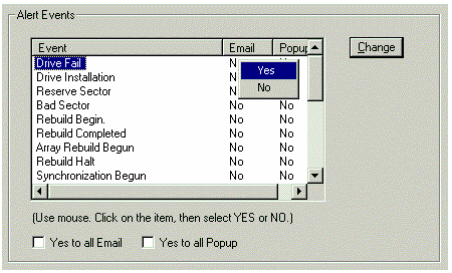


Figure 5-10. Specifying Events for Alert Notification.

3. From the left column, select an Event you want reported.
4. Right click on the Email column. Select Yes or No from the popup menu.
5. Right click on the Popup column. Select Yes or No from the popup menu.

   Selecting Yes adds that item to the Email or Popup list. Selecting No deletes the item. Use the checkboxes at the bottom to set all Events or Popups to Yes or No.
6. When you are finished, click the Change button.

Device

The term Devices refers to a Promise RAID product: a FastTrak or SuperTrak card, or an UltraTrak RAID Subsystem.

There are no control functions in PAM for Devices. But you can access information about them. To do so, select the Device icon in Tree View.

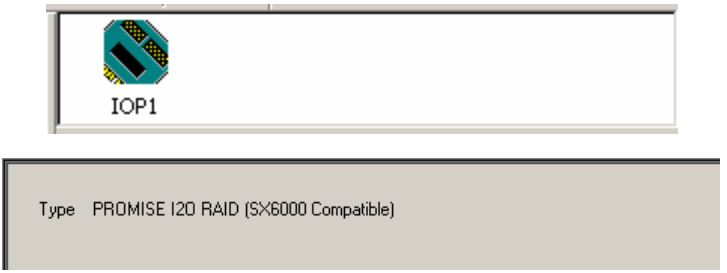
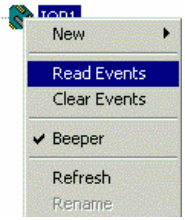


Figure 5-11. A Controller in the Device Object View (top) and Information View (bottom).

Controller

The Controller deals with creating new Arrays, reading events from the memory buffer, setting cache and performance options. Array creation is covered in the Arrays section of this chapter.

Memory Buffer Events



The Controller's Memory Buffer records all the events that happen on the RAID, classified as Errors, Warnings and Information. These are very useful for diagnosing and solving problems on your system.

To see the Event Log, right-click on the Controller icon in Tree View and select Read Events from the popup menu (right).

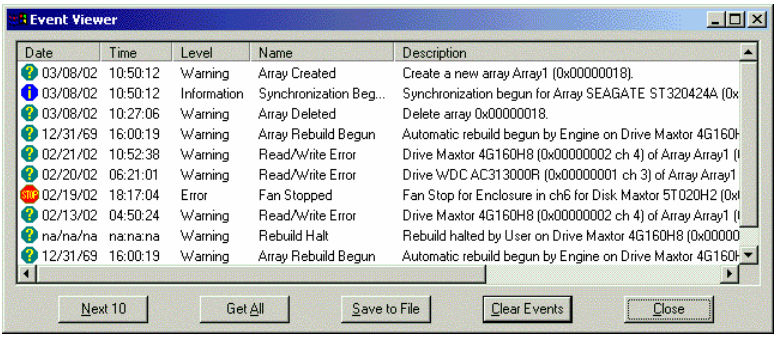


Figure 5-12. The Event Viewer.

In the Event Viewer, you can view the events, make a permanent record by saving them to a file, and clear the events from the Viewer. You can also clear the events using the popup menu in Tree View.

Note that the collecting and reporting of these Events is independent from the Alert Notification preferences set in the Message Agent.

Controller Options

The Controller has system information and settings for disk cache and performance features. Click on the Controller icon in Tree View to see the Options in Information View.

SuperTrak Options

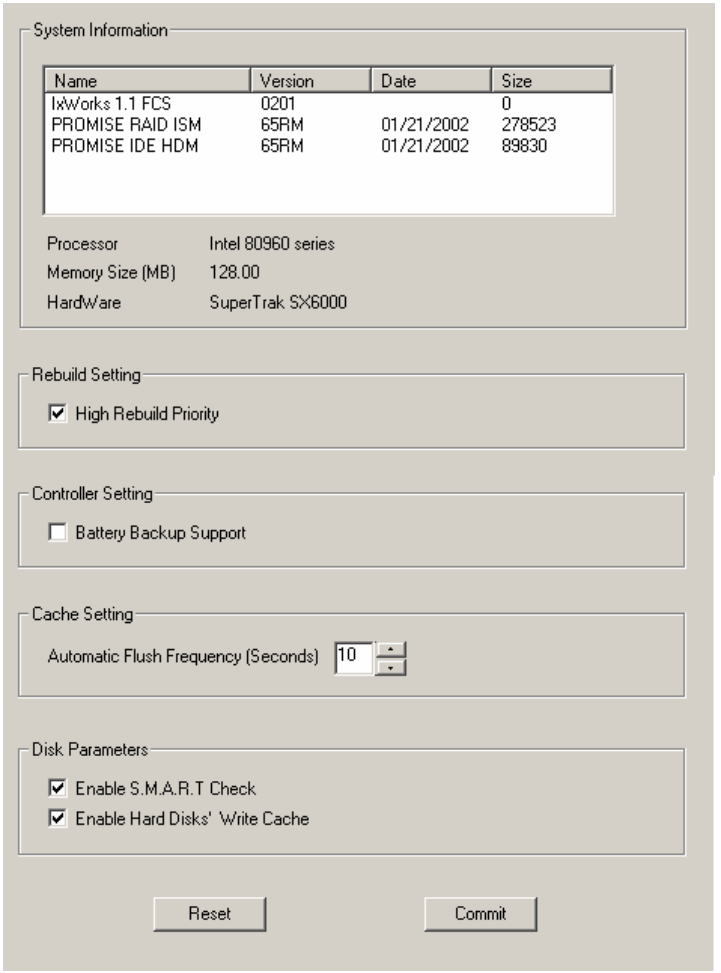


Figure 5-13. Controller Options for SuperTrak.

Rebuild Setting

High priority (box checked) assigns most of the system resources to rebuilding. Rebuilding goes faster, restoring redundancy sooner but read/write requests are handled slower.

Low priority assigns most of the system resources to handling read/write requests. Read/write requests are handled at nearly normal speed while the rebuild takes longer.

See Rebuild an Array later in this chapter for more information on the rebuilding process.

Controller Setting

This feature applies to the SX6000 controller with the optional battery backup unit. When Battery Backup Support is enabled and a power failure occurs, the SX6000 will attempt to recover cached data from the SDRAM rather than discarding it. This includes data waiting to be written to the hard drive at the moment of the power failure.

Cache Setting

This option applies only when write-back cache is enabled (see Array Options later in this chapter). Enter the maximum number of seconds data is held in cache before being written to the hard drive, called flush frequency. A longer period tends to increase apparent read/write performance but at a greater risk of lost data should a power failure occur.

Disk Parameters: SMART Check

SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the disk drive software. It monitors the internal performance of the drive and reports to the PC when it finds a potential failure. SMART warns you of a developing drive failure so you can replace the drive before it actually fails.

Disk Parameters: Enable Hard Disk's Write Cache

Speeds hard disk performance by writing data to the cache first and later to the disk. Note that you can lose data if a power failure occurs while data is still in the drive's cache.

If any of these features are grayed out, it means they are not available on your hard drives.

FastTrak Options

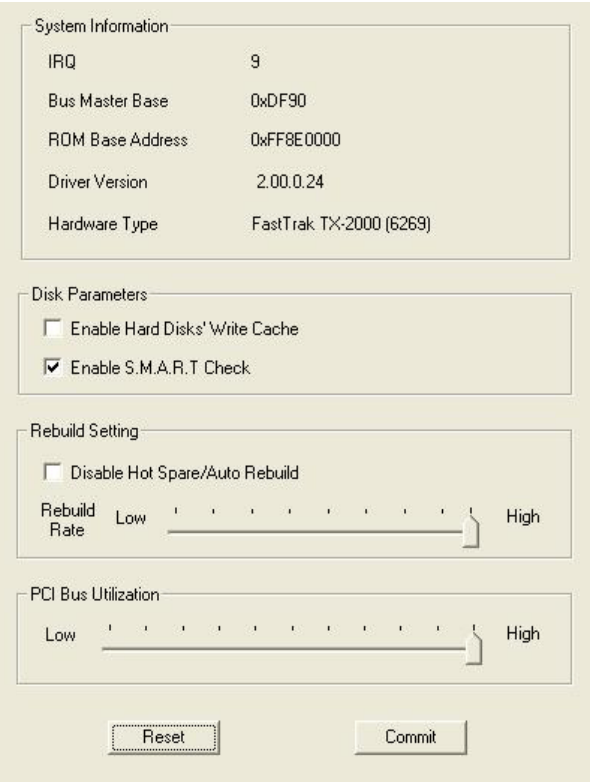


Figure 5-14. Controller Options for FastTrak.

Disk Parameters: Enable Hard Disk's Write Cache

Speeds hard disk performance by writing data to the cache first and later to the disk. Note that you can lose data if a power failure occurs while data is still in the drive's cache.

Disk Parameters: SMART Check

SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the disk drive software. It monitors the internal performance of the drive and reports to the PC when it finds a potential failure. SMART warns you of a developing drive failure so you can replace the drive before it actually fails.

Rebuild Options: Disable Hot Spare/Auto Rebuild

For mirrored arrays (RAID 1 and 0+1), this option turns off the hot spare drive and automatic rebuilding. The default is unchecked, hot spare and automatic rebuilding enabled.

Rebuild Options: Rebuild Rate

A High setting assigns most of the system resources to rebuilding. Rebuilding goes faster, restoring redundancy sooner but read/write requests are handled slower.

A Low setting assigns most of the system resources to handling read/write requests. Read/write requests are handled at nearly normal speed while the rebuild takes longer.

See Rebuild an Array later in this chapter for more information on the rebuilding process.

PCI Bus Utilization

On High setting, FastTrak holds onto the PCI bus longer for data transfers to occur.

On Low setting, FastTrak releases the PCI bus sooner for other PCI devices to use.

Normally, no adjustment is required. However, some video capture cards may produce a glitch during playback of audio/video files. If this happens, try adjusting the slider.

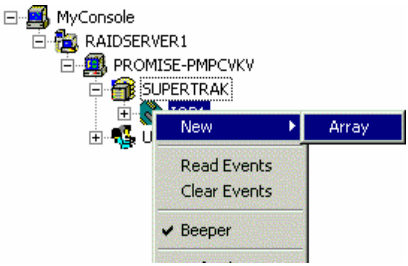
If any of these features are grayed out, it means they are not available on your hard drives.

Arrays

Create a New Array

1. Select a Controller icon on which you want to create an array.
2. Right-click on the icon. Select New > Array from the popup menu (right).

   OR Click the New Array button in the Toolbar.



A window opens for the new Array in the information view.

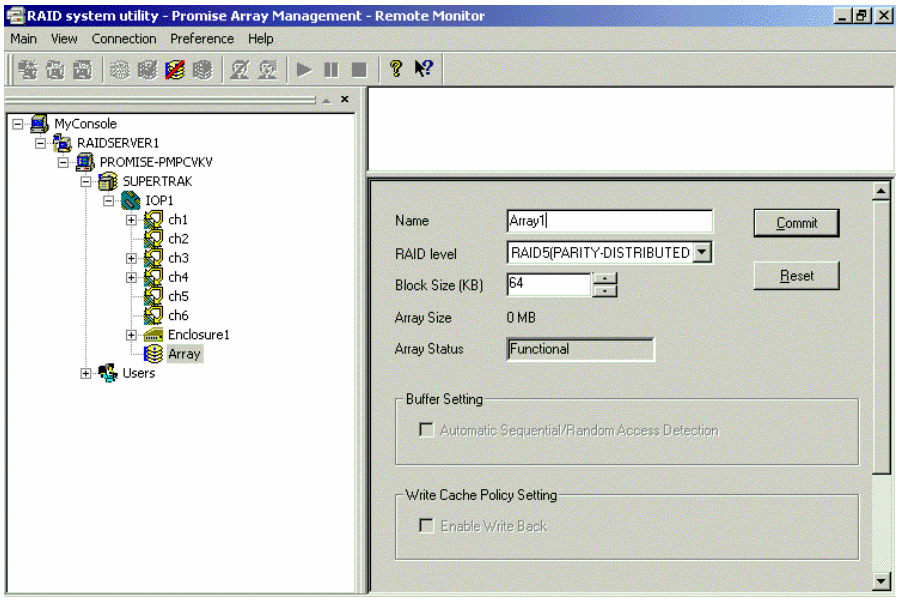


Figure 5-15. New Array information window.

3. Type in an Array name, RAID level and Block Size. Do NOT click the Commit button yet.

   The default Block Size is 64KB.

Note: The available RAID selection depends on the number of disk drives available. See the RAID chart in the Appendix for more information.

A new array icon appears in the Tree View.

4. Expand the Channels to find the unassigned drives. Unassigned drives display this icon. You cannot add assigned drives to a new array.

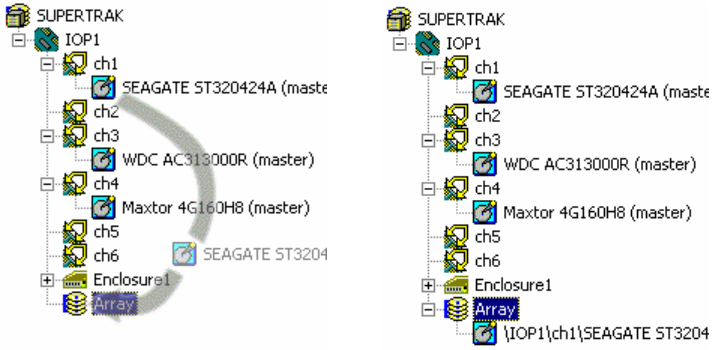


Figure 5-16. Drag and drop unassigned drive icons onto the array icon.

5. Drag and drop the unassigned drive icons onto the array icon. The drives are assigned to the new array in the order you add them.

6. Repeat the above step until you have added all the drives you intended.

   Note: If you added a drive that you did not want, right-click on its icon and select Delete from the popup menu. This action removes the selected drive from the array.

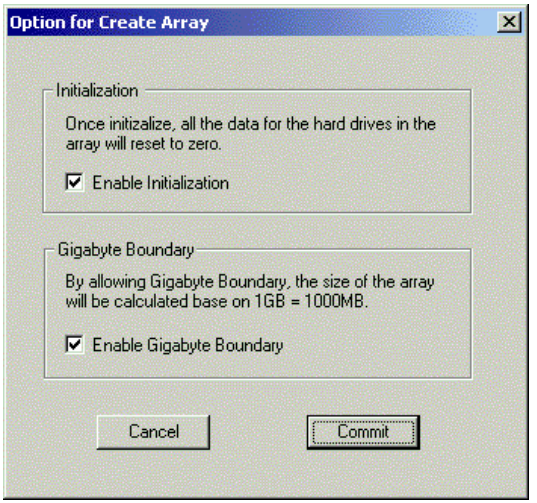


Figure 5-17. Options dialog box.

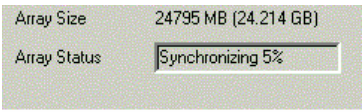
7. Click the Commit button in the Information View. The Options dialog box appears. Check the box to enable:

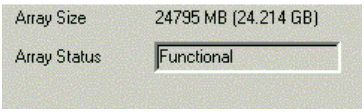
   Initialization ? Data on all drives is set to zero, erasing the disks.

   Gigabyte Boundary ? On the array, a GB will be based on 1000 MB used with networking, rather than the 1024 MB normally used with computers.

8. When you have made your selection, click the Commit button on the Options dialog box.

   For several minutes, depending on the number and size of disks in your array, the Array Status field in the Information View will show that the array is synchronizing (right).





9. When the Array Status field shows Functional (right), reboot your computer.

Note: You cannot read or write to a newly created array until it is done synchronizing and you have rebooted your computer.

Scheduled Array Synchronization

Promise uses the term synchronization to mean an automated process of checking and correcting data and parity. It applies to RAIDs 1, 0+1, 3 and 5. Synchronizing takes place when an array is first created and then, optionally, on a regularly scheduled basis to maintain content integrity.

Scheduling

Schedule a time for synchronization when the RAID is least busy reading and writing data. The early morning hours are often a convenient time.

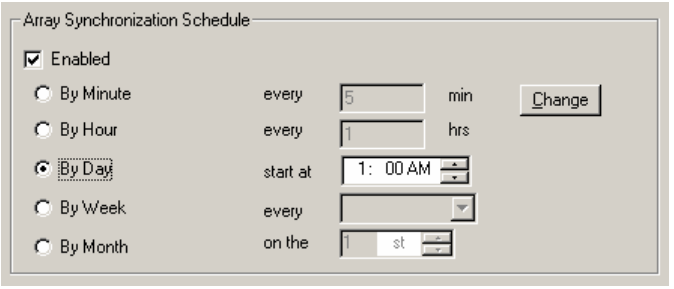


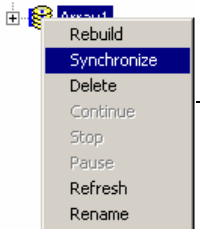
Figure 5-18. Array Synchronization Schedule

To enable scheduled synchronization:

1. In Tree View, select an Array icon of the array you want to synchronize.
2. In Information View, check the Enabled box
3. Click on the radio button beside the time interval (by minute to by month) you want.
4. Based on the time interval you selected, enter the number of units or clock time for the synchronization process to begin.
5. When you are done, click the Commit button.
6. Repeat these steps for any additional Arrays on your system.

On-Demand Array Synchronization

To synchronize an Array immediately, do the following:



1. In Tree View, right-click on the icon of the array you want to synchronize.
2. Select Synchronize from the popup menu.

   OR click the Synchronize Array button in the Toolbar.

While the Array is synchronizing, it is still available to read and write data. If the beeper is enabled, it will beep slowly during this process.

To turn the beeper on or off, right-click on the Controller icon or the Enclosure icon in Tree View and check or uncheck Beeper in the popup menu.

Tree View and Information View display the progress.

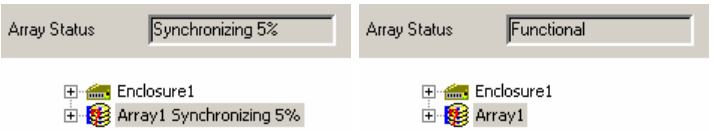


Figure 5-19. Synchronization in progress (left) and completed (right).

When Synchronization is complete Tree View returns to normal and Information View displays Functional.

Rebuild an Array

Rebuilding is the process of restoring redundancy to a RAID 1, 0+1, 3 or 5 after one of its drives has failed. When the replacement drive has been installed, the RAID can read and write data but there is no redundancy until the RAID has been rebuilt, that is, the new drive receives all the data and parity of the original.

When a drive fails for any reason, the Array goes Critical. This condition is noted when you select the Array Critical icon in Tree View. The RAID alarm beeps quickly to call your attention to the condition.

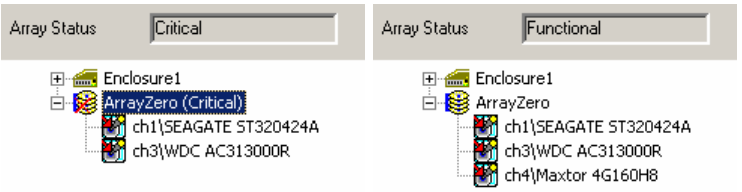


Figure 5-13. An Array in Critical condition (left) and restored to Functional condition (right).

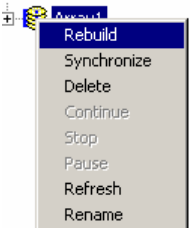
Normally, the rebuild process begins automatically when you repair or replace the faulty disk drive. The Array recognizes the drive and begins the process a few moments later.

If your RAID has a hot spare, the rebuild begins without waiting for a replacement drive. Be sure to replace the faulty drive as soon as possible.

During the Rebuild process, the array is still available to read and write data but it may run noticeably slower.

Manual Rebuild

To initiate a manual Array rebuild:



1. In Tree View, select the Array icon of the array you want to rebuild.
2. Right click on the icon and select Rebuild from the popup menu.

   OR Click the Rebuild Array button in the Toolbar.
3. The Rebuild Wizard will assist you further.

During the rebuild progress, the array will be available for use but it may run noticeably slower. If the beeper is enabled, it will beep slowly during this process.

While the Array is synchronizing, it is still available to read and write data. If the beeper is enabled, it will beep slowly during this process.

To turn the beeper on or off, right-click on the Controller icon or the Enclosure icon in Tree View and check or uncheck Beeper in the popup menu.

Tree View and Information View display the progress.

Figure 5-21. Rebuilding in Progress (left) and completed (right).

When the rebuild is complete Tree View returns to normal and Information View displays Functional. The following popup appears:

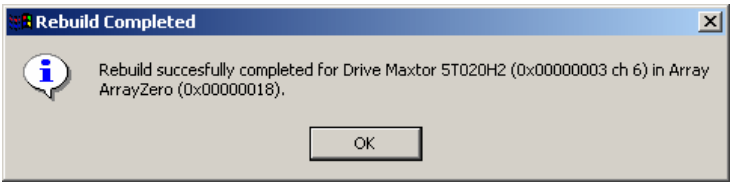


Figure 5-22. Rebuild Successful.

Stop, Pause, Continue

Promise recommends that you let your synchronization or rebuild run to completion. If you need to stop or pause the process:

1. Right-click on the Array icon .
2. Select Stop or Pause from the popup menu.

   OR Click the Stop or Pause buttons on the Toolbar.

The following warning appears. Click OK to continue.

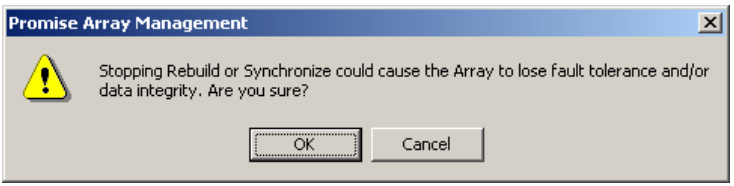


Figure 5-23 Stop Warning.

To resume after a pause:

3. Right-click on the Array icon .
4. Select Continue from the popup menu.

   OR Click the Continue button on the Toolbar.

Object View

Select the Array icon in Tree View to see a display of individual disk drives in Object View.

Figure 5-24. Disk Drives in Array Object View.

Array Options

Select the Array icon in Tree View to see a display in Information View:

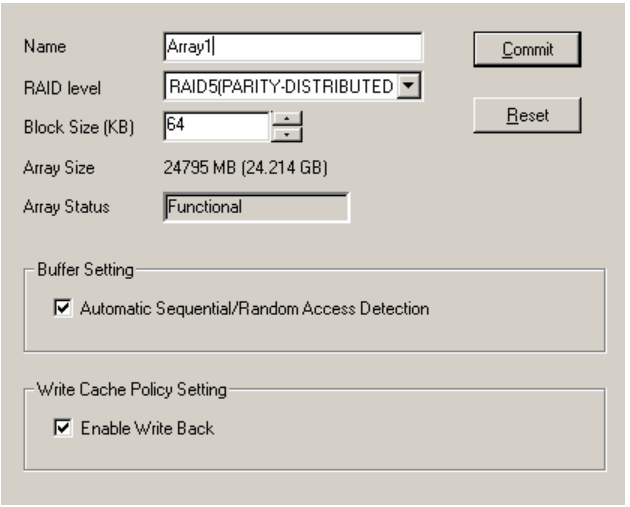


Figure 5-25. Array in Information View.

There are two options you can specify for an Array:

Automatic Sequential / Random Access Detection

(**NOTE:** This option is only available for SuperTrak SX6000). When enabled (checked) the read-ahead cache determines if a sequential or random input/output event is occurring and optimizes itself accordingly. Optimizing results in better array performance.

Enable Write Back Cache

Write back cache accepts write data from the CPU and holds it briefly in cache memory. When the computer has idle cycles, the data is written to the hard drive. This arrangement speeds up disk performance because you can write data to a cache much faster than to a hard disk.

While the data is in the cache, there is a risk of loss if a power failure occurs. Using an uninterruptible power supply virtually eliminates that risk.

Appendix

IP Address

In order for PAM to be configured over a network, you must know the IP (network) address of every component. The Message Server uses IP addresses to communicate with the Message Agent on the RAID PCs and the Monitoring Utility on the network PCs.

Windows XP

To find the IP network address, go to Start > Control Panel > Network Connections > Local Area Connection > Support tab.

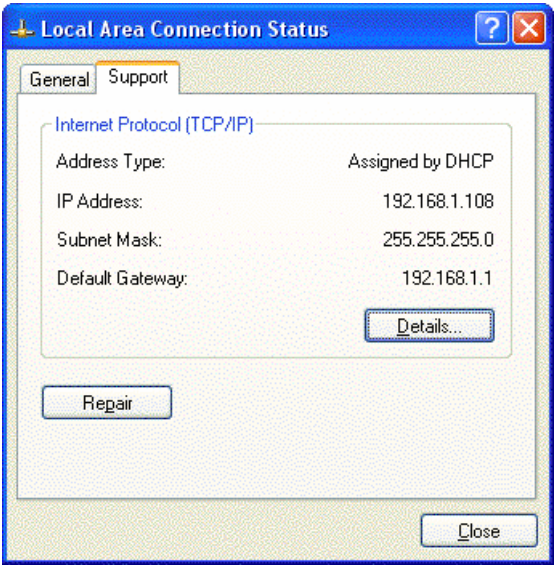


Figure A-1. Local Area Connection Status dialog box and Support tab.

The IP address is the means of identification of a PC on a TCP/IP network. In the example above, the IP address is 192.168.1.108.

Earlier Windows Systems

To find the IP network address, go to Start > Programs > Accessories > Command Prompt. Type in: IPConfig and press [Enter].

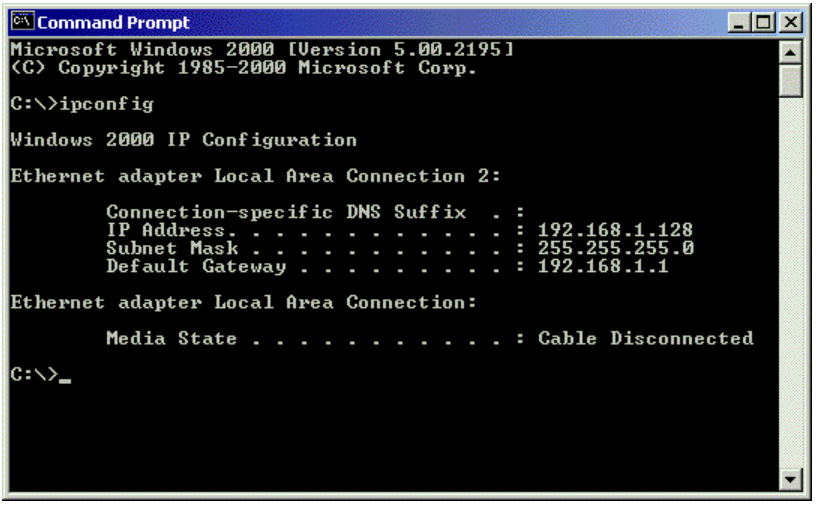


Figure A-2. Use the Command Prompt to find your PC's IP address.

Locate and record the IP addresses of all PCs and Servers on your network that will work with PAM. This document will help you recall individual PCs when it is time to specify their connections.

DHCP Issues

Referring to Figure A-1 above, note that it says Address Type: *Assigned by DHCP*. This means that a DHCP server gave this IP address to this PC when the PC connected to the network. DHCP stands for Dynamic Host Configuration Protocol and refers to software that allows a file server to assign IP addresses to computers on the network.

DHCP is very helpful in reducing the number of IP address a company or organization requires. The DHCP server assigns an IP address to a computer as it logs onto the network. The IP address will remain the same until the computer logs off or disconnects for any reason, such as a power failure. When the computer logs on again, it will receive a different IP address.

Because IP addresses are subject to change when a DHCP server is involved, make it a point to maintain the RAID PC network connections at all times. When a disconnection happens for any reason, you must find the new IP address and enter it into the Message Server. Instructions for doing this appear under Message Server Address Change in Chapter 5.

Operating System Support

Promise Technology recommends Windows NT 4.0, 2000 and XP Professional to take full advantage of all the features of PAM.

The table below shows which versions of Windows work with specific Promise products and PAM components.

Windows versions	Monitoring Utility	Message Server / Message Agent		
	All	FastTrak	SuperTrak	UltraTrak
98	•	•		•
ME	•	•		•
NT 4.0	•	•	•	•
2000	•	•	•	•
XP	•	•	•	•

Table A-2. Operating system support.